

PROPERTY TAX PERFORMANCE AND POTENTIAL IN BRAZIL

by

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DECLARATION

I, Pedro Humberto Bruno de Carvalho Junior, declare the following:

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- The language in this thesis was edited by Nikki Groenewald.

Pedro Humberto Bruno de Carvalho Jr

Signature

April, 24 2017

Date

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ABSTRACT

PROPERTY TAX PERFORMANCE AND POTENTIAL IN BRAZIL

by

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Despite the growing demand for infrastructure and social services resulting from urbanization and decentralization, many urban local governments in developing countries are failing to generate sufficient own revenues to meet this demand. Property taxes are often identified as a major source of local revenues, as they are economically non-distortive and have large, immovable, progressive and growing tax bases. Therefore, this study aims to estimate the current property tax performance and potential in Brazil and to propose feasible reforms taking into account the great heterogeneity amongst the 5,570 Brazilian municipalities.

The study firstly focuses on the examination of property tax administration in 47 selected Brazilian municipalities that voluntarily provided information by replying to remitted questionnaires. These municipalities were divided into three strata of *per capita* income and location in metro areas, which was established as an indicator of their tax potential. Their results were used to assess and estimate the main elements of property tax performance and potential in respect of these municipalities, in order to extend the estimation to the rest of the country by using linear regression models. Consequently, the feasible property tax potential was established as being the percentiles 80 or 90 in each stratum.

In presenting a general model of ratios that has been traditionally employed by literature, this study had to quantify: a) the size of property market values or the potential tax base; b) the property registration or the cadastral coverage; c) the property valuations or the assessment ratio; d) the extension of the exemptions or the taxable values; e) the taxation

level or the tax rates values and structures; and f) the collection rates or the policies of billing, compliance and enforcement.

The current property tax performance in Brazil has been approximately 0.5 percent of GDP and can be considered far below the 0.9-1.2 percent ratios as is found in Colombia, South Africa and Uruguay, which can be a feasible benchmark for developing countries. It was estimated that the current ratio in Brazil is a result of property market values of 2.6 percent of the country's GDP, cadastral values coverage of 82 percent, level of taxation on market values of 0.15 percent and a collection rate of 44 percent. However, taking into account the percentile 90 of the three strata of municipal income, it was assumed that the national ratios could feasibly achieve 95 percent of coverage, 0.41 percent of taxation on market values, and 69 percent of the collection rate. This would provide a revenue level of 1.13 percent of GDP.

The local property tax performance in Brazil has been diverse due to the local particulars, the economic disparities and significant local autonomy related to property tax policies and administration. This study found that large municipalities need to update their cadasters, promote revaluations and, in some cases, also minimize exemptions and increase tax rates. Smaller municipalities, however, have to focus on managing their cadasters by updating property use and taxpayers' details, and performing collection-led strategies by reducing compliance costs and promoting better enforcement. Furthermore, any non-revenue purposes (e.g., more efficient land use) would also benefit if property tax administration were to be improved.

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LIST OF ACRONYMS

| | |
|----------------|---|
| CAMA | Computer Assisted Mass Appraisal |
| CAR | Brazil's Rural and Environmental Cadaster |
| Cosip | Brazil's Municipal Street Lighting Fee |
| CM | Brazil's Contribution for Improvements |
| CPMF | Brazil's Provisional Contribution on Financial Transactions |
| CTN | Brazil's National Tax Code |
| CUB | Sinduscon's Basic Cost of New Constructions |
| FIG | International Federation of Surveyors |
| Fipe | Brazil's Foundation Institute of Economic Research |
| FNAS | Brazil's Fund of Social Assistance |
| FUNDEB | Brazil's Fund of Maintenance and Development of Basic Education |
| GDP | Gross Domestic Product |
| GIS | Geographic Information System |
| IAAO | International Association of Assessing Officers |
| IBGE | Brazilian Institute of Geography and Statistics |
| ICMS | Brazil's State Value-Added Tax |
| IGF | Brazil's Federal Wealth Tax |
| IMF | International Monetary Fund |
| IPEA | Brazil's Institute of Economic Research Applied |
| IPTU | Brazil's Municipal Urban Property Tax |
| IPTU-PT | Instrument of IPTU increases to encourage land development |
| IPVA | Brazil's State Vehicle Tax |
| IRRV | Institute of Revenues Rating and Valuation |
| ISS | Brazil's Municipal Tax on Services |
| ITBI | Brazil's Property Transfer Tax |
| ITCM | Brazil's State Inheritance and Gift Tax |
| ITR | Brazil's Federal Rural Property Tax |
| LPT | Land Value Property Tax |
| Munic | IBGE's Survey of Brazilian Municipal Governments |
| OECD | Organization for Economic Co-operation and Development |
| OODC | Brazil's Governmental Sales of Building Increases and Change of Use |
| POF | IBGE's Survey of Brazilian Household Budget |
| TADAMUN | The Cairo Urban Solidarity Initiative |

| | |
|------------------------|--|
| Serasa Experian | Brazil's Centralized Banking Services Register |
| Sinduscon | Brazil's State Unions of Civil Construction Industry |
| SPC | Brazil's Credit Protection Service Register |
| STF | Brazil's Federal Constitutional Court |
| STJ | Brazil's Superior Court of Justice |
| STN | Brazil's National Treasury |
| SUS | Brazil's Unified Health System |
| UNECE | The United Nations Economic Commission for Europe |
| UN-Habitat | United Nations Human Settlements Program |
| VAT | Value-Added Tax |

CHAPTER 1:

INTRODUCTION TO THE STUDY

1.1 Background to the Study

Cities have increasingly become the providers of economic dynamism in all countries. They create agglomeration and network economies for individuals and companies, which generate externalities that facilitate transactions, production and distribution activities. However, the degree of success in this task depends on their ability to ensure sustained provision of a wide range of urban public services that promote the environment for business activities and workers' productivity and quality of life (Rao and Bird, 2011). Indeed, McCluskey (2000) noted a worldwide increase in demand for public services provided by local governments, which requires a political and governance framework, and certainly a local taxation system.

The rapid increase of urbanization in many metropolitan areas in developing countries has often occurred in a disorganized manner, due to the lack of local regulations and skilled local officials, and even a liberal and misleading way of thinking with regard to non-interference in the real estate markets (UN-Habitat, 2016). This has led to bad externalities and overloading of the (low) budget cities' capacity to perform their functions. These functions include providing elementary schools, basic health clinics, local environment protection, water supply, sewerage systems, garbage collection and disposal, public cleaning services, traffic systems, public transportation and stray animal care, amongst many other functions typically assigned to local governments.

International evidence reveals that cities in developing countries without an adequate source of revenue to provide their functions have become places of urban chaos, criminality, traffic, pollution and endemic disease. The magnitude of these problems is great and these countries are often not organized and trained to deal with these new challenges. For that and other reasons, property tax has been considered as a suitable, stable and reliable source of revenue to fund local governments. In addition, the immovable tax base of these property taxes decreases the tax competition amongst a great number of neighboring local governments. They can also be linked to the urban services which benefit the taxable properties which increase their values in a positive cycle of property appreciation and revenue generation (Bird and Slack, 2007; Dillinger, 1991; McGuire, 2001).

The importance of property taxation involves urban growth and the increasing demand for local public infrastructure in a worldwide scenario of growing decentralization, central government's budget constraints in transferring revenues to sub-national governments, and therefore the urgent need to introduce or enhance local sources of revenues. The annual property tax is naturally the main candidate to assume this challenge, as it has the potential to provide significant and stable revenue outcomes if well administered. According to Norregaard (2013, p.23):

[...] a particularly urgent issue in many developing countries is the need to better capture the strongly growing base of urban property to finance infrastructure. According to UN projections, Africa's urban population will more than double between 2000 and 2030, creating an urgent need for local tax structures that can grow in tandem with the need for urban infrastructure. Property taxes are considered a natural candidate since they are progressive, administratively feasible, and scale-up automatically with urban expansion.

The author states that the world's urban population will double from 3 billion in 2000 to 9.7 billion in 2050, with almost all increases occurring in developing countries (AfDB/OECD, 2010; United Nations, 2015). Therefore cities need to plan for future expansion and identify sources of revenues to fund this demand for basic urban infrastructure.

The property taxation debate is also becoming increasingly important, given the new responsibilities that have recently been devolved from central governments to local governments in many developing countries (Bahl, 1998). Oates (2001) highlights that decentralization promotes more efficient fiscal decisions due to a better knowledge of the local demand. However, Bahl and Martinez-Vazquez (2008) also note that the governments' will to enhance immovable, non-distortive and stable taxes has also encouraged decentralization, considering that property taxation is traditionally a competence of local governments. In addition, besides decentralization, Norregaard (2013), McCluskey and Franzsen (2016) and De Cesare (2017a) observe that many developing countries - including Chile (Acuña, 2017), Colombia (Montaña, 2017), Costa Rica (Roman, 2017); Egypt (Amin, 2010; TADAMUN, 2015), India (Bahl *et al*, 2009; Prakash, 2013; Rao, 2013), Indonesia (Kelly, 2013; Adijanto, 2013), Peru (Ayala, 2017); Philippines (Aguilar, 2014) - are performing property tax reforms with distributive, administrative and fiscal purposes. Therefore, it can be concluded that property tax reforms are being undertaken worldwide for multiple reasons, including: a) growing decentralization; b) the demand for stable and non-distortive sources of revenues; c) land privatization and the growth and development of real estate markets; and d) the need to improve tax administration and equity.

In relation to the local taxes of developed countries, Bahl (1998) notes that they generally allow the levy of local sales and income taxes, generating a more variable source of local revenues. McCluskey and Franzsen (2016) also maintain that property taxes have recently increased in OECD countries due to the recurrent fiscal crises, as well as the development of real estate markets in transitional countries.

Nevertheless, property taxes in developing countries have remained one of the few local taxes due to their often highly centralized tax systems. Although central governments of developing countries generally provide an equalization system of governmental transfers, the amounts involved have been far from able to fully fund the local demand for revenues. In addition, these schemes generally fall under central government rules, policies and discretions that constrain resource stability and better allocation.

IMF (2015) and OECD (2015) data suggests that property taxes have great potential for mobilizing local revenues, especially in developing countries, where they have commonly

produced between 0.3 percent and 0.6 percent of GDP, while between 2 percent and 3 percent has been achieved in some developed countries (e.g. Australia, Canada, France, Japan, New Zealand, the United Kingdom, and the United States). However, more recently, a few developing countries have had relevant revenue performance per GDP, such as South Africa (1.2-1.3 percent), Colombia (0.9 percent) and Uruguay (0.7 percent) (IMF, 2015; De Cesare 2017a). This international benchmarking provides evidence of the high potential to tap property taxation where it does not operate well, along with improvements in equity and efficiency. However, reaching this potential is very challenging for developing countries that must also undertake meaningful policy and administrative reforms that include improving tax base and cadastral coverage, updating valuations, minimizing exemptions, setting tax rates and applying collection strategies. Apart from the political and administrative challenges, corruption is more likely to occur in cities of developing countries that still have not developed independent mechanisms and entities that control their administrative practices and their governmental budget and expenditure, such as local controller agencies and courts of auditors.

In Brazil, the decentralization process is a more mature process that started with the enactment of the Brazilian Constitution, 1988, that reintroduced a democratic system after 24 years of military dictatorship. The Brazilian Constitution, 1988, granted federative autonomy to all 26 states, 1 federal district and more than 4,000 municipal governments in 1988 (5,570 municipalities in 2016). Therefore, municipalities became autonomous in establishing and/or implementing policies at local level, according to the Constitution and federal legislations¹. To fund these new municipal responsibilities, the amount of federal and state governmental transfers to municipal governments was increased. Subsequently, additional national funds linked to the decentralized services of health, social assistance and education were created (Dillinger, 2001; Santos, 2012).

1.2 Research Problem

The overall research problem is the verified low level of property tax performance in Brazil. The problem background and its main challenges are debated below.

Brazil's federal system has some peculiarities that can be considered an amalgam of features related to typical systems of developing and developed countries. For example, besides property tax, municipalities are entitled to levy sales tax on services (the most important municipal tax), property transfer tax and some public service fees, which diversify their source of local revenues². In addition, Brazil has high levels of decentralization compared with many other developing countries. Notwithstanding, most of the Brazilian municipalities still have weak own-taxation (approximately 10 percent of total municipal revenues). This is due to their high reliance on governmental transfers, low levels of fiscal culture and political

¹ For example, the typical municipal responsibilities in Brazil are: elementary education, basic health attendance, public cleaning and street maintenance, public transportation and transit, land and construction regulations, local environmental, municipal budget and tax policies, among others assignments.

² However, Brazilian municipalities are not allowed to introduce any other new taxes, besides those strictly specified in the Constitution.

will, and lack of administrative infrastructure and economies of scale in tax administration (50 percent of municipalities have less than 10,000 inhabitants) (Dillinger, 2001; Santos, 2012). Most of the local property tax systems therefore require urgent reforms.

The level of property tax revenues has been very low in most of the 5,570 Brazilian municipalities since the median (common) ratio of the municipal total revenues and municipal own-tax revenues has been approximately 1 percent and 10 percent respectively in recent years. Even considering the 16 largest Brazilian municipalities (population greater than 1,000,000), these approximate ratios have been respectively 7 percent and 22 percent, which indicates that there is much room to improve property taxation. In addition, 116 municipalities provided 60 percent of the national GDP; however only 22 municipalities provided 60 percent of property tax revenues in 2012 (IBGE, 2015; STN, 2015). Therefore, there is a great revenue concentration in Brazil and even a small sample of municipalities is likely to provide relevant insights, conclusions and recommendations about the property tax performance in Brazil.

Numerous authors (Afonso, Araujo and Nobrega, 2010, 2013; Afonso, Castro and Santos, 2016; Carvalho Jr., 2006, 2012; De Cesare, 2010, 2012, 2017a, 2017b; De Cesare *et al*, 2014; Sepulveda and Martinez-Vazquez, 2011; Orair and Albuquerque, 2016; Santos, 2014; Villela, 2001) have argued that property taxation operates far below its potential in Brazil. These analyses were basically developed using municipal revenue data from National Treasury (*Secretaria do Tesouro Nacional* - STN).

Various reasons have been provided to justify the low property tax performance in Brazil. For instance, Afonso *et al* (2010), Santos (2014), Silva (1994) and Villela (2001) blame the governmental transfer system that discourages local taxation; Afonso *et al* (2010), Carvalho Jr. (2006, 2012), De Cesare (2004, 2010, 2012), De Cesare *et al* (2003) and Domingos (2011) blame the valuations levels and the legal requirements to undertake new assessments; Afonso *et al* (2010), Carvalho Jr. (2006, 2010), Carvalho Jr. and Lima Neto (2010), and Villela (2001) blame the political costs and fiscal culture to enhance property taxation; and Carvalho Jr. (2013, 2014), De Cesare (2017b), Dillinger (1989), and Sepulveda and Martinez-Vazquez (2011) blame the lack of administrative infrastructure and human resources to undertake the property tax reforms. Indeed, all these reasons are probably realistic and contribute to the current scenario in Brazil, but the weight of each element in different classes of municipalities is not known. In addition, due to the municipalities' disparities and the great level of tax autonomy, they are likely to have different challenges that should be addressed more effectively.

Furthermore, most of the Brazilian academic debate has viewed property taxation as a distributive instrument that would help to reduce the income and spatial inequality, or alternately as a land-based instrument that would induce efficient land use and contribute to urban and housing policies (Carvalho Jr., 2006, 2009; Carvalho Jr. and Lima Neto, 2010; De Cesare, 2010, 2012; Furtado and Acosta, 2013; Möller, 2007; Sandroni, 2011; Santos, 2014; Serra *et al*, 2005; Smolka, 2011, 2013; Smolka and Cenecorta, 1999; Smolka and De Cesare, 2013).

In Brazil, when the debate of the administration of property tax arises, it is mainly focused on the outdated cadasters and valuation systems (Afonso *et al*, 2010; De Cesare, 2010, 2012; Dillinger, 1989; Domingos, 2011). Indeed, outdated valuations are likely to be an important administrative concern in almost all municipalities; however, the studies have only focused on the cases of large municipalities that generally have more efficient collection systems and large nonresidential tax bases. Nevertheless, the cases of low collection rates verified in smaller municipalities or on certain types of properties, the cases of comprehensive discretionary exemptions, and even some cases of statutory tax rates that are too low are other important issues that have not been intensively discussed.

The debate has also focused on the long valuation cycles that lead to great adversities in terms of tax fairness, especially in locations with growing urbanization and land appreciation. Nevertheless, as an international comparison, in 2015, England and Scotland still had their residential banded values (Council Tax) adjusted as of 1991 (McCluskey and Franzsen, 2013a; OECD, 2015; Slack and Bird, 2014). However, the United Kingdom has one of the world's highest ratios of property tax revenues per GDP. This may mean that the valuation system is not the only decisive determinant of property tax revenue performance - perhaps other elements may compensate for a valuation shortcoming.

Nevertheless, some recent studies performed models to evaluate property tax performance and potential in Brazil, including Afonso *et al* (2016), De Cesare (2017b), De Cesare *et al* (2014), Orair and Albuquerque (2016), and Sepulveda and Martinez-Vazquez (2011). This indicates a recent trend in identifying and understanding all parameters that impact the current performance in order to mobilize revenues in an efficient way.

Despite most of these studies having described and debated the Brazilian legislation, valuation practices, revenue indicators and formulated models of performance, they did not quantify the impact of the six main determinants of property tax performance that have been pointed out by the recent international literature (Bahl and Martinez-Vazquez, 2007; Bahl and Wallace, 2008; Kelly, 2003; Lewis, 2003; Norregaard, 2013). These six main determinants that must be jointly analyzed through a model of ratios are: a) the tax base size; b) the cadastral coverage; c) the assessment ratio; d) the exemptions level; e) the taxation level; and f) the collection rate. This approach emphasizes the role of property tax administration, especially the collection policies in developing countries (Kelly, 2013). In Brazil, this new approach was just performed in both case studies of Rio de Janeiro and São Paulo (Carvalho Jr., 2013, 2014) and in a sample of 28 municipalities (De Cesare *et al*, 2014). Therefore, there is currently no deep understanding of the impact of the property tax determinants on this under-performance.

1.3 Importance of the Study

The importance and benefits of this study are due to the growing need for strengthening local revenues in Brazil and identifying feasible solutions to reach this objective. This situation occurred due to two factors, which exacerbated each other. The first of these occurred between 2008 and 2012, when economic growth and poverty reduction appreciated the land prices and intensified the growth of informal settlements, yet the supply of legal

housing for low income communities did not increase³ accordingly. Furthermore, the growing demand for local infrastructure and public services did not follow the increase in the locally generated revenues, while cadasters and valuations were becoming increasingly outdated. This issue was initially overlooked by many municipal governments probably due to the increase in governmental transfers that resulted in long valuation cycles, exemptions expanding and enforcement disregard. Additional issues that have been gaining more attention include the cadasters' lack of coverage and accuracy, the low valuation assessment levels and horizontal inequity were emerging.

The second factor is the economic recession and the oil price decrease which resulted in a fiscal crisis that decreased the amount of governmental transfers to municipalities from 2014⁴. Furthermore, between 2013 and 2014, federal and state governments initially tried to react to this scenario by expanding tax exemptions and reliefs as an economic incentive based on the "Laffer Curve" Theory⁵ that greatly enhanced the fiscal crisis and the reduction of governmental transfers.

Property tax is certainly a suitable candidate to cushion the impact of the fiscal crisis in Brazilian municipalities. In order to ensure that revenues are successfully mobilized, the high number of municipalities demands a greater immovable tax base to avoid tax evasion, the fiscal crisis demands more non-distortive taxes to have less of an affect on economic recovery, the increase in unemployment and income inequality demands more progressive taxation, and the need for tax increases demands more transparency of systems and better tax administration.

1.4 Research Objectives

The overall aim of this study is to estimate the current property tax performance and potential in Brazil and to propose feasible reforms taking into account the great heterogeneity amongst the 5,570 Brazilian municipalities. This aim can be accomplished by achieving the following four complementary objectives:

- a) The first is to investigate the causes of the current low level of property tax revenues in Brazil as well as the great performance disparities amongst Brazilian municipalities;
- b) The second is to quantify the six main property tax performance determinants in Brazil (tax base size, registration coverage, assessment ratio, exemptions level, tax rates and collection rate);

³ According to the 2000 and 2010 Brazilian Demographic Census, the total of Brazil's population increased 15.1 percent while the population living in informal settlements increased by 74.9 percent (from 3.8 percent to 6.0 percent of the national population) (IBGE, 2001a; 2011).

⁴ According to Brazil's National Treasury (STN, 2016), the inflation adjusted amount of federal and state transfers to municipal governments decreased 6.3 percent from 2014 to 2015. A further reduction is expected in 2016.

⁵ The Laffer Curve is a representation of the relationship between taxation level and revenue outcomes. The assumption is that no tax is collected at the extreme tax rates of 0% and 100% while a tax rate value exists that maximizes revenues. The debate of the Laffer Curve generally occurs to support tax cuts with the potential to increase revenues; however little empirical evidence has been found that most taxes are on the wrong side of the curve. More details are available in Laffer (2004).

- c) The third is to develop a property tax model of ratios in Brazil using the six determinants listed above, and to estimate feasible revenue scenarios by improving these six determinants; and
- d) The fourth is to analyze the Brazilian legislation related to property taxation and propose policies and legislation changes that can be feasibly implemented to tap the property tax potential in Brazil;

1.5 Contribution to Existing Knowledge

This research's main contribution is to provide an integrated analysis of the property tax performance determinants in Brazil. Additionally, this study has five supplementary contributions to the existing knowledge:

- a) Improving the property tax model of ratios that is being used worldwide by many authors. This includes adapting the model to be used at city level and developing the model, being needed to estimate the property tax base size (property market values), the cadastral coverage, the assessment ratio and the collection rate with available data in Brazil;
- b) Discussing the most suitable valuations policies, schemes and methods to be applied in Brazil and therefore in other developing countries;
- c) Emphasizing the role of property tax administration in the effectiveness of the land value capture instruments that are being applied in many Latin American countries;
- d) Demonstrating the causes of the great property tax performance variety amongst Brazilian smaller and larger municipalities and lower and higher income municipalities, using quantitative data;
- e) Contributing a new focus on Brazilian literature of property taxation that has overlooked the role of some property tax determinants, including the exemptions level, the taxation level and the collection level;

1.6 Structure of the Thesis

The study will be structured in seven chapters as set out below.

1.6.1 Chapter 1: Introduction to the Study

Chapter 1 presents the background to the study by highlighting the problem statement, the objectives and the importance of the study, as well as the research questions.

1.6.2 Chapter 2: Literature Review

Chapter 2 provides a theoretical framework within which the property tax system in Brazil is analyzed to enhance the understanding of property tax performance and potential. The main debate and theories of all taxes on properties are provided in more detail, and evidence of recurrent property taxation is presented and discussed.

1.6.3 Chapter 3: Property Taxation in Brazil

Chapter 3 commences by describing the tax on properties levied in Brazil, including the main aspects of the legislation and the juridical rules and litigations, while a more detailed approach for the Brazilian annual urban property tax is developed. Subsequently Brazil's federative arrangements and the main sources of municipal revenues are revealed and explained, while relevant property tax revenue indicators are discussed and analyzed.

1.6.4 Chapter 4: Research Methodology

Chapter 4 describes the methodology of this study, highlighting the process of gathering data from the local property tax administrations by using e-mail questionnaires. The design of the questionnaires, their content, the remittance and the analysis of their responses are examined in detail. Finally, the delimitation of a selection of 47 municipalities is debated, while their clustering and organisation into 3 strata is explained.

1.6.5 Chapter 5: Analysis and Results of Questionnaires

Chapter 5 explains the information provided by the questionnaires in the 47 selected municipalities related to their cadasters, valuations, exemption policies, taxation levels and collection administration. The cases are analyzed and their stratification is provided. Some relevant indicators are designed and debated in order to show a detailed framework of the property taxation in the studied selection, and also to provide the required data to develop the property tax performance model of ratios in Chapter 6.

1.6.6 Chapter 6: Estimating Property Tax Performance and Potential in Brazil

Chapter 6 presents the property tax performance model of ratios used in this study, which analyzes the level of property tax performance of the 47 selected municipalities in 2012 and estimates feasible scenarios of revenues potential. Subsequently, making use of some assumptions, the chapter transfers this estimation to all remaining Brazilian municipalities by performing linear regression models.

1.6.7 Chapter 7: Discussion of Findings, Limitations, Policy Options and Conclusion

Chapter 7 presents the final considerations and discusses the main instruments used to achieve the feasible property tax revenue scenario developed by this study. Some policy options and legislation changes are recommended which may tap the current revenue yields, highlighting the cultural, political, legal, administrative and financial challenges that need to be overcome and taking into account the great disparities of Brazilian municipalities. The chapter ends with a discussion of a range of specific strategies and proposals that have the potential to strengthen property tax revenues in Brazil, as they are currently operating far below their potential.

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

A theory is a series of concepts, which together provide a scientific understanding of how a phenomenon is built up, classified and used (Kayuza, 2006). In this study, these concepts essentially consist of standard principles and empirical evidence of property taxation, where it is intended to display a theoretical framework in order to better analyze the property tax problem in Brazil. It is expected that this theoretical background will enable a better understanding of the reasons for different levels of property tax performance amongst Brazilian municipalities and between Brazil and other countries, as well as to enable better strategies in property tax reforms. The theoretical outlines provided in this chapter will thus better enable the study to meet its objectives.

Property taxation is generally considered to be merely a local annual property tax (recurrent tax on immovable properties); however this study will provide a broader overview, including the different categories of taxes on properties that indeed exist in the world, following the categorization of the IMF (2014) and the OECD (2015). Besides the annual property tax, other taxes on properties include a) tax on transfer of immovable properties; b) tax on ownership, capital gains or transfer of financial assets; c) inheritance and gift taxes; d) betterment levies, development fees, and other land-related taxes; and e) net wealth tax (IMF, 2014; OECD, 2015). The reason for this broader approach is to highlight the advantages and disadvantages of each type of tax on properties, to identify the reasons why some countries use one type of tax on properties to a greater extent than others, and to identify the reasons why local annual property tax traditionally constitutes the most important tax on properties in many countries.

Thus, prior to the empirical analysis of property tax in Brazil that will be developed in Chapter 3 of this study; Chapter 2 undertakes a literature review of property taxation as an important point of departure for the topic which is central to this study. The themes discussed in this chapter briefly consist of the following areas of focus: a) taxation principles and tax categorization; b) the different types of tax on properties; c) the instruments of tax policy and administration; and d) tax performance analysis with international comparisons. Including this introduction, Chapter 2 is thus divided into eleven sections, as follows:

Section 2.2 provides a summary of some taxation concepts. It commences by explaining the main principles of a tax system, which are efficiency, simplicity, political responsibility and fairness. The section concludes by clarifying the different classes of taxes i.e. tax on income, tax on consumption and tax on properties. As tax on properties is the topic of this study, it is examined in greater detail.

Section 2.3 examines and defines the different types of taxes on properties that are divided into transaction tax on properties (e.g., property transfer taxes, inheritance taxes, financial transactions taxes, development fees, and betterment levies) and recurrent taxes on properties (e.g., taxes on wealth, taxes on movable properties and taxes on immovable properties).

Section 2.4 explains and debates the property tax base and its different approaches, including capital value, rental value, land and site value, and banded systems. In addition, the worldwide use of these different approaches is displayed.

Section 2.5 discusses the main issues and challenges related to the taxpayers' assignment in property taxation.

Section 2.6 examines the typical assignment of property taxes to local governments and debates the main advantages and drawbacks of such policy.

Section 2.7 debates the role of the fiscal cadasters, explains the importance of the re-registration processes to update cadastral data, and discusses the improvement of registration coverage.

Section 2.8 examines the role of the valuations in a property tax system. The analysis is divided into two parts. The first part considers the three main methods of valuations (sales comparison, cost approach and income approach). The second part considers the aspects related to the valuations administration (responsibility of valuation, self-assessment, appeals and revaluations).

Section 2.9 investigates the role of the property tax exemptions and relief, the common interferences of higher tiers of governments on local property taxation, and the use of property tax incentives for business and investment location.

Section 2.10 considers the role of the tax rates, including their design and mechanisms, such as when tax rates are crystallized in legislation or buoyant based on budgetary needs and when they are proportionate, progressive or selective (differentiated for residences and businesses or for land and buildings).

Section 2.11 discusses the role of the collection polices and strategies in a property tax system and considers the process of billing and collection, the policies that encourage voluntary compliance and the enforcement policies.

Section 2.12 explores the recent compendiums about recurrent property taxation worldwide and displays some recent international property tax indicators.

Finally, Section 2.13 provides the main considerations gathered by this literature overview, highlighting what will be its importance to the subsequent analysis of the property taxation in Brazil and the estimation of its current performance and potential to be carried out in the following chapters.

2.2 The Characteristics of a Tax System

Taxation consists of transferring money from individuals to governments that must impose taxes as a means to fund the governmental functions (Musgrave, 1959). Taxes can be imposed in different ways and by different levels of government to achieve their objectives. According to Lymer and Oats (2015), an optimal tax system must follow the equity efficiency principles. In other words, the system should treat individuals fairly and, at the same time, should minimize interference in the economy and should minimize the administrative costs on taxpayers and administrators. Therefore an optimum mix of these three elements is essential to constitute a well-designed and well-operated tax system.

Subsequent to the debate of the principles of taxation, this section will provide an overview of the four main categories of taxes described by the OECD (2008a, 2015): tax on income, social contributions, tax on goods and services and tax on property. Within this framework, this study will then be able to address its central topic which is the taxation of property.

2.2.1 Principles of Taxation

According to Stiglitz (2000), there are four main purposes of taxation: a) generating revenue for public expenditure; b) general redistribution of income and wealth; c) correcting the market's inefficiencies in the allocation of resources; and d) controlling of money, credit and liquidity in order to stabilize the economy. The revenue generation for local public expenditure by property taxation is the main objective of this study. Thus, considering a tax system designed to fund governments, Stiglitz (2000) highlights that a desirable tax system should have these four attributes: a) economic efficiency; b) administrative simplicity; c) political responsibility; and d) equity.

A tax system can be considered as efficient if it causes little interference in an economy, since in a competitive economy without distortive taxes the resource allocation is pareto-efficient. The pareto-efficient allocation occurs when there are no rearrangements of resources that make one person better off without making someone else worse off (Stiglitz, 2000). Thus, with the exception of land value taxation or lump-sum taxes, most forms of taxation affect the taxpayer's economic behavior in many ways. Economists generally agree that often a tax system or a type of tax is distortive, as the generated economic inefficiencies cause the resources to not be used in a pareto-optimal way. In other words, the economic loss will be greater than the revenue raised by the tax (Lymer and Oats, 2015). However, an in-depth discussion of how each type of tax alters the taxpayers' behavior and the economy's function is not within the scope of this study, due to its great complexity and range.

The principle of simplicity means that the tax system must be understood by the taxpayers and its administrative, compliance and enforcement costs must be kept as low as possible, to generate the amount of revenue demanded (Stiglitz, 2000). Administrative, compliance and enforcement costs tend to be higher the more complex the tax system, and therefore the complexity of a tax system should be minimized. The main administrative costs are those related to identifying the tax base and taxpayers, the management of tax records, attributing

value to the tax base or managing and inspecting the taxpayers' self-declarations and proper calculations, and billing the tax liability. The compliance costs are those related to the time spent on completing tax forms, costs of record keeping and payment to accountants and lawyers, amongst other tasks. Finally, the enforcement costs are those related to identifying, charging and prosecuting delinquent taxpayers as well as seizing properties to raise resources to recover the arrears (Lymer and Oats, 2015; Stiglitz, 2000).

The political responsibility principle means that while citizens have the obligation to pay taxes, the governments should work in a transparent manner in order to clarify which expenses are being funded by the taxes paid. The taxpayers should know the relationship between their contributions and the supply of public goods. A great challenge in any tax system consists of knowing exactly which type of public goods and in which amount they are demanded by the taxpayers (Stiglitz, 2000).

Prior to the discussion of tax equity principles, it is important to discuss the tax incidence. According to Stiglitz (2000), the tax incidence is closely linked to equity in taxation, since this issue must be considered as the basis of who effectively bears the tax burden. Thus, the incidence of taxation describes who finally bears the tax burden, since taxpayers can partially or totally shift the tax imposed to other individuals. Lymer and Oats (2015) state that there are two types of incidence: the formal incidence and the incidence in who effectively has their wealth reduced by the taxation. The formal incidence is easily identifiable, while the effective incidence is generally a great challenge. The effective incidence results from the taxpayer (totally or partially) shifting the tax burden to another person, who becomes the ultimate bearer of the true economic weight of a tax. For example, indirect taxes may be shifted backwards to workers, resulting in falling wages, or may be shifted forward to consumers, causing an increase in prices (Lymer and Oats, 2015).

The common approach to describe the equity of a tax system consists of differences in the vertical equity and the horizontal equity. The principle of vertical equity states that the tax burden should be assigned according to a taxpayer's level of economic well-being and ability to pay (Berliant and Strauss, 1985; Jacobs, 2013). Stiglitz (2000) states that the income is the most widely used basis for taxation, as it provides a good measure of ability to pay. However, the main challenge is to quantify the most suitable amount of taxes levied on different levels of incomes. A traditional view is that richer taxpayers must pay a higher fraction of their incomes in taxes, leading to a progressive tax system (Jacobs, 2013; Stiglitz, 2000). However progressive rates on labor income can distort the labor market. As an alternative, the level of consumption could be the tax base; but this also gives rise to other problems such as the savings and the tax shifting. Many defend properties as a good proxy for the tax capacity without the effects on the labor market generated by income tax; however, similarly indirect taxes, property tax's incidence may be shifted to consumers (unless in a pure land tax, as will be discussed in the next sections). Conclusively, all the bases of taxation that attempt to achieve the principle of vertical equity are not free of negative externalities; however, they are still widely used with the intention to improve fairness and income distribution.

The principle of horizontal equity, which consists of equal treatment of taxpayers who are equal in relevant aspects (Elkins, 2006; Jacobs, 2013; Stiglitz, 2000). Horizontal equity differs from vertical equity, since the first concern is equally taxing individuals under the same conditions, while vertical equity is concerned with highly taxing individuals with the higher ability to pay. However, Auerbach and Hassett (1999) and Stiglitz (2000) contend that the main problem with the horizontal equity principle is to classify groups of taxpayers as identical or different. Although several approaches can be established to classify individuals in terms of their well-being and ability to pay, income is commonly the chosen indicator which presumes that individuals who earn the same income should pay the same tax. However, the author notes that two different taxpayers with the same level of income may have different levels of well-being, since one taxpayer may need more income to fund their basic needs, for example their health. This is one of the many challenges in defining equal treatment to achieve a horizontal equity system, since in reality two individuals are rarely fully identical.

2.2.2 Types of Taxes

Prior to further discussion of property taxation, it is important to mention the different types of categories in which taxes are usually classified. The OECD (2008a; 2015) categorizes taxes as being: a) taxes on income, profits and capital gains; b) social security contributions; c) taxes on payroll; d) taxes on goods and services; e) taxes on property; and f) other taxes. Moreover, the IMF (2014) also provides a similar categorization, classifying taxes as being: a) taxes on income, profits and capital gains; b) taxes on payroll and workforce; c) taxes on goods and services; d) taxes on international trade and transactions; and e) other taxes. The analysis of both classifications adopted by the OECD and the IMF are very broad and this section will merely provide a summary of the points in common to both sources, focusing on the three main tax bases: income, production/consumption and property.

2.2.2.1 Income Taxes

According to the IMF (2014, p.91), taxes on income, profits, and capital gains or, as generally referred to, income taxes “consist of taxes assessed on the actual or presumed incomes of institutional units. They include taxes assessed on holdings of property, land, or real estate when these holdings are used as a basis for estimating the income of their owners”. Income taxes can be divided into: a) taxes on individual or household income; b) taxes on the income of corporations; c) taxes on capital gains; and d) taxes on gambling. However, the OECD (2015) notes that many countries consider taxes on capital gains and taxes on gambling as individual income taxes.

Income related taxes have been intensively used as a source of revenue for many countries that have the main advantages of a broad tax base and a great level of equity. However, the OECD (2008a) lists the four main disadvantages of income-related taxes as follows:

Firstly, taxes on income can potentially have adverse effects on the labor market, since they influence the cost of labor when, for any reason, the tax burden cannot be shifted on to lower salaries. Secondly, corporate income taxes can affect the rate of capital accumulation and

therefore the *per capita* income, since investment decisions are related to their costs and expected return. Thus, corporate taxes can have a negative effect on corporate investment by reducing their after-tax return. In addition, corporate income taxes can affect factor prices resulting in a re-allocation of resources towards less productive sectors, or can drive investments to countries with more favorable taxation. Thirdly, progressive income taxes are generally viewed as an important instrument in achieving a more equal distribution of income and consumption. However, it is also widely agreed that their progressivity may distort individual decisions to supply labor and to invest in education. In addition, most countries have applied lower effective tax rates on capital income rather than labor income, which tends to increase regressivity. Finally, taxes on personal capital income may affect private savings by reducing their after-tax return. Nevertheless, many countries have applied tax incentives to certain types of savings.

2.2.2.2 Taxes on Goods and Services

The IMF (2014, p.94) defines taxes on goods and services as being “taxes that become payable as a result of the production, sale, transfer, leasing or delivery of goods and rendering of services, or as a result of their use for own consumption, or own capital formation”. The OECD (2015) divides taxes on goods and services into seven categories, while the IMF (2014) uses six categories⁶. Using the OECD categorization, this study will include the taxes on international trade as a subdivision of taxes on goods and services, in order to simplify the analysis. Thus, these seven categories are:

- a) General taxes on goods and services. They include value-added taxes, sales taxes (levied on a single stage of sale), multistage cumulative taxes, and tax on financial and capital transactions (levied on the change in ownership that is not related to properties, gifts, inheritance, or estate transactions);
- b) Excise taxes. They are taxes levied on specific products that are usually charged per unit. These products are generally nonessential or luxury goods, alcoholic beverages, tobacco, fuel, hydrocarbon oils and energy;
- c) Taxes on profits and fiscal monopolies. They are generally taxes on the profits of own-state companies, public corporations or concessionary companies that have been granted a legal monopoly over the production or distribution of a particular kind of good or service with the primary purpose of raising revenue for government (e.g., tobacco, alcoholic beverages, and petroleum). Therefore, they do not include the public utility companies, such as transportation, electricity, post offices, and other telecommunications;
- d) Taxes on specific services. They are levied on specific services, such as transportation, insurance, banking, entertainment, restaurants and advertising, amongst others. They do not include the taxes on services forming part of the general tax on goods and services, and the taxes on the use of utilities that are under excise taxes;

⁶ This is because the IMF places the taxes on international trade and transactions in an extra category, since the latter yields relevant revenue in many non-OECD countries, while being insignificant amongst OECD countries.

- e) Taxes on the use of goods, or on permission to use goods or perform activities. They are generally fees levied for the issuance of a license or permit that are not related to the regulation, control or inspection functions. Examples are vehicle taxes, business and professional licenses, pollution taxes, television licenses, licenses and permits for households, amongst others;
- f) Taxes on international trade and transactions. They are taxes that become payable when goods cross the customs frontiers or when transactions occur in services exchange between residents and nonresidents. These taxes include customs and other import duties, taxes on exports, profits of export or import monopolies and exchange profits and exchange taxes;
- g) Other tax on goods and services. They include taxes on the extraction of minerals, fossil fuels and other exhaustible resources that are not included in the previous categories. They are generally levied on a fixed amount per unit of quantity, but they can also be *ad valorem*.

As the main advantage of the tax on goods and services, the OECD (2008a) highlights that consumption taxes do not influence the rate of return on savings and individual's savings choices, since they apply the same tax rate to the current and future consumption. On the other hand, as two main disadvantages, the study asserts that the tax may affect employment level and hours of work in the same way as income taxation, since they can lower the purchasing power of salaries if they are increased. Tax on goods and services also fails to reduce income inequality and most evidence has revealed that it is indeed regressive. Nevertheless, the study explains that if well designed, differentiated consumption taxes can encourage work and provide environmental benefits (e.g. excise duties on petrol and diesel).

2.2.2.3 Taxes on Properties

The tax on properties is the main topic of this study and this section will briefly address its main aspects, since a further and more detailed analysis will be provided in the next sections of this chapter. Initially, the IMF (2014, p. 93) defines tax on properties as being “the taxes payable on the use, ownership, or transfer of wealth”, which includes the annual property tax; net wealth tax, inheritance and gift tax, land-related taxes and taxes on financial and capital transactions.

The OECD (2008a) states that taxes on properties have five main advantages. Firstly, annual property taxes have a small adverse effect on economic performance, since they have minor impact on the allocation of resources in an economy. They do not affect the decisions of economic agents to supply labor, to invest in education, to produce, invest and innovate to the same extent as income and consumption taxes do. Secondly, annual property taxes have more stable and predictable revenues. Thirdly, real estate and land are highly visible and immobile, making it more difficult to evade tax thereon. Fourthly, taxes on properties have great potential to be progressive, if the tax base is regularly updated. Finally, well-designed property taxes on land and buildings can be used as an instrument to affect land development and land use patterns.

However, the same study states that tax on properties has three main drawbacks. Firstly, there is a general trend in favoring real estate properties, residential properties and owner-occupied housing, rather than other forms of investment, which distorts capital flows. Secondly, by contrast, taxes on financial and capital transactions are highly distortionary. Finally, net wealth taxes can be distortionary if savings or pension fund assets are included in their tax base.

The IMF (2014) and the OECD (2015) highlight that while sharing some attributes, certain taxes should not be classified as tax on properties, which include:

- a) Taxes on capital gains resulting from the sale of a property that should be classified as taxes on income;
- b) Taxes on immovable property that are levied on the basis of a presumed net income, which should be classified as taxes on income;
- c) Taxes on the use of property when the amount taxable is a function of the user's personal circumstances, which should be classified as taxes on income;
- d) Taxes on use of property for special trading purposes, such as selling alcohol or tobacco, which should be classified as taxes on goods and services, in particular as "taxes on the use of goods, or on permission to use goods or perform activities"; and
- e) Property of mines, land, subsoil and water related to the exploitation of natural resources. Taxes on exploitation of natural resources should be classified as "other taxes on goods and services". The governmental revenues of natural resource royalties should be classified as "rent". Finally, revenues for licenses that allow natural resource exploitation should be classified as "taxes on the use of goods, or on permission to use goods or perform activities".

2.3 The Types of Taxes on Properties

Property taxes are generally viewed as a recurrent (annual) tax on property value, but they actually cover a great variety of duties on the use, ownership, accumulated wealth, property value increases and transfer of property. In addition, the latter comprises the selling, donation and inheritance of properties. Both the OECD (2015) and the IMF (2014) divide taxes on properties into five categories, namely: a) recurrent taxes on immovable property; b) recurrent taxes on net wealth; c) taxes on estates, inheritances and gifts; d) financial and capital transaction taxes or sales of immovable property; and e) other taxes on property.

It is important to differentiate between once-off property taxes, fees and charges and annual recurrent property taxes. The tax event of once-off property taxes is generally the ownership transfer, while in the recurrent property taxes it is the property ownership or occupation (UN-Habitat, 2011). Once-off taxes on properties are based on a single tax event, not having any other future tax events. A tax event greatly relies on the economic cycle not being unpredictable and providing a stable flow of revenue over time. For example, each sale of properties is conducted under property transfer taxes and the tax can be productive during real estate booms. However, local governments do not have much control over the future revenues

collected and cannot rely on them to plan investments or guarantee loans. On the other hand, the tax event of the recurrent tax on properties exists during the property's useful life, which can be decades or centuries in the case of real estate. Due to their attributes, properties are the most convenient source of revenue for local governments (UN-Habitat, 2011).

Norregaard (2013) contends that countries have greatly differed with regard to the uses and mechanisms applied to their tax on properties. Most countries have basically exhibited three different types of proposals to reform their property tax systems: a) mobilizing revenues to sub-national governments using recurrent property taxes; b) prioritizing the revenues due to central government, by mainly using capital transfer taxes; and c) prioritizing the social aspect of tax progressivity and fairness by increasing taxes on wealth and inheritances.

Nevertheless, due to a wider tax base than other types of taxes on properties, Norregaard (2013) highlights that recurrent taxes on immovable property have roughly comprised one half of all tax on property yields in a sample of developed, transitional and developing countries between 1965 and 2010. He mentions that, on average, developed countries have three times higher ratios of tax on property revenues to GDP than transitional and developing countries. However, recurrent immovable property tax revenues have reduced their share in relation to total tax revenues; despite still being a great source of local revenues, at least amongst some developed countries where they have reached 40 percent of total local taxes.

2.3.1 Transaction Taxes on Properties

This section briefly explains the transaction (once-off) taxes on properties, which are the type of tax on properties based on a single and final tax event. Transaction taxes on properties basically comprise four groups of taxes: a) property (rights) transfer taxes; b) inheritance and estate taxes; c) taxes on financial transactions; and d) development fees, betterment levies instruments and land value capture instruments.

2.3.1.1 Property Transfer Taxes

Property transfer tax consists of a percentage levied on the full property value, when the property ownership is legally transferred, for instance, due to a sale (IMF, 2014; OECD, 2015). The only exception is when the ownership change is as the result of an inheritance which is classified as a tax event of inheritance and estate taxes. Property transfer taxes can also cover transfers on right of use in countries where the land is viewed as public, such as China (UN-Habitat, 2011).

Property transfer taxes are very common around the world in developed, transitional and developing countries. However, UN-Habitat (2011) argues that tax rates that are too high may lead to the discouragement of business investments, misrepresentation of sales and even no registration of transfers. The administration of once-off real estate transfer tax and recurrent property tax has synergies, since the declared transaction values can be used to estimate property values of properties on the tax roll. In general, property transfer tax is self-assessed by taxpayer declaration of market value. Therefore, some argue that property transfer tax rates cannot be too high as this may encourage informal or hidden transfers or

false transaction values (Bahl and Wallace, 2010; UN-Habitat, 2011). Indeed, Bahl (2004) verifies a low rate of voluntary compliance in declaring true market values under the combined 13 percent rate of all property transfer taxes in Jamaica.

Both the studies of Bahl (2004) and Bahl and Wallace (2010) list seven reasons that many countries include property transfer taxes in their revenue base: a) their potential revenue outcomes with apparently low cost of collection; b) their collection is facilitated since most buyers and sellers desire to legally record the transfer and therefore will voluntarily comply; c) their reduced number of taxpayers compared to general taxes with consequent lower political fallout; d) their possible use to regulate real estate price and land speculation in bubble periods; e) the sense that tax on property sales would mainly occur amongst higher income classes; f) their capacity to reach sectors that are able to avoid income taxes; and g) their long tradition, namely one of the most antique taxes.

Bahl and Wallace (2010), however, outline that this tax also has three main drawbacks. Firstly, it increases the cost of property transactions and may discourage the formal transactions and therefore the development of a real estate market. Tax rates that are too high may keep a property in sub-optimal use in order to avoid a transfer. Secondly, if the self-declared values need to be verified to avoid under-declarations, the administrative costs could be very high. Thirdly, there is a vicious circle between annual property tax and property transfer tax. Developing countries generally do not have an accurate assessment system that can be used to verify self-declared values of property transfer tax. At the same time, property transfer tax that is too high encourages under-declarations that could be used as a database for the annual property tax valuations. The authors conclude that the intensity of the stated problems largely depend on the value of the tax rates, and indeed many countries have reduced tax rates of their property transfer taxes.

As stated, property transfer taxes are mostly the main or the unique tax on properties in many developing countries by central, intermediate or local governments; however they have low revenue potential. Bahl and Wallace (2010) propose that annual property taxes, property transfer taxes and various forms of land value increment taxes and development fees be replaced by a unified property tax administrated by a single tax agency.

2.3.1.2 Estate, Inheritance and Gift Taxes

Estate and inheritance taxes are similar in that the tax event is the wealth transfer due to the death of their former owner. However, their mechanisms of application are quite different. Estate taxes are applied to the taxable value of a deceased person's wealth (estate) that will be transferred to their inheritors. Legislation often exempts or relieves certain types of properties (for instance, the familiar residence), applies a tax threshold to the total estate and sometimes progressive tax rates according to the estate value. Inheritance taxes are applied to the taxable value of the inheritance portions received by each inheritor and may be integrated into the individual income tax. Their mechanisms are very similar to estate tax, with the exception that the tax rates often vary according to the degree of kinship between the deceased and the heir (Gale and Slemrod, 2001; Pestieau, 2002).

Gift taxes generally cover all taxable gratuitous transfers of (tangible or intangible) properties over a tax threshold. They are often integrated with estate and inheritance tax legislation, since estate tax cannot be effectively enforced without a gift tax. In the absence of a gift tax, the estate tax could be easily avoided by lifetime gifts (Gans and Soled, 2007)⁷.

Some argue in favor of inheritance taxes saying that, similar to real estate transfer taxes, inheritances taxes are easier to collect, and sometimes their tax base consists of ‘unrealized’ capital gains that were never taxed (Kopczuk and Slemrod, 2001). Gale and Slemrod (2001) estimate that 56 percent of the estates valued at over 10 million dollars are in the form of unrealized capital gains in the United States. Thus, the estate tax would be a small return of a substantial proportion of the country’s wealth that was never taxed. The sense of equity is greatly taken into account in inheritance and estate taxes, especially in countries with high income inequality where few families own most of the country’s wealth. Despite their common low level revenues, Bird (1991) found that inheritance taxes were twice as effective as income taxes in wealth and income distribution in Japan. In addition, it is alleged that the tax encourages personal spending in education and entrepreneurship, as well as encouraging more donations to social organizations and charity, since this would be preferable to the simple inheritance taxation (Gale and Slemrod, 2001).

However, the tax is also criticized for impacting on the factors that generate economic growth and anticipating capital gains realization. UN-Habitat (2011) notes that estate and inheritance taxes mainly comprise real estate and a few comprise cash and financial assets. Therefore the tax tends to be very burdensome for the heirs, who may have to sell part of their real estate to pay the tax (liquidity problem). In addition, Norregaard (2013) argues that inheritance tax discourages long term investments and savings, since the profits and interest cannot be appropriated by the heirs. The tax encourages capital realization before death and consequent cash mobility across countries.

2.3.1.3 Taxes on Financial Transactions

Taxes on financial transfers are classified by both the IMF (2014) and the OECD (2015) as tax on properties and basically consist, in a very small percentage, of each taxable financial transaction under the banking system having very reduced administrative and compliance costs and being almost not susceptible to tax avoidance and evasion at all. Tobin (1978) was one of the first authors that approached the tax and suggested a specific currency transaction tax for stabilizing currencies on a larger global scale. Thus, it has been debated the introduction of a “Global Tobin Tax” to be levied by United Nations to fund international development (Arestis and Sawyer, 2013; Patterson and Galliano, 1999; Spahn, 1995).

They have been widely used and are particularly useful when an urgent need arises to mobilize revenues during fiscal crises (for example, in Mexico, Brazil, Argentina and Greece) (Baker *et al*, 2009). However, despite often producing a great share of the overall tax burden of a

⁷ The authors also state that despite the estate tax elimination in the United States in 2001, the gift tax still remains since taxpayers could defeat the progressive income tax rate structure by engaging gifts and donations.

country, the tax has been extensively criticized because it is cumulative, going against many of the principles of taxation (neutrality, efficiency and equity) (Griffith-Jones and Persaud, 2012). Indeed, the OECD (2008a) highlights that although all types of taxes on properties discourage the ownership of many assets at certain levels; taxes on financial transactions additionally discourage the transactions that would allocate these assets more efficiently.

2.3.1.4 Development Fees

Development fees, impact fees, planning fees and garbage collection fees, are fees or taxes generally levied by local governments to compensate the urbanization costs and urban services, such as roads, water, sewerage and schools, amongst other investments (UN-Habitat, 2011). The tax base is generally the full cost of the investment or service; however the amount levied to taxpayers may take into account the property value, location or size⁸. The fees have the potential to be a significant source of revenue to fund urban projects in developing countries during economic growth. Nevertheless, they are very cyclical, and are not a stable source of revenue to recurrently fund the maintenance of urban services.

2.3.1.5 Betterment Levies and Value Capture Instruments

Betterment levies (known as a special assessment in the United States) are intended to capture part of the increased value resulting from infrastructure improvements or changes in land use and have a similar goal to development fees, i.e. funding urban development. Smolka (2013, p.23) defines betterment levies as “a charge or fee imposed on owners of selected properties to defray the cost of a public improvement or service from which they specifically benefit”. Betterment levies differ from development fees because their tax base is the increment value, rather than the cost of the investment. They also differ from recurrent property taxes, since there is only a once-off assessment and the tax is levied to increment value (Walters, 2012).

Walters (2012) highlights that betterment levies with a broader tax base would be more effective and would have more potential to mobilize revenues than when they are exclusively related to public projects. This instrument is called a “Value Capture Instrument” and consists of taxing extra events of land appreciation, for instance, due to population growth, change in economic conditions, change in land neighborhood or change in land regulations. Smolka (2013) also states that a common application of betterment levies is the government recovery of land value increases generated by public investments. However, the author highlights that a broader and fairer application is to apply value capture instruments to recover any land value increase that is not caused by landowner actions. However, UN-Habitat (2011) argues that despite being a good instrument to fund the upfront cost of urban investments; betterment levies and value capture instruments are not recommended to fund the maintenance expenses. For instance, new roads demand recurrent expenses on street lighting, new schools demand

⁸ Some development fees may be recurrently charged when their tax events are the regular benefit of a public service. In Brazil, the local garbage collection fees and street lighting fees were introduced to fund the maintenance of these services.

expenses on maintenance and salaries, and so on. Therefore the local governments should not rely exclusively on once-off property taxes.

Betterment levies and land value capture instruments also have similarities to capital gains taxes, with the exception that there is no need of capital realization. However, despite being fairer than development fees and having a similar approach to that of capital gains taxes, their administration is more complex, since the estimation of the previous and posterior property values is required (UN-Habitat, 2011). Compared with recurrent property taxes and capital gains taxes, one advantage is the greater political will in public investments being carried out under a financial constraint scenario, and higher taxpayer acceptance, since they have their investments attended to.

Betterment levies and value capture instruments are suitable in countries where the land is exclusively state-owned, as in the People's Republic of China. During the 1987 China tax reform, the "Land Appreciation Tax" was introduced, which taxes from 30 percent to 60 percent of the transmission (sale) of land use rights or changes in land use (for instance, from rural to urban or from residential to nonresidential) (Asian Development Bank, 2014; UN-Habitat, 2011). According to the Asian Development Bank (2014, p.106), the tax represented 4.8 percent of total local revenues in China in 2013.

Many countries have applied betterment levies and value capture instruments, such as Argentina, Brazil, Colombia, Denmark, India, Mexico, and Poland (Smolka, 2013; UN-Habitat, 2011; Walters, 2012). In Denmark, the Land Development Gains Tax is levied on 50 percent of the increment value when a rural area is changed to an urban one. Poland taxes the increment value up to 30 percent when the land is sold within a five year period (UN-Habitat, 2011). In Argentina and Brazil, the sub-national governments may fund public works by taxing all the estimated increased value strictly caused by those investments (Smolka, 2013). In Colombia, in a similar manner to that of capital gains tax, the "*Contribución de Plus Valías*" is levied at 30 percent or 50 percent on the estimated land appreciation at the time when the property is sold (UN-Habitat, 2011). Its tax base is broader than in the cases of Brazil and Argentina, because the increase is not restricted to a public investment.

Despite development fees, betterment levies and value capture instruments having a long tradition in many countries' tax systems, they have provided a very small percentage of the local governments' revenues, for example in Mexico, Colombia, Argentina and Brazil (Smolka, 2013; UN-Habitat, 2011). Smolka (2013) highlights that betterment levies have had minor shares of local revenues in Latin America since the fee has had five great challenges: a) the definition of the cost of the project or investment to be recovered; b) the estimation of the land value increment; c) the identification of the impacted area and benefited properties; d) the criteria of charge distribution amongst beneficiaries; and e) the mechanism of payment. According to UN-Habitat (2011), Colombia has faced many administrative challenges since the implementation of betterment levies in 1997, having achieved just 0.35 percent of Bogotá's own tax revenues in 2009. The study states that there are few examples where a land value capture instrument was efficiently implemented, such

as in India and China, where the tax is a more revenues-biased instrument to recovering costs of urban investments, rather than a distributive policy.

Thus, this study asserts that there is some empirical evidence that the use of betterment levies and land-based instruments aimed at social, distributive, or urban policies will likely not achieve their target, due to their costly and complex administration. Therefore development fees and betterment levies would be more efficient in mobilizing revenues when they are applied as a mechanism to fund specific projects or expenses in urban infrastructure that are demanded by the benefit taxpayers. Indeed, investments that are mainly demanded by and benefit specific economic actors, rather than the overall community, should be preferentially funded by simple and non-costly mechanisms of development fees and betterment levies that only affect the benefit taxpayers. On the other hand, alternative revenue schemes, such as cross-subsidization of these same mechanisms or annual property strengthening could be more efficient in mobilizing revenues to fund the infrastructure in poor communities.

2.3.2 Recurrent Taxes on Properties

Different from once-off taxes on properties, recurrent taxes on properties tax (annually) a property throughout its useful life, generating a stable and predictable flow of revenue. These involve three main groups: taxes on (net) wealth, specific taxes on movable properties (for example, the automotive tax), and the recurrent taxes on properties (or generally referred to as property taxes), which is the main focus of this study.

2.3.2.1 Taxes on Wealth

Recurrent taxes on wealth, or wealth taxes, are taxes imposed on the taxable value of all types of properties owned by a certain taxpayer, which generally is an individual person but can also include company assets. The taxable properties can be movable and immovable, tangible and intangible and can be restricted to their net value (the gross values excluded from debts and liabilities) or not.

Wealth taxes differ from recurrent taxes on immovable properties in relation to their broader tax base (including movable capital) and different tax event, which is the taxpayer's wealth rather than a single property ownership. Theoretically, the tax would have great potential to launch revenue; however its administrative challenges and the existence of other (progressive) taxes on properties and income have been pointed out as the reasons for wealth tax being so overlooked worldwide.

Wealth taxes have some advantages and they are justified in terms of their fairness, since wealth provides a more superior level of security, independence, influence and social power than income. Glennerster (2012) highlights that wealth is generally more concentrated than income, and therefore net wealth taxes would be more progressive than income taxes, according to the OECD (2008b). The author states that despite the relative success of French annual and progressive 'solidarity tax' since 1981, the tax has been abandoned in the recent

period in some European countries, such as in Austria, Denmark and Germany (1997), Finland (2006) and Sweden (2007). The European Commission (2015) also argues that it has recently recommended to partially switch the taxation from labor income to capital and wealth income, due to the growing income and wealth inequality in Europe. In addition, progressive income taxes on labor that are too high have been proved deleterious, since there is a need to preserve the positive incentive effects on labor supply and human capital investment.

However, during the period that wealth taxes were in force in several European countries, their administration proved very costly and complex. The valuation rules for wealth taxes need the taxpayer's self-registration and valuation, which includes real estate, farms, art, jewelry, shares, financial assets and familiar companies, amongst others. Total net wealth tax payments were usually capped at a percentage of the individual's income, since the European countries that adopted wealth taxes also had high taxation on income. Ristea and Trandafir (2010) studied the history of wealth taxation in Europe and pointed out that the three main problems that caused its suppression were as follows: a) it caused capital transfer to other countries with no wealth taxation; b) the financial assets were appraised at market level, while real estate at cadastral or purchase values altered the investment preferences; and c) the tax had high administrative costs.

Recently the idea of re-introducing wealth taxes to finance the mounting public debt during fiscal crises is gaining ground in several OECD countries, in a scenario where the wealth is becoming more concentrated, having the potential to raise substantial revenues with few taxpayers (Bach, Beznoska and Steiner, 2011⁹). The European Commission (2015, p.80) argues that their possible administrative costs are likely lower at the present time, explaining that "new international standards on third-party reporting and on information exchange relating to asset holdings and capital income are making the avoidance of capital taxation less profitable. The new standards and the falling cost of managing large databases can similarly be expected to lower the administrative costs of wealth taxation".

Wealth taxes were revived due to the fiscal crises in Iceland and Spain. In addition, UN-Habitat (2013) identified that wealth taxes were never abolished in France, Italy, Luxembourg, Norway, Slovenia and Switzerland. Switzerland and Norway are examples where the recurrent taxes on immovable properties (property taxes) have low levels of revenues; however, both countries levy sub-national wealth taxes. OECD (2015) recent data reveals that between 2009 and 2014, the ratio of wealth taxes per GDP has been around 0.2 percent in France, 2.1 percent in Luxembourg, 0.6 percent in Norway and 1.1 percent in Switzerland. In Latin America, Carvalho Jr. (2011) found that wealth taxes are tradition in some countries, still being levied in Argentina, Colombia and Uruguay. Since 2010, the author states that tax has represented about 0.3 percent, 0.8 percent, and 1.1 percent of Argentina's, Colombia's and Uruguay's¹⁰ GDP, respectively.

⁹ The authors suggest a one-time individual net wealth tax imposed on the existing stock of German wealth, in order to not provide incentives for adjustments in economic behavior. This also provides a mechanism of tax relief and a 10 year payment period to resolve liquidity constraints. They estimated that with an annual proportionate rate of 0.5 percent and 414,000 taxpayers, the tax could reach 0.4 percent of German GDP.

¹⁰ Wealth taxes in Luxembourg and Uruguay have a more revenue-biased framework, focused on corporate assets. Both countries are considered tax havens where wealth tax is applied on secret banking deposits. Indeed, the corporate portion on wealth tax revenues has been over 90 percent in Uruguay and 70 percent in Luxembourg.

2.3.2.2 Taxes on Movable Properties

Recurrent taxes on movable properties are the class of taxes on properties that do not encompass real estate and personal or corporate wealth. They are often levied on movable capital at subnational level, such as the annual vehicle taxes and business licenses (based on the property's size, use, or number of employees). Both annual vehicles taxes and business licenses are categorized by the OECD (2015) and the IMF (2014) as taxes on goods and services, specifically in the subcategory of "taxes on the use of goods, or on permission to use goods or perform activities". However, they will be examined by this study for two main reasons. First, they are typically local taxes and their tax bases are generally the vehicle's market value for automotive tax and the properties' size and use for business licenses, which generally constitutes an important property stock in many jurisdictions. Finally, they have increasingly been an important source of subnational revenues in many developing countries, such as India and Brazil¹¹. In addition, some authors such as Bahl and Martinez-Vazquez (2007) and Bird (2010) refer to them as property-related taxes in their studies of property taxation.

Literature that deals exclusively with this topic is scarce, and despite their potential to raise sub-national revenues, these taxes are generally criticized. Pigou (1947) and Oates (1972), as cited in Zodrow and Mieszkowski (1986), state that the supply of public services is lower in jurisdictions with distortionary taxes.

On the other hand, when a jurisdiction lowers its taxation on capital, more capital and labor is attracted, which would demand more public goods. If other neighboring jurisdictions undertook similar policy, all taxation would be reduced, as well as the optimum supply of public goods (Wilson, 1999). Literature has observed that local tax rates on capital tend to be correlated across neighboring jurisdictions, enhancing a scenario of tax competition when there is tax rate discretion (Bordignon, Cerniglia and Revelli, 2003). It has also been argued that the building portion of property taxes based on capital value has partial features and attributes of taxes on movable capital, as it is able to be transferred to the final consumers.

However, some authors view movable capital taxation as advantageous, at least amongst the annual vehicle taxes in developing countries (Bahl and Martinez-Vazquez, 2007; Bird, 2010). Vehicles are visible and vehicle taxes are easy to register and administer, since market values are widely available and the tax is easy to enforce. The tax base is large, elastic, progressive and growing amongst urban areas of developing countries. In addition, cars are not considered meritorious goods, facilitating political acceptability and enforcement. Tax authorities can easily ban the car circulation or taxpayer's driver's license and they can seize the vehicle in the case of arrears, without significant political fallout. Car registration can easily be linked to the taxpayers' driver's license, to ensure the payment of traffic fines and penalties. Furthermore, vehicles taxes can be used to control external effects on accidents, pollution and congestion, as a way to compensate the community for their high

¹¹ In 2008, vehicle taxes were approximately 8 percent of all states' source of revenues in India (M. Purohit and V. Purohit, 2010), and 7 percent in São Paulo State in Brazil (STN, 2015).

health and environmental cost. Vehicle taxes can also be considered as a benefit tax, since they are often used to fund roads and transportation expenses (Bird, 2010; Smith, 1987).

Bird (2010) also notes that it is politically more acceptable to tax goods viewed as luxurious in local governments of developing countries. The number of vehicles in most developing countries' urban areas is increasing at a faster rate than the public transportation infrastructure, creating bad externalities such as pollution, accidents and traffic. The author explains that vehicle taxes can be a partial solution for local governments that need to strengthen their own revenues, given the unpopularity of residential property taxation. In addition, vehicle taxes provide a great range of tax rates structure discretion. For example, tax rates can be based on age, engine and vehicle size (related to level of noise and air pollution), axle-weight (heavier vehicles require roads that are more costly to build and maintain), and the registered location of the vehicle (cars in a metropolis cause more pollution and congestion, while in rural municipalities without public transportation, they are needed to a greater extent).

2.3.2.3 Taxes on Immovable Properties

Recurrent taxes on immovable properties, commonly referred to as property taxes, are taxes levied regularly on immovable properties and paid for by their owners or occupiers. This tax is the main topic of this study and it is widely agreed that property taxes can be a significant source of stable revenues to local governments and can be adapted in accordance with the local budgetary needs, if tax policy discretion is allowed (Norregaard, 2013; UN-Habitat, 2011, 2013).

Norregaard (2013) argues that, although economists are mostly in favor of the economic principles of property taxation in a globalized world, there is a local widespread popular and political opposition to its strengthening. The author states that the two main reasons for this opposition are transparency and the limited scope for its mobility, as well as avoidance and evasion. In addition, Slack (2013) highlights that property taxes are generally viewed (or have a psychological effect) as an annual lump sum charge. The author explains that tax administrations should at least allow monthly payments of the annual levy, in order to be better adjusted to the monthly income of the family. Despite the likely reduction of delinquency rates and the compliance and collection costs when lump sum payments are encouraged, this may exacerbate the political costs of a tax increase.

Reviewing the literature about property taxes, Bird (2010), Cornia (2013) and Norregaard (2013) point out at least eight main arguments in favor (but sometimes criticized) of property taxation, as follows:

The first and the most important argument is that recurrent property taxation is well known in terms of its efficiency, due to the immobility of the tax base, which when levied on land and buildings, is considered to be more efficient than other taxes in terms of their impact on the resource allocation and in the labor market. Only land is actually considered to be genuinely immovable, since building structures (improvements) may have a certain degree of mobility; especially nonresidential buildings, which property taxation may drive investors to move to other jurisdictions. However, if it has already been introduced and it remains

stable, property taxation levies are capitalized in the land market value, meaning lower purchase prices, as though the property was not taxed. Consequently, property tax does not alter future behavior, as it is considered the least distortive tax.

The second reason is that property taxes provide a stable and predictable revenue source for local governments. Empirical evidence revealed that even during the 2008-2010 recession in the United States, property tax grew approximately 5 percent, while the other subnational taxes had significant decreases. The tax base remained stable since the valuations still continued under market values. Lutz (2008), as cited in Norregaard (2013), estimates the elasticity of property tax revenues and property prices in the United States between 1990 and 2011 as being 0.4 percent, indicating that effective property taxation moves in the opposite direction to housing prices. During a housing boom, local governments tend to grant tax relief, while budgetary needs encourage tax increases during recessions.

The third reason is that property taxes have the advantage of being a benefit tax. Under the benefit tax principle, property tax would be a price for the local services received by the landowners, therefore it does not interfere with savings, investments and labor supply decisions of individuals and companies.

The fourth reason is that property taxes provide an incentive for property owners to ensure a more efficient use of land and buildings, because they promote development in both rural and urban land. Theoretically, if the incentive for land use is the main target of a property tax policy, a pure site (land) tax on land value would offer the best tax design, maximizing the incentive to the land's optimal use. However, this issue is somewhat controversial, since other authors emphasize the neutrality of property taxation, saying that land value includes its "highest and best use", which means that the property taxation and its expected increases are a component of the current land price (Oates and Schwab, 2009).

The fifth reason is that property taxes may have an effect on speculative housing price booms and volatility. Again, it is well known that the expected flows of property taxation are capitalized in housing prices (by the net present value of future taxes). Therefore some authors have argued that property taxes may not have an effect on price levels and should not be used as a counter-cyclical instrument, at least under the expected taxation (an unexpected tax increase would impact price) (Bentick, 1979; Mills, 1981; Oates and Schwab, 1997). Nevertheless, other important factors, rather than property taxes, have proved to be more crucial in affecting real estate prices, such as the housing credit policy (IMF, 2009).

The sixth reason is that there is a high correlation between the residential property values and the owner's income level. Therefore, capital-valued property tax can be used as a distributive tax policy by progressive tax rates, without the negative effects on the labor supply caused by a progressive individual income tax. Even if some studies have found empirical evidence that property taxation may be actually regressive due to the usual assessment inequity as stated by Norregaard (2013), progressive tax rates may mitigate the impact of assessment inequalities. In another study, Sennoga, Sjoquist and Wallace (2008) note that the equity impact may be more limited in developing and transitional countries, where real estate markets are not well

developed and the property rights and ownership are not well defined. The authors also found that, even in developing and transitional countries, property taxation burden tends to be borne by landowners of middle and high income groups that are able to avoid income taxes.

The seventh reason is that property taxes do not need international tax coordination to be efficient, due to their tax base immobility. Indeed, only amongst the remaining few countries that impose *net wealth tax*, can the property tax paid by the taxpayers' overseas properties be used to relieve the *net wealth tax* levies in their home countries.

Finally, the eighth reason is that (land) property taxation may be the only tax base available in rural and small municipalities (Bird and Slack, 2006).

2.4 The Property Tax Base, Taxpayers and Assignment

In order to introduce the analysis of property tax, this section considers the three fundamental pillars in relation to property taxation systems: the tax base (what is taxed), the taxpayers (who is responsible for paying) and the tax assignment (for whom the revenue outcomes are assigned).

2.4.1 Property Tax Base

One of the main reasons for local governments to levy property tax is because the tax base is immovable. Taxes on income or consumption are able to move to other jurisdictions with more favorable taxation. In addition, property taxes obey the principle of “benefit tax”, in that if their yields are used to fund the taxpayers' required services and infrastructure, they are able to increase the market values of taxable properties. Taxpayers will not support property taxation if their revenues are used to fund expenses that are not desirable, to fund non-specific expenses in the local government's budget (low accountability) or if there is suspicion of corruption (UN-Habitat, 2011).

Franzsen and McCluskey (2013) state that in more centralized states (e.g., Indonesia, South Africa and the UK), the property tax base is generally set by national legislation, while in many federal countries (e.g., Australia, Canada and the USA), the states or provinces have the inherent power to choose their tax base criteria or are given a range of tax base options from which to choose. However, they note that this choice is a very important tax policy decision, highly related to historical, cultural, political and administrative factors. The authors highlight that there are also forms of tax base exclusions (e.g. owner-occupied, government-owned, religious properties or idle lands properties) and inclusions (e.g. machinery, aircrafts, boats, vehicles, furniture and other assets).

The tax law must define what is taxable and what is excluded for taxation. Properties that are commonly nontaxable include, churches and religious buildings, historical properties, hospitals and schools, governmental properties, railways, mines and forests. Rural properties are also commonly exempted or taxed at lower rates than urban properties. In addition, legislation must define whether land and/or improvements will be taxed, as well as whether the movable and intangible capital crystallized in the properties market values will be

excluded. Legislation may stipulate in which way land and/or improvements must be taxed and whether a certain valuation system will be nationally established, or if jurisdictions will be allowed to choose their own system (capital value, annual rental value, or an area-based system). It is agreed that the law should only stipulate the general standards and specific procedures for determining value, and other administrative tasks should be delegated to the local tax administration (UN-Habitat, 2011).

There are two main concepts used as the basis for valuations: the “current use” and the “highest and best use”. The current use concept is the valuation based on the property value at the moment when the taxation occurs. The “highest and best use” concept is the valuation based on the most economic and legally permitted use, even if it is not realized (Oates and Schwab, 2009). Actual market values tend to reflect future, not current use thereof, but some countries have adopted “highest and best use” for agricultural land (Denmark and Sweden) while in others (United Kingdom), the standard is the current base use (UN-Habitat, 2013).

The basis for property valuation for tax purposes can be based on market driven approaches (capital value, annual value and land value systems) or on non-market approaches based on purely physical property characteristics (area-based systems) (Franzsen and McCluskey, 2013; McCluskey and Franzsen, 2013a). UN-Habitat (2011) states that the best valuation option depends on the property market data availability and the available administrative infrastructure to implement the tax. Indeed, the reason to choose between a capital value system, a land value system, a rental value system, or other basis of valuation, depends on the cultural specificities and administrative capacity. However, regardless of the chosen method, there is a need for regular value updates.

Value-based systems can be performed according to two approaches: the discrete valuation approach, i.e. when the full and discrete capital value of a property is estimated, or the banded valuation approach, i.e. when a property is placed within an assessment value interval under a fixed tax (McCluskey and Franzsen, 2013a). In addition, the use of self-assessment valuation carried out by the taxpayers is a task that can be applied in all types of value-based systems (UN-Habitat, 2013).

Capital market value systems presume a functioning market for land and improvements with regular and public sales information. According to UN-Habitat (2011, p.50), “when the market for real property is immature or non-existent, it is still possible to have a well-functioning LPT (Land Value Property Tax) system, but it must be based on land and property attributes other than capital market value”.

Franzsen and McCluskey (2013) assert that there are different mechanisms in establishing the tax base. Rental and capital values are more suitable in tax jurisdictions where the information on market transactions, rental contracts and/or construction costs is available and transparent. Banding cadastral values, area-based systems and other similar systems are recommended if the property market exists, but the information is not available or the tax administration is limited. Finally, the land value system is more suitable when there is no administrative capacity to obtain and maintain market values data.

In another study, McCluskey and Franzsen (2013a) note that there are many cases of hybrids or partial systems and non-market valuation approaches that are used worldwide. The most common hybrid system is when the taxable value is only related to the property's size (element of area-based system) and location (element of a site value system). However, there are many other mechanisms such as: acquisition value, banded value, inflation-indexed value, building value only, uniform flat charge (unique charge per property) and flat-rate charge (minimum charge per property or class of property). Most of these systems will be described in the following sections.

2.4.1.1 Capital Value Systems

Under capital value systems, the property market value in an open market (including land and improvements) is the defined tax base. This is the method used in most of the OECD and Latin American countries, and there is a worldwide trend to shift towards capital value in the countries that traditionally have used annual rental value or land value systems (McCluskey and Bell, 2008; McCluskey and Franzsen, 2013b). The method can also be considered the most equitable, since market values reflect the benefits of public investments.

The valuation mass appraisal accuracy is a key factor in capital value systems and the accuracy can be estimated by an "assessment ratio study", which checks how closely the valuations are to the comparable market values (Gloude-mans and Almy, 2011, as cited in UN-Habitat, 2013). Prices from recent real estate transactions in the open-market are used as evidence of market values, where the "assessment ratio" study is the frequency of the valuation ratios amongst the sales prices. Therefore "assessment ratio" studies provide the indicators of "assessment level" (the median, that is, the most common assessment ratio) and "assessment uniformity", which measures the dispersion of assessment ratios amongst properties with different market values (vertical equity) and similar market values (horizontal equity), (IAAO, 2013).

McCluskey, Plimmer and Connellan (2002) note that accurate capital value systems based on a computerized mass appraisal model may have some advantages, such as objectivity, economies of scale and ability to update values frequently. However the authors state that the technology may not be suitable for developing countries, since this demands high initial costs of introduction, availability and intensive use of data and the need for qualified and recurrently trained staff.

2.4.1.2 Annual Rental Value Systems

Under annual rental value systems, the tax base is the annual rental value expected in a fair market transaction. The system is used in many countries (particularly former British and French colonies), for example in Australia (some local governments), Egypt, France, Guinea, Hong-Kong, the Ivory Coast, India (most local governments), Italy, Lebanon, Nigeria, Malaysia, New Zealand (some local governments), Pakistan, Senegal, Singapore, Thailand, Trinidad and Tobago, Tunisia, Uganda and the United Kingdom (for nonresidential properties), amongst others (Franzsen and McCluskey, 2013; McCluskey and Bell, 2008). Franzsen and McCluskey (2013) also note that in most developing countries

that use annual rental value systems that are still based in very antiquated methods, even when reforms were undertaken, such as in Egypt and Uganda, they have had political and administrative obstacles mitigate their results. On the other hand, Hong-Kong and Singapore efficiently administer their rental value systems.

Bahl (2009, p.13) recommends the rental value system only “when the rental is the main form of housing tenure and when there are no rent controls”. Indeed, in the annual rental value systems the tax base is narrower, since medium and short term rentals only reflect the present use of the properties, not providing the value of their “highest and best use”. Another disadvantage is the rental value estimation, since it requires much evidence of formalized rental transactions (including industrial properties, vacant land and other properties that are rarely in the rental market). The tax base estimation may rely on rent surveys, or in the estimated property market values may be converted to the rental equivalent. Therefore, it is initially necessary to estimate market values, as occurs in capital values systems, as having the same challenges of this latter system. In addition, some countries operate rent control and the judiciary may force use of outdated controlled rental values, as happens in India. Franzsen and McCluskey (2013) also highlight that the common higher share of vacant land properties in the cadasters of developing countries is a drawback in the use of rental value systems for these countries.

Indeed, the rental value system is a more accurate and suitable method to assess nonresidential properties or residences under the formal rental markets, while alternative methods should be considered to evaluate informal properties (e.g. area-based systems or split-rate capital value systems). In addition, the annual value systems tend to be more regressive than capital value systems, since the rents amongst informal and low valued properties are commonly a higher percentage of their market values (the rental profitability) than amongst formalized and high valued properties. Using data from the Brazilian Household’s Budget of 2002-2003 (IBGE, 2004), Carvalho Jr. (2009) notes that there is a certain inflexibility of small values of rents amongst low valued properties as well as informal rental contracts, which certainly represents more risk to land owners¹².

2.4.1.3 Area-based Systems

Under area-based systems either land or building area can be assigned as the property tax base. In this system, the area is multiplied by a monetary rate with some applicable adjustments, which are easier to administer, since only property classifications and area measurements are required. Franzsen and McCluskey (2013) explain that area-based systems are suitable for developing countries with higher levels of undeveloped and informal real property markets, where there is not enough data to perform a proper valuation system. The system tends to be simple, transparent, and easy to administer, and it is the first step towards a market based system. Area-based systems can range from a ‘pure’ form based only on physical area, to hybrid

¹² The study estimated usual annual rental profitability between 5 percent and 9 percent amongst the last decile of the richest Brazilian families, and between 12 percent and 25 percent amongst the first three deciles of the poorest families. It is important to mention that the 2002-3 Survey of the Brazilian Household’s Budget includes an imputed declared rental for owner-occupied residences.

forms by using coefficients of zoning, to type of use and to quality of structures. Certainly, as an area-based system becomes more complex, it becomes similar to a capital value system.

Nevertheless, area-based systems may not be considered fair, since all equal area properties pay the same amount of tax; except if coefficients of location adjustment are implemented to attenuate this drawback (UN-Habitat, 2013). Indeed, the lack of equity can reduce the taxpayers' acceptance as well as the potential to raise revenues by applying progressive rates on those with a higher ability to pay. In addition, Slack (2006) and Bird (2010) criticize area-based systems based on the arguments that they are regressive, not related to the benefit-tax principle, and the revenues produced by this system are inelastic. The authors note that the tax base could be more elastic if the fixed charges were frequently readjusted, but this has not occurred in most countries that have employed such systems.

India is a case where area-based systems have been applied with relative success, by replacing the outdated rental values. India's municipal governments are authorized by the Constitution to levy property tax according to the regulations imposed by their respective states (state acts). State acts may list exemptions, minimum and maximum tax rates and procedures for administration and enforcement. India's states can also choose their property tax base or give this competence to local governments. Rao (2013) found that India's states and municipal corporations have replaced capital value and annual rental value systems with area-based systems. The author states that the capital and annual value system in India has experienced serious challenges because the real estate market is unorganized and the registered values are often very outdated. In addition, the existence of rent control in many of India's states greatly undervalues rental values, making such a system impracticable in the country. As an example, the author cites the great success of replacing annual rental value with an area-based system in Bangalore.

2.4.1.4 Land and Site Value Systems

The land and site value systems tax the market value of land alone and are used in some countries such as Australia, Denmark, Estonia, Fiji, Jamaica, Kenya and New Zealand. According to Franzsen and McCluskey (2008, p.268) the terms *site value*, *land value* and *unimproved land value* have been used interchangeably by the literature. However, the authors explain that *site value* encompasses the land merged improvements, i.e. drainage, filling, excavation and grading, amongst others. On the other hand, *unimproved value* refers to the land "in its most pristine natural state".

The main advantage of land and site values is their immobility and neutrality, since the capital is untaxed. Olima (2005), as cited in McCluskey and Bell (2008), argues the potential for improving the efficiency of land use when a land value system is applied using land valuation based on its highest and best use. Bell, Bowman and Clark (2005), as cited in Franzsen and McCluskey (2008), state that land value systems works as a "land value capture instrument", since they include the increase in land values resulting from public investments (such as: either provision or improvements on transportation systems, installing sewers and water systems) and general economic events (such as: housing credit, economic and population growth, etc.).

Land value systems may have easier cadastral administration since there is no need to catalogue the building structures and their attributes (size, use, age and quality). In addition, the method may provide a simple solution for taxation of rural areas (Bahl and Wallace, 2010, as cited in Franzsen and McCluskey, 2013). However, valuation of land in highly developed areas is problematic, because data from vacant land sales is scarce. This has been indicated as the main cause for the recent worldwide trend in switching towards capital value systems. Indeed, indirect ways to estimate land value would basically exclude the cost of building structures from the property full market value (French, 2004; Skarzyński, 2006). However, Franzsen (2005) explains that although indirect ways can be applied to estimate land value in developed areas, full market values and construction costs are necessary in this approach, requiring the same tasks of a capital value system, undercutting the economy-of-administration argument and making the valuation task more complex and costly.

The system also has other drawbacks. Franzsen and McCluskey (2013) note that the system is not transparent, since taxpayers generally have an intuitive notion of the value of their property and a significant share (building values) of the full property value is excluded in the assessment. In addition, taxpayers may feel that the system is unfair, since there is no taxation on a visible wealth inherent in buildings. Moreover, the tax base is less wide and buoyant than capital value systems and demands higher nominal tax rates. Large cities in developing countries often experience quick urban growth with fast and growing construction and sales of multi-story flats and corporate buildings. Therefore land value systems may not have the ability to capture these changes as fast as under a capital value system that uses computer-assisted mass appraisal models based on comparative sales.

2.4.1.5 Banded Systems

McCluskey and Franzsen (2013a) contend that hybrid methods of valuation consist of assessment methodologies that use a form of property value as the basis of the property tax; however they only partially rely on market value evidence. Currently, there is a growing discussion on their feasibility for developing countries due to their lower administrative cost and higher simplicity and transparency (McCluskey *et al*, 2002).

McCluskey and Franzsen (2013a) describe banded systems as being a discrete method of valuation that assigns properties into different value bands under a fixed property tax charge in each band. The authors explain that there are three crucial elements in banded systems in terms of their effectiveness: the number of value bands, the band widths and the tax rates. Theoretically, the system could be applied in all three of the evaluation methods (capital value, annual rental value and land value); however it has more often been implemented under capital value systems.

Slack and Bird (2014) relate that banded systems have been adopted in Great Britain (England, Scotland and Wales) since 1993 and in Ontario (Canada), since 1998. More recently, in 2014, Ireland re-introduced residential property taxation also using a banded system. The authors explain that the British system is the most known and classical experience. Prior to 1990, all British properties were subject to property taxes, named “rates”,

based on annual rental value under a central government valuation agency (the last revaluations occurred in 1973). In 1990, residential rates were replaced by a “poll tax”, named “community charge”, which was an annual lump sum levy per adult. However, due to its unpopularity, poll tax was abolished in 1992 and replaced by a residential property tax, named “council tax”. The system was changed to a capital value banded system, based on the assessed values of 1991, trying to achieve simplicity and stability due to an urgent need to replace the poll tax and provide new assessments. In the case of Ireland, the country abolished its residential property tax in 1978. In 2012, however, an annual household charge of 100 Euros was introduced, which also proved very unpopular. Therefore in 2013, the system was switched to a residential property tax, based on self-assessed capital values under 19 different bands (McCluskey and Franzsen, 2013a; Slack and Bird, 2014).

McCluskey *et al* (2002) argue that the banded system can be favorable for developing and transitional countries. They explain that banded valuations are less costly than accurate discrete valuations and they preserve the principle of vertical and horizontal equity. These authors highlight five other advantages:

- a) It is a quicker and cheaper process and therefore suitable for countries with an urgent need for reforming their property tax systems;
- b) It is a robust and simple system that allows some value movements without the need of revaluations and therefore it can be used over a longer period;
- c) The volume of appeals tends to be lower, since the valuation dispute lies around the edges of each band. In addition, appeals can be even more limited if bands are based on regional zones;
- d) Due to its greater simplicity, there is more availability, competition and therefore lower costs in outsourcing the assessment task to private valuers;
- e) It does not demand the intensive data that is used in mass appraisal models, in tables of construction costs, and there is no need of individual assessments for singular high valued properties (industries, hospitals, mansions, etc). All that is required is evidence that the taxable property is correctly banded.

However, these authors also state that the main disadvantage is related to the system’s lack of fairness. The British system is divided into 8 bands, where the highest band pays three times more than the lowest. However research undertaken by the IRRV (1998), as cited in McCluskey *et al* (2002) found that the average values in the highest band were eight times greater than in the lowest. Indeed, the market values variance amongst the highest banded properties was great enough to ensure an inequitable system in Britain. For example, both properties with market values of £320,000 and £2,000,000 would pay the same amount of property tax in the British system, which reveals high regressivity amongst the highest banded taxpayers as well as regressivity inside each band. A solution for this problem would be to carry out discrete valuations up to a certain assessment. The administrative costs would still be lower than an overall discrete capital value system, since these discrete valuations

would cover a small portion of the registered properties. Indeed, since the late 1990's, there have been calls for additional higher bands in Great Britain (IRRV, 1998; RICS, 1998; as cited in McCluskey *et al*, 2002).

McCluskey *et al* (2002) indicate three further drawbacks. Firstly, banded systems may encourage over long valuation cycles causing the system to not work as an authentic property tax system. For example, England and Scotland use the same values used in 1991; however, market values must have changed vastly during this period. Secondly, the current mass appraisal systems have become more sophisticated due to computerization, GIS and other technologies. Therefore, taxpayers should benefit from such systems and should even demand such systems. Finally, when a property is higher banded, the tax increases due to revaluations are likely to be much higher than in a discrete system.

Nevertheless, there is some consensus that banded systems can be useful for countries that require simple and less costly tax administration, such as transitional and developing countries (McCluskey *et al*, 2002; McCluskey and Franzsen, 2013a; Slack and Bird, 2014). As displayed by Table A1 in Annexure A, approximately half of transitional countries still use area-based systems, as occurred after the communism period when their real estate markets were not so developed. However, they are currently much more developed than in the past and a banded system can be a transitional system to achieve a modern capital value system. The method is also useful for developing countries that face enormous administrative and political challenges in property taxation. Amongst Latin American countries, despite their long tradition of discrete capital values systems, some cities face long valuation cycles with very low assessment. Banded values would make the task of revaluation easier financially, administratively and politically.

2.4.1.6 Tax Base Worldwide

McCluskey and Bell (2008, p.30-33) catalogued the property tax base in 121 countries during the 2000's. This does not represent a complete picture of the recent scenario, since many countries have switched from annual rental values to area-based or capital value systems, as well as from land values to capital values. Table A1 in Annexure A used the data available in McCluskey and Bell's compendium, as well as adding other countries to the survey, and updated information for some European countries by using more recent reports from Almy (2014), the Lincoln Institute of Land Policy (2015), Muller (2011, p.80), Slack and Bird (2014), and UN-Habitat (2013, p.46-51).

The compendium is useful since it displays the great variety of base systems used around the world and shows certain homogenous use amongst countries on the same continent. It is important to mention that some countries appear in the table with more than one system. This is because more than one system is used in those countries, for example when jurisdictions are allowed to choose their own system or when a country has more than one property tax that uses different methods of valuations.

From Table A1, it is apparent that capital value systems are used in 38 percent of the compendium's countries, mainly located in the Americas and Europe. Annual rental values are used in 24 percent of the countries, mainly located in Africa, Asia and the Caribbean, while area-based systems operate in 23 percent of the surveyed countries, mainly located in Africa, Asia and some Eastern European (transitional) countries. Finally, the two extremes, land value systems and improvements only systems are more rarely used around the world. Land value systems occur in 10 percent of the surveyed countries, and are more common in Oceania and Eastern Asia (Korea and Taiwan) while improvements value based systems are restricted to a few African countries.

2.4.2 Taxpayers

Property tax legislation must establish the subject responsible for paying the tax, which can be the legal owner of the property, the occupant or the tenant (or a combination of these). Still, it must be determined whether each taxable property will have its tax calculated and linked to a certain taxpayer, or if the tax will be calculated according to the group of all the properties owned by a certain taxpayer (Kitchen, 2013; Plimmer, 2013; UN-Habitat, 2011).

Taxpayer's assignment is an important element in a property tax system and depends on the local culture (Plimmer, 2013). If the land is seen as a private good, the owner must be assigned as a taxpayer and liable to all penalties against delinquency. There are some administrative advantages when owners are assigned as taxpayers. Generally, in a jurisdiction, there are fewer landowners than occupants, and fewer occupants than properties, and therefore it could be less costly to assign the legal landowners as taxpayers. In addition, landowners are generally less mobile than users, simplifying the enforcement against delinquents. Nevertheless, the legislation can assign users as an alternative taxpayer in the case of properties owned by the government or when the legal landowner is unknown (UN-Habitat, 2013).

On the other hand, the land occupant, or those who have its beneficial use, should preferentially be assigned as taxpayer in five situations: a) when the land is seen as a public good owned by the state; b) when the private ownership of the land is not well established or recognized; c) when the private ownership of the land is not acceptable to the community; d) when the land registration is not well administered by the government; and e) when the land registration is not disclosed because it is considered a secret (UN-Habitat, 2011). Another advantage in taxing users is because property tax becomes more visible to the community, improving democratic accountability (UN-Habitat, 2013).

2.4.3 Tax Assignment

It is almost unanimously agreed that property taxes should be a levied priority by local governments. Oates (1996) as cited by Bird (2010) suggests three general rules to assign taxes amongst different tiers of governments: a) local governments should rely on benefit taxation of individual and corporate movable capital; b) if certain non-benefit tax has a distributive purpose, it should be entitled to central government; and c) local governments should rely on non-benefit taxes, if their tax bases are relatively immobile across local jurisdictions.

Indeed, in the classical literature of public finance emanating from Musgrave (1959) and Oates (1972), local governments should only impose property taxes and user charges, since local governments are viewed as decentralized service providers that could produce distortive taxes on capital. However, despite most authors recommending that local taxes be considered as benefit taxes, the literature also highlights that “if fiscal decentralization is to be a reality, subnational governments must control their own sources of revenue” (Martinez-Vazquez, McLure and Vaillancourt, 2006, p. 21).

Local governments are more likely and able to efficiently and effectively allocate, provide and control their expenditures, if they can also plan and control their own revenues. The virtues of local taxation rely on local governments’ authority to decide on the amount of tax revenue they can raise, being responsible to their citizens’ choices and political costs. When local governments cannot control their revenues, they will rely more on capital revenues (borrowings) and governmental transfers, reducing the stability of local service provision. Bird (2010) states that evidence of the full local governments’ autonomy in establishing their own property taxation system is seen under four conditions: a) they can decide on the convenience to levy property tax or not; b) they can decide on the tax base, its methods of valuation, exemptions and reliefs mechanisms, and tax rates; c) they can administer the tax by registration and assessment of properties and collecting and enforcing taxes; and d) they can keep all the revenues that they collect.

Bahl and Cyan (2010) updated the classical thought by highlighting the main challenges that the international practice of subnational taxation has faced, which include: a) the role of tax competition amongst subnational governments; b) the need for providing a higher degree of benefits received; c) the lack of political will to replace traditional and distortionary sales taxes with value-added taxes; d) the tax exportation that occurs when the place (tax jurisdiction) of the tax event and the taxpayer’s residence or the place of production and consumption are different; e) the challenge in taxing services, especially internet services; f) the need for tax sharing arrangements of certain taxes between central and subnational governments; g) the higher administrative costs in performing local taxation; and h) the higher political pressures on local communities.

Nevertheless, Bahl and Cyan (2010) conclude that property taxes still continue to be the most suitable tax for local governments, only failing in the test of administrative costs and political pressures. The authors conclude that developing countries, however, have struggled to enhance their property tax systems. They hypothesize the causes as: a) the lack of political will to explore the tax powers that are being given to local governments; b) the fear that local taxes can crowd out central taxes, especially in countries with a low tax burden; c) the fear that tax decentralization leads to high fiscal disparities, since high regional inequality amongst developing countries is common; and d) there is no general commitment to improving tax administration.

Indeed, despite being unanimously pointed out as the typical tax which local government should levy, property taxes are sometimes overlooked, especially in developing countries. Bird (2010, p.28) states that: “[...] experience around the world suggests that the political costs of reliance on residential property taxes in particular are so high that no government with access to

politically “cheaper” sources of finance is likely to willingly take the risk. Transfers (other people’s money), borrowing (a problem for the next government!), and taxes on business [...]”.

2.5 Fiscal Cadasters

Property registration can be defined as the “process of determining, recording and disseminating information about the ownership, value and use of land when implementing land management policies” (UNECE, 1996 as cited by Enemark and Van Der Molen, 2008, p. 9). For tax purposes, the term “fiscal cadaster”, “property record” or just “registration” refers to the (digital) catalogue of the totality of assessable property records, taxpayers, assessments and tax liabilities. According to Enemark (2004), the cadasters should ensure proper management of rights, restrictions, responsibilities and risks in relation to property, land and natural resources. The author considers that the registration has four basic functions:

- a) Land tenure: cadasters should register the rights, use and transfers of lands, buildings and their boundaries;
- b) Property value: cadasters should contain all elements of assessment, the property and taxable values, and other required elements to perform taxation;
- c) Land use: cadasters should be used to control the land use through adoption of planning policies and regulations;
- d) Land development: cadasters should be used to plan new buildings and infrastructure, and to manage land-use instruments, permissions and costs.

There are several types of cadasters, such as the legal cadasters under the notaries, exclusive cadasters for tax purposes and the integrated multi-purpose cadasters that have been widely debated recently. However, two type of cadasters or two elements under the integrated cadasters that are primordial for tax purposes are the personal or taxpayer registers and the property (land and buildings) registers. Personal registers basically list the persons (individual or corporate) and information about the properties that they possess. Property registers are map-based, combining a geodetic control network, a coordinate system, cadastral maps and land registers. Certainly, for tax purposes, it is highly recommended that the personal register be linked and updated with the property-based registers (UN-Habitat, 2013).

Modernized cadasters include digital mapping, parcel identification, land and building attributes, assessed and market estimated values and taxpayers’ records. They should contain records of tax obligations, exemptions benefits, payment and amounts in arrears. Modern land cadasters should be computerized using Geographic Information Systems (GIS) (McIlhatton *et al*, 2013). GIS provide digital maps with property boundaries, building outlines, amongst other data, to be used to detect physical changes and to make more precise measurements for property tax purposes (UN-Habitat, 2013). Modern cadasters with GIS facilitate property tax administration by reducing property overlapping and providing better and less costly information to be used in the property assessment. McIlhatton *et al* (2013)

reinforce the GIS advantages when integrated with computer-aided mass appraisal (CAMA), in order to have timely procedures and information as well as more accurate assessments.

Maintaining a good property record is the primary instrument to operate a reasonable property tax system and to implement any tax reform. All taxable properties must be identified and numbered within the tax jurisdiction geographical area and must include their property boundaries. They must contain their main elements of valuation separately catalogued and currently updated on the tax roll (Enemark, 2004). The correct registration of valuation attributes is important for the assessment accuracy when an appropriate assessment model is used (McIlhatton *et al*, 2013). Updating the data of land zone values and data of constructions, as per its quality, size, age and use, is relevant to ensure the accuracy of an assessment system based on capital values.

The International Federation of Surveyors (FIG, 2014) explains that there is a growing global interest in the administration of property registration, since the world has recently faced rapid and unregulated urbanization that encourages the emergence of slums, environment problems and other negative externalities caused by unregulated cities. Therefore, FIG (2014) establishes six trends and targets that should be accomplished, as follows: a) the inclusion of the complete legal situation of land, including public rights and restrictions; b) the integration of different agencies and the harmonization of their records; c) the use of a logical data model with fully automated registration; d) the abolishment of “paper and pencil cadasters”; e) the privatization or outsourcing of cadasters or cadastral tasks, since most governments do not have the capacity to perform a mass systematic registration; and f) the requirement that cadastral reforms should be cost recovering.

Kitchen (2013) explains that property identification is very challenging in developing countries for many reasons such as: a) the (digital) maps for property identification sometimes do not exist; b) fiscal cadasters are not linked with the notaries system or other agencies that manage land tenure rights; c) information on improvements may be missing due to the lack of landowners’ self-reporting or lack of re-registration; d) computerized tax records may not exist because of the expense; and e) tax records are considered secret.

In addition, Un-Habitat (2011) states that the registration efficiency depends on the land-related rights specificities of each country, and the administrative capacity of the tax agencies. The study explains that in developing countries, there often exist different scenarios of land rights and therefore the cadaster must also contain the land occupants to be used in land regularization programs. Informal settlements often demand any governmental document that indicates their occupancy, which could be offered by a property tax bill addressed to the taxpayer. Indeed, besides tax purposes, De Cesare (2005) and Smolka and De Cesare (2013) argue that the property records may also have other relevant functions such as being a source of data to establish environmental and urban projects and being an instrument to prepare, control and inspect urban planning, housing programs and social policies.

2.5.1 Cadastral Maintenance

The tax base maintenance, which includes the cadastral re-registration and property re-inspecting, is an important task to keep the cadaster accurate, by checking property changes and localizing and updating taxpayer details. Although taxpayers' self-updating must be encouraged, it is necessary to perform cadastral update after a certain period of time through the use of different strategies such as outsourced georeferencing or aerial photos. If the cost of a re-registration is an issue, it can be performed in partial re-inspections restricted to areas where it is believed to be more necessary (Kitchen, 2013; McIlhatton *et al*, 2013). Indeed, it is preferable to perform a detailed re-inspection in a city area, rather than a complete, but inaccurate re-registration. The IAAO (2013, p.12) recommends that: "property characteristics data should be reviewed and updated at least every 4 to 6 years". The study gives three different ways to accomplish this task: a) by re-inspecting all property at periodic intervals (every four to six years); b) by re-inspecting properties on a cyclical basis (for instance, one-fourth or one-sixth each year); and c) by re-inspecting properties based on the own tax administration's strategy, but ensuring that all properties will be examined at least every six years.

Although re-registration can be an outsourced task if the local government does not have the necessary infrastructure, the project is often expensive and involves high up-front costs, skilled human resources, aerial photography and tax mapping. In addition, fieldwork, local re-inspections of building structures, surveys, valuations and organized record-keeping are required, which can be very challenging for low income or small local governments (Bahl and Bird, 2008; FIG, 2014). Even if third party assistance is provided to fund the upfront cost of a cadastral reform (such as higher tiers of governments, development banks or other entities); the revenue outcomes may be limited by various issues, such as low collection, high exemptions, low assessment, low tax rates and costly and time-consuming juridical litigation.

2.5.2 Cadastral Coverage

According to UN-Habitat (2011), tax base or cadastral coverage means the proportion of properties that should be taxed to all really registered properties. For example, Norregaard (2013) relates that coverage ratio ranges from 30 percent to 70 percent in Kenya, 40 percent to 50 percent in Serbia, and in Chile, a large share of new constructions have not been included in the tax roll. Kayuza (2006, p.157) estimates that only 21 percent of properties in Dar Es Salaam, Tanzania are on the tax roll; however this ratio increased to about 70 percent in 2012 after the cadastral and administrative reforms undertaken by this city (United Republic of Tanzania, 2013). Before the property tax reform in Egypt in 2014, the tax registration only covered properties within city boundaries, on the basis of 1954 figures, which comprised one third of the urban properties that really exist in the country (TADAMUN, 2015). Carvalho Jr. (2013, 2014) estimated the cadastral coverage as being between 60 percent and 70 percent amongst eight large Brazilian municipalities. Bahl *et al* (2009) estimated the cadastral coverage in Delhi, India, as being 38 percent. The authors stated that the "*Jawaharlal Nehru National Urban Renewal Mission*" fixed the target of a full cadastral coverage in all Indian cities with a population of over 100,000 within 7 years (2005-2012) by using GIS.

These ratios reflect the physical data, which means the number of properties that should be taxed to the number of all registered properties. However, the values coverage would be more appropriate when the property tax performance is analyzed, since a high number of unregistered low valued properties would be likely to have little impact on the tax performance. Lewis (2003) assumes that both ratios are strongly related in Indonesia, but he highlights that this assumption must be analyzed on a case to case basis in each study.

2.6 Valuations

Property tax is different from other tax because its tax base values need to be presumed. In indirect taxes, taxes on income and even taxes on properties based on monetary transactions, the taxable base is determined by the realized monetary value. Most of the tax base of the annual property tax has not been traded in the current year of the tax event and therefore the value assignment (assessed value) may be a challenging task.

The term “assessment” comprises all the necessary processes to produce a valuation roll, i.e. a list of properties, taxpayers and property attributes (use, area, value and eligibility for exemptions). Thus, this section is divided into two parts. In the first part, the methods of valuations stated by the literature are discussed, while in the second part the role of the administration of valuations is considered.

2.6.1 Methods of Valuations

IAAO (2013) and UN-Habitat (2011) explain that capital value systems have three main techniques of valuation that are used worldwide: sales comparison, cost approach and income approach. Market data are required in all three methods but are integral to the sales comparison, which is the generally preferred approach when there are sufficient sales (Almy, 2014).

2.6.1.1 Sales Comparison

The sales comparison method evaluates a property based on other properties with similar characteristics that have been sold recently. The method takes into account the effect that individual attributes have on the overall property value. The data of properties that have been sold in the recent past is gathered and computerized mass appraisal models are generally applied (Almy, 2004). These models permit the assessment of a great number of similar properties with high levels of accuracy in a less costly way. However, the appraisals' accuracy depends on the number of similarities between the sold and assessed properties (IAAO, 2013). Despite its lower cost and higher economies of scale, the method requires skilled valuers with knowledge of the local real estate market, computerized mass appraisal models and statistics analysis. The sales comparison method has been also recommended to assess residential properties for property tax purposes. Cornia and Slade (2005) and Sirmans *et al* (2008) note that controlling vertical and horizontal inequity between residential and nonresidential properties is more difficult in sales comparison and cost approach methods than in income approach methods.

2.6.1.2 Cost Approach

Cost approach technique is based on the assumption that no informed buyer would pay more for a property than would be required to acquire the land and to construct the improvements, where the cost of land and improvements are separately determined. The land values are often estimated using the same technique of sales comparison, while improvement values are estimated using construction cost indices adjusted by age and obsolescence. In the absence or vacant site sales in densely urbanized areas, alternative techniques can be established to determine land value. For example, the residual method considers as land value the difference between the full market values and the depreciated replacement construction cost¹³.

Despite its more costly administration, Franzsen and McCluskey (2013) note some advantages of cost approach method. Appeals are likely to be minimized, since the land zone and the construction values are the elements entrenched into the system, rather than individual assessments. In addition, its transparency is greater since land zones and construction costs are displayed in legislation, rather than long valuation rolls with numerous assessed properties¹⁴. The authors also highlight that split-rate taxation is a very popular worldwide system under the cost approach method, where the building and land portions are separately assessed and taxed at different tax rates.

2.6.1.3 Income Approach

Income approach is recommended for nonresidential properties and is based on the assumption that the investor's willingness to pay for a property does not exceed the value of the income that can be realized from that investment (IAAO, 2013). According to Almy (2014), the income approach estimates the present value of future income, having two different approaches: direct capitalization and discounted cash flow. In the first approach, the property value is equal to the ratio of its rent to the market capitalization rate. In the second approach, the expected flow of property incomes/rents is discounted at a discount rate.

2.6.2 Administration of Valuations

This section debates the role of the administration of valuations, which encompasses all the administrative tasks needed to produce an assessment list. UN-Habitat (2011, p.81) states that "the major challenges for administering the LPT valuation system are to acquire accurate current information on each property and to use a consistent and fair system for assigning taxable value, based on that information". The approach is divided into four parts: the responsibility of valuation, the self-reporting and self-assessment analysis, the role of appeals and the analysis of basis time and revaluations processes.

¹³ Almy (2014) notes that the property value may sometimes be different to the sum of land value and construction cost due to economic circumstances, necessitating the use of an "economic condition factor".

¹⁴ Moreover, the cost approach method does not require supplementary valuation rolls for new or under construction buildings. There may be political and administrative challenges in updating valuation rolls, and the permit longer valuation cycles. This can be useful in countries like Brazil where each municipal valuation roll must be presented under a municipal law approved by the municipal councils

2.6.2.1 Responsibility of Valuation

There are a myriad of schemes by which valuations can be administered. Bird (2010) recommends that all tax administration, including the valuation, should be the responsibility of the level of government that appropriates the revenues. However, central or intermediate governments' valuation agencies may be useful for small municipalities due to economies of scale and scope (De Cesare, 2012).

Various schemes have occurred around the world, where valuations have been performed by different tiers of government, by autonomous valuation agencies and even by the private sector. In addition, higher tiers of governments or centralized agencies can provide the valuation methodology, valuation cycle and assessment ratio to be applied by local administration (UN-Habitat, 2011).

Despite being generally recommended, the local governments' autonomy in managing their own taxes or excessive autonomy may lead to low revenue performance if the schemes of equalization transfers discourage revenue enhancement (Scheider, 2012; UN-Habitat, 2013). In addition, local governments may be more susceptible to political pressures by the local community and they may need external incentives to undertake an efficient administration. Almy (2014) and Norregaard (2013) provide four main arguments in favor of centralized valuations and two drawbacks.

The first advantage would be that centralized valuations are uniform and are more likely to be fairer amongst taxpayers located in different jurisdictions. The second is that many local governments do not have the administrative infrastructure, qualified local valuers and economies of scale and scope to provide accurate valuations. For example, IPTI (2007) as cited in De Cesare (2012) reports that the valuation costs are greatly reduced when the number of assessed properties exceeds 750,000. The third advantage is that local valuation officers are often subject to political pressures to delay or minimize updates. The fourth advantage is that centralized valuations can be used to administer other central taxes, such as income tax, wealth tax, and inheritance. In addition, valuations can be used as part of national housing policies.

On the other hand, the first argument against centralized valuations is the low amount of knowledge regarding the local real estate markets. However, centralized agencies can more efficiently manage contracts with valuation companies, or can have more technical capacity to develop accurate valuation models¹⁵. Finally, the second and main drawback is the revenue incentive for local administrations to keep cadastral coverage and values up to date.

As examples worldwide, the Norregaard (2013) notes that the valuations are fully decentralized in Brazil and Vietnam, while there has been a gradual shift from decentralization in Guatemala and Mexico. Centralized systems, however, have been efficient in countries such as Denmark, Lithuania, Latvia and Uruguay. In Brazil, however, there have been recent calls to enact a federal legislation that forces municipalities to undertake revaluations every four

¹⁵ The valuation task can be fully or partially outsourced to the local real estate market (e.g. local valuers, real estate agents). Outsourced valuations can be validated with sales data from different sources (e.g. property transfer tax registration, notaries, financial institutions of housing credit, or real estate advertisement on the internet).

years, as a way to reduce the political costs of revaluations that are undertaken on an as needed basis. The same scheme occurs in South Africa. Although valuations are locally administered, the South African “Municipal Property Rates Act” establishes a valuation cycle of 4 years that must be followed by the local governments (Republic of South Africa, 2004).

Another important issue is by whom and how a property valuation should be performed. In some countries (the Netherlands, the United Kingdom, South Africa and Tanzania), the valuation officer has discretion in determining a property value, given national guidelines (Bell and Bowman, 2002; Fjeldstad, Chambas and Brun, 2014; Norregaard, 2013). In other countries, the legislation must present all the valuation models and coefficients to establish each property value. This latter method is more transparent, since discretion is limited after the valuation model has been incorporated into the law. However, the valuation methodology crystallized in law makes valuation changes more difficult and therefore maintaining valuation equity and accuracy is equally difficult (Almy, 2014).

2.6.2.2 Self-declaration and Self-assessment

In most countries inspectors or local officials perform the task of registration maintenance, valuation and collection, resulting in a great number of tasks and therefore high administrative costs. Using self-reporting data (including assessment) and relying more on taxpayers to provide information is an alternative to obtain quick and less costly information (Bird and Slack, 2004; Tanzi, 2001; UN-Habitat, 2011). On the other hand, the field re-inspection to check the integrity, accuracy and veracity of taxpayers’ information is also expensive (UN-Habitat, 2013). Self-reporting, especially self-assessment, can be feasible if there is taxpayer capacity, honesty and willingness in providing information. In addition, the valuation method must be simple, clear and well understood by taxpayers, since they are required to calculate the assessments of their properties. Self-assessment is more convenient in area-based systems, since taxpayers just need to know the size of their properties, and this scheme has become popular in India (McCluskey and Franzsen, 2013a).

According to UN-Habitat (2013), taxpayers are often required to provide information of ownership, purchase price and the circumstances of sale. In annual rental value systems, owners or occupants are typically required to disclose rents paid or received. In some countries (Bulgaria, Georgia, the Philippines and Russia) where the property tax base also comprises some movable properties (machinery, furniture and vehicles, amongst others), the taxpayers must provide a list of assets related to the taxed property. This task is also required in countries that use net wealth taxes (Belarus, France, Norway and Switzerland).

Smolka and De Cesare (2013) argue that self-assessment schemes of registration and valuation may be suitable to low income and informal settlements. Self-assessment is usually acceptable, simple, quick, inexpensive and minimizes appeals. In addition, it can be used as a tool to enhance fiscal culture and citizen’s participation. The authors note that self-assessment schemes increased assessment levels and cadastral coverage in Bogota, Colombia. Norregaard (2013) also highlights that prior to the 1993 Bogota property tax reform, the registration coverage was less than 50 percent and the assessment level was

around 20-30 percent. By introducing self-assessment, the reform improved registration and valuations and brought informal properties and their occupants to the tax roll.

However, such policy also receives some criticism. McCluskey *et al* (2002) note that self-assessment has been used in some developing countries' reforms due to the lack of administrative capacity in estimating real market values. In the long run, the authors state that the mechanism may lead to tax base erosion, since taxpayers do not wish to increase appraisals. There is wide evidence that field verifications might be even more costly than other mass appraisal methods (Almy, 2014). It is certainly necessary to have mechanisms of adjustment to make self-assessment successful. The self-reporting of relevant property information (e.g., new improvements, ownership transfer, rents paid by tenants) can greatly reduce the administrative costs, and are important tools to promote general revaluations while self-assessment is applied between the valuation cycles¹⁶.

2.6.2.3 Objections and Appeals

Opinion differences between the administration and the taxpayer may occur when the valuation agency makes the property assessment. Therefore, there is a need for an appeal system where the interests of appellants and the administration are fairly resolved. Property tax appeals typically consist of several administrative hierarchical steps and are usually lodged with regard to unfair valuations (over market values) (Mikesell, 2013; Plimmer, 2013). A typical situation is the emergence of a bad external influence after the year of the valuation that reduces property values. However other attributes can also be queried, such as: the registered property size and use, the insertion to the roll of exemptions and social issues (inability to make payment), amongst other claims (UN-Habitat, 2011). Nevertheless, it can be affirmed that the more complex the property tax system, the higher the level of appeals and litigations. A banded system also reduces the number of appeals, since only properties close enough to the band limits would have alterations in the tax paid by changing their banding level. In addition, the number of appeals can be eliminated (or greatly reduced) when self-assessment is applied.

The appeals are often initially lodged under the assessment department and sometimes there are committees to hear subsequent appeals. They may finally end in the judiciary courts if there is no agreement between the parties (Kitchen, 2013). According to UN-Habitat (2013) and Kitchen (2013), Austria, Denmark, the Netherlands and Sweden have three-stage appeal processes, while in Ireland and the United Kingdom, the appeals initially are lodged with the valuation office and the subsequent appeals are taken to specialized tribunals.

In developing countries, however, the importance of appeals is generally minimized, since their level of taxation is mostly low and the administrative costs of appeals are generally higher and time-consuming. Therefore, in some cases, the cost to the taxpayer to undertake an appeal may not compensate the expected reduction on taxation (Kelly, 2013).

¹⁶ Tanzi (2001) proposes a system that discloses self-assessment values and anyone who wants to buy a property at a price of a percentage that exceeds the declared value could make an offer. If the owner refuses the offer, the bid plus a penalty would become the new assessment.

2.6.2.4 Revaluations Cycles

The time lag with which valuations are updated is called the “valuation cycle” or “assessment cycle” (IAAO, 2013, p.16). Revaluations should be frequent enough to maintain a certain degree of uniformity and horizontal equity, which means they should be adjusted to keep pace with market value changes, as well as changes in general price levels, especially amongst developing countries where inflation rates are often high. Ideally, valuations should be updated annually if necessary; however the administrative costs to annually undertake this task could not compensate the gains in revenues and equity. Thus, the administrative practice or the legislation can establish a full valuation cycle or one of “rolling revaluations”. Rolling revaluations is the mechanism where reappraisals recurrently occur in shares of the total tax roll (UN-Habitat, 2013).

It has been very common to encounter valuations based on market values that are quite outdated. The European Commission (2015, p.42) states that at least 10 countries in the European Union still use outdated values (Austria, Belgium, Cyprus, Estonia, France, Germany, Greece, Italy, Luxembourg and the United Kingdom). Even if adjustments based on inflation or real estate indexes can be uniformly applied to all properties, the horizontal inequity is increasingly enhanced. The legislation of some countries (Austria, Germany and the United Kingdom) states that the valuation must be nationally performed at the same time. This legislation stipulates that all taxable properties must be uniformly assessed throughout the country, in order to avoid unfair taxation amongst taxpayers of different jurisdictions. However, this initial righteous concern in fact becomes deleterious when revaluations are no longer performed, since market values vary greatly over time, resulting in similar market valued properties at the current time supporting very disparate tax burdens. Thus, related to this issue, Table 2.1 was compiled to display the year of value basis in some countries and jurisdictions, mainly where valuations are nationally established, based on the data compiled by UN-Habitat (2013, p.46-51) for European countries. In addition, this study gathered the valuation year basis of some developing countries, by using other data sources in order to verify whether antique valuations are a phenomenon that exists in both developed and in developing countries. The table’s information reflects the scenario of the year of 2013, and highlights the valuation basis time.

Table 2.1: Value basis year in some countries or jurisdictions

| Developed and transitional countries | | Developing countries | |
|--------------------------------------|--|----------------------|---------------------|
| Austria | 1973 | Botswana | 2007 (Gaborone) |
| Belarus | 1994 | Chile | 2001, 2013-2014 |
| Belgium | 1975 | Kenya | 1982 (Nairobi) |
| Cyprus | 1980, 2015 | Nepal | 2004 |
| Estonia | 1996 | Malaysia | 1992 (Kuala Lumpur) |
| Germany | 1935 (farms and former Eastern Germany) 1964 (former Western Germany) | Philippines | 1991 (Metro Manila) |
| Italy | 1992, 2002 | Puerto Rico | 1964 |
| Portugal | 2004, 2014 | Thailand | 1977, 2008, 2013 |
| Russia | 1999 | Tunisia | 1997 |
| United Kingdom | 1973, 1991 (England and Scotland) 1991, 2003 (Wales) | Uganda | 1990, 2005 |
| | | Uruguay | 1963, 2006 |

Data Source: UN-Habitat (2013, p. 46-51), with exception of: Botswana and Kenya (McCluskey and Franzsen, 2016); Chile (Acuña, 2017); Italy (Slack and Bird, 2014); Malaysia (McCluskey and Franzsen, 2013b); Nepal (Pandey, Chhetri and Baskota, 2013); Nicaragua (Bird, 2004); Philippines (Aguilar, 2014); Puerto Rico (Puerto Rico's Department of Finances, 2016); Thailand (Varanyuwatana, 2004); Uganda (Olima, 2010a); Uruguay (Casanova, 2017).

Table 2.1 shows that there is not a great difference between the developed and developing countries' groups in relation to the year of the valuation basis. The only observed trend is that countries with more property tax interferences from higher levels of government generally have an older value basis. For example, the requirement that the revaluations must be nationally performed at the same time lead to widely spaced basis years in Great Britain (1977, 1991), Germany (1935, 1964) and Puerto Rico (1964). In addition, older value basis also occurred in the United States where state governments are allowed to interfere in local property taxation (California and Oregon).

2.7 Exemptions, Reliefs and Incentives

This section discusses the role of the exemption and relief mechanisms, the interferences in local property taxation by higher tiers of government, and the use of tax incentives to attract private investors and promote local development. These issues may have a great impact on property tax performance by reducing the tax base restraining the impact of any property tax reform.

2.7.1 Tax Exemptions and Relief

According to UN-Habitat (2013), all property tax systems in the world provide some type of selective relief. The most common form of relief is to government properties and properties of charitable, religious or educational organizations. Exemptions and tax relief for residential, especially owner-occupied, and agricultural properties are politically very popular worldwide, while exemptions for business properties are not.

Cornia (2013) and Slack (2013) each highlight that the excessive relief policies result in lack of taxation uniformity and equity, and there is great difficulty in removing the relief mechanisms which are entrenched in a tax system. As an example, despite being popular in India, Pakistan and Serbia, the exemption for owner-occupied housing has been pointed out as being extremely costly, deleterious and regressive (Norregaard, 2013). Bahl (2009) estimated a 200 percent gain

of revenues if the exemption for owner-occupied houses was abolished in the province of Punjab, Pakistan. Exemptions for owner-occupied houses also exist in Italy (Slack and Bird, 2014), Thailand (Varanyuwatana, 2004), Uganda (Olima, 2010a) and probably in many other countries. Such a scheme is also administratively costly, due to the recurrent verification of properties' tenure choice. In Latin America, however, which includes Brazil, the most common form of exemptions is those granted to low assessed value residential property.

There are several mechanisms to relieve property taxation. The more visible ways include the differentiation amongst taxable ratios (the ratio of taxable value to assessed value), tax rates and those which fully exempt certain properties or groups of taxpayers. The non-transparent ways are differing tax rebates and credits, or differing assessment mechanisms (assessment techniques that favor certain types of properties and disfavor others) (Kitchen, 2013; UN-Habitat, 2013). Both visible and non-transparent ways are common amongst Brazilian municipalities, in order to surtax nonresidential and relief residential properties (Carvalho Jr., 2012).

Exemption mechanisms can be related to the taxpayers' status or to the property status itself. Those related to taxpayers' status comprise exemptions for the elderly, the disabled, former military fighters, self-owners and low income taxpayers, while those related to the properties' status comprise exemptions for low valued, smaller sized, residential, agricultural, religious and educational properties. Sometimes such differences are very tenuous. For example, the legislation can exempt properties owned by governments (based on taxpayers' status) or used for governmental purposes (based on properties' status) (UN-Habitat, 2011).

Nevertheless, there is a general agreement that the more a tax system is detail designed in relation to tax exemptions, the more costly is its administration. On the other hand, generic exemptions lead to more revenue losses. For example, recurrent inspections are required, if only properties that are used for governmental services are exempted, rather than if the criterion was government ownership. Exemptions for low-income taxpayers are likely to be fairer and narrower than when the benefit covers low-valued properties; however, they have much higher administrative costs.

It has been common to exempt low income settlements from paying property taxes. The reasons are that the administrative costs are higher than the revenues collected from low valued properties, as well as that such exemptions would provide a fairer system (UN-Habitat, 2011). However, the argument that poor occupants should pay a minimum tax has achieved some popularity. As recognized, indeed, the property tax bills provide local government recognition of land occupancy and this is sometimes the only document of tenure right. In addition, these taxpayers would tend to feel more legitimized in claiming for better public services in their communities, enhancing their sense of citizenship. This point is explored in Smolka and De Cesare (2013). The authors state that registration of informal settlements may encourage the focus of public investment on the poorest areas, since cities in developing countries have historically over-invested in high-income areas and have overlooked low-income areas. Thus, despite having little impact in terms of revenues, symbolic property tax payments would be likely to strengthen fiscal culture.

2.7.2 Interference by Higher Tiers of Government

The interference in local property taxation frequently carried out by central and intermediate governments (states, provinces, regional governments) has had four main justifications, pointed out by many authors, as listed in Bird (2010): a) to avoid tax competition amongst local jurisdictions (Ter-Minassian, 1997); b) the wish to achieve horizontal equity within countries as a whole (Musgrave, 1983); c) the existence of economies of scale and scope in tax administration (Vehorn and Ahmad, 1997); and d) the higher visibility (accountability), stability and uniformity (Norregaard, 1997). However, it has been very common for central or intermediate governments to establish a great variety of limits, ranges or closed options in relation to many property tax attributes, even if some local discretion is granted. For example, higher tiers of government can set a list of property tax bases to be chosen, a list of exemptions, the taxable ratio to be applied on the valuations, a range for tax rates and how intensively the taxes are enforced. Indeed, Slack and Bird (2014) empirically note that in most countries, higher tier governments play a significant role in the local property tax policy, design and administration. The authors indicate that the most common interference is to establish the tax rates or apply centrally-set limits. Interference in the local assessment system or even taking over the assessment function is common. The reason provided by the authors for such interferences is that centralized assessments may achieve economies of scale, ensuring valuations fairness and uniformity.

Most of those who defend property tax centralization argue that local governments are incapable of effectively administering their own taxes, and are under political pressure to not strengthen property taxation. However, it has been empirically proven that even low skilled local administrators have better and more knowledge about the real estate market of their jurisdictions, than an uninformed and remote centralized agency (Norregaard, 2013; UN-Habitat, 2011). When property tax is fully controlled by central governments, there is always a temptation to grant residential exemptions with minor loss of overall tax revenues, since property taxes are generally a small portion of the taxes collected in a country. In addition, when levied or even (partially) administered by central or intermediate governments, property taxes are often not fully devolved in accordance with the location of the tax base, losing their essence of a benefit tax.

Bird (2010) states that detailed planning and the application of a phase-in within the mechanism should be performed, to switch property taxation from central to local governments, when the weak administrative capacity of local governments is apparent. For example: a) beginning with the larger cities and subsequently moving to the smaller ones; b) provisionally transferring taxation to intermediate governments; c) supporting local administrative infrastructure, sharing data, promoting primers, manuals, seminars, qualification courses and other agreements for local governments, and d) promoting 'pilot' experiences.

Studies have analyzed three main consequences of property tax interference set by American state governments. The first consequence is that the revenues have decreased. Shadbegian (1999) as cited in Kitchen (2013) found that local property taxes *per capita* fell by 3 per cent after tax limits were imposed. The second consequence is that reductions in property tax revenues have been compensated by increases in other local taxes. There is some evidence

that local user fees, permits and licenses were raised after the application of property tax limits (Brunori, 2007; O’Sullivan, 2001; as cited in Kitchen, 2013). The third consequence is that, according to some studies, property tax limitation may have affected the amount and quality of local public services as well as switched their provision to the private sector (O’Sullivan, 2001, as cited in Kitchen, 2013).

Bahl and Wallace (2008) note that higher tiers of government have frequently reduced the property tax base by listing exemptions, reliefs and ceiling mechanisms in both developed and developing countries. Limiting annual tax increases is a very popular policy, especially during revaluations that greatly increase taxation. Some countries even prefer to rely on national valuations performed in the distant past, rather than undertaking new valuations. Indeed, a long period without revaluations may lead to dramatic increases in property tax burdens when revaluations are finally undertaken, enhancing political and economic fallout. Annual capping of the tax increases, tax rate reduction, and/or smoothing out the increases during a certain period (the phase-in mechanisms) are alternatives to mitigate these consequences.

Tax rate reduction or smoothing out the increases during a certain period are generally considered fairer than increase caps. Increase caps can greatly enhance horizontal inequity, since different properties may have different assessment ratios. As an example, two 100,000\$ market valued properties are formerly assessed at 50,000\$ and 30,000\$, under an annual tax rate of 1 percent, which results in a respective tax burden of 0.5 percent and 0.3 percent. After fair revaluations, both properties would be assessed at 90,000\$, but under a tax increase cap of 50 percent. In this case, the effective tax burden would be 0.75 percent and 0.45 percent, giving the properties the same horizontal inequality, despite both properties being equally assessed. Indeed, Norregaard (2013, p.34) states that “a problem with capping is that, by driving a wedge between tax liability and the market value, the tax may be transformed into something other than a real property tax, with the resulting consequences that may arise for economic efficiency, revenue raising and fairness”.

In Brazil, unfortunately, the tradition has been to impose tax caps rather than phase-in mechanisms during the revaluations (Carvalho Jr., 2014). Increase caps have less political fallout in a process of valuation reform, because they do not lead to dramatic increases in land zones that had greatly appreciated after the former valuations; however the result remains horizontal inequity. The land appreciation of certain areas is a challenging phenomenon in developing countries with an intensive process of urbanization.

Although the interferences typically applied by central and intermediate governments reduce the autonomy to raise local property tax revenues, national regulations may be important in providing general rules through which local governments can impose and administer property taxes. There are cases of positive interference. For example, South African national legislation states that local revaluations must occur at least every 4 years (Republic of South Africa, 2004). This is a good policy for countries with low local political will in promoting revaluations. Where such national regulations do not exist, a local regulation establishing the valuation cycle can be applied. This case occurs in Brazil. Despite not having any federal law regarding the valuations, in 2009, São Paulo’s Municipal Council amended the local tax code and introduced a 2-year

valuation cycle to be applied from 2013. This will be likely to reduce the political costs during the valuation discussions that in Brazil must be presented in a municipal law passed by the municipal councils (Carvalho Jr., 2014; Municipality of Sao Paulo, 2009).

Nevertheless, higher tier regulations and interference should be kept to a minimum, in order to allow local government to develop their own property tax systems, based on their own realities and revenue needs. There are several negative interferences worldwide and these will be listed in the cases of Germany, India and the United States hereafter.

National tax uniformity, equity and harmonization are strong principles in the German property tax system. According to the German Assessment Code, the rental values for all property-related taxes must be centrally established at the same time, and applied to all properties in the country. As a result, most of the current valuations date back to 1964, when the last property census occurred (Spahn, 2004). For rural areas and those areas from the former Eastern Germany, the last property census occurred in 1935.

In India, in the absence of constitutional provision, state governments are allowed to regulate property taxes levied in their local governments. Rao (2013) highlights that some Indian states have simply abolished property taxation, while others have exempted residential properties or self-occupied residential properties. In addition, a 1976 decision of the Indian Supreme Court states the need to replace the annual rental value basis as a condition to update the tax base under the rental control acts, which provides an example of judiciary interference.

In the United States, Anderson (2006) notes that it has been common for local property tax to be capped or tax rates limitation to be levied by state governments. Nevertheless, another popular interference is the limitation of the taxpayer's income that can be taken by property tax, a mechanism that is called *Circuit-Breakers* (Bowman *et al*, 2009). New York and California provide interesting cases of property tax intervention. In 2015, New York City's top statutory tax rate of 19.16 percent was applied under a 6 percent or a 45 percent assessment ratio with tax increase limits and caps established by New York State's legislation. In California State, Proposition 13 of 1978 froze valuations upon the 1975 basis, established the tax rate as 1 percent, and limited the valuation increase at 2 percent per year (except in the case of sales or new constructions). In other words, California's Proposition 13 establishes the valuation at the time of purchase, also known as the "acquisition value system" (McCluskey and Franzsen, 2013a). As a result, in 1979 there was an immediate decrease of about 45 percent in revenue (Kitchen, 2013). There was also a gradual change in the real estate market; resulting in properties of equal market value having different tax burdens and increasing consumers' preferences towards rental properties assessed prior to 1975 (Wasi and White, 2005).

2.7.3 Incentives to Investment Location

Granting local tax incentives to attract investment to a location is a very popular practice in some countries, including Brazil. The usual argument is the job creation and the increased local investment and production output that the incentives inspire. They are intended to influence investment decisions and reward certain economic activities. When local governments are

autonomous and may establish their own tax policies, there is a temptation to offer property tax incentives, since it is one of the few location factors that they can influence directly. Therefore local governments tend to engage tax competition to attract and keep taxpayers who they believe to contribute more in local revenues than they consume in government services (Slack and Bird, 2014). The improvement of the local employment indicator is also a frequent (and political) argument in Brazil to granting tax incentives; however they are usually granted without any prior study of effects on local economy and public finances.

Property tax incentives can be granted temporarily or not, and harmful tax competition often occurs. Studies in the United States show that property tax competition is widespread (Brueckner and Saavedra, 2001). However, evidence shows that property tax incentives have been unimportant in investment location (Bartik, 1991; Kenyon, Langley and Paquin, 2012; Kitchen and Slack, 1993). Kitchen (2013) argues that despite it being agreed that the local cost of doing business is an important factor in investment location decisions, there is no consensus on whether the property taxation level would have an effect thereon. The author explains that the extent to which business responds to property tax differentials and incentives depends on many factors. For example, a company decides to be located in downtown areas for many reasons, regardless of the level of property taxation. In addition, companies may have the capacity to shift the tax burden onto consumers. A case study of office buildings in the Downtown Chicago area shows that 45 percent of property tax differentials were borne by tenants, while 55 percent were borne by owners (McDonald, 1993).

According to Kenyon *et al* (2012), although local governments generally think that property tax incentives are decisive for investment location and there are exaggerated business lobbies for tax breaks, there is little evidence that they are an effective instrument to promote economic development in the United States. The authors conclude that: a) property taxes have been a small part of the total costs for most companies; b) companies would have chosen the same location even without incentives; c) companies could obtain similar incentives in other jurisdictions due to tax competition; and d) these incentives have annually cost 15 billion dollars in forgone revenue (7 percent of property tax revenues on business properties in 2010).

2.8 Tax Rates

Bird (2000) notes that the local ability to set the tax rate is a critical aspect of the property tax policy, since it directly affects the level and composition of revenues as well as the local autonomy and accountability. Local governments are in the best position to determine what their citizens want and need. Therefore, they should be as autonomous as possible for revenues, in order to fund the local public services that are assigned to them.

Zorn (2013) explains that the tax rate setting is an important policy instrument to effect any property tax reform because it permits management of the revenue outcomes. During a property tax reform, if the tax rates are too low, the costly upfront investment to improve the registration, assessment and collection may not be compensated by the revenue outcomes. Considering that certain levels of revenue are needed to fund the local government functions, expanding the tax

base would result in reducing tax rates. On the other hand, if the tax base is narrowed by low cadastral coverage, low assessment levels or excessive exemptions, higher tax rates are required.

Thus, this section discusses the property tax rates issue, which is divided into three parts. The first part explains the main challenges of tax rates design; the second part debates the relationship between tax rates level and budgetary needs; and the third part encompasses the multiple tax rates schemes, including their main mechanisms, advantages and drawbacks.

2.8.1 Tax Rates Design

Most often, tax rates are fixed in legislation and valuations are adjusted by inflation. However, the property tax rates can be the adjustable variable when a country does not promote recurrent revaluations or does not adjust valuations by inflation. When tax rates are fixed in legislation, their design should be based on the main concerns of the property taxation system. For example, tax rates should be: a) based on budgetary needs if funding local expenses is the main concern; b) uniform if the main concern is neutrality; c) progressive if the main concern is the system's fairness; and d) selective on land and improvements if the main concern is economic efficiency (UN-Habitat, 2013).

Kitchen (2013) argues that property tax rates tend to be harmonized amongst neighboring jurisdictions. Taxpayers are frequently aware of the tax rates of their neighboring jurisdictions and can bring political pressure to bear for equalization. On the other hand, executive local governments can justify their tax rates values by comparing them with the tax rates of their neighbors. Carvalho Jr. (2006) noted that this commonly happens amongst Brazilian municipalities, when the tax rates of a sample of 365 municipalities were analyzed.

UN-Habitat (2013) notes that tax rates that are too low or too high encourage inefficient and outdated valuation systems. Rates that are too low would produce very low revenue outcomes, even if valuations are close to market values. Conversely, tax rates that are too high and flexible do not demand recurrent adjustments and revaluations to provide the required revenues. In addition, simple tax rates increases to raise revenues are much less costly than to undertake revaluations.

However, no matter which policy is needed or chosen by local governments to mobilize property tax revenues, this study highlights that cadastral and valuation reforms are costly and tax rates must be high enough to compensate, at least for their upfront costs. Wallace (2006) noted that when a very low statutory tax rate is established, the local government has little incentive to increase tax administration performance. These findings were also confirmed in Indonesia by Bahl and Martinez-Vazquez (2007), who noted that the national property tax reform undertaken in the early 2000's did not generate significant revenue outcomes, since the national tax rate was only 0.5 percent under a taxable ratio of 20 percent or 40 percent.

2.8.2 Tax Rates Based on Budgetary Needs

UN-Habitat (2011) argues in favor of tax rates being set locally, to facilitate better local autonomy, transparency and accountability. The autonomy to set tax rates ensures revenue

management, even if the valuation system is not efficient, which promotes better fiscal responsibility. When tax rates are based on budgetary needs, it is necessary to estimate the amount of property revenues raised, as occurs in France, the Netherlands, South Africa and Switzerland¹⁷. In this case, Zorn (2013) explains that the process of setting tax rates mainly depends on three steps. The first step is to establish all the expenditure needs, the second is to subtract all non-property tax revenues expected, and the third is to divide the demanded property tax revenues by the property tax base. UN-Habitat (2013, p.21) describes a tax rate setting equation (Equation 2.1) that provides evidence of this approach, also referred to by the literature as the “residual method”, as follows:

Equation 2.1 (tax rate setting):

$$R = \frac{E - NPR}{AV}$$

Where:

- a) R is the tax rate;
- b) E is the total approved local budget;
- c) NPR is the total estimated non-property tax revenue;
- d) AV is the tax base.

Equation 2.1 shows that the tax levied is affected by both the tax base and the tax rate. Lower tax rates are required in scenarios where the tax base is wider. A wider tax base means that the property tax system has high ratios of coverage, assessment and collection, and a low ratio of exemptions. On the other hand, a higher tax rate is required in scenarios where the tax base is narrowed by low cadastral coverage, deficient valuations and a high level of exemptions and delinquency. Certainly when a property tax system has multiple tax rates, this equation design is not so simple, since different equations are required to be applied to different tax base brackets and rates. However the stated assumptions related to the tax base level and overall level of taxation still remains.

2.8.3 Multiple Tax Rates

Different tax rates structures can be applied to the property tax base. Proportionate, progressive or selective tax rates are normally applied when the tax base is the capital value. A proportionate rate is also typically applied when the base is rental value, while in the area-based systems the usual rule is a proportionate rate on a fixed monetary amount per area (Franzsen and McCluskey, 2013). Norregaard (2013) contends that a uniform (proportionate) rate structure is more transparent, simpler, fairer and makes the revenues more predictable. It also simplifies tax administration, minimizes the risk of tax avoidance and evasion, and minimizes the risk of misallocation of capital. The author argues that if the main intention for lower residential tax rates is protecting the poorest, a better solution would be a tax threshold.

¹⁷ Coincidentally, these countries have an out of date assessment, according to the European Commission (2015).

Slack (2010, 2013) argues that in most countries, local governments levy property taxes with variable tax rates, especially those that vary by property class (residential, commercial and industrial, vacant land parcels, etc), which allows better tax burden management by local governments. The author states that variable tax rates are justified in terms of equity and efficiency. In terms of equity, tax rates should be higher on properties that use more public services (benefit approach). However, according to Plummer (2009), tax rates should be higher for taxpayers with a higher ability to pay (fairness approach). In terms of efficiency, higher taxation is justified on more inelastic tax bases (residences and land parcels). The author argues, however, that higher taxation on residential properties has rarely occurred worldwide.

2.8.3.1 Progressive Tax Rates

Progressive property tax systems are those in which the tax rates increase with the tax base bracket value. They are justified in terms of equity, since there is a high relationship between income and real estate wealth. Zorn (2013) maintains that the main advantage of the progressive tax rates is the ability to generate a more stable stream of revenue, and the resulting higher equity matches the taxpayer's ability to pay, based on the property value.

UN-Habitat (2011) asserts that proportionate rates are administratively easier than progressive tax rates, since less information is required. Progressive systems demand more accurate property valuations and meticulously designed tax brackets, in order to maintain equity. Progressive tax rates may greatly enhance horizontal inequity if the valuations are not accurate. In addition, depending on the bracket design, revenues can be mitigated if properties are under-assessed and most of the tax roll falls on the lower tax brackets, including those that are high market valued (Carvalho Jr., 2012).

According to De Cesare (2012), progressive tax rates are very common amongst Latin American countries, with the intention to enhance equity, since property inequality in the region is very visible where luxurious buildings contrast with low income informal settlements. In addition, despite being progressive, the individual income tax in Latin America usually does not operate well, with regard to the reduction of inequity. Therefore progressive property tax systems could be an extra policy mechanism to attain equity. Indeed, until 2000, progressive property tax rates were under judicial litigation and declared unconstitutional in Brazil, since owners of high valued properties had more capacity to exert political and judicial pressures. Therefore, a constitutional amendment to legalize progressive property taxation in Brazil was required (Federative Republic of Brazil, 2000a).

2.8.3.2 Different Tax Rates on Residences and Businesses

Residential properties often enjoy favorable property taxation worldwide. Slack (2013) notes that this can be carried out in three different ways: a) applying lower taxable ratios or favorable assessment mechanisms; b) granting higher levels of tax exemptions and relief; and c) applying lower tax rates. In addition, the author notes that lower residential taxation has meaningful political significance, since occupants of residences usually vote in local elections.

On the other hand, nonresidential properties encompass a variety of property uses, such as commercial, industrial, governmental and special uses (pipelines, railway rights of way, etc). Higher property taxation amongst nonresidential properties is a very common practice around the world (Bird and Slack, 2004; Kitchen, 2013; Slack, 2010). This is carried out in two ways. The first way is assessing business properties at higher values, for instance, by applying higher taxable ratios, by using the “income approach” method of valuation that assesses business properties on their “highest and best use”, and even by considering some entrenched movable property in the valuation (such as machinery, non-building structures and other tangible assets). The second way is merely to apply higher statutory tax rates.

Some jurisdictions may assess business properties on a greater ratio of their market values than residential properties, by using a different appraisal methodology. Amongst the three standard methods: sales, income and cost, the sales method is most often used for residential properties and least often for business properties (Franzsen and McCluskey, 2013). Although each methodology should lead to the same valuation, it has been demonstrated that the cost method may undervalue properties, while the income method may overvalue them (Cornia 1995; as cited in Kenyon *et al*, 2012).

The verified higher taxation on business properties is often not related to the differential use of local services. Kitchen and Slack (1993), as cited in Slack (2013), found that, on average, in eight municipalities of Ontario Province (Canada), nonresidential properties comprised 51 percent of property tax revenues, but demanded 40 percent of municipal expenditures. Following this line of thought, Kitchen (2013) argues that higher property taxation on business is likely to be used to subsidize services consumed by residential properties, since local services are mostly driven by the community’s demands. The author relates that this assumption was confirmed in Canada by a number of studies (Kitchen and Slack, 1993; KPMG, 1995; MMK Consulting Inc., 2004).

In Brazil, indeed, there is a trend to surtax nonresidential properties by using each of the following three mechanisms: assessment methodology¹⁸, a lower level of exemptions and higher tax rates (Carvalho Jr., 2012). However, it is not known whether nonresidential properties demand more public services or generate bad externalities to justify their higher level of taxation. Certainly industrial properties generate environmental problems that have to be controlled by local government. On the other hand, certain types of nonresidential properties can appreciate land zones and therefore improve taxation.

2.8.3.3 Different Tax Rates on Land and Buildings

Of particular interest to policymakers is a differential taxation between land and buildings. The rationale for taxing land at a (much) higher tax rate than buildings is more efficient land use. The land has fixed supply and therefore land value taxation cannot be transferred, which makes

¹⁸Although all assessment methodologies (sales comparison, cost approach or income approach) aim to estimate the real market value, Brazilian municipalities are autonomous to design their own methodology which can be influenced by political issues. For example, Rio de Janeiro’s municipal legislation establishes a higher depreciation index for residential properties. In addition, an assessment coefficient that favors small sized residential properties is applied. Therefore, the assessment ratio is higher on nonresidential and large-sized properties (Carvalho Jr., 2012).

land speculation less economic. Conversely, taxing more buildings is a disincentive to land development (Franzsen and McCluskey, 2008; Oates and Schwab, 2009; UN-Habitat, 2011).

As debated in Section 2.6.1.4, many economists have highlighted the advantages of the pure land tax. Cohen and Coughlin (2005) defend a two-rate tax on land and buildings, which means higher tax rates on land, rather than taxing land and structures at the same rate, as a more general and practical alternative to incentive land development. UN-Habitat (2011) cites the Ukraine, Jamaica, Australia, Kenya and New Zealand as examples of land value systems use; however the study mentions that systems where land parcels are taxed at higher tax rates than improved properties, are much more commonly practiced worldwide. Split tax rate systems are popular in Latin America. Schechinger (2004) analyzed property taxation in Mexico City, Santiago, Bogota and São Paulo. The author found that vacant land statutory tax rates were higher than those on built on properties, such as in Bogota (2 times higher), Buenos Aires (5.7 times higher), Santiago (2.1 times higher) and São Paulo (1.2 times higher). Carvalho Jr. (2009) mapped the statutory tax rates in a sample of 365 Brazilian municipalities. The author found that the median tax rate for residential properties was 0.8 percent, while for unimproved land it was 2 percent (2.5 times higher).

2.9 Billing and Collection

High demand for public services due to growing urbanization and the strategies on how to fund these demands are a great challenge in many developing countries. Collection-led strategies in property taxation are those that broaden the tax base, minimize exemptions and reliefs, advertise and facilitate compliance, improve transparency and effectively apply sanctions and penalties for delinquency (Kelly, 2013; McCluskey and Franzsen, 2016).

The collection approach in property taxation is a relevant and complex issue that comprises several steps, mechanisms and policies in which property taxes can be effectively collected. Thus, this section examines the impact of collection rates and collection-led strategies in property tax performance, which is divided into four topics: a) the importance to improve billing and collection, b) the voluntary compliance policies, c) the enforcement instruments applied against delinquency, and d) the higher collection costs and lower collection rate on unimproved land.

2.9.1 Improving Billing and Collection

Dillinger (1991), as cited by Bird (2010), was one of the first authors who emphasized that in most countries there is an urgent need to improve the final steps of the property taxation process, namely the collection and enforcement tasks. The author explains that the development of new mapping registers and sophisticated valuation models is costly and may not be effective to raise revenues if the collection rate remains low. Therefore having an efficient collection system is the main key to achieve any other target in a property tax reform, including uniformity and equity. The tax compliance and the administrative costs must always be taken into account when a property tax is designed.

Most developing countries have historically demonstrated a low level of property tax collection, as this is a much more important issue than in developed countries. Kelly (2003; 2013) studied the importance of both compliance and enforcement policies in developing countries, highlighting that the main objective in all property tax systems should be to mobilize revenues in an efficient and equitable manner to fund local public services. McCluskey and Franzsen (2016, p.5) also note that “given the extremely low level of collection efficiency in developing countries, much of the effort spent in mapping and valuation is likely to be wasted if corresponding efforts are not made to improve collection administration”. Indeed, as the authors contend, the high upfront costs in performing and modernizing the registration and valuation systems would not be compensated in terms of revenue yields under the extremely low collection rates verified in many developing countries. Furthermore, any other non-revenue concerns (fairness, land development incentives, etc) would not be effective.

UN-Habitat (2011) reinforces that no matter how efficiently the registration is managed, the valuations are accurate and the tax rates are properly set only if property taxes are effectively paid. The study argues that the collection rate depends on the taxpayers’ fairness perception, the agencies’ administrative capacity, how the land-related rights are viewed in the community, and the political will in promoting and enforcing property taxation. Taxpayers should perceive that the tax is used to fund public services in the community and that they are all treated equally in terms of taxation.

Many surveys have displayed that property tax collection has been very low in a number of developing countries where the index has ranged from 30 percent to 60 percent in some studies, such as Youngman and Malme (1994, 2000) and Bird and Slack (2004). A recent compendium of Norregaard (2013) notes a low collection rate in Macedonia (15 percent), the Philippines (50 percent) and Kenya (60 percent). Olima (2010a, 2010b) estimated a collection rate of about 50 percent in Kampala (Uganda) and Dar Es Salaam, (Tanzania), while Bahl *et al*, (2009, p.28) found an overall collection rate of only 37 percent amongst 36 large Indian municipal corporations. In Indonesia, Kelly (2013) states that collection rates improved from 50-60 percent in 1990 to 80 percent in 1994, due to a collection-led reform. McCluskey and Franzsen (2016), in criticizing countries that have undertaken property tax reforms focused on valuations, even mention collection rates under 50 percent, such as those in Sierra Leone, Tanzania and Uganda.

2.9.2 Voluntary Compliance

Tax collection is challenging in many developing countries that do not have a culture of paying taxes fully and voluntarily. Property tax systems should attempt to make it easier and less expensive to pay the taxes, rather than to avoid them. According to Kelly (2013), policies that facilitate compliance must include: a) tax bills accessible online or available at taxpayer’s service centers; b) comprehensive payment options, such as installments by recurrent automatic withdrawals on taxpayers’ banking accounts or credit cards; c) correct taxpayer notification and billing, which depends on an accurate taxpayers’ register; d) a sense of the system’s transparency and fairness and e) a sense that sanctions and penalties will be effectively applied.

Improving transparency must include: a) the publicity of local finances (city budget, revenues collected, expenses, assets and liabilities, amongst other financial statements); b) the design of simple and easily understood tax legislation; and c) administrative tax tribunals to efficiently and inexpensively resolve litigation and appeals. Advertising compliance is important and should be a non-coercive policy. It should involve available public reports of tax administration, brochures, public campaigns in the media, schools and on the internet, and a (partial) revenue linkage to the services that the community has most frequently demanded (Plimmer, 2013; Rosengard, 2013).

Tax bills are usually mailed by post; however in most developing countries the postal service is not efficient or the taxpayers are sometimes unknown (this is a very common situation amongst vacant land properties). However, even in developing countries, internet facilities and accessibility is widespread and the tax administration can provide online platforms where taxpayers can easily download their tax bills (UN-Habitat, 2011).

Granting a reasonable number of installments or partial payment reduces the political costs in paying property taxes, since this provides a better adjustment through taxpayers' monthly income (Kelly, 2013; UN-Habitat, 2013). In addition, the compliance costs are also reduced when property installments are done by automatic withdrawals from taxpayer's banking accounts or credit cards. As discussed in Section 2.3.2.3 of this chapter, taxpayers do not notice when they pay indirect taxes on a daily basis, but in contrast, property taxes are generally levied in a lump-sum annual bill (Kelly, 2013; Slack, 2013). The author recommends that as far as possible, the number of installments mechanism should be granted. Indeed, some countries even grant large discounts for lump-sum anticipated payments with the intention to reduce compliance costs; however such a policy tends to encourage the perception of an annual bill adjusted into a monthly family budget.

Most of the policies that enhance taxpayer's voluntary compliance and reduce compliance costs depend on internet facilities. Websites should publicize the local public finances, have efficient taxpayers' services and have a service channel to attend to the doubts and questions of local citizens. This ensures more transparency and accountability¹⁹.

2.9.3 Enforcement

Enhancing sanctions and penalties should be the final instrument to improve collection, if other policies that improve registration, reduce compliance costs and enhance voluntary compliance are still not sufficient to change the jurisdiction's fiscal culture and increase its collection ratios (Kelly, 2013; Mikesell, 2013).

More costly enforcement policies should mainly be focused on higher valued residences and commercial properties, due to their lower numbers. Policies that facilitate compliance should mainly focus on lower valued properties and residential taxpayers, due to their wider

¹⁹ De Cesare (2017b) illustrates creative ways to encourage voluntary compliance. For example, in Porto Alegre, tax administration automatically posts (bar coded) proposals of arrears renegotiation, in order to reduce the taxpayers' compliance costs. Tax clearance certificates can be also be issued if the renegotiation terms are fulfilled. In addition, SMS messages and telephone contacts are used to contact taxpayers more easily.

coverage. Imposing strong sanctions for delinquent taxpayers is politically very difficult, especially amongst local taxpayers, who are more susceptible to political pressure (Fjeldstad *et al.*, 2014). Therefore enforcement of policies greatly depends on the local political will in promoting, informing and advertising property taxes. Taxable property seizure and its auction to raise funds to pay tax arrears can be an ultimate sanction if property is viewed as an economic asset (Kelly, 2013). Alternatively, the seizure of taxpayer's assets should take into account whether land is viewed as a social and fundamental good (UN-Habitat, 2011).

Bahl and Martinez-Vazquez (2007) state that property tax enforcement has been a great challenge in developing countries, and the only action typically applied is to prohibit the sale or transfer of properties in arrears. However, it has been pointed out that other feasible instruments of enforcement are as follows:

- a) Lawsuits and tax liens; however they are costly and time-consuming and demand accurate taxpayer identification to start the juridical procedure;
- b) The taxpayer's placement on a national blacklist of delinquents (run by the private sector or government), which can be directly carried out by local authorities or by a specific intermediary entity (such as the notaries);
- c) The outsourcing of tax arrears to financial entities with better administrative capacity, skilled human resources, expertise and economics of scale and scope in charging debts. The outsourcing is advantageous when the property owner is unknown or when its registration is outdated;
- d) Seizure and auction of the taxpayer's debit property or other taxpayer's assets (cars, deposits or financial investments). Alternatively, the seizure of other taxpayer's smaller valued assets would be more feasible when the arrears amount is not so large.
- e) Some non-property-related penalties, such as restrictions on the taxpayer's driver license or automobile transit license, amongst others²⁰;

As an example of creative but polemic enforcement policy, in 2014 Greece introduced an area-based central property tax (Unified Property Tax) levied on the occupants of residential and commercial buildings that was charged to the electricity bills. Through administration by the electricity companies, the collection rate was 85 percent, since tax delinquency would result in the electricity being cut off. However, sanctioning non-payment by shutting off electricity may be deemed unconstitutional and prove very unpopular. Alternative ways to achieve this, such as notifying wages and pensions, and seizing and auctioning other properties (automobile, banking deposits) proved to be a less unpopular but efficient manner of enforcement (IMF, 2013, as cited in Slack and Bird, 2014).

²⁰ However, it is important to mention that the prohibition of property sale/transfer and alternative personal penalties (e.g. restriction on transit licenses) are not allowed by Brazilian legislation.

2.10 Property Taxation Worldwide

The level of decentralization generally causes revenue mobilization from property taxation, and therefore increasing decentralization is the main way to tap property taxation (Brunori, 2007; Musgrave, 1983; Stiglitz, 2000). Nevertheless, a study by Bahl and Martinez-Vazquez (2008) provides empirical evidence that the will for property tax revenues also drives decentralization. Norregaard (2013) found that the level of economic development (measured by GDP *per capita*) and urbanization play a significant role in determining the level of property taxation in a country.

It has been agreed by many authors (Kelly 2013; Wallace, 2006) that revenue enhancement should be the main target in a property tax system, especially amongst developing countries that face administrative challenges and need revenue yields to fund their growing demand for local infrastructure. McCluskey and Franzsen (2016, p.4-5) highlight that “[...] the primary purpose of the property tax is to generate revenue. It is generally a poor tool for non-revenue objectives such as guiding allocative decisions like attracting investment, achieving social goals like combating property speculation, or achieving land reform [...]”. The authors maintain that revenue enhancement can be achieved by changing tax design (reducing exemptions and/or increasing tax base and tax rates) or by improving administration (registration, valuations and compliance and enforcement strategies).

The inequities of property tax systems that produce vertical and horizontal inequity can be used as a reason to convince taxpayers that a reform is needed. Therefore even when high collection ratios are the main target in any tax reform, the improvement of fairness should be a concomitant strategy. In addition, phase-in mechanisms can be applied in order to avoid great shifts in the tax levies (Bahl, 2009; McCluskey and Franzsen, 2016; Slack and Bird, 2014).

UN-Habitat (2011) recommends that property tax reforms should produce a fair and stable revenue yield that achieves between 1-2 percent of the country’s GDP. Analyzing the property tax ratios per GDP in a survey of countries, Norregaard (2013) established benchmarks that reflect the average ratios of the best performers in high income (2.9 percent of GDP) and middle income (0.9 percent of GDP) countries.

Recurrent taxation on immovable properties has had different levels of performance around the world. For international comparison, the best performance indicator would be the ratio of property tax revenues to GDP, since GDP data is available for most countries and is related to the property values (Bahl and Wallace, 2008). Alternatively, the ratio of property tax revenues to local revenues reveals the reliance on property taxation, which also highlights the level of performance.

Norregaard (2013) states that there is a renewed interest in property taxation around the world, especially amongst developing countries. The reasons for this include the devolution of fiscal power to local governments and revenue mobilization to fund their growing urbanization. The author catalogued the introduction of property taxation for the first time and important reform initiatives in some countries, which occurred between 2009 and 2013, as follows:

- a) Cambodia, Croatia, Kyrgyzstan and Vietnam: introduction of new capital values or area-based property taxes;

- b) China, Ireland and Latvia: (re)introduction of residential property tax;
- c) Namibia: introduction of rural land tax;
- d) Egypt, Liberia, Greece, Serbia, Slovenia: significant administrative reforms;
- e) Hong Kong and Singapore: property transfer tax reform.

Table A2 in Annexure A was compiled to display, for the 2010 to 2014 period, the ratios of the recurrent taxes on immovable properties to the GDP in 81 countries that were selected in accordance with the data availability of the IMF (2015), OECD (2015) and the Lincoln Institute of Land Policy (2015) database, as well as some sources from the countries' National Treasuries. In the selection, 17 are developing countries in Latin America, 15 are developing countries outside Latin America, 22 are transitional countries in Eastern Europe and Central Asia, 20 are developed countries in Western Europe and 10 are developed countries outside Europe.

Table A2 reveals differing property tax per GDP ratios around the world; however these ratios tend to be roughly harmonized amongst most countries of the same continents. The average ratio in developing countries (Latin America and Non-Latin America groups) was approximately 0.3-0.5 percent, while in transitional countries it was approximately 0.5 percent, in Western Europe 0.9-1.0 percent and amongst the developed countries outside Europe the ratio was approximately 1.7 percent.

Recurrent property tax is often a local tax exclusively levied by local governments. However, amongst the 81 selected countries, in Azerbaijan, Chile, the Dominican Republic, Egypt, Luxembourg, Hong-Kong and Singapore, recurrent property taxes are levied exclusively by the central government, while in Argentina they are levied by intermediate governments. In addition, in Greece, Iceland, Sweden and the United Kingdom, they are simultaneously levied by central and local governments²¹, while in Australia and Russia they are levied by intermediate and local governments²².

Although recurrent property tax is not an important source of revenue for most national tax systems, they are important to local governments of some countries. Thus, Table A3 in Annexure A was designed to show the ratio of the local recurrent property taxes to all local revenues in countries where property tax is set locally. However, in countries where

²¹ In Sweden, residential property tax is levied by the municipal governments, while non-residential property tax is levied by central government (UN-Habitat, 2013). In England and Wales, the residential property tax (*Council Tax*) is exclusively a local tax with centralized valuations while the non-residential property tax (*Business Rates*) is a central tax administered locally. Central government redistributes *Business Rates* revenues to the councils, according to a national granting formula and since 2013, local governments can retain one half of the *Business Rates* revenues collected (European Commission, 2015).

²² In Russia, land tax and individual property tax are levied by the local governments, while corporate building tax considers various types of movable assets and is levied by the regional governments (Malme and Kalinina, 2001). In Australia, the states levy the land tax on the total unimproved land value, while the local governments levy the municipal rates according to a chosen tax base that can be: a) unimproved land value; b) site value; c) improved value of land and buildings; and d) rental value of land and buildings (McCluskey and Franzsen, 2001).

property tax is levied by two tiers of government (Australia, Russia, the United Kingdom and Sweden). Table A3 merely displays the local ratios.

It is relevant to mention that *all local revenues* include the grants receipt by central governments and other non-tax revenues. This assumption is important, since some studies have analyzed the ratio of property tax revenues to *all tax revenues* which provide much greater ratios, since governmental transfers and other sources of non-tax revenues are usually a large portion of the local budget.

From Table A3, it is noted that, on average, property taxes account for approximately 8-13 percent of all local revenues in the selected Latin American and Western European countries, around 5-8 percent in the transitional countries and developing countries in Asia, Africa and Caribbean, and roughly 30 percent in the developed countries from North America, Asia and Oceania. Except in this latter group, the table displays that few countries of the table's selection had ratios above 20 percent, such as in Honduras and Paraguay (Latin America) and France, Ireland and Spain (Western Europe).

In the following sections, this study analyzes Table A2 and Table A3 ratios in each group of countries.

2.10.1 Latin American Countries

Based on data of the IMF (2015), the Lincoln Institute of Land Policy (2015) and De Cesare (2017), the survey catalogued the ratio of property taxes to GDP in 17 of the 18 Latin American countries, with the exception of Venezuela (no available data) and El Salvador (has not introduced property taxes yet). The average regional ratio was between 0.35 and 0.5 percent in the period of 2010-2014. Chile, Colombia, Honduras, Uruguay and more recently Paraguay were cases of greater performance, with average ratios of 0.6-0.8 percent, while Argentina and Brazil had ratios of 0.35-0.45 percent. At the other extreme, Guatemala, Mexico and Peru had very low ratios (lower than 0.2 percent), while the Dominican Republic had an almost null level of revenues²³.

Table A3 catalogued the ratio of local property tax to total local revenues in only 6 of the 18 Latin American countries, due to the data availability and the existence of property tax set locally, since some countries have central or state property taxation. The ratio had an average value of approximately 13 percent in the region. Higher ratios were found in Honduras and Paraguay (20-30 percent) and Colombia and Mexico (7-11 percent), while lower ratios were found in Brazil and Peru (5 percent). In Argentina, recurrent property tax comprised 3 percent of the total province governments' revenues.

²³ Paraguay reassessed its centrally administered cadastral values in 2012 which led to large revenue gains that increased from 0.3 percent to 0.8 percent of its's GDP (De Cesare, 2012; IMF, 2015). In the case of Mexico, its low ratio is justified, due to the great interference by state governments in local property taxation (De Cesare, 2012).

2.10.2 Developing Countries from Asia, Africa and the Caribbean

The data availability of developing countries in Asia, Africa and the Caribbean was limited, and this study was only able to catalogue 15 ratios, which were, on average, approximately 0.3-0.4 percent of the countries' GDP. South Africa had by far the best ratio, approximately 1.1 percent, which can be considered as a benchmark for developing countries. China has slightly grown its ratio, reaching 0.6 percent in 2013, while Indonesia²⁴, Jamaica (since 2013), Morocco, the Philippines and Turkey have had average ratios of 0.3-0.4 percent. At the other extreme, in India, Mongolia and Thailand, the average ratios have been approximately 0.2 percent, while Cambodia, Egypt, Nepal, and Tunisia have had extremely low levels of revenues.

The ratios of some selected countries are likely to improve. Cambodia only introduced property taxation in 2012 (Norregaard, 2013). Egypt has had extremely low property tax revenues, due to its limited tax base, its lack of inflation adjustment, its wide range of exemptions and its informal property transactions. However, the centralized Egyptian property tax was reformed in 2014, causing the expectation of some gains in revenues (TADAMUN, 2015). In 2012, Jamaica's property tax system was reformed, which provided better tax administration, valuation and collection. Jamaica's ratio increased from 0.19 percent in 2012 to 0.46 percent in 2014 (UN-Habitat, 2011).

Table A3 catalogued 13 ratios of local property tax to local revenues of developing countries of Asia, Africa and the Caribbean, which ranged between 6-7 percent. Higher average ratios were found in the Philippines, South Africa and Uganda (11-16 percent), and Cambodia, Mongolia (until 2012), Morocco, Nepal and Turkey (6-8 percent), while lower ratios were found in China²⁵, India, Indonesia, Thailand and Tunisia (2-4 percent).

2.10.3 Transitional Countries

This study considered as transitional countries those defined as such by the methodology of The World Bank (2002) that are changing from a centrally planned economy to a market economy and carrying out structural reforms intended to develop market-based institutions. Table A2 catalogued the ratios of property tax to GDP in 22 of the total 28 transitional countries in Europe and Central Asia. The transitional countries' average ratio was 0.5 percent between 2010 and 2014, as they are in an intermediate position in relation to the world's property tax performance. These countries had higher ratios than developing countries, but lower ratios than most of the developed countries. Latvia, Poland and Russia

²⁴ It is important to explain that property tax was a central government tax in Indonesia until 2009, when it was gradually devolved to local governments, and this transference process was scheduled to be concluded in 2014. However, as shown by Table A2, since 2012, Indonesia's ratio per GDP has decreased, mainly due to the administrative complexity of the devolution process. As a consequence, if an Indonesian local government was not completely ready to levy property taxes by 2014, there was no other level of government authorized to collect the tax in its jurisdiction. Furthermore, Indonesian local governments became completely autonomous in administering and even deciding to levy property taxes or not (Adijanto, 2013).

²⁵ It is important to explain that the reason for such low ratios in China, compared with its relatively medium level of revenues per GDP (0.5 percent), is due to its high share of local revenues in the Chinese GDP (approximately 25 percent) (IMF, 2015).

had ratios over 1 percent, while Albania, Azerbaijan, Bosnia, Bulgaria, the Czech Republic, Estonia and Lithuania had ratios under 0.3 percent²⁶.

Table A3 catalogued the ratio of local property tax to local revenues in 21 of the 28 transitional countries. The average ratio ranged from 5 percent to 7 percent between 2010 and 2014. From 2013, higher average ratios were found in Georgia and Kyrgyzstan (10-14 percent), and Bosnia, Croatia and Poland (7-9 percent), while lower ratios were found in Belarus, the Czech Republic, Lithuania, and Russia²⁷ (2-3 percent).

2.10.4 Western European Countries

Table A2 catalogued the ratio of property tax to GDP in 20 Western European countries, where the average ratio was approximately 0.9-1.0 percent. However, the table displays vastly differing ratios, revealing great performance disparity. In seven countries, Belgium, Denmark, France, Iceland, Italy, Spain and the United Kingdom, the ratios were superior to 1.3 percent, while in Austria, Germany²⁸, Norway and Switzerland²⁹ they were under 0.5 percent. Malta has not levied recurrent property taxes yet.

It is important to mention that property taxation was recently strengthened in many European countries, due to fiscal crises in the 2000's and 2010's. This was the case in Greece, where the central government introduced the "Unified Property Tax" in 2014, which caused property tax revenues per GDP to increase from 0.43 percent in 2013 to 1.75 percent in 2014. Moreover, Iceland (2009), Ireland (2013), Italy (2013), Spain (2013) and Portugal (2014) were other examples of property tax reforms undertaken due to the fiscal European crisis (European Commission, 2015). The average ratios of local property tax to local revenues catalogued by Table A3 ranged from 8 percent to 10 percent in Western Europe. From 2013, higher average ratios were found in France and Ireland (20-22 percent), Belgium, Cyprus and Spain (16-18 percent)

²⁶ Croatia is an interesting case because the country only introduced property taxation in 2013 that has reached 0.44 percent of GDP and produced 9 percent of the local revenues (European Commission, 2015; OECD, 2015). On the other hand, in 2012 the Ukraine simplified its annual building tax which was fixed at 1 percent of the country's minimum wage for most taxpayers. Therefore, the Ukraine's ratio decreased from 0.81 percent to 0.23 percent (USUBC, 2013).

²⁷ Russia is an interesting case since property taxation is levied by both regional government (corporate property tax) and local government (individual property tax and land tax). Corporate property tax (the regional government recurrent property tax) has provided approximately 80 percent of all Russia's property tax revenues and 6 percent of total regional governments' revenues (Malme and Kalinina, 2001; IMF 2015). However, Russian corporate property tax was not taken into account since Table A3 was only focused on local revenues.

²⁸ The main reason for the low property tax performance in Austria and Germany is because both countries have centralized valuations that date back to 1973 and 1964 respectively (Spahn, 2004). In addition, Austria's current mechanism of revenue equalization discourages property tax yields, because this reduces the amount of grants received (Scheider, 2002; Kanda, 2008).

²⁹ In Switzerland and Norway, the reason for such low ratios is likely to be due to their subnational net wealth tax. Indeed, cantonal and local net wealth taxes in Switzerland have provided approximately 1.1 percent of GDP, while in Norway this ratio has been approximately 0.5 percent (European Commission, 2015; UN-Habitat, 2013). This means that all sub-national recurrent taxes on properties (property tax and wealth tax) per GDP reached 1.26 percent and 0.93 percent respectively in Switzerland and Norway in 2014 (IMF, 2015).

and Iceland, Portugal and the United Kingdom (11-14 percent), while low ratios were found in Austria, Denmark³⁰, Finland, Norway, Sweden and Switzerland (2-3 percent).

2.10.5 Developed Countries from North America, Asia, and Oceania

Table A2 catalogued the ratio of property tax to GDP in 10 developed countries from North America, Asia and Oceania, where the average ratios were approximately 1.7 percent between 2010 and 2014, and also had the best survey performance. The table also displays that in five countries: Canada, Israel, Japan, New Zealand and the United States, these ratios were superior to 2 percent, while in Hong-Kong, Taiwan and Korea they were under 1 percent.

According to Table A3, the average ratio of property tax to total local revenues in 8 developed countries from North America, Asia, and Oceania was approximately 25 percent. New Zealand has by far the best performance, where property taxes have comprised approximately 50 percent of total local revenues. Higher ratios were also found in Australia, Canada and Israel (33-40 percent), the United States and Taiwan (24-28 percent), while lower ratios were found in Japan (12-13 percent) and Korea (5-6 percent).

2.10.6 Brazil's Property Taxation in a Global Context

In Brazil, property tax revenues have been on average the same as those of many other developing countries, namely about 0.4-0.5 percent of its GDP (STN, 2015). However, Brazil has high economic and tax burden indicators that imply a broad property tax potential, such as GDP (it was the seventh in the world in Purchasing Power Parity – PPP in 2015, according to the IMF (2016) and The World Bank (2016)); overall tax burden (about 33 percent of GDP in recent years, according to STN (2015)); reasonable level of employment and diversified industries and services; and a private, well developed and less controlled real estate market. In addition, Brazil has a high level of governmental decentralization and local tax autonomy, which includes tax rates discretion, exemptions delimitation, assessment of properties and administrative functions by municipal governments of most of their own taxes³¹.

Therefore, Brazil has the potential to produce much higher property tax revenues than it currently does, and the cost and complexity of property tax administration is likely not to be the main reason for the current performance. The compendium shows that there are many other developing countries with similar or lower economic indicators that have much higher ratios, such as Chile, Colombia, Honduras, Paraguay, South Africa and Uruguay. Moreover, Georgia and Uzbekistan, both transition countries with lower *per capita* income than Brazil, and less well operated real estate markets, also perform better in terms of property tax.

³⁰ Property taxes have provided 3.7 percent of local revenues in Denmark; however the local revenues have contributed approximately 35 percent of Danish GDP - an extremely high ratio. Therefore Denmark cannot be considered a case of low performance, since local property taxes have comprised approximately 1.4 percent of GDP (OECD, 2015).

³¹ A relevant exception is the municipal tax on services (ISS) that has a list of taxable services and tax rates delimited by a federal legislation (Federative Republic of Brazil, 2003a).

2.11 Conclusions

Chapter 2 explored the literature review of property taxation, firstly examining the different types of taxes on properties. It subsequently further discussed the framework of the annual property tax (recurrent tax on immovable properties) which is the main topic of this study.

The chapter showed that there is a wide range of categories for taxes on property, which can be divided into two main groups: a) transaction taxes on property, such as property transfer tax, inheritance and gift taxes, capital and financial transaction taxes, and the value capture instruments; and b) recurrent property taxes, such as the annual property tax, vehicle tax or net wealth tax. The literature review states that transaction taxes on property are easier to administer, and tend to be politically more acceptable than annual property taxes. Many developing countries have relied much more on transaction taxes on property and vehicle taxes, rather than on annual property taxes. However, their real estate market is growing at the same time as the local revenue needs and annual property taxation should be strengthened.

The literature states that the annual property tax has six performance determinants that were separately discussed in this chapter: tax base, registration, valuations, exemptions, tax rates and collection. The chapter concludes with a property tax performance model of ratios, which established and compared international indicators of recurrent property taxation.

The chapter demonstrated that the coverage of tax base, taxpayers and registration should be maximized, in order to facilitate and enhance the revenue impact of any property tax reform and increase the system's horizontal equity. In addition, the chapter states that there is a general agreement amongst many authors that the annual property tax should preferably be delegated to local governments, including its tax policy design, administration and revenue yields. FIG (2014) states that the reform steps to improving the tax base coverage should follow this order: a) changing legislation in order to expand the roll of taxable properties and taxpayers; b) decentralizing property taxation; c) integrating different cadasters that may exist in a country; d) qualifying human resources and outsourcing cadastral tasks; and e) modernizing land and building cadasters by using technological tools. However, the jurisdiction's size, the costs of implementation and the revenue potential should always be taken into account in a cadastral reform.

The chapter showed that there are four main tax base systems that have been used worldwide: capital value, rental value, area-based value and land (site) value. Each system has its own specificities, advantages and drawbacks that were further discussed in this chapter. Nevertheless, the study reveals that there is a worldwide tendency to switch rental or land value systems to area-based or capital value systems. Area-based valuation is more suitable when the cost of administration is challenging, while capital value systems are more suitable in larger jurisdictions with better administrative capacity. The capital value system is used in Latin American countries, as well as in many developed countries. The chapter showed that the system may enable higher and quicker revenue yields, considering the growing new constructions, urban density and higher land area ratios in many metros of developing countries. Rental value and area-based systems are still applied in developing

countries for tradition or easier administration; however, alternative mechanisms, such as banded systems, may provide a transitional model towards a full capital value system.

The chapter asserted that the modernization of assessment systems through the use of mass appraisal models and the reduction of valuation cycles should also be implemented. However, besides being more transparent, tax systems that specify in their legislation the land zone values and the construction costs, when the cost approach method of valuation is used, or all factors of valuation, when the sales comparison method of valuation is used, may be more suitable for countries with legal restrictions in altering their valuation rolls, such as Brazil, Chile and Egypt.

The chapter also highlighted that there is a great temptation for central and state governments to interfere in local property taxation. This chapter provided some evidence that the local autonomy in property tax administration should always be preserved, while higher tiers of governments should only interfere in providing ways to encourage better administration. For instance, this occurs in South Africa, where the valuation cycle period was nationally established, avoiding the postponement of revaluations. However, the South African case is an exception, and in many countries, interferences by higher tiers of government have indeed reduced the tax base, postponed valuations, expanded the roll of exemptions and narrowed tax rates.

Tax rates design is generally overlooked in many studies of property taxation, which mainly focus on administration; however this chapter encompassed relevant literature about the theme. In many countries, tax rates values are very buoyant, based on budgetary needs, while in other countries tax rates values are fixed by legislation and remain unaltered for many years. This chapter asserted that tax mechanisms that tend to favor or surtax certain groups should be preferentially granted by tax rates values, rather than registration exclusion, favorable assessment methods or non-transparent tax rebates, credits and discounts. This would improve the system's transparency and reduce the political fallout of reforms. In addition, progressive or multiple tax rates may be able to better maximize fairness and revenues, by surtaxing the sectors with the higher ability to pay.

Tax collection is generally the main property tax administrative challenge in developing countries, which often do not have a fiscal culture of paying taxes, and do not effectively apply compliance and enforcement instruments. According to Kelly (2013), collection-lead strategies are being argued to be the main way to raise revenues, as well as to effect any other registration or valuation property tax reform. In addition, even in countries where the property collection rate has overall reasonable ratios, they may vary, being very low amongst smaller municipalities or amongst certain types of properties. The literature also highlighted that property tax collection may also be very challenging in countries where the land ownership is not clear, or does not operate well. This causes additional obstacles to taxpayer identification, in order to bill and enforce taxation.

Property taxes have shown little potential in raising more than 2 percent of GDP in revenue, and in most developing countries, no more than 0.5 percent. Nevertheless, there are some

exceptions with over 0.8 percent ratios amongst some middle-income countries, such as Colombia, Uruguay, South Africa, Georgia and Russia. In addition, a recent trend in increasing these ratios in both developed and developing countries was verified. However, this has not occurred in Brazil, where property taxation still continues to stagnate at 0.4-0.5 percent of the country's GDP. Therefore, this chapter discussed a general model of ratios that have been commonly used by many authors to estimate property tax performance of a country or jurisdiction. This model will also be used in Chapter 6 to estimate property tax performance and revenue scenarios in a selection of Brazilian municipalities that will subsequently be expanded to the whole country.

This chapter tried to examine some reasons for the general low performance scenario in developing countries, which involve political, federative and administrative challenges. These challenges always have to be analyzed in a property tax reform, in accordance with the political, juridical, cultural and administrative specificities of each country and local government. Reforms should begin with the identification of the main causes of low revenue performance, and choosing the least costly and time-consuming instruments to address this. The following chapters will investigate these specificities for Brazil, in order to estimate the current scenario of property taxation in Brazil and suggest a more suitable and feasible model of property tax reforms for the 5,570 municipalities that exist in the country. The focus of the next chapter will be on the same topics examined in the literature reviewed for Brazil in this chapter. Therefore, from Chapter 3 onward, this study will be able to better display its methodology, as well as the data that was gathered, and it will estimate property tax performance and potential in Brazil.

CHAPTER 3:

PROPERTY TAXATION IN BRAZIL

3.1 Introduction

Considering the definition of tax on properties given by the IMF (2014) and the OECD (2015) and discussed in the previous chapter, the main tax on property levied in Brazil consists of an annual urban property tax (recurrent tax on urban immovable properties), named *Imposto Predial and Territorial Urbano – IPTU* (Tax on Urban Building and Land). This chapter therefore aims to explore the annual urban property tax in Brazil, based on the literature review of the previous chapter. The discussion will be divided into three parts, which will appear in the following sequence: Firstly, the different types of tax on properties levied in Brazil, including their legislation, mechanisms and revenue indicators will be presented and explained. Subsequently, the six crucial elements of property tax performance, which consist of registration, valuations, exemptions, tax rates, collection and property market values, will have their legislation and mechanisms explained, some indicators provided and their effectiveness evaluated. Finally, an overview of the municipal finances in Brazil will be presented, in order to highlight the importance of property taxes and other sources of revenue, as well as some property tax revenue disparities verified amongst different municipalities. After examining these topics, this study will be able to perform empirical research on the administration of property taxes, based on questionnaires responded to by selected municipal governments. It will also establish a model to estimate revenue performance and potential in Brazil.

3.2 A Brief History of Property Tax in Brazil

Despite the historically low property tax per GDP ratios, Brazil has a long tradition of property taxation. In 1660, the General Governor of Brazil's Portuguese Colony attempted to levy property tax in the colonial capital of Rio de Janeiro, to fund military expenses. However this led to a tax revolt and the initiative had to be abandoned in 1661. Thereafter, in 1808, the Portuguese royal family moved from Lisbon to Rio de Janeiro due to the Napoleonic Wars and introduced a property tax (amongst many other taxes) to fund the urban infrastructure required by the new colonial status of "The United Kingdom of Brazil and Portugal". Therefore the first Brazilian property tax was named *Décima Urbana em Imóveis Prediais* ("Tenth on Urban Buildings") at a rate of 10 percent on rental values. However, in 1808, Rio de Janeiro's buildings did not have any formal addresses or numeration, and the first registration had to be performed, covering the central city area where 7,548 buildings were catalogued. After Brazil's independence in 1822, the "Urban Tenth" administration still remained the responsibility of the imperial central government; however, in 1834 it was decentralized to the provinces and in 1873 the tax was renamed *Imposto sobre Prédios* ("Tax on Buildings"). In 1889 the proclamation of Brazil's Republic occurred, which created the 1891 Constitution which included the *Imposto sobre a Propriedade Urbana e Rural* ("Tax on Urban and Rural Properties") entitled to Brazilian

states. Nevertheless, the municipalities were still allowed to levy the previous “Tax on Buildings” in their jurisdictions. The double taxation on urban properties changed under the 1934 Constitution that exclusively entitled the *Imposto Predial e Territorial Urbano* - IPTU (“Tax on Urban Buildings and Land”) to the municipalities, while the *Imposto Territorial Rural* - ITR (“Tax on Rural Land”) was exclusively entitled to the states. Finally, under the 1988 Constitution, ITR was transferred to the federal government while IPTU remained the responsibility of the municipal governments (Municipality of Rio de Janeiro, 2008).

3.3 The Taxes on Properties in Brazil

The taxes on properties in Brazil include the municipal annual urban property tax, the property transfer tax, development fees and betterment levies; the state’s vehicle tax and estate and gift tax and the federal government’s rural property tax.

There are only two general tax legislations in Brazil where each specific tax must have its own legislation and regulations directly designed by the tier of government to which the tax is assigned. Thus, seven types of tax on properties are briefly listed in the Brazilian Constitution, 1988, that mainly establish the tax base and for which level of government the tax is liable. The Federal Law 5,176 of 1966, named *Código Tributário Nacional* – CTN (National Tax Code) also provides for other general minor rules. Therefore, specifically federal, state or municipal laws further regulate these taxes, including exemptions (other than those given by the Constitution) and tax rates mechanisms. Each level of government has the autonomy to design its own tax system without interference of another tier of government, unless this conflicts with the 1988 Constitution, the National Tax Code or any jurisprudence of the two higher courts - *Superior Tribunal de Justiça* - STJ (Superior Court of Justice) or *Supremo Tribunal Federal* - STF (Federal Constitutional Court). Nevertheless, Brazil’s National Congress is legally empowered to amend CTN and the 1988 Constitution, which would include issues related to taxation.

3.3.1 Transaction Taxes on Properties in Brazil

Transaction taxes on properties in Brazil mainly include three specific taxes. The estate and gift tax administered by the state governments; and the property transfer tax, development fees and betterment levies that are administered by the municipal governments³².

3.3.1.1 Property Transfer Tax in Brazil

In Brazil, the property transfer tax is named *Imposto de Transmissão Imobiliária Inter-vivos* – ITBI. Article 156 of the Brazilian Constitution, 1988, states that ITBI is completely administered by the municipalities, while Articles 35 to 42 of the National Tax Code state

³² The federal government had a financial transaction tax (*Contribuição Provisória sobre Movimentações Financeiras* – CPMF) between 1997 and 2007 to fund the public health system. Its tax base was all taxable financial transactions, but specifically banking debts (Federative Republic of Brazil, 1996a). Between 2002 and 2007, its revenues reached approximately 1.4 percent of Brazilian GDP, under a tax rate of 0.38 percent. However, it was abolished in 2008 due to its unpopularity and political pressures (STN, 2015).

that the tax must be levied on the taxable value of a sale of urban or rural properties. Therefore, the municipalities must enact municipal tax legislation with the ITBI requirements, regulations and mechanisms under the juridical control of the local courts.

The taxable value is the assessed property value, which is generally the same assessed value of the annual property tax; however, some large municipalities have prepared property transfer tax valuation rolls with more accurate values than the recurrent urban property tax valuation rolls. This is likely to occur since the political costs to impose accurate valuations are mitigated in property transfer taxes. Municipalities have the autonomy to set the tax rate, and there is a widespread use of a proportionate rate of 2 percent; however some municipalities (e.g. Brasilia, Belo Horizonte, São Paulo) have recently increased the tax rate to 2.5 percent or 3 percent, in order to collect more revenue without any meaningful effect in the real estate market.

Property transfer tax revenues have been diverse amongst the 5,570 Brazilian municipalities. According to Brazil's National Treasury (STN, 2015), aggregate data reveals that the tax provided 2.1 percent and 9.8 percent respectively of current revenues (the total municipal revenues including governmental grants, but excluding capital receipts) and own tax revenues in 2013. In addition, revenues *per capita* were R\$ 83, representing 0.18 percent of GDP. In general coastal "holiday cities" and rural municipalities with relevant agribusiness sectors tend to have higher ratios, due to the higher number of property transactions and relatively low populations. Amongst the fifty most populated Brazilian municipalities, property transfer tax respectively comprised 3.4 percent and 9.6 percent of total and own-tax revenues in 2013. Table 3.1 displays the property transfer tax *per capita*, per GDP, per total revenues and per own-tax revenues between 1998 and 2013.

Table 3.1: Brazil's property transfer tax *per capita*, per GDP, per current revenues and per own-tax revenues (1998-2013)

| | <i>Per Capita*</i> | <i>Per Capita</i> 1998 = 100 | <i>Per GDP</i> (in %) | <i>Per Total</i> <i>Revenues (in %)</i> | <i>Per Own-Tax</i> <i>Revenues (in %)</i> |
|-------------|--------------------|---------------------------------|--------------------------|--|--|
| 1998 | 18 | 100 | n.a. | 1.5 | 6.3 |
| 2001 | 18 | 103 | 0.09 | 1.3 | 6.5 |
| 2004 | 20 | 113 | 0.08 | 1.0 | 5.0 |
| 2007 | 28 | 160 | 0.11 | 1.4 | 6.5 |
| 2010 | 39 | 223 | 0.14 | 1.6 | 7.6 |
| 2013 | 51 | 283 | 0.16 | 2.0 | 8.7 |

*R\$ adjusted as of 31 Dec of 2015.

Data Source: STN (2015) and IBGE (2015).

In Table 3.1 it can be noted that property transfer *per capita* tax increased 3 times (in current values) from 1998 to 2013, as well as its ratio to GDP increased 78 percent (from 0.09 percent to 0.16 percent). This was due to three factors: a) better tax administration; b) the tax base replacement carried out by municipalities of the annual property tax assessed values for a specific property transfer tax valuation roll; and c) since 2008, the new housing credit policy and the real estate boom which increased the property prices and the number of transactions. Despite the great potential for providing a relevant share of municipal revenues, ITBI is still a minor source of revenues for local governments, accounting for 1-2 percent of local revenues in the period.

Some larger Brazilian municipalities are running specific property transfer tax valuation rolls with more accurate values, without the need to pass a municipal law to be implemented. However, despite being a relevant tool to avoid the property transfer tax evasion (underreporting of purchase values), this system demands the same administrative tasks related to valuation systems of the recurrent property taxes. Therefore, the general policy in most municipalities is to apply self-declarations with minimum values limited to the assessed values used for property tax purposes (due to the lower administrative cost). Moreover, self-declaration is the only method used to establish the tax base of rural properties, since this type of property is outside the urban property tax established at the municipal level.

Complementarily a tax reform that makes the ITBI tax base close to market values, is another feasible alternative to improve revenues and to slightly increase the current tax rates that are mostly established at 2 percent, to a value between 3 percent or 4 percent³³. According to Bahl (2004, p.41) property transfer tax rates are up to 6 percent in many countries and in some countries, such as South Africa, new properties are subject to a value-added tax. Furthermore, the European Commission (2015, p.42-3) mapped the property transfer tax systems in its Member States, and found that half have, on average, statutory tax rates superior to 5 percent and property transfer taxes represent one third of all tax on properties in Europe. As discussed in Section 2.3.1.1 of Chapter 2, property transfer taxes have the potential of disturbing real estate markets, for example, by encouraging under-declarations of purchase values or avoiding formal transactions. However, since Brazil's property transfer tax rates are commonly established as being 2 percent (which is lower than many European countries, as listed above), and considering that some municipalities (São Paulo, Brasilia and Belo Horizonte) have greatly increased revenues due to the tax rate rising, such a policy may be feasible.

3.3.1.2 Estate and Gift Tax in Brazil

In Brazil, the estate (inheritance) and gift tax is named *Imposto de Transmissão Causa Mortis* – ITCM and is a competence of state governments. Article 155 of the Brazilian Constitution, 1988, establishes that the Federal Senate must set the estate tax top tax rate, which was established at 8 percent in 1992, according to the Senate's Resolution No 9. This resolution also permitted its progressivity in accordance with the inheritance value received by the heir (Federative Republic of Brazil, 1992). Nevertheless, the state's legislation has generally established a proportionate rate of 4 percent as well as relief mechanisms and other tax regulations.

Estate and gift tax have been poorly managed, with prevailing high levels of exemptions autonomously given by state governments, and low assessed values of immovable properties, which should be the same as that used in the property tax. The tax has had very low levels of revenues, performing only 0.6 percent and 1 percent respectively of states' total and own-tax revenues that reached 0.08 percent of GDP in 2013 (STN, 2015).

³³ For example, Belo Horizonte introduced a property transfer tax valuation roll in 2010 and the ratio of ITBI revenues to own-tax revenues increased from 11 percent in 2009 to 14 percent in 2012. In São Paulo, this ratio increased from 7 percent in 2014 to 12 percent in 2015 due to a tax rate increase from 2 to 3 percent in 2015.

3.3.1.3 Development Fees in Brazil

In Brazil, Development Fees and Charges for Public Services levied by municipal governments basically cover two municipal fees - the garbage collection fee (sometimes also named the public cleaning fee), and the street lighting fee. The tax base for garbage collection is the cost of the current or potential use of the garbage collection benefited by each taxable property, while the street lighting fee is the cost of electricity received by each taxable property³⁴.

The fees' tax base assignment faced various judicial litigations until recent years. In the case of street lighting fees, they were declared unconstitutional by many state courts during the 1990's, since the courts understood that street lighting is not a divisible service benefited by a singular taxpayer to be charged as a fee. Furthermore, the Federal Supreme Court established a precedent by judging as unconstitutional a case of street lighting fees in 1999 (STF, 1999). However, in 2002, the Brazilian Congress enacted the "Constitutional Amendment No. 39" that allows the street lighting fee, named *Contribuição para Custeio da Iluminação Pública - Cosip*, also permitting its charge on electricity bills (Federative Republic of Brazil, 2002).

The garbage collection fees also faced various judicial litigations under the state courts, since the municipal legislations were commonly assigning the tax base as being the property size (as a proxy for the amount of potential garbage generated). However, the size of a property is one of the required elements to calculate the annual property tax (based on capital value). Therefore, the state courts were considering the fee as a double taxation, which is forbidden by the Constitution. However, in 2010, the Federal Supreme Court published "Binding Precedent No. 29" stating that fees may partially contain elements of other taxes (STF, 2010).

Garbage collection represented respectively 0.8 percent and 3.9 percent of total and own tax municipal revenues in 2014, reaching 0.07 percent of GDP or R\$ 24 *per capita*. In relation to street lighting fees, they represented respectively 0.8 percent and 4.7 percent of total and own tax municipal revenues in 2014, reaching R\$ 25 *per capita* (STN, 2015). Table 3.2 displays the garbage collection fee and street lighting fee *per capita*, per GDP, per total revenues and per own-tax revenues between 2005 and 2014.

Table 3.2: Brazil's garbage collection fee and street lighting fee *per capita*, per current revenues and per own-tax revenues (2005-2014)

| Year | Garbage Collection Fee | | | Street Lighting Fee | | |
|------|------------------------|---------------------------|-----------------------------|---------------------|---------------------------|-----------------------------|
| | Per Capita* | Per Total Revenues (in %) | Per Own-Tax Revenues (in %) | Per Capita* | Per total Revenues (in %) | Per Own-Tax Revenues (in %) |
| 2005 | 23 | 1.4 | 6.8 | 19 | 1.1 | 5.7 |
| 2008 | 19 | 0.9 | 4.6 | 22 | 1.0 | 5.2 |
| 2011 | 22 | 0.8 | 4.1 | 23 | 0.9 | 4.4 |
| 2014 | 24 | 0.8 | 3.9 | 25 | 0.8 | 4.7 |

*R\$ adjusted as of 31 Dec of 2015.

Data Source: STN (2015) and IBGE (2015).

³⁴ The tax base of the garbage collection fee is commonly related to the property size, as approximation to the quantity of the garbage than can be produced, and the street lighting fee is commonly related to the property front size that directly benefits from street lighting.

In Table 3.2 it can be noted that the garbage collection fee and the street lighting fee have been stable, between R\$ 19-25 *per capita* each from 2005 to 2014. Both fees account for 1.6-2.5 percent of local revenues or 8.6-12.5 percent of own-tax revenues in the period.

3.3.1.4 Land-Based Instruments in Brazil

In Brazil, there are basically two main types of land-based instruments - the “Contribution for Improvements” named *Contribuição de Melhoria* (CM) and the “Governmental Sales of Building Increases and Change of Use”, named *Outorga Onerosa do Direito de Construir e Alteração de Uso* - OODC. CM has existed since 1946 and charges the increment value due to public works, which is limited to the cost of such investments. The tax can be levied by all tiers of government, but only municipalities generally undertake these taxable public works. CM was regulated in 1967 and has a complex form of administration since legislation requires a prior description of the public work, which must state the properties that benefit and the expected increase values. In addition, the tax was capped at 3 percent of the assessed value for property taxation (Federative Republic of Brazil, 1967).

The “City Statute”, named *Estatuto da Cidade* (Federal Law No 10,257 of 2001) was enacted in order to regulate the Urban Policy Chapter under the Brazilian Constitution, 1988 (Articles 182 and 183) (Federative Republic of Brazil, 2001). The City Statute established the use of urban properties in accordance with the local community welfare and environment preservation, while introducing land-based mechanisms that ensure land regularization, housing access, reduction of urban inequality and the capture of land value increases. The OODC is considered its main innovation, which consists of charges of increases in the permitted built area and floor area ratio, or charges in the use changes (for instance, from rural to urban or from residential to commercial). OODC still needs to be specifically introduced in the municipal legislation, which should autonomously establish their main mechanisms and their coverage within the municipal geographical area. In practice, municipalities have generally set a proportionate rate that has ranged from 4 percent to 20 percent of the land assessed values on the valuation roll (the same for the annual urban property tax). Alternatively, São Paulo and Rio de Janeiro have auctioned these increase permissions on the stock markets; however the geographical coverage is restricted to some areas under urban projects (Rio de Janeiro’s New Port Area and the urban revitalization programs in São Paulo).

CM revenues have been almost nil, being just R\$ 0.79 *per capita* in 2013 and being charged at just one fifth of municipalities. Furthermore, in 2014, CM represented more than 1 percent of current municipal revenues in only 73 municipalities (STN, 2015). In relation to OODC, the National Treasury database does not provide its revenues; however, some case studies have displayed some data evidence. For example, between 2007 and 2009, the average ratio of OODC to total revenues was 0.5 percent in São Paulo, 0.2 percent in Brasilia and 0.3 percent in Natal (Carvalho Jr. and Lima Neto, 2010).

3.3.2 Recurrent Taxes on Properties in Brazil

Recurrent taxes on properties in Brazil include the state tax on vehicles, and the tax on immovable properties, which is divided into the federal rural property tax and the municipal urban property tax³⁵.

3.3.2.1 Vehicle Tax in Brazil

In 1969, Decree-Law No. 999 unified several fees on vehicle ownership, introducing the *Taxa Rodoviária Única* (Unified Road Tax) that was aimed at funding the construction and maintenance of federal highways (Federative Republic of Brazil, 1969). Its tax rate was 7 percent of the assessed vehicle value and its revenue achieved 3.1 percent of current federal revenues in 1977, and was responsible for funding the construction of many federal highways throughout the country.

However, Constitutional Amendment No. 27 of 1985 altered the 1967 Brazilian Constitution, switching the name to *Imposto sobre a Propriedade de Veículos Automóveis* – IPVA (Tax on Vehicles Ownership) and transferring its competence to the state governments without any budgetary linkage (Federative Republic of Brazil, 1985). The Brazilian states became autonomous to be able to introduce the tax or not, set the tax rates and design the exemptions and relief mechanisms. In addition, one half of their revenues had to be shared with municipalities, in accordance with the vehicle's place of registration. In 2008, the Brazilian Federal Constitutional Court decided that the IPVA tax base must just cover ground vehicles, not including vessels and aircrafts (STF, 2008).

IPVA is easy to administer where assessed values are nationally established by a vehicle market survey from *Fundação Instituto de Pesquisas Econômicas* – FINE (Foundation Institute of Economic Research) that annually publishes the average vehicle values in Brazil. IPVA tax rates currently range from 1 percent to 4 percent and are generally established according to the vehicle's engine power and use. In Brazil, IPVA provided 4.3 percent and 6.7 percent respectively of states' total revenues and own-tax revenues in 2013. In addition, revenues *per capita* were R\$ 144 and per GDP they were 0.54 percent in 2013. Sao Paulo State had the best ratios, where IPVA reached 7.1 percent and 9.2 percent respectively of total and own-tax revenues (STN, 2015).

³⁵ A federal net wealth tax (Tax on Large Fortunes - IGF) is under article 153 of Brazilian Constitution, 1988, but never implemented. Despite several attempts in the National Congress, the parliamentarians alleged that wealth taxes have high administrative costs, low potential to generate revenues and were being abolished in many European countries. However, net wealth taxes supporters in Brazil have alleged that income tax legislation, which exempts income produced from dividends, and the mechanism of payroll's social contributions, are elements that bring great levels of regressivity to Brazil's tax system that could be mitigated by net wealth taxes (Carvalho Jr. 2011).

3.3.2.2 Rural Property Tax

The Brazilian federal rural property tax is named *Imposto Territorial Rural* – ITR (Tax on Rural Land) and is applied to all taxable areas outside the municipal urban area, as defined by municipal legislation. The tax is regulated by Federal Law 9,393 of 1996 (Federative Republic of Brazil, 1996b).

ITR is characterized by complex and costly administration, since the tax is used as an instrument of the national rural and environmental policies, and not as a revenue-bias tax. There is a national register of rural properties, named *Cadastro Ambiental Rural* – CAR (Rural and Environment Cadaster) which contains the properties' coordinates, environmental situation and taxpayer information. The national CAR is decentralized and updated by the state or municipal environmental departments. The tax base is the self-assessed taxable land value, without any type of improvement, not including, for instance, the value of pastures, planted forests, crops and private roads. The taxable areas are those with potential use for rural activities, while the non-taxable areas include the lands which cannot be used for rural activities, native forests, areas of permanent environmental protection and flooded areas due to hydropower construction. The taxpayers are the properties' landowners or, in the case of their absence, without any legal dispute³⁶, the land possessors. Taxpayers must report all rural properties that they own on specific tax software managed by "Federal Revenue Department" (*Secretaria da Receita Federal*). Exemption is granted to taxpayers that only own one property under 30 hectares (or under 50-100 hectares in some remote areas). The main ITR's enforcement instrument is the need to prove payment as a condition to receive rural credit with federal-owned banks.

The tax rates are selective in accordance with the size and level of land utilization, ranging from 0.03 percent (lands up to 30 hectares with more than 80 percent of land utilization) to 20 percent (lands over 5,000 hectares with less than 30 percent of land utilization). One half of ITR revenues must be shared with the municipalities where the property is located. Nevertheless, ITR's revenues have been extremely low. In 2013, its revenues reached R\$ 864 million (R\$ 4 *per capita*), accounting for just 0.1 percent of total federal revenues in 2013 or 0.02 percent of GDP.

Indeed, rural properties in Brazil are extremely under-taxed compared with urban properties, which goes against the principle of horizontal equity discussed in Section 2.1.1 of Chapter 2. In addition, despite not having any empirical study about the ITR's administrative costs, its revenue yields are probably very low compared with its complex administration, which goes against the principle of administrative simplicity.

Constitutional Amendment No 42 of 2003 was an attempt to improve ITR administration (Federative Republic of Brazil, 2003b). Under a formal agreement between federal and municipal governments, the amendment allowed the transference of ITR collection administration to municipalities with the assignment of all revenues collected, rather than half of revenues when the tax was not decentralized. The mechanism was regulated by

³⁶ According to a STJ jurisprudence of 2009, landowners do not have to pay urban or rural property tax when a property is illegally occupied and is under judicial dispute (STJ, 2009b).

Federal Law 11,250 of 2005 and finally implemented by the Federal Decree 6,433 of 2008 (Federative Republic of Brazil, 2005b, 2008). According to Brazil's Federal Revenue Secretariat, approximately 40 percent of Brazilian municipalities signed this agreement in 2016. Indeed, due to these agreements, the average municipal ratios of ITR revenues *per capita* greatly increased from R\$ 6 in 2009 to R\$ 22 in 2015 (current values), while the average municipal ratios of ITR to total revenues increased from 0.22 percent in 2009 to 0.84 percent in 2015. Nevertheless, the ITR is still at a low level, even with the decentralization of its administration in several municipalities. The major problem is the lack of local autonomy to establish the tax policy. Law 9,396 of 1996 designed ITR as a regulatory tax to encourage land development. The rule of self-reporting and self-assessment combined to tax rates based on the level of land use encourage tax evasion.

Therefore, Brazil's rural property taxation should be rethought, since this study has provided evidence that many land instruments that use property taxation have been inefficient in achieving their objectives. A reform that could increase horizontal equity and administrative simplicity would be to integrate rural properties in a new municipal annual property tax. Brazilian municipalities would have the autonomy to manage all properties in their territory more effectively, and apply land and tax policies. In addition, the confusion and disputes in relation to properties' classification as rural or urban would be mitigated, and the administration of the property transfer tax on rural properties would be improved.

3.3.2.3 Urban Property Tax

Brazil has a long tradition of levying property tax on urban properties. The urban property tax (IPTU) is applied to all taxable areas in the municipal urban area, as defined by municipal legislation. Municipalities have autonomy in establishing their property tax policies and administration, and unlike many other countries, states cannot interfere in urban property tax.

IPTU is also often used by municipal governments as the policy of local economic development, to attract business and industry through tax holidays, rebates and credits, amongst other tax incentives. Furthermore, the regulation of Article 182 of the Constitution, 1988, by the City Statute extended the property tax role, covering other non-revenue purposes such as land use optimization. Therefore, IPTU can be applied for regulatory purposes.

However, IPTU has some general federal regulations and falls under a few specific higher court precedent rules. These federal regulations are those under Articles 32, 33 and 34 of the National Tax Code (Federal Law No. 5,172 of 1966) and under Articles 156 and 182 of the Brazilian Constitution, 1988 (Federative Republic of Brazil, 1966a; Federative Republic of Brazil, 1988a).

The article 33 of National Tax Code establishes the urban property tax base as being the fair market value, which theoretically would be the property capital value at its highest and best use³⁷. Article 34 establishes the taxpayer as being the legal landowner, or alternatively the property possessor.

³⁷Brazilian municipalities are autonomous in establishing their own assessment criteria and the National Tax Code states that the assessment should target the market values; however this is "*de facto*" not complied with.

The legal classification of a property as urban must comply with three rules. Firstly, according to Article 32 of National Tax Code, a property is classified as urban when it receives the benefit of at least two of the following five public services: a) a street curb and pavement with channeling rainwater; b) water supply; c) a sewer system; d) street lighting; and e) a public school or health station at a maximum distance of three kilometers. If the property does not benefit from at least two of these services, it falls under the federal rural property tax. Secondly, a specific municipal legislation and/or the municipal master plan must specify the urban zone area and the areas to be urbanized within their territory. Thirdly, the Federal Decree-Law 57 of 1966 and the STJ jurisprudence state that properties with rural use are under federal rural property tax, even if they fall within the conditions of the National Tax Code and municipal legislation (Federative Republic of Brazil, 1966b; STJ, 2009a).

Article 156 of the Brazilian Constitution, 1988, states that municipalities are entitled to levy urban property tax. In 2000, Constitutional Amendment No. 29 altered the first paragraph of Article 156, stating that statutory tax rates can be progressive or selective (Federative Republic of Brazil, 2000a). This constitutional amendment was needed, since several municipalities were setting progressive tax rates, leading to several juridical litigations under the state courts. State courts were judging municipal tax laws with progressive tax rates as unconstitutional, since IPTU is not a personal tax. Indeed, the original text of Article 156 stated that tax rates could be progressive to ensure the “social use of the land”, which was being viewed by the courts as only a surtax on vacant land. In 1996, the progressive system of *Belo Horizonte* was judged unconstitutional by the Federal Constitutional Court, which followed the decision of the state court (STF, 1996). Since several tax legislations were being annulled by the courts and the taxes paid were being returned to the taxpayers, the national congress amended the Constitution, permitting progressive tax rates. Furthermore, in 2003, the Federal Constitutional Court established “Precedent No. 668” which states that progressive tax rates are legal if introduced after Constitutional Amendment No. 29 of 2000 (STF, 2003). Since then, there has been a widespread use of progressive rates amongst Brazilian municipalities, where Carvalho Jr. (2009) catalogued their use in one sixth of a selection of 365 municipalities in 2007.

Article 182 of the Brazilian Constitution, 1988, states that municipalities must carry out the policies of urban development and ensure the social function of the urban land and buildings, including the use of urban property taxation for such purposes. The fourth paragraph of Article 182 provides three instruments with which municipalities may enforce property utilization in accordance with the municipal master plans: a) mandatory subdivision and/or edification; b) the application of annual increases on IPTU tax rates, an instrument named *IPTU Progressivo no Tempo* – IPTU-PT; and c) property expropriation with fair indemnification. Thus the Constitution innovates by introducing the IPTU-PT, which is a land-based instrument that permits the annual increase of tax rates in order to encourage property utilization.

The City Statute (Federal Law No. 10,257 of 2001) regulated Article 182 of the Constitution (Federative Republic of Brazil, 2001). It established the rules by which municipalities can carry out the mandatory subdivision and/or edification in accordance with the municipal master

plans. These rules include proper landowner notification, and that the period of the construction project submission and its conclusion should take place within one year. If the project is not submitted or completed, the City Statute states that IPTU-PT must be applied, where the tax rate increase can be carried out for five years up to the limit of 15 percent and can continue at this level, while the landowner does not comply with the determination of the municipal master plan. In addition, the municipal government may expropriate the property and indemnify the landowner after 5 years of the IPTU-PT being charged. Indeed, this complex, costly and time-consuming process that includes landowner notification, over taxation and property expropriation, has made this land-based instrument ineffective. Furthermore, considering the cadastral and valuation shortcomings in many Brazilian municipalities, the effectiveness of the instrument is likely to be reduced due to a low level of taxation and collection.

The judiciary branch of government can also interfere in property taxation by establishing precedent and legal interpretations. Therefore, in 1996, the *Superior Tribunal de Justiça - STJ* (Superior Court of Justice), which is the second highest tier amongst the four court levels that exist in Brazil, established “Precedent No. 160”. This states that each municipal valuation roll must be specified in a particular municipal law, named *Planta Genérica de Valores – PGV* (STJ, 1996). Therefore, a revaluation bill must be approved by the municipal council, in which it is permitted to alter, establish tax caps or even reject the bill. However, this precedent also permitted the valuations adjustment by a national inflation index through a simple executive municipal government ordinance. Therefore, this has encouraged valuation rolls to be simply adjusted by the inflation index for many years, which caused valuations to become outdated and likely enhanced vertical and horizontal inequity³⁸.

Although the general rules are provided by the National Tax Code and Articles 156 and 182 of the Brazilian Constitution, 1988, as well as “Precedent No. 160” established by the Brazilian Superior Court of Justice, Brazilian municipalities are largely autonomous in setting their own property tax policy and administration. However, despite such autonomy in establishing their own property tax policies, Brazilian municipalities have historically overlooked property taxation for many reasons. By 2015, Brazil contained 5,570 autonomous municipal governments, which are the third (and lowest) tier of government. The Union (federal government) is the first tier of government, while the twenty six states and one federal district (Brasília) are the second tier of government. In 2013, amongst all the municipalities, 77 percent had a population under 20,000 inhabitants and therefore it can be assumed that is politically, administratively, and financially harder to enhance property taxation in most municipalities. The following sections will therefore investigate the main elements of urban property taxation in Brazil, including: a) the cadastral situation; b) the valuations challenges; c) the exemptions and relief mechanisms; d) the tax rates structures; e) the instruments of collection and enforcement; f) the estimation of the property market values in the municipalities; and g) a summarized study of the municipal finances in Brazil, including an analysis of the main sources of municipal revenues and the development of property taxation.

³⁸ Furthermore, this drawback is exacerbated since developing countries tend to have higher inflation indexes than developed countries. Indeed, Brazil had an average annual inflation rate of 704 percent between 1979 and 1994 and 9 percent between 1995 and 2016.

3.4 Fiscal Cadasters in Brazil

In Brazil, the cadastral modernization and integration is a very important and challenging task, since it is well known that the country has experienced urban growth with the emergence of slums and environmental degradation. However, federal, state and municipal governments, as well as the notaries' entities, manage their own registers in accordance with their public competences, with a very low level of integration. Moreover, Brazil has 5,570 municipal governments and 13,803 notaries and there is a lack of skilled human resources to deal with this challenge. Indeed, McCluskey and Plimmer (2016, p.15) state that a vital requirement of cadastral modernization is "the education provided to local/national aspiring and existing assessors. Levels of competence may vary according to the needs of the system, but developing a recognized pathway to quality specialist expertise is considered to be important for the long term sustainability of a robust and reliable property tax system".

Brazilian municipalities have full autonomy in establishing and managing their own property tax cadastres of urban properties. This is a good element of the Brazilian system, since there is revenue incentive to keep records updated, to issue a complete and transparent cadastres, to choose the method or technology to update records in accordance with the municipal size and finances, to resolve taxpayer complaints and finally to collect the tax. In addition, good cadastres can provide better application of the increasing use of progressive and selective tax rates. Therefore, it is important that cadasters have their data recurrently updated to provide tools to implement more effective revenue based property taxation. Evidently, modern cadasters are more likely to occur amongst high income municipalities in Brazil. De Cesare (2017b, p.55) using data of the IBGE (2013) notes that poorer municipalities, especially those located in the Northern and Northeastern Regions, had lower levels of digitalized cadasters in 2012. The author states that amongst the Southern, Southeastern and Central-Western Regions, this rate was higher than 90-95 percent, while in the Northern and Northeastern Regions this rate is lower than 60-70 percent.

When property tax fell under the central government in Indonesia, Lewis (2003) reported that Indonesian taxpayers had to self-provide relevant and comprehensive data regarding their properties, such as: updated taxpayer's data, the taxable area of land and buildings and the recent purchase price. Unfortunately, in Brazil, the taxpayers often do not have such an active role in cadastral administration. The municipal tax departments are usually the only role-player in the process, and frequently have to (re)inspect all property information, which requires skilled human resources, high administrative costs and reduces transparency. Legally, Brazilian taxpayers only have to report change of ownership, and have to submit projects of property alterations to other municipal departments. Therefore tax departments have to re-inspect properties to capture physical and personal changes and place them on record. When municipalities decide to update cadasters, GIS may be used, while the re-registration task may be fully or partially outsourced. These strategies have been more common amongst the large municipalities due to their cost.

In Brazil, all legalized properties must be registered and assessed, even if they are tax exempt or under construction. This latter case is facilitated since, rather than assigning

values to each registered property, a PGV (valuation roll) contains the values of land zones and different types of building structures that are used to perform the assessment (cost approach method of valuation as discussed in Section 2.6.1.2 in Chapter 2). Municipalities can also register informal settlements in accordance with their own policy towards land regularization. Indeed, residences in “*favelas*” can comprise a great share of all households in some large municipalities, such as in Belem (52 percent); Salvador (32 percent) and Recife, Rio de Janeiro, and São Luis (approximately 20 percent) (IBGE, 2011). Unfortunately, it has been common for areas occupied by these informal buildings to be simply registered as vacant lands parcels. In addition, their taxpayers have been strictly assigned as the legal landowners. According to the Brazilian Constitution, 1988, if a land parcel is not registered under the ownership of a person, a corporation, a municipal government or a federal government; its ownership is then assigned to the state government. The City Statute establishes various mechanisms by which the municipality may regularize informal settlements located on private or government-owned lands.

Taxpayer’s identification may also be a great challenge, since formal building titles are merely provided by notaries if a property complies with all legal (and complex) requirements. Nevertheless, the National Tax Code permits, under certain conditions³⁹, that the tax administration assigns the property possessor as taxpayer. As an example, the Belo Horizonte’s Tax Department has undertaken such a policy by carrying out field inspection and registering informal settlements, while giving possession certificates for tax purposes. This policy has been very well received amongst the benefitting communities, since these certificates have been the only legal document of their properties available to them, while the property tax charged has been very low or exempt. This topic is further debated by Smolka and De Cesare (2013).

The cadastral coverage amongst metro or dormitory cities has been estimated at between 50 percent and 70 percent, due to the high number of informal settlements; however this ratio has been higher amongst medium or small municipalities located in the south and southern regions. For example, compared with data of the 2010 National Census, Recife and Rio de Janeiro had residential coverage of 59 percent and 64 percent respectively. However, excluding the informal settlements, these ratios increased to 81 percent and 84 percent respectively (Carvalho Jr., 2014). Chapter 5 will interpret the results of the questionnaires sent to selected municipalities, providing detailed information about the municipal cadasters that enable cadastral coverage estimation.

3.5 Property Valuations in Brazil

This section examines the theme of valuations in Brazil, which has been very challenging. The section is divided into three parts. The first part provides the technical standards of real estate appraisals that exist in Brazil, which is mandatory for the private sector while being optional for tax purposes. The second section debates the cost approach method of valuation

³⁹ The assigned of possessors as IPTU taxpayers just occur when such possession is not legally disputed between the possessor and the legal owner.

which is generally used for property tax purposes by most Brazilian municipalities. Finally the third section discusses the legal themes applied to the valuations process, including the valuation cycles and the national regulation of the valuation profession.

3.5.1 Technical Standards of Valuations in Brazil

The Brazilian Association of Technical Standards (*Associação Brasileira de Normas Técnicas* - ABNT) is a non-profit normative body, a member of the International Organization for Standardization (ISO) and liable for the elaboration of technical standards in Brazil. The standards published by ABNT are named “Regulatory Brazilian Standards” (*Norma Brasileira Regulamentadora* - NBR) and provide evidence of the common agreements of certain technical practices in Brazil. The first national standard that regulated the appraisal of urban properties was the NBR-576 of 1977. Subsequently, this standard was reviewed and replaced by others, such as the NBR-576:1980, the NBR-576:1989, the NBR-576:1990, the NBR-14653-2:2004, and the NBR-14653-2:2011. The NBR-14653-2 of 2011 is the current standard to assess urban properties and details the technical procedures to evaluate properties under the three methods of valuation: sales comparison, the income approach, and the cost approach (ABNT, 2011).

The NBR-14653-2:2011 recommends that “sales comparison” should be preferentially applied when there is available sales data of comparable properties. It basically presents the steps and procedures to elaborate a sample of comparable sales, to adjust the data, and to elaborate the statistical models of market values prediction.

The NBR-14653-2:2011 recommends that “the income approach” should be preferentially used to evaluate specific nonresidential properties such as industries, hotels, shopping malls, and enterprises; as well as properties that are not numerous and lack market data of sales. The property value is basically determined through its level of profitability and rate of the investment return.

Finally, the NBR-14653-2:2011 clarifies that the cost approach method consists of the sum of land value and the structure replacement cost, applied to a sales factor (that depends on the market circumstances)⁴⁰. The replacement cost should be calculated by quantifying the cost of a new construction under a depreciation index, while the land value should be preferentially calculated by the sales comparison method applied on vacant sites. However, the “residual method” may also be applied in the case of lack of data of vacant site sales. The residual method is simply to consider land value as being the difference of the full market value and the replacement construction cost.

3.5.2 Methods of Valuation for Tax Purposes in Brazil

Brazilian municipalities have the autonomy to choose their own cycle of revaluations and their own method of valuation for property tax purposes, particularly between the sales comparison

⁴⁰ $MV = (LV + RC) \times SF$, where MV is the market value, LV is the land value, RC is the replacement cost and SF is the sales factor.

(using computer-assisted mass appraisal) or the cost approach (where computer-assisted mass appraisal can also be applied). Both sales comparison and cost approach methods can be recommended for tax purposes, if efficiently applied, since they aim for market values. Nevertheless, the most used method in Brazil has been the cost approach where land zone values and construction cost values are separately specified in the valuation roll (PGV). The method has been chosen for tradition, simplicity and transparency, since prior to the availability of legislation on the internet, it would be a very complex task to specify each property value making use of paper legislation. The cost approach method also permits the assessment of a new property without the need for new or supplementary valuation rolls, since the assessment can be performed through the statutory values of construction costs and land zones. Indeed, if only the full value of taxable properties was specified in legislation (as frequently occurs when the sales comparison method is used), a new municipal law would be required to bring more properties to the roll of taxable properties in Brazil⁴¹.

Thus, under the cost approach method, land and buildings are separately assessed and therefore combined. Land is often categorized into land value zones according to its use (residential, non-residential and vacant) and location. Constructions are classified into different categories often under an established depreciation coefficient⁴². Each land zone and type of construction has an assigned value in square metres at the time of the valuation roll enactment, which have annually been adjusted by the general inflation index. Franzsen and McCluskey (2013) also note that the same Brazilian cost approach simplified system is used in Indonesia, and perhaps may be convenient for developing countries⁴³. Indeed, this system is very transparent and simple, and the taxpayers can easily check the land zone and construction cost values of their municipality in the legislation available on the internet.

3.5.3 Legal Issues of Valuations in Brazil

As previously stated, the National Tax Code establishes that the tax base for property tax is the capital value and all municipalities must evaluate the urban properties in their fiscal cadasters. As previously stated, no federal or state legislation interferes in the method of valuation or in the valuation cycle, with the exception of “Precedent No. 160” of STJ that valuations must be specified under a municipal law (STJ, 1996). However, the same STJ determination permits

⁴¹ Brasilia is the only known case where the chosen method of estimation is the sales comparison by computer appraisal. This has required annual amendments in the PGV law to assess and tax new properties or those under construction. Therefore, these properties have had much higher assessment ratios than the older ones, considering that Brasilia’s last valuation roll update occurred in 2008.

⁴² ABNT (2001) recommends different methods of construction depreciation. However, its use is not mandatory and the municipal legislation must autonomously establish all the mechanisms of assessment, including the optional use of a depreciation index applied to the construction costs. For example, in Rio de Janeiro, all residential properties have an annual depreciation of 1 percent up to 50 percent in 50 years; however stores have a maximum depreciation of 20 percent in 60 years. In Belo Horizonte and São Paulo, the depreciation index varies with the quality of construction and use. In São Paulo, residential properties with a lower quality of construction have a maximum depreciation of 80 percent in 40 years. On the other hand, the Municipality of Niteroi does not use any depreciation index (Carvalho Jr., 2012).

⁴³ The appraisal index as a non-market or hybrid method of valuation is further debated in McCluskey and Franzsen (2013a).

that a municipal ordinance adjusts valuations by an official inflation index. Therefore, this is the only permitted mechanism of values increase without the need of a municipal law (if the property's characteristics are maintained). Brazil has experienced some periods of very high inflation (e.g. 1,200% in 1994, 25% in 2002, 11% in 2015). Therefore, the annual inflation adjustment of valuations is greatly needed, in order not to erode the tax base in the short term.

According to De Cesare (2017b), in 2009, Brazil's Ministry of Cities recommended the implementation of more modern cadasters and more accurate valuations by a guideline "Ordinance No 511 of 2009" (Ministério das Cidades, 2009). This ordinance is just a recommendation to municipal governments and states that valuation must follow the standards of NBR/ABNT and a maximum valuation cycle of 4 years. Nevertheless, in 2014, there was an attempt to change this scenario by the "Senate's Supplementary Bill No 277 of 2014" (*Projeto de Lei Complementar do Senado Federal No 277 de 2014*) that amended the Fiscal Responsibility Law and established a national 4-year valuation cycle, to which all municipalities must comply. As the bill altered a "supplementary law", a special vote quorum was required. In 2015, however, the Senate did not pass the bill by the difference of one vote (Federative Republic of Brazil, 2000b, 2014).

Long periods between revaluations have been observed in many Brazilian municipalities, as noted by many authors, such as De Cesare (2012), Domingos (2011) and Carvalho Jr. (2013; 2014). These authors emphasize the following as the main reasons for this: a) the political fallout of the tax increases resulting from revaluations; b) the judicial litigation; c) the low potential revenue outcomes compared to the political cost to undertake the reforms; d) the higher reliance on other sources of revenues (governmental transfers and the tax on services); and e) the low administrative capacity in undertaking revaluations (especially amongst the smaller municipalities).

Notwithstanding, municipalities may establish a valuation cycle in their municipal tax legislation, according to their criteria and needs. This has become more common since the executive municipal governments have faced great political obstacles in approving the revaluations bills under the municipal councils. Thus, a statement in their municipal tax law may mitigate the political costs. As an example, Article 10 of São Paulo's Municipal Law No. 15,044 of 2009 ("São Paulo's Valuation Roll of 2010") established a 2-year cycle from 2014 onwards. This was effectively complied with by the approval of São Paulo's Municipal Law No 15,889 of 2013 ("São Paulo's Valuation Roll of 2014") (Carvalho Jr., 2014; Municipality of São Paulo, 2009, 2013).

Federal Law No 5,194 of 1966 regulates the profession of engineers, architectures and agronomists and states that only these professionals can undertake real estate appraisals in Brazil (Federative Republic of Brazil, 1966c). In addition, the NBR 14653-1:2001 states that only engineers can certificate appraisal reports (ABNT, 2001). However, Federal Law 6,350 of 1978 regulates the profession of real estate agents and states that they can estimate market values of properties (Federative Republic of Brazil, 1978). Therefore a judicial litigation started in relation to the professional liable to perform real estate appraisals. The solution occurred in 2012, when STF decided that real estate agents are also allowed to certificate appraisal reports

(STF, 2012). Thus, this can be useful in outsourcing municipal valuations, since real estate agents are usually less costly than engineers. Many small municipalities cannot contract or even find engineers located in their territory to be part of their technical team⁴⁴.

It is important to mention that the NBRs do not have force of law, unless any legislation states that a certain NBR must be followed for a specific purpose or by a professional group⁴⁵. This is not the case of property appraisal for tax purposes. Indeed, municipalities have full autonomy to design their valuation system, being a very complex task since all specifications and land zone values must be drafted in a specific municipal law (PGV) in accordance with “Precedent No. 160” of the Superior Court of Justice (STJ, 1996).

Municipal valuers must follow PGV specifications, even if they are out of date or are not in accordance with the recommended techniques of real estate appraisal. Evidently it would be necessary for a (political) legislative process and a bill approval between the municipal councils to make any change in a PGV. Therefore, even considering that a specific NBR to evaluate urban properties exists in Brazil and considering that a meaningful share of municipal valuers are civil engineers, the following guidelines greatly depend on the political will.

3.6 Tax Exemptions and Relief in Brazil

Article 150 of the Brazilian Constitution, 1988, establishes the constitutional tax exemptions, named *Imunidade Tributária* (“Tax Immunity”), which lists the entities that are exempt from any type of taxation, including property taxes. These exemptions cover self-owned federal, state, and municipal properties and the properties of religious entities, political parties, labor unions and charitable providers of social assistance and education services. A relevant issue that was litigated in the Brazilian courts was whether the constitutional exemption of property taxation would only cover the buildings where the granted activities (religious, political, unions or social assistance) occurred, or whether it would cover all types of properties owned by these sectors. According to Marton (2013), a STF precedent of 1953 established a restricted constitutional interpretation that only buildings used for religious activities would be granted by constitutional property tax exemption (STF, 1953). However, due to the enactment of the Brazilian Constitution, 1988, this litigation took place again, and finally in 2002, the STF established a comprehensive interpretation of constitutional exemptions, including all type of properties (even with diverse destinations) owned by religious entities (STF, 2002)⁴⁶.

⁴⁴ The database of the Lincoln Institute of Land Policy (Table D1 of Annexure D) specifies the qualification of municipal valuers in a sample of 27 medium and large municipalities. In 11 municipalities they were engineers, architects and/or agronomists, in 4 municipalities they were real estate agents and in 12 municipalities they were only tax officers or municipal public servants (their qualification was not declared) (Lincoln Institute of Land Policy, 2015).

⁴⁵ It has actually been very common that laws, regulations and other legal instruments specify the mandatory use of NBR for a purpose. For example, the Brazil’s Consumer Protection Code states that certain products must be produced in accordance to NBR rules.

⁴⁶ Recently, evidence has come to light that this jurisprudence has encouraged the register of new religious entities, probably with the purpose of tax evasion. According to the Federal Revenue Department, since 2010, on average, 25 new religious entities have been registered per day.

Nevertheless, municipalities are still autonomous to establish other exemptions and relief mechanisms in their jurisdictions, including exemptions for poor families, low valued properties and tax incentives for investment location. This practice has been very common, mainly amongst the smaller municipalities in metropolitan areas. This is because they tend to attract investments that produce goods or render services to all metropolitan markets. These tax incentives are often granted by partial or full exemption of tax on services and property tax, which can be time-limited or even infinite.

Property tax exemptions may cover a great share of the municipal tax rolls, such as in Rio de Janeiro (60 percent) and São Paulo (32 percent), and greatly affect the revenue performance (Carvalho Jr., 2013, 2014). Residential exemptions are politically very popular, mainly amongst municipalities with higher non-residential tax bases or in those that rely greatly on other revenues sources, such as governmental transfers. Carvalho Jr. (2012) mapped the municipal tax relief mechanisms in 12 large Brazilian municipalities and verified that the most popular were those for lower assessed residential properties.

Indeed, exemptions based on assessed values are much easier to administer than those based on personal attributes, such as level of household income or owner-occupancy. This is because exemptions based on assessed values better permit the municipal control of the exemptions coverage and operation of valuation's inspections, and therefore this can be considered a preferable mechanism to be applied. Chapter 5 will provide the results of the questionnaires that were sent to selected municipalities which afford information of the tax exemptions' impact on the tax roll and on the total assessed values.

3.7 Tax Rates in Brazil

Unlike many developed and developing countries, Brazilian municipalities have full autonomy to establish their tax rates values and the discretion mechanisms, which are often proportionate rates, progressive rates, or selective rates per use, size or location. Multiple tax rates have become increasingly common and they are usually progressive and/or vary in accordance with the type of property (residential, nonresidential and vacant) (Carvalho Jr., 2009). This may permit better tax burden management and may boost revenue yields, as it is possible to surtax some taxpayers that have a higher ability to pay. As an example, large industrial or commercial properties can be subject to a higher statutory tax rate than residential properties.

As previously discussed in Section 3.3.2.4 of this chapter, Brazilian municipalities were not allowed to levy progressive tax rates before 2000, due to the jurisprudence of the Federal Constitutional Court; however, the enactment of Constitutional Amendment No 29 of 2000 guaranteed the right to establish progressive rates or selective rates in accordance with the property use or location.

Carvalho Jr. (2009) mapped the statutory tax rates of 365 Brazilian municipalities in 2007 and found that the tax rates values varied greatly throughout. The residential tax rates often ranged from 0.2 percent to 1.5 percent; nonresidential tax rates from 0.5 percent to 2 percent (reaching up to 5 percent in a few municipalities); and those applied to vacant land often

varied from 1 percent to 6 percent⁴⁷. In addition, the same study found that: a) all municipalities applied different tax rates for residential, non-residential and vacant land properties; b) 25 percent applied multiple tax rates in each one of these classes; and c) 15 percent had progressive systems. Another relevant advantage for progressivity application is the revenue yields in surtaxing high valued commercial properties. Chapter 5 will verify the effective taxation on assessed values between residential and nonresidential properties in a group of selected municipalities.

3.8 Tax Collection in Brazil

As previously discussed in Section 2.9 of Chapter 2, property tax collection has been the main administrative problem in developing countries. Nevertheless, some large Brazilian municipalities have had over 80 percent collection rate (e.g., São Paulo, Rio de Janeiro, Belo Horizonte), while in smaller and low income municipalities this indicator may be under 30 percent (these ratios will be further discussed in Chapter 5, where a survey of 180 municipal property tax collection rates will be displayed). In Brazil, municipal governments have a wide range of instruments to encourage voluntary compliance and to enforce property tax; however, they have not been used to their full potential. Thus this section is divided into four parts. The first part explains the current status of the billing and collection process in Brazil. The second part explores the instruments that facilitate voluntary compliance. The third part examines the enforcement instruments that can be applied in Brazil, highlighting their limitations, administrative costs and effective use. Finally, the fourth part debates the evidence of low collection rates on vacant land properties in most of the Brazilian municipalities, their causes, consequences to the revenue performance and possible solutions to overcome this problem.

3.8.1 Billing and Collection in Brazil

Unlike many developing countries, the addressing of properties and the postal services in Brazil are very efficient, even in remote areas. Therefore, the billing of property taxes is not a great concern if the taxpayer is correctly registered. In addition, the internet has been widely available and taxpayers can easily download the tax bills on the municipal government websites. The banking system is also very efficient and most bills can be paid at the banks, lotteries and post offices.

Municipal governments annually send a booklet to the taxpayer's registered address which includes the details of the registered property and a bar-coded property tax bill for lump-sum payment (often giving a large discount) or various bills for payment in installments. In addition, the property tax can be charged together with other property-related fees, such as the garbage collection and public cleaning fees.

⁴⁷ As previously explained in Section 3.3.2.3, progressive rates over time (IPTU-PT) may achieve 15 percent if the instrument was introduced by a municipality. IPTU-PT is applied as a penalty for selected properties that do not comply with the land utilization stated in the municipal legislation. The municipal legislation must state the areas where subdivision, development or utilization must occur and the rules of IPTU-PT application (Federative Republic of Brazil, 2001).

However, the indicators of the collection rate in Brazil are diverse and largely depend on the local fiscal culture and the types of properties that are registered. Some evidence has been found that collection rates are higher in large municipalities as well as in those located in the Southern or Southeastern regions. The causes for higher ratios amongst large municipalities are more straightforward, since they tend to have better tax administration. In the case of the higher ratios amongst Southern and Southeastern municipalities, their better fiscal culture and higher level of legalized residences and non-residential tax base have been identified as the main reasons for this. Indeed, if a great share of the cadaster consists of vacant land, low income and/or informal properties, the property tax collection rate tends to be low. This is more likely to occur amongst the smaller municipalities located in the Northern and Northeastern regions. It is also important to mention that the level of exemptions that are autonomously granted by the municipalities can greatly affect the collection rate indexes. For example, if the common exemptions for low assessed residential properties cover a great share of the tax roll; the taxable properties will be likely to be those with easier collection (higher valued and/or nonresidential).

In 2000, IBGE undertook a national survey about municipal public finances which catalogued the property tax collection rate in almost all municipalities (IBGE, 2001b), but unfortunately, no other such survey has been performed since then. Based on the IBGE data of 2000, Table 3.3 was drawn up to show the median of property tax collection rates amongst Brazilian municipalities by population strata and regional location. The population ranges were chosen to minimize the number of strata with similar index variance within them.

Table 3.3: Brazil's urban property tax collection rate (2000, per population and regional cluster, in percentage, median values)

| Population Strata | North and Northeast | | South, Southeast and Central-West | |
|----------------------------|----------------------|-----------------|-----------------------------------|-----------------|
| | No of Municipalities | Collection Rate | No of Municipalities | Collection Rate |
| Under 200,000 | 1,930 | 24.3 | 3,138 | 53.8 |
| 200,000 – 1,000,000 | 25 | 34.3 | 69 | 57.3 |
| Over 1,000,000 | 5 | 53.3 | 8 | 71.0 |

Data source: IBGE (2001b).

In 2000, Table 3.3 shows that property tax collection rates were higher amongst large municipalities and/or those located on the Southern, Southeastern and Central-Western Regions. Amongst municipalities with a population lower than 200,000, the median collection in the Southern Cluster was 2.2 times higher than in the Northern Cluster (54 percent vs 24 percent). Furthermore, a reasonable collection rate of 71 percent was verified only amongst municipalities with a population higher than 1 million located in the Southern Cluster. Nevertheless, this situation probably improved after 2000, due to the enactment of the Fiscal Responsibility Law in 2000 and the new tax administration technology, including computerization of many municipal governments. The increase in property tax revenues after 2000 in many smaller municipalities provides evidence of an improvement in the collection. Chapter 5 will display the collection results for 2012 in a sample of 180 municipalities based on information from local newspapers. In addition, the collection results per type of property (built upon and vacant sites) based on the questionnaires that were sent to 47 selected municipalities will be discussed, enabling a more detailed analysis.

3.8.2 Compliance Encouragement in Brazil

Policies that encourage property tax voluntary compliance should be the first point on an agenda of a “collection-led” reform, as observed by Bird (2010) and Kelly (2013). Reforms in property tax enforcement should be preferentially performed only after the application of policies that encourage voluntary compliance and minimize taxpayers’ compliance costs. In Brazil, the most used instruments that facilitate compliance can be listed as being: a) media advertising; b) installment payment; c) the possibility of recurrent automatic withdrawals on taxpayer’s banking accounts and/or credit cards; d) the local community’s participation in the revenue spending (participatory budgets); e) recurrent taxpayer re-registration; f) discount for anticipated full payment; and g) renegotiation of the tax arrears.

It can be assumed that collection policies that focus on voluntary compliance encouragement, rather than on enforcement policies, are politically easier to implement and they are more likely to occur in small municipalities. Chapter 5 will catalogue the compliance and enforcement policies applied in a group of Brazilian municipalities and may verify whether the exclusive use of instruments that encourage and facilitate compliance has been able to provide high collection levels where there is a lack of effective enforcement strategies.

On the other hand, it is important to mention that two of the listed instruments that are used with the intention of facilitating compliance (and actually are able to reduce property tax delinquency) may result in reducing the local fiscal culture.

Firstly, as discussed in Sections 2.3.2.3 and 2.11.2 of Chapter 2, the great discount offered for an advanced lump-sum payment, rather than the encouragement of payment in installments, increases the political costs of revaluations, since the tax increases would not be mitigated during the year (Slack, 2013). In Brazil, these discounts can reach 20-30 percent of the original tax levied (this issue was raised by the questionnaires and will be discussed in Chapter 5).

Indeed, property tax in Brazil has been commonly viewed as an annual tax to be paid in a single payment. Despite it being possible to pay this in installments, such policy encourages tax compliance and reduces administrative costs, especially for residential taxpayers that bear smaller charges. In addition, the municipal governments have an anticipation of their tax credits to better plan and fund their expenses throughout the year. Therefore, the benefits of discounts offered for advanced lump-sum payments should always be taken into account with the political cost intensification of a tax reform.

Secondly, the renegotiation of the tax arrears, rather than the application of enforcement instruments, may be a quicker and politically more feasible way to partially recover the arrears; however, this likely reduces the fiscal culture since delinquents may expect favorable renegotiations of their debts in the future.

3.8.3 Enforcement in Brazil

Brazil has a wide range of property tax enforcement instruments, although they are rarely applied to their full potential by municipal governments. Indeed, the most common

instrument applied has been the costly and very time-consuming tax liens. Cunha, Klin and Pessoa (2011) found that the average time of a federal tax lien conclusion has been nine years and the probability of a full arrears recovery has been about 25 percent, while its average administrative cost has been approximately R\$ 6,000. Under this scenario, alternative ways of property tax enforcement should be explored by municipalities. Other legally permitted means of property tax enforcement in Brazil include: a) placement on the national blacklists of delinquents; b) the property's seizure and auction; and more recently c) tax arrears outsourcing.

Bahl and Martinez-Vazquez (2007) note that developing countries face considerable difficulties in property tax enforcement, and the only action typically taken against delinquent taxpayers is to prohibit the sale of a property. However, in 2009, the Federal Constitutional Court declared unconstitutional the Article 1 of Federal Law No 7,711 of 1988 that states the need of tax clearance certificates to register property sales and transfers (STF, 2009; Republic Federative of Brazil, 1988b). Therefore, since 2009, possible arrears are simply transferred to the new property's owner. Nevertheless, in Brazil's real estate market, there is a widespread practice of properties' tax clearance certificates being required by buyers and housing credit institutions, as a condition to effective purchase, due to the risks of debit transferring and a consequent tax lien to the new owner.

There are two main blacklists of delinquents in Brazil that are consulted by the private sector in making credit decisions: the *Serviço de Proteção ao Crédito* - SPC (Credit Protection Service Register) to fund consumers' purchases and the *Centralização de Serviços dos Bancos - Serasa Experian* (Centralized Banking Services Register) to grant loans and credit by the banks. The municipal governments can directly or indirectly place the delinquent taxpayers on both lists. In 2012, Federal Law 12,767 gave permission for its use in relation to tax arrears (Federative Republic of Brazil, 2012a). Under the legal instrument named *Protesto* (similarly a "Notice of Dishonor" used in some English-speaking countries), the creditor can claim a debit under a notary office which must electronically register that claim, and which automatically causes the institution that manages SPC and *Serasa Experian* to place the debtors on their registers. Notwithstanding, the establishment of a municipal blacklist of tax delinquents has been common amongst the municipalities. However, they provide low levels of enforcement, since these blacklists are not commonly checked by the private sector or other levels of government.

The property's seizure and its public auction is the most unpopular instrument of tax enforcement, and it is only permitted at the end of a tax lien in Brazil. Therefore, many tax liens are simply not carried out due to their cost and slowness, and property auctions do not occur very often since this instrument is the final step of a tax lien which may be abolished due to the statute of limitations (expiration time) of five years. The seizure of financial taxpayers' assets, for example, may be carried out by a tax lien, but alternative seizures such as those cars or other tangible assets have not been so common. Civil rights restrictions, such as those on vehicle traffic and driver's licenses are not even allowed by Brazilian legislation. Nevertheless, since 2009, as a successful example, Rio de Janeiro's municipal tax department has biannually performed an auction of properties in arrears with the permission of the state court during the running of the tax liens. Most of the time, taxpayers

have quickly headed toward the municipal tax centers to renegotiate or pay their arrears, after their property has been listed in the following public auction.

Finally, arrears outsourcing was enabled by Federal Senate Resolution No. 33 of 2006, but there is no known case of its implementation as yet (Federative Republic of Brazil, 2006).

3.8.4 Lower Collection on Vacant Land in Brazil

UN-Habitat (2011) notes that property tax billing and collection is a great challenge in developing countries, where a significant portion of the land is not registered and the landowner is unknown. In Jamaica, the study mentions that 48 percent of all land parcels did not have a registered owner, which proved to be a great challenge to their tax billing. Therefore the country faced a low property tax collection ratio.

The experience of Brazil has demonstrated that even a very well designed legislation that provides sophisticated mechanisms of land value capture to induce land development or occupation has failed in its objectives, due inefficient tax administration, out-of-date cadaster of taxpayers and ineffective enforcement system. Indeed, property tax on unimproved land, including when IPTU-PT is applied, has faced very low collection rates. Improving registration by assigning possessors as taxpayers, as well as improving enforcement, may reduce the verified lower collection on unimproved land and may render the policies of land value capture more effective. The following reasons have been identified for the low property tax collection on vacant land in Brazil:

- a) Incomplete or outdated taxpayer information. The municipal tax departments often do not have accurate taxpayer information to properly bill and enforce property tax. This situation occurs more frequently with vacant land properties, since there is no occupancy and their taxpayers must be billed at other addresses. The application of tax enforcement instruments requires the notification of the correct taxpayer;
- b) Occupation of vacant land parcels by informal buildings. Outdated cadasters may have areas recorded as vacant land parcels that actually were informally divided up and built on. As previously stated, although the National Tax Code permits assignment of either legal landowner or possessor (under certain conditions) as a taxpayer. The usual practice has been to exclusively assign the legal landowner (De Cesare, 2017b);
- c) Divergences between the classification of urban or rural. Rural properties are liable to the federal rural property tax, which bears a much lower level of taxation and enforcement. As previously stated in Section 3.3.2.3, the legal rules to classify properties as rural or urban are complex and conflicting, since three different legislations establish such classification by benefit of public services, by geographical delimitation in municipal law and by land use. Thus there have been common objections, appeals and judicial disputes in relation to the classification of land parcels as rural or urban;

- d) Higher statutory tax rates on vacant land. The tax levied on vacant land properties may be too high, sometimes more than 200 percent of that of levied on built on properties (Carvalho Jr., 2009). Therefore, the much higher taxation may be viewed as unfair and not related to the taxpayer's ability to pay. In addition, large parcels of vacant land are often owned by a few high income people that are able to bring political and juridical pressures to bear;
- e) Tax forgiveness and speculative behaviour. The granting of tax forgiveness has been a common practice amongst many Brazilian municipalities. This policy has been so common that many taxpayers usually do not pay the current debts, expecting posterior forgiveness or debt renegotiation (De Cesare, 2017b). In addition, vacant land owners may expect that governments perform housing programs with land expropriation under profitable indemnification.

Therefore, municipalities that have a great share of vacant land in their registration or tax liability, as well as those that aim to introduce or strengthen IPTU-PT and other land-based instruments, should seriously focus on the challenges and possible solutions of vacant land taxation that have been discussed.

3.9 Municipal Finances in Brazil

This section will examine municipal finances in Brazil, covering municipal functions and main mandatory expenses (Section 3.9.1), schemes of municipal control and inter-municipal agreements (Section 3.9.2), sources of revenues, their statement and concentration (Section 3.9.3), the revenue indicators and development of property taxes (Section 3.9.4) and the international analysis of Brazil's subnational revenues (Section 3.9.5).

3.9.1 Municipal Functions in Brazil

In Brazil municipalities have several functions and competences. The main local functions given by the Brazilian Constitution, 1988, include: a) elementary education; b) basic services of health and social assistance; c) city planning and some housing policies; d) local public transportation and traffic management; e) public cleaning, garbage collection and maintenance of streets; f) building control, inspection and management; g) regulation of local commerce; and h) noise pollution control and environmental protection at local level.

Municipal public clinics co-exist with state hospitals and federal health institutions under Brazil's health system. Supplementary Federal Law No. 141 of 2012 establishes that municipalities must spend at least 15 percent of most of their main sources of revenues on health. These main sources of revenues basically include the local taxes and the constitutional transfers (Federative Republic of Brazil, 2012b).

Public elementary education is generally offered by municipal schools, while public secondary education is offered by state high schools. Public universities comprise state and federal institutions. Article 212 of the Brazilian Constitution, 1988, establishes that municipalities must

spend at least 25 percent of most of their main revenues on elementary education. Federal Law No. 11,494 of 2007 introduced an educational fund named *Fundo de Manutenção e Desenvolvimento da Educação Básica - Fundeb* (Fund of Maintenance and Development of Basic Education). This law establishes that state governments must transfer resources (limited to 20 percent of most of their tax and transfers revenues) to ensure a minimum and nationally established expense per student (R\$ 2,576 per student in 2015). However, if these municipal and state resources are still not enough to reach the national index - federal government resources must complement the fund (Federative Republic of Brazil, 2007).

Thus, this study concludes that Brazilian municipal functions are mainly focused on health and education, which represents at least 40 percent of the municipal expenses. Indeed, Slack (2010) notes that property taxation is generally weak in countries where local governments are responsible for providing more “people-related” services than “property-related” services. Therefore, in Brazil, urban property tax cannot be viewed as a tax used to fully benefit the taxable property through the provision of urban services, since almost one half of revenues are linked to the universal systems of health and education.

3.9.2 Municipal Control and Inter-Governmental Agreements

The instruments of municipal control and inter-governmental agreements are key elements of municipal governments’ efficiency, including tax administration. If efficiently implemented, the instruments of control ensure legality in the administrative procedures, good use and care of the public assets, more transparency and accountability and corruption avoidance. On the other hand, instruments of inter-governmental arrangements and agreements ensure more efficient use of the public resources with better economies of scale and scope in the tax administration provision. They are especially useful considering the great number of small municipalities. Therefore, the next two sections explore these two instruments that exist in Brazil and can be applied by the tax administrations.

3.9.2.1 Municipal Control Agencies

Policies of transparency and information access are related to administrative practice improvement and corruption avoidance (United Nations, 2003). According to Articles 31, 70 and 74 of the Brazilian Constitution, 1988, the municipal councils assisted by the State or Municipal Courts of Auditors are the institutions liable for the external control of the municipal acts, while general municipal control agencies organized by the own municipal governments (named “*Controladoria Geral do Município - CGM*”) are liable to internal control. Article 59 of the Fiscal Responsibility Law also reinforces the need of CGM implementation (Federative Republic of Brazil, 2000b).

Nevertheless, the external control of governmental practices is generally a *posteriori* action with punishment procedures, without the purpose of illegality or corruption prevention. According to the Brazilian Constitution, 1988, only São Paulo and Rio de Janeiro are permitted to have Municipal Courts of Auditors, since these courts were implemented prior to the constitution enactment. The other municipalities are under the external control of their

Municipal Councils, which are assisted by the State Courts of Auditors. These courts have to inspect all municipalities' accounts under their state jurisdiction, and are not able to promote focused control. Evidently, the external control is also subject to political issues by the Municipal Councils not having a completely technical procedure.

Thus, CGM must be implemented by a municipal law and further regulated by a municipal decree. However, despite the constitutional requirement of CGM implementation, there is still no national regulation of how to design and operate these municipal control agencies. Well-functioning municipal control agencies need to be singly structured and need to have independence, a regular budget, skilled officials and high operation coverage under the municipal government organization (Veloso *et al*, 2011).

However, despite the lack of a national survey that identifies the existence of municipal control agencies in Brazil, Cruz *et al* (2014) state that many municipalities have not implemented their agencies yet⁴⁸. In a sample of 34 municipal agencies of control, the authors identify that 34 audit municipal accounts, 31 inspect contracts, 31 manage the requests for information and complaints, 26 inspect governmental programs, 17 design guidelines for administrative practices and corruption prevention, 14 audit public works, and 8 promote disciplinary judgments at administrative level. In addition, Rebien and Amorim (2008) highlight that the implementation of a CGM can be feasible, even in a small municipality, as occurred in the Municipality of Santa Rita, in the State of Rio Grande do Sul, with 20,513 inhabitants in 2006.

In Brazil, some examples of well designed and independent agencies of control under the municipal governments' structure have enabled the identification of non-conformity, illegalities and corruption in the public administration. Therefore, the efficiency of a tax administration is also enhanced when it is under a system of internal control. For example, in 2013, after the implementation of São Paulo's CGM, an enormous fraud was detected in the granting of tax on services (ISS) incentives to construction companies of R\$ 500 million between 2008 and 2012 (approximately 1 percent of all ISS revenues in the period).

3.9.2.2 Inter-Governmental Agreements

There are basically two types of inter-governmental agreements that can be performed by Brazilian municipalities: (vertical) agreements with federal or state governments and (horizontal) agreements between municipalities. This section approaches the use of these two types of agreements by the municipal tax administrations.

The general rules and procedures of inter-governmental agreements are under the Article 116 of Federal Law No. 8,666 of 1993 that regulates the contracts, agreements and partnerships in the Brazil's public administration (Federative Republic of Brazil, 1993). Since 1997, the "Program of Tax Administration Modernization" (*Programa de Modernização da Administração Tributária - PMAT*) is the main inter-governmental vertical agreement

⁴⁸ The authors state that Rio de Janeiro was the first case of a CGM implementation in 1993. However, some large municipalities implemented their agencies much latter, such as São Paulo, Recife and Goiânia in 2009.

between federal and municipal governments related to the modernization of local tax administrations. The program is implemented by the federal state-owned bank “Brazilian Development Bank” (*Banco Nacional de Desenvolvimento Econômico e Social* - BNDES) that provides subsidized loans disbursed over a two to four years period. Local governments have to prepare a detailed tax modernization project to be assessed and selected by BNDES. In relation to the property taxation, the main projects financed by the program have been those related to the fiscal cadaster update through digital mapping (Santos *et al*, 2008).

Gadonne (2011) analyzed the PMAT impact in the tax revenues of all 321 municipalities that joined the program between 1998 and 2008. The author statistically verified that the own tax revenue growth in these municipalities was approximately 30 percent higher than in municipalities that did not take part in the program (the increase was nearly 100 percent if they joined more than 9 years in the program). In addition, PMAT was cost-effective since on average R\$ 1 of loan led to an extra R\$ 1.8 of tax revenue (considering the real interest rate 4 percent in the period).

However, Grin (2014) notes that the PMAT coverage has still been low due to three main barriers: a) the requirement of debit clearance certificates; b) the provision of collateral guarantees that involve the governmental transfers; and c) the need of credit approval under the Federal Senate and the Municipal Councils. Indeed, the author states that the program has been greatly limited to large municipalities while only 4 percent of all projects were granted to non-capital municipalities located in the Northern and Northeastern Regions between 1997 and 2010.

Indeed, according to STN (2015), 89 percent of all municipal governments are not permitted to apply to PMAT since they are in debt with the federal government social security agency (National Institute of Social Security - INSS). In addition, governmental transfers have been nearly 90 percent of total revenues in smaller municipalities. Therefore, the use of these resources as a collateral warrantee may be considered too risky. Alternatively, as a mechanism to expand the program coverage, municipalities that are restructuring or renegotiating their debits could be permitted to join the program. In addition, the collateral warrantees could be limited to the own municipal tax revenues while state governments could be the warrantor.

In relation to the horizontal agreements between municipal governments, it is important to emphasize that Brazil currently has 5,570 municipalities in which approximately 70 percent have populations under 20,000 inhabitants. Therefore, most municipal administrations lack economies of scale and scope to perform their functions. Thus it is highly recommended that neighboring municipalities have some scheme of inter-municipal corporation to achieve a common task that otherwise would be unfeasible or inefficient. Small neighboring municipalities generally face similar problems and challenges and inter-municipal corporations can facilitate more efficient management of the resources. However, well-functioning and sustainable systems need stable rules and the compliance with the agreed obligations by all members that cannot be easily altered by political changes in the municipal governments.

Following Article 241 of the Brazilian Constitution, 1988, Federal Law No. 11,107 of 2005 regulates the mechanisms of inter-municipal corporations in Brazil (named *Consórcios Municipais*) (Republic Federative of Brazil, 2005a). The law requires that an inter-municipal corporation be a legal, private or public entity registered under a notary, instituted by a contract and approved by the municipal councils. All their members must be identified and their objectives defined, as well as their execution times, mechanisms of functioning, the value share of each municipal government contribution, amongst other attributes. In addition, the law specifies the process of punishment in case of non-compliance with the scheme rules and requirements. The corporations are commonly implemented as public entities and are therefore part of the indirect administration of all municipal governments' members and exempted from any taxation. A public entity can also have the same processes of public procurement and bidding used by the governmental sector.

The instrument has been widely used in Brazil. According to IBGE (2016), in 2015, 64 percent of Brazilian municipalities declared being part of an inter-municipal corporation, this includes agreements in health (48 percent), garbage collection and management (23 percent), environmental protection (16 percent), urban or regional development (13 percent), sanitation (12 percent) and other areas (5-9 percent). In addition, many successful practices have been documented. For example, Ribeiro *et al* (2014) studied the case of 24 municipalities in Minas Gerais State that instituted a multi-purpose inter-municipal corporation to promote regional development in 2006, which included the digital mapping of their rural areas and the unified tax collection procedures.

Therefore, there is much scope to use inter-municipal corporation schemes as part of local tax administration. As another example, Chrispim *et al* (2011) analyzed the case of a multipurpose inter-municipal corporation in 10 municipalities of Belo Horizonte Metropolitan Area in 2009 that included the running of the tax on services on a computerized register and sales receipts system and the institution of seminars and refresher courses in tax administration.

3.9.3 Municipal Revenues in Brazil

According to the Brazilian Constitution, 1988, municipalities are entitled to levy three of their own taxes: a) annual urban property tax (IPTU); b) sales tax on services, named *Imposto sobre Serviços – ISS*⁴⁹; and c) property transfer tax (ITBI). In addition, minor fees to fund specific and divisible public services are also allowed, for instance: a) betterment levies; b) a garbage collection and public cleaning fee; c) a street lighting fee; d) a business license fee; and e) a sanitary surveillance fee⁵⁰. Finally, municipalities may levy social contributions on their own public servants' salaries to fund their social security systems, as well as appropriating the

⁴⁹ The ISS is regulated by Supplementary Federal Law No 116 of 2003 that displays a list of taxable services. The tax can be considered a multi-stage cumulative tax under a low tax rate (not being a value added tax). The law nationally ranged its tax rates from 2 percent to 5 percent (Federative Republic of Brazil, 2003a).

⁵⁰ These fees are respectively named: a) *Contribuição de Melhoria*; b) *Contribuição para Custeio da Iluminação Pública*; c) *Taxa de Coleta de Lixo e Limpeza Pública*; d) *Taxa de Alvará de Funcionamento*; and e) *Taxa de Vigilância Sanitária*.

income tax levied on public servants' salaries. In addition, other non-tax revenues include those from municipal assets (revenues from rents, interest, permits and concessions, amongst others) and revenues from chargeable services provided directly by the municipalities (not including those provided by state companies or entities, which have separate accounting).

Municipalities also receive a great range of governmental transfers. The main federal transfers include: a) a system of equalization payments composed of federal revenues, the "Municipalities' Fund" (FPM); b) federal royalties of natural resources; c) transfers to the unified health fund (SUS); d) transfers to the basic education fund (Fundeb); and e) transfers to social assistance (FNAS)⁵¹. As the main state transfers, municipalities are entitled to two revenue-sharings of state taxes that are transferred in accordance with the municipality of the tax event: a) one half of the state vehicle tax (IPVA); and b) one fourth of state value-added tax (ICMS)⁵². In addition, there is a large state transfer to the basic education fund (Fundeb).

Finally, municipalities can receive revenues from: a) projects and agreements with federal and state government (named *Convênios*); b) revenues from their own municipal companies and entities (for instance, dividends from municipal-owned companies of cleaning or water supply); and c) capital revenues, which include credit operations (public or private) and capital transfers (grants to investment) from federal and state governments.

3.9.3.1 Revenues in all Municipalities

The sources of municipal revenues of 5,070 Brazilian municipalities in 2013 (91 percent of all municipalities) are displayed in Table 3.4. The table displays the revenues collected per source in billion of R\$ and as three revenue ratios: a) the ratio of the national total of each revenue source to the national total of all current revenues (named as "ratio of means"); b) the average ratio of all 5,070 ratios of each municipal revenue source to each municipal current revenue (named "mean of ratios"); and c) the revenue source as a percentage of Brazil's GDP.

It is important to mention that Table 3.4 does not consider the data of Brasília (Federal District) that has both municipal and state competences in Brazil. In addition, the two different measures, "ratio of means" and "mean of ratios", were displayed, since the first is highly impacted by the performance of the larger municipalities and is often used to analyze the performance of a country as a whole while the second is used to analyze usual or common ratio performance in the municipalities. For example, the Municipality of São Paulo accounts for approximately one fifth of all own municipal revenues collected in Brazil. Therefore the

⁵¹ These federal transfers are respectively named: a) *Fundo de Participação dos Municípios* - FPM; b) *Compensação Financeira pela Exploração de Recursos Naturais*; c) *Fundo do Sistema Único de Saúde* - SUS; d) *Nacional de Desenvolvimento da Educação* - FNDE and *Fundo de Manutenção e Desenvolvimento da Educação Básica* - Fundeb; and e) *Fundo Nacional de Assistência Social* - FNAS.

⁵² These revenue sharing mechanisms are respectively named: a) *Cota do Imposto sobre a Propriedade de Veículos Automotores* – *Cota IPVA*, and b) *Cota do Imposto sobre a Circulação de Mercadorias e Serviços* - *Cota ICMS*.

“ratio of means” index does not provide the average or median ratio that is found in most of the Brazilian municipalities, as given by the “mean of ratios” index⁵³.

Table 3.4: Brazil’s municipal revenues (2013, in Billion of R\$, and as percentage of total revenues and GDP)

| Source of Municipal Revenue | Billion of R\$ | Perc. of Current Revenues | | GDP Ratio (%) |
|--|----------------|---------------------------|----------------|---------------|
| | | ratio of means | mean of ratios | |
| Own Municipal Revenues | 134.88 | 31.6 | 11.7 | 2.52 |
| • Tax revenues | 89.72 | 21.0 | 6.8 | 1.68 |
| Property Tax (IPTU) | 21.87 | 5.1 | 1.2 | 0.41 |
| Tax on Services (ISS) | 43.24 | 10.1 | 2.8 | 0.81 |
| Property Transfer Tax (ITBI) | 8.75 | 2.1 | 0.8 | 0.16 |
| Street Cleaning Fees | 3.47 | 0.8 | 0.4 | 0.07 |
| Street Lighting Fees (Cosip) | 3.33 | 0.8 | 0.5 | 0.06 |
| Income Tax on Public Servants’ Salaries | 9.06 | 2.1 | 1.1 | 0.17 |
| • Social contrib. on public servants’ salaries | 7.55 | 1.8 | 0.9 | 0.14 |
| • Revenues from municipal assets | 7.90 | 1.9 | 1.0 | 0.15 |
| • Revenues from municipal services | 8.59 | 2.0 | 0.9 | 0.16 |
| • Revenues from fines, penalties and arrears | 13.93 | 3.3 | 1.2 | 0.26 |
| • Other own municipal revenues | 7.19 | 1.6 | n.a. | 0.13 |
| Governmental Transfers | 291.38 | 68.4 | 88.3 | 5.48 |
| • Transfers from federal government | 131.83 | 30.9 | 51.2 | 2.48 |
| Municipalities’ Equalization Fund (<i>FPM</i>) | 67.39 | 15.8 | 35.4 | 1.27 |
| Unified health fund (<i>SUS</i>) | 34.92 | 8.2 | 6.9 | 0.66 |
| Education funds (<i>FNDE, Fundeb</i>) | 14.54 | 3.4 | 4.6 | 0.27 |
| Natural resources royalties | 8.42 | 2.0 | 1.5 | 0.16 |
| Social assistance fund (<i>FNAS</i>) | 2.11 | 0.5 | 1.0 | 0.04 |
| Projects and agreements | 1.39 | 0.3 | 0.5 | 0.03 |
| Other | 3.07 | 0.7 | 1.5 | 0.05 |
| • Transfers from state government | 156.29 | 36.7 | 36.9 | 2.94 |
| Sharing on value-added tax (<i>Cota ICMS</i>) | 84.13 | 19.7 | 18.1 | 1.58 |
| Sharing on automotive tax (<i>Cota IPVA</i>) | 14.12 | 3.3 | 1.7 | 0.27 |
| Unified health fund (<i>SUS</i>) | 2.27 | 0.5 | 0.6 | 0.04 |
| Education fund (<i>Fundeb</i>) | 52.97 | 12.4 | 15.0 | 1.00 |
| Natural resources royalties | 0.68 | 0.2 | 0.1 | 0.01 |
| Projects and agreements | 2.12 | 0.5 | 0.8 | 0.04 |
| • Other governmental transfers | 3.26 | 0.8 | n.a. | 0.05 |
| CURRENT REVENUES | 426.29 | 100.00 | 100.00 | 8.01 |
| CAPITAL REVENUES | 15.01 | 3.5 | 4.2 | 0.28 |
| • Credit operations | 3.87 | 0.9 | 0.2 | 0.07 |
| • Capital transf. from federal and state govern. | 9.46 | 2.2 | 3.7 | 0.18 |
| • Other | 1.68 | 0.4 | n.a. | 0.03 |
| Revenues from companies and entities | 15.01 | 3.5 | 1.2 | 0.28 |
| TOTAL REVENUES | 456.66 | 107.1 | 105.6 | 8.59 |

Data Source: STN (2015) and IBGE (2015).

Analyzing Table 3.4, it can be noted that current municipal revenues reached the nominal value of R\$ 426.3 Billion in 2013 (8 percent of Brazil’s GDP), while total municipal revenues

⁵³ Mean of Ratios (μ_{mr}) calculates the mean of each ratio (X_i/Y_i) in the studied population (n) and is given by the equation: $\mu_{mr} = 1/n \sum(X_i/Y_i)$. Ratio of Means (μ_{rm}) calculates the ratio between the sum of the terms of each ratio and is given by the equation: $\mu_{rm} = \sum(X_i) / \sum(Y_i)$ (Formenti, 2014).

reached R\$ 456.7 Billion (8.6 percent of GDP). In 2013, all own municipal revenues collected accounted for 31.6 percent of all current revenues (the ratio of means index) that was 2.52 percent of GDP in 2013. However, the average ratio of own municipal revenues per current revenues amongst Brazilian municipalities was just 11.7 percent (the mean of ratios index).

Governmental transfers are by far the largest source of municipal revenues, accounting for 68.4 percent of all municipal current revenues collected, while the “mean of ratios” or the average index amongst all municipalities was 88.3 percent. Furthermore, federal transfers were more important than state transfers for most of the municipalities (51.2 percent vs. 36.9 percent, considering the “mean of ratios” index). This was because both state value-added tax and vehicle tax were transferred, in accordance with the tax event, benefiting the large and industrial municipalities. On the other hand, considering all the revenues collected (“ratio of means” index), state transfers were slightly more important than federal transfers (36.7 percent vs 30.9 percent of current revenues). Indeed, the Municipalities’ Equalization Fund was the main source of revenue in most (smaller) municipalities, while the state value-added tax share was the more important source amongst the larger municipalities.

In relation to capital revenues, until 2000, they used to be an important source of municipal revenues. However, their importance declined rapidly due to the new rules for local funding stipulated by the Fiscal Responsibility Law (Federative Republic of Brazil, 2000b). Therefore, capital revenues presently account for less than 4 percent of the current municipal revenues.

Finally, municipal-owned companies and entities that usually exist in large municipalities (such as cleaning and water supply public companies) may transfer dividends to municipal governments. The total of these revenues represented 3.5 percent of current revenues in 2013; however the “mean of ratios” index was just 1.2 percent.

3.9.3.2 Revenues in the 30 Most Populated Municipalities

Municipal revenues in Brazil have been widely diverse where large municipalities have had different indicators and revenues levels compared with the small municipalities. Table 3.4 displays the revenue sources indicators of 5,070 municipalities in which 3,501 have a population under 20,000 people. Nevertheless, 26 percent of the Brazilian population lived in only 30 municipalities in 2013 (population over 637,960). Therefore, Table 3.5 was compiled to display the revenues sources in the 30 most populated municipalities, in order to provide evidence of any possible revenue bias between the large and small municipalities.



Table 3.5: Brazil's municipal revenues in the 30 most populated municipalities* (2013, in Billion of R\$, and as percentage of current revenues and GDP)

| Source of Municipal Revenue | Billion of R\$ | Perc. of Current Revenues | | GDP Ratio (%) |
|--|----------------|---------------------------|----------------|---------------|
| | | ratio of means | mean of ratios | |
| Own Municipal Revenues | 66.65 | 50.9 | 41.1 | 3.71 |
| • Tax revenues | 48.47 | 37.0 | 28.3 | 2.61 |
| Property Tax (<i>IPTU</i>) | 12.41 | 9.5 | 6.7 | 0.67 |
| Tax on Services (<i>ISS</i>) | 24.88 | 19.0 | 13.3 | 1.34 |
| Property Transfer Tax (<i>ITBI</i>) | 4.53 | 3.5 | 2.8 | 0.24 |
| Street Cleaning Fees | 1.28 | 1.0 | 1.2 | 0.07 |
| Street Lighting Fees (<i>Cosip</i>) | 1.25 | 1.0 | 1.4 | 0.07 |
| Income Tax on Public Servants' Salaries | 4.12 | 3.1 | 3.0 | 0.22 |
| • Social contrib. on public servants' salaries | 3.07 | 2.3 | 2.4 | 0.17 |
| • Revenues from municipal assets | 2.84 | 2.2 | 1.9 | 0.15 |
| • Revenues from municipal services | 3.07 | 2.3 | 2.7 | 0.17 |
| • Revenues from fines, penalties and arrears | 6.77 | 5.2 | 4.0 | 0.37 |
| • Other own municipal revenues | 2.43 | 1.8 | n.a. | 0.24 |
| Governmental Transfers | 64.52 | 49.2 | 58.9 | 3.48 |
| • Transfers from federal government | 21.51 | 16.5 | 23.1 | 1.16 |
| Municipalities' Equalization Fund (<i>FPM</i>) | 6.25 | 4.8 | 7.8 | 0.34 |
| Unified health fund (<i>SUS</i>) | 11.56 | 8.8 | 11.4 | 0.62 |
| Education funds (<i>FNDE, Fundeb</i>) | 2.6 | 1.9 | 2.5 | 0.14 |
| Natural resources royalties | 0.33 | 0.3 | 0.4 | 0.02 |
| Social assistance fund (<i>FNAS</i>) | 0.26 | 0.2 | 0.3 | 0.01 |
| Projects and agreements | 0.21 | 0.2 | 0.3 | 0.01 |
| Other | 0.30 | 0.2 | n.a. | 0.02 |
| • Transfers from state government | 42.82 | 32.7 | 35.6 | 2.31 |
| Sharing on value-added tax (<i>Cota ICMS</i>) | 24.46 | 18.7 | 21.3 | 1.32 |
| Sharing on automotive tax (<i>Cota IPVA</i>) | 5.99 | 4.6 | 4.3 | 0.32 |
| Unified health fund (<i>SUS</i>) | 0.36 | 0.3 | 0.3 | 0.02 |
| Education fund (<i>Fundeb</i>) | 11.02 | 8.4 | 8.8 | 0.59 |
| Natural resources royalties | 0.22 | 0.2 | 0.2 | 0.01 |
| Projects and agreements | 0.32 | 0.2 | 0.2 | 0.02 |
| Other | 0.45 | 0.2 | n.a. | 0.03 |
| • Other governmental transfers | 0.19 | 0.1 | n.a. | 0.01 |
| CURRENT REVENUES | 131.17 | 100.00 | 100.00 | 7.19 |
| Capital Revenues | 5.37 | 4.1 | 3.0 | 0.29 |
| • Credit operations | 2.77 | 2.1 | 1.6 | 0.15 |
| • Capital transfers from federal and state gov. | 1.55 | 1.2 | 1.1 | 0.08 |
| • Other | 1.05 | 0.8 | n.a. | 0.06 |
| Revenues from companies and entities | 7.77 | 5.9 | 5.2 | 0.42 |
| TOTAL REVENUES | 144.31 | 110.0 | 108.2 | 7.90 |

Data Source: STN (2015) and IBGE (2015).

*The 30 most populated municipalities are those with over 637,960 people in 2013 and include: Sao Paulo, Rio de Janeiro, Salvador, Fortaleza, Belo Horizonte, Manaus, Curitiba, Recife, Porto Alegre, Belem, Goiania, Guarulhos, Campinas, Sao Luis, Sao Goncalo, Maceio, Duque de Caxias, Natal, Teresina, Campo Grande, Sao Bernardo do Campo, Nova Iguaçu, Joao Pessoa, Santo Andre, Osasco, Jaboatao dos Guararapes, São Jose dos Campos, Ribeirao Preto, Uberlandia, and Contagem. Brasilia (Federal District) was excluded from the survey.

From Table 3.5, it can be noted that own-municipal revenues in the 30 most populated municipalities accounted for approximately one half (R\$ 66.7 Billion) of Brazil's own-municipal revenues (R\$ 134.9 Billion). Thus, Table 3.6 was compiled to better explain such differences and to facilitate comparisons, displaying the median ratio of each revenue source to current revenues and per municipal GDP in two groups: a group with all Brazilian municipalities (including the 30 most populated) and an exclusive group with the 30 most populated municipalities.

Table 3.6: Brazil's municipal revenues in all municipalities and amongst the 30 most populated (2013, as percentage of current revenues and GDP, median values)

| Source of Municipal Revenues | Percentage of current revenues | | | | GDP Ratio | | | |
|---|--------------------------------|--------------|------------|------------|--------------|-------------|------------|------------|
| | Value | | All = 100 | | Value | | All = 100 | |
| | All | Top 30 | All | Top 30 | All | Top 30 | All | Top 30 |
| Own municipal revenues | 11.7 | 41.1 | 100 | 351 | 1.77 | 3.07 | 100 | 173 |
| Property tax | 1.2 | 6.7 | 100 | 558 | 0.15 | 0.49 | 100 | 327 |
| Tax on services | 2.8 | 13.3 | 100 | 475 | 0.46 | 1.00 | 100 | 217 |
| Property transfer tax | 0.8 | 2.8 | 100 | 350 | 0.12 | 0.21 | 100 | 175 |
| Fines, penalties and arrears | 1.2 | 4.0 | 100 | 333 | 0.17 | 0.30 | 100 | 176 |
| Governmental transfers | 88.3 | 58.9 | 100 | 67 | 19.42 | 4.58 | 100 | 24 |
| Federal transfers | 51.2 | 23.1 | 100 | 45 | 12.10 | 1.92 | 100 | 16 |
| Municipalities' Fund | 35.4 | 7.8 | 100 | 22 | 8.47 | 0.68 | 100 | 8 |
| Unified Health Fund | 6.9 | 11.4 | 100 | 165 | 1.50 | 0.93 | 100 | 62 |
| State transfers | 36.9 | 35.6 | 100 | 96 | 7.27 | 2.66 | 100 | 37 |
| Sharing on value-added tax | 18.1 | 21.3 | 100 | 118 | 3.24 | 1.58 | 100 | 49 |
| Sharing on vehicle tax | 1.7 | 4.3 | 100 | 253 | 0.24 | 0.32 | 100 | 133 |
| Education fund | 15.0 | 8.8 | 100 | 59 | 3.34 | 0.66 | 100 | 20 |
| CURRENT REVENUES | 100.0 | 100.0 | 100 | 100 | 21.27 | 7.70 | 100 | 36 |
| Capital Revenues | 4.2 | 3.0 | 100 | 71 | 0.87 | 0.24 | 100 | 28 |
| Credit operations | 0.2 | 1.6 | 100 | 800 | 0.03 | 0.13 | 100 | 433 |
| Capital transfers | 3.7 | 1.1 | 100 | 30 | 0.80 | 0.08 | 100 | 10 |
| Municipal companies and entities | 1.2 | 5.2 | 100 | 433 | 0.20 | 0.40 | 100 | 200 |
| TOTAL REVENUES | 105.6 | 108.2 | 100 | 102 | 22.38 | 8.34 | 100 | 37 |

Data Source: STN (2015) and IBGE (2015).

In Table 3.6, it can be observed that own municipal revenues per current revenues in the 30 most populated municipalities were 3.5 times higher than in all municipalities (11.7 percent vs. 41.1 percent), while the ratio of the two most important municipal taxes, property tax and tax on services, was about 5 times greater. In relation to own-municipal revenues per municipal GDP, the 30 largest municipalities had a 73 percent higher ratio than the all municipalities ratio, where property tax and tax on services were respectively 3.3 and 2.2 times greater.

Governmental transfers per current revenues were 50 percent greater in all municipalities than they were amongst the 30 most populated (88.3 percent vs. 58.9 percent). Federal transfers were 2.2 times greater (51.2 percent vs. 23.1 percent), while state transfers were almost the same (36.9 percent vs. 35.6 percent). Furthermore, comparing all municipalities with the 30 most populated, the Municipalities' Fund was 4.5 times greater, (35.3 percent vs. 7.8 percent)

and the education fund was 70 percent greater. The importance of the state value-added tax was almost the same between the two groups (18.1 percent vs. 21.3 percent), while the share on vehicle tax was 2.5 times greater amongst the 30 most populated municipalities (4.3 percent vs. 1.7 percent). In all municipalities, in terms of revenues per GDP, governmental transfers were 4 times greater (19.42 percent vs. 4.58 percent). Federal and state transfers were respectively about 6 to 3 times greater (12.10 percent vs. 1.92 percent and 7.27 percent vs. 2.66 percent) and the Municipalities' Fund was 12.5 times greater (8.47 percent vs. 0.68 percent).

Finally, both current revenues and total revenues per GDP were 2.7 times higher in all municipalities (21.3 percent vs. 7.7 percent and 22.4 percent vs. 8.3 percent). In addition, revenues from municipal-owned companies were much greater amongst the top 30 municipalities (4.3 times).

Thus, after analyzing the municipal revenues indicators of Tables 3.4, 3.5 and 3.6, it can be concluded that:

- a) Own revenues are much more important amongst the larger municipalities. On the other hand, governmental transfers are much more important amongst the smaller municipalities;
- b) Federal transfers are much more important amongst the small municipalities, since the criteria of equalization of the Municipalities' Fund take into account the level of *per capita* income;
- c) There is no great difference in the level of state transfers in relation to the municipal size, since some state transfers (the share on the value-added and vehicle taxes) take into account the location of the tax event. The same occurs with the funds linked to health and education expenses, since their mechanism of granting is the population and number of students;
- d) Governmental transfers play an important role in most small municipalities' economies, providing, on average, 20 percent of their GDP;
- e) Large municipalities are more likely to obtain resources from credit operations and from own companies and entities, while small municipalities rely more on capital transfers donated by federal and state governments.

3.9.4 Property Tax Revenues in Brazil

After discussing the main sources of municipal revenues in Brazil, this section will specifically examine the property tax revenues, highlighting their concentration in a few Brazilian municipalities, the revenue development and also performing a comparison with other countries in relation to their role in the local budgets.

3.9.4.1 Revenues Concentration

In Brazil, as discussed in the previous section, property tax disparity is even higher than other sources of revenue, where the Municipality of São Paulo accounts for one fourth of all Brazil's property tax revenues collected in 2013. Table 3.7 provides evidence of this disparity.

Table 3.7: Brazil’s population, GDP and property tax concentrations (2013, per population cluster of municipalities)

| Population Cluster | No of municipalities | Share (in percentage) | | | GDP = 100 | |
|------------------------|----------------------|-----------------------|------|--------------|-----------|--------------|
| | | population | GDP | property tax | GDP | property tax |
| Top 1 (São Paulo) | 1 | 5.9 | 10.8 | 24.3 | 100 | 225 |
| Top 1% populated | 55 | 29.7 | 43.4 | 70.5 | 100 | 162 |
| Inferior 99% populated | 5,452 | 70.3 | 56.6 | 29.5 | 100 | 52 |

Data Source: STN (2015) and IBGE (2015).

From Table 3.7, it can be noted that property tax revenues are concentrated in a few municipalities and these concentrations are even higher than the GDP (a good proxy for the tax base, i.e., the property market values). São Paulo produced 24.3 percent of all property tax revenues, while the 55 most populated municipalities (the top 1 percent, including São Paulo) produced 70.5 percent. On the other hand, the remaining 5,452 municipalities only produced 29.5 percent. Comparing the share of each population cluster on Brazil’s GDP and property tax revenues, São Paulo’s share on property tax revenues were 125 percent higher than GDP while in the top 1 percent cluster was 62 percent higher and the inferior 99 percent cluster was 48 percent lower.

Moreover, such disparity is increasing over time, while the GDP is becoming less concentrated and property taxation is becoming more concentrated, as shown by Table 3.8.

Table 3.8: Brazil’s property tax and GDP concentrations (2001-2013, per population cluster of municipalities)

| Cluster | Property Tax Share | | | | | GDP Share | | | | |
|-------------------|--------------------|------|------|------|------|-----------|------|------|------|------|
| | 2001 | 2004 | 2007 | 2010 | 2013 | 2001 | 2004 | 2007 | 2010 | 2013 |
| Top 1 (São Paulo) | 23.7 | 24.1 | 24.2 | 24.9 | 24.3 | 13.7 | 11.6 | 12.2 | 11.8 | 10.8 |
| Top 1% populated | 67.3 | 68.7 | 66.5 | 66.4 | 70.5 | 49.0 | 46.3 | 47.7 | 46.6 | 43.4 |

Data Source: STN (2015) and IBGE (2015).

Table 3.8 shows that Brazilian GDP concentration in the top 1 percent of the most populated municipalities decreased from 49 percent to 43 percent between 2001 and 2013, while property taxation increased from 67 percent to 71 percent.

3.9.4.2 Revenues Development

This section will explore property tax revenues development and its main indicators between 2000 and 2013, in order to demonstrate whether there is a possible trend over time in relation to the property tax indexes.

Table 3.9 was thus compiled to display the property tax development between 2000 and 2013, in *per capita* levels (in R\$, adjusted as of 31 Dec 2015); and as a ratio to GDP, to current revenues, and to own-tax revenues. Furthermore, the table displays the national ratios and those within four population clusters: a) population under 20,000 that comprises 68.8 percent of the number of all municipalities; b) population between 20,001 and 100,000

that comprises 25.7 percent; c) population between 100,000 and 500,000 that comprises 4.7 percent, and d) population over 500,000 that comprises 0.7 percent or just 39 municipalities.

Table 3.9: Brazil's property tax *per capita*, per GDP, per current revenues and per own-tax revenues (2000-2013; per population cluster, median values)

| Ratios | Population cluster | Median values | | | | | 2000 = 100 | | | | |
|--|--------------------|---------------|-------------|-------------|-------------|-------------|------------|------------|------------|------------|------------|
| | | 2000 | 2003 | 2006 | 2010 | 2013 | 2000 | 2003 | 2006 | 2010 | 2013 |
| Per capita (R\$ adjusted as 31 Dec 2015) | Under 20,000 | 15 | 17 | 19 | 20 | 22 | 100 | 113 | 127 | 133 | 147 |
| | 20,000-100,000 | 40 | 43 | 44 | 48 | 53 | 100 | 108 | 110 | 120 | 133 |
| | 100,000-500,000 | 89 | 94 | 95 | 114 | 128 | 100 | 106 | 107 | 128 | 144 |
| | Over 500,000 | 186 | 194 | 209 | 243 | 270 | 100 | 104 | 112 | 131 | 145 |
| | Total | 89 | 95 | 102 | 117 | 132 | 100 | 107 | 115 | 131 | 148 |
| Per GDP (in percentage) | Under 20,000 | 0.16 | 0.14 | 0.15 | 0.13 | 0.12 | 100 | 88 | 94 | 81 | 75 |
| | 20,000-100,000 | 0.30 | 0.29 | 0.29 | 0.25 | 0.24 | 100 | 97 | 97 | 83 | 80 |
| | 100,000-500,000 | 0.43 | 0.45 | 0.39 | 0.38 | 0.37 | 100 | 105 | 91 | 88 | 86 |
| | Over 500,000 | 0.63 | 0.69 | 0.67 | 0.63 | 0.63 | 100 | 110 | 106 | 100 | 100 |
| | Total | 0.46 | 0.47 | 0.46 | 0.43 | 0.42 | 100 | 102 | 100 | 93 | 91 |
| Per current revenues (in percentage) | Under 20,000 | 1.3 | 1.2 | 1.0 | 0.9 | 0.9 | 100 | 92 | 77 | 69 | 69 |
| | 20,000-100,000 | 3.5 | 3.5 | 2.9 | 2.5 | 2.5 | 100 | 100 | 83 | 71 | 71 |
| | 100,000-500,000 | 6.9 | 6.6 | 5.5 | 5.1 | 5.1 | 100 | 96 | 80 | 74 | 74 |
| | Over 500,000 | 9.8 | 10.5 | 9.4 | 8.6 | 8.6 | 100 | 107 | 96 | 88 | 88 |
| | Total | 6.2 | 6.2 | 5.5 | 5.1 | 5.1 | 100 | 100 | 89 | 82 | 82 |
| Per own-tax revenues (in percentage) | Under 20,000 | 30.0 | 22.4 | 18.2 | 15.5 | 14.6 | 100 | 75 | 61 | 52 | 49 |
| | 20,000-100,000 | 31.9 | 32.4 | 28.1 | 23.6 | 22.1 | 100 | 102 | 88 | 74 | 69 |
| | 100,000-500,000 | 35.6 | 33.9 | 29.9 | 26.1 | 25.2 | 100 | 95 | 84 | 73 | 71 |
| | Over 500,000 | 30.0 | 28.2 | 25.5 | 23.1 | 21.9 | 100 | 94 | 85 | 77 | 73 |
| | Total | 31.4 | 29.5 | 26.4 | 23.5 | 22.3 | 100 | 94 | 84 | 75 | 71 |

Data Source: STN (2015).

Analyzing the *per capita* ratios, Table 3.9 reveals that property tax increased 48 percent between 2000 and 2013. This increase was approximately the same in all four clusters; however, the ratios of the cluster with populations over 500,000 were about 12 times higher than those with populations under 20,000. This, again, highlights the great disparity of property taxation between small and large municipalities.

Despite the *per capita* increase within 13 years, this occurred under a stable GDP ratio of about 0.45 percent, which indicates that property tax revenues need to be tapped. The GDP ratio amongst municipalities with populations over 500,000 remained almost stable in the period (about 0.65 percent); however, amongst the other municipalities, it decreased by approximately 20 percent.

The overall property tax per current revenues decreased from 6 percent to 5 percent amongst municipalities with populations under 100,000, where this decline was about 30 percent. Finally, property tax per own-tax revenues also declined between 2000 and 2013, (from 31 percent to 22 percent), being more common amongst the municipalities with populations under 20,000, where this reduction was 50 percent. This was mainly due to the reform and tax base expansion in tax on services in 2004.

Thus, after analyzing the property tax revenues ratios presented in Table 3.9 it can be concluded that:

- a) There is great performance disparity between the large and the small municipalities;
- b) *Per capita* revenues increased in current values, but at a much lower rate than other sources of revenues, including governmental transfers and other municipal taxes;
- c) Property tax revenues are not following Brazil's GDP growth and their ratio to GDP has slightly decreased;
- d) This general trend of ratios decline was higher amongst the smaller municipalities, enhancing the revenue disparity.

3.9.5 Brazil's Subnational Revenues in a Global Context

From Table 3.4, this study notes that total municipal total revenues represented 8 percent of Brazil's GDP in 2013, where governmental transfers roughly comprised two-thirds of this value. In addition, state governments' total current revenues represented 12.5 percent of Brazil's GDP; however, some of the state revenues were transferred to municipal governments, which gave a net state governments' current revenue of 9.5 percent of GDP. Therefore, the total subnational current revenues (the municipal revenue plus the (net) state revenue) were 17.5 percent of GDP in 2013.

Table A4 in Annexure A was compiled to check whether Brazil's subnational revenues indicators are in accordance with the international trend, where the table displays the ratios of: a) local revenues per GDP; b) local grants as share of local revenues; c) intermediate governments' total revenues per GDP (states, provinces or regions); and d) the subnational revenues. The countries were selected according to the data availability, since indicators of local revenues, including governmental grants, are scarce. In addition, these countries were clustered into three groups (developing, transitional and developed) according to their property tax performance in the same manner as exhibited in Tables A2 and A3. Thus, amongst the 75 selected countries, 25 are developing countries, 23 are transitional countries and 27 are developed countries. It is important to mention that, in order to calculate the net state revenues and therefore the level of subnational revenues of the fourth column, the state expense on governmental transfers was deductible from the total state revenues of the third column⁵⁴.

According to Table A4, Brazil's ratio of municipal revenues per GDP was: a) higher than the average of other developing countries (8.0 percent vs. 5.0 percent); b) similar to the average of transitional countries (8.0 percent vs. 8.5 percent); and c) lower than the average of developed countries (8.0 percent vs. 10.6 percent). Nevertheless, in Brazil, the ratio of governmental grants to the total local revenues seems to be too high if compared with most countries in the survey. The ratios of developing, transitional and developed countries

⁵⁴ When data of state governments is not displayed in Table A4, this is because the country does not have intermediate governments, or there is no available data for them.

generally ranged from 35 percent to 55 percent, much lower than the 69 percent ratio found in Brazil. Indeed, this level of grants was only higher in Malawi, Tanzania, Tunisia, Uganda, Albania, Lithuania, Romania and the Netherlands.

Despite the lack of data of state revenues in many countries, Brazil's ratio was higher than the average ratio of developing countries and transitional countries (13.2 percent vs. 8.3 percent) and was quite similar to developed countries (13.2 percent vs. 14.3 percent). However, 24 percent of Brazil's total state revenues were transferred to the municipalities, and this level did not occur in most of the selected countries, with the exception of Russia (41 percent), Germany (22 percent) and the United States (21 percent). Brazil's ratio of subnational (state and municipal) revenues to GDP was higher or quite similar to the other countries in the table.

3.10 Conclusions

The chapter began with a discussion of the taxes on properties that exist in Brazil, where the Constitution assigns the annual rural property tax to federal government; the inheritance and gift tax, and the vehicle tax to state governments; and the annual urban property tax, the property transfer tax, and other minor charges and fees to municipal governments. As mentioned in Chapter 2, despite the recommendation by some authors for the unification of different taxes on properties into a single, locally administered, annual property tax (Bahl and Wallace, 2008), there is evidence that shows that it has been positive for Brazilian municipalities to have a wide range of taxes to be explored.

The annual rural property tax has represented only 0.02 percent of Brazil's GDP, being a regulatory tax to encourage rural land development and not serving any revenue purpose. Therefore, the taxation of rural properties has been ineffective, greatly enhancing vertical and horizontal inequity between rural and urban taxpayers. In addition, as discussed in Section 3.3.2.3, three rules of property classification exist for rural and urban taxation: a) the benefit of public services according to the National Tax Code; b) the geographical urban area delimited by the municipal laws and/or municipal master plans; and c) the land use according to the Federal Decree-Law 57 of 1966. These three rules may be confusing and contradictory, causing juridical litigation and procrastination. Thus the chapter concludes that a possible proposed unification of rural and urban property taxes into a single, locally designed and administered, annual property tax would be a good solution to increase municipal revenues (especially amongst smaller municipalities) and improve fairness, scale and efficiency in tax administration.

Since ITR and IPTU fall under the Brazilian Constitution, 1988, this proposed unification would require a constitutional amendment to devolve the competence of rural property taxation to municipalities. This would indirectly repeal all the legal rules of property classification for tax purposes. Articles 33 and 34 of the National Tax Code would also have to be amended to determine the tax base and taxpayers of this "new" tax. Therefore, municipalities would continue to autonomously establish their policies of urban property taxation; however with the inclusion of rural properties. An agreement between federal government and municipal governments would be necessary to share the federal rural cadaster (CAR) information. In addition, the training of municipal officers would be needed

for its implementation and administration. In terms of this proposed unified tax administration, municipalities currently have a database of rural properties' transactions (municipal property transfer tax), federal government manages the national rural cadaster (federal rural property tax) and the local notaries keep the documents of registration. Therefore, an agreement between federal government, municipal governments and notaries would be recommended to share information, in order to implement this proposed new tax⁵⁵. In addition, the funding of investments in administrative infrastructure and municipal officers' training is highly recommended.

In relation to the tax on properties levied by state governments, the chapter recommends that vehicle tax should have its tax base expanded to also cover vessels and personal aircrafts. The value of these properties is high, while the number of taxpayers is reduced, ensuring fairness and easier administration. However, since the tax base consists of mobile properties, its legislation, including tax rates, should be nationally established in order to avoid tax competition amongst states. With regard to the inheritance and gift tax, there is no reason for it being entitled to state governments, rather than to federal governments. Most of the international experience reveals that the tax is often centralized, while tax burden fairness is frequently an important concern, and its administration has synergies with the income tax. Indeed, in Brazil, inheritance and gift tax has a nationally capped tax rate of only 8 percent, while its revenues represent only 0.08 percent of GDP.

In relation to the tax on properties levied by municipal governments, property transfer tax revenues have greatly increased in recent years due to the real estate boom, the national policy of housing credit (requiring formal transactions), the running of property transfer tax valuation rolls (providing a more accurate tax base), and the better administrative practices in large municipalities. However, this latter trend should also be spread out to the small local governments, since some may have a dynamic market of rural properties with high potential to raise revenues. As explained in Section 3.3.1, the usual tax rate of 2 percent in Brazil can be considered low by international standards and it could feasibly be increased to 3 percent without any meaningful disturbance to the real estate market, as occurred in São Paulo.

Specific fees to fund the municipal services of garbage collection, street cleaning and street lighting are also widely applied. Their revenues must be used to fund such services, not being linked to health and education funds, as occurs with other general municipal taxes. Municipalities can establish their own mechanism of charging, but they are generally levied according to the properties' size. This may be viewed as unfair since the property size is not completely related to the cost of service. Therefore political pressures may occur. Nevertheless, their use should be intensified due to the relevance of such urban services to local welfare. In addition, other fees should be created to fund other municipal divisible services, such as street and pavement maintenance and the sewerage treatment.

The chapter states that there are three main land-based instruments that are applied in Brazil: a) contribution for improvements (CM); b) annual increases on property tax rates (IPTU-

⁵⁵ De Cesare (2017b) highlights that the Municipality of Porto Alegre enacted a municipal law that ensures the data availability of property transactions and ownership transfers registered by the notaries in Porto Alegre.

PT); and c) governmental sales of building increases and change of use (OODC). However, only this latter instrument has been successfully applied, due to its market orientation in order to fund urban projects, while the others have been ineffective due to their costly administration. Therefore, the chapter concludes that these instruments should be re-thought in order to be used to fund relevant projects required by the community, as well as to increase revenues for the municipality.

In relation to the annual property tax (IPTU) which is the main topic of this study, the chapter examined its six main elements that determine its performance: cadasters, valuations, exemptions, tax rates, and collection.

It is recommended that, in terms of efficiency and due to its costs and the existence of economies of scale and scope, the registration process should be fully or partially outsourced to the private sector, since there is a growing demand in more modern cadasters for updating and re-inspecting properties and taxpayers. In a final scenario, different governmental and private registers should be integrated into a single cadaster with multi-purpose functions. The chapter also noted that the relevance of the cadastral challenges differs between large and small municipalities in Brazil. In large municipalities, it may be more urgent for the cadastral modernization and policies of registering informal properties, while in smaller municipalities it may be more important to update taxpayers and re-inspect properties in locus. Indeed, the shortcoming in taxpayers' registration was proposed as the main reason for the low collection amongst vacant land properties. The status of the registration, including the GIS use and the coverage estimation, will be explored for a selection of municipalities in Chapter 5.

Valuations are a great and probably the main concern in most of the Brazilian municipalities. Despite the annual adjustment of property values by ordinary inflation indexes being permitted, there is a legal requirement of valuation rolls under municipal laws. Thus municipal councils have postponed and/or capped revaluations, enhancing vertical and horizontal inequity and restricting the revenue potential. In 2014, there was an attempt to reduce this political bias by amending the federal "Fiscal Responsibility Law" (that regulates the public finances in Brazil) and establishing a minimum 4-year valuation cycle in the country (Federative Republic of Brazil, 2000b, 2014). However, this proposal did not have consensus in the Federal Senate, and was rejected in 2015. Alternatively, the chapter suggests that the valuation cycle should be specified in the local tax legislations, as has occurred in some municipalities. Another suggestion for the very low assessment verified in many Brazilian municipalities is the linking of the construction costs under the PGV to the tables of construction costs provided by the construction unions (CUB). This can be applied when the method of valuation is the "cost approach", while land values should be estimated by the municipal tax departments using "residual values".

Indeed, the problem of municipal valuations in Brazil is very complex, since most of the details of property valuation must be stated according to a municipal law approved by the municipal councils, which makes the system very unyielding. Therefore, a federal legislation that forced municipalities to promote more frequent revaluations and to apply modern

techniques of valuation would be recommended⁵⁶. In addition, such a meaningful reform could also cover the proposal of merging rural and urban property tax. Evidently a constitutional amendment that placed in the Brazilian Constitution the possibility of a property tax act to regulate IPTU at national level would be required, since the tax is already stated and partially regulated by the constitution. Subsequently the enactment of a federal law would be possible that would have to be discussed with society and implemented by the municipalities.

Granting tax exemptions for residential properties and tax incentives for companies is an autonomous and generalized tax policy in many municipalities. However, exemptions reduce the tax base and mitigate the impact of tax reforms, so their reduction to no more than 10 percent of the tax roll is recommended. In addition, informal low income communities would willingly receive property tax bills as a way to prove possession. The literature discussed in Section 2.7 of Chapter 2 also pointed out that property tax incentives have a low impact on the decisions of investment location and municipalities should consider better ways to encourage local development. Chapter 5 will provide the real coverage and revenue impact of tax exemptions in a selection of municipalities.

Brazilian municipalities are also autonomous to establish their own tax rates policy where progressive and higher tax rates to nonresidential properties are generally applied. Tax rates level may be a relevant reason for low revenue outcomes and can also mitigate the upfront costs of tax reform that aim to improve the tax equity, for example. Indeed, due to the local discretion in setting tax rates, it was catalogued that tax rates for built properties ranged from 0.2 percent to 2.8 percent in a sample of 365 municipalities in 2007 (Carvalho Jr., 2009). Tax rates design should surtax taxpayers with a higher ability to pay, enhancing fairness in a transparent way, rather than favoring taxation by assessment or exemptions mechanisms. In addition, a minimum level of tax rates to enable a feasible level of revenues should be considered, even in progressive systems. This will be examined further in Chapter 5 which discusses the different practices of tax rates design amongst a selection of municipalities.

Several policies that facilitate compliance and enforce property tax are legally permitted in Brazil; however the chapter provided evidence that voluntary compliance instruments are preferentially applied due to the political fallout in enforcing property taxation. Voluntary compliance policies commonly include the tax services and facilities available on the internet, the payment in installments or by credit cards and a great discount for lump-sum anticipated payment. However, lump-sum payment can actually increase the political cost of tax reforms when property tax is viewed as an annual lump-sum levy that has to be accommodated in the taxpayer's monthly budget.

Enforcement policies include costly and time-consuming tax liens, placement on the national blacklist registers, the outsourcing of arrears, and finally the seizure and auction of the property. However, only the tax lien has been widely used, while blacklisting has been applied in some

⁵⁶ For example, this occurs under Article 41 of Brazil's City Statute (Federal Law 10,257 of 2001) that forces the implementation of municipal master plans and their review every ten years in municipalities with populations over 20,000 inhabitants (Federative Republic of Brazil, 2001). Another example is the Supplementary Federal Law No 116 of 2003 that specifies the services under the municipal tax on services and ranges its tax rates from 2 to 5 percent (Federative Republic of Brazil, 2003a).

large municipalities. The other permitted practices are still overlooked, due to their political costs. In addition, the chapter also found that registration has been strongly related to the property collection rates, since the property tax billing and enforcement needs correct taxpayer identification, which has been challenging amongst small municipalities. Chapter 5 will catalogue the compliance and enforcement practices applied in a selection of municipalities.

Section 3.9 highlighted that municipal agencies of internal control and the schemes of inter-government agreements are feasible instruments that can be used to enhance legality, transparency, corruption prevention and more efficient tax administration. This section shows that PMAT federal program to fund projects of municipal tax administration modernization has been proved highly cost-effective; however its coverage should be expanded to smaller municipalities through more simplified and relaxed rules. Inter-municipal corporations have been most useful amongst small neighboring municipalities that do not have the scale to implement modern tax administration in a scenario of increasing computerization and demand of skilled professionals. The section provided some examples where these agencies were effective in detecting corruption (São Paulo's Agency of Control in 2013) or reform in the collection systems (Inter-Municipal Corporation in Belo Horizonte Metropolitan Area in 2009).

In addition, other considerations were provided in Section 3.9 of this chapter, which highlight the municipal source of revenues, including the annual property tax. Despite *per capita* property tax revenues having increased 50 percent between 2000 and 2013 (in real terms), it was found that such an increase did not accomplish the GDP growth and other revenues sources. Property tax revenues still continue to be very concentrated in the large municipalities, due to their better administrative capacity and lower dependency on governmental grants. Indeed, property taxes represented 0.63 percent of GDP and 9 percent of total revenues amongst municipalities with populations over 500,000 people; with only 0.13 percent of GDP and 1 percent of total revenues amongst municipalities with populations under 20,000. Governmental transfers provided more than 80 percent of total municipal revenues in most of the (small) Brazilian municipalities.

The chapter also displayed the differences between smaller and larger municipalities in relation to their public finances. In 2013, one-fourth of the population lived in only 30 municipalities, while three fourths lived in 5,540 municipalities, in which 3,501 had populations under 20,000. Comparing the public finances of both groups, the study showed that the average ratio of own revenue sources represented 41 percent of current revenues amongst the 30 most populated municipalities, while representing only 11 percent in the remaining municipalities. On the other hand, governmental transfers were very important for the economy of small municipalities, representing 19 percent of their GDP or 88 percent of their current revenues.

Most Brazilian municipalities have largely relied on governments transfers (commonly 70-80 percent of total revenues, as displayed in Table 3.4). Unlike other countries where annual property taxes represented a meaningful share of local revenues (see Table A3 in Annexure A), Brazil's property tax has commonly generated between 2 and 6 percent of municipal revenues, where these ratios positively vary with the municipal income and population (as

shown by Tables 3.4 and 3.5). Therefore, as debated by Slack (2010), Brazil's property tax has a low impact in funding the cost of municipal services, and is likely not being viewed as a benefit tax by the taxpayers. Furthermore, the constitutional and federal regulations that require 45 percent of most municipal revenues (which include the urban property tax) to be spent on the public system of education and health, also mitigate the taxpayers' view that property tax is used to fund the specific urban services benefited by the taxable properties.

Compared with other countries, Brazil's subnational revenues accounted for 18 percent of GDP, which was similar to some emerging countries (China, Russia and South Africa) and some developed countries (Belgium, Germany, Spain, Switzerland and the United States). In Brazil, however, the federal transfers and own indirect taxes (the state value-added tax and municipal tax on services) are likely to be much more meaningful to the subnational governments than in other countries. Conversely, revenues from property taxation, income tax, fees and charges play a minor role in Brazil.

This reveals that Brazil's subnational governments, especially the smaller municipal governments, have little incentive to enhance their own revenue sources, since the administrative, financial and political costs to perform such tax reforms are considered far superior to the expected revenue outcomes. Therefore, initiatives to encourage local revenue strengthening should also have the cooperation and participation of: a) executive federal and state governments; b) federal parliament and states' councils; c) juridical and economic entities; d) universities and academic organizations; and e) local community and media. After having discussed the main issues of property taxation and municipal public finances in Brazil, this study will continue to perform its empirical section where its methodology is examined in the next chapter, the results of the questionnaires are displayed in Chapter 5, and the models and estimations of property tax performance and potential in Brazil are provided in Chapter 6.

CHAPTER 4:

RESEARCH METHODOLOGY

4.1 Introduction

This chapter describes the research methodology highlighting the process and steps that were developed to gather, select and display data. This data will be used to display the research results, to estimate the current property tax performance in Brazil and to establish feasible scenarios of revenue potential. This enhances the trustful and the validity of this research. The validity is important in procedures used for qualitative data collection and analysis, and requires the application of ethical principles using databases of third parties.

This chapter is divided into eight sections. The first section introduces the chapter. The second section presents the classical property tax performance model of ratios that will be adapted to estimate the property tax performance in Brazil in Chapter 6. The third section displays the pre-existing data and statistics that will be used in the models developed in Chapter 6. The fourth section considers the reason for using email questionnaires as a method of gathering the data that is not available, while describing the questionnaire design. The fifth section provides extensive details of the selected 47 municipalities that replied to the questionnaires, so as to permit the development of this research. The sixth section displays the stratification of all Brazilian municipalities by property tax potential, in order to better display the questionnaire results in Chapter 5 and more feasibly establish the ratios of revenue potential in Chapter 6. The seventh section develops a model to estimate the property tax base in a municipality, i.e. its total market values, while attempting to validate the results. Finally, the last section concludes the chapter appointing the highlighted methodology and results that will be used in Chapters 5 and 6.

4.2 Property Tax Performance Model of Ratios

Lewis (2003) relates that Bahl (1979), Linn (1980) and Bahl and Linn (1992) were three of the first studies that evaluated property tax performance in a country based on a model of ratios. This model basically states that property tax performance is related to six main indicators, two policy ratios (tax base and tax rate), three administrative ratios (cadastral coverage, valuations and collection) and one exogenous ratio (total property market values). Kelly (2000, 2004) used this model to determine the property tax performance in Kenya, while Kelly (2003) and Lewis (2003) each used it for Indonesia, following the administrative reforms undertaken by the central government of this country. Subsequently Bahl and Martinez-Vazquez (2007), Bahl and Wallace (2008), and Norregaard (2013) developed a general model of ratios to estimate property tax performance in a country using an identity, which is the decomposition of the ratio of property tax revenues to GDP. The authors noted three major challenges with this approach. The first is stipulating an optimum level of property tax revenues. The second is the lack of data. The third is the inability to take into account the financial, administrative and political costs of undertaking a suggested ratios improvement. The authors highlight that the

revenue yields must be high enough to compensate the upfront costs of any reform. This identity (Equation 4.1) is basically a model of ratios as follows:

Equation 4.1 (Property tax performance model):

$$PT = MV * VCR * VR * RR * CR$$

Where:

- a) PT is the property tax revenues;
- b) MV is the market values of all properties;
- c) VCR is the values coverage ratio which is the ratio of the market values of properties on fiscal cadasters to the market values of all properties;
- d) VR is the valuation ratio, which is the ratio of the assessed values of properties on fiscal cadasters to the market values of properties on cadasters;
- e) RR is the rateable ratio, which is the ratio of all the tax levied to all the assessed values;
- f) CR is the collection ratio, which is the ratio of all tax collected to all the tax levied.

It is important to detail other case studies that applied the mentioned model. Bahl *et al* (2009) estimated all of India's property tax yields and potential through a sample of the 36 most populated Indian local governments. At the time of the study, India had a total of 5,161 local governments and the authors established three estimations through three different assumptions. In the first estimation, the property tax performance indicators in the remaining 5,125 municipalities were equal to the four less populated municipalities in their sample. In the second estimation, the indicators were equal to the sampled municipally with the lowest *per capita* revenues. Finally, in the third estimation, the remaining municipalities had their performance indexes based on the sampled municipalities with the lowest *per capita* revenues in their respective states. The study finally estimated that the property tax revenues were likely to be between 0.15 percent and 0.23 percent of Indian GDP, with the potential to achieve 0.8 percent if an index of 85 percent for both collection and coverage ratios was achieved. In Brazil, Carvalho Jr. (2013, 2014) also established a similar model to estimate property tax performance in a city, studying Rio de Janeiro and São Paulo.

Equation 4.1 describes a property tax performance model based on studies of many authors (Kelly, 2000, 2003, 2004; Lewis, 2003; Bahl and Martinez-Vazquez, 2007; Bahl and Wallace, 2008; Norregaard, 2013). Essentially, all of these authors employed, with minor discrepancies, the ratio of property tax revenues to GDP as the variable to be predicted using the five explained variables. Thus, this study designed a property tax performance model as represented in Equation 4.2. The equation is basically the same as the other authors' models, with the exception of the introduction of an error term. This was introduced because the variable "market values to GDP" will be estimated in the last section of this chapter, not being a residual variable that adjusts the identity, as occurs in the other authors' models.

Equation 4.2 (Brazilian Municipalities' Property Tax Performance Model):

$$\left(\frac{T'}{Y}\right) = \left(\frac{MV}{Y}\right) \left(\frac{TMV}{MV}\right) \left(\frac{AV}{TMV}\right) \left(\frac{T}{AV}\right) \left(\frac{T'}{T}\right) \varepsilon$$

Where:

T' = Property tax collection

Y = Municipal GDP

MV = Total market values

TMV = Taxable market values

AV = Total assessed values

T = Property tax liability

ε = Error term

To explain the equation terms, the first term (T'/Y) is the ratio of property tax revenues to GDP. The second term is the ratio of the all market values to GDP. The third term (TMV/MV) is the ratio of the market values of properties on fiscal cadasters to all market values, i.e., the values coverage. The fourth term (AV/TMV) is the ratio of total assessed values to the market values of properties on fiscal cadasters, i.e. the assessment ratio. The fifth term (T/AV) is the ratio of property tax liability to total assessed values, i.e. the taxation on assessed values. The sixth term (T'/T) is the ratio of property tax collection to liability, in other words, the collection rate. Finally, the seventh term (ε) is the error term.

It is important to discuss the role of the error term. It is a variable created in statistical models when they do not fully represent the actual relationship between the independent variables and the dependent variables. As a result of this incomplete relationship, the error term is the amount at which the equation may differ during empirical analysis. In other words, the term essentially means that the model is not completely accurate; however, it can be considered to be an acceptable level of accuracy, when its value is lower than 30 percent (or between 0.7 and 1.3). Box 4.1 summarizes the description of these ratios.

Box 4.1: Definition of the property tax performance determinants

Market Values

- Properties' market values: the sum of the market values of all properties in a jurisdiction. By extension, the property market values indicator can be equalized as *per capita* or per GDP index.

Coverage

- Residential properties coverage: the ratio of the number of residences on fiscal cadaster to the surveyed households at National Census;
- Residential values coverage: the ratio of the residential market values on fiscal cadaster to all residential market values in a jurisdiction;
- Overall values coverage: the ratio of the market values of all properties on fiscal cadasters to all the properties' market values in a jurisdiction.

Assessment

- Assessment level: the common or overall ratio of assessed values to market values;
- Assessment ratio: the ratio of the total assessed values of a valuation roll to the total market values in a jurisdiction (IAAO, 2013).

Taxation

- Taxation on assessed values: the ratio of the overall tax levied to the total assessed values. The index just accounts for IPTU (the annual urban property tax in Brazil); not including any other municipal fees that are often billed together. In addition, the total assessed values cover all registered properties; including those that are tax exempted.
- Taxation on taxable properties: the ratio of the overall tax levied to the total assessed values of taxable properties. Taxable properties are those that are effectively charged for property tax and not including those benefited by municipal or constitutional tax exemptions;
- Taxation on taxable values: the ratio of the overall tax levied to all the taxable assessed values. This includes all taxable assessed values under the valuation roll. Therefore, these values exclude fully exempted properties as well as the non-taxable portion of some properties that may be granted by any type of discounts, rebates and tax credits.

Collection

- Collection rate: the ratio of the amount effectively collected to the amount demanded. In this study, this index excludes the payment of fines, penalties and tax arrears, but includes the amount not collected, caused by discounts for advance payments (which is not caused by taxpayer delinquency).

In addition to the abovementioned model of ratios, alternative approaches can be also used to estimate property tax potential. In Brazil, three previous studies employed alternative or adapted models to estimate property tax potential in the country.

De Cesare *et al* (2014) developed two models to estimate property tax potential in Brazil. The first model was based on one similar to Bahl's model of ratios, that used a sample of 28 municipalities to estimate property tax potential as being 1 percent of Brazil's GDP. However, this approach assumed a 100 percent level of coverage, assessment and collection as being a potential scenario, while taxation on assessed values was a stable variable in their model. Therefore estimation based on diverse and stratified levels of coverage, taxation on market values and collection could not be performed. The second model was based on socio-

economic indexes as proxies of administrative capacity (coverage, assessment and collection) and divided all municipalities into five clusters based on GDP *per capita* and municipal revenues *per capita*. The authors estimated a revenue potential of 1.2 percent of Brazil's GDP using this approach.

Afonso *et al* (2016) performed a “Fuzzy Modeling” that also divided the Brazilian municipalities into five clusters according to their property tax capacity, based on socioeconomic indexes. The authors estimated property tax potential in Brazil as being 0.63-0.67 of GDP.

Orair and Albuquerque (2016) estimated Brazil's property tax potential as being 0.8 percent of GDP, using a “Stochastic Frontier Model” based in the percentile 90 performance of each comparable 16 groups (cluster) of municipalities⁵⁷ according to their socio-economic indexes.

Despite the need for more (and often not available) data than alternative approaches based on economic indexes, the main advantage of the model of ratios is to provide the weight of each performance element and therefore to propose more robust and stratified recommendations and reform steps to achieve the estimated potential. Chapter 3 described the administrative practices and challenges in Brazil's property taxation in order to design the recommended guidelines.

However, the two main drawbacks of the model of ratios can be minimized with relevant adjustments. First, to mitigate the lack of national data, this study will gather additional data by questionnaires as well as develop estimations by econometric models. Second, to mitigate the socioeconomic differences amongst municipalities (and therefore their potential), this study will stratify the municipalities into similar groups of property tax potential, similar to those performed by the previously mentioned studies.

Thus, Section 4.3 will examine the pre-existing (available) data that will be used and/or applied to the model, and the required data that will need to be gathered to be applied to the model. Section 4.4 describes the process of questionnaire design and remittance as the method of data gathering and the delimitation of a sample of municipalities that replied to these questionnaires. Section 4.5 describes the process of sample stratification to mitigate the property tax potential disparities amongst Brazilian municipalities.

4.3 Pre-existing Data

In Brazil, there are some institutes that recurrently release relevant publications about real estate market and property taxation that will be used by this study. These institutes are “the Brazilian Institute of Geography and Statistics” (*Instituto Brasileiro de Geografia e Estatística* – IBGE), “Brazil's National Treasury” (*Secretaria do Tesouro Nacional* - STN), “the Foundation Institute of Economic Research” (*Fundação Instituto de Pesquisas Econômicas* - Fipe), and “the States' Unions of the Civil Construction Industry” (*Sindicato da Indústria da Construção Civil* - Sinduscon). In addition, “the Lincoln Institute of Land

⁵⁷ Percentile value 90 was the median value amongst the 20 percent of municipalities with better performance in each established group.

Policy” releases publications about property taxation in Latin America, including Brazil. These institutes and their publications (data) used by this study will be described herewith.

IBGE is the official statistics institute of Brazil’s federal government that performs several census and surveys, including the National Census and the indicators of production (GDP) and employment. The IBGE database is very relevant in this study because it provides the needed indicators to develop the model of ratios (e.g. number of properties on cadasters, GDP of municipalities). In addition, other data will be used to delimit the clusters and to run the linear regression models (e.g., population, *per capita* income, number of households, among others).

STN has a relevant database that provides the public finances of all Brazilian municipalities, including their property tax revenues.

Fipe is a private foundation linked to the Department of Economics, Administration and Accounting of São Paulo University (FEA/USP). Fipe publishes several economic studies, including some specific inflation indexes, and the price development of some assets (real estate, vehicles, amongst others).

Sinduscon is the union of the civil construction industry that exists in each of the 26 Brazilian states and in the Federal District (Brasilia). Sinduscon publishes the costs of different types of construction (in square metres) in their respective states on a monthly basis. This data is relevant in studies that deal with property valuations.

The Lincoln Institute of Land Policy is an international economic research institute based in Cambridge, Massachusetts, that promotes studies in property taxation and land regulation. The institute is organized into three departments and two programs, which includes the “Program on Latin America and the Caribbean”. This program has conducted several studies on Latin America’s property taxation (including Brazil) which provides a great source of data and compendiums that will be used by this study.

4.3.1 Finances of Brazil

Since 1998, Brazil’s National Treasury annually publishes the survey named “Finances of Brazil” (*Finanças do Brasil* - Finbra) that displays the public finances of almost all Brazilian municipalities. Supplementary Federal Law no 101 of 2000 establishes that all municipalities must display their public finances as a condition to celebrate agreements with the federal government (Federative Republic of Brazil, 2000b). Therefore, STN provides a time series of municipal revenues, including property tax.

4.3.2 Brazilian Demographic Census

The decennial Brazilian Demographic Census (performed by IBGE) has surveyed all households in Brazil and compiled very comprehensive demographic data, such as: age, sex, level of study, level of employment, familiar income, water supply, sewer systems, garbage collection and other characteristics of the familiar residences. The level of municipal *per*

capita income will be used to cluster and stratify the Brazilian municipalities (Section 4.6) and to establish a model to predict the total market values of a municipality (Section 4.7).

4.3.3 GDP of Brazilian Municipalities

Unlike many countries where GDP at the local level is not calculated, IBGE currently releases (with a lag of two years) a survey that catalogues the GDP of all Brazilian municipalities, named “GDP of the Municipalities” (*PIB dos Municípios*). The survey compiles the level of production of the agricultural, industrial, services and governmental sectors that occurred in each municipality. The lag of two years is due to the estimation complexity and the 2014 *PIB dos Municípios* was published in December of 2016. The ratio of property tax revenues to municipal GDP can be used to determine the property tax performance of a municipality, since municipal GDP is annually available and related to the property tax base (market values). The level of municipal income (or *per capita* income) is also related to the market values; however the indicator is only available every 10 years in the decennial National Census.

4.3.4 Profiles of Brazilian Municipalities - Munic

Since 2000, IBGE annually releases a survey named “Profile of Brazilian Municipalities” (*Perfil dos Municípios Brasileiros - Munic*) that provides a wide range of information declared by the executive municipal governments (the themes and topics may differ in each annual Munic). Nevertheless, the Munic of 2000 performed a comprehensive survey about municipal public finances, including property tax administration. Munic of 2000 catalogued the number and type (built or vacant) of properties on fiscal cadasters, and the indicators of collection and delinquency. Unfortunately, such a comprehensive survey has not been performed since then. The number and type of properties on municipal cadasters were still catalogued by Munic in 2002 and 2004, but have been interrupted since them. It is important to mention that according to STN, between 2000 and 2015, the majority of municipalities greatly increased their property tax *per capita* levels (as shown by Table 3.9 in Chapter 3) and it is likely that they greatly improved their cadastral coverage and collection levels after Munic of 2000.

4.3.5 Basic Cost of New Constructions - CUB

Sinduscon releases the “Basic Cost of New Constructions” (*Custo Unitário Básico - CUB*) in each Brazilian state on a monthly basis. CUB provides the cost values of different types of new constructions. A time series of the average CUB values is estimated by the “Brazilian Chamber of Commerce and Industry” (*Câmara Brasileira de Indústria e Comércio - CBIC*) and is illustrated by Table 4.1 as follows.

Table 4.1: Brazil’s average CUB Index and GDP

| Month/Year | Average CUB Index (in R\$* per sqm) | Average CUB Index Dec/2009 = 100 | Brazil’s GDP Dec/2009 = 100 |
|------------|-------------------------------------|----------------------------------|-----------------------------|
| 12/2009 | 1,225 | 100 | 100 |
| 12/2010 | 1,235 | 101 | 108 |
| 12/2011 | 1,246 | 102 | 112 |
| 12/2012 | 1,268 | 103 | 114 |
| 12/2013 | 1,285 | 105 | 117 |
| 12/2014 | 1,282 | 105 | 118 |

Data source: Sinduscon (2014) and IBGE (2015)

*In R\$ as of 31st December of 2015, adjusted by IPCA inflation index.

Table 4.1 shows that the general average cost of new constructions in Brazil has remained stable between 2010 and 2015, being between 1,225 and 1,282 per square metre in the period (in real terms). As discussed in Section 3.5.2 of Chapter 3, CUB value is an important element to evaluate the assessment level when the cost approach method of valuation is applied.

4.3.6 Fipezap Index of Real Estate Adverts

The “Fipezap Index of Real Estate Adverts” (*Índice Fipezap de Imóveis Anunciados - Fipezap Index*) is the main market values index with national coverage in Brazil and compiles the prices of sales and rents in the largest Brazilian municipalities (Fipe, 2016). The index is estimated by Fipe based on the advertising of apartments on internet. The Fipezap Index compiles approximately 500,000 advertisements per month that can be searched by period and by municipality. The Fipezap Index provides evidence of the effects of the real estate bubble in Brazil, as shown by the Table 4.2.

Table 4.2: Brazil’s Real Estate Prices (Fipezap Index) and GDP (31st of December of 2009 = 100)

| Month/Year | Fipezap Index* | Brazil’s GDP |
|------------|----------------|--------------|
| 12/2009 | 100 | 100 |
| 12/2010 | 108 | 108 |
| 12/2011 | 133 | 112 |
| 12/2012 | 154 | 114 |
| 12/2013 | 177 | 117 |
| 12/2014 | 197 | 118 |

Data source: Fipe (2016) and IBGE (2015)

* Prices in real terms, adjusted by IPCA Inflation Index.

Table 4.2 shows that the prices of real estate advertised in Brazil increased by 97 percent between 2009 and 2014 (in real prices) while Brazil’s GDP increased by 18 percent.

As discussed in Section 3.5.2 of Chapter 3, in most municipalities, the assessed value is the sum of the adjusted cost of a construction and its land zone value. Therefore, both CUB values of different types of constructions and the market values on the Fipezap database can be used to evaluate the assessment level. Although the Fipezippe Index provides the average full market value in a certain municipal area (comparable land zone), land values can be

estimated as a residual value, being the difference between the full market value and the (adjusted) construction cost (CUB).

4.3.7 Reports about Property Taxation in Regional Newspapers

Municipalities or regions in Brazil often have local online newspapers that publish news about local themes, including property taxation. At the beginning of every year, these newspapers generally publish reports about the property tax that is being levied in the communities, including the number of taxable properties, the increases in valuations or taxation, new policies of billing and enforcement, the usual collection rate verified in the jurisdiction, amongst other relevant data. In addition, they often promote interviews with the local tax authorities that explain additional information. Therefore these local online newspapers are an excellent source from which to gather data about property taxation.

4.3.8 Database of the Lincoln Institute for Latin American Countries

The Lincoln Institute of Land Policy compiled a wide database about property tax systems in Latin American countries, including some Brazilian municipalities (Lincoln Institute of Land Policy, 2015). The Lincoln Institute's database was gathered by online questionnaires answered by municipal tax officers. This database can be used to validate some of the results of this study, including the estimations provided by the questionnaires in Chapter 5. Table D1 in Annexure D displays the Lincoln Institute's data about fiscal cadasters and valuations of 38 Brazilian municipalities between 2008 and 2014.

4.4 Questionnaires as a Method of Data Collection

The data collection can be carried out from direct and indirect sources, such as observations, questionnaires, interviews and experiments. Ackroyd and Hughes (1981) identified three types of surveys, namely: a) factual surveys that are used to collect descriptive information, such as the demographic census; b) attitude surveys, (e.g. opinion polls); and c) explanatory surveys which aim to test theories and hypotheses by data collection.

The role of questionnaire is to provide a standardized interview across all subjects. All the respondents must reply to exactly the same questions and in the same way, as this will permit the researcher to appropriately aggregate and interpret the results (Brace, 2013).

In surveys related to tax administration, there are three main ways to collect data, namely: a) in personal interviews; b) through telephonic interviews and; c) using postal (including e-mail) questionnaires. According to Ackroyd and Hughes (1981) and Brace (2013), postal questionnaires have some advantages and drawbacks, where their six main advantages are:

- a) They are practical and the results can be statistically analyzed;
- b) A significant amount of information can be collected from a large and geographically dispersed number of respondents in a short period of time at minimal cost;

- c) The respondents can complete the questionnaire in private at their own convenience. This is helpful when participants' responses need to be anonymous or confidential. This is especially important in gathering sensitive data or information;
- d) Questionnaires can be fully managed by the researcher, reducing the risks of their validity and reliability;
- e) The results can be more quickly and easily quantified by the researcher and/or by a statistical software package; and
- f) The quantitative data can be compared with all the data gathered, and it can even be compared with that of other studies. This allows hypotheses and theory testing.

Notwithstanding, there are also disadvantages associated with postal questionnaires. The six main disadvantages are:

- a) They may lack validity;
- b) The examination of the data truthfulness may be problematic. In addition, researcher does not have control over exactly whom completes the questionnaire.;
- c) Response rates from mail surveys are often very low;
- d) The respondents may misinterpret one or more questions and their replies may be based on their own and sometimes incorrect interpretations of the relevant question(s);
- e) The respondents may not have an easy way or are not willing to contact the researcher when they do not clearly understand the questions, considering that there is nobody to assist them; and
- f) The delimitation of the questionnaire content by the researcher does not permit a reasonable exchange of knowledge about the relevant questions between the researcher and respondent, which can be important to pertinent issues in the studied topic. Overcoming this drawback, however, some questionnaires permit additional comments and suggestions of the respondents that may be followed up by a telephone interview.

Taylor-Powell (1998) notes that there are three ways to increase the response rates to questionnaires.

- a) Communicating the questionnaire value. Participants will be more likely to complete the questionnaire if they understand its purposes and benefits. The researchers should communicate its purpose, how they plan to use the data and how the results will help participants and their community;
- b) Following-up. If the questionnaire is administered by mail or electronically, the researcher may need to re-contact the participants, perhaps a few times. The higher the number of follow-up contacts, the higher the response rate;

- c) Providing incentives. Giving modest financial or other incentives to participants increases the likelihood that they will complete the questionnaire.

4.4.1 Questionnaires in the Study

Considering the intentions of this study, personal interviews were considered to be too costly and time-consuming to be performed in respect of municipal tax departments that are geographically spread throughout Brazil. Telephonic interviews were also deemed inappropriate, as these are time-consuming and often require many calls to different municipal officials before the correct person that is supposed to provide the required information is identified. In addition, the calls are often firstly received by a central number call centre. This means that it is necessary to know the person's name, his/her working time, name and number of office, department and directory, amongst other specificities, that researchers often do not know. The questionnaires, especially email questionnaires or other ways of remittance using the internet, can instead be addressed to the tax departments and then forwarded to the individual staff member who is supposedly best qualified to complete it. Phone calls can then still be used to follow up or attain additional information or explanations from the respondent.

Postal questionnaires have changed greatly since the 2000's, due to the existence of internet facilities such as emails, as well as websites that display a list of staff's emails and online systems of requests. Thus, this study chose email questionnaires as the more feasible method to gather data from the Brazilian municipal tax departments. They are an impersonal method of data collection and involve a self-administered questionnaire in which access and return can be also carried out by email. This method is also cheaper and its data processing and analysis is less time consuming compared to other alternative methods.

In addition, from 2011, the email questionnaire has become even more convenient in the case of Brazil. Articles 5, 37 and 216 of the Brazilian Constitution, 1988, that ensure public information access to all citizens were regulated by Federal Law No 12,257 of 2011, named "Law of Information Access" (*Lei de Acesso à Informação*). The "Law of Information Access" regulated the permission and processes in which any citizen could request non-secret governmental information from any level of government, including their entities and state companies, and also established that all requirements must be coded and replied to (Federative Republic of Brazil, 2011)⁵⁸. In accordance with the law, some websites of municipal governments have an online platform where the citizens can make their requests. Therefore, when available, these platforms were used by this study to ask for information and send the questionnaires. These online platforms on the municipalities' websites were a preferable instrument for sending the questionnaires, rather than a simple email remittance, since the response rate would be likely to be higher. However, the platforms were not always available on the municipal governments' websites, or their design did not always permit a request in a questionnaire format. In these cases, an email remittance was used.

⁵⁸By May of 2013, according to the Federal Office of the General Comptroller, named *Controladoria Geral da União*, the Federal Government had 87.119 information requests of which 96 percent received responses.

This section discusses the way in which the questions were selected, designed and remitted to the municipal tax departments. It also discusses the questionnaires' response rate and the use of these responses by this study. The selection of 47 municipalities was based on the completion and quality level of the questionnaire response. These selected municipalities will be used in this chapter henceforth and in the subsequent chapters that consider the questionnaires' results (Chapter 5) and estimate revenue performance and potential (Chapter 6).

4.4.2 Question Selection

The questions within the questionnaires that were sent to the municipal tax departments were those necessary to carry out the property tax performance model stated in Equation 4.2. These questions contain numeric (mainly), closed-ended, open-ended and fixed choice questions about the cadasters and property tax administration. A copy of a questionnaire that was addressed to the Ribeirão Preto's Municipal Tax Department is displayed in Annexure B. From the questionnaire example in Annexure B, it can be observed that Questions 1 to 6 request quantitative cadastral data for all properties and per type of property (residential, nonresidential and vacant lands), while questions 7 to 9 ask specific quantitative and qualitative questions. The reasons for studying these aspects are summarized below:

The first question is needed to estimate the cadastral coverage. The second question is required to estimate the impact of the autonomous municipal tax exemptions in the cadastral coverage. The third question is used to estimate the level of assessment by using Equation 4.3 to be discussed in Section 4.7. The fourth question assesses the impact of the autonomous municipal tax exemptions in the revenue potential. The fifth question is needed to evaluate the overall level of taxation on the tax base⁵⁹. The sixth question calculates the collection rate per type of property by comparing it with the tax levied. The qualitative and quantitative data of the seventh question informs the level of updating of the valuation roll, and therefore the recommendation of a valuation reform. The qualitative and quantitative data of the eighth question informs the level of updating of the registration and modernization, and therefore the recommendation of a cadastral reform. Finally, the qualitative data of the ninth question is needed to inform the compliance and enforcement policies and therefore the recommendation of collection-leads strategies.

4.4.3 Questionnaire Remittance and Response

The questionnaires were sent to 241 medium and large Brazilian municipalities (population over 100,000 people) between the years of 2012-2014⁶⁰. The response rate was 25 percent,

⁵⁹ This study was cautious in emphasizing that the requested questionnaire was limited to the IPTU levy (annual urban property tax), and did not consider any other property-related taxes that may have been charged together in the same tax bill.

⁶⁰ Prior to the questionnaire remittance, similar questionnaires were piloted in two previous studies of Rio de Janeiro and São Paulo (Carvalho Jr., 2013, 2014). In addition, this survey questionnaire was tested twice in Belo Horizonte's Municipal Tax Department, due to their willingness to provide information for this research. The only change in the original questionnaire resulted from the piloting process, and was the identification of a legal instrument under the notaries named *Protesto* (similarly a "Notice of Dishonor") to blacklist delinquent

where 61 municipalities replied to the questionnaires, but the information provided in 15 municipalities was not sufficient to be utilized and to perform the property tax performance model. Therefore, 47 questionnaires with complete responses from different municipalities were selected. Three channels were used to communicate with tax departments to whom questionnaires were sent. These are listed in accordance with their relevance:

- a) A requesting platform on the municipality website from which any citizen can electronically request information and can attach documents (questionnaire attachment), according to the “Law of Information Access” referred to above;
- b) A list of e-mails as stated on the tax departments’ or the municipalities’ websites. Generally, the email of the Secretary of the Tax Department (the tax department’s chief) and/or the e-mail of the Director of the Property Tax Board is displayed on the website;
- c) A list of telephone numbers is displayed on tax departments/municipality websites, which were used to contact the department, to explain the research objective and, therefore, to request an e-mail address to which to send the questionnaire.

The computer systems of seven tax departments were not able to easily and quickly provide reports as data sources to reply to the questionnaires. Therefore, these tax departments that did not have quite such efficient administrations and computer systems had to do more extensive research in order to reply to the questionnaires. Sometimes this took them more than 6 months to complete the task. This scenario did not have any relation to the municipal population or level of property tax revenues. On the other hand, municipalities with better tax administration had their computer systems and administrative reports efficiently managed and therefore replied to the questionnaires in less than a week. It was noted that the reply rate was also influenced by the tax department’s will to help with this study.

Analyzing the questionnaire content and the responses gathered, it was noted that some of the answers were more easily available than others. For instance, the number of registered and exempted properties per type, in Questions 1 and 2, were easily replied to, since this information is generally promptly available. However, the cadasters of nine municipalities do not differ in terms of the use of built on properties (residential and nonresidential) and estimations have to be done using data sources of third parties (for instance, data from households and registered commercial premises provided by IBGE)⁶¹. Generally, nonresidential properties represented between 12-20 percent of the number of built on properties.

Eight of 47 municipalities struggled to reply to Questions 3 and 4, since their computer systems were not able to catalogue the assessed values of all properties and provide a total sum of them. However, if a municipality has a proportionate tax rate system and very few

taxpayers in Belo Horizonte. However, the survey questionnaire was not tested in small municipalities, as it was later verified that they often have administrative shortcomings in managing and running their databases.

⁶¹ These municipalities are: Manaus, Uberlândia, São José do Rio Preto, Betim, Carapicuíba, Piracicaba, Pelotas, Magé and Corumbá.

levels of exemption, the total assessed values can be estimated by dividing the total tax levied in each class to the tax rate of each class.

With regard to the total tax liability, Question 5 would be, at first glance, easy to respond to. However, when the property tax is billed with other municipal fees, the separation may be challenging. Thus, it was emphasized that respondents should only report the levy exclusively related to the property tax (IPTU). However, when a municipality is not able to separate these values, it was requested that they clarify what the extra fees were and how they were charged. This was because, if these mechanisms are known, estimations can be done to extract property tax from the provided value in some cases.

Question 6 was easily replied to, since the property tax collected is already published by the Brazilian National Treasury. However, 17 municipalities declared that they could not provide the information about the amount collected in each class of property, since such information was not promptly available.⁶²

Question 7 posed nominal and subjective questions about the valuation rolls. A separation between land zone values and building type values was made, since they may be separated into different municipal tax legislation. Furthermore, just four municipalities replied to the item that asked if the municipality has its own estimation of assessment level. It is possible that this question had a low reply rate due to its subjectivity and/or lack of market values studies.

Question 8 and 9 put forth simple nominal questions about the registration and the compliance/enforcement instruments adopted; which was not a great challenge for response.

4.5 The Selected Municipalities

Based on the questionnaires' reply rate, 47 municipalities were selected, which provides a 42 percent and 61 percent coverage of the Brazilian municipalities in terms of property tax revenues and the country's GDP (as shown by Table 4.1). Despite only containing municipalities with populations over 100,000 inhabitants, the sample presents municipalities in different geographical regions, and with different levels of *per capita* income and property tax revenues per GDP. In the next section, a statistical process of sample clustering and stratification will facilitate assumptions of what is likely to occur in the rest of the country in terms of property tax administration according to strata of municipalities. The location of each municipality sampled within Brazil's territory is displayed in Figure 4.1 and their main details are displayed in the Appendix.

⁶² These municipalities are: Manaus, Curitiba, Recife, Porto Alegre, Teresina, Osasco, Uberlândia, Juiz de Fora, Diadema, Betim, Piracicaba, Pelotas, Caruaru, Vitória da Conquista, Barueri, Palmas and Juazeiro.

Figure 4.1: Selected municipalities' location in the Brazilian Territory



In Figure 4.1, it is evident that 10 amongst the 47 municipalities are in the area of influence of São Paulo Metropolitan Area, where property tax has had the best performance in the country. Furthermore, 23 municipalities are within the triangle area São Paulo-Rio de Janeiro-Minas Gerais, the richest area in the country. In addition, there are another five municipalities in the Southern Region, four in the Central-Western Region, twelve in the lower income Northeastern Region and only two in the lower income Northern Region. In actual fact, many attempts were made to add more Northern municipalities to the sample; however their extremely low indicators of tax revenues reveal their weak tax administration, even in providing basic information, for example, the number of registered properties.

Nevertheless, there are three main reasons to assume that the selection coverage is a good proxy for what occurs in Brazil. Firstly, the selection covers municipalities in different geographical regions, populations, territorial sizes and levels of income. Table 4.3 displays these 47 selected municipalities ranked by population. According to the table, by 2013, the selection accounted for 29 percent of the country's population, 42 percent of Brazilian GDP and 61 percent of total property tax revenues collected. Therefore the selection's property tax performance estimation would be a reasonable proxy for Brazil, since it encompasses at least 42 percent of the country's property tax base, considering it as related to the GDP. Secondly, due to the wide municipal autonomy in legislating and managing their own property tax

systems, the sample also displays a selection of different tax policies and mechanisms applied, which are likely to occur in the rest of the country and will require specific recommendations. Finally, the property tax revenues indexes are very different amongst the selection, even in terms of revenues *per capita*, revenues per GDP and as a share of current revenues or own tax revenues (see Tables C1, C2, C3 and C4 in Annexure C).

Table 4.3: Selected municipalities' percentages on Brazil's population, GDP and property tax revenues (2013)

| Municipality | Pop | GDP | PT | Municipality | Pop | GDP | PT |
|------------------------|------|-------|-------|--------------------------|--------------|--------------|--------------|
| 1 São Paulo | 6.10 | 11.40 | 24.84 | 26 Juiz de Fora | 0.28 | 0.23 | 0.44 |
| 2 Rio de Janeiro | 3.42 | 5.04 | 8.03 | 27 Santos | 0.22 | 0.86 | 1.18 |
| 3 Salvador | 1.45 | 0.91 | 1.31 | 28 São José do Rio Preto | 0.22 | 0.25 | 0.47 |
| 4 Brasília | 1.42 | 3.91 | 2.35 | 29 Mogi das Cruzes | 0.21 | 0.22 | 0.41 |
| ⁵ Fortaleza | 1.34 | 0.99 | 0.95 | 30 Diadema | 0.21 | 0.27 | 0.42 |
| 6 Belo Horizonte | 1.28 | 1.33 | 3.44 | 31 Betim | 0.21 | 0.64 | 0.13 |
| 7 Manaus | 1.00 | 1.14 | 0.37 | 32 Olinda | 0.20 | 0.08 | 0.07 |
| 8 Curitiba | 0.95 | 1.35 | 1.94 | 33 Carapicuíba | 0.20 | 0.09 | 0.14 |
| 9 Recife | 0.83 | 0.84 | 1.15 | 34 Piracicaba | 0.20 | 0.27 | 0.29 |
| 10 Porto Alegre | 0.76 | 1.10 | 1.40 | 35 São Vicente | 0.18 | 0.09 | 0.42 |
| 11 Goiânia | 0.71 | 0.69 | 1.32 | 36 Pelotas | 0.18 | 0.13 | 0.14 |
| 12 Guarulhos | 0.67 | 1.02 | 1.22 | 37 Vitória | 0.18 | 0.65 | 0.24 |
| 13 Campinas | 0.59 | 0.98 | 1.75 | 38 Caruaru | 0.17 | 0.09 | 0.12 |
| 14 São Gonçalo | 0.54 | 0.27 | 0.20 | 39 Vitória da Conquista | 0.17 | 0.09 | 0.05 |
| 15 Teresina | 0.44 | 0.28 | 0.15 | 40 São José dos Pinhais | 0.15 | 0.35 | 0.12 |
| 16 São Bernardo | 0.42 | 0.78 | 1.20 | 41 Juazeiro do Norte | 0.14 | 0.05 | 0.01 |
| 17 João Pessoa | 0.40 | 0.26 | 0.18 | 42 Barueri | 0.13 | 0.75 | 0.08 |
| 18 Santo André | 0.36 | 0.41 | 0.84 | 43 Itajaí | 0.10 | 0.45 | 0.09 |
| 19 Osasco | 0.36 | 0.89 | 0.75 | 44 Palmas | 0.13 | 0.09 | 0.10 |
| 20 Ribeirão Preto | 0.33 | 0.46 | 0.63 | 45 Magé | 0.12 | 0.06 | 0.02 |
| 21 Uberlândia | 0.33 | 0.49 | 0.17 | 46 Juazeiro | 0.11 | 0.05 | 0.01 |
| 22 Contagem | 0.33 | 0.47 | 0.27 | 47 Corumbá | 0.06 | 0.09 | 0.03 |
| 23 Sorocaba | 0.32 | 0.43 | 0.42 | Total Selection | 28.76 | 41.83 | 60.49 |
| 24 Aracaju | 0.31 | 0.22 | 0.30 | Total Brazil | 100.0 | 100.0 | 100.0 |
| 25 Cuiabá | 0.30 | 0.30 | 0.32 | | | | |

Data Source: IBGE (2015) and STN (2015).

4.6 Municipalities Stratification by Property Tax Potential

This study utilises stratified random sampling as a technique that facilitates the data analysis of the information gathered by the questionnaires, and the establishment of a feasible revenue potential, taking into account the disparities amongst municipalities. Dudovskiy (2013) relates that the main advantages of the technique are: a) if the measurements within strata have low variance, stratification gives smaller error in estimation; b) measurements become more manageable and cheaper when the population is grouped into strata; and c) the technique gives estimation of population parameters for groups within the population. Therefore, the objective of this section is to display the process of strata design choice, using available indicators that are likely to be related to the property tax potential.

The ultimate value of sample stratification in this study is to be a toll to establish more accurate scenarios of revenue potential, based on the heterogeneity and divergent levels of property tax potential amongst Brazilian municipalities. Many economic indexes available are related to the property tax base and potential, for example, the level of income, the level of GDP and the location in a metropolitan area, amongst others. The rationale for this assumption is that municipalities with higher levels of income, population and GDP would have higher urban property tax bases and economics of scale and scope in tax administration, and therefore higher property tax potential. In the case of Brazil, this can be demonstrated by a simple log-log model as follows:

- a) PT_GDP_{2012} is the property tax per GDP in 2012 (dependent variable);
- b) Pop_{2012} is the population in 2012;
- c) $GDPpc_{2012}$ is the *per capita* GDP in 2012;
- d) $INCOMEpc_{2010}$ is the *per capita* income surveyed by the 2010 Demographic Census;
- e) d_metro is a *dummy* variable with a value of 1 if the municipality is within a metropolitan area, or 0 if not.

The linear regression was run by SPSS 19.0 and Table D2 in Annexure D displays the model's results and its main statistics. The model's R square was 52 percent and all the independent variables were statistically significant at 5 percent, with their expected relationship. However, the regression showed that the correlation between *per capita* income and *per capita* GDP was 81 percent, and the correlation between level of population and location in metro area was 34 percent. Therefore, these variables cannot be used together to stratify Brazilian municipalities. Thus, the level of *per capita* income and the location in a metropolitan area were chosen as the two variables to establish the revenue potential stratification.

The determination of the best strata design using the variable of *per capita* income (in natural log) and *dummy* of metro area can be provided by the SPSS 19.0 software. Thus, the function "Hierarchical Cluster Analysis" was used and the method of clustering was "Median Clustering"⁶³. Thus Table 4.4 displays the strata frequency amongst all Brazilian municipalities and amongst the 47 selected municipalities.

⁶³ The Hierarchical Cluster Analysis attempts to identify relatively homogeneous groups of cases based on selected characteristics, using an algorithm that starts with each case in a separate cluster and combines clusters until only one is left. For the median clustering method, the dissimilarity between Cluster A and Cluster B is represented by the distance between the median for the cases in Cluster A and the median for the cases in Cluster B (IBM Corp, 2010).

Table 4.4 Results of the stratification process: number of municipalities and median ratios of property tax (PT) to GDP in 2012 and *per capita* income in 2010

| Strata | All municipalities | | | Selected municipalities | | | Municipalities in the Selection |
|--------|--------------------|------------|-----------|-------------------------|------------|-----------|---|
| | Number | PT per GDP | Pc Income | Number | PT per GDP | Pc Income | |
| 1 | 47 | 0.65% | 1,268 | 22 | 0.65% | 1,124 | São Paulo, Rio de Janeiro, Salvador, Brasília, Fortaleza, Belo Horizonte, Manaus, Curitiba, Recife, Porto Alegre, Goiânia, Guarulhos, Campinas, São Bernardo, Santo André, Osasco, Sorocaba, Santos, Mogi das Cruzes, São Vicente, Vitória and Barueri. |
| 2 | 1,095 | 0.22% | 788 | 16 | 0.50% | 981 | Teresina, João Pessoa, Ribeirão Preto, Uberlândia, Contagem, Diadema, Aracaju, Cuiabá, Juiz de Fora, São José do Rio Preto, Diadema, Carapicuíba, Piracicaba, Pelotas, Itajaí, Palmas, and São José dos Pinhais. |
| 3 | 4,275 | 0.04% | 403 | 9 | 0.15% | 556 | Betim, São Gonçalo, Olinda, Magé, Caruaru, Vitória da Conquista, Juazeiro do Norte, Juazeiro and Corumbá. |

Data Source: IBGE (2011) and IBM Corp. (2010)

From Table 4.4, it can be noted that Stratum 1 covers 47 municipalities, of which 22 were presented in this study selection, Stratum 2 covers 1,095 municipalities of which 16 were presented in the selection and Stratum 3 covers 4,275 municipalities which 9 were presented in the selection. The clustering process was based on property tax potential. There was not performance bias between sample and population in Stratum 1 (0.65 percent); however, the sample's performance was higher than population in Strata 2 and 3. Therefore it can be assumed that selected municipalities of Strata 2 and 3 are already those with higher performances in each stratum and this will have to be taken into account in the design of revenue potential scenarios in Chapter 6 (e.g., choosing a lower percentile potential than Stratum 1). Certainly if the stratification was not applied, the study's selection would be highly biased to the higher income municipalities. Therefore, the stratification was applied to mitigate the selection's bias in order to establish the scenarios of revenue potential in Chapter 6.

4.7 Estimation of Property Market Values in Brazil

As stated in Section 4.2, the market value of all properties that should be taxed in a jurisdiction is the potential property tax base when capital value is the method of valuation. This includes Brazil, where the maximum potential tax base of a municipality is the market value of its taxable properties. Therefore the relationship between the revenue outcomes and the properties' market values is a key factor in a tax performance analysis. However, data of all properties' market values is often not available in many countries. This problem may be bypassed using economic indexes that may have some correlation to the property market values, such as GDP, *per capita* income and real estate price indexes, amongst others. For instance, Bahl and Wallace (2008) used a factor of from 3 to 4 times GDP as a proxy for the total property market values in developing countries.

In Brazil, estimations of total property market values have already been performed. Carvalho Jr. (2009) estimated residential market values as approximately 1.5 times of municipal GDP amongst the largest Brazilian municipalities for the period of 2002-2003, using data from the

2002-3 Brazilian Families' Budget Survey (IBGE, 2004), which reports both imputed rentals for owner-occupied residences and rentals effectively paid for tenants. In subsequent works, using the property tax performance equation, the author estimated all property market values per GDP as being 2.80 in Rio de Janeiro and 2.79 in São Paulo (including residential, non-residential and urban lands); however both ratios were the model residual of the property tax performance equation (Carvalho Jr., 2013, 2014). Thus an index of 3 times municipal GDP amongst the largest Brazilian municipalities may initially be thought to be a good proxy of the total market values.

However, a general stipulation of 3 times GDP to all municipalities may be inaccurate, especially amongst the small municipalities, where they are likely to have very different ratios of property market values and levels of production (GDP). For instance, a more industrial municipality may have high levels of production, but undervalued properties due to the urban and environmental degradation, amongst other negative externalities of industrial cities. On the other hand, small coastal or mountain municipalities may have valued holiday properties but little industrial production or service levels.

Thus, based on the property market values ratios found for Rio de Janeiro and São Paulo in the year of 2011, this study aimed to design an equation to estimate the ratio of property market values to GDP in each Brazilian municipality, given the municipal GDP and household income, with the data provided by the 2010 Brazilian National Census (IBGE, 2011). The equation was drawn up by establishing a relationship amongst properties' market values, GDP and level of municipal income that lead to Rio de Janeiro's and São Paulo's estimated ratios. The main rationale of the equation is that municipalities with ratios of household income to GDP that are higher than those found in Rio de Janeiro and São Paulo will have property market values per GDP higher than 2.8. In other words, if a municipality has high income and low production, the property market values ratio to GDP will be high; however if a municipality has low income and high production, this ratio will be low. Thus, using simulations, a good and simple relationship was given by Equation 4.3 as follows:

Equation 4.3 (Estimated Properties Market Values per Municipal GDP):

$$\text{Market Values per GDP}_{2011} = \frac{4}{\sqrt{\frac{\text{Municipal GDP}_{2010}}{\text{Municipal Income}_{2010}}}}$$

Using Equation 4.3, the estimated indexes for all 5,570 Brazilian municipalities ranged from 0.51 to 5.16 and in 99 percent of these municipalities, they ranged from 1.40 to 4.10. The estimated indexes for São Paulo (2.51) and Rio de Janeiro (2.90) were slightly different from the observed ratio of 2.8, since the ratio of income to GDP differs in both cities⁶⁴.

However, it is recommended to have more empirical analysis to achieve a conclusion in the relationship between the sum of market values and the municipal GDP given by Equation 4.3. The Lincoln Institute's database, as presented in the Table D1 of Annexure D, provides

⁶⁴ This small change, however, will not be relevant in a property tax performance analysis. In São Paulo, such a difference gives an assessment level of 42% rather than the verified assessment level of 45%.

the total assessed values, the cadastral coverage and the assessment level in 11 Brazilian municipalities. It is important to mention, however, that the indicators of cadastral coverage and assessment level presented by the Lincoln Institute's database are not exactly the same as the indicators of values coverage and assessment ratio used in the models of Bahl and Wallace (2008) and Carvalho Jr. (2013, 2014).

In relation to the indicator of cadastral coverage provided by Lincoln Institute, it is important to take into account that high valued properties are more likely to be under the cadasters than the low valued ones. Therefore the indicator of *values coverage* (the ratio of the market values in the fiscal cadasters to the market values of all properties) is higher than the *cadastral coverage* (the ratio of the properties in the fiscal cadasters to all properties). In relation to the indicator of assessment level provided by Lincoln Institute database, it is important to take into account that this indicator relates to the overall or general level of assessment in a municipality rather than the indicator of overall assessment ratio (the ratio of all assessed values to all market values in the fiscal cadasters).

In addition, most of the data in the Lincoln Institute's database is presented in the period base of Jan/2014, rather than the period base of Jan/2011. According to Fipe (2016), the real estate prices in Brazil increased 63.9 percent between Dec/2010 and Dec/2013 (in real terms), while Brazil's GDP increased 8.3 percent in the period (see Table 4.1 in Section 4.3). Therefore, it is expected that the ratio of market values to GDP in Jan/2014 would be about 50 percent higher than in Jan/2011.

Thus, Table 4.5 displays the original data of the Lincoln Institute: *total assessed values (AV)*⁶⁵, *cadastral coverage (CC)*, and *assessment level (AL)* in 9 Brazilian municipalities as shown by Table D1 in Annexure D. In addition, Table 4.5 also provides a stipulation of the *values coverage*⁶⁶ (*VC*), displays the municipal GDP and finally gives the estimation of the *total market values (MV)*.

Table 4.5: The Lincoln Institute's data of total assessed values, cadastral coverage and assessment level

| Municipality | Year Base | Assessed Values* | Cadastral Coverage | Assessment Level | Values Coverage (stipulated) | GDP* | Market Values* |
|-------------------------|-----------|------------------|--------------------|------------------|------------------------------|--------|----------------|
| Aracaju | 2014 | 10.33 | 92% | 20% | 94% | 13.92 | 58.45 |
| Belém | 2014 | 18.82 | 87% | 30% | 91% | 25.77 | 75.76 |
| Belo Horizonte | 2014 | 125.76 | 98% | 35% | 99% | 81.43 | 366.61 |
| Criciúma | 2014 | 1.25 | 82% | 6% | 88% | 5.57 | 26.90 |
| Curitiba | 2012 | 53.60 | n.a. | 25% | 90%** | 79.38 | 264.69 |
| Jaboatão dos Guararapes | 2014 | 10.09 | 75% | 40% | 83% | 11.95 | 36.62 |
| Porto Alegre | 2015 | 73.01 | 83% | 20% | 89% | 57.38 | 460.86 |
| Santo André | 2014 | 26.10 | n.a. | 40% | 90%** | 25.03 | 72.50 |
| São Paulo | 2014 | 967.18 | 89% | 60% | 93% | 570.71 | 1,863.76 |

Data Source: Lincoln Institute of Land Policy (2015) and IBGE (2015).

*In Billion of R\$ (year base). ** No data available, stipulated as 90 percent.

⁶⁵ The total assessed values of Santo André in 2014 reported by Lincoln Institute's database was 47 percent lower than the reported by this study (R\$ 14.9 Billion vs R\$ 26.1 Billion). However, this study selected the value of R\$ 26.1 Billion as being more realistic since it better matches with other ratios.

⁶⁶ This value will be stipulated by the formula: $VC = \frac{(CC \times 2) + 1}{3}$.

It is important to emphasize that the validation of the ratio of market values to GDP is given by Equation 4.4, as follows:

Equation 4.4 (Estimation Validation of Market Values per GDP using the Lincoln Institute’s database)

$$\frac{MV}{GDP} = \frac{AV}{AL \times CC \times GDP}$$

Continuing the validation process of Equation 4.3, Table 4.6 displays three estimated ratios of market values per GDP: a) the original ratios given by Equation 4.3 for the year of 2011; b) the adjusted ratios of Equation 4.3 to the respective year base of the Lincoln Institute database; and c) the ratios given by Equation 4.4, using the Lincoln Institute’s database. In addition, the table also displays the growth of the municipal GDP and the Fipezap Index between Jan/2011 and the year base. This is needed to adjust the original ratios provided by Equation 4.3.

Table 4.6: Ratio of Market Values to GDP (*MV_GDP*) (estimation and validation)

| Municipality | Year Base (Lincoln) | Equation 4.3 | | | | | Equation 4.4 | $\frac{C - D}{D}$ |
|-----------------|---------------------|---------------|------------|----------------|---------------|-----------------------|-----------------------|-------------------|
| | | MV_GDP (2011) | GDP Growth | Fipezap Growth | MV_GDP Growth | MV_GDP (year base, C) | MV_GDP (year base, D) | |
| Aracaju | 2014 | 3.51 | 33% | 64% | 31% | 4.60 | 4.20 | 10% |
| Belém | 2014 | 3.42 | 20% | 33%* | 13% | 3.86 | 2.94 | 32% |
| Belo Horizonte | 2014 | 3.47 | 32% | 64% | 32% | 4.58 | 4.50 | 2% |
| Criciúma | 2014 | 3.21 | 26% | 64% | 38% | 4.43 | 4.83 | -8% |
| Curitiba | 2012 | 2.99 | -2% | 15% | 13% | 3.37 | 3.33 | 1% |
| Jab. Guararapes | 2014 | 3.04 | 30% | 41%* | 11% | 3.37 | 3.06 | 10% |
| Porto Alegre | 2015 | 3.15 | 20% | 82% | 62% | 5.10 | 8.03 | -36% |
| Santo André | 2014 | 2.96 | 25% | 33%* | 8% | 3.20 | 2.89 | 10% |
| São Paulo | 2014 | 2.51 | 8% | 41%* | 33% | 3.34 | 3.27 | 2% |

Data Source: Lincoln Institute of Land Policy (2015), IBGE (2015) and Fipe (2016).

*Specific Fipe (2016) data to Metro Belém, Recife and São Paulo.

In the last column of Table 4.6, it can be noted that the error between Equation 4.4 and the adjusted Equation 4.3 ratios was lower than 10 percent in 7 municipalities and was higher than 30 percent in 2 municipalities (Belém and Porto Alegre). In Belém and Porto Alegre, the *assessment level* given by the Lincoln Institute’s database was 30 percent and 20 percent, respectively. However, if both assessment levels were switched to 25 percent, the Equation 4.2 error would be lower than 20 percent. Therefore, it was evident that the ratios provided by Equation 4.3 were validated, and can be applied for most of cases.

4.8 Conclusions

The chapter was divided into five parts. In Section 4.2, the chapter discussed the original property tax model of ratios initially described by Bahl (1979). Subsequently, some adjustments were made to establish the model of ratios of this study (Equation 4.2), that will be used to estimate the property tax performance and potential of Brazilian municipalities in Chapter 6.

In Section 4.3, the pre-existing databases that will be used to estimate the property tax performance and potential in Brazil were displayed, to validate the estimations performed by this study. These databases are: a) the property tax revenues provided by STN; b) the Demographic Census, the Production Surveys (GDP) and the Municipal Surveys provided by IBGE; c) the market data sources of construction costs (CUB Index) and property values (Fipezap Index) provided by Sinduscon and Fipe, respectively; d) some news about property taxation gathered in local newspapers; and e) the database of property taxation in Latin America provided by the Lincoln Institute of Land Policy, which will be used to validate the estimation of property market values amongst Brazilian municipalities.

In Section 4.4, the chapter explained the reasons for choosing email questionnaires as the most feasible and suitable way to gather data that is not available from different municipal tax departments throughout Brazil. The questionnaires' content, the process of remittance and the main challenges in gathering data were examined. In Section 4.5, the group of 47 Brazilian municipalities that were selected in accordance with the questionnaires' response rate were presented. In Section 4.6, all Brazilian municipalities were stratified into three strata of *per capita* income and location in metropolitan areas, to ensure more accuracy in the establishment of scenarios of revenue potential in Chapter 6.

Section 4.7 also established a model (Equation 4.3) to estimate the property market values amongst Brazilian municipalities, being a key indicator to perform the assessment level analysis in the selected municipalities in Chapter 5 and to develop the model of ratios in Chapter 6. In addition, this model was validated with the Lincoln Institute of Land Policy database which was revealed to be accurate.

The chapter demonstrated the importance of a well-developed research methodology, in terms of the results and conclusion accuracy, since this study deals with a large amount of data provided from the questionnaires as well as aims to estimate the property tax performance and potential in all 5,570 Brazilian municipalities. The data stratification into three strata facilitates simpler observation and analysis for the reader in Chapter 5, and permits the establishment of a model of ratios per strata. This enhances the accuracy of revenue potential scenarios established in Chapter 6.

A crucial estimation of this study - the market values in Brazilian municipalities - was successfully validated by the Lincoln Institute database, which also enhanced the study's accuracy. Thus, the next chapter will outline and present the data analysis, assumptions, results, observations and findings, based on the methodology that was displayed in this chapter.

CHAPTER 5:

ANALYSIS AND RESULTS OF QUESTIONNAIRES

5.1 Introduction

This chapter will discuss and display the results of the questionnaires that were sent to the 47 selected municipalities. The information obtained will be needed to develop the model of property tax performance in the following chapter. In addition, the results will provide the current scenario of each municipal tax administration and will reveal the main challenges that need to be addressed to reform their property tax systems.

The chapter is divided into seven sections. The first section introduces the Chapter. The second section examines the fiscal cadasters in the selected municipalities, estimating their coverage, displaying the cycles of update and the use of technological tools. The third section discusses the valuations, debating the valuation cycles and estimating the value assessment ratios. The fourth section explores the exemptions and relief policies that are autonomously granted by the selected municipalities, identifying their coverage on fiscal cadasters and the impact on the revenue outcomes. The fifth section considers the taxation levels, displaying the statutory tax rates that are applied in each selected municipality, and the indicators of average charge per property, taxation on assessed values and taxation on market values. The sixth section examines the collection systems in the selected municipalities, displaying the collection rates and debating the instruments of compliance and enforcement applied. The final section discusses the main conclusions of this Chapter.

5.2 Fiscal Cadasters in the Selected Municipalities

Evaluating the quality and coverage of the 47 selected municipalities' cadasters may be a challenging task. The questions in the questionnaires were formulated to be easily understood and replied to by the tax departments and therefore more complex questions about the registration were not included. Thus, the questionnaire was made up of four questions related to the municipal cadasters: a) the number of residential, nonresidential and vacant lands on fiscal cadasters; b) the year of the last cadastral update; c) whether the last cadastral update coverage in the municipal area was partial or total; and d) whether the GIS system was used.

The number of residential properties on fiscal cadasters is needed to estimate the residential cadastral coverage, since the number of potential taxable residences is likely to be related to the total number of surveyed households provided by the decennial Demographic Census of Brazil. Making use of this view and considering that taxable residences should be those with a minimum level of urban services, the comparison between registered residences and surveyed households with water supply, sewer connection or garbage collection can also be performed.

However, this coverage estimation has three weaknesses: a) the properties on the tax roll may not be catalogued in the same way as the households in the Census (for example, one

recorded building may be a home of more than one household); b) the estimated ratio may merely cover residential properties; c) the last Demographic Census of Brazil occurred in 2010, so the data should preferably be compared with cadastral data of 2010. Any assumption about the residential coverage would be outdated if a significant cadastral reform had occurred after the year base.

It is important to mention that the established coverage hitherto is related to the ratio of existing registered units to the potential registered units. Therefore, the ratio of the market values of registered properties to the total market values, which determines the registration's revenue impact, was not displayed. For instance, a great number of low valued houses may be outside of the tax roll; however if they were brought to the tax roll, the increment in terms of revenue outcomes may be small. On the other hand, a re-registration may update the proprieties already registered, but with incorrect use, size, quality of construction or taxpayer assignment, which would increase the tax liability and facilitate collection. For some municipalities, these specific re-inspections may be more effective in terms of revenue yields than just improving the building coverage using GIS. Therefore an estimation of "values coverage" rather than "buildings coverage" is more appropriate to evaluate property tax performance in a municipality. This will again be discussed in the model of property tax performance in the next chapter.

Using data from the questionnaires, Table E1 in Annexure E displays: a) the number of registered properties per class (residential, nonresidential and vacant land); b) the number of total surveyed households in 2010 (including informal settlements and properties occupied or not); c) the number of occupied surveyed households with garbage collection in 2010; d) the estimated residential coverage comparing the registration with the total surveyed households; and e) the estimated residential coverage comparing the registration with the surveyed households with garbage collection⁶⁷. The choice of garbage collection, rather than water supply or sewerage system, was made because garbage collection is an exclusive municipal service, while water and sewerage are commonly provided by the states. In addition, due to the great extension of Table E1 and in order to identify a possible strata bias, Table 5.1 was compiled to stratify the data and better display the results of residential buildings coverage. In addition the quartile coefficient of dispersion in each stratum is displayed⁶⁸.

⁶⁷ The estimated residential coverage in this study is the ratio of the number of residential properties on the fiscal cadaster to all households surveyed by the 2010 Brazilian Demographic Census (overlooking the minor increment on the number of residences between 2010 and the data year base). The indicator is a proxy to the cadastral coverage on residences, which is likely linked to the overall cadastral coverage in a municipality.

⁶⁸ The Quartile Coefficient of Dispersion (QCD) is a popular measure of dispersion based on the quartile deviation. Its formula is: $\frac{Q_3 - Q_1}{Q_3 + Q_1}$, where Q_1 is the value of the first quartile and Q_3 is the value of the third quartile. A sample can be considered highly variable if QCD is greater than 0.3 (Bonett, 2006).

Table 5.1: Selected municipalities' estimated residential buildings coverage (2011-2014, per stratum, median values and quartile coefficient of dispersion)

| Stratum | Repliers | Estimated coverage | |
|-------------------|-----------|--------------------|------------------------------------|
| | | All Households | Households with garbage collection |
| 1 (22) | 22 | 66% (0.140) | 78% (0.156) |
| 2 (16) | 16 | 79% (0.062) | 96% (0.079) |
| 3 (9) | 9 | 82% (0.076) | 93% (0.132) |
| Total (47) | 47 | 77% (0.133) | 91% (0.130) |

Data Source: Municipal Tax Departments and IBGE (2011).

Analyzing Table E1, it can be assumed that the registration is likely to need substantial improvement in 8 municipalities: Rio de Janeiro, Salvador, Fortaleza, Curitiba, Recife and in the three dormitory cities of São Paulo's Metro Area (Osasco, Diadema and Barueri), since they have an overall estimated residential coverage of under 60 percent, probably due to the existence of a high number of informal settlements. However, considering the roll of households with garbage collection, the ratio would be lower than 70 percent in 6 municipalities: Recife, Fortaleza, Curitiba, Osasco, Diadema and Barueri.

Table 5.1 displays that the median residential coverage in all 47 selected municipalities was 77 percent; being lower in Stratum 1 than others (66 percent vs. 81 percent). As previously explained, this probably happened because large metro municipalities have higher numbers of informal settlements. Furthermore, considering only the households with garbage collection, the total residential coverage increased to 91 percent: 78 percent in Stratum 1 and 95 percent in the other strata. These results perhaps provide evidence that larger municipalities are not willing to register low valued residences due to the high cost of the task combined with expected low revenue outcomes.

The use of GIS is an important technological tool that indicates the level of cadastral quality and accuracy. Notwithstanding, at first glance, the year of the last re-registration and its coverage would also indicate any level of registration quality and accuracy. However, despite the existence of economies of scale in the process of re-registration, in large municipalities it is a more costly and time consuming task as a whole, and some of them may opt to extend the task over some years, by recurrently performing partial updates. In addition, municipalities may have promoted a comprehensive re-registration in the past; making it necessary now to only recurrently carry out punctual inspections in some areas combined with a policy of taxpayer self-reporting.

Thus, Table E2 in Annexure E displays the questionnaire results of: a) the year of the last cadastral update (data available in 40 municipalities); b) whether this last update was totally or partially performed in the municipal urban area; and c) whether the municipality uses a digital cadaster with GIS (data available in 27 municipalities). In addition, Table 5.2 was compiled to stratify the data and better displays the results.

Table 5.2: Selected municipalities' year of the last cadastral update, the update coverage (frequency of total coverage) and if GIS is used (2014, per stratum)

| Stratum | Cadastral Update | | | GIS | |
|-------------------|------------------|-----------------------|---|-----------|--------------------|
| | Repliers | Year (median year) | Coverage (frequency of total coverage) | Repliers | (frequency of use) |
| 1 (22) | 21 | 2007 | 43% | 15 | 87% |
| 2 (16) | 14 | 2006 | 79% | 8 | 100% |
| 3 (9) | 9 | 2008 | 56% | 5 | 40% |
| Total (47) | 44 | 2007 | 57% | 28 | 82% |

Data Source: Municipal Tax Departments.

According to Table E2, considering the year base of 2014, 19 municipalities had the last cadastral update carried out 5 years previously or less, 15 municipalities had the last cadastral update between 6 and 10 years previously and 10 municipalities more than 11 years previously. In total, this gives an average delay period of 7 years in the selection. In relation to the coverage of the last registration, in 25 municipalities, the last cadastral update fully covered the municipal geographical urban area, while in 19 municipalities it was partially covered. Finally, it was reported that 23 municipalities use GIS while 5 municipalities do not, where Brasília was the only large city that reported not using GIS (but reported having plans to introduce GIS in 2017).

Table 5.2 shows that the GIS was less used in Stratum 3 than in others (60 percent vs. 94 percent), probably due to its costs and its lower urban area. In relation to the coverage of the last re-registration, as expected, a total coverage was less likely in Stratum 1 than others (43 percent vs. 68 percent).

Comparing Table E1 and E2, it can be noted that some municipalities with low estimated residential coverage in the year bases recently undertook a re-registration and it was likely that their ratio improved. This is the case in Barueri with coverage of 39 percent in 2013 that finalized a partial re-registration at the end of 2013; Salvador with coverage of 55 percent in 2012 that fully re-registered in 2013; Fortaleza with coverage of 57 percent in 2011 that partially re-registered in 2013 and Belo Horizonte and Santo André, both municipalities with coverage of 62 percent in 2012 which partially promoted re-registration in 2014. In addition, it is relevant to mention the successful case of the cadastral reform in Manaus, which increased the number of total registered properties, from 305,220 in 2010 to 497,095 in 2012; causing its estimated residential coverage to rise from 46 percent to 85 percent.

5.3 Valuations in the Selected Municipalities

Valuations are the most challenging task in Brazil's property tax systems. It is well known that low levels of assessment exist in almost all Brazilian municipalities, regardless of the size of their population and level of income or their geographic location (Carvalho Jr., 2012; De Cesare, 2012, 2017b; Domingos, 2010). Initially, as stated in the previous chapter, the questionnaires asked seven questions about the valuation rolls; however, due to the low reply rate for some questions, this study only considers the results of valuation year basis and the sum of all assessed values which permits an estimation of all the assessed value ratios, according to Equation 4.3 in Section 4.7 of Chapter 4.

5.3.1 Year Basis

The year basis of a valuation is the last year when the valuation roll update occurred, in other words, the year of the last revaluation. As explained in Section 3.3.2.3 and 3.5.3 of Chapter 3, a STJ Precedent No. 160 states that a revaluation must be specified under a Municipal Law enacted by the Municipal Councils. Thus, the valuation year basis is determined as the following year after the enactment of the law. In addition, as was also explained in Section 3.5.2 of Chapter 3, most Brazilian municipalities adopt the cost approach method of valuation where the land zones and the cost of new constructions are separately assessed. These land zones and building values are generally revaluated under the same Municipal Law; however there are some cases where the revaluation of land and building values occurs under different laws and therefore has a different year basis. Table E3 thus displays the year of the last revaluation for both land zone values and construction costs in the 47 selected municipalities, while Table 5.3 was compiled to stratify the data and better display the results.

Table 5.3: Selected municipalities' last revaluations years of the land zones values and construction costs (2015, per stratum, median values and quartile coefficient of dispersion)

| Stratum | Repliers | Land | Construction Costs |
|-------------------|-----------|---------------------|---------------------|
| 1 (22) | 22 | 2007 (0.692) | 2006 (0.548) |
| 2 (16) | 16 | 2011 (0.533) | 2009 (0.548) |
| 3 (9) | 9 | 2007 (0.333) | 2008 (0.600) |
| Total (47) | 47 | 2007 (0.574) | 2006 (0.600) |

Data Source: Municipal Tax Departments (selected municipalities).

Table 5.3 shows that there was a median revaluations lag of 8 years for land values and 9 years construction costs (considering the year base of 2015). Table E3 shows that many municipalities have not had revaluations for more than a decade. In addition, there are some relevant cases where the land value year basis is outdated, such as: João Pessoa (1973), Recife (1981), Barueri (1989), Porto Alegre (1992) and Aracaju (1996), and the construction cost year basis is also outdated, such as in Pelotas (1975), São Vicente (1990) and Santo André (1994). However, the stratified results did not reveal any strata bias and these dispersed cases of outdated valuations may reveal the role of political factors in valuation processes.

5.3.2 All Values Ratio

As discussed in Chapters 2 and 3, the lag between assessed and market values is a key indicator of valuations' performance. When assessed values are under market values, the property tax base is not explored to its full potential and horizontal and vertical inequality in taxation is likely to exist. There are several indicators and definitions related to the level of valuations. According to the International Association of Assessing Officers - IAAO (2013, p. 16), the term *assessment level* is "the common or overall ratio of assessed values to market values" while the term *assessment ratio* is "the fractional relationship an assessed value bears to the market value of the specific property in question. By extension, "the fractional relationship is what the total of the assessment roll bears to the total market value of all taxable property in a jurisdiction". In other

words, the *assessment level* is the most common or the modal ratio between assessed and market values, while *assessment ratio* can be defined as the level of assessment of a specific property or the level of assessment of the sum of all property values in a jurisdiction.

The assessment level estimation is a very complex process, consisting of a study of assessed values to market values ratios in a representative sample of properties. Therefore, undertaking this task for the 47 selected municipalities would be very challenging, due to the lack of market value data in many municipalities. Thus alternatively, this study will estimate the all values assessment ratio through comparing the sum of all assessed values reported by each municipality in the questionnaire with its estimated ratios of market values to GDP given by Equation 4.3 in Chapter 4. Table E4 in Annexure E shows the results of: a) total assessed values (including the assessment of registered exempted properties); b) average assessed value per property; c) ratio of all properties' market values to municipal GDP given by Equation 4.3; d) estimated value of all properties' market values; and e) the estimated all values ratio, i.e, the assessment ratio. In addition, Table 5.4 summarizes and stratifies these results.

Table 5.4: Selected municipalities' assessed value per property and estimated assessment ratio (2011-2014, per stratum, median values and quartile coefficient of dispersion)

| Stratum | Repliers | Assessed Value per Property* | Estimated Assessment Ratio |
|-------------------|-----------|------------------------------|----------------------------|
| 1 (22) | 22 | 131,743 (0.353) | 41% (0.191) |
| 2 (16) | 16 | 94,339 (0.387) | 33% (0.316) |
| 3 (9) | 9 | 21,676 (0.368) | 18% (0.053) |
| Total (47) | 47 | 98,920 (0.475) | 33% (0.314) |

Data source: Municipal Tax Departments of the selected municipalities.

*In R\$ adjusted as of Dec. 2015.

Table E4 shows that assessed values of São Paulo represented 27 percent of the selection's total assessed values; however, this values concentration was equal to the GDP concentration in the selection (see Table 4.3 in Chapter 4). In relation to the average assessed value per property, as expected, it was closely related to the GDP level and the assessment ratio. The average assessment per property ranged from to about R\$ 22,000 in municipalities of Strata 3 to more than R\$ 200,000 in Santos, São Bernardo do Campo, Vitória, São Paulo, Osasco, Santo André, Brasília and Belo Horizonte.

In relation to ratio of properties' market values per GDP, Table E4 displays that municipalities with relevant industrial sectors had ratios lower than 2.5, such as Manaus, Guarulhos, São Bernardo do Campo, Osasco, Contagem, Sorocaba, Diadema, Betim, Piracicaba and São José dos Pinhais. The same occurred in municipalities with relevant port services (Santos, Itajaí and Vitória); financial banking and institutions (Barueri) and agricultural/livestock sectors (Corumbá). On the other hand, dormitory cities (São Gonçalo and Carapicuíba) and holiday cities (São Vicente and Olinda) had ratios greater than 3.4⁶⁹.

⁶⁹ It is important to mention that the ratios of property market values to GDP are buoyant, depending on the growth rate of GDP and real estate prices. The original ratios given by Equation 4.3 are to the year of 2011 and therefore adjustments had to be made in municipalities with a different year basis. These adjustments were made based on the growth of real estate prices (*Fipezap* Index) and municipal GDP.

Finally, the assessment ratio estimation ranged from only 10-20 percent in 10 municipalities⁷⁰ to more than 80 percent in Santos and Cuiabá. Indeed, the results displayed in Tables 5.3 and E3 confirm the assessment level estimations of Table E4. For example, Barueri's 10 percent of assessment ratio was caused by its 1989 year basis and maximum land value of R\$ 100 per square metre. On the other hand, Santos performed its last revaluations in 2009 and in 2014.

Analyzing the stratified results of Table 5.4, as expected, it can be noted that the average assessed value per property decreased in relation to the stratum's income. In addition, the assessment ratio estimation was lower in Stratum 3 than in Stratum 1 and 2 (18 percent vs. 39 percent). This evidences that the valuations are a major serious problem in small and/or poor municipalities

5.4 Exemptions in the Selected Municipalities

As explained in Section 3.6 of Chapter 3, with the exception of the constitutional exemptions (that are very limited), Brazilian municipalities have the autonomy to apply their own policy of property tax exemptions and relief without any federal or state interference. There are two indicators of exemption coverage that are apparent in studies of property tax performance: a) the share of properties on the tax roll that are fully exempted; and b) the share of assessed values that are not taxed on the valuation roll. However, the latter ratio is more relevant because it reveals the effective impact of relief policies in the revenue potential. If full exemption were granted on a great number of lower valued properties, their revenue impact would be limited. On the other hand, if partial relief, tax rebates or tax credits are granted to a large number of properties, the revenue impact may be significant, even if property tax is still levied on most of the registered properties.

Thus Table E5 in Annexure E displays the share of the exempted properties in the fiscal cadasters (the ratio of the number of exempted properties to the total properties on fiscal cadaster) and the share of exempted values on the valuation roll (the ratio of the total exempted values to the total assessed values). In addition, Table 5.5 stratifies the results due to the results' extension and in order to identify a possible strata bias.

Table 5.5: Selected municipalities' property tax exemption (2011-2014, per stratum, median values and quartile coefficient of dispersion)

| Stratum Size | Total Properties on Cadaster | | Total Valuation Roll | |
|-------------------|------------------------------|---------------------|----------------------|---------------------|
| | Repliers | Exempted Properties | Repliers | Exempted Values |
| 1 (22) | 21 | 10.9% (0.516) | 14 | 11.2% (0.353) |
| 2 (16) | 16 | 7.7% (0.362) | 9 | 5.3% (0.381) |
| 3 (9) | 9 | 1.2% (0.697) | 4 | 5.9% (0.419) |
| Total (47) | 46 | 7.7% (0.650) | 27 | 8.2% (0.607) |

Data Source: Municipal Tax Departments (various municipalities).

⁷⁰ Barueri and Uberlândia (10-11 percent), Betim and Vitória da Consquista (14-15 percent) and João Pessoa, Olinda, Magé, Juazeiro do Norte, Juazeiro and Corumbá (18-20 percent). Despite Uberlândia's year base being 2012, the municipality had new revaluations in 2014.

The results in Table 5.5 show that the selection's median of the fully exempted properties was just 7.7 percent, while revealing a bias of higher exemptions in Strata 1 and 2 than Stratum 3. However the results had high coefficient of dispersion. Furthermore, in Table E5, it can be noted that a great exemption disparity exists amongst the selected municipalities, where Contagem (75 percent), Betim (73 percent) and Rio de Janeiro (61 percent)⁷¹ presented very high levels of exempted properties on their registrations. In addition, meaningful ratios were also found in Guarulhos, São Paulo, Pelotas and Vitória (approximately 30 percent). Indeed, it can be noted that higher levels of exemption were more likely to occur in large and high-income municipalities. The reason for this is probably their higher number of informal settlements and greater nonresidential tax base that can compensate for the loss of revenues of the popular residential exemptions. This tendency was not however so straightforward, since there were two large municipalities (Manaus and Recife) with low levels of exemption, which likely means that the political factors are more decisive in the level of exemptions.

Table 5.5 displays that the median of the exempted value share was 8.2 percent amongst the 27 municipalities where this data was available. However, according to Table E6, a great indicator was found in Contagem (56 percent), Rio de Janeiro (33 percent), São Paulo, Fortaleza, Porto Alegre, Guarulhos and Vitória (approximately 20 percent).

5.5 Taxation Level in the Selected Municipalities

The term “tax rates” in studies of property taxation often has different definitions: it can be construed as the statutory tax rates stated in the legislation, as the average tax burden (taxation) on the tax base (assessed values), or even as the “effective tax rate”, which sometimes is the tax burden on the market values. The statutory tax rates, the level of taxation on assessed values and the level of taxation on market values vary greatly amongst Brazilian municipalities, due to the vast local discretion in establishing the assessment system, relief levels and the tax rates values and their mechanisms. Nevertheless, the statutory tax rates are far from being a good indicator by which to evaluate tax performance and revenue potential, since the legislation may have multiple tax rates and the tax exemptions can greatly cushion the tax burden. Evidently, the “taxation on market values” would be the best indicator of tax levels, because the “taxation on assessed values” may also be greatly smoothed out by low assessment.

Thus, the following section is divided into three parts. The first part examines statutory tax rates. The second part explains taxation on assessed values. Finally, in the last part, the taxation on market values is explored.

⁷¹ In Betim and Contagem, the reason for such a high percentage is because both municipalities fully exempt residential properties, focusing property taxation only on nonresidential properties. Both are industrial municipalities with large non-residential tax bases, as well as being granted a high amount of state value-added tax transfers. In Rio de Janeiro, the main reason for a high percentage is because in 1999 the municipality faced judicial litigation about the legality of its progressive tax rates. Therefore, the system was reformed by setting a high proportionate tax rate and exempting the residential properties under the previous lower tax rate brackets. Nevertheless, although the progressive tax rates were legalized in 2000, these exemptions became crystallized in the Rio de Janeiro system and, for political reasons; they have not been reformed since then. More details are available in Carvalho Jr. (2013).

5.5.1 Statutory Tax Rates

In Brazil, statutory tax rates levels are diverse amongst municipalities, according to a mapping of their values and mechanisms of discretion in a sample of 365 Brazilian municipalities in 2007 (Carvalho Jr., 2009). In a subsequent study of a smaller sample, it was verified that the existence of progressive systems with tax rates brackets based on market values was common, but disconnected to the (outdated) assessed values. Therefore most of the taxable values fell into the lower brackets, mitigating the aim of equity of progressive systems (Carvalho Jr., 2012).

In Brazil, almost all municipalities have at least two statutory tax rates applied to vacant properties and those with buildings thereon, or three statutory tax rates applied to residential, nonresidential and vacant sites properties. In addition, several mechanisms of multiple tax rates can be autonomously created and applied by the municipalities. Carvalho Jr. (2009) found that proportionate tax rates per property class (residential, nonresidential and vacant sites or built upon and vacant sites) are the most common mechanism in smaller municipalities, while progressive systems are more common in larger municipalities.

Table E6 in Annexure E was compiled to display the statutory tax rates values levied in each property class (residential, nonresidential and vacant land) in the year of 2012. In addition, the table shows the six mechanisms of discretion that were identified by this study: a) proportionate; b) progressive; c) selective per location (land zones); d) selective per presence of urban facilities (eg, pavement, curbing, street lighting); e) selective per type of non-residential use (eg, commercial, industrial, offices, banks); and f) selective per property size. In addition, Table 5.6 stratifies the results due to their extension and in order to identify a possible strata bias. The table displays three indicators: a) the median tax rate value in the proportionate systems; b) the median tax rate value range in multiple systems; and c) the number of municipalities with proportionate and multiple tax rates in each stratum (in brackets after the median value of tax rates).

Table 5.6: Selected municipalities' frequencies of proportionate and multiple tax rate systems and tax rates values and ranges (2012, per stratum, in percentage and frequency, median values)

| Stratum | Residential | | Nonresidential | | Vacant Land | |
|-------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|
| | Proportionate Value | Multiple Range | Proportionate Value | Multiple Range | Proportionate Value | Multiple Range |
| 1 (22) | 1.0 (10) | 0.3 - 1.0 (12) | 1.3 (10) | 0.9 - 1.7 (12) | 2.5 (9) | 1.2 - 3.0 (13) |
| 2 (16) | 0.7 (7) | 0.4 - 1.0 (9) | 0.6 (6) | 0.5 - 1.4 (10) | 1.7 (4) | 1.5 - 4.0 (12) |
| 3 (9) | 1.0 (5) | 0.6 - 1.1 (4) | 1.0 (5) | 0.9 - 1.5 (4) | 3.0 (3) | 1.7 - 2.8 (6) |
| Total (47) | 1.0 (22) | 0.3 - 1.0 (25) | 1.0 (21) | 0.8 - 1.5 (26) | 2.3 (16) | 1.5 - 3.0 (31) |

Data Source: Municipal Tax Departments (selected municipalities).

Table E6 reveals that selective tax rates per residential, nonresidential and vacant sites properties (three classes of properties) were applied in 27 municipalities, while selective tax rates amongst built upon and vacant sites properties (two classes of properties) were applied in 20 municipalities (14 municipalities in Strata 2 and 3). Furthermore, amongst built upon properties, 21 municipalities applied proportionate systems, 20 municipalities applied

progressive systems and 6 municipalities applied other criteria of discretion (location, presence of urban utilities, type of nonresidential use and property size). Nevertheless, there was a great disparity on tax rates values which ranged from 0.05 percent to 4 percent amongst properties with buildings thereon, and from 0.5 percent to 6 percent amongst vacant sites properties. Indeed, in general, vacant sites tax rates were higher than nonresidential tax rates, which in turn were higher than residential tax rates. This relationship occurs in both proportionate and multiple systems; however, the maximum tax rates on multiple systems were much higher than the average tax rates of proportionate systems.

From Table 5.6, it can be noted that no stratum bias was found in relation to the tax rates values and in the use of proportionate and multiple systems. In all selections, the median tax rate in proportionate systems was 1 percent amongst both residential and nonresidential properties and 2.3 percent amongst vacant sites properties. In multiple systems, the median top tax rate value was 1 percent amongst residential properties, 1.5 amongst nonresidential properties and 3 percent amongst vacant sites properties. This shows that multiple systems generally provide lower tax rates to residential properties and higher tax rates to nonresidential properties.

5.5.2 Taxation on Assessed Values

The taxation on assessed values is the ratio of the total tax levied to the total assessed values, and despite being impacted by the exemption policies and statutory tax rates, the index is not affected by the assessment ratio⁷². Table E7 in Annexure E catalogued this ratio in the 47 selected municipalities per property class: residential, nonresidential and vacant land. In addition, Table 5.7 stratifies the results due to their extension and in order to identify a possible strata bias.

Table 5.7: Selected municipalities' taxation on assessed values (2011-2014, per stratum and property class, median values and quartile coefficient of dispersion)

| Strata | Repliers | Residential | Nonresidential | Vacant Land | Total |
|-------------------|-----------|---------------------|---------------------|---------------------|---------------------|
| 1 (22) | 20 | 0.6% (0.262) | 1.0% (0.293) | 1.4% (0.267) | 0.8% (0.233) |
| 2 (16) | 15 | 0.4% (0.303) | 0.6% (0.233) | 1.7% (0.215) | 0.7% (0.297) |
| 3 (9) | 9 | 0.8% (0.207) | 1.0% (0.138) | 2.0% (0.261) | 1.0% (0.117) |
| Total (47) | 44 | 0.6% (0.342) | 1.0% (0.310) | 1.6% (0.225) | 0.8% (0.257) |

Data Source: Municipal Tax Departments (selected municipalities).

From Table E7, cases of very low taxation on residential assessed values can be noted. For instance, only 0.05 percent is apparent in Betim and Contagem due to the exemptions for residential properties, and between 0.2 percent and 0.4 percent is visible in 9 amongst 44 municipalities due to the very low residential statutory tax rates. Thus, in one quarter of the selection, the taxation on residential assessed values was under 0.4 percent.

On the other hand, taxation on nonresidential and vacant land values was much higher, and is over 1.5 percent in Rio de Janeiro, Campinas and Betim (nonresidential properties) and

⁷² It is important to mention that the indicator of total assessed values includes the assessed values of exempted properties. Indeed, if only the taxable values were included in the roll of total assessed values, the taxation level would be very similar to the statutory tax rate as stated in the legislation (in proportionate systems).

over 2.5 percent in 8 municipalities for vacant sites properties. Low levels of nonresidential taxation were less likely to occur, and occur at under 0.5 percent in only five municipalities: Porto Alegre, Cuiabá, Vitória, São José dos Pinhais and Barueri.

The stratified results of Table 5.7 show that the overall taxation level on assessed values in the 47 selected municipalities (including the three municipalities where the taxation per property class was not available) was 0.8 percent, whereas it was 0.6 percent for residential, 1 percent for nonresidential and 1.6 percent for vacant land. Unlike the statutory tax rates values, the indicator did not have any meaningful strata bias and only a slightly higher taxation in Strata 3 was evident. However, the single ratios of Table E7 display greater disparity amongst the selected municipalities, which highlights the political role in the establishment of the taxation policies.

5.5.3 Taxation on Market Values

The taxation on market values displays the tax burden on the market value of the taxable properties. The ratio is impacted by the level of valuations, exemptions and tax rates and can be calculated using the estimation of all values assessment ratios (Table E4) and the total taxation on assessed values (Table E7). A segregated analysis per property class, as this study has developed hitherto, however, cannot be performed, since there is no estimation of assessment ratio per property class. Thus Table E8 displays the ratios of taxation on all market values and Table 5.8 displays the stratified results.

Table 5.8: Selected municipalities' taxation on market values (2011-2014, per stratum, median values and quartile coefficient of dispersion)

| Strata | Repliers | Total |
|-------------------|-----------|----------------------|
| 1 (22) | 22 | 0.33% (0.258) |
| 2 (16) | 16 | 0.27% (0.310) |
| 3 (9) | 8 | 0.18% (0.145) |
| Total (47) | 46 | 0.27% (0.357) |

Data Source: Municipal Tax Departments (selected municipalities).

From Table 5.8, it can be noted that the median taxation on market values in the 47 selected municipalities was 0.27 percent, while municipalities of Stratum 1 had a slightly greater ratio than others (0.33 percent vs. 0.24 percent). However, there were cases of great ratio disparity, where for Uberlândia and Barueri the ratios were under 0.1 percent, while in São Vicente it was over 0.5 percent. Furthermore, it was evident that in 58 percent of the selected municipalities (27 municipalities), the total taxation on market values was under 0.3 percent. This reveals that there is much room for increasing property taxation, by increasing valuations, reducing exemptions and restructuring tax rates.

5.6 Collection in the Selected Municipalities

A low collection rate is a well-known phenomenon in many Brazilian municipalities, particularly municipalities with small populations, low incomes that are mainly rural and are

located in the Northern and Northeastern Regions. Given the results of this study, it can be assumed that the assessment ratio and collection rate are likely to be the main performance elements that explain the property tax revenue disparities in Brazil. Even though it appears below its full potential in all areas, there was not such disparity in the Strata 1 and 3 ratios of cadastral coverage of residences with garbage collection (78 percent vs. 93 percent, Table 5.1) and taxation on assessed values (0.8 percent vs. 1.0 percent, Table 5.8). Indeed, the Strata 1 and 3 assessment ratio disparity (41 percent vs. 18 percent, Table 5.5) and the collection disparity (to be discussed in this section) are the crucial elements.

Thus, this section will analyze the collection theme in three areas. Firstly, the overall collection rate in a sample of 180 municipalities that were investigated by this study using an extra data source, rather than the questionnaires, was catalogued. These will be examined. Secondly, the study performed a more detailed analysis of the collection rates per property class in the 47 selected municipalities, using the questionnaires, and this will be discussed. Finally, the questionnaires' results about the reported policies of compliance and enforcement that are applied will be displayed and explained.

5.6.1 Collection in 180 Selected Municipalities (Expanded Sample)

Highlighting the importance of having a detailed profile of the collection rates amongst Brazilian municipalities, this study undertook further research making use of online local and regional news in 180 municipalities in the year of 2012, in order to gather recent data of more collection rates than those provided by the questionnaires. The reason in undertaking this further research in the collection ratios using a greater sample than the original sample is because this data is needed to estimate the collection ratios in all Brazilian municipalities in next Chapter using a linear regression model. This selection of 180 municipalities comprised 47 percent and 61 percent of Brazil's population and GDP in 2012, respectively. Table E9 in Annexure E catalogues and presents the collection rates of a sample of 180 municipalities in the years of 2000 and 2012. The 2012 data was gathered from the stated online news while the 2000 data came from *Munic* survey ("Profiles of Brazilian Municipalities", as discussed in Section 4.3.4 of Chapter 4) (IBGE, 2001b). In addition, Table 5.9 stratified data from Table E9, due to its extension.

Table 5.9: Property tax collection rate in a sample of 180 municipalities (2000 and 2012, per stratum, median values and quartile coefficient of dispersion)

| Stratum | No of municipalities | | Sampled Collection Rate | |
|--------------|----------------------|------------|-------------------------|--------------------|
| | Brazil | Sample | 2000 | 2012 |
| 1 | 47 | 28 | 69% (0.132) | 76% (0.140) |
| 2 | 1,364 | 113 | 54% (0.311) | 67% (0.203) |
| 3 | 4,096 | 39 | 27% (0.448) | 44% (0.333) |
| Total | 5,507 | 180 | 52% (0.371) | 64% (0.206) |

Source: Munic (IBGE, 2001b) and local/regional online newspapers (various sources, 2013).

Table 5.9 reveals that the median of the collection rate in the 180 selected municipalities increased slightly from 52 percent to 64 percent over this 12 year period. In addition, the

stratum analysis shows that in both periods Stratum 1 had a greater collection rate than Stratum 2, which in turn had a greater collection rate than Stratum 3. This scenario provides evidence of a high correlation between collection rate and *per capita* income level, since the stratification of this study was performed in accordance with the municipal *per capita* income catalogued by Brazil's 2010 Demographic Census.

From the table, it can be noted that even in 2012, there was much room for improving the current property tax collection and therefore the overall revenue outcomes in Brazil. It can be assumed that a tax reform that improves collection rate when its level is low (for example under 70 percent) should be more urgently implemented, rather than cadastral mapping or valuation reforms. These collection-led reforms can be performed by updating taxpayers' information, reducing compliance costs, and strengthening tax enforcement. Indeed, property tax needs to be effectively paid to compensate the tax administration costs and ensure its main targets (e.g. revenues outcomes, fairness and land development, amongst others).

5.6.2 Collection in 47 Selected Municipalities (Original Sample)

As discussed in Section 3.8.4 of Chapter 3, the property tax collection rate is generally much lower amongst vacant sites properties than amongst built upon properties in Brazil. Verifying this assumption, the questionnaires requested the collection ratios per property class (residential, nonresidential and vacant land). Nevertheless, 17 of the 47 selected municipalities could not segregate the collection indicators, since this information was not promptly available and therefore they only provided the overall collection. Thus, Table E10 in Annexure E was designed to display the collection rate of built upon and vacant sites properties (when available) and the overall collection ratio. In addition, Table 5.10 stratifies the results due to the extension of Table E10 and in order to identify a possible strata bias.

Table 5.10: Selected municipalities' collection rates (2011-2014, per stratum and property class, in percentage, median values and quartile coefficient of dispersion)

| Stratum | Total Collection | | Collection per Property Class | | |
|-------------------|------------------|--------------------|-------------------------------|--------------------|--------------------|
| | Repliers | Value | Repliers | Built Upon | Vacant Sites |
| 1 (22) | 22 | 76% (0.072) | 16 | 80% (0.043) | 51% (0.198) |
| 2 (16) | 16 | 66% (0.100) | 9 | 77% (0.114) | 53% (0.145) |
| 3 (9) | 9 | 46% (0.132) | 5 | 49% (0.010) | 17% (0.458) |
| Total (47) | 47 | 71% (0.140) | 30 | 77% (0.114) | 50% (0.238) |

Data Source: Municipal Tax Departments (selected municipalities).

The stratified questionnaire results of Table 5.10 reveal that the median collection rate in all selected municipalities was 71 percent, 77 percent for built upon properties and only 50 percent for vacant land. In addition, the data of total collection of Table 5.10 can be compared with the data of total collection in 2012 of Table 5.9. Thus Stratum 1 had the same indicator in both samples (76 percent), while being similar in Stratum 2 (66 vs. 67 percent) and Stratum 3 (46 vs. 44 percent). The total collection rate in Strata 1 and 2 (about 71 percent) was much greater than in Strata 3 (46 percent). Nevertheless, it can be argued that smaller municipalities have a higher share of vacant sites on their fiscal cadasters, which

may impact upon their overall collection if this is also followed by a higher share on the tax liabilities. However, comparing the exclusive collection on built upon properties, municipalities of Strata 1 and 2 still had greater ratios than Strata 3 (79 percent vs. 49 percent). This may reveal that the collections rates are greatly impacted by the level of administrative infrastructure and economies of scale and scope in tax administration.

Table E10 shows that a very low collection rate on vacant sites was found in Olinda, Juazeiro do Norte and Magé (about 15 percent); and in Salvador, São Gonçalo, Cuiabá and Brasília (about 35 percent). Indeed, in some cases, such low collections on vacant sites may affect the overall collection index if tax liabilities on vacant land properties are significant. Based on this scenario, it can be assumed that if municipalities rely for a significant amount of their tax liability on vacant sites properties, their property tax performance is mitigated due to the usual low collection on vacant sites. This also emphasizes the importance of accurate and updated cadasters, in order to identify new constructions and taxpayers. Further emphasizing this assumption, Table E11 in Annexure E was compiled to display the share of each class of property on: a) the number of properties on fiscal cadasters; b) the total assessed values; c) the total tax liabilities; and d) the total tax collected. In addition, Table 5.11 stratifies the results due to their extension and in order to identify a possible strata bias.

Table 5.11: Selected municipalities' share of Residential (Res), Nonresidential (NRes) and Vacant Land (Vac) properties on total properties, assessed values, liabilities and collection (2011-2014, per stratum, median values)

| Strata | Properties | | | Assessed Values | | | Liability | | | Collection | |
|--------------|------------|------------|------------|-----------------|------------|-----------|------------|------------|------------|------------|------------|
| | Res | NRes | Vac | Res | NRes | Vac | Res | NRes | Vac | Built | Vac |
| 1 | 76% | 12% | 9% | 55% | 33% | 8% | 41% | 37% | 18% | 85% | 15% |
| 2 | 70% | 11% | 21% | 59% | 33% | 9% | 45% | 30% | 31% | 75% | 26% |
| 3 | 58% | 8% | 32% | 69% | 19% | 13% | 55% | 19% | 25% | 85% | 15% |
| Total | 71% | 11% | 17% | 61% | 33% | 9% | 44% | 34% | 22% | 84% | 16% |

Data Source: Municipal Tax Departments (selected municipalities).

Table 5.11 displays some of the strata's bias that can be summarized as follows:

- Residential properties have comprised approximately 70-75 percent of the fiscal cadasters in Strata 1 and 2 and 60 percent in Stratum 3. Nonresidential properties have represented approximately 10 percent in all strata while the share of vacant land in the cadasters of Stratum 3 was meaningfully higher than others (32 percent vs. 15 percent);
- Residential share of the total valuations was lower in Strata 1 and 2 than Stratum 3 (57 percent vs. 69 percent), while the nonresidential share was higher (33 percent vs. 19 percent). Vacant land comprised approximately 10 percent in all Strata;
- Residential share of the total tax liabilities was lower in Strata 1 and 2 than Stratum 3 (43 percent vs. 55 percent) while nonresidential share was higher (34 percent vs. 19 percent). Vacant land properties have represented 18 percent of the tax liabilities in Stratum 1 and 28 percent in Strata 2 and 3;

- d) The collection rate on built upon properties has represented approximately 80-85 percent of overall collection in all Strata.

In addition to the bias listed above, other bias not related to the designed strata was also verified. Table E11 displays that coastal holiday municipalities (Santos and São Vicente) had almost 90 percent of their registration comprised of residential properties, while large and/or industrial municipalities (São Paulo, Rio de Janeiro, Guarulhos, São Bernardo do Campo and Santo André) had more than 50 percent of their tax liability comprised of non-residential properties.

The previous section stated that the taxation level is autonomously established by the municipalities and meaningfully determined by political issues and therefore there were some examples of great ratio disparity, regardless of the strata. According to Table E11, a great share of vacant land tax liability was found in Palmas (73 percent); Carapicuíba and Juazeiro do Norte (about 50 percent), whilst Brasilia, Contagem and Betim had approximately 40 percent. Therefore, the overall collection rates in these municipalities were lower than the average, ranging from 28 percent to 66 percent (as displayed on Table E10).

Cases of high tax charges on vacant sites (for instance, as proportion of the *per capita* income) due to a higher statutory tax rate may also encourage delinquency. Compared with the monthly national minimum wage of R\$ 724 in 2014, it can be observed that some municipalities had a high average charge on vacant sites and low collection rate on vacant sites, such as Salvador (R\$ 1,871 vs. 36 percent); Brasilia (R\$ 3,546 vs. 38 percent); Belo Horizonte (R\$ 2,364 vs. 51 percent); Contagem (R\$ 2,113 vs. 50 percent); Cuiabá (R\$ 1,322 vs. 35 percent); Carapicuíba (R\$ 2,091 vs. 43 percent); São Vicente (R\$ 11,874 vs. 45 percent) and Vitória (R\$ 4,147 vs. 46 percent). However, this relationship was not so straightforward, since there were also cases of both low average charges and low collection, such as Fortaleza (R\$ 549 vs. 42 percent); São Gonçalo (R\$ 139 vs. 35 percent); Olinda (R\$ 161 vs. 13 percent); Juazeiro do Norte (R\$ 107 vs. 13 percent) and Magé (R\$ 101 vs. 17 percent).

Thus, it can be concluded that it should not generalize the reasons for the usual low collection on vacant land properties, perhaps assuming that the following four elements impact the collection in different ways according to the specificities of each municipality: a) the fiscal culture and political issues; b) the shortcoming on taxpayers' registration and tax administration; c) higher tax charges; and d) the weak tax enforcement. Therefore, prior to any registration or valuation reform, it is recommended to identify and undertake policies, reforms and strategies focused on these four elements, when the overall collection ratio is greatly impacted by vacant land properties' collection.

Possible solutions for this shortcoming can be discussed. Firstly, the lack of fiscal culture could be bypassed, for instance, by advertising property taxation as a way to fund the local public investments and ensuring more fairness to the system (more accurate valuations and progressive tax rates). Secondly, the shortcoming on taxpayers' registration could be bypassed by implementing cadastral updates focused on taxpayers' personal information. This could be efficiently performed by arrangements and agreements with other governmental and private entities that run personal registers (federal revenue department, local notaries, electricity

companies, banks, etc). Thirdly, high tax charges on vacant sites that encourage delinquency could be mitigated by reducing tax rates in municipal legislation. Finally, the weak enforcement could be improved by applying alternative and less costly instruments of tax enforcement permitted by Brazilian legislation, such as the blacklisting of taxpayers and the outsourcing of arrears. These recommendations will be further approached in Chapter 7.

5.6.3 Compliance and Enforcement Strategies in the Selected Municipalities

This study catalogued some collection strategies in Item 9 of the questionnaire (see Annexure B) where a list of six instruments that facilitate tax compliance (Q1 to Q5) and five instruments that enforce property tax (Q6 to Q11) are displayed. Table E12 in Annexure E displays the use (as “yes” or “no”) of each established compliance and enforcement strategy in the selected municipalities. In addition, due to the results extension, Table 5.12 was compiled to summarize and stratify the results and to identify a possible strata bias where the percentage values indicate the frequency of responses as “yes”.

Table 5.12: Selected municipalities’ frequency of the use of compliance and enforcement strategies (2011-2014, per stratum)

| Stratum | Repliers | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 |
|-----------------------|-----------|------------|------------|----------------------------|------------------------|------------|------------|-------------|-----------|------------|------------|------------|
| 1 (22) | 19 | 31% | 31% | 10 inst (0.052) | 7% (0.331) | 100% | 68% | 100% | 0% | 47% | 89% | 21% |
| 2 (16) | 14 | 25% | 50% | 10 inst (0.034) | 10% (0.274) | 93% | 21% | 100% | 0% | 14% | 69% | 23% |
| 3 (9) | 7 | 85% | 43% | 9 inst (0.112) | 12% (0.501) | 86% | 14% | 100% | 0% | 14% | 100% | 14% |
| Total (47) | 40 | 41% | 41% | 10 inst (0.052) | 10% (0.333) | 95% | 43% | 100% | 0% | 26% | 85% | 21% |

Data Source: Municipal Tax Departments.

Q1: Advertising of property taxation;

Q2: Recurrent taxpayers’ re-registration;

Q3: Number of maximum installments (median number of monthly installments and quartile coefficient of dispersion);

Q4: Discount for advanced lump-sum payment (median percentage of discount and quartile coefficient of dispersion);

Q5: Possibility of payment in most banking network and lottery offices;

Q6: Possibility of automatic direct debit on taxpayer banking account or credit cards;

Q7: Judicial tax liens to recover the arrears;

Q8: Tax arrears outsourcing;

Q9: Inclusion of delinquent taxpayers on the national black list registers “SPC” and “Serasa Experian”;

Q10: Inclusion of delinquent taxpayers on own running municipal black list register;

Q11: Seizure and public auction of the properties in arrears.

Analyzing the results of Table E12 and their stratified results displayed in Table 5.12, it can be noted that:

- a) Q1 displays that 41 percent of selected municipalities declared that they perform any type of advertising in relation to property taxation. This is more likely to occur in Stratum 3 than in the others (85 percent vs. 28 percent), probably due to the lower cost of the task in smaller municipalities as well as the higher proximity between taxpayers and local governments of smaller municipalities (closer relationship amongst citizens, local media, politicians and local administration);

- b) Q2 displays that 41 percent of the selected municipalities reported having undertaken recurrent updates of taxpayers' personal information as a way to update the cadastral base and improve the billing and enforcement systems. There was no significant strata bias found;
- c) Q3 displays that payment in installments was permitted in all selected municipalities, where the median maximum number of monthly installments was 10. However, this ranged from just 2 installments (Barueri) to 12 in many other municipalities;
- d) Q4 shows that median discount for an advanced lump sum property tax payment in the selected municipalities was 10 percent (with a high coefficient of dispersion). However, there was great disparity where this ranged from just 2 percent in Santos to 30 percent in Palmas, Olinda, Juazeiro and Corumbá (the latter three municipalities are in Stratum 3);
- e) Q5 shows that 95 percent of the selected municipalities permit the tax payments in most of the banking network or lottery offices, reducing the compliance costs. In Q6, however, only 43 percent provide the facility of automatic direct debit on taxpayers' banking accounts, or the use of credit cards. There was a higher Q6 frequency in Strata 1 than in the others (68 percent vs. 18 percent), probably due to its better administrative infrastructure and economies of scale that enable agreements with banks;
- f) Q7 shows that the costly and time-consuming tax liens have been used as an enforcement instrument in all selected municipalities. Excluding Q10 that provides low levels of enforcement, tax liens were the only enforcement instrument used in 49 percent of the municipalities, which shows that there is much room for improvement in the use of more enforcement instruments in many municipalities;
- g) Q8 reveals that no municipality outsources their tax arrears, despite the recent permission for this granted by Senate Resolution No 33 of 2006 (Federative Republic of Brazil, 2006). Indeed, this policy would be very convenient for small municipalities that have shortages of qualified human resources and economies of scope and scale to better recover the arrears;
- h) Q9 displays that only 26 percent of the selected municipalities blacklist the delinquent taxpayers at SPC and *Serasa Experian* registers. Furthermore, the policy was applied in 47 percent of municipalities in Stratum 1, while just 14 percent in Strata 2 and 3. This probably occurred due to the better administrative capacity of large municipalities and the higher political cost of such a policy in smaller municipalities. Alternatively, Q10 reveals that 85 percent of the selected municipalities run their own blacklists of delinquent taxpayers that can be consulted for granting governmental tax incentives or subsidized credit; however with much lower level of enforcement than the national blacklists SPC and *Serasa Experian*;
- i) Finally, Q11 shows that 21 percent of the selected municipalities reported having seized and promoted public auctions of properties to recover tax arrears; however there is no further information on whether this policy is commonly or rarely applied. Rio de Janeiro is a known case that has biannually promoted such a strategy.

The four main findings from the collection strategies can be summarized as follows:

- a) Some municipalities have granted meaningful discounts for advanced lump sum payments, which discourage payments in installments, may reduce the compliance cost and increase voluntary compliance. Indeed, this may be an easy and low cost compliance policy implemented by many municipalities. However, installment payments are useful since they mitigate the tax increases of tax reform and they should be encouraged through the use of financial facilities that provide low risk of delinquency (automatic debits on taxpayers' banking account or credit cards);
- b) Few municipalities have provided the facility for direct debit installments on the taxpayers' banking accounts or credit cards, which would greatly reduce both taxpayers' compliance costs and tax administration risk of delinquency. In addition, through agreements between banks and tax administrations, these entities could receive the amount of the tax levies in advance (under an interest rate), while the taxpayers would pay the installments to the banks;
- c) Few municipalities have implemented two important enforcement instruments recently permitted by legislation (arrears outsourcing and the SPC and *Serasa Experian* blacklisting using *Protesto*), while the costly and time consuming tax liens are the only instrument generally applied;
- d) According to Table E12, Belo Horizonte and Ribeirão Preto are the only cases that simultaneously apply the Q2 and Q9 policies, which is likely to explain their over-80 percent collection rate (Table E10). Furthermore, collection of over 75 percent amongst built upon properties was found in 9 of the 12 municipalities that blacklist delinquent taxpayers on SPC and *Serasa Experian* registers and, despite its high political cost, such a low cost and less time consuming policy should be highly considered as a strategy to increase property tax collection.

5.7 Conclusions

This chapter examined the results of the questionnaires replied to by the 47 selected municipalities which are related to the property tax performance model to be developed in the next chapter. These indicators were provided by the results and data analysis of the registration, valuations, exemptions, taxation level and collection. Furthermore, these results were stratified in accordance with the methodology explained in the previous chapter that created three strata based on municipal *per capita* income.

The results related to the registration displayed that the residential cadastral coverage was lower in Stratum 1 than others (66 percent vs. 80 percent), likely due to its higher level of informal settlements. On the other hand, the use of GIS was less frequent in Stratum 3, probably due to their costs and economies of scale and scope. Therefore, it can be concluded that there is a more urgent need of cadastral updates of property-related information in larger municipalities (to improve coverage), while the improvement in cadastral administration and taxpayer identification should be more urgently implemented by smaller municipalities (to improve collection). Nevertheless, this study found that the update of taxpayers' personal information is

an extremely important task that should be recurrently performed by all municipalities, and many mechanisms of how to implement this policy were discussed in this chapter.

In relation to the valuations, it was found that some municipalities had frequent revaluations, while others had long valuation cycles and antique year bases, which reveals that the revaluations greatly depend on the political will. It was estimated that the prevailing assessment ratio was around 35-40 percent, except in Stratum 3 where this ratio was approximately 20 percent. Thus, the chapter concludes that municipalities should have a policy of more frequent revaluations with the establishment of phase-in mechanisms and the encouragement of payment in installments, in order to fully smooth out the tax increases and reduce both revaluations' political costs and distortions caused by increase caps. In addition, since the "cost approach" is the valuation method generally used in Brazil, the construction portions of property values could be linked with the widely available indicator of cost of new constructions provided by *Sinduscon* (CUB index). This would be an easier way to perform more accurate assessments while the values of land zones could be determined as a residual value, as commonly applied in "cost approach" methods.

In Brazil, property tax exemptions are autonomously granted by municipal governments and therefore their coverage on registration and valuations varies greatly. The chapter found that higher levels of exemptions are more frequent in more industrialized municipalities, likely due to their greater nonresidential tax base and higher amount of other sources of revenue that can mitigate the exemptions' impact. However, such policy has led to a great loss of revenue, enhanced vertical and horizontal inequity and has discouraged the sense of citizenship provided by property tax payments. Therefore, despite its great popularity, this policy should be rethought.

Municipalities are also fully autonomous in establishing their tax rates values, policies and mechanisms of discretion, which results in a great taxation level variance, regardless of the selection strata. Multiple and progressive systems on built upon properties were used in 53 percent of municipalities, however are much less frequent amongst smaller municipalities, probably because multiple systems focus taxation on high valued properties that demand more accurate and detailed registers. Statutory tax rates were also generally higher for vacant land and lower for residential properties. The same occurs with the taxation level on assessed values in the selection, which were 0.6 percent for residential, 1 percent for nonresidential and 1.8 percent for vacant land properties, which resulted in an overall ratio of 0.8 percent. However, considering the overall taxation on market values, this overall ratio decreased to 0.3 percent, due to the impact of the assessment ratio. Therefore, this chapter concludes that municipalities that wish to establish a taxation rate that promotes reasonable revenue outcomes, should have detailed cadasters in order to better apply progressive and multiple systems, and should have more accurate valuations in order to have less distortive taxation levels on market values.

The chapter found that the reason for the great disparity amongst the municipal property tax revenues indicators is mainly caused by the much lower collection rate amongst small and low income municipalities (Stratum 3) that generally fall under a 50 percent ratio, in opposition to an over 70 percent ratio found in larger and higher income municipalities

(Strata 1 and 2). Indeed, the strata variety in the results of registration, exemptions and taxation on assessed values did not present such variety, and collection-led reforms integrated with cadastral reforms focused on taxpayers' personal information should be the first point on the agenda of smaller municipalities, in order to increase revenues and reduce disparities. In addition, the study also found that low collection rates are commonly found when vacant land properties are overtaxed, likely due to their problematic collection administration.

Large discounts for advanced property tax payment and the possibility of payment in installments are the most used instruments to encourage voluntary compliance. However, only 43 percent of municipalities reported providing the facility of automatic direct debit or payments using credit cards. In relation to tax enforcement, the study found that the costly and time-consuming tax liens are the only enforcement instrument widely applied. However the Brazilian legislation permits other more efficient instruments that are being overlooked. Only 28 percent of the selected municipalities reported the inclusion of delinquent taxpayers on the national black list registers, and none reported tax arrears outsourcing. It was verified that these instruments had great potential to increase collection; however only large municipalities reported using them more intensively, likely due to their better administrative capacity. Therefore, smaller municipalities should think of alternative means to implement these instruments, for example to fully or partially outsource the collection task and the arrears. In addition, federal and state governments should create policies and mechanisms to better assist and fund small municipalities in their tax administration, since the lack of infrastructure and skilled human resources is widespread under a scenario of 5,570 municipal governments. In addition, as stated in Section 3.9.2.2 of Chapter 2, the establishment of inter-municipal corporations of neighbouring municipalities in the procurement process of property tax administration outsourcing to private companies should also be considered as a way to benefit from economies of scale and scope in tax administration.

The questionnaire results discussed in this chapter provided the ratios for the property tax performance model that will be developed in the next chapter. The great level of detail provided by the questionnaires and the stratification of the results that revealed important bias helped in identifying the challenges and debating possible solutions to improve property tax performance in Brazil.

CHAPTER 6:

ESTIMATING PROPERTY TAX PERFORMANCE AND POTENTIAL IN BRAZIL

6.1 Introduction

The previous chapter provided the data required in the 47 selected municipalities in order to establish the ratios of the property tax performance model used by many authors in previous studies that were debated in Section 4.2 of Chapter 4 and specified by Equation 4.2. Thus, this chapter has two main targets: estimating the property tax performance and feasible revenue potential in the 47 municipalities (Section 6.2), performing estimations to be carried over to the model for all Brazilian municipalities (Section 6.3) and therefore estimating the revenue potential in all Brazilian municipalities (Section 6.4).

In Section 6.2, the current performance in the selected municipalities will basically be provided by applying the ratios studied in the previous chapter to Equation 4.2. Their potential performance will be given by establishing feasible scenarios, which will be carried out by applying feasible ratios to the model into the three strata that are being studied. These feasible ratios will be determined as being high percentile values of the current performance (percentiles 90 and 95) in each stratum, assuming that the tax potential is related to the best current ratios. This approach is similar to a “Stochastic Frontier Analysis” as used by Orair and Albuquerque (2016).

Thus, using available data and after carrying out some adaptations, assumptions and estimations, this study will be able to be applied to the model for all Brazilian municipalities in Section 6.3. Similar to those performed for the selected municipalities, feasible scenarios of revenue performance will be established in order to estimate the property tax potential for the whole country in Section 6.4. In addition, the model will be able to highlight the role of each ratio, in order to generate the revenue outcomes.

However, there are four main challenges in this objective. Firstly, one must consider the established property tax performance model as having low error term, in order to preserve the accuracy of the estimation. Secondly, it is important to also preserve the model’s accuracy, since some assumptions, stipulations and estimations will be required, in order to work with the available data. Thirdly, it is necessary to take into account the differences and specificities amongst municipalities in establishing the feasible revenue scenarios, which will be mitigated by applying different ratios per stratum. Finally, it is also necessary to stipulate these revenue scenarios, taking into account that municipalities will have to overcome financial, administrative, cultural, juridical and political barriers to implement the reforms needed to achieve the recommended revenue potential.

Box 6.1 was drawn to provide an overview of how the estimation processes will be developed in this chapter to reach its final objective which is to establish the feasible property tax revenue potential in all Brazilian municipalities.

Box 6.1: Estimations Development of Chapter 6

| Chapter Section | Model Ratio | Source of Data | Estimations | Baseline | Percentile Potential (Scenarios “a” and “b”) |
|---|---------------------------|---|---|------------|--|
| Section 6.2 (47 Selected Municipalities) | Market Values to GDP | Municipal GDP and income (IBGE, 2011; 2015) | Equation 4.3 | Table 6.1 | Table 6.2 |
| | Values Coverage | Questionnaires (Tables E1 and E2) | a) Resid. Buildings Coverage b) Year of the last cadastral update | | Stratum 1 (Perc 90-93) |
| | Collection | Questionnaires (Table E9) | Overall Collection Rate | | Stratum 2 (Perc 80-90) |
| | Taxation on Market Values | Questionnaires (Table E8) | a) Assessment Ratio; b) Taxation on Assessed Values. | | Stratum 3 (Perc 75-85) |
| Sections 6.3 and 6.4 (All Brazilian Municipalities) | Market Values per GDP | Municipal GDP and Municipal Income (IBGE) | Equation 4.3 | Table 6.13 | Table 6.14 |
| | Values Coverage | a) Residential Buildings Coverage in 2004 (IBGE, 2005) b) Table E1 | a) Residential Buildings Coverage (Table 6.5); b) Residential Values Coverage (Table 6.6); c) Overall Values Coverage (Table 6.9) | | Stratum 1 (Perc 90-95) |
| | Collection | a) Collection Rate in 2000 (IBGE, 2001b); b) Local Reports of Property Tax in 2012 (180 cases) | Collection Rate in 2012 (Table 6.11) | | Stratum 2 (Perc 90-95) |
| | Taxation on Market Values | Residual term of the Equation 4.2 (Table 6.12) | | | Stratum 3 (Perc 90-95) |

6.2 Property Tax Performance Model in the 47 Selected Municipalities

In this section, the current performance ratios of the 47 selected municipalities will be displayed to permit the simulations of the revenue potential by strata. The multiplication of all of the ratios in the Equation 4.2 (including the error term), will provide the property tax revenues per GDP, as displayed by Table F1 in Annexure F. With the exception of the cadastral values coverage, which will be discussed hereafter, all the other terms have already been discussed and displayed in the tables of Annexure E that were discussed in the previous chapter.

The unobserved ratios of cadastral values coverage can be stipulated by making four assumptions based on the residential buildings coverage displayed in Table E1 (the ratio of the number of registered residences to the surveyed households) and based on the year of the last cadastral update displayed at Table E2. The first assumption, that the cadastral values coverage will be higher than the residential buildings coverage since non-registered residences are likely to be informal properties with lower market values, impacts less in terms of values. The second assumption is that long periods with no updates mean less accurate cadastres, which will reduce the cadastral values coverage. The third assumption is that nonresidential properties have higher average values than residences, as well as higher

probability to be covered by formal registration. Finally, it will be assumed that the cadastral values coverage will probably range from 75 to 95 percent of all values.

Thus, the application of the ratios in the property tax performance equations of each of the 47 selected municipalities is displayed by Table F1 in Annexure F. In addition, due to its size, Table 6.1 stratified and summarized the results.

Table 6.1: Selected municipalities' terms of the property tax performance model (2012, per stratum, mean values)

| Stratum | Revenues per GDP | Market Values per GDP | Values Coverage | Assessment Ratio | Taxation on Assessed Values | Taxation on Market Values | Collection Rate | Error Term |
|-------------------|------------------|-----------------------|-----------------|------------------|-----------------------------|---------------------------|-----------------|-------------|
| 1 (22) | 0.67% | 2.70 | 89% | 41% | 0.84% | 0.34% | 76% | 3.7% |
| 2 (16) | 0.49% | 2.89 | 88% | 39% | 0.76% | 0.27% | 69% | 0.5% |
| 3 (9) | 0.23% | 3.03 | 86% | 21% | 0.98% | 0.21% | 43% | 3.6% |
| Total (47) | 0.53% | 2.83 | 88% | 36% | 0.84% | 0.29% | 67% | 2.6% |

Data Source: Municipal Tax Departments and IBGE (2011, 2015).

From Table 6.1, some assumptions can be made about the current property tax performance in the 47 selected municipalities (the mean ratios). The difference of performance (revenues per GDP) amongst Strata 1, 2 and 3 was mainly caused by the level of assessment and collection, since their ratios of values coverage and taxation on assessed values were not so divergent. It is important to mention that the taxation on market values (the ratio of the total tax levied to total market values) should be preferentially analyzed, rather than a separate analysis of assessment ratio and taxation level carried out. This is because it was verified that the assessment ratio was generally inversely related to the taxation level, since higher assessments demand lower tax rates. In Table F1, it was evident that Cuiabá's assessment ratio reached 85 percent; however with 0.55 percent of taxation on assessed values, this provides taxation on market values of 0.47 percent.

Thus, to establish the scenarios' potential, Table 6.2 stratified and summarized the same results of Table E1 in relation to the three variable ratios of the model, i.e. values coverage, taxation on market values and collection. Table 6.2 provides the median ratio (percentile 50) and displays the values of high percentiles per strata that will be used to establish the ratios' potential. The established percentiles in Stratum 1 (90 and 93) are greater than Stratum 2 (80 and 90), which in turn are greater than Stratum 3 (75 and 85). This is because Stratum 1's sample is not biased in relation to the population and contains larger municipalities with better administrative capacity to reach higher targets of revenue potential (as discussed in Section 4.6 of Chapter 4). It is important to mention that the scenarios of revenue potential retained the current performance ratios when they were already greater than the potential ratios (the better performance cases).

Table 6.2: Minimum ratios to Scenarios 1, 2 and 3 of property tax potential in the selected municipalities (2011-2014)

| Stratum | Percentiles | | Scenario 1 Collection Rate | | Scenario 2 Values Coverage | | Scenario 3 Taxation on Market Values | |
|---------|-------------|----------|-------------------------------|----------|-------------------------------|----------|---|----------|
| | Ratios A | Ratios B | Ratios A | Ratios B | Ratios A | Ratios B | Ratios A | Ratios B |
| 1 (22) | 90 | 93 | 87% | 89% | 92% | 95% | 0.50% | 0.63% |
| 2 (16) | 80 | 90 | 80% | 84% | 90% | 93% | 0.37% | 0.48% |
| 3 (9) | 75 | 85 | 53% | 60% | 90% | 93% | 0.22% | 0.37% |

Data Source: Municipal Tax Departments and IBGE (2011, 2015).

The administrative procedures of property taxation involve the following steps in this order: identifying properties, evaluating properties, establishing the amount taxed on valuations and charging and collecting the tax levied. However, in a property tax reform, it is recommended to firstly focus on the procedures that are less financially and politically costly to the administration, as well as having more potential to raise revenues. In the case of developing countries, the collection rates are generally low and therefore they should be the first target in any property tax reform. Therefore this study will establish the revenue scenarios per strata, by firstly analyzing the effects of a collection improvement (Scenarios 1a and 1b). Consequently the next targets would follow the natural order that would be the tax base identification (Scenarios 2a and 2b) and its valuation and the tax rate setting (Scenarios 3a and 3b).

Thus, this study is now able to estimate the revenue effects in the 47 selected municipalities by improving the model's ratios to feasible values. Three questions in six scenarios can be formulated:

- a) Scenario 1a and 1b: What would be the respective resulting tax yield if the collection rate was at least 87 or 89 percent in Stratum 1, 80 or 84 percent in Stratum 2, and 53 or 60 percent in Stratum 3?
- b) Scenario 2a and 2b: What would be the respective resulting tax yield if the values coverage was at least 92 or 95 percent in Stratum 1, and 90 or 93 percent in Strata 2 and 3, while retaining the respective Scenarios 1a and 1b ratios?
- c) Scenario 3a and 3b: What would be the respective resulting tax yield if the taxation on market values was at least 0.50 or 0.63 percent in Stratum 1, 0.37 or 0.48 percent in Stratum 2 and 0.22 or 0.37 percent in Stratum 3, while retaining respective Scenarios 2a and 2b ratios?

Table F2 in Annexure F displays the scenarios' ratios of property tax revenues to GDP. Due to the extension of Table F2, Table 6.3 was compiled to stratify and summarize the scenarios' results. The stratum results are displayed in mean values, while the total results are displayed in two indicators: "mean of ratios" and "ratio of means"⁷³.

⁷³ As referred to in Section 3.9.2.1 of Chapter 3, "ratio of means" represents the ratio of the sum of all property tax revenues to the sum of all GDP in the 47 selected municipalities. It is more relevant in providing a global view of the property tax performance of a country, which is greatly impacted by the performance of larger municipalities.

Table 6.3: Selected municipalities' property tax revenues per GDP: baseline and established scenarios (2012, per stratum, mean values)

| Stratum | Baseline | Scen. 1a | Scen. 2a | Scen.3a | Scen. 1b | Scen. 2b | Scen. 3b |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1 (22) | 0.67% | 0.77% | 0.79% | 1.16% | 0.78% | 0.84% | 1.53% |
| 2 (16) | 0.49% | 0.58% | 0.59% | 0.81% | 0.61% | 0.64% | 1.09% |
| 3 (9) | 0.23% | 0.30% | 0.31% | 0.38% | 0.33% | 0.36% | 0.67% |
| Total (47) | 0.53% | 0.61% | 0.63% | 0.89% | 0.64% | 0.68% | 1.21% |
| Total (ratio of means) | 0.66% | 0.71% | 0.72% | 1.04% | 0.73% | 0.75% | 1.38% |

Data Source: Municipal Tax Departments and IBGE (2011, 2015).

From 6.3, it can be deduced that in a collection-led reform that increased the selection's collection rate, the average value of property tax per GDP would reach respectively 0.61 and 0.64 percent in Scenarios 1a and 1b, increasing by approximately 18 percent in relation to the baseline value. Furthermore, this effect was more evident in Stratum 3, which Scenario 1b increases by approximately 44 percent in relation to the baseline value (from 0.23 percent to 0.33 percent). In terms of the total selection's property tax per GDP (ratio of means), Scenario 1a and 1b increase was not so evident (approximately 10 percent) since the most relevant municipalities in terms of GDP and revenues (São Paulo, Rio de Janeiro and Belo Horizonte) had a baseline collection rate of over 80 percent.

Scenario 2a and 2b would imply a possible administrative reform that increased the values coverage level combined with the collection level of the respective Scenarios 1a and 1b. Thus, the average value of property tax per GDP would be respectively 0.63 and 0.68 percent, while the total selection's property tax per GDP (ratio of means) would be respectively 0.72 and 0.75 percent.

Scenarios 3a and 3b display the results of the previously mentioned collection and cadastral improvements combined with a valuation reform and tax rate restructuring, which would alter the taxation on market values. In Scenario 3a and 3b, the average value of property tax per GDP would be respectively 0.89 percent and 1.21 percent, while their ratio of means would be respectively 1.04 percent and 1.38 percent, increasing revenues by 58 percent and 110 percent in relation to the baseline value, respectively.

Scenario 3a level (1.04 percent) is similar to the international benchmarking index for developing countries (Norregaard, 2013), where property tax per GDP would be at a similar level to South Africa, the highest property tax performance amongst developing countries, as shown by the compendium in Table A2 of Annexure A. However, considering the 47 selected municipalities, Scenario 3b (1.38 percent) may be feasible since this sample is composed of the largest Brazilian municipalities. Thus, the property tax potential in all Brazilian municipalities will be estimated in the next section, as follows.

6.3 Property Tax Performance Model in all Brazilian Municipalities

As mentioned in Section 4.5 of Chapter 4, in 2012, the 47 selected municipalities that are being considered in this study represented 29 percent of the population, 42 percent of GDP and 60 percent of property tax revenues collected in Brazil (Table 4.3). The property tax performance

model of Equation 4.2 that was presented in Chapter 4 contains the ratios of property tax per GDP, market values per GDP, values coverage, assessment ratio, taxation on assessed values, collection rate and an error term. Nevertheless, this model can be carried over to all Brazilian municipalities with available data, while making two simplifications in relation to the original model. Firstly, as performed in the scenarios of the previous section, the simplified model combines both assessment ratio and taxation on assessed values into a single variable named “taxation on market values”. Secondly, the model assumes that there is no error term, which means it would be equal to one (or equal to zero in natural logarithm). Therefore this simplified model’s version is given by Equation 6.1 as follows:

Equation 6.1 (All Municipalities’ Simplified Property Tax Performance Model for 2012):

$$PT_GDP_{2012} = MV_GDP_{2012} * Cov_{2012} * Tax_MV_{2012} * Col_{2012}$$

Where:

- a) PT_GDP_{2012} is the ratio of municipal property tax revenues to GDP in 2012. This data is available to all Brazilian municipalities on the databases of STN (2015) and IBGE (2015);
- b) MV_GDP_{2012} is the 2012 ratio of total market values to GDP that was already determined by Equation 4.3 and is available to all municipalities;
- c) Cov_{2012} is the 2012 overall values coverage, which is unknown for the municipalities outside the selection. However, the IBGE (2005) catalogued the number of registered buildings in 2004, while the Demographic Census of 2000 and 2010 (IBGE, 2001a; 2011) catalogued the number of total households. Thus, the residential properties coverage in 2004 will be determined and a linear regression will be elaborated upon to estimate this coverage in 2012 and subsequently the values coverage;
- d) Tax_MV_{2012} is the taxation on market values. The ratio is the result of the multiplication of the taxation on assessed values by the assessment ratio. With the exception of the 47 municipalities that replied to the questionnaires, these ratios are also unknown. However, they will be determined as a residual term of the model;
- e) Col_{2012} is the 2012 property tax collection rate. IBGE (2001b) catalogued the collection rate of all municipalities in 2000, while Table E9 displays the collection rates in a sample of 180 municipalities in 2012. Thus, a linear regression model will be elaborated upon to estimate the collection in 2012 for all Brazilian municipalities;

6.3.1 Estimating Values Coverage

This study will estimate the overall values coverage in all Brazilian municipalities in order to develop the model of ratios determined by Equation 6.1. Firstly, the residential buildings coverage in 2012 (the ratio of recorded residences to all residences) will be estimated, and subsequently the residential values coverage (the ratio of the market values of recorded

residences to all residential market values). Finally, the overall values coverage will be discussed, which is the ratio of the market values of properties on fiscal cadasters to all market values.

6.3.1.1 Residential Buildings Coverage

The estimation of the residential buildings coverage in 2012 will be performed by a log-log model, as shown by Equation 6.2 as follows:

Equation 6.2 (All Municipalities' Residential Buildings Coverage Estimation for 2012):

$$\text{Ln}(Cov_{2012_res}) = -0.208 + 0.534\text{Ln}(Cov_{2004_res}) + 0.312\text{Ln}(I + \Delta PTPC_{2004-12}) + \varepsilon$$

Where:

- a) Cov_{2012_res} is the 2012 residential buildings coverage (observed for 47 cases), which is the ratio of the registered residences in 2012 to the 2010 surveyed households (overlooking the minor population increase between 2010 and 2012). It is the dependent variable to be explained;
- b) Cov_{2004_res} is the 2004 residential buildings coverage, which is the ratio of the registered residences in 2004 to the average value of the number of surveyed households in 2000 and 2010. The registered residences in 2004 will be stipulated as being 90 percent of the number of registered buildings catalogued by *Munic* (IBGE, 2005). It is expected to provide a positive relationship between the coverage in 2004 and in 2012;
- c) $\Delta PTPC_{2004-12}$ is the increase in property tax *per capita* between 2004 and 2012 (in real terms). It is expected to provide a positive relationship, which means that if revenues increased, the coverage also increased;
- d) ε is the error term.

The regression outcomes and its main tests and statistics are displayed in Table F3 on Annexure F. Table 6.4 summarizes the regression outputs and displays the Student's T-test, Fisher's F-test⁷⁴ and the Coefficient of Determination "R Square"⁷⁵. Table 6.5 summarizes the results by stratum.

⁷⁴The T-test reveals whether a single variable is statistically significant, while an F-test reveals whether the group of variables (the model) are jointly significant (Wooldridge, 2006).

⁷⁵ "R Square" or "R²" is a number that indicates the proportion of the variance in the dependent variable that is predictable from the independent variables. R² gives information about the good fit of a model and measures how well the regression line approximates the real data points. An R² of 1.0 indicates that the regression line perfectly fits the data (Wooldridge, 2006).

Table 6.4: Residential buildings coverage: regression outputs and its main tests and statistics

| | Model Coefficients | | | | | Regression Statistics | | |
|--------------------------------|--------------------|------------|------------|-------------|-------------|-----------------------|--------------------|-------------|
| | Value | Std. Error | Std. Value | T statistic | T-Test Sig. | R Square | F-Test F statistic | F-Test Sig. |
| Constant | -0.208 | 0.056 | | -3.718 | 0.001 | | | |
| Ln(Cov _{2004_res}) | 0.536 | 0.120 | .466 | 5.306 | 0.000 | 53% | 24.22 | 0.000 |
| Ln(1+ΔPTp ₂₀₀₄₋₁₂) | 0.314 | 0.059 | .555 | 4.4517 | 0.000 | | | |

Data Source: IBGE (2001a; 2005, 2011), STN (2015) and IBM Corp. (2010).

Table 6.5: All municipalities' estimated residential buildings coverage (2004 and 2012, per stratum, median and quartile coefficient of dispersion)

| Stratum | 2004 | 2012 |
|----------------------|---------------------|---------------------|
| 1 (44) | 0.65 (0.125) | 0.71 (0.099) |
| 2 (1,112) | 0.61 (0.225) | 0.69 (0.138) |
| 3 (2,001) | 0.45 (0.314) | 0.61 (0.212) |
| Total (3,147) | 0.50 (0.312) | 0.65 (0.185) |

Data Source: IBGE (2001a; 2005, 2011), STN (2015) and IBM Corp. (2010).

From Table 6.4, after running the linear regression on IBM/SPSS 19.0, all the independent variables were statistically significant at 5 percent level with their expected relationships, while the R square was 53 percent with no significant correlations.

From Table 6.5, it can be noted that, although the growth in population and even a proportionally higher growth on the number of informal settlements was verified in Brazil, the median of the estimated residential buildings coverage in 2012 was higher than in 2004 (65 percent vs. 50 percent) and this improvement occurred in all Strata. This is probably due to an overall improvement in cadastral administration, new cadastral updates and more frequent use of GIS.

6.3.1.2 Residential Values Coverage

The previous section estimated the residential buildings coverage (the cadastral coverage of residential buildings); however, this study is interested in the cadastral values coverage. Therefore this study will assume that the indicator of residential values coverage is higher than residential buildings coverage, since registered properties are likely to have higher market values than unregistered properties. This relationship is displayed in Equation 6.3 as follows:

Equation 6.3 (All Municipalities' Residential Values Coverage Interval):

$$\text{Residential Buildings Coverage} < \text{Residential Values Coverage} < 1.0$$

From the 2012 estimated residential buildings coverage given by Equation 6.2, it was found that these ratios ranged from 0.21 to 0.99 (excluding outliers), and therefore residential values coverage will be ranged from certain values higher than 0.21 and up to 0.99. Nevertheless, software IBM/SPSS Statistics 19.0 provides the option to estimate a linear regression model with a “weighted variable” applied to the dependent variable, which is the “weight estimation” function. Thus this study will run the same residential properties coverage model of Equation 6.2 with minimum and maximum weights applied to the

dependent variable according to an extra weight variable. The chosen variable that will weight the outcomes will be the “2010 municipal income”, assuming that higher income municipalities have a higher residential values concentration. In addition, this study will stipulate that the weights will be ranged from 1 to 2. These will make the weighted dependent variables range from 0.42 to 0.99, which means that the residential values coverage will be assumed to be between 42 percent and 99 percent.

Running the “weighted” version of Equation 6.2, the model provides the residential values coverage that is stratified and displayed on Table 6.6 bellow.

Table 6.6: All municipalities’ estimated residential values coverage (2012, per stratum, median and quartile coefficient of dispersion values)

| Stratum | Residential Values Coverage |
|----------------------|-----------------------------|
| 1 (44) | 0.85 (0.047) |
| 2 (1,102) | 0.83 (0.070) |
| 3 (2,001) | 0.78 (0.111) |
| Total (3,147) | 0.81 (0.095) |

Data Source: IBGE (2001a; 2005, 2011), STN (2015) and IBM Corp. (2010).

From Table 6.6, it can be noted that the estimated median of residential values coverage in all Brazilian municipalities was 81 percent in 2012 (comparing with a residential buildings coverage of 65 percent), with a few variances per stratum.

6.3.1.3 Residential Values Share on Total Values

After estimating the residential values coverage, it is necessary to estimate the share that these residential values have on total values that include the values of residential, nonresidential and vacant sites properties. Table 5.11 in Chapter 5 and Table E11 in Annexure E show that the median of the share of residential assessed values on total assessed values was 61 percent in the 47 selected municipalities (ranging from 41 percent to 83 percent). This study will assume that this residential share is inversely related to the indicator of “GDP of Services Sector *per capita*”⁷⁶, since a higher index is likely to indicate a higher share of nonresidential values. However, it can be noted that three observed cases of “holiday” municipalities (Santos, São Vicente and Olinda) had relatively high *per capita* GDP of the Services Sector, and a very high share of residential values. Therefore a “dummy” variable for holiday and coastal municipalities was created, since these types of municipalities have high numbers of residential properties. Thus, a linear regression was carried out to estimate the residential values share on total values in Equation 6.4 as follows.

Equation 6.4 (All Municipalities’ Estimated Ratio of Residential Values to Total Values in 2012):

$$\text{Ln}(\text{ValuesShare}_{res}) = -0.161 - 0.122\text{Ln}(2012\text{GDP}_{ser_pc}) + 0.143d_holiday + \varepsilon$$

⁷⁶ The variable GDP of the Services Sector was chosen, rather than the total GDP, to eliminate the agricultural and mineral sectors bias, which is not related to the values of nonresidential properties.

Where:

- a) $ValuesShare_{res}$ is the residential values share on total market values (observed for 47 cases), which is the dependent variable to be predicted;
- b) $2012GDP_{ser_pc}$ is the *per capita* GDP of the Services Sector in 2012. It is assumed that its higher index provides a higher nonresidential share. Therefore, a negative relationship to the dependent variable is expected;
- c) $d_holiday$ is a *dummy* variable for holiday and coastal municipalities. It is expected that it will have a positive relationship to the dependent variable.
- d) ε is the error term.

The regression outcomes and its main tests and statistics are displayed in Table F4 on Annexure F. Table 6.7 summarizes the regression outputs and displays the Student's T-test, Fisher's F-test and the Coefficient of Determination "R Square". Table 6.8 summarizes the results by stratum, giving the median values.

Table 6.7: Residential share on total values: regression outputs and its main tests and statistics

| | Model Coefficients | | | | | Regression Statistics | | |
|--------------------------------|--------------------|------------|------------|-------------|-------|-----------------------|-------------|-------|
| | Value | Std. Error | Std. Value | T statistic | Sig. | R Square | F statistic | Sig. |
| (Constant) | -0.161 | 0.001 | | -137.232 | 0.000 | | | |
| Ln(2012GDP _{ser_pc}) | -0.122 | 0.002 | -0.929 | -59.311 | 0.000 | 71% | 1,974.82 | 0.000 |
| d_holiday | 0.143 | 0.011 | 0.202 | 12.905 | 0.000 | | | |

Data Source: IBGE (2001a; 2005, 2011), STN (2015) and IBM Corp. (2010).

Table 6.8: All municipalities' estimated residential share on total values (2012, per stratum, median and quartile coefficient of dispersion values)

| Stratum | Residential Share on Total Values |
|----------------------|-----------------------------------|
| 1 (47) | 0.62 (0.037) |
| 2 (1,364) | 0.68 (0.033) |
| 3 (4,096) | 0.79 (0.063) |
| Total (5,507) | 0.75 (0.082) |

Data Source: IBGE (2015) and IBM Corp. (2010).

From Table 6.7, after running the linear regression on IBM/SPSS 19.0, all the independent variables were statistically significant at 5 percent with their expected relationships. The R square was 71 percent with no significant correlations.

Table 6.8 displays that the median of residential values share on total values was 75 percent; being approximately 65 percent in Strata 1 and 2 (likely due to their higher share of nonresidential tax base), while being 79 percent in Stratum 3.

6.3.1.4 Overall Values Coverage

After estimating the residential values coverage and its share on total values, the study also needs to estimate the nonresidential and vacant sites values coverage and their share on total

values, in order to finally establish the overall values coverage. Firstly, it is necessary to stipulate both nonresidential and vacant land values coverage as being 90 percent. Indeed, higher valued nonresidential buildings are likely to be on the tax record, and therefore such a value is feasible. In relation to vacant land properties, their values represented a minor share on the valuation rolls of larger municipalities, while they may be meaningful in smaller municipalities. Nevertheless, the probability of unregistered vacant land parcels is also lower than residences. Thus the overall values coverage of a municipality will be given according to Equation 6.5 as follows:

Equation 6.5 (All Municipalities' Overall Values Coverage Estimation for 2012):

$$Cov_{2012} = (ValuesShare_{res} * Cov_{2012_res}) + ((1 - ValuesShare_{res}) * 0.90)$$

Where:

- a) Cov_{2012} is the estimated overall values coverage in 2012;
- b) $ValuesShare_{res}$ is the estimated share of residential values on total values, as given by Equation 6.4;
- c) Cov_{2012_res} is the estimated residential values coverage in 2012, as given by the “weighed” version of Equation 6.2;
- d) $(1 - ValuesShare_{res})$ is the estimated share of nonresidential and vacant land values on total values;
- e) 0.90 is the assumed nonresidential and vacant land values coverage.

Table 6.9 displays the stratified results of overall values coverage given by Equation 6.5, including the median values and the percentiles 90 and 95 in order to establish the scenarios of revenue potential in the next section:

Table 6.9: All municipalities' estimated overall values coverage (2012, per stratum, percentiles values)

| Stratum | Overall Values Coverage | | |
|----------------------|-------------------------|---------------|---------------|
| | Median | Percentile 90 | Percentile 95 |
| 1 (44) | 0.87 | 0.92 | 0.94 |
| 2 (1,102) | 0.85 | 0.92 | 0.94 |
| 3 (2,001) | 0.81 | 0.93 | 0.95 |
| Total (3,147) | 0.83 | 0.93 | 0.96 |

Data Source: IBGE (2015) and IBM Corp. (2010).

From Table 6.9, it can be observed that the median of values coverage in all Brazilian municipalities was 83 percent in 2012, with a few variances per stratum.

6.3.2 Estimating Collection in 2012

After carrying out all the steps to estimate the overall values coverage of all Brazilian municipalities in the previous section, the estimation of the collection rates must be performed. This study will estimate the 2012 collection rate for all Brazilian municipalities given: a) the observed collection rates in all Brazilian municipalities in 2000; b) the observed collection rates in a sample of 180 municipalities in 2012 (Table E9); c) the ratio of property tax revenues to total municipal revenues in 2012; and d) the increase in property tax revenues *per capita* between 2000 and 2012. Thus, a log-log model is designed by Equation 6.6 as follows:

Equation 6.6 (All Municipalities' Collection Rate Estimation for 2012):

$$\text{Ln}(Col_{2012}) = 0.196 + 0.307 \text{Ln}(Col_{2000}) + 0.156 \text{Ln}(SharePT_{2012}) + 0.140 \text{Ln}(1+\Delta PTPc_{2000-12}) + \varepsilon$$

Where:

- Col_{2012} is the collection rate in 2012 (observed for 180 cases), being the dependent variable to be explained;
- Col_{2000} is the collection rate in 2000. A positive relationship between the level of collection in 2000 and in 2012 is expected;
- $SharePT_{2012}$ is the ratio of property tax revenues to total municipal revenues in 2012. A positive relationship between this ratio and the collection rate is expected;
- $\Delta PTPc_{2000-12}$ is the increase of the property tax *per capita* between 2000 and 2012 (in real terms). A positive relationship is expected, which means if *per capita* revenues increased, the collection rate also increased;
- ε is the error term.

The regression outcomes and its main tests and statistics are displayed in Table F5 on Annexure F. Table 6.10 summarizes the regression outputs and displays the Student's T-test, Fisher's F-test and the Coefficient of Determination "R Square". Table 6.11 summarizes the results by stratum's median and giving the percentiles 90 and 95 to establish the scenarios potential in the next section.

Table 6.10: 2012 collection rate: regression outputs and its main tests and statistics

| | Model Coefficients | | | | | Regression Statistics | | |
|---------------------------------|--------------------|------------|------------|--------------------|------|-----------------------|--------------------|-------|
| | Value | Std. Error | Std. Value | T-Test T statistic | Sig. | R Square | F-Test F statistic | Sig. |
| (Constant) | 0.196 | 0.085 | | -2.298 | .023 | | | |
| Ln(Col ₂₀₀₀) | 0.307 | 0.043 | 0.512 | 7.140 | .000 | 57% | 74.0 | 0.000 |
| Ln(SharePT ₂₀₁₂) | 0.156 | 0.028 | 0.167 | 5.506 | .004 | | | |
| Ln(1+ $\Delta PTPc_{2000-12}$) | 0.140 | 0.048 | 0.363 | 2.897 | .000 | | | |

Data Source: IBGE (2001a; 2005, 2011), STN (2015) and IBM Corp. (2010).

Table 6.11: All municipalities' collection rates (2000 (observed) and 2012 (estimated), per stratum, percentiles values)

| Stratum | Observed Col 2000 | Estimated Collection 2012 | | |
|----------------------|-------------------|---------------------------|---------------|---------------|
| | Median | Median | Percentile 90 | Percentile 95 |
| 1 (47) | 0.67 | 0.75 | 0.85 | 0.88 |
| 2 (1,309) | 0.52 | 0.57 | 0.74 | 0.79 |
| 3 (2,984) | 0.27 | 0.36 | 0.55 | 0.61 |
| Total (4,340) | 0.34 | 0.43 | 0.67 | 0.73 |

Data Source: IBGE (2001b), STN (2015) and IBM Corp. (2010).

From Table 6.10, after running the linear regression on IBM/SPSS 19.0, all the independent variables were statistically significant at 5 percent with their expected relationships. The R square was 57 percent and there were no significant correlations, as displayed by the correlation matrix in Table F5.

From Table 6.11, it can be observed that the median of the collections rate increased from 34 percent to 43 percent between 2000 and 2012 in Brazil and such improvement occurred in all strata.

6.3.3 Estimating Taxation on Market Values

As explained in the simplified model of property tax performance of Equation 6.1, the indicators of assessment ratio and the tax levied on assessed values are unknown ratios in the municipalities outside the selection. However, the taxation on market values, which is simply the result of the taxation on assessed values multiplied by the assessment ratio, can be determined as a residual term in the equation. Thus, by running Equation 6.1 and establishing the taxation on market values as a residual term to be predicted, Table 6.12 displays the residual ratios of the median taxation on market values per stratum. In addition, it displays the percentiles 90 and 95 values in order to establish the scenarios of revenue potential in the next section.

Table 6.12: All municipalities' estimated taxation on market values (2012, per stratum, percentiles values)

| Stratum | Taxation on Market Values | | |
|----------------------|---------------------------|---------------|---------------|
| | Median | Percentile 90 | Percentile 95 |
| 1 (44) | 0.33% | 0.50% | 0.64% |
| 2 (1,056) | 0.16% | 0.36% | 0.51% |
| 3 (1,725) | 0.07% | 0.21% | 0.32% |
| Total (2,825) | 0.11% | 0.28% | 0.37% |

Data Source: IBGE (2001a, 2001b, 2005, 2011, 2015); STN (2015) and IBM Corp. (2010).

Table 6.12 displays that the median of the taxation on market values was only 0.11 percent in Brazil. However the ratio greatly varies according to the strata, being 0.33 percent in Stratum 1, 0.16 percent in Stratum 2 and 0.07 percent in Stratum 3. In addition, the assessment ratio could be presumed while assuming the same usual taxation on assessed values found in the 47 selected municipalities (as displayed in Table 5.7). Therefore, the assessment ratio median would be 41 percent in Stratum 1, 23 percent in the Stratum 2, and 7 percent in Stratum 3.

6.4 Estimating Property Tax Performance and Potential in Brazil

After establishing all five of the terms of Equation 6.1, this study can estimate feasible scenarios of revenue potential in Brazil. The analysis will divide the sample of 2,825 municipalities⁷⁷ into three strata as has been done previously. This sample represents 50 percent of the total number of Brazilian municipalities and 80 percent of the country's population. The ratios of the 47 selected municipalities listed in Table F1 in Annexure F will be retained in the baseline values, while the estimations of Equation 6.1 will be applied to the remaining 2,779 municipalities. Table 6.13 displays the stratified baseline ratios of Equation 6.1 in mean values, and the total results in mean of ratios and ratio of means values⁷⁸.

Table 6.13: All municipalities' terms of the property tax performance model (2012, per stratum, mean values)

| Stratum | Revenues per GDP | Values Coverage | Taxation on Market Values | Collection Rate | Market Values per GDP |
|------------------------|------------------|-----------------|---------------------------|-----------------|-----------------------|
| 1 (44) | 0.62% | 88% | 0.33% | 72% | 2.65 |
| 2 (1,056) | 0.37% | 85% | 0.22% | 57% | 2.86 |
| 3 (1,725) | 0.12% | 80% | 0.11% | 37% | 3.03 |
| Total (2,825) | 0.22% | 82% | 0.15% | 44% | 2.95 |
| Total (mean of ratios) | 0.51% | 89% | 0.26% | 74% | 2.62 |

Data Source: IBGE (2001a, 2001b, 2005, 2011, 2015); STN (2015) and IBM Corp. (2010).

Table 6.13 displays the terms' means in the baseline scenario as being: property tax per GDP (0.22 percent), market values per GDP (2.95), values coverage (83 percent), taxation on market values (0.15 percent) and collection rate (44 percent). All ratios increased according to the strata, revealing the high disparities between small and large municipalities in property taxation. Furthermore, the 0.51 percent ratio of means values of property tax per GDP amongst these 2,825 municipalities were significantly higher than the 0.19 percent mean value, due to the more relevant revenue impact of large municipalities that had much better performance indexes. Therefore, the 0.51 percent of Brazil's property tax per GDP in the selection was the result of 89 percent of coverage, 0.26 percent of taxation on market values and a 74 percent level of collection.

Hence, six feasible scenarios were established to estimate property tax potential in all Brazilian municipalities based on the percentile values displayed in the Table 6.9 (overall values coverage), Table 6.11(collection rate) and Table 6.12 (taxation on market values). Thus, Box 6.2 specifies the scenarios' reforms and displays the percentile values of the current ratios that will be used to establish the scenarios of revenue potential (only applied in municipalities under these percentile values).

⁷⁷ Although the study aims to estimate the performance in all 5,570 Brazilian municipalities, the accumulated missing data of all terms estimations reduced the sample size by about one half.

⁷⁸ For instance, the "ratio of means" of the indicator of "revenues per GDP" is the ratio of the sum of all revenues collected in the sample to the sum of all GDPs in the sample; the "ratio of means" of the indicator "collection rate" is the ratio of the sum of all tax levied in the sample to all tax collected in the sample; and so on.

Box 6.2: Reforms specification and percentile values of the current property tax performance ratios to be applied in each scenario

| | Reforms | Scenarios |
|----------------|--|-----------------------------|
| | Collection | 4a and 4b |
| | Collection and Coverage | 4a, 4b, 5a and 5b |
| | Collection, Coverage and Taxation on Market Values | 4a, 4b, 5a, 5b, 6a and 6b |
| Stratum | Scenarios 4a, 5a, 6a | Scenarios 4b, 5b, 6b |
| 1 | Percentile 90 | Percentile 95 |
| 2 | Percentile 90 | Percentile 95 |
| 3 | Percentile 90 | Percentile 95 |

Six scenarios of reforms were established. First, a reform that increased the collection rates (Scenarios 4a and 4b). Second, a reform that increased the collection rates and values coverage (Scenarios 5a and 5b). Third, a reform that increased the collection rates, the values coverage and the taxation on market values (by revaluations and tax rates restructuring) (Scenarios 6a and 6b). As displayed in Box 6.2, ratio “a” is equal to the percentile 90 of the current performance, while ratios “b” is equal to the percentile 95. Table 6.14 displays the results of Scenarios 6a and 6b per stratum which includes all the hypothesized reforms applied.

Table 6.14: Baseline and scenarios ratios of collection, coverage and taxation on market values

| Stratum | Baseline | | | Scenario 6a | | | Scenario 6b | | |
|----------------|-------------------|-----------------|-----------------------|--------------------|-----------------|-----------------------|--------------------|-----------------|-----------------------|
| | Collection | Coverage | Taxation on MV | Collection | Coverage | Taxation on MV | Collection | Coverage | Taxation on MV |
| 1 | 72% | 88% | 0.33% | 85% | 92% | 0.48% | 88% | 95% | 0.64% |
| 2 | 57% | 85% | 0.22% | 74% | 92% | 0.36% | 79% | 95% | 0.50% |
| 3 | 37% | 80% | 0.11% | 55% | 92% | 0.21% | 61% | 95% | 0.32% |

Data Source: IBGE (2001a, 2001b, 2005, 2011, 2015); STN (2015) and IBM Corp. (2010).

Running the simulations with the established scenarios’ ratios of Table 6.14, Table 6.15 displays the stratified scenarios’ outcomes in mean values of property tax per GDP ratios, and the total results in mean of ratios and ratio of means.

Table 6.15: All municipalities’ property tax per GDP: baseline and established scenarios (2012, per stratum, mean values)

| Stratum | Baseline | Scenarios | | | | | |
|-------------------------------|-----------------|------------------|--------------|--------------|--------------|--------------|--------------|
| | | 4a | 5a | 6a | 4b | 5b | 6b |
| 1 (44) | 0.61% | 0.69% | 0.72% | 1.04% | 0.71% | 0.76% | 1.44% |
| 2 (1,056) | 0.37% | 0.43% | 0.46% | 0.80% | 0.45% | 0.50% | 1.15% |
| 3 (1,725) | 0.12% | 0.15% | 0.17% | 0.35% | 0.16% | 0.19% | 0.58% |
| Total (2,825) | 0.22% | 0.27% | 0.29% | 0.54% | 0.28% | 0.32% | 0.82% |
| Total (ratio of means) | 0.51% | 0.56% | 0.57% | 0.80% | 0.57% | 0.60% | 1.13% |

Data Source: IBGE (2001a, 2001b, 2005, 2011, 2015); STF (2015) and IBM Corp. (2010).

From Table 6.15, it can be noted that under Scenarios 4a and 4b, Brazil’s property tax revenues per GDP (ratio of means) would increase by approximately 10 if collection rates were increased up to the minimum established ratios. Evidently this result is much more noticeable amongst Stratum

3 municipalities that generally face low collection. Therefore, the property tax per GDP “mean of ratios” would approximately increase by 27 percent, from 0.22 percent to 0.27-0.28 percent.

In Scenarios 5a and 5b, Brazil’s property tax revenues per GDP (ratio of means) would be respectively 0.57 and 0.60 percent, if the collection and values coverage ratios were increased up to the minimum established ratios. The property tax per GDP “mean of ratios” would approximately increase by 39 percent from 0.22 percent to 0.29-0.32 percent due to the lower collection and lower coverage amongst smaller municipalities.

Finally, in Scenarios 6a and 6b, Brazil’s property tax revenues per GDP (ratio of means) would be respectively 0.80 percent and 1.13 percent if the collection, values coverage and taxation on market values ratios were increased up to the minimum established ratios. In addition, the property tax per GDP “mean of ratios” would increase from 0.22 percent to 0.54 percent and 0.82 percent respectively.

Indeed, the value of 1.13 percent per GDP found in Scenario 6b is the highest property tax potential assumed by this study and may be feasible, since a ratio of 1.25 percent of property tax revenues per GDP is similar to the value recommended by Norregaard (2013) for developing countries, as well as that achieved by South Africa, according to Table A2. On the other hand, the ratio of 0.8 percent in Scenario 6a is similar to the ratio found by Orair and Albuquerque (2016). Indeed, these authors based Brazil’s property tax potential on the current performance of the percentile 90, which was the established percentile of Scenario 6a. Thus, this study concludes that an intermediated value between these two scenarios (from 0.8 to 1.13 percent), would be even more feasible and is recommended for Brazil, for example a ratio of 1 percent of GDP.

6.5 Conclusions

This chapter aimed to estimate the current property tax performance and feasible scenarios of revenue potential in the 47 selected municipalities, in order to subsequently carry over the estimation to the rest of the country.

A model was presented that established the ratio of property tax to GDP as determined by the ratio of properties’ market values to GDP (potential tax base), the cadastral values coverage, the assessment ratio, the taxation on assessed values, the collection rate and an error term. Using this model, the study established a feasible scenario for the 47 selected municipalities that would increase the selection’s average ratio of property tax per GDP from 0.53 percent to 1.21 percent.

The study had to establish a simplified version of the model of ratios in order to extend the performance and revenue potential estimation to all Brazilian municipalities in the year of 2012. The simplified version considered no error terms in the model and merged the assessment ratio and the taxation on assessed values into a single ratio of taxation on market values that was determined as the model’s residual. In addition, the chapter had to perform some exercises to estimate the values coverage and collection rates, while indicators of properties’ market values per GDP were already determined by Equation 4.3 in Chapter 4.

The values coverage in Brazil was estimated using linear regression models and some stipulations. Firstly, the residential buildings coverage in 2012 was estimated given the observed coverage in 2004 and the indicator of revenue increase between 2004 and 2012. Secondly, the 2012 residential values coverage was estimated given these 2012 residential buildings coverage. Finally, the values coverage of all types of properties was established to be applied to the simplified model. It was estimated that the mean and median of values coverage in all Brazilian municipalities was 82 percent and 83 percent, respectively.

The collection rate was estimated for all Brazilian municipalities in 2012 by a linear regression model. This regression used the observed collection rates of all Brazilian municipalities in 2000, the observed collection rates of a sample of 180 municipalities in 2012 and the property tax revenue increase between 2000 and 2012. The estimation of the mean and median collection rate in all Brazilian municipalities was 44 percent and 53 percent, respectively.

The taxation on market values was estimated as being a residual in the simplified model. The estimation of the mean and median taxation on market values in all Brazilian municipalities was 0.15 and 0.11 percent, respectively.

Finally, after running simulations of the revenue scenarios, a maximum feasible scenario was established, that increases all property tax revenues (ratio of means) from 0.51 to 0.8-1.13 percent of Brazil's GDP, which is at the same level of value as is recommended by Norregaard (2013) for developing countries, as well as that which was achieved by South Africa.

The steps to achieve this scenario represented an increase in the average ratios of: a) values coverage from 82 percent to 95 percent; b) taxation on market values from 0.15 percent to 0.41 percent; and c) collection rates from 44 percent to 69 percent. Some feasible recommendations to achieve these ratios that cover legal, administrative, political and cultural issues were discussed in Chapter 3 and 5 and will be summarized in the next chapter.

This chapter performed relevant and statistically significant linear regressions that were used to estimate the unobserved ratios of cadastral values coverage and collection rates in 2012, which are determinants of the property tax performance. Therefore, this study is able to provide solid considerations about property tax performance in Brazil in the next chapter, after investigating the international literature of property taxation in Chapter 2; the current status and the main particulars of Brazil's property taxation in Chapter 3; the methodology of this research in Chapter 4; the display and analysis of property tax indicators in a selection of 47 municipalities in Chapter 5 and the use of the data gathered to perform estimations and to establish feasible scenarios of property tax performance in this chapter.

Nevertheless, the role and importance of this chapter is not only to display the current property tax performance and to study feasible scenarios. The chapter also provided detailed estimations of the property tax performance ratios in Brazil, and adapted and simplified the original model used by many authors to Brazil's case, considering the available data in the country and making rational stipulations. Therefore, these adaptations and estimations can be used in other countries' research.

CHAPTER 7:

DISCUSSION OF FINDINGS, LIMITATIONS, POLICY OPTIONS AND CONCLUSIONS

7.1 Introduction

This chapter presents a discussion of the issues and findings that have emerged from this study. The main purpose of the study was to estimate the current property tax performance and potential in Brazil and to propose feasible reforms taking into account the great heterogeneity amongst the 5,570 Brazilian municipalities.

The property tax policy debate has generally been concerned with tax base definitions, exemption mechanisms, tax rates structures, and more recently, the use of technological tools in property identification and registration, for instance, the Geographic Information Systems (GIS) being integrated into multipurpose cadasters. The reality in developing countries is that improving more basic tax administration, which consists of skilled human resources, tax departments' infrastructure, cadastral reforms focused on taxpayers' personal information and collection and enforcement systems, have better potential to enhance property tax performance.

Notwithstanding, unlike many other developing countries, Brazilian municipalities have wide autonomy in establishing their own property tax policy and managing their administrative tasks. Therefore, this study found that there is no overall prescription to be recommended in the country and each municipality may have different challenges and recommendations in order to improve its tax performance. However, this study notes that there is widespread use of very outdated assessed values, and the reform of valuation systems should perhaps be the common point on the agenda. Again, there is no focus limitation on the valuations and some municipalities may demand more urgent reforms in their cadasters, others in reducing their tax exemptions or in increasing their tax rates, and so on.

This final chapter is divided into four sections. The first section introduces the chapter. The second section is the longest and discusses some legal and administrative recommendations to bypass the main challenges of property taxation in Brazil and improve its performance. This second section is divided into general recommendations (Section 7.2) and focused recommendations (Sections 7.2.1 to 7.2.6), which include property tax base and taxpayers, fiscal cadasters, valuations, exemptions, tax rates and collection. In addition, these recommendations will be presented to be separately performed at national and municipal level. The third section of this chapter examines the significance of this research and its main contribution to the knowledge, while the final section discusses the proposals for additional research and gives the final conclusions

7.2 Strategies for Boosting Property Taxation

As previously discussed in Chapter 6, a feasible property tax potential would increase revenues from the current 0.45 percent of Brazil's GDP to approximately 0.8-1.13 percent, which is a similar level of value as is recommended by Norregaard (2013) for developing countries, as well as that which was achieved by South Africa. The ratios estimated by this study were similar to those found by Orair and Albuquerque (2016) (0.8 percent) and De Cesare *et al* (2014) (1-1.2 percent), while they were higher than those found by Afonso *et al* (2016) (0.63-0.67 percent). According to the estimations carried out in Chapter 6, the highest potential of 1.13 percent would represent an increase in the average ratios of cadastral coverage from 82 percent to 95 percent, taxation on market values from 0.15 percent to 0.41 percent, and collection rates from 44 percent to 69 percent.

In Brazil, a way that may tap more frequent revaluations would be a “top-down policy”, which means federal interference in local property taxation, which must be carried out by a constitutional amendment and the enactment of a property tax act. However, it is important to mention that a national regulation of local property taxation must be established with caution. The international experience has shown that higher tiers of government's regulations on local taxes may reduce the local autonomy and the revenue potential, since there is a common political temptation to centralize valuations, to grant exemptions to residential or owner-occupied properties, to set tax rates, and to cap tax increases. However, a well-designed national property tax policy may prove to be positive when improving property taxation, as has occurred in South Africa. Therefore, it is necessary for mechanisms that ensure that the federal interference in local property taxation will not result in loss of revenues. This may be implemented, for example, by establishing minimum levels of assessment, maximum periods of valuation cycles, or simply by establishing in the legislation that the property tax act cannot be used to expand exemptions or cap valuations and tax rates.

Another possible federal interference in Brazil that could boost property tax performance would involve the Fiscal Responsibility Law. The law establishes several national regulations in relation to the federal, state and municipal public finances. Therefore, the law could be amended in order to also include a maximum period of valuation cycles and cadastral updates, exemptions limitations and minimum revenue indicators. However, an attempt to alter the Fiscal Responsibility Law and establish a 4-year valuation cycle was rejected by the Senate in 2015. This was because “supplementary laws” demand a qualified quorum of one half of all members of both houses of the national congress to be passed (rather than a common quorum of one half in the voting process) (Federative Republic of Brazil, 2000b; 2014).

Norregaard (2013, p.35) states that property tax reforms require political will, careful planning and resolute action to address administrative challenges that are often not quickly resolved. The reforms must be planned through a medium-and long term reform strategy which has to be carefully calibrated in accordance with the circumstances of each country. Moreover, in Brazil's case this should be applied according to the specificities of each municipality. Thus, complementing Norregaard's (2013) recommendations, this study establishes eight general guidelines for a reform strategy that will be further discussed in the next sections:

- a) A diagnostic analysis that identifies the main policies and administrative challenges, which must be combined with future policy decisions, including the broader level of decentralization, local autonomy and citizens' participation, especially in smaller jurisdictions (by participatory local budget, for instance);
- b) Development of tax policy reform, with a focus on the definition of the tax base, the tax rates mechanisms, and the reliefs, increase caps and exemption policies. The main target should be a transparent and simplified system that minimizes exemptions, inequities and the political costs;
- c) Detailed planning of administrative reform, carefully adjusted to local specificities, including: a) improved registration coverage of properties and taxpayers; b) better valuation and commitment with regular revaluations; c) improved collection rates though minimizing compliance costs, stimulating voluntary compliance, and strongly enforcing delinquency; and d) clear allocation of responsibilities amongst central, intermediate and local governments with regard to how and by whom the administrative tasks are carried out, as well as trying to decentralize and outsource or privatize them as much as possible;
- d) Recurrently monitoring the tax performance indicators including assessments of cadastral coverage, valuation performance and collection efficiency;
- e) Enactment of a property tax act or to better regulate the local property taxation at national level with the intention to bypass its political, judicial and/or administrative challenges;
- f) Simplification in the funding rules of PMAT program ("Program of Modernization of Tax Administration). PMAT should be also focused on municipalities with weaker tax administration (e.g., lower income or located in the Northern and Northeastern Regions). Therefore, the collateral warranties should be limited to the own-tax revenues raised and the requirement of debit clearance certificates should be relaxed. Furthermore, PMAT has been proved highly cost-effective and therefore state governments could also implement similar, but less bureaucratic programs;
- g) Encouragement of the creation of private companies with technical expertise and economies of scale in tax administration systems. Governmental development banks or agencies can support and fund private companies' projects and identify their potential clients (municipal governments). Furthermore, the outsourcing of certain administrative tasks in small municipalities without economies of scale in tax administration should be encouraged;
- h) Implementation of inter-municipal cooperation of neighboring municipalities (arrangements and agreements) in the procurement process of outsourcing their property tax administration. This would enable better economies of scale and scope and therefore be a less costly task.

Thus, the recommendations and strategies presented by this study will be further discussed in the next section, and are divided into five topics - tax base and taxpayers, fiscal cadasters, valuations, exemptions, tax rates and collection. In addition, each topic will be divided into strategies to be performed at national level and at municipal level.

7.2.1 Rethinking the Tax Base and Taxpayers

The expansion of property tax base and the roll of taxpayers is an important element to increase the property tax potential in a country. In Brazil, such reform would have to alter the Brazilian Constitution, 1988 and federal legislations and therefore it would have to be implemented by the federal government. Thus, this study notes that the property tax base and taxpayers have two main challenges:

- a) The property classification as urban and rural, which is respectively liable to the municipal urban property tax (with fiscal purposes) and the federal rural property tax (with extra-fiscal purposes). The legal classification is under three contradictory legislations, where vacant sites can be classified and assigned as urban or rural land, considering their benefit of public services (National Tax Code), their geographical location in the municipal territory (Municipal Laws and/or Master Plans) or their type of use (Federal Decree-Law 57 of 1966);
- b) Although the National Tax Code assigns as property taxpayers either landowners or possessors, according to STJ jurisprudence, possessors are just taxpayers in the absence of any judicial litigation or dispute (STJ, 2009). However, the existence of informal and irregular settlements has reduced the roll of taxpayers.

The recommendations at national level to bypass these juridical issues would cover:

- a) A constitutional amendment that merged the current urban and rural property taxes into a single, locally administered overall property tax. In addition, the Brazilian Constitution, 1988 must state that this new tax would have to be nationally regulated by a property tax act;
- b) The property tax act could assign either landowners or possessors as taxpayers in all circumstances, with the property tax payment by the litigant parties during the judicial actions being mandatory.

In addition, regardless of any property tax reform that may occur at national level, the recommendations that could be applied at municipal level would include:

- a) Municipal Master Plans should regularly update the municipal urban areas (or areas to be urbanized). This would therefore create more areas liable to the municipal urban property tax;

- b) Municipalities should identify (or provide) areas with at least two of the five public services specified in the National Tax Code⁷⁹ to expand the roll of urban properties liable to municipal urban property tax;
- c) Municipalities should implement programs of land regularization of informal settlements, preferentially if located on government-owned land (due to the lower complexity of the process). The urban instruments provided by the City Statute, should be preferentially applied in accordance with the Cities Ministry Guidelines (*Ministério das Cidades*, 2009);

7.2.2 Rethinking the Fiscal Cadasters

This study found that the indicator of cadastral buildings coverage and cadastral values coverage alone is not the main concern in relation to the property registration in Brazil. Table 5.1 in Chapter 5 found a median residential building coverage ratio of 77 percent amongst 47 selected municipalities. Evidently, this ratio would be higher if it was just considered for residences with certain benefits of urban services (the median ratio would increase to 91 percent in the case of the garbage collection benefit). In addition, the result of estimations displayed on Chapter 6 found a median residential buildings coverage of 65 percent and overall values coverage of 83 percent in all Brazilian municipalities.

This study also found that in Brazil fiscal cadasters have different challenges in small and large municipalities: in large municipalities it is urgently required that the informal properties should be registered in the fiscal cadasters and the possessors should be regularized and assigned as taxpayers, while in small municipalities it is more urgently required to better assign the urban areas within their territories and to localize and update the taxpayers.

However, Brazilian municipalities need to know the composition and particulars of their property tax base very well, including the type and use of the taxable properties (e.g. built upon, vacant site, residential, nonresidential, commercial, industrial, religious, etc). Fiscal cadasters must be computerized, detailed and recurrently updated to provide such information, in order to better manage the tax policies. They must inform on how much property tax is levied and paid by each type of property, since this is of primary importance in determining differing bases of assessments, exemption amounts, multiple tax rates and collection strategies. For example, Table E11 found that 8 amongst the 25 selected municipalities in Strata 2 and 3 did not have the information pertaining to property use (residential or nonresidential) in their fiscal cadasters. Therefore these municipalities cannot apply higher tax rates to nonresidential properties; however a cadastral update could easily identify and catalogue the property use.

Thus, this study highlights eight main challenges related to the fiscal cadasters in Brazil:

⁷⁹ These services are: street curb and pavement with channeling rainwater, water supply, sewer system, street lighting and public school or health station at a maximum distance of three kilometers to the taxable property.

- a) The existence of outdated and incomplete fiscal cadasters and the lack of commitment in recurrent cadastral updates. For example, this study found that, by 2015, 19 of 41 selected municipalities had their last cadastral update over one decade previously;
- b) The significant level of informal settlements in some municipalities, which are often wrongly registered in the fiscal cadasters as large parcels of vacant sites;
- c) Outdated personal registers of taxpayers which reduces collection rate since the taxes are wrongly billed. This problem is at its worst on vacant sites since they are not inhabited. In addition, municipalities with a large share of vacant sites in their fiscal cadasters likely generate an overall low collection rate indicator. Therefore, the collection strategies must be jointly applied with cadastral strategies.
- d) The non-compilation of the properties' type and use (e.g. residential, commercial, industrial) that can be used to better evaluate properties and differentiate tax rates;
- e) Lack of modernized cadasters where paper and pencil fiscal cadasters still exist in smaller municipalities (especially in the Northern and Northeastern Regions, as stated by De Cesare, 2017b);
- f) Lack of taxpayers' participation and self-reporting in the update processes;
- g) Lack of the integration with cadasters of governmental agencies, notaries and private institutions;

Thus, the recommendations at national level related to the fiscal cadaster challenges would cover:

- a) A property tax act that could establish a federal multipurpose cadaster of properties, integrating the current federal cadaster of rural properties, the municipal fiscal cadasters of urban properties and the notaries' registers. The process would have to be implemented by mandatory agreements between the agencies and would have to be well scheduled and planned, since many small municipalities still have outdated cadasters;
- b) Similarly recommended by IAAO (2013) and *Ministério das Cidades* (2009), a property tax act could establish a minimum cadastral update cycle of 4-6 years, i.e the period where all properties must be re-inspected and updated;
- c) A property tax act could state that the cadastral modernization, maintenance and update could be outsourced to certificated private companies

Regardless of any property tax reform that may occur at national level, the recommendations at municipal level related to cadastral challenges would cover:

- a) Higher focus on the update of taxpayers' personal information. The data analysis of this study reveals that the update of taxpayers may be a more important task than the update of property-related characteristics. This is because the update of taxpayers'

information has a high impact on improved collection and is generally less costly and time consuming than cadastral reforms focused on the use of GIS to improve coverage.

- b) The process and recurrence of the cadastral updates must be specified in a municipal law to enhance the local commitment with regular updates;
- c) Taxpayers should have easy mechanisms of self-reporting the property changes in ownership, construction, use, permissions etc. Municipal governments should provide taxpayers' services by offices or the internet where they can remit documents;
- d) The municipal governments should make arrangements or agreements and partnerships with the local notaries. Municipal legislation must oblige the prompt remittance to the municipal government of any property transfer or changes, as has occurred in Porto Alegre (De Cesare, 2017b);
- e) As discussed, the task of cadastral maintenance and update should be outsourced and inter-municipal cooperations with neighbouring municipalities should be performed in the procurement process.

7.2.3 Rethinking the Valuations

The empirical part of this study found that by 2015, the median year basis of the land valuations was 8 years out of date amongst the 47 selected municipalities. However, there were cases of great disparities, such as a year basis of 1973 and one of 1981. In addition, the study found a median assessment ratio of 33 percent that ranged from 10 percent to 88 percent in the selection. This also reveals a great disparity on assessment ratios amongst municipalities, which was expected due to their great level of assessment autonomy. In Brazil, revaluations are autonomously established by municipal governments on an as-needed basis.

This study still found that improvements in the assessment levels do not always occur during the revaluation processes, since minor adjustments with increased caps are often established. In addition, the land appreciation in developing countries can be so strong and unregulated that local governments are not able to follow this growth rate in their official assessments. This occurred in some revaluations of many metropolitan areas in Brazil during the period of the housing bubble between 2008 and 2013. Indeed, meaningful valuation reforms on old valuation rolls can greatly impact the tax levied. However, phase-in mechanisms that smooth out these tax increases over a certain number of years are preferable to simply applying tax increase caps which can greatly enhance the taxation's horizontal inequity. For instance, if two similar market valued properties fall under different assessment ratios, a tax increase cap will increase the "effective taxation" disparity between them. In contrast, despite taking a certain amount of time to be completed, a full calculated tax increase applied by a phase-in mechanism is able to correct these distortions.

An efficient valuation system scheme in Brazil would be one where valuations are technically and currently performed by the executive municipal governments, while the local councils would establish the level of taxation borne by the residents, in other words, the tax rates

values. However, the Precedent No. 160 of Brazil's Superior Court of Justice (STJ, 1996) that requires revaluations under municipal laws has brought about serious political barriers in relation to the revaluations. Therefore, this legal statement should be reviewed either by a new juridical precedent, or more feasibly by a property tax act.

In addition, the valuation methods and techniques must also be specified in a municipal law. In Brazil, the ABNT/NBR 14653-2:2011 is the national standard to evaluate urban properties (ABNT, 2011). However, this standard is just a recommendation and municipal governments can establish their own (and inaccurate) method of valuation and its mechanisms. Therefore, the property tax act could nationally establish the following of ABNT Standards in all valuations. Certainly, this would serve to harmonize the valuations in Brazil.

In summary, this study notes that the main challenges related to the municipal valuations are:

- a) The existence of outdated valuations, prevailing very long valuation cycles and valuation caps during the (infrequent) revaluations. This study found that by 2015, the last revaluations occurred more than one decade previously in 23 of 47 selected municipalities;
- b) Brazilian municipalities are greatly autonomous in designing their own method and techniques of valuation for tax purposes. The ABNT Standard to evaluate urban properties is merely a recommendation that may be followed by municipal governments (ABNT, 2011);
- c) The valuations have been increasingly outdated while vertical and horizontal inequity has probably been enhanced due to the scenarios of the real estate bubble (between 2008 and 2014) and lack of revaluations;
- d) The political bias in revaluations is very strong in Brazil, since STJ Precedent No. 160 states that a new municipal law is needed to replace a valuation roll. The municipal councils are susceptible to local political pressures and they have frequently rejected the revaluation bills or have introduced increase caps during the political negotiations to pass the bill;
- e) The valuation mechanisms have been used by some municipalities as a way to establish tax policies, for example by favorable assessment mechanisms applied to lower valued and/or smaller sized residential properties.

Thus, the recommendations at national level related to the main valuation challenges would cover:

- a) A property tax act or the Fiscal Responsibility Law could establish a maximum 4-year valuation cycle;

- b) A property tax act could prohibit revaluation capping, while only tax rates would adjust the tax burden. Complementarily, a phase-in mechanism that fully smoothes out the tax increases over four years, as occurs in South Africa, could be established;
- c) A property tax act could permit the establishment of revaluations by an executive municipal ordinance, repealing STJ Precedent No. 160;
- d) A property tax act should make mandatory the use of ABNT Standards in the valuation process. This would require an alteration of municipal laws that establish the valuation mechanisms and would bring about certain harmonization in the assessment methods applied in Brazil;
- e) A property tax act or the Fiscal Responsibility Law could establish an average minimum assessment level that could be verified by external governmental agencies, or private entities;
- f) A property tax act could link CUB indexes to the construction costs stated in the valuation rolls;
- g) A property tax act could state that the revaluation process can be outsourced to certificated private companies in municipalities.

Regardless of any property tax reform that may occur at national level, the recommendations at municipal level in relation to the main valuation challenges would include:

- a) Some proposals that could be established by a property tax act could be alternatively imposed by a municipal legislation. For example, a valuation cycle period (as occurs in São Paulo), the use of ABNT Standards, the establishment of a minimum level of assessment, the use of the CUB Index and the outsourcing of valuations⁸⁰;
- b) Municipal governments should explain and publicize to the local communities the existence of vertical and horizontal inequities in the valuations, to reduce the political cost of revaluations;
- c) Municipal governments should recurrently track the real estate adverts and transactions by agreements and partnerships with local notaries, housing credit banks and real estate agencies. This would provide a market values database to be used in the revaluations;
- d) In 2012, STF permitted that real estate agents perform valuations. Therefore, they could be part of valuator teams, due to their knowledge about the local real estate market, and their lower cost and being less scarce than engineers;
- e) Municipal governments should make agreements and partnerships with local universities for the valuation task. This would encourage the local supply of courses

⁸⁰ However, the enactment of a property tax act is preferable, since a municipal legislation depends on the local political will to pass it and is more easily unfulfilled, reviewed or litigated under the state courts. For example, despite the statement of a 2-year valuation cycle period in the São Paulo Tax Code, the revaluations scheduled for 2016 were not performed.

and seminars, the opening of new companies, and the provision of skilled professionals to be part of the valuers team.

7.2.4 Rethinking the Tax Exemptions

In Brazil, in addition to the constitutional exemptions for religious and charitable entities, political parties, labor unions and governmental properties, most of the property tax exemptions are autonomously granted by the municipalities and these exemptions can greatly affect the tax performance if they cover a large share of the tax roll.

The empirical part of this study found a median share of exempted properties of 8 percent amongst the 47 selected municipalities; however this ratio ranged from 1 percent to 75 percent which reveals a great disparity amongst municipal exemption policies. The study also noted a trend of high exemptions amongst large and industrial municipalities in the selected municipalities, probably due to their great nonresidential tax base that can be explored and would compensate the loss of revenues for residential exemptions. In the 47 studied municipalities, Betim and Contagem (both industrial cities within Belo Horizonte Metropolitan Area), exempted all residential properties of any property taxation, while the exemptions covered 60 percent of the registration in Rio de Janeiro. Furthermore, the combined effect of low cadastral coverage and exemption coverage resulted in only 20 percent of households being effectively taxed in Rio de Janeiro. The questionnaires also revealed that 27 amongst 47 municipalities probably do not have control of the exemptions granted, by not knowing the number of benefitting properties or their impact on the revenues. The recurrent preparation of property tax administrative reports, amongst other objectives, would provide better knowledge and transparency on the exemption status.

In addition, the municipalities must estimate the loss of revenues born in each property class, in order to control and minimize the exemptions impact on their tax liabilities. This study recommends that the tax exemptions should be minimized. For example, no more than 10 percent of residential properties and no exemptions should be granted for commercial/industrial and urbanized vacant land properties. A property tax act could also minimize the level of exemptions by establishing a maximum share of exempted properties. However, it must be highlighted again that, depending on how the property tax act would be applied, there is a potential risk that these interferences in local tax autonomy might result in expanding the politically popular residential exemptions.

Property tax exemptions may have social, ethical and community purposes. This may be especially true in countries where land is viewed as public and/or land is being devolved to the natives' communities (UN-Habitat, 2011). In Brazil, however, this community view has a minor extension, including churches and temples, historical buildings, forests and areas of environmental protection, and protected areas of native indigenous land, former slaves' communities or fishing/subsistence communities. Therefore, this study concludes that reducing property tax exemptions where they are significant is a condition to improve property tax performance and enhance the sense of citizenship, especially amongst informal settlements. This is because in these communities, the property tax bill might be the only

ownership document recognized by the government, and therefore the tax billing would not face opposition, as stated by Smolka and De Cesare (2013). Certainly, the tax levied on these communities should be related to taxpayers' ability to pay and they should also benefit from public services in order to enhance acceptability. In terms of fiscal culture, the enhancement of citizenship awareness when communities claim public investments as return for what they pay in taxes can be viewed as positive, rather than a governmental act of generosity.

This study also noted that property tax exemption as incentive to attract investment location is a common practice in many Brazilian municipalities. However, it was discussed in Chapter 2 that some studies state that this is commonly ineffective, since there exist other more crucial factors that impact the decision of investment location (Kenyon *et al*, 2012). In addition, policies of tax incentives may enhance corruption, especially when there is a lack of independent control agencies, as verified in São Paulo in 2013.

Thus, this study notes that the main challenges related to the property tax exemptions include:

- a) The role of the constitutional exemptions and their legal interpretation by the courts;
- b) The great level of municipal autonomy in granting property tax exemptions and their extension on some tax rolls;
- c) The lack of control related to the exemptions impact on the loss of revenues;
- d) The popular granting of exemptions to target the poor and their impact on the local fiscal culture and sense of citizenship;
- e) The ineffectiveness of property tax incentives in attracting investment location;
- f) The possibility of corruption enhancement in policies of tax exemptions and incentives.

Thus, the recommendations at national level related to the exemptions policies would cover:

- a) A constitutional amendment and/or a property tax act that could establish that the constitutional exemptions only cover the buildings effectively used for religious practices, rather than the current legal interpretation that all types of properties owned by religious entities are property tax exempted;
- b) A property tax act or the Fiscal Responsibility Law could establish a maximum share of properties on fiscal cadasters that could be granted by property tax exemptions;
- c) A property tax act or the Fiscal Responsibility Law could establish the mandatory publication of tax reports that include the impact of tax exemptions and incentives in the loss of revenues;
- d) A property tax act or the Fiscal Responsibility Law could regulate the granting of property tax incentives for investment location. These tax incentives could be limited to those investments related to historical, artistic, cultural, community or

environmental heritage. In addition, a report could be required on the exemption impact, as well as a contract stating the obligations in each incentive granted;

- e) A property tax act or the Fiscal Responsibility Law should establish that municipal governments (or inter-municipal corporations) must implement control agencies to inspect and control, amongst other tasks, the granting of tax exemptions and the suspicions of corruption.

In addition, regardless of any property tax reform that may occur at national level, the recommendations at municipal level to establish the exemptions policies would include:

- a) Some proposals that could be established by a property tax act could also be imposed by municipal legislation. For example, the establishment of tax reports that contain the exemptions' impact on the revenues, the regulation of tax incentives and the creation of control agencies;
- b) The municipal tax code could minimize exemptions amongst poor communities with taxation level compatible with their level of income, in order to enhance their fiscal culture and sense of citizenship. Campaigns and primers to advertise the benefits of property taxation could be complementarily applied.

7.2.5 Rethinking the Tax Rates

The tax rates are a less debated topic in property tax reform discussions, since they are generally buoyant and based on the budgetary needs in many countries. However, Brazilian municipalities have full autonomy to establish their tax rates values and mechanisms of discretion, as they have commonly been fixed and crystallized in legislation for many years. Therefore this study notes that tax rates values are sometimes an important reason for the low property tax performance in a municipality. Amongst the 47 selected municipalities, this probably occurred in 8 cases where it was found that statutorily proportionate residential tax rates ranged from 0.16 percent to 0.5 percent. In addition, when multiple tax rates are applied, the minimum tax rates are often under 0.4-0.5 percent and perhaps, depending on how the tax brackets are designed and how the valuations are performed, a meaningful share of registration can be born under this lowest bracket, which would greatly affect the tax performance.

The use of statutorily multiple tax rates (selective and/or progressive) was another issue debated by the empirical part of this study. Amongst the 47 selected municipalities, it was verified that proportionate and progressive systems took place in respectively 22 and 20 municipalities, while the remaining 5 municipalities used other mechanisms of multiple tax rates. In addition, 27 amongst 47 municipalities (16 municipalities in Stratum 1) surtaxed nonresidential properties, which reveals that these municipalities have catalogued the property use in their fiscal cadasters to promote this tax policy. On the other hand, it was also verified that 20 (14 municipalities in Strata 2 and 3) applied the same statutory tax rates for residential and nonresidential properties. Therefore, a cadastral update that catalogued property use could enable the tax rates differentiation to better explore the revenue potential.

In relation to the surtaxing of vacant sites, this occurs in all 47 selected municipalities (on average, 3.7 and 2.6 times higher than residential and nonresidential tax rates, respectively). The reason is more related to land use encouragement, as stated in the Brazilian Constitution, 1988, and in the City Statute. However, despite the many reasons referred to by the literature and the Brazilian legislation in surtaxing unimproved lands, this may have enhanced their low property collection rate, as will be debated in the next section.

In the empirical part of this study, it was also verified that the median value of the taxation on assessed values (the ratio of the total tax levied on the full assessed values) was 0.8 percent, which was the combined effect of 0.6 percent on residential properties, 1 percent on nonresidential properties and 1.6 percent on vacant land. Nevertheless, it is important to mention that the tax rates are correlated with the assessment level since, as previously stated, higher assessments demand lower tax rates. Therefore this study also analyzed the level of taxation on market values (the ratio of the total tax levied on the full market values). According to the estimations performed in Chapter 5 to the 47 selected municipalities, the median taxation on market values was 0.27 percent, ranging from 0.05 percent to 0.84 percent. Furthermore, the estimations to all Brazilian municipalities performed in Chapter 6 found a median taxation on market values of 0.15 percent in Brazil, being 0.33 percent, 0.22 percent and 0.11 percent in municipalities of Strata 1, 2 and 3, respectively⁸¹.

There is always a temptation to increase tax rates when a boost to revenues is required, since this is a less costly and time-consuming way than promoting administrative reforms in cadasters or valuations. In addition, tax rates adjustment is politically easier to implement, since the tax increase is equally borne by all taxpayers. Moreover, recently some Brazilian municipalities have updated their valuation rolls simply by applying proportionate increases to all land zones, which is the same as a tax rate increase⁸². However, this preserves the growing vertical and horizontal inequity due to the urbanization and land appreciation verified in many municipalities.

This study concluded that tax rates are an important component in the Brazilian property tax system. They should be viewed as a buoyant element of a well-functioning system; however, tax rates should not be either excessively highlighted or overlooked. Indeed, the tax rates level should be established in a fair and transparent way, based on the level of valuations and on the taxpayers' ability to pay, leading to a politically acceptable level of taxation for the community.

Therefore, this study notes that the main issues related to the property tax rates include:

- a) Municipalities are greatly autonomous to establish the tax rates values and discretion criteria (e.g. proportionate, progressive, or selective per use, property size, quality of construction and benefit of urban services, amongst others);

⁸¹ Applying a median taxation on assessed values of 0.8 percent to all Brazilian municipalities (the same indicator found in the 47 selected municipalities), the assessment level in Brazil would be 19 percent, being 42 percent, 28 percent and 14 percent in municipalities of Strata 1, 2 and 3, respectively.

⁸² For example, this occurred in Fortaleza's revaluations of 2010, where they simply applied a 30 percent increase for most of the values in the previous valuation roll of 2004 (Municipality of Fortaleza, 2009).

- b) Tax rates are generally entrenched in the municipal tax legislation with low levels of buoyancy due to the difficult legislative process of tax rates alteration. Therefore tax rates are not generally viewed as a crucial element to adjust the tax burden when revaluations are performed;
- c) Tax rates may be at low levels, not generating an adequate level of revenues in accordance with the tax administration cost recovery, the budgetary needs and the taxpayers' ability to pay. In addition, low value of tax rates also mitigates the revenue strengthening of a tax reform;
- d) This study found that, amongst the selected municipalities, the tax rates on vacant sites were on average 3 times higher than those applied on built upon properties. Therefore, the tax levied may be at a high level to encourage delinquency⁸³.

Thus, the recommendations at national level to establish the tax rates policies include:

- a) A property tax act or the Fiscal Responsibility Law could establish that the annual Municipal Budgetary Laws must define the tax rates of municipal taxes, in accordance with the budgetary needs. This would likely encourage higher levels of tax rates buoyancy, as well as more transparency, participation and accountability in the budgetary decisions;
- b) A property tax act or the Fiscal Responsibility Law could establish that municipalities must prepare and publish annual tax reports, including the information of statutory tax rates and the level of taxation on assessed values.

Regardless of any property tax reform that may occur at national level, the recommendations at municipal level related to tax rates policies include:

- a) The municipal tax administrations could voluntarily introduce a policy of tax reports, including the information of taxation level on assessed and market values. In addition, these reports could analyze the tax policies of neighboring municipalities to substantiate the tax policy discussions in the municipal councils;
- b) The municipal tax administrations could always catalogue the property use to be able to differentiate tax rates. For example, higher and progressive tax rates to commercial or industrial properties;
- c) The municipal governments could apply a progressive system if tax fairness is viewed as an important attribute by the local community. For example, in municipalities that exist both luxurious high valued properties and low income informal settlements;

⁸³ For example, in São Vicente and Santos the average annual tax levied on vacant sites was approximately R\$ 12,000 in 2014, which was about 13 times the value of the Brazilian monthly minimum wage.

- d) The municipal governments might review tax rates during the process of revaluations. Revaluations should aim at market values, while tax rates should be the variable to adjust the tax burden;
- e) The municipal governments could always establish tax rates values that generate an adequate level of revenues, while not encouraging delinquency. Therefore, tax rates should be increased if their low levels impact upon revenue performance and should be reduced in cases that encourage delinquency (e.g. surtaxation on vacant sites).

7.2.6 Rethinking the Collection Policies

An efficient collection system that combines policies that facilitate compliance and enforce property taxation has recently been the main recommendation for developing countries. Indeed, this study found that Brazilian municipalities generally have low collection rates when they present at least one of these three situations: a) they are small municipalities or low income municipalities, which generally have weak tax administration; b) they are located in the Northern and Northeastern Regions, which generally have weak fiscal cultures; and c) they have a large share of vacant land in their tax liabilities, which generally causes more difficult collection.

The empirical part of this study found that the median collection rate amongst the 47 selected municipalities was 71 percent, 77 percent for built on properties and 50 percent for vacant sites properties. This difference is generally due to the harder taxpayer identification and billing processes of vacant sites properties and therefore cadastral and collection policies should be jointly considered and applied. Furthermore, the estimations applied to all Brazilian municipalities performed in Chapter 6 found a median collection of 43 percent in Brazil, being 75 percent, 57 percent and 36 percent in municipalities of Strata 1, 2 and 3, respectively. Conclusively, the collection ratios estimated by this study revealed a great disparity amongst municipalities with different level incomes. Therefore, the implementation of collection strategies should focus mainly on lower income municipalities.

Amongst various policies that facilitate compliance, the study verified that only 17 amongst 40 selected municipalities (13 cases in Stratum 1) provide the financial facility of automatic direct debit of the tax installments on taxpayers' banking accounts or credit cards, which greatly reduces the compliance costs to taxpayers and the risk of delinquency to tax administration. Instead, as the main compliance policy applied, all selected municipalities have encouraged advanced lump-sum payments, granting an average 10 percent discount on the original tax levied. However, there were five municipalities (four cases in Stratum 3) where this discount reaches 20-30 percent. Indeed, the literature discussed in Chapter 2 highlights that this policy may be deleterious, since taxpayers end up viewing property taxes as a lump-sum annual tax that has to be paid from a monthly income, which also enhances the political fallout of the tax increases caused by a tax reform. On the other hand, Brazilian tax administrations have claimed that such policy reduces compliance and administrative costs and permits a better planning of the municipal payments throughout the year. Therefore, this study recommends that municipal

tax administration may still grant a small discount for advance lump-sum payments. However, the possibility of payment in many installments through credit cards or automatic direct debits should also be provided.

Despite being the most common enforcement instrument applied in developing countries, STF was judged unconstitutional to restrict the transfer or sales of properties in arrears in Brazil (STF, 2009). In addition, despite being legal and proving more effective to enforce property tax in a less costly and time-consuming way, the inclusion of delinquent taxpayers on both the national blacklist registers of SPC and *Serasa Experian* was applied in only 12 amongst 40 selected municipalities (9 cases in Stratum 1), while none of selected municipalities outsourced the tax arrears recovery to financial institutions. Indeed, this study found that amongst the policies that enforce property tax, the costly, time-consuming and generally ineffective tax liens were the only effective enforcement instrument applied in 28 amongst 40 selected municipalities.

Again, these alternative enforcement policies have not been widely applied, due to lack of fiscal culture, political costs, administrative infrastructure and skilled tax officials. Therefore the federal and state governments could advertise and promote training for tax officials related to the legal changes and administrative practices of collection strategies, and should encourage the blacklisting of delinquent taxpayers and the outsourcing of tax arrears recovery when municipalities do not have the administrative capacity. This outsourcing could be regulated, for instance, by the enactment of a property tax act or other legislation.

Thus, this study notes that the main challenges related to the property tax collection are:

- a) The indicators of property tax collection rates are most diverse amongst Brazilian municipalities, being generally over 80 percent in large and high income municipalities and under 50 percent in smaller and low income municipalities;
- b) During the processes of cadastral updates, municipal governments generally focus on the update of property-related information and overlook the update of taxpayers' personal information that has a high impact on collection;
- c) Arrangements and agreements with third-party registers are often not performed to update the taxpayer's personal information. Example of these registers are: other governmental cadasters, the consumer register of telecommunications, electricity and water supply companies, the ownership registers of local notaries and client registers of banks and other financial institutions, including the national black lists managed by SPC and *Serasa Experian*;
- d) In 2009, STF was judged unconstitutional in Article 1 of Federal Law 7,711 of 1988 that determined the need for a tax clearance certificate to register a property sale or transfer. Therefore, municipalities cannot restrict the sales of properties in arrears;
- e) Based on the analysis of the selected 47 municipalities, it can be assumed that few municipalities have used alternatives and lower costly instruments to enforce property tax, such as taxpayer blacklisting or arrears outsourcing;

- f) Seizure and subsequent public auction of property in arrears is legally permitted in Brazil. However, this is a time-consuming and administratively expensive instrument that must be carried out only in the final part of a tax lien;
- g) Areas registered as vacant sites on fiscal cadasters may be occupied by informal or irregular settlements. Therefore property tax is not correctly billed due to the assignment of legal and often outdated landowners as taxpayers. In addition, the overall collection rate in smaller municipalities may be greatly impacted since vacant sites often represent a meaningful share of the total tax levied.

Thus, the recommendations at national level to establish the collections policies would cover:

- a) The Fiscal Responsibility Law could introduce a national register of delinquent taxpayers to be used by all tiers of governments, state-owned companies and banks, amongst other entities;
- b) The property tax act or the Fiscal Responsibility Law could make mandatory the delinquent taxpayers' notice of dishonor (*Protesto*) and inclusion in all black lists run by governmental and private sectors, including SPC and *Serasa Experian*;
- c) The property tax act or the Fiscal Responsibility Law could regulate the arrangements and agreements of information sharing between governments, local notaries and other agencies and entities;
- d) Federal or state government agencies should provide professional training and refresher programs for municipal officers related to the legal changes and administrative practices of tax collection.

Regardless of any property tax reform that may occur at national level, the recommendations at municipal level to establish the collection policies would cover:

- a) Some proposals that could be established by a property tax act could also be imposed by municipal legislation. For example: a) the agreements with notaries and other entities to update taxpayer information; b) the establishment of a local list of delinquent taxpayers; c) the introduction and regulation of tax arrears outsourcing; and d) the mandatory blacklisting and/or notice of dishonor (*Protesto*) of delinquent taxpayers on SPC and *Serasa Experian* registers;
- b) Municipal governments should always implement cadastral and collection policies as an integrated collection-lead strategy, since the taxpayers' personal information is a crucial element of an efficient collection system;
- c) Municipal governments could permit the property tax payment in 10-12 installments through payment instruments that minimize both compliance costs and delinquency risk (e.g. credit cards and automatic direct debits);

- d) Municipal governments should make taxpayers' services available on the internet. Due to the costs in smaller municipalities, private companies could design these online platforms and the procurement process could be performed by inter-municipal corporations;
- e) Municipal governments should update the landowners' personal information (especially on vacant sites) through agreements with the local notaries (that register the information of sales), and the federal government (that runs the rural fiscal cadaster). Finally, property seizure and auction should be performed if the taxpayer is still unknown.

7.3 The Significance of the Study and its Contribution to the Knowledge

This study confirmed many statements regarding the current literature knowledge about property taxation, as well as many conclusions of the previous studies related to property taxation in Brazil. However, it also provides new contributions to the current knowledge and highlights issues that have been overlooked by many studies. It also highlights new property tax policies that complement the existing ones that can be applied in other countries, especially developing countries.

Section 1.5 of Chapter 1 states that the study's main contribution to the existing knowledge is to provide an integrated analysis of all property tax performance determinants in Brazil for the first time. In addition, it was stated that this study's aim was to include another five contributions to the existing knowledge: a) improving and adapting the traditional property tax model of ratios of Bahl, which includes the estimation of property tax performance elements with available data; b) discussing policies, schemes and methods of valuation to be applied to Brazil and other developing countries; c) demonstrating the causes of the great property tax performance disparity amongst Brazilian municipalities; d) emphasizing the role of property tax administration to effective land value capture instruments; and e) bringing to Brazil's academic debate some overlooked topics of property taxation, such as the impact of exemptions, taxation level and collection rate in property tax performance.

Firstly, in order to apply the property tax model of ratios in the Brazilian municipalities, this study developed a method to estimate one of its six variables that has been calculated as a residual in the model: the ratio of property market values to GDP. The study explored the relationship between this ratio, the level of GDP and household income. Thus, in dormitory and holiday municipalities that generally have lower production compared with higher household income, this ratio tends to be higher than in the rest of the country. In contrast, in more industrialized jurisdictions with higher production and lower household income, this ratio tends to be lower. In addition, the study simplified the original model of ratios by joining two variables, assessment ratio and taxation level, into a single variable named "taxation on market values". Therefore, the simplified model under an estimated ratio of property market values to GDP permits its wider use, since an unknown variable can be more easily estimated as a residual variable, which can be useful in scenarios with a lack of data.

Indeed, as previously stated at the beginning of this chapter, similar to the potential found by this research (0.8-1.13 percent of GDP), two previous studies estimated property tax potential in Brazil as being between 0.8 percent and 1.2 percent of GDP. However, the models of Orair

and Albuquerque (2016) and De Cesare *et al* (2014) estimated the revenue potential in Brazil without the estimation of the performance determinants, since these models established municipal socioeconomic indicators as proxies of tax base size and administrative capacity. Therefore, their recommendations related to the fiscal cadasters, assessment/taxation and collection were limited. De Cesare *et al* (2014) developed a second approach based on a model of ratios in a sample 28 Brazilian municipalities. However, this study assumed 100 percent level of coverage, assessment and collection as being a potential scenario, while tax rate was a stable variable. Therefore, estimation based on diverse and stratified levels of coverage, taxation on market values and collection could not be performed.

Secondly, it is well known that some valuation rolls in Brazil are very out of date under an antique year basis adjusted by the official inflation index for many years. The cost approach has been the method of valuation adopted by most Brazilian municipalities, where land zones and construction costs are separately assessed. This study revealed that assessed values of both land values and construction costs have been outdated under many local valuation rolls. However, *Sinduscom* releases the CUB Index (cost of new constructions) monthly that could be easily linked to the construction costs in the valuation rolls. In addition, land values could be estimated using the residual approach method through data of property adverts (as performed by the Fipezap Index), and through registers of sales in the notaries and housing credit banks.

Indeed, despite the valuation shortcomings in Brazil, the experience in using an inflation adjusted cost approach method of valuation, where the valuation rolls only contain land zones and construction costs, rather than each property being individually assessed, can be convenient for certain developing countries with administrative and legal challenges related to property valuation (e.g. Egypt, India). This is because: a) the cost approach method is more transparent and minimizes appeals and corruption; b) the inflation is often higher in developing countries and the assessment indexation would avoid the tax base erosion; c) the accurate data of construction costs may be provided by the construction industry; and d) this method of valuation easily permits the valuation and taxation of new properties, without the need of supplementary valuation rolls, since the method only demands the type of construction and land zone location.

Thirdly, the study evidences the low collection rates in smaller Brazilian municipalities, which probably also occurs in other jurisdictions of developing countries. The low assessment ratios and the infrequent revaluations have been indicated by previous studies as the main cause of the low property tax performance in Brazil. The previous studies that have yielded this conclusion were mainly performed in large municipalities that present good levels of collection. Indeed, this study verified that valuation shortcomings are a common challenge amongst most of the Brazilian municipalities. However, it reveals that the verified disparities (for example, amongst Northern and Southern municipalities or high and low income municipalities) of property tax revenues indicators (e.g., revenues *per capita*, per GDP or per municipal revenues) are mainly caused by the collection rates disparity. Indeed, the property coverage and tax rates did not meaningfully vary according to the estimations of this study. However, besides the challenges in tax administration and enforcement policies, this study

revealed that the cadastral shortcomings in taxpayer identification and in informal settlements registration have contributed to the collection level. Poorer jurisdictions often have a great share of their property tax base composed of rural properties, urban vacant sites and informal properties that have harder taxpayer identification, billing and collection. Therefore, cadastral and collection reforms should be integrated and implemented together in developing countries.

Fourthly, the popular land based instruments and the progressive tax rates of property taxation tend to not fully achieve their main objectives – namely land development and tax fairness. This is because both instruments have complex administration and demand accurate cadasters, valuations and tax collection. Therefore, the common administrative shortcomings found in many property tax systems of developing countries greatly mitigate the impact of these well designed and righteous tax policies. The study asserts that a revenue bias property tax system that efficiently generates revenues to be allocated amongst the poor would have greater distributive impact than ineffective land based instruments and progressive property tax systems.

Finally, this study also provided contributions and highlighted issues that have been overlooked by previous Brazilian studies, including the role of exemption level, taxation level and collection rate. Due to the wide local autonomy in establishing property tax policies, the exemptions and tax rates levels also have the potential to greatly impact the local property tax performance, as verified in some municipalities of this study. In the 47 selected municipalities, this study revealed 10 cases where more than one fifth of the registered properties are property tax exempted and 11 cases where the taxation on total assessed values is lower than 0.55 percent. In addition, this study concludes that tax rates should always be redesigned after a revaluation reform, to better graduate the tax burden impact and should have certain levels of buoyancy to permit better management of the budgetary needs. Therefore, despite being overlooked in many studies of property taxation in Brazil, exemptions and tax rates levels should also be taken into account on Brazil's reform agenda.

In relation to the collection policies three points were highlighted. The first point is that this study asserts that alternative means to enforce property tax payment, rather than the costly and time-consuming tax liens, have been effective in improving collection rates. Indeed, 9 amongst 12 selected municipalities that reported the placement of delinquent taxpayers on the Brazilian black list registers of *Serasa Experian* and SPC, had collection rates of over 80 percent amongst built upon properties. For the second point, this study verified that 4 amongst 9 selected small municipalities grant up to 20-30 percent discount for anticipated property tax payment. Therefore, property tax may be viewed by taxpayers as an annual tax that has to be fully paid from a monthly income. Despite the assumed reduction in administrative and compliance costs, such a policy enhances the political fallout of revaluations and tax reforms that increase tax burden. Thus, this study concludes that the culture of payment in installments with financial instruments that avoid delinquency must be encouraged. Under the last point, smaller municipalities have a greater share of urban vacant sites in their tax base composition, which renders collection and enforcement to be a harder task. Therefore, as low collection ratios have occurred in smaller municipalities, an integrated cadastral and collection reform should be the first point on the reform agenda in most

Brazilian municipalities. Thus, the future studies should also take into account the differences amongst Brazilian municipalities, in order to make assumptions and recommendations.

7.4 Reflections, Proposals of Additional Research and Final Conclusions

The great autonomy of Brazilian municipalities in managing their own property tax systems can be viewed as positive and an attribute to be preserved in the country. Since the enactment of the Fiscal Responsibility Law in 2000, municipalities have to publish several public finance reports, including the information on the property taxes collected. However, there is no legal requirement for publishing administrative reports that includes the number of registered properties, and the tax levied and collected amongst other relevant information that was catalogued by the questionnaires in the 47 selected municipalities. This data would permit a better analysis of Brazil's entire property tax system and would assist in establishing the federal government policies to strengthen municipal property taxation.

In areas where property taxes are less well accepted in Brazil, such as in small municipalities or in municipalities located in the Northern and Northeastern Regions, the understanding and acceptability of a well-functioning property tax system by the taxpayers is crucial to improve performance. The taxpayers should be aware of the importance of property tax in contributing to the locally generated revenue, the provision of public goods and the sense of citizenship. Unlike many other countries where property taxes are viewed as a more individual benefit-tax or a property-related tax, the Brazilian Constitution states that 45 percent of the revenues of municipal taxes must be linked to public education and health expenses. However, it is still recommended that the property taxes be advertised as a community benefit tax that funds social expenses in education and health, as well as in urban infrastructure.

This study examined many issues of property taxation in Brazil, highlighting its complex administration and the disparities amongst municipalities with different levels of population, income, or regional location. Most Brazilian property tax studies have mainly focused on land and housing policies, on distributive issues, and on the analysis of revenue indicators. In addition, most of studies have had the intention to provide general guidelines to be applied nationally, and equally applied to all municipal governments. This study demonstrates that this topic is much more complex than it was initially thought to be.

Indeed, further research needs to be conducted on more case studies, since it was noted that, despite their data stratification, each one of the 47 selected municipalities had its own specificities and particulars in relation to property taxation. Therefore there is no general prescription to be recommended to all municipalities. Unlike many previous Brazilian studies that merely explored one or a few topics of tax administration, this research attempted to analyze all six of the main elements indicated by the literature to impact property tax performance, i.e. tax base extension, fiscal cadasters, valuations, exemptions, tax rates and collection. Therefore, these elements should always be approached together in any future studies. The questionnaires did reveal that other points can be explored in subsequent research, such as the effective results of recent cadastral, valuation or collection-lead reforms performed by the municipalities. This research may also include the more

intensive use of the recent new enforcement instruments allowed by legislation, such as tax arrears outsourcing or the blacklisting of taxpayers.

Upgrading the questionnaires with more recent data as well as expanding the roll of selected municipalities are other possibilities for follow-up research that can be performed. Many important large Brazilian municipalities and state capitals did not reply to the questionnaire remittance, even after many attempts. These include Belém, São Luís, Natal, Maceió, Campo Grande, Porto Velho and Florianópolis, amongst others. However, from 2017, new tax administrations may become more open to providing data and information, due to the municipal elections occurred in October of 2016, combined with a recent scenario of municipal budget crisis that has strengthened the discussions on how to increase own municipal tax revenues.

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ANNEXURE A

INTERNATIONAL INDICATORS OF PROPERTY TAXATION



Table A1: Countries' property tax valuation methods

| Region | Land Value | Capital Value | Improvements | Rental Value | Area-based or flat rate |
|------------------------------------|--|--|--|--|--|
| Africa | Kenya (1) | Botswana, Lesotho, Malawi, Mauritius, Nigeria, South Africa, Zambia, Zimbabwe (9) | Egypt, Ghana, Mozambique, Sierra Leone, Tanzania (4) | Congo, Gambia, Guinea, Ivory Coast, Mauritius, Morocco, Nigeria, Tunisia, Uganda (9) | Burundi, Congo DR, Cameroon, Eritrea, Ethiopia, Kenya, Lesotho, Namibia, Nigeria, Rwanda, Tanzania, Tunisia, Zambia, Zimbabwe (14) |
| Caribbean | Bahamas, Barbados, Belize, Jamaica, Montserrat (5) | Bahamas, Barbados, Grenada, Guyana, Montserrat, St Lucia (6) | (0) | Antigua, Belize, Bermuda, Guyana, Montserrat, St Kitts, St Lucia, St Vincent, Trinidad (9) | Dominica, St Kitts, St Lucia, St Vincent, Trinidad (5) |
| Asia | Rep Korea, Taiwan, Thailand (3) | Cambodia, China, Indonesia, Japan, Malaysia, Philippines, (6) | Philippines, Rep Korea (2) | Brunei, China, Honk Kong, India, Macau, Malaysia, Nepal, Pakistan, Pakistan, Singapore, Sri Lanka, Thailand (12) | Brunei, China, India, Kirgizstan, Lao, Vietnam, Tajikistan, Uzbekistan (8) |
| Oceania | Australia, Fiji, New Zealand, Papua New Guinea, Solomon, Vanuatu (6) | Australia, New Zealand (2) | (0) | Australia, New Zealand, Tuvalu, Vanuatu (4) | |
| Western and Southern Europe | (0) | Austria, Cyprus, Denmark, Finland, Germany, Greece, Ireland, Iceland, Italy Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom (18) | (0) | Belgium, France, Ireland, Italy, Switzerland, United Kingdom (6) | Greece, Israel (2) |
| Eastern Europe | Estonia (1) | Bulgaria, Croatia, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Montenegro, Serbia, Slovenia, Romania, Russia (14) | (0) | Bulgaria, Georgia (2) | Albania, Armenia, Azerbaijan, Belarus, Bosnia, Czech Rep, Georgia, Hungary, Lithuania, Moldova, Poland, Slovakia, Ukraine (12) |
| Americas | Chile, Mexico (2) | Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Ecuador, Honduras, Nicaragua, Paraguay, Peru, Dominican Rep, USA, Uruguay, Venezuela (16) | Chile (1) | (0) | (0) |
| Total | 18 | 70 | 7 | 43 | 40 |

Data source: Almy (2014) and McCluskey and Bell (2008), except: UN-Habitat (2013, p.46-51) for Belgium, Bulgaria, Cambodia, Croatia, Finland, Hungary, Luxembourg, Norway, Portugal, Romania and Vietnam; Nzewanga (2009) for Congo; Varanyuwatana (2004) for Thailand; Slack and Bird (2014) to Greece, Italy and Ireland; Muller (2011, p.80) to Bosnia, Macedonia, Montenegro and Serbia; and Lincoln Institute of Land Policy (2015) for Latin American countries.



Table A2: Countries' recurrent taxes on immovable properties per GDP (in percentage)

| Latin America | 2010 | 2011 | 2012 | 2013 | 2014 | Others Developing | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------------------------|-------------|-------------|-------------|-------------|-------------|--------------------------|-------------|-------------|-------------|-------------|-------------|
| • Argentina | 0.28 | 0.32 | 0.36 | 0.41 | 0.39 | • Cambodia | n.a. | n.a. | 0.17 | 0.10 | 0.10 |
| • Brazil | 0.43 | 0.43 | 0.44 | 0.44 | 0.44 | • China | 0.47 | 0.49 | 0.55 | 0.58 | n.a. |
| • Bolivia | 0.75 | 0.52 | 0.42 | n.a. | n.a. | • Egypt | 0.04 | 0.02 | n.a. | n.a. | n.a. |
| • Chile | 0.50 | 0.60 | 0.61 | 0.60 | 0.65 | • India | 0.20 | n.a. | n.a. | n.a. | n.a. |
| • Colombia | 0.58 | 0.60 | 0.59 | 0.70 | 0.90 | • Indonesia | 0.44 | 0.40 | 0.35 | 0.28 | 0.23 |
| • Costa Rica | 0.22 | 0.23 | 0.25 | n.a. | n.a. | • Jamaica | 0.22 | 0.20 | 0.19 | 0.38 | 0.46 |
| • Domin. Rep | 0.03 | 0.03 | 0.03 | 0.06 | n.a. | • Morocco | 0.40 | 0.37 | 0.37 | n.a. | n.a. |
| • Ecuador | 0.11 | n.a. | n.a. | n.a. | n.a. | • Mongolia | 0.16 | 0.15 | 0.15 | 0.25 | n.a. |
| • El Salvador | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | • Nepal | 0.04 | n.a. | n.a. | n.a. | n.a. |
| • Guatemala | 0.19 | 0.17 | 0.19 | 0.18 | 0.18 | • Philippines | 0.35 | 0.35 | 0.39 | n.a. | n.a. |
| • Honduras | 0.74 | 0.68 | 0.61 | 0.63 | 0.68 | • South Africa | 1.08 | 1.07 | 1.09 | 1.16 | 1.29 |
| • Mexico | 0.19 | 0.20 | 0.20 | 0.20 | n.a. | • Thailand | 0.25 | 0.17 | 0.20 | 0.20 | 0.20 |
| • Nicaragua | 0.22 | 0.21 | 0.20 | n.a. | n.a. | • Tunisia | 0.10 | 0.06 | 0.07 | n.a. | n.a. |
| • Panama | 0.41 | 0.35 | 0.33 | 0.42 | n.a. | • Turkey | 0.24 | 0.27 | 0.29 | 0.27 | 0.36 |
| • Paraguay | 0.25 | 0.28 | 0.30 | 0.78 | n.a. | • Uganda | 0.50 | n.a. | n.a. | n.a. | n.a. |
| • Peru | 0.17 | 0.18 | 0.19 | 0.21 | 0.21 | • Total (mean) | 0.32 | 0.32 | 0.35 | 0.40 | 0.44 |
| • Uruguay | 0.81 | 0.76 | 0.74 | 0.66 | 0.67 | Transitional | | | | | |
| Total (mean) | 0.37 | 0.37 | 0.36 | 0.44 | 0.52 | • Albania | 0.16 | 0.15 | 0.19 | 0.14 | 0.22 |
| Western Europe | | | | | | • Azerbaijan | 0.35 | 0.29 | 0.27 | 0.30 | 0.32 |
| • Austria | 0.23 | 0.23 | 0.22 | 0.23 | 0.24 | • Belarus | 0.43 | 0.34 | 0.36 | 0.41 | 0.39 |
| • Belgium | 1.24 | 1.26 | 1.24 | 1.29 | 1.32 | • Bosnia | n.a. | 0.28 | 0.30 | 0.34 | 0.36 |
| • Cyprus | 0.56 | 0.47 | 0.39 | 0.31 | 0.49 | • Bulgaria | 0.27 | 0.30 | 0.31 | 0.33 | 0.33 |
| • Denmark | 1.34 | 1.36 | 1.33 | 1.39 | 1.41 | • Croatia | 0.00 | 0.00 | 0.00 | 0.44 | n.a. |
| • Finland | 0.63 | 0.61 | 0.64 | 0.68 | 0.74 | • Czech Rep. | 0.22 | 0.21 | 0.24 | 0.24 | 0.22 |
| • France | 2.37 | 2.40 | 2.48 | 2.55 | 2.58 | • Estonia | 0.35 | 0.31 | 0.33 | 0.31 | 0.30 |
| • Germany | 0.44 | 0.43 | 0.44 | 0.44 | 0.34 | • Georgia | 0.92 | 0.91 | 0.88 | 0.86 | 0.84 |
| • Greece | 0.20 | 0.36 | 0.42 | 0.43 | 1.75 | • Hungary | 0.34 | 0.37 | 0.45 | 0.64 | 0.60 |
| • Iceland | 1.76 | 1.67 | 1.64 | 1.67 | 1.61 | • Kazakhstan | 0.71 | 0.61 | 0.59 | 0.55 | 0.49 |
| • Ireland | 0.80 | 0.77 | 0.85 | 0.78 | 0.73 | • Kyrgyzstan | 0.76 | 0.59 | 0.56 | 0.58 | 0.56 |
| • Italy | 0.60 | 0.60 | 1.47 | 1.25 | 1.24 | • Latvia | 1.00 | 0.98 | 0.95 | 0.92 | 1.00 |
| • Luxembourg | 0.80 | 0.74 | 0.73 | 0.76 | 0.69 | • Lithuania | 0.34 | 0.29 | 0.26 | 0.25 | 0.27 |
| • Malta | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | • Poland | 1.16 | 1.14 | 1.22 | 1.19 | 0.87 |
| • Netherlands | 0.59 | 0.60 | 0.63 | 0.65 | 0.65 | • Romania | 0.43 | 0.42 | 0.40 | 0.38 | 0.62 |
| • Norway | 0.33 | 0.33 | 0.34 | 0.35 | 0.43 | • Russia | 1.18 | 0.97 | 1.11 | 1.17 | 1.18 |
| • Portugal | 0.62 | 0.69 | 0.68 | 0.80 | 0.85 | • Serbia | 0.42 | 0.41 | 0.44 | n.a. | n.a. |
| • Spain | 0.87 | 0.92 | 1.04 | 1.06 | 1.18 | • Slovakia | 0.41 | 0.41 | 0.44 | 0.45 | 0.44 |
| • Sweden | 0.75 | 0.75 | 0.78 | 0.81 | 0.81 | • Slovenia | 0.48 | 0.48 | 0.52 | 0.55 | 0.52 |
| • Switzerland | 0.16 | 0.16 | 0.16 | 0.17 | 0.16 | • Ukraine | 0.80 | 0.75 | 0.81 | 0.23 | 0.20 |
| • United Kingdom | 3.20 | 3.17 | 3.19 | 3.19 | 3.11 | • Uzbekistan | n.a. | n.a. | 0.70 | 0.70 | 0.64 |
| Total (mean) | 0.87 | 0.88 | 0.93 | 0.94 | 1.02 | • Total (mean) | 0.54 | 0.49 | 0.52 | 0.52 | 0.52 |
| Others Developed | | | | | | • New Zealand | 2.05 | 2.04 | 2.01 | 1.92 | 1.90 |
| • Australia | 1.28 | 1.27 | 1.29 | 1.31 | 1.33 | • Singapore | 0.85 | 1.12 | 1.04 | 1.12 | 1.13 |
| • Canada | 3.01 | 2.87 | 2.84 | 2.78 | 2.69 | • Taiwan | 0.86 | 0.86 | 0.85 | 0.88 | 0.85 |
| • Honk Kong | 0.58 | 0.59 | 0.65 | 0.81 | n.a. | • United States | 2.96 | 2.86 | 2.77 | 2.69 | 2.63 |
| • Israel | 2.25 | 2.24 | 2.18 | 2.14 | 2.06 | • Total (mean) | 1.67 | 1.67 | 1.65 | 1.65 | 1.71 |
| • Japan | 2.13 | 2.16 | 2.08 | 2.05 | 2.03 | | | | | | |
| • Korea Rep | 0.73 | 0.73 | 0.75 | 0.76 | 0.79 | | | | | | |

Data Source: IMF (2015) and OECD (2015) except: Argentina (MECON, 2015); Brazil (STN, 2015); Dominican Rep (Dominican's Rep Tax Department); Bolivia, Costa Rica, Ecuador and Nicaragua (De Cesare, 2017); India (Prakash, 2013, p.26); Nepal (Pandey, Chhetri and Baskota, 2013); Philippines (Aguilar, 2014); Uganda (Olima, 2010a); and Tawan (MOF, 2015).



Table A3: Countries' local recurrent taxes on immovable properties per local revenues (in percentage)

| | 2010 | 2011 | 2012 | 2013 | 2014 | | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------------------------|------|------|------|------|------|-----------------------|-------------|-------------|-------------|-------------|-------------|
| Latin America | | | | | | | | | | | |
| • Brazil | 5.2 | 5.0 | 4.9 | 5.0 | 5.4 | • Paraguay | 22.9 | 21.3 | 16.3 | 43.7 | n/a |
| • Colombia | 8.9 | 9.5 | 6.7 | 7.1 | 11.3 | • Peru | 4.6 | 4.4 | 4.1 | 4.8 | 5.0 |
| • Honduras | 32.5 | 26.4 | 26.0 | 22.6 | 28.7 | • Total (mean) | 14.1 | 12.9 | 11.6 | 16.6 | 12.6 |
| • Mexico | 10.3 | 10.9 | n/a | n/a | n/a | | | | | | |
| Other Developing | | | | | | | | | | | |
| • Cambodia | n/a | n/a | 12.9 | 7.7 | 7.1 | • Philippines | 10.9 | 10.7 | 11.5 | n/a | n/a |
| • China | 1.9 | 1.9 | n/a | n/a | n/a | • South Africa | 14.6 | 13.3 | 12.2 | 14.8 | 15.8 |
| • India | 3.1 | n/a | n/a | n/a | n/a | • Thailand | 7.0 | 4.1 | 4.5 | 4.4 | 4.4 |
| • Indonesia | 6.7 | 5.7 | 4.7 | 3.7 | 2.9 | • Tunisia | 5.3 | 2.9 | 3.3 | n/a | n/a |
| • Morocco | 9.4 | 8.3 | 8.0 | n/a | n/a | • Turkey | 5.7 | 6.3 | 6.6 | 5.9 | 8.5 |
| • Mongolia | 9.6 | 7.3 | 6.3 | 2.3 | n/a | • Uganda | 14.0 | n/a | n/a | n/a | n/a |
| • Nepal | 7.0 | n/a | n/a | n/a | n/a | • Total (mean) | 7.9 | 6.7 | 7.8 | 6.5 | 7.7 |
| Transitional | | | | | | | | | | | |
| • Albania | n/a | n/a | n/a | 3.8 | 5.0 | • Latvia | 6.1 | 6.7 | 6.9 | 6.8 | 7.3 |
| • Belarus | 2.5 | 2.1 | 2.1 | 2.2 | 2.2 | • Lithuania | 3.0 | 3.0 | 2.9 | 3.1 | 3.2 |
| • Bosnia | n/a | 6.0 | 7.0 | 8.6 | 8.1 | • Poland | 8.2 | 8.4 | 9.3 | 9.0 | 6.6 |
| • Bulgaria | 3.6 | 4.3 | 4.4 | 3.9 | 3.6 | • Romania | 4.5 | 4.3 | 4.3 | 4.0 | 4.0 |
| • Croatia | 0.0 | 0.0 | 0.0 | 9.1 | n/a | • Russia | 3.5 | 2.1 | 2.7 | 2.7 | 3.1 |
| • Czech Rep. | 2.1 | 2.1 | 2.6 | 2.5 | 2.3 | • Serbia | 5.7 | 5.6 | 5.2 | n/a | n/a |
| • Estonia | 3.4 | 3.2 | 3.4 | 3.2 | 3.4 | • Slovakia | 6.4 | 6.3 | 6.9 | 6.7 | 6.5 |
| • Georgia | 12.4 | 12.8 | 12.6 | 13.9 | 14.1 | • Slovenia | 5.0 | 5.1 | 5.4 | 5.8 | 5.3 |
| • Hungary | 2.6 | 2.7 | 4.1 | 4.1 | 4.2 | • Ukraine | 5.5 | 5.4 | 5.1 | 1.5 | 1.4 |
| • Kazakhstan | 5.1 | 4.9 | 4.8 | 4.9 | 5.1 | • Uzbekistan | 5.8 | 5.5 | 5.2 | 5.8 | 5.5 |
| • Kyrgyzstan | 11.1 | 7.9 | 7.4 | 9.8 | 13.9 | • Total (mean) | 5.1 | 4.9 | 5.1 | 5.6 | 5.5 |
| Western Europe | | | | | | | | | | | |
| • Austria | 2.5 | 2.5 | 2.4 | 2.4 | 2.8 | • Italy | 3.9 | 4.1 | 9.7 | 8.4 | 8.4 |
| • Belgium | 17.0 | 17.1 | 17.0 | 17.2 | 18.2 | • Netherlands | 3.9 | 4.0 | 4.3 | 4.7 | 4.8 |
| • Cyprus | 12.5 | 12.0 | 12.1 | 18.6 | 16.2 | • Norway | 2.3 | 2.3 | 2.4 | 2.4 | 2.9 |
| • Denmark | 3.7 | 3.7 | 3.6 | 3.7 | n/a | • Portugal | 9.5 | 10.4 | 10.8 | 11.4 | 13.4 |
| • Finland | 2.8 | 2.8 | 2.9 | 2.9 | 3.2 | • Spain | 13.6 | 15.4 | 17.0 | 16.8 | 18.5 |
| • France | 20.1 | 20.5 | 21.0 | 21.6 | 22.3 | • Sweden | 1.7 | 1.6 | 1.7 | 1.6 | 1.6 |
| • Germany | 5.8 | 5.6 | 5.7 | 5.6 | 4.3 | • Switzerland | 0.8 | 0.8 | 0.8 | 1.7 | n/a |
| • Greece | 7.5 | 6.3 | 6.7 | 6.7 | 6.9 | • Unit. Kingdom | 12.7 | 13.3 | 13.0 | 14.3 | 14.3 |
| • Iceland | 14.8 | 13.2 | 12.9 | 12.8 | 12.6 | • Total (mean) | 8.3 | 8.5 | 9.1 | 9.6 | 10.7 |
| • Ireland | 14.5 | 16.5 | 19.9 | 19.9 | 20.3 | | | | | | |
| Others Developed | | | | | | | | | | | |
| • Australia | 35.6 | 36.9 | 35.4 | 36.4 | 37.7 | • New Zealand | 51.3 | 52.0 | 49.4 | 48.8 | 49.8 |
| • Canada | 32.8 | 33.5 | 34.9 | 34.7 | 34.7 | • Taiwan | 24.1 | 24.3 | 25.3 | 25.5 | 24.1 |
| • Israel | 39.5 | 38.6 | 38.3 | 37.8 | 37.5 | • United States | 27.1 | 26.6 | 27.7 | 26.4 | 26.9 |
| • Japan | 13.5 | 12.9 | 12.6 | 12.2 | n/a | • Total (mean) | 28.7 | 28.8 | 28.6 | 28.4 | 30.7 |
| • Rep. of Korea | 5.4 | 5.6 | 5.1 | 5.1 | 4.3 | | | | | | |

Data Source: IMF (2015) and OECD (2015), except: Brazil (STN, 2015); India (Prakash, 2013, p.26); Nepal (Pandey *et al*, 2013); Philippines (Aguilar, 2014); Uganda (Olima, 2010a); Taiwan (MOF, various years); and United States (U.S. Census Bureau, various years). Despite property tax being levied by two tiers of government in Australia, Greece, Russia, Sweden, Ukraine and the United Kingdom, the displayed ratios just cover the local tax.



Table A4: Countries' local, state, and subnational revenues per GDP; and local grants per local revenues (2013, in percentage)

| | Revenues per GDP | | | Grants per Revenues | | Revenues per GDP | | | Grants per Revenues |
|-------------------------------|------------------|-------|---------|---------------------|---------------------|------------------|-------------|------------|---------------------|
| | Local | State | Subnat. | | | Local | State | Subnat. | |
| Developing Countries | | | | | | | | | |
| Afghanistan | 0.4 | n/a | n/a | 19 | Kenya | 0.6 | n/a | n/a | 14 |
| Argentina | 3.3 | 13.6 | n/a | 53 | Malawi | 1.2 | n/a | n/a | 85 |
| Brazil | 8.0 | 12.5 | 17.5 | 69 | Mongolia | 9.8 | n/a | n/a | 59 |
| Cambodia | 1.3 | n/a | n/a | 34 | Morocco | 4.4 | n/a | n/a | 64 |
| Chile | 3.2 | n/a | n/a | 48 | Paraguay | 1.8 | 0.6 | 2.4 | 43 |
| China | 27.4 | n/a | 27.4 | 35 | Peru | 4.3 | 4.1 | 8.4 | 79 |
| Colombia | 9.8 | 4.1 | 13.9 | 61 | South Africa | 7.7 | 11.9 | 19.4 | 32 |
| Costa Rica | 1.2 | n/a | n/a | 15 | Tanzania | 6.9 | n/a | n/a | 91 |
| El Salvador | 2.4 | n/a | n/a | 53 | Thailand | 4.6 | n/a | n/a | 63 |
| Honduras | 2.8 | n/a | n/a | 63 | Tunisia | 2.1 | n/a | n/a | 76 |
| India | n/a | 9.6 | n/a | n/a | Turkey | 4.6 | n/a | n/a | 61 |
| Indonesia | 7.6 | n/a | n/a | 75 | Uganda | 3.0 | n/a | n/a | 96 |
| Jordan | 2.1 | n/a | n/a | 2 | Total (mean) | 5.0 | 8.5 | n/a | 54 |
| Transitional Countries | | | | | | | | | |
| Albania | 3.7 | n/a | n/a | 76 | Kyrgyzstan | 5.9 | n/a | n/a | 41 |
| Armenia | 2.4 | n/a | n/a | 51 | Latvia | 13.6 | n/a | n/a | n/a |
| Azerbaijan | 0.04 | 0.6 | 0.6 | 25 | Lithuania | 8.0 | n/a | n/a | 88 |
| Belarus | 18.7 | n/a | n/a | 30 | Moldova | 9.4 | n/a | n/a | 48 |
| Bulgaria | 8.7 | n/a | n/a | n/a | Poland | 13.2 | n/a | n/a | 55 |
| Bosnia | 4.0 | n/a | n/a | 6 | Romania | 9.4 | n/a | n/a | 82 |
| Czech Rep. | 9.5 | n/a | n/a | 36 | Russia | 8.9 | 15.5 | 18.0 | 55 |
| Croatia | 4.8 | n/a | n/a | 13 | Serbia | 7.9 | n/a | n/a | 26 |
| Estonia | 9.5 | n/a | n/a | n/a | Slovakia | 6.7 | n/a | n/a | 33 |
| Georgia | 6.2 | n/a | n/a | 64 | Slovenia | 9.5 | n/a | n/a | n/a |
| Hungary | 10.1 | n/a | n/a | n/a | Ukraine | 15.0 | n/a | n/a | n/a |
| Kazakhstan | 9.5 | n/a | n/a | 59 | Total (mean) | 8.5 | 8.1 | n/a | 42 |
| Developed Countries | | | | | | | | | |
| Australia | 2.5 | 13.3 | 15.6 | 16 | Japan | 16.6 | n/a | n/a | 45 |
| Austria | 8.5 | 9.3 | 16.9 | 63 | Korea | 15.0 | n/a | n/a | 54 |
| Belgium | 7.3 | 15.8 | 20.9 | n/a | Luxembourg | 5.5 | n/a | n/a | 55 |
| Canada | 8.0 | 20.5 | n/a | 47 | Malta | 0.7 | n/a | n/a | n/a |
| Cyprus | 1.7 | n/a | n/a | n/a | Netherlands | 13.9 | n/a | n/a | 70 |
| Denmark | 36.6 | n/a | n/a | n/a | New Zealand | 3.9 | n/a | n/a | 16 |
| Finland | 23.2 | n/a | n/a | n/a | Norway | 14.6 | n/a | n/a | n/a |
| France | 11.5 | n/a | n/a | n/a | Portugal | 6.7 | n/a | n/a | n/a |
| Germany | 7.8 | 12.8 | 17.8 | 36 | Spain | 6.3 | 13.7 | 18.6 | 35 |
| Greece | 3.9 | n/a | n/a | 65 | Sweden | 25.0 | n/a | n/a | 29 |
| Iceland | 13.0 | n/a | n/a | 12 | Switzerland | 6.9 | 13.2 | 19.4 | 11 |
| Ireland | 3.9 | n/a | n/a | n/a | Unit. Kingdom | 11.4 | n/a | n/a | n/a |
| Israel | 5.7 | n/a | n/a | 39 | United States | 10.2 | 15.6 | 20.4 | 32 |
| Italy | 14.9 | n/a | n/a | 41 | Total (mean) | 10.6 | 14.3 | n/a | 40 |

Data from the year of 2013; except Armenia, Kenya, Serbia and Tunisia (2012); and Morocco (2011).

Data Source: IMF (2015); except Argentina (MECON, various years), India (India's Ministry of Finance, 2015) and the United States (U.S. Census Bureau, various years).

ANNEXURE B

**EXAMPLE OF A QUESTIONNAIRE SENT
TO A MUNICIPAL TAX DEPARTMENT
(free translation from Portuguese to English)**



Letter n° 1 IPEA/DIRUR – Department of Environmental, Regional and Urban Studies

Mr Francisco Sérgio Nalini
Municipal Secretary of Ribeirão Preto's Treasury
Address: Rua Lafaiete n° 1000. Ribeirão Preto – SP, Brazil
Telephone: +55 1639775700
Subject: Information request about property taxation and real estate registration in Ribeirão Preto.

Dear Chartered Secretary of Ribeirão Preto's Treasury,

My name is Pedro Humberto Bruno de Carvalho Junior. I am on levy researcher of Institute of Economic Research Applied (Ipea) and currently ongoing P.h.D program in Tax Policy at University of Pretoria, in South Africa. Behalf of Ipea and as part of my P.h.D thesis where I intend to estimate the property tax performance and potential in Brazil, I would like to kindly request some information about Ribeirão Preto's property tax system, even if you are just able to partially fill this questionnaire with the available information. I certify that my request has exclusive academic purposes, being at aggregated level and therefore not going against any confidentiality or tax secrecy.

1. Number of registered properties

| | 2011 | 2012 | 2013 | 2014 |
|--------------------------------------|------|------|------|------|
| Residential | | | | |
| Nonresidential | | | | |
| Built (residential + nonresidential) | | | | |
| Vacant Land | | | | |
| Total | | | | |

2. Number of exempted properties granted by municipal law

| | 2011 | 2012 | 2013 | 2014 |
|--------------------------------------|------|------|------|------|
| Residential | | | | |
| Nonresidential | | | | |
| Built (residential + nonresidential) | | | | |
| Vacant Land | | | | |
| Total | | | | |

3. Sum of assessed values of all registered properties (in R\$)

| | 2011 | 2012 | 2013 | 2014 |
|--------------------------------------|------|------|------|------|
| Residential | | | | |
| Nonresidential | | | | |
| Built (residential + nonresidential) | | | | |
| Vacant Land | | | | |
| Total | | | | |



4. Sum of assessed values of all exempted properties (in R\$)

| | 2011 | 2012 | 2013 | 2014 |
|--------------------------------------|------|------|------|------|
| Residential | | | | |
| Nonresidential | | | | |
| Built (residential + nonresidential) | | | | |
| Vacant Land | | | | |
| Total | | | | |

5. Sum of all levied property tax (in R\$)*

| | 2011 | 2012 | 2013 | 2014 |
|--------------------------------------|------|------|------|------|
| Residential | | | | |
| Nonresidential | | | | |
| Built (residential + nonresidential) | | | | |
| Vacant Land | | | | |
| Total | | | | |

* Please, report only the property tax levied without any other aggregate fees, fines and penalties. However, if it is not possible to separate the taxes, please indicate each component of the filled value and how these fees are calculated.

6. Sum of all collected property tax (in R\$)

| | 2011 | 2012 | 2013 | 2014 |
|--------------------------------------|------|------|------|------|
| Residential | | | | |
| Nonresidential | | | | |
| Built (residential + nonresidential) | | | | |
| Vacant Land | | | | |
| Total | | | | |

7. Valuation Roll

| |
|---|
| a) Year of the last land zones revaluations. Please, specify the municipal legislation. |
| b) Year of the last building types revaluations and their municipal law number (some municipalities revalue land and buildings in different period). Please, specify the municipal legislation. |
| c) Was a tax increase or assessment increase ceiling applied to cushion the impact of the last valuation reform? Please, specify the mechanism. |
| d) Were the tax rates reduced or the exemptions extended to cushion the impact of the last valuation reform? Please, specify the mechanism. |
| e) Value of the most valued land zone and its specification/location in the municipality (in R\$ per square metre). |
| f) Value of the most valued building type and its specification/type or quality of construction (in R\$ per square metre). |
| g) Is there any estimation of the current assessment level in the municipality? |

8. Registration

| |
|--|
| a) Year or period that was undertaken the last re-registration. Was a complete or a partial re-registration? |
| b) What is the most needed information to be updated in the current tax roll? |
| c) Is the GIS used to registration georeferencing? Is it partially or completely used? |

9. Compliance and enforcement policies

| | |
|--|----------------|
| a) Advertising of property tax compliance. | () Yes () No |
| b) Recurrent taxpayers' re-registration. | () Yes () No |
| c) Number of maximum installments per annual levy. | |
| d) Percentage discount for an advance lump sum payment. | |
| e) Possible payment in most of banking network and lottery offices. | () Yes () No |
| f) Possibility of recurrent automatic withdrawals on taxpayer banking account or credit card payments. | () Yes () No |
| g) Judicial tax liens to recover the arrears. | () Yes () No |
| h) Tax arrears outsourcing. | () Yes () No |
| i) Inclusion of delinquent taxpayers on the Brazilian national black list registers: <i>SPC</i> and <i>Serasa Experian</i> . | () Yes () No |
| j) Inclusion of delinquent taxpayers on own municipal running black list register. | () Yes () No |
| k) Public auction of the properties on arrears. | () Yes () No |

I appreciate the intention of Ribeirão Preto's Secretary of Treasury in cooperating with my research. If you demand any requirement or formal documents, please inform me thereof. Still, if you have any further enquiries, doubts or questions regarding this questionnaire, you can contact me via e-mail: pedro.carvalho@ipea.gov.br.

I would also like that the questionnaire response to be sent to my e-mail.

Your Sincerly

Pedro Humberto Bruno de Carvalho Junior

ANNEXURE C

**DEVELOPMENT OF PROPERTY TAX
REVENUES INDICATORS IN THE 46
SELECTED MUNICIPALITIES**

Table C1: Selected municipalities' property tax *per capita* (2000-2014, in R\$ of December 2015)

| Municipality | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 São Paulo | 341 | 336 | 348 | 368 | 366 | 381 | 413 | 431 | 411 | 436 | 507 | 529 | 552 | 544 | 556 |
| 2 Rio de Janeiro | 272 | 270 | 267 | 277 | 291 | 295 | 294 | 292 | 300 | 308 | 319 | 317 | 318 | 338 | 344 |
| 3 Salvador | 94 | 89 | 81 | 82 | 79 | 76 | 79 | 80 | 78 | 87 | 105 | 120 | 123 | 117 | 182 |
| 4 Brasília | 192 | 185 | 172 | 169 | 171 | 179 | 186 | 185 | 205 | 208 | 219 | 226 | 224 | 222 | 214 |
| 5 Fortaleza | 60 | 67 | 54 | 56 | 61 | 63 | 65 | 62 | 62 | 68 | 92 | 92 | 96 | 98 | 133 |
| 6 Belo Horizonte | 203 | 223 | 219 | 216 | 225 | 233 | 247 | 252 | 254 | 262 | 313 | 350 | 363 | 359 | 364 |
| 7 Manaus | 23 | 22 | 22 | 22 | 23 | 28 | 32 | 61 | 45 | 48 | 39 | 38 | 50 | 59 | 70 |
| 8 Curitiba | 196 | 194 | 219 | 223 | 247 | 188 | 229 | 231 | 227 | 229 | 246 | 240 | 276 | 251 | 249 |
| 9 Recife | 117 | 127 | 122 | 128 | 134 | 141 | 149 | 155 | 159 | 162 | 170 | 175 | 188 | 196 | 198 |
| 10 Porto Alegre | 164 | 166 | 170 | 254 | 183 | 213 | 219 | 236 | 263 | 252 | 276 | 267 | 249 | 241 | 255 |
| 11 Goiânia | 148 | 137 | 150 | 158 | 165 | 178 | 227 | 250 | 252 | 250 | 247 | 245 | 250 | 242 | 252 |
| 12 Guarulhos | 183 | 179 | 191 | 216 | 203 | 209 | 223 | 224 | 226 | 229 | 245 | 245 | 248 | 311 | 280 |
| 13 Campinas | 282 | 306 | 292 | 284 | 337 | 342 | 351 | 370 | 373 | 395 | 382 | 387 | 404 | 395 | 405 |
| 14 São Gonçalo | 176 | 297 | 301 | 299 | 398 | 362 | 347 | 359 | 362 | 368 | 356 | 376 | 391 | 394 | 385 |
| 15 Teresina | 128 | 131 | 177 | 248 | 277 | 299 | 310 | 308 | 340 | 333 | 313 | 305 | 314 | 306 | 323 |
| 16 São Bernardo | 180 | 177 | 174 | 188 | 192 | 196 | 201 | 212 | 228 | 234 | 259 | 280 | 284 | 324 | 329 |
| 17 João Pessoa | 124 | 118 | 110 | 112 | 113 | 120 | 126 | 157 | 155 | 160 | 170 | 174 | 176 | 174 | 176 |
| 18 Santo André | 489 | 627 | 587 | 631 | 592 | 618 | 585 | 602 | 622 | 622 | 586 | 673 | 713 | 720 | 784 |
| 19 Osasco | 232 | 206 | 248 | 241 | 219 | 219 | 232 | 244 | 242 | 240 | 243 | 248 | 262 | 258 | 265 |
| 20 Ribeirão Preto | 232 | 297 | 262 | 276 | 294 | 243 | 191 | 231 | 221 | 276 | 254 | 287 | 312 | 297 | 280 |
| 21 Uberlândia | 116 | 103 | 95 | 104 | 107 | 111 | 130 | 184 | 174 | 173 | 172 | 176 | 186 | 180 | 179 |
| 22 Contagem | 68 | 62 | 63 | 59 | 60 | 50 | 48 | 68 | 69 | 69 | 78 | 79 | 111 | 73 | 81 |
| 23 Sorocaba | 55 | 54 | 54 | 55 | 52 | 54 | 58 | 66 | 68 | 69 | 79 | 80 | 87 | 88 | 90 |
| 24 Aracaju | 24 | 22 | 31 | 28 | 29 | 27 | 28 | 30 | 32 | 36 | 37 | 51 | 46 | 53 | 61 |
| 25 Cuiabá | 34 | 38 | 37 | 40 | 50 | 45 | 51 | 53 | 54 | 57 | 57 | 59 | 60 | 62 | 65 |
| 26 Juiz de Fora | 155 | 152 | 187 | 213 | 191 | 199 | 202 | 211 | 212 | 227 | 213 | 222 | 258 | 355 | 373 |
| 27 Santos | 48 | 48 | 43 | 50 | 52 | 49 | 49 | 52 | 54 | 61 | 66 | 66 | 69 | 70 | 73 |
| 28 S.J. Rio Preto | 81 | 47 | 52 | 49 | 42 | 43 | 46 | 53 | 51 | 56 | 64 | 94 | 110 | 121 | 136 |
| 29 Mogi Cruzes | 193 | 176 | 182 | 210 | 216 | 224 | 234 | 247 | 227 | 234 | 251 | 262 | 273 | 269 | 284 |
| 30 Diadema | 62 | 44 | 41 | 40 | 43 | 47 | 54 | 54 | 57 | 58 | 74 | 77 | 85 | 84 | 94 |
| 31 Betim | 41 | 57 | 45 | 47 | 49 | 55 | 57 | 61 | 58 | 65 | 72 | 92 | 95 | 63 | 222 |
| 32 Olinda | 112 | 109 | 98 | 94 | 99 | 100 | 106 | 109 | 109 | 113 | 116 | 124 | 129 | 129 | 144 |
| 33 Carapicuíba | 41 | 38 | 35 | 35 | 36 | 45 | 49 | 56 | 51 | 57 | 58 | 105 | 146 | 177 | 186 |
| 34 Piracicaba | 149 | 146 | 143 | 146 | 136 | 126 | 122 | 143 | 144 | 155 | 201 | 204 | 212 | 207 | 215 |
| 35 São Vicente | 178 | 186 | 173 | 174 | 169 | 176 | 198 | 211 | 206 | 220 | 273 | 289 | 287 | 285 | 325 |
| 36 Pelotas | 146 | 126 | 132 | 145 | 143 | 146 | 145 | 147 | 153 | 164 | 177 | 188 | 199 | 203 | 207 |
| 37 Vitória | 60 | 69 | 104 | 79 | 72 | 10 | 69 | 81 | 80 | 87 | 104 | 101 | 104 | 101 | 71 |
| 38 Caruaru | 82 | 74 | 73 | 86 | 83 | 94 | 107 | 115 | 123 | 131 | 117 | 117 | 121 | 171 | 182 |
| 39 Vit. Conquista | 47 | 50 | 35 | 39 | 34 | 28 | 27 | 36 | 37 | 60 | 62 | 64 | 108 | 112 | 206 |
| 40 S. J. Pinhais | 68 | 52 | 47 | 45 | 41 | 39 | 40 | 42 | 42 | 44 | 50 | 46 | 50 | 50 | 56 |
| 41 Juazeiro Norte | 58 | 45 | 41 | 49 | 48 | 41 | 35 | 34 | 35 | 50 | 56 | 48 | 47 | 40 | 45 |
| 42 Barueri | 20 | 27 | 29 | 31 | 29 | 36 | 41 | 35 | 27 | 37 | 35 | 41 | 21 | 44 | 35 |
| 43 Itajaí | 20 | 27 | 26 | 24 | 28 | 47 | 39 | 58 | 52 | 66 | 85 | 95 | 95 | 76 | 73 |
| 44 Palmas | 22 | 21 | 22 | 22 | 20 | 19 | 23 | 28 | 30 | 32 | 35 | 37 | 39 | 38 | 41 |
| 45 Magé | 6 | 5 | 5 | 4 | 4 | 4 | 4 | 7 | 9 | 11 | 11 | 12 | 10 | 14 | 12 |
| 46 Juazeiro | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 4 | 5 | 8 | 7 | 7 | 8 | 8 |
| 47 Corumbá | 35 | 36 | 52 | 31 | 40 | 52 | 43 | 42 | 47 | 56 | 62 | 63 | 64 | 65 | 58 |
| All selection (median) | 112 | 103 | 98 | 94 | 99 | 100 | 107 | 115 | 123 | 131 | 117 | 124 | 146 | 174 | 186 |
| Brazil (median) | 6 | 6 | 7 | 7 | 10 | 9 | 8 | 9 | 9 | 9 | 10 | 11 | 11 | 13 | 13 |
| Brazil (ratio of means) | 93 | 94 | 100 | 103 | 118 | 111 | 103 | 112 | 115 | 115 | 127 | 142 | 142 | 147 | 157 |

Data Source: STN (2015).

Table C2: Selected municipalities' property tax per municipal GDP (2000-2013, in percentage)

| Municipality | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 São Paulo | 0.83 | 0.80 | 1.04 | 1.01 | 1.04 | 1.01 | 1.01 | 0.90 | 0.90 | 1.04 | 1.02 | 1.05 | 1.01 | 0.95 | 0.95 |
| 2 Rio de Janeiro | 0.78 | 0.78 | 0.90 | 0.98 | 0.90 | 0.89 | 0.85 | 0.85 | 0.80 | 0.81 | 0.80 | 0.78 | 0.74 | 0.65 | 0.67 |
| 3 Salvador | 0.70 | 0.66 | 0.63 | 0.67 | 0.58 | 0.55 | 0.59 | 0.55 | 0.60 | 0.61 | 0.67 | 0.68 | 0.67 | 0.54 | 0.84 |
| 4 Brasília | 0.31 | 0.30 | 0.33 | 0.33 | 0.33 | 0.32 | 0.31 | 0.34 | 0.31 | 0.30 | 0.30 | 0.29 | 0.28 | 0.30 | 0.28 |
| 5 Fortaleza | 0.43 | 0.49 | 0.44 | 0.48 | 0.48 | 0.46 | 0.41 | 0.40 | 0.40 | 0.50 | 0.46 | 0.46 | 0.44 | 0.43 | 0.54 |
| 6 Belo Horizonte | 1.08 | 1.15 | 1.18 | 1.21 | 1.14 | 1.19 | 1.14 | 1.04 | 1.02 | 1.18 | 1.23 | 1.27 | 1.19 | 0.93 | 0.93 |
| 7 Manaus | 0.09 | 0.08 | 0.09 | 0.10 | 0.10 | 0.12 | 0.19 | 0.15 | 0.15 | 0.12 | 0.11 | 0.15 | 0.15 | 0.16 | 0.19 |
| 8 Curitiba | 0.71 | 0.73 | 0.91 | 0.96 | 0.70 | 0.80 | 0.79 | 0.70 | 0.66 | 0.67 | 0.60 | 0.68 | 0.66 | 0.50 | 0.53 |
| 9 Recife | 0.64 | 0.69 | 0.64 | 0.71 | 0.74 | 0.73 | 0.72 | 0.70 | 0.71 | 0.68 | 0.61 | 0.62 | 0.63 | 0.57 | 0.57 |
| 10 Porto Alegre | 0.51 | 0.52 | 0.86 | 0.63 | 0.72 | 0.65 | 0.68 | 0.72 | 0.68 | 0.73 | 0.67 | 0.62 | 0.59 | 0.52 | 0.53 |
| 11 Goiânia | 0.76 | 0.72 | 0.89 | 0.97 | 0.98 | 1.19 | 1.19 | 1.15 | 1.10 | 1.07 | 1.00 | 0.96 | 0.88 | 0.71 | 0.69 |
| 12 Guarulhos | 0.55 | 0.58 | 0.85 | 0.85 | 0.80 | 0.76 | 0.66 | 0.68 | 0.63 | 0.66 | 0.62 | 0.57 | 0.55 | 0.69 | 0.65 |
| 13 Campinas | 0.82 | 0.95 | 0.95 | 1.16 | 1.11 | 0.96 | 0.99 | 0.95 | 0.96 | 0.92 | 0.87 | 0.88 | 0.83 | 0.75 | 0.73 |
| 14 São Gonçalo | 0.54 | 0.42 | 0.41 | 0.40 | 0.35 | 0.35 | 0.36 | 0.36 | 0.35 | 0.37 | 0.34 | 0.35 | 0.34 | 0.31 | 0.59 |
| 15 Teresina | 0.22 | 0.21 | 0.28 | 0.24 | 0.27 | 0.23 | 0.22 | 0.22 | 0.22 | 0.22 | 0.20 | 0.28 | 0.25 | 0.25 | 0.73 |
| 16 São Bernardo | 0.42 | 0.68 | 0.84 | 1.04 | 0.90 | 0.89 | 0.83 | 0.74 | 0.67 | 0.67 | 0.62 | 0.67 | 0.71 | 0.56 | 0.35 |
| 17 João Pessoa | 0.27 | 0.29 | 0.32 | 0.41 | 0.39 | 0.39 | 0.36 | 0.36 | 0.35 | 0.34 | 0.34 | 0.35 | 0.32 | 0.27 | 0.31 |
| 18 Santo André | 0.42 | 0.43 | 0.97 | 0.98 | 0.99 | 1.08 | 1.07 | 1.11 | 1.13 | 1.02 | 0.91 | 0.97 | 0.94 | 0.73 | 1.52 |
| 19 Osasco | 0.50 | 0.46 | 0.60 | 0.56 | 0.54 | 0.50 | 0.51 | 0.43 | 0.37 | 0.39 | 0.39 | 0.39 | 0.39 | 0.34 | 0.75 |
| 20 Ribeirão Preto | 0.53 | 0.53 | 0.83 | 0.70 | 0.72 | 0.65 | 0.62 | 0.59 | 0.62 | 0.62 | 0.61 | 0.69 | 0.63 | 0.83 | 1.81 |
| 21 Uberlândia | 0.18 | 0.18 | 0.21 | 0.21 | 0.19 | 0.19 | 0.19 | 0.17 | 0.18 | 0.17 | 0.17 | 0.18 | 0.16 | 0.15 | 0.24 |
| 22 Contagem | 0.32 | 0.19 | 0.21 | 0.17 | 0.17 | 0.16 | 0.17 | 0.16 | 0.16 | 0.18 | 0.23 | 0.29 | 0.26 | 0.27 | 0.09 |
| 23 Sorocaba | 0.41 | 0.41 | 0.49 | 0.49 | 0.48 | 0.46 | 0.53 | 0.48 | 0.48 | 0.50 | 0.49 | 0.47 | 0.45 | 0.35 | 0.05 |
| 24 Aracaju | 0.68 | 0.64 | 0.60 | 0.66 | 0.63 | 0.60 | 0.62 | 0.60 | 0.61 | 0.67 | 0.62 | 0.66 | 0.62 | 0.48 | 0.26 |
| 25 Cuiabá | 0.21 | 0.21 | 0.22 | 0.20 | 0.21 | 0.22 | 0.25 | 0.23 | 0.23 | 0.23 | 0.40 | 0.53 | 0.49 | 0.48 | 0.26 |
| 26 Juiz de Fora | 0.78 | 0.79 | 0.88 | 0.85 | 0.73 | 0.69 | 0.79 | 0.74 | 0.77 | 0.99 | 0.97 | 0.95 | 0.88 | 0.72 | 0.79 |
| 27 Santos | 1.66 | 2.09 | 1.43 | 1.44 | 1.43 | 0.96 | 0.95 | 0.86 | 0.71 | 0.77 | 0.77 | 0.76 | 0.63 | 1.37 | 0.15 |
| 28 S.J. Rio Preto | 0.70 | 0.81 | 0.84 | 0.88 | 0.90 | 0.91 | 0.90 | 0.86 | 0.88 | 1.00 | 1.00 | 0.98 | 0.89 | 0.79 | 0.30 |
| 29 Mogi Cruzes | 1.14 | 1.07 | 1.38 | 1.18 | 1.12 | 1.15 | 1.12 | 1.05 | 0.90 | 0.87 | 0.84 | 0.86 | 0.85 | 0.70 | 0.75 |
| 30 Diadema | 0.66 | 0.58 | 0.87 | 0.86 | 0.83 | 0.74 | 0.75 | 0.67 | 0.67 | 0.69 | 0.69 | 0.72 | 0.73 | 0.69 | 0.16 |
| 31 Betim | 0.09 | 0.06 | 0.08 | 0.08 | 0.08 | 0.09 | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 | 0.09 | 0.09 | 0.13 | 1.65 |
| 32 Olinda | 0.78 | 0.62 | 0.71 | 0.72 | 0.57 | 0.42 | 0.40 | 0.42 | 0.56 | 0.58 | 0.44 | 0.42 | 0.38 | 0.27 | 0.54 |
| 33 Carapicuíba | 0.43 | 0.64 | 0.55 | 0.61 | 0.69 | 0.67 | 0.65 | 0.61 | 0.64 | 0.62 | 0.75 | 0.72 | 0.69 | 0.47 | 0.47 |
| 34 Piracicaba | 0.54 | 0.47 | 0.58 | 0.58 | 0.56 | 0.54 | 0.47 | 0.47 | 0.46 | 0.48 | 0.48 | 0.51 | 0.50 | 0.33 | 0.78 |
| 35 São Vicente | 2.15 | 2.88 | 2.68 | 2.85 | 3.22 | 2.49 | 1.84 | 2.11 | 1.91 | 2.11 | 1.82 | 2.04 | 2.19 | 2.01 | 0.81 |
| 36 Pelotas | 0.43 | 0.50 | 0.63 | 0.58 | 0.07 | 0.53 | 0.59 | 0.56 | 0.58 | 0.63 | 0.55 | 0.51 | 0.50 | 0.49 | 0.33 |
| 37 Vitória | 0.19 | 0.17 | 0.20 | 0.21 | 0.17 | 0.15 | 0.21 | 0.19 | 0.16 | 0.20 | 0.18 | 0.17 | 0.17 | 0.24 | 0.33 |
| 38 Caruaru | 0.25 | 0.32 | 0.31 | 0.37 | 0.57 | 0.43 | 0.58 | 0.50 | 0.60 | 0.78 | 0.76 | 0.73 | 0.64 | 0.42 | 0.19 |
| 39 Vit. Conquista | 0.28 | 0.26 | 0.28 | 0.26 | 0.22 | 0.22 | 0.26 | 0.25 | 0.26 | 0.25 | 0.25 | 0.26 | 0.25 | 0.22 | 0.75 |
| 40 S. J. Pinhais | 0.14 | 0.12 | 0.15 | 0.15 | 0.12 | 0.11 | 0.16 | 0.14 | 0.12 | 0.13 | 0.12 | 0.16 | 0.16 | 0.07 | 0.34 |
| 41 Juazeiro Norte | 0.10 | 0.09 | 0.08 | 0.07 | 0.08 | 0.07 | 0.09 | 0.13 | 0.13 | 0.12 | 0.12 | 0.09 | 0.09 | 0.10 | 0.30 |
| 42 Barueri | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | 0.23 |
| 43 Itajaí | 0.26 | 0.20 | 0.21 | 0.18 | 0.17 | 0.17 | 0.18 | 0.17 | 0.15 | 0.14 | 0.10 | 0.10 | 0.09 | 0.19 | 0.36 |
| 44 Palmas | 0.36 | 0.34 | 0.27 | 0.27 | 0.22 | 0.20 | 0.21 | 0.19 | 0.29 | 0.34 | 0.29 | 0.56 | 0.51 | 0.42 | 0.23 |
| 45 Magé | 0.19 | 0.25 | 0.33 | 0.34 | 0.40 | 0.47 | 0.37 | 0.28 | 0.37 | 0.30 | 0.34 | 0.16 | 0.15 | 0.28 | 0.08 |
| 46 Juazeiro | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 | 0.04 | 0.05 | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 |
| 47 Corumbá | 0.22 | 0.20 | 0.18 | 0.19 | 0.23 | 0.17 | 0.13 | 0.15 | 0.13 | 0.17 | 0.15 | 0.15 | 0.14 | 0.21 | 0.18 |
| All selection (median) | 0.43 | 0.47 | 0.58 | 0.58 | 0.56 | 0.50 | 0.53 | 0.48 | 0.56 | 0.58 | 0.49 | 0.53 | 0.50 | 0.43 | 0.47 |
| Brazil (median) | 0.06 | 0.07 | 0.07 | 0.06 | 0.08 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.08 |
| Brazil (ratio of means) | 0.46 | 0.46 | 0.47 | 0.47 | 0.45 | 0.44 | 0.46 | 0.44 | 0.42 | 0.44 | 0.43 | 0.44 | 0.44 | 0.42 | 0.42 |

Data Source: STN (2015) and IBGE (2015).

Table C3: Selected municipalities' property tax per municipal revenues (2000-2014, in percentage)

| Municipality | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 São Paulo | 17.1 | 16.1 | 17.4 | 17.9 | 16.4 | 15.9 | 15.3 | 14.2 | 12.5 | 13.3 | 14.6 | 14.3 | 14.4 | 14.4 | 14.7 |
| 2 Rio de Janeiro | 13.0 | 12.0 | 11.6 | 12.1 | 12.1 | 12.9 | 12.5 | 11.3 | 11.6 | 11.5 | 10.7 | 10.2 | 9.6 | 9.7 | 10.1 |
| 3 Salvador | 10.3 | 9.4 | 8.6 | 8.8 | 8.3 | 7.6 | 6.6 | 6.2 | 5.7 | 6.5 | 6.5 | 6.7 | 6.9 | 6.4 | 9.3 |
| 4 Brasília | 2.6 | 2.6 | 2.4 | 3.6 | 3.3 | 3.2 | 3.0 | 3.0 | 3.0 | 3.1 | 3.0 | 3.0 | 2.9 | 2.9 | 2.8 |
| 5 Fortaleza | 5.5 | 6.1 | 4.4 | 4.4 | 4.7 | 4.6 | 4.4 | 4.2 | 3.5 | 3.9 | 4.8 | 4.4 | 4.3 | 4.9 | 6.1 |
| 6 B. Horizonte | 11.4 | 12.2 | 12.2 | 11.6 | 10.9 | 10.8 | 11.3 | 10.7 | 9.6 | 9.7 | 10.3 | 10.6 | 10.6 | 10.6 | 10.3 |
| 7 Manaus | 2.2 | 2.0 | 1.8 | 1.9 | 1.9 | 2.2 | 2.2 | 3.6 | 2.5 | 2.8 | 2.0 | 1.9 | 2.4 | 2.8 | 3.2 |
| 8 Curitiba | 7.7 | 8.2 | 9.1 | 9.1 | 10.0 | 7.8 | 8.5 | 8.0 | 7.7 | 7.4 | 7.3 | 6.8 | 7.0 | 6.7 | 6.6 |
| 9 Recife | 8.5 | 9.0 | 8.6 | 9.1 | 8.0 | 8.2 | 7.6 | 7.8 | 7.4 | 7.3 | 7.3 | 6.9 | 6.8 | 7.5 | 7.0 |
| 10 Porto Alegre | 6.8 | 6.6 | 6.8 | 9.7 | 7.4 | 8.4 | 8.3 | 8.3 | 8.5 | 8.1 | 8.2 | 7.4 | 6.8 | 6.7 | 6.7 |
| 11 Goiânia | 9.5 | 8.2 | 9.0 | 9.8 | 8.7 | 9.1 | 11.6 | 12.0 | 10.7 | 10.5 | 9.8 | 9.3 | 9.3 | 9.5 | 9.6 |
| 12 Guarulhos | 10.4 | 10.5 | 10.9 | 12.8 | 12.2 | 12.3 | 11.4 | 10.3 | 9.3 | 9.8 | 8.9 | 8.6 | 8.7 | 10.0 | 9.5 |
| 13 Campinas | 13.8 | 13.5 | 14.3 | 13.8 | 15.8 | 14.9 | 14.1 | 12.6 | 11.9 | 12.4 | 11.4 | 11.1 | 11.2 | 10.9 | 10.9 |
| 14 São Gonçalo | 11.7 | 8.8 | 7.8 | 8.0 | 6.8 | 6.1 | 7.3 | 7.7 | 5.6 | 5.1 | 5.2 | 4.8 | 4.4 | 4.6 | 5.0 |
| 15 Teresina | 2.3 | 2.1 | 2.6 | 2.5 | 2.4 | 2.0 | 1.8 | 1.8 | 1.7 | 1.8 | 1.7 | 2.2 | 1.9 | 2.0 | 2.3 |
| 16 São Bernardo | 5.8 | 9.7 | 10.7 | 10.3 | 12.6 | 12.7 | 11.3 | 9.7 | 9.7 | 10.2 | 7.8 | 8.4 | 8.3 | 8.7 | 8.7 |
| 17 João Pessoa | 3.1 | 3.3 | 3.9 | 3.2 | 4.6 | 2.8 | 3.2 | 3.1 | 2.6 | 2.6 | 2.6 | 2.5 | 2.4 | 2.5 | 2.5 |
| 18 Santo André | 8.4 | 9.4 | 12.7 | 16.8 | 18.3 | 15.9 | 12.5 | 11.6 | 11.5 | 11.5 | 10.5 | 10.0 | 10.2 | 10.1 | 10.4 |
| 19 Osasco | 13.6 | 14.3 | 14.2 | 14.0 | 13.4 | 13.1 | 11.6 | 11.1 | 10.6 | 10.6 | 9.8 | 9.3 | 9.8 | 11.1 | 11.3 |
| 20 Ribeirão Preto | 6.8 | 7.6 | 9.0 | 10.7 | 8.9 | 9.6 | 8.9 | 8.1 | 7.4 | 7.9 | 7.3 | 7.2 | 8.0 | 10.8 | 11.2 |
| 21 Uberlândia | 3.1 | 3.8 | 3.0 | 3.4 | 3.4 | 3.1 | 2.9 | 2.8 | 2.5 | 3.0 | 2.7 | 2.5 | 2.4 | 2.6 | 2.7 |
| 22 Contagem | 5.2 | 3.3 | 3.9 | 3.7 | 3.2 | 3.0 | 2.8 | 3.1 | 2.7 | 3.0 | 3.0 | 4.2 | 4.7 | 5.3 | 5.8 |
| 23 Sorocaba | 6.8 | 6.5 | 6.0 | 5.9 | 6.1 | 6.1 | 7.1 | 7.7 | 6.9 | 5.8 | 5.6 | 5.4 | 5.2 | 5.1 | 4.5 |
| 24 Aracaju | 9.6 | 9.3 | 7.1 | 6.3 | 6.4 | 6.1 | 6.0 | 6.3 | 5.2 | 5.4 | 5.4 | 5.3 | 5.0 | 5.1 | 5.4 |
| 25 Cuiabá | 2.2 | 2.4 | 2.4 | 2.4 | 2.2 | 2.5 | 3.0 | 3.1 | 2.4 | 2.7 | 2.6 | 4.0 | 4.9 | 6.3 | 6.7 |
| 26 Juiz de Fora | 10.5 | 9.7 | 9.8 | 9.8 | 8.7 | 7.5 | 6.9 | 7.6 | 7.2 | 7.3 | 8.7 | 8.7 | 8.3 | 8.8 | 8.8 |
| 27 Santos | 17.8 | 19.5 | 20.9 | 22.3 | 20.5 | 19.5 | 17.5 | 17.1 | 15.9 | 15.1 | 13.6 | 14.8 | 14.6 | 14.9 | 15.7 |
| 28 S.J. Rio Preto | 12.9 | 13.1 | 10.6 | 10.2 | 9.9 | 10.3 | 10.7 | 9.9 | 8.8 | 9.2 | 10.0 | 9.5 | 9.4 | 9.2 | 10.3 |
| 29 Mogi Cruzes | 16.9 | 15.9 | 19.1 | 18.8 | 17.2 | 14.2 | 15.1 | 12.6 | 11.8 | 11.1 | 11.0 | 9.5 | 9.3 | 9.3 | 11.1 |
| 30 Diadema | 11.9 | 12.3 | 12.7 | 13.7 | 13.3 | 13.0 | 12.4 | 12.7 | 9.0 | 10.5 | 9.2 | 9.4 | 8.7 | 9.5 | 9.9 |
| 31 Betim | 2.6 | 1.8 | 1.7 | 1.6 | 1.7 | 1.8 | 1.9 | 1.8 | 1.7 | 1.8 | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 |
| 32 Olinda | 11.6 | 9.0 | 7.9 | 9.0 | 8.3 | 5.3 | 4.0 | 3.7 | 3.2 | 5.5 | 4.4 | 3.5 | 3.3 | 2.7 | 3.0 |
| 33 Carapicuíba | 9.6 | 11.6 | 8.4 | 9.1 | 8.2 | 8.7 | 8.3 | 8.0 | 7.1 | 7.5 | 7.1 | 7.3 | 6.7 | 5.5 | 6.7 |
| 34 Piracicaba | 8.4 | 6.8 | 7.2 | 7.9 | 7.5 | 7.2 | 6.7 | 6.0 | 5.5 | 5.7 | 5.5 | 5.4 | 5.7 | 5.7 | 5.7 |
| 35 São Vicente | 18.4 | 21.5 | 18.7 | 20.4 | 21.1 | 16.8 | 12.8 | 14.6 | 10.2 | 13.1 | 11.5 | 11.9 | 13.0 | 12.8 | 11.8 |
| 36 Pelotas | 5.9 | 6.4 | 7.9 | 6.0 | 5.3 | 0.4 | 5.3 | 5.3 | 5.1 | 5.3 | 5.7 | 5.2 | 5.0 | 4.8 | 3.3 |
| 37 Vitória | 3.6 | 3.3 | 3.2 | 3.4 | 3.1 | 2.8 | 3.0 | 3.7 | 3.2 | 3.5 | 3.4 | 3.2 | 3.2 | 3.6 | 3.6 |
| 38 Caruaru | 3.2 | 4.0 | 2.9 | 3.2 | 3.1 | 4.8 | 3.5 | 4.9 | 3.9 | 4.8 | 5.9 | 6.0 | 5.7 | 4.5 | 4.4 |
| 39 Vit. Conquista | 2.8 | 2.5 | 2.7 | 2.5 | 1.9 | 1.7 | 2.1 | 2.3 | 2.2 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.4 |
| 40 S. J. Pinhais | 5.3 | 4.9 | 4.1 | 3.5 | 3.3 | 2.7 | 2.8 | 3.6 | 3.0 | 2.8 | 2.7 | 2.5 | 3.2 | 2.1 | 2.3 |
| 41 Juazeiro Norte | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 | 0.6 | 0.5 | 0.7 | 0.7 | 0.9 | 0.8 | 0.8 | 0.6 | 0.9 | 0.7 |
| 42 Barueri | 1.3 | 1.2 | 1.2 | 1.3 | 1.3 | 1.2 | 1.3 | 1.2 | 1.0 | 0.9 | 0.9 | 0.8 | 0.9 | 0.9 | 1.0 |
| 43 Itajai | 5.2 | 3.4 | 3.5 | 3.5 | 2.9 | 3.1 | 3.1 | 3.0 | 2.8 | 3.2 | 2.6 | 2.5 | 2.4 | 3.3 | 3.2 |
| 44 Palmas | 2.4 | 2.5 | 1.6 | 1.9 | 1.5 | 1.3 | 1.1 | 1.1 | 1.1 | 1.8 | 2.2 | 2.0 | 3.2 | 3.5 | 5.7 |
| 45 Magé | 3.1 | 3.6 | 3.4 | 3.6 | 3.1 | 3.4 | 3.5 | 3.0 | 1.8 | 2.5 | 1.9 | 2.2 | 1.1 | 2.2 | 1.8 |
| 46 Juazeiro | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 |
| 47 Corumbá | 4.4 | 2.7 | 3.7 | 2.1 | 2.4 | 2.7 | 1.9 | 1.5 | 1.3 | 1.7 | 1.8 | 1.7 | 1.6 | 1.6 | 1.3 |
| All selection | 6.8 | 6.8 | 7.2 | 7.9 | 6.8 | 6.1 | 6.6 | 6.2 | 5.5 | 5.5 | 5.6 | 5.4 | 5.2 | 5.3 | 5.8 |
| Brazil (median) | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Brazil (ratio of means) | 6.2 | 6.1 | 5.9 | 6.2 | 5.8 | 5.5 | 5.5 | 5.3 | 4.8 | 4.9 | 5.1 | 5.0 | 4.8 | 5.1 | 5.4 |

Data Source: STN (2015).

Table C4: Selected municipalities' property tax per municipal own tax revenues (2000-2014, in percentage)

| Municipality | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 São Paulo | 39.8 | 39.2 | 37.5 | 38.1 | 36.2 | 35.0 | 33.2 | 31.4 | 28.5 | 29.7 | 30.9 | 30.2 | 28.7 | 29.3 | 29.0 |
| 2 Rio de Janeiro | 33.7 | 33.2 | 31.4 | 32.6 | 35.6 | 34.5 | 32.7 | 28.2 | 26.0 | 25.2 | 24.9 | 22.9 | 21.6 | 22.1 | 21.9 |
| 3 Salvador | 25.5 | 24.0 | 23.3 | 24.5 | 24.4 | 22.7 | 20.4 | 20.5 | 18.9 | 19.5 | 18.7 | 18.9 | 18.7 | 17.6 | 23.6 |
| 4 Brasília | 7.3 | 6.9 | 5.7 | 5.2 | 5.0 | 4.9 | 4.6 | 4.6 | 4.8 | 4.9 | 4.8 | 4.8 | 4.6 | 4.6 | 4.3 |
| 5 Fortaleza | 25.3 | 27.4 | 22.7 | 29.1 | 28.3 | 26.2 | 24.3 | 22.1 | 20.6 | 21.4 | 23.3 | 21.2 | 20.1 | 20.1 | 24.5 |
| 6 B. Horizonte | 33.3 | 37.2 | 37.9 | 38.3 | 36.0 | 36.1 | 35.3 | 32.9 | 30.2 | 30.2 | 31.2 | 32.1 | 31.2 | 31.1 | 28.9 |
| 7 Manaus | 8.6 | 7.3 | 7.0 | 7.5 | 8.7 | 9.2 | 9.4 | 14.7 | 11.4 | 12.3 | 9.6 | 8.9 | 10.9 | 12.6 | 14.1 |
| 8 Curitiba | 31.0 | 30.4 | 32.9 | 33.7 | 35.2 | 28.8 | 30.8 | 28.9 | 27.1 | 26.9 | 25.3 | 22.6 | 23.2 | 21.2 | 21.0 |
| 9 Recife | 26.6 | 27.6 | 25.6 | 26.0 | 26.4 | 26.0 | 25.7 | 25.7 | 25.2 | 25.0 | 23.5 | 22.6 | 21.6 | 22.3 | 21.0 |
| 10 Porto Alegre | 27.4 | 27.7 | 24.5 | 29.9 | 23.8 | 25.8 | 25.0 | 25.2 | 25.7 | 24.9 | 24.3 | 22.4 | 20.3 | 19.6 | 20.1 |
| 11 Goiânia | 38.8 | 36.4 | 35.2 | 33.8 | 33.7 | 32.0 | 37.2 | 37.8 | 35.9 | 35.5 | 31.2 | 29.9 | 29.4 | 29.7 | 29.0 |
| 12 Guarulhos | 53.3 | 52.9 | 51.4 | 55.8 | 53.0 | 51.7 | 52.0 | 47.3 | 47.0 | 48.7 | 43.8 | 40.1 | 39.0 | 42.2 | 37.9 |
| 13 Campinas | 41.6 | 43.1 | 39.3 | 38.7 | 39.4 | 37.7 | 36.0 | 35.2 | 32.7 | 34.2 | 31.5 | 29.9 | 30.2 | 27.6 | 28.2 |
| 14 São Gonçalo | 45.3 | 47.9 | 41.8 | 44.5 | 39.4 | 36.1 | 33.0 | 32.8 | 34.2 | 36.5 | 31.7 | 27.0 | 27.2 | 24.4 | 24.2 |
| 15 Teresina | 18.2 | 19.4 | 24.5 | 22.4 | 21.8 | 18.9 | 16.6 | 16.3 | 15.3 | 15.7 | 14.2 | 17.1 | 14.3 | 14.2 | 14.3 |
| 16 São Bernardo | 41.2 | 48.6 | 42.5 | 35.6 | 42.0 | 41.4 | 40.0 | 38.4 | 35.4 | 36.6 | 33.5 | 33.2 | 32.5 | 32.7 | 31.6 |
| 17 João Pessoa | 20.2 | 22.1 | 18.8 | 17.7 | 18.8 | 16.9 | 17.0 | 20.3 | 15.4 | 14.0 | 13.2 | 12.5 | 12.1 | 12.3 | 11.5 |
| 18 Santo André | 32.3 | 35.1 | 38.7 | 44.8 | 48.9 | 45.7 | 40.4 | 38.8 | 37.8 | 39.4 | 34.6 | 31.3 | 33.3 | 32.2 | 32.2 |
| 19 Osasco | 56.9 | 50.4 | 46.1 | 45.3 | 43.3 | 41.9 | 39.2 | 36.3 | 34.3 | 32.2 | 29.6 | 30.5 | 29.4 | 31.7 | 30.6 |
| 20 Ribeirão Preto | 41.2 | 40.4 | 41.1 | 43.2 | 39.0 | 39.6 | 38.6 | 35.7 | 32.6 | 33.8 | 29.7 | 28.6 | 29.6 | 35.1 | 36.6 |
| 21 Uberlândia | 17.8 | 17.6 | 14.9 | 19.2 | 20.3 | 18.2 | 16.9 | 17.1 | 15.5 | 15.9 | 14.3 | 13.2 | 12.8 | 13.2 | 12.8 |
| 22 Contagem | 27.0 | 19.4 | 18.8 | 18.0 | 20.1 | 19.8 | 19.0 | 18.7 | 15.9 | 17.5 | 16.3 | 20.7 | 22.5 | 23.2 | 25.7 |
| 23 Sorocaba | 32.6 | 33.3 | 30.2 | 28.8 | 31.1 | 26.5 | 26.1 | 27.5 | 24.6 | 26.1 | 24.2 | 21.7 | 20.0 | 18.7 | 17.7 |
| 24 Aracaju | 32.9 | 33.2 | 29.8 | 29.0 | 26.8 | 26.0 | 24.7 | 23.3 | 22.5 | 23.3 | 21.3 | 20.2 | 19.0 | 18.8 | 19.6 |
| 25 Cuiabá | 16.7 | 14.6 | 12.8 | 11.5 | 11.5 | 13.1 | 13.7 | 13.6 | 11.0 | 13.6 | 11.6 | 16.6 | 19.9 | 21.1 | 21.8 |
| 26 Juiz de Fora | 40.5 | 38.2 | 37.1 | 36.0 | 34.2 | 31.1 | 26.9 | 30.9 | 29.5 | 31.6 | 33.7 | 31.9 | 30.9 | 31.3 | 31.1 |
| 27 Santos | 44.9 | 52.0 | 45.9 | 46.4 | 42.7 | 41.1 | 38.6 | 36.9 | 35.9 | 35.6 | 32.8 | 32.9 | 32.3 | 31.9 | 33.2 |
| 28 S.J. Rio Preto | 53.6 | 55.5 | 49.5 | 46.7 | 45.9 | 43.2 | 44.0 | 41.6 | 37.9 | 39.6 | 40.9 | 36.9 | 36.3 | 34.7 | 36.7 |
| 29 Mogi Cruzes | 54.1 | 52.9 | 58.6 | 56.8 | 54.4 | 54.1 | 54.9 | 50.3 | 49.7 | 51.2 | 48.0 | 43.8 | 44.4 | 43.7 | 44.0 |
| 30 Diadema | 64.4 | 62.3 | 53.5 | 55.8 | 51.5 | 51.0 | 51.1 | 50.1 | 44.1 | 46.5 | 44.2 | 43.6 | 42.7 | 42.6 | 42.3 |
| 31 Betim | 24.6 | 23.7 | 16.3 | 16.1 | 17.8 | 18.5 | 19.1 | 16.6 | 15.5 | 16.1 | 16.5 | 15.8 | 16.4 | 16.2 | 17.7 |
| 32 Olinda | 33.6 | 26.2 | 25.2 | 30.5 | 31.5 | 27.0 | 22.3 | 20.3 | 18.8 | 22.5 | 24.2 | 21.2 | 18.0 | 14.5 | 14.9 |
| 33 Carapicuíba | 59.0 | 69.3 | 49.3 | 37.9 | 33.6 | 40.2 | 41.4 | 42.4 | 44.8 | 46.4 | 37.7 | 38.1 | 39.9 | 27.6 | 28.3 |
| 34 Piracicaba | 44.9 | 36.7 | 35.0 | 39.0 | 34.4 | 27.9 | 25.7 | 28.1 | 25.6 | 28.4 | 26.7 | 25.9 | 25.4 | 24.5 | 24.3 |
| 35 São Vicente | 49.3 | 55.3 | 49.4 | 54.1 | 56.2 | 46.9 | 44.3 | 49.2 | 44.1 | 49.8 | 45.5 | 46.6 | 45.9 | 44.7 | 41.8 |
| 36 Pelotas | 47.7 | 50.3 | 58.8 | 51.3 | 46.1 | 8.4 | 45.1 | 45.0 | 40.9 | 41.5 | 42.2 | 37.3 | 35.9 | 31.4 | 22.8 |
| 37 Vitória | 13.5 | 12.2 | 10.6 | 11.8 | 10.9 | 9.8 | 10.0 | 12.0 | 11.0 | 11.1 | 10.8 | 10.0 | 9.8 | 10.3 | 10.5 |
| 38 Caruaru | 19.6 | 27.4 | 20.6 | 18.1 | 26.1 | 43.8 | 31.3 | 42.8 | 38.0 | 43.5 | 45.7 | 37.0 | 34.1 | 25.0 | 22.8 |
| 39 Vit Conquista | 28.4 | 25.9 | 23.7 | 22.4 | 18.7 | 17.3 | 19.3 | 20.5 | 20.6 | 20.7 | 18.2 | 16.4 | 15.1 | 15.3 | 16.2 |
| 40 S. J. Pinhais | 21.1 | 20.3 | 19.6 | 20.0 | 19.5 | 15.7 | 14.0 | 17.1 | 15.0 | 14.3 | 13.5 | 12.5 | 15.3 | 11.3 | 11.5 |
| 41 Juazeiro Norte | 22.8 | 16.3 | 12.6 | 9.3 | 9.2 | 10.0 | 7.6 | 11.7 | 16.0 | 13.3 | 11.5 | 11.9 | 8.6 | 10.7 | 8.3 |
| 42 Barueri | 4.7 | 4.5 | 4.6 | 4.5 | 4.0 | 3.9 | 4.0 | 3.4 | 2.7 | 2.5 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 |
| 43 Itajaí | 29.2 | 23.4 | 20.7 | 18.5 | 16.0 | 17.8 | 17.9 | 18.8 | 18.6 | 21.2 | 16.9 | 15.7 | 14.0 | 18.1 | 17.5 |
| 44 Palmas | 20.3 | 20.0 | 11.9 | 15.6 | 12.9 | 12.2 | 9.9 | 10.4 | 9.3 | 13.8 | 14.5 | 14.8 | 20.9 | 20.0 | 26.8 |
| 45 Magé | 27.4 | 30.7 | 27.2 | 26.6 | 23.0 | 25.8 | 30.1 | 32.1 | 20.0 | 17.1 | 17.3 | 27.8 | 12.9 | 26.9 | 21.3 |
| 46 Juazeiro | 6.4 | 8.9 | 7.4 | 7.9 | 8.0 | 8.1 | 8.4 | 7.6 | 4.5 | 6.3 | 5.4 | 4.4 | 3.7 | 4.8 | 4.4 |
| 47 Corumbá | 26.0 | 32.7 | 26.6 | 16.8 | 15.8 | 22.7 | 16.8 | 10.7 | 10.9 | 13.2 | 13.2 | 13.4 | 11.9 | 11.2 | 9.9 |
| All Selection (median) | 31.0 | 30.7 | 27.2 | 29.1 | 28.3 | 26.2 | 25.7 | 27.5 | 25.2 | 25.0 | 24.2 | 22.6 | 21.6 | 22.1 | 22.8 |
| Brazil (median) | 17.8 | 17.2 | 12.4 | 12.0 | 14.4 | 12.2 | 9.9 | 9.7 | 9.2 | 9.1 | 8.8 | 9.1 | 8.5 | 9.2 | 9.4 |
| Brazil (ratio of means) | 31.4 | 31.6 | 29.2 | 29.5 | 28.1 | 26.6 | 26.4 | 25.2 | 23.4 | 23.9 | 23.5 | 22.7 | 21.9 | 22.3 | 22.3 |

Data Source: STN (2015).

ANNEXURE D

TABLES FROM CHAPTER 4

Table D1: The Lincoln Institute's database related to property taxation in Brazilian municipalities (2008-2014)

| Municipality | Population 2013 | Year Base | Cadastr e | | | | Exempted Properties | Estimated Cadastral Coverage |
|--------------------|-----------------|-----------|-----------|------|---------|--------|---------------------|------------------------------|
| | | | Total | Res. | Nonres. | Vacant | | |
| 1 Águas Frias | 2,430 | 2014 | 568 | 56% | 16% | 28% | 2% | 92% |
| 2 Alfenas | 77,618 | 2012 | 42,017 | 63% | 11% | 26% | 4% | 98% |
| 3 Ananindeua | 493,976 | 2014 | 132,272 | n.a. | n.a. | n.a. | 23% | 88% |
| 4 Aracajú | 614,577 | 2014 | 211,457 | 77% | 12% | 10% | 24% | 92% |
| 5 Bela Vista | 10,342 | 2014 | 2,850 | 77% | 23% | n.a. | 5% | 57% |
| 6 Belém | 1,425,922 | 2014 | 379,802 | 83% | 7% | 10% | 1% | 87% |
| 7 Belo Horizonte | 2,479,165 | 2014 | 758,876 | 75% | 19% | 7% | 38% | 98% |
| 8 Brasília | 2,789,761 | 2008 | 751,947 | 72% | 16% | 12% | 7% | n.a. |
| 9 Campinas | 1,144,862 | 2008 | 423,000 | 61% | 17% | 21% | 0% | 94% |
| 10 Cascavel | 305,615 | 2010 | 120,695 | 85% | | 13% | 8% | n.a |
| 11 Chapecó | 198,188 | 2014 | 86,877 | n.a. | n.a. | n.a. | 3% | 94% |
| 12 Criciúma | 202,395 | 2014 | 123,500 | 71% | 13% | 16% | 0% | 82% |
| 13 Curitiba | 1,848,946 | 2014 | 600,289 | 68% | 24% | 9% | 23% | n.a |
| 14 Diadema | 406,718 | 2012 | 76,223 | 78% | 18% | 5% | 6% | 85% |
| 15 Fortaleza | 2,551,806 | 2014 | 697,250 | 67% | 20% | 13% | 18% | n.a |
| 16 Gaspar | 62,618 | 2014 | 22,000 | 71% | 13% | 16% | 0% | 85% |
| 17 Goiânia | 1,393,575 | 2010 | 483,375 | 74% | | 26% | 0% | n.a |
| 18 Gov. Valadares | 275,568 | 2008 | 93,590 | n.a. | n.a. | n.a. | 5% | 94% |
| 19 Guarulhos | 1,299,249 | 2012 | 366,568 | 74% | 10% | 17% | 34% | 85% |
| 20 Guaxupé | 51,488 | 2010 | 23,684 | 59% | 14% | 28% | 11% | n.a |
| 21 Indaial | 60,433 | 2014 | 33,334 | 55% | 28% | 13% | 4% | 100% |
| 22 Jab. Guararapes | 675,599 | 2014 | 179,000 | 64% | 8% | 28% | 6% | 75% |
| 23 Joinville | 546,981 | 2014 | 223,866 | 76% | 15% | 9% | 2% | n.a |
| 24 Juiz de Fora | 545,942 | 2009 | 207,384 | 66% | 14% | 20% | 39% | 90% |
| 25 Limeira | 291,748 | 2010 | 111,895 | 68% | 10% | 21% | 0% | n.a |
| 26 Mauá | 444,136 | 2010 | 71,654 | 79% | 17% | 3% | n.a. | n.a |
| 27 Palhoça | 150,623 | 2014 | 127,397 | 47% | 33% | 20% | 0% | 94% |
| 28 Piracicaba | 385,287 | 2012 | 157,663 | 77% | | 23% | 2% | n.a |
| 29 Porto Alegre | 1,467,816 | 2015 | 701,758 | 81% | 15% | 4% | 22% | 83% |
| 30 Rio Branco | 357,194 | 2014 | 102,000 | n.a. | n.a. | n.a. | 0% | 68% |
| 31 Rio de Janeiro | 6,429,923 | 2014 | 1,869,071 | 79% | 12% | 9% | 25% | n.a |
| 32 Santo André | 704,942 | 2014 | 197,637 | 80% | 10% | 10% | 2% | n.a |
| 33 São Paulo | 11,821,873 | 2014 | 3,186,315 | 84% | 13% | 4% | 59% | 89% |
| 34 Sapiroanga | 78,718 | 2014 | 31,865 | 55% | 9% | 36% | 3% | 80% |
| 35 Serra Talhada | 83,051 | 2014 | 36,253 | 57% | 9% | 30% | 2% | 73% |
| 36 Sumaré | 258,556 | 2014 | 137,561 | n.a. | n.a. | n.a. | n.a. | 92% |
| 37 Urussanga | 20,826 | 2014 | 11,473 | 75% | | 25% | 3% | 76% |
| 38 Varginha | 130,139 | 2012 | 51,065 | 65% | 12% | 23% | 6% | n.a |



| Valuations | | | | | | |
|---------------------|------------------|--|-------------------------|---------------------------------|--|------|
| Municipality | Year Base | Valuations (in Billions of R\$) | Assessment Level | Valuators' Qualification | Last Revaluations | |
| 1 | Águas Frias | 2014 | n.a. | n.a. | Architects and Engineers | 2001 |
| 2 | Alfenas | 2012 | 2.07 | n.a. | Tax Officers | 2011 |
| 3 | Ananindeua | 2014 | 0.03 | n.a. | n.a. | 2010 |
| 4 | Aracajú | 2014 | 10.33 | 18% | Engineers | 2015 |
| 5 | Bela Vista | 2014 | n.a. | n.a. | General Officers, Real Estate Agents | n.a. |
| 6 | Belém | 2014 | 18.82 | 30% | General Officers, Architects and Engineers | 1999 |
| 7 | Belo Horizonte | 2014 | 125.76 | 35% | Tax Officers | 2010 |
| 8 | Brasília | 2008 | n.a. | n.a. | General Officers | 2008 |
| 9 | Campinas | 2008 | 45.0 | n.a. | Tax Officers, Architects and Engineers | 2006 |
| 10 | Cascavel | 2010 | 3.35 | 12 - 20% | Agronomists, Architects and Engineers | 2002 |
| 11 | Chapecó | 2014 | n.a. | n.a. | n.a. | n.a. |
| 12 | Criciúma | 2014 | 1.25 | 6% | n.a. | 1971 |
| 13 | Curitiba | 2014 | 65.63 | 25% | Engineers | 2004 |
| 14 | Diadema | 2012 | 8.30 | n.a. | Tax Officers | 2012 |
| 15 | Fortaleza | 2014 | n.a. | 54% | Tax Officers | 2014 |
| 16 | Gaspar | 2014 | n.a. | 20% | General Officers and Real Estate Agents | 2007 |
| 17 | Goiânia | 2010 | n.a. | n.a. | General Officers and Real Estate Agents | n.a. |
| 18 | Gov. Valadares | 2008 | 1.05 | n.a. | General Officers | 1999 |
| 19 | Guarulhos | 2012 | 13.74 | n.a. | General Officers | 2012 |
| 20 | Guaxupé | 2010 | 0.60 | n.a. | n.a. | 2010 |
| 21 | Indaial | 2014 | n.a. | 80% | General Officers | 2014 |
| 22 | Jab. Guararapes | 2014 | 10.09 | 40% | Tax Officers, Architects and Engineers | 2010 |
| 23 | Joinville | 2014 | 13.07 | n.a. | n.a. | 2007 |
| 24 | Juiz de Fora | 2009 | 12.04 | 60% | General Officers, Arch., Engr., RE Agents | 2009 |
| 25 | Limeira | 2010 | 4.99 | n.a. | n.a. | 1998 |
| 26 | Mauá | 2010 | 9.46 | n.a. | Tax Officers | 2012 |
| 27 | Palhoça | 2014 | n.a. | n.a. | n.a. | n.a. |
| 28 | Piracicaba | 2012 | 7.92 | n.a. | n.a. | 1994 |
| 29 | Porto Alegre | 2015 | 73.01 | 19% | Tax Officers, Architects and Engineers | 1992 |
| 30 | Rio Branco | 2014 | n.a. | n.a. | Agronomists, Arch., Engr., Tax Officers | n.a. |
| 31 | Rio de Janeiro | 2014 | n.a. | 54% | Tax Officers | 1998 |
| 32 | Santo André | 2014 | 14.90 | 40% | n.a. | n.a. |
| 33 | São Paulo | 2014 | 967.18 | 59% | Tax Officers | 2014 |
| 34 | Sapiranga | 2014 | n.a. | n.a. | n.a. | n.a. |
| 35 | Serra Talhada | 2014 | n.a. | 80% | No valuers | 2014 |
| 36 | Sumaré | 2014 | n.a. | n.a. | n.a. | 2014 |
| 37 | Urussanga | 2014 | 0.20 | 40% | General Officers, Architects and Engineers | 1991 |
| 38 | Varginha | 2012 | 1.52 | n.a. | Tax Officers | 2010 |

Data Source: Lincoln Institute of Land Policy (2015)



Table D2: Property tax per GDP in 2013: linear regression statistical outcomes from the prediction model

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|---------|----------|-------------------|----------------------------|
| 1 | ,720(a) | ,519 | ,518 | 1,20658 |

a Predictors: (Constant), (Constant), Ln(Pop₂₀₁₂), Ln(GDPpc₂₀₁₂), Ln(INCOMEpc₂₀₁₀), d_metro

ANOVA(b)

| | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|-------|-------------|-------|------|
| Regression | 7,563 | 4 | 1,890 | 1,298 | 0 |
| Residual | 7,020 | 4,822 | 1.455 | | |
| Total | 14,583 | 4,826 | | | |

a Predictors: (Constant), Ln(Pop₂₀₁₂), Ln(GDPpc₂₀₁₂), Ln(INCOMEpc₂₀₁₀), d_metro

b Dependent Variable: Ln(PT_GDP₂₀₁₂)

Coefficients

| | Unstand.Coefficients | | Stand.Coefficients | | |
|-------------------------------|----------------------|------------|--------------------|---------|-------|
| | B | Std. Error | Beta | t | Sig. |
| (Constant) | -29,170 | 0,349 | | -83,502 | 0,000 |
| Ln(GDPpc ₂₀₁₂) | -0,852 | 0,043 | -0,345 | -19,987 | 0,000 |
| Ln(INCOMEpc ₂₀₁₀) | 3,591 | 0,067 | 0,929 | 53,734 | 0,000 |
| Ln(Pop ₂₀₁₂) | 0,193 | 0,016 | 0,131 | 12,227 | 0,000 |
| d_metro | 0,405 | 0,087 | 0,050 | 4,636 | 0,000 |

a Dependent Variable: ln_IPTU_PIB_2013

Coefficient Correlations

| | d_metro | Ln(INCOMEpc ₂₀₁₀) | Ln(Pop ₂₀₁₂) | Ln(GDPpc ₂₀₁₂) |
|-------------------------------|---------|-------------------------------|--------------------------|----------------------------|
| d_metro | 1,000 | -0,032 | -0,343 | -0,056 |
| Ln(INCOMEpc ₂₀₁₀) | -0,032 | 1,000 | -0,060 | -0,808 |
| Ln(Pop ₂₀₁₂) | -0,343 | -0,060 | 1,000 | 0,010 |
| Ln(GDPpc ₂₀₁₂) | -0,056 | -0,808 | 0,010 | 1,000 |

a Dependent Variable: ln_IPTU_PIB_2013

ANNEXURE E

TABLES GENERATED BY THE QUESTIONNAIRES

Table E1: Selected municipalities' number of registered properties per property class; number of households (total and with garbage collection); and estimated residential cadastral coverage (2011-2014)

| Municipality | Year | Registered Properties | | | Households in 2010 | | Res. Coverage | |
|-------------------|------|-----------------------|-----------------|-------------|--------------------|------------------------|---------------|-------|
| | | Residential (A) | Non-residential | Vacant Land | Total (B) | Garbage Collection (C) | (A/B) | (A/C) |
| 1 São Paulo | 2011 | 2,562,498 | 389,150 | 119,775 | 3,898,745 | 3,398,570 | 0.66 | 0.75 |
| 1 Rio de Janeiro | 2011 | 1,422,000 | 213,293 | 170,144 | 2,406,815 | 1,824,766 | 0.59 | 0.78 |
| 1 Salvador | 2012 | 530,692 | 81,054 | 40,758 | 961,206 | 525,851 | 0.55 | 1.01 |
| 1 Brasília | 2011 | 627,561 | 109,117 | 80,524 | 827,233 | 640,863 | 0.76 | 0.98 |
| 1 Fortaleza | 2011 | 441,900 | 122,619 | 93,548 | 779,286 | 663,681 | 0.57 | 0.67 |
| 1 Belo Horizonte | 2012 | 528,870 | 126,865 | 56,137 | 846,488 | 745,388 | 0.62 | 0.71 |
| 1 Manaus | 2013 | 395,022 | 65,000 | 50,000 | 511,191 | 435,381 | 0.86 | 0.91 |
| 1 Curitiba | 2012 | 372,575 | 129,558 | 53,711 | 634,538 | 556,089 | 0.59 | 0.67 |
| 1 Recife | 2013 | 304,291 | 70,494 | 26,073 | 514,715 | 445,776 | 0.59 | 0.68 |
| 1 Porto Alegre | 2012 | 402,248 | 105,471 | 27,814 | 574,039 | 488,544 | 0.70 | 0.82 |
| 1 Goiânia | 2012 | 386,569 | 60,779 | 128,717 | 480,859 | 393,871 | 0.80 | 0.98 |
| 1 Guarulhos | 2011 | 270,251 | 35,600 | 60,717 | 398,887 | 344,328 | 0.68 | 0.78 |
| 1 Campinas | 2013 | 247,114 | 26,284 | 85,829 | 381,006 | 332,569 | 0.63 | 0.74 |
| 1 São Bernardo | 2013 | 169,111 | 18,222 | 15,546 | 255,675 | 209,009 | 0.66 | 0.81 |
| 1 Santo André | 2012 | 148,005 | 21,276 | 16,202 | 240,483 | 203,120 | 0.62 | 0.73 |
| 1 Osasco | 2013 | 120,309 | 12,259 | 6,496 | 214,531 | 187,930 | 0.56 | 0.64 |
| 1 Sorocaba | 2012 | 168,172 | 21,935 | 63,713 | 198,225 | 147,610 | 0.85 | 1.14 |
| 1 Santos | 2013 | 156,004 | 19,600 | 2,636 | 176,792 | 135,669 | 0.88 | 1.15 |
| 1 Mogi Cruzes | 2012 | 83,429 | 12,602 | 35,242 | 120,298 | 110,489 | 0.69 | 0.76 |
| 1 São Vicente | 2014 | 96,609 | 7,842 | 4,804 | 122,043 | 97,056 | 0.79 | 1.00 |
| 1 Vitória | 2011 | 117,981 | 43,509 | 4,106 | 124,115 | 103,452 | 0.95 | 1.14 |
| 1 Barueri | 2013 | 34,082 | 19,054 | 11,698 | 77,528 | 69,669 | 0.39 | 0.49 |
| 2 Teresina | 2014 | 201,020 | 20,672 | 69,751 | 236,330 | 201,144 | 0.85 | 1.00 |
| 2 João Pessoa | 2013 | 232,223 | 39,016 | 37,473 | 241,130 | 206,023 | 0.96 | 1.13 |
| 2 Ribeirão Preto | 2011 | 169,995 | 27,506 | 54,306 | 218,457 | 186,692 | 0.78 | 0.91 |
| 2 Uberlândia | 2012 | 188,358 | 29,370 | 68,812 | 210,832 | 191,079 | 0.89 | 0.99 |
| 2 Contagem | 2012 | 165,998 | 33,086 | 19,515 | 201,482 | 178,340 | 0.82 | 0.93 |
| 2 Diadema | 2012 | 59,284 | 13,464 | 3,475 | 124,278 | 112,927 | 0.48 | 0.52 |
| 2 Carapicuíba | 2013 | 89,098 | 13,313 | 14,101 | 115,486 | 104,221 | 0.77 | 0.85 |
| 2 Aracaju | 2013 | 154,592 | 24,393 | 26,250 | 197,045 | 157,316 | 0.78 | 0.98 |
| 2 Cuiabá | 2013 | 176,202 | 25,786 | 51,411 | 189,060 | 151,075 | 0.93 | 1.17 |
| 2 Juiz de fora | 2013 | 128,210 | 32,323 | 31,957 | 194,436 | 163,591 | 0.65 | 0.78 |
| 2 S. J. Rio Preto | 2014 | 128,154 | 20,862 | 47,748 | 143,419 | 132,568 | 0.89 | 0.97 |
| 2 Piracicaba | 2013 | 107,594 | 17,515 | 39,330 | 126,976 | 109,404 | 0.82 | 0.98 |
| 2 Pelotas | 2013 | 93,622 | 13,990 | 21,762 | 120,860 | 98,493 | 0.77 | 0.95 |
| 2 Itajaí | 2013 | 48,072 | 9,695 | 17,001 | 61,103 | 56,956 | 0.79 | 0.84 |
| 2 Palmas | 2012 | 48,724 | 8,834 | 31,556 | 75,256 | 11,011 | 0.65 | 4.43 |
| 2 S. J. Pinhais | 2013 | 56,904 | 4,521 | 18,430 | 78,483 | 77,457 | 0.73 | 0.73 |
| 3 Betim | 2012 | 112,417 | 7,000 | 32,364 | 123,508 | 109,179 | 0.91 | 1.03 |
| 3 São Gonçalo | 2013 | 253,916 | 25,565 | 71,659 | 345,513 | 289,234 | 0.72 | 0.88 |
| 3 Olinda | 2013 | 95,995 | 11,542 | 18,373 | 122,138 | 103,937 | 0.79 | 0.92 |
| 3 Magé | 2013 | 75,999 | 9,667 | 51,111 | 82,394 | 65,282 | 0.92 | 1.16 |
| 3 Caruaru | 2013 | 104,822 | 74,737 | 61,850 | 100,288 | 90,013 | 1.05 | 1.16 |
| 3 Vit. Conquista | 2013 | 61,401 | 11,016 | 59,165 | 87,061 | 69,251 | 0.71 | 0.89 |
| 3 Juazeiro Norte | 2013 | 58,489 | 9,199 | 48,024 | 72,189 | 62,575 | 0.81 | 0.93 |
| 3 Juazeiro | 2016 | 56,187 | 4,853 | 33,780 | 55,019 | 44,158 | 1.02 | 1.27 |
| 3 Corumbá | 2013 | 20,299 | 3,305 | 11,424 | 28,575 | 23,362 | 0.82 | 0.87 |

Data Source: Municipal Tax Departments and IBGE (2011).



Table E2: Selected municipalities' year of the last cadastral update, the update coverage (total or partial) and if GIS is used (2014, in percentage)

| Municipality | Year | Coverage | GIS | Municipality | Year | Coverage | GIS |
|-------------------|------|----------|------|-------------------------|------|----------|------|
| 1 São Paulo | 2006 | Total | Yes | 2 Teresina | 2002 | Total | Yes |
| 1 Rio de Janeiro | 2014 | Partial | Yes | 2 João Pessoa | 2012 | Partial | Yes |
| 1 Salvador | 2013 | Partial | n.a. | 2 Ribeirão Preto | n.a. | n.a. | n.a. |
| 1 Brasília | 2004 | Total | No | 2 Uberlândia | n.a. | n.a. | n.a. |
| 1 Fortaleza | 2013 | Partial | Yes | 2 Contagem | 2005 | Total | n.a. |
| 1 Belo Horizonte | 2014 | Partial | Yes | 2 Diadema | 2005 | Total | n.a. |
| 1 Manaus | 2011 | Total | Yes | 2 Carapicuíba | 2010 | Total | n.a. |
| 1 Curitiba | 2004 | Total | n.a. | 2 Aracaju | 1995 | Total | Yes |
| 1 Recife | 2000 | Total | Yes | 2 Cuiabá | 2006 | n.a. | n.a. |
| 1 Porto Alegre | 2014 | Partial | Yes | 2 Juiz de Fora | 2010 | Total | Yes |
| 1 Goiânia | 1993 | Total | Yes | 2 São José do Rio Preto | 2002 | Total | Yes |
| 1 Guarulhos | 2012 | Total | Yes | 2 Piracicaba | 2013 | Total | Yes |
| 1 Campinas | 2003 | Partial | Yes | 2 Pelotas | 2009 | Total | Yes |
| 1 São Bernardo | 2007 | Partial | Yes | 2 Itajaí | 2013 | Total | n.a. |
| 1 Santo André | 2014 | Partial | n.a. | 2 Palmas | 2003 | Partial | n.a. |
| 1 Osasco | n.a. | n.a. | n.a. | 2 São José dos Pinhais | 2004 | Partial | Yes |
| 1 Sorocaba | 2006 | Partial | Yes | 3 Betim | 2012 | Total | No |
| 1 Santos | 2005 | Partial | Yes | 3 São Gonçalo | 2008 | Partial | Yes |
| 1 Mogi das Cruzes | 2007 | Total | n.a. | 3 Olinda | 2013 | Partial | Yes |
| 1 São Vicente | 2000 | Partial | No | 3 Magé | 2011 | Total | n.a. |
| 1 Vitória | 2010 | Total | n.a. | 3 Caruaru | 2005 | Partial | n.a. |
| 1 Barueri | 2013 | Partial | n.a. | 3 Vitória da Conquista | 2001 | Total | n.a. |
| | | | | 3 Juazeiro do Norte | 2008 | Partial | n.a. |
| | | | | 3 Juazeiro | 2006 | Total | No |
| | | | | 3 Corumbá | 1998 | Total | No |

Data Source: Municipal Tax Departments.



Table E3: Selected municipalities' last revaluations years of the land zones values and construction costs (2015)

| Municipality | Land | Building | Municipality | Land | Building |
|---------------------|-------------|-----------------|------------------------|-------------|-----------------|
| 1 São Paulo | 2013 | 2013 | 2 Teresina | 2003 | 2003 |
| 1 Rio de Janeiro | 1998 | 1998 | 2 João Pessoa | 1973 | 1973 |
| 1 Salvador | 2014 | 2014 | 2 Ribeirão Preto | 2013 | 2004 |
| 1 Brasília | 2008 | 2008 | 2 Uberlândia | 2014 | 2014 |
| 1 Fortaleza | 2014 | 2014 | 2 Contagem | 2010 | 2010 |
| 1 Belo Horizonte | 2011 | 2011 | 2 Diadema | 2014 | 2014 |
| 1 Manaus | 2012 | 2012 | 2 Carapicuíba | 2011 | 2011 |
| 1 Curitiba | 2005 | 2005 | 2 Aracaju | 1996 | 1996 |
| 1 Recife | 1981 | 1981 | 2 Cuiabá | 2011 | 2011 |
| 1 Porto Alegre | 1992 | 1992 | 2 Juiz de Fora | 2014 | 2006 |
| 1 Goiânia | 2006 | 2006 | 2 S. J. do Rio Preto | 2014 | 2014 |
| 1 Guarulhos | 2013 | 2011 | 2 Piracicaba | 2010 | 2010 |
| 1 Campinas | 2006 | 2006 | 2 Pelotas | 2010 | 1975 |
| 1 São Bernardo | 2002 | 2002 | 2 Itajaí | 2013 | 2003 |
| 1 Santo André | 2003 | 1994 | 2 Palmas | 2013 | 2013 |
| 1 Osasco | 2006 | 2006 | 2 S. J. dos Pinhais | 2007 | 2007 |
| 1 Sorocaba | 2007 | 2007 | 3 Betim | 2002 | 2013 |
| 1 Santos | 2014 | 2014 | 3 São Gonçalo | 2007 | 2008 |
| 1 Mogi das Cruzes | 2003 | 2002 | 3 Olinda | 2005 | 2005 |
| 1 São Vicente | 2011 | 1990 | 3 Magé | 2010 | 2010 |
| 1 Vitória | 2007 | 2007 | 3 Caruaru | 2007 | 2007 |
| 1 Barueri | 1989 | 1989 | 3 Vitória da Conquista | 2014 | 2014 |
| | | | 3 Juazeiro do Norte | 2003 | 2003 |
| | | | 3 Juazeiro | 2015 | 2015 |
| | | | 3 Corumbá | 2007 | 2007 |

Data Source: Municipal Tax Departments (selected municipalities).



Table E4: Selected municipalities' total assessed values, average assessed value per property, properties' market values per GDP and estimated assessment ratio (2011-2014)

| | Municipality | Year Base | Total Assessed Values* | Average Assessed Value** | Market Values per GDP | Total Market Values* | Assessment Ratio |
|---|---------------------|------------------|-------------------------------|---------------------------------|------------------------------|-----------------------------|-------------------------|
| 1 | São Paulo | 2011 | 703,740 | 242,268 | 2.51 | 1,675,571 | 0.42 |
| 1 | Rio de Janeiro | 2011 | 207,083 | 114,699 | 2.90 | 828,332 | 0.25 |
| 1 | Salvador | 2012 | 84,791 | 129,948 | 3.48 | 188,424 | 0.45 |
| 1 | Brasília | 2011 | 169,648 | 207,596 | 2.30 | 514,085 | 0.33 |
| 1 | Fortaleza | 2011 | 48,652 | 73,932 | 3.16 | 173,757 | 0.28 |
| 1 | Belo Horizonte | 2012 | 145,437 | 204,303 | 3.47 | 264,431 | 0.55 |
| 1 | Manaus | 2013 | 36,524 | 71,612 | 2.31 | 166,018 | 0.22 |
| 1 | Curitiba | 2012 | 74,227 | 133,538 | 2.99 | 239,442 | 0.31 |
| 1 | Recife | 2014 | 44,934 | 112,093 | 3.10 | 140,419 | 0.32 |
| 1 | Porto Alegre | 2012 | 102,270 | 190,970 | 3.78 | 237,837 | 0.43 |
| 1 | Goiânia | 2012 | 59,438 | 103,180 | 3.55 | 129,213 | 0.46 |
| 1 | Guarulhos | 2011 | 47,112 | 128,520 | 2.17 | 120,800 | 0.39 |
| 1 | Campinas | 2013 | 56,852 | 158,260 | 2.70 | 145,774 | 0.39 |
| 1 | São Bernardo | 2013 | 66,551 | 328,030 | 2.12 | 112,798 | 0.59 |
| 1 | Santo André | 2012 | 38,844 | 209,414 | 2.96 | 76,165 | 0.51 |
| 1 | Osasco | 2013 | 29,199 | 209,965 | 1.76 | 94,190 | 0.31 |
| 1 | Sorocaba | 2012 | 24,010 | 94,593 | 2.65 | 52,196 | 0.46 |
| 1 | Santos | 2013 | 80,150 | 449,674 | 2.11 | 98,951 | 0.81 |
| 1 | Mogi Cruzes | 2012 | 12,986 | 98,920 | 2.74 | 36,072 | 0.36 |
| 1 | São Vicente | 2014 | 8,678 | 79,431 | 3.88 | 18,865 | 0.46 |
| 1 | Vitória | 2012 | 45,803 | 288,107 | 2.05 | 81,791 | 0.56 |
| 1 | Barueri | 2013 | 5,219 | 80,500 | 1.31 | 52,190 | 0.10 |
| 2 | Teresina | 2014 | 15,789 | 54,212 | 3.28 | 50,932 | 0.31 |
| 2 | João Pessoa | 2013 | 9,271 | 30,029 | 3.58 | 51,506 | 0.18 |
| 2 | Ribeirão Preto | 2011 | 32,660 | 129,704 | 2.86 | 72,578 | 0.45 |
| 2 | Uberlândia | 2012 | 7,308 | 25,504 | 2.49 | 66,436 | 0.11 |
| 2 | Contagem | 2012 | 36,920 | 168,890 | 2.19 | 60,525 | 0.61 |
| 2 | Diadema | 2012 | 11,491 | 150,749 | 2.09 | 32,831 | 0.35 |
| 2 | Carapicuíba | 2012 | 11,178 | 95,932 | 3.76 | 20,324 | 0.55 |
| 2 | Aracaju | 2013 | 11,474 | 55,909 | 3.51 | 45,896 | 0.25 |
| 2 | Cuiabá | 2013 | 46,119 | 181,999 | 3.18 | 52,408 | 0.88 |
| 2 | Juiz de Fora | 2013 | 21,792 | 113,209 | 3.42 | 42,729 | 0.51 |
| 2 | S. J. do Rio Preto | 2014 | 18,249 | 92,745 | 3.11 | 41,475 | 0.44 |
| 2 | Piracicaba | 2013 | 12,204 | 74,219 | 2.60 | 42,083 | 0.29 |
| 2 | Pelotas | 2013 | 11,191 | 86,503 | 3.40 | 22,839 | 0.49 |
| 2 | Itajaí | 2013 | 10,301 | 137,771 | 1.49 | 35,521 | 0.29 |
| 2 | Palmas | 2012 | 5,256 | 58,976 | 3.44 | 20,215 | 0.26 |
| 2 | S. J. dos Pinhais | 2013 | 8,234 | 103,116 | 1.77 | 35,800 | 0.23 |
| 3 | Betim | 2012 | 5,095 | 33,570 | 1.28 | 33,967 | 0.15 |
| 3 | São Gonçalo | 2013 | 16,398 | 46,700 | 3.38 | 52,897 | 0.31 |
| 3 | Olinda | 2013 | 1,954 | 15,511 | 3.80 | 10,856 | 0.18 |
| 3 | Magé | 2013 | 1,855 | 13,566 | 3.35 | 10,306 | 0.18 |
| 3 | Caruaru | 2013 | 6,709 | 27,794 | 3.31 | 16,363 | 0.41 |
| 3 | Vit. da Conquista | 2013 | 2,223 | 16,893 | 3.06 | 15,879 | 0.14 |
| 3 | Juazeiro do Norte | 2013 | 1,732 | 14,964 | 3.33 | 9,622 | 0.18 |
| 3 | Juazeiro | 2016 | 2,055 | 21,676 | 3.76 | 12,575 | 0.16 |
| 3 | Corumbá | 2013 | 1,898 | 54,185 | 2.01 | 9,490 | 0.20 |

Data Source: Municipal Tax Departments (various municipalities), IBGE (2011, 2015).

*In million of R\$ as of 31st December of 2015 (adjusted by IPCA inflation index);

**In R\$ as of 31st December of 2015 (adjusted by IPCA inflation index).



Table E5: Selected municipalities' property tax exemptions (as percentage of total properties on cadastre and total values on valuation roll 2011-2014)

| Municipality | Year Base | Exempted Properties | Exempted Values | Municipality | Year Base | Exempted Properties | Exempted Values |
|-------------------|-----------|---------------------|-----------------|------------------------|-----------|---------------------|-----------------|
| 1 São Paulo | 2011 | 32.3 | 21.5 | 2 João Pessoa | 2013 | 10.8 | 10.7 |
| 1 Rio de Janeiro | 2011 | 60.7 | 33.0 | 2 Teresina | 2014 | 16.9 | 6.7 |
| 1 Salvador | 2012 | 21.9 | n.a. | 2 Ribeirão Preto | 2011 | 0.9 | n.a. |
| 1 Brasília | 2011 | n.a. | 9.5 | 2 Uberlândia | 2012 | 6.9 | n.a. |
| 1 Fortaleza | 2011 | 16.4 | 17.5 | 2 Contagem | 2012 | 75.2 | 56.5 |
| 1 Belo Horizonte | 2012 | 10.9 | n.a. | 2 Diadema | 2012 | 6.2 | n.a. |
| 1 Manaus | 2013 | 7.0 | 0.8 | 2 Carapicuíba | 2012 | 1.5 | n.a. |
| 1 Curitiba | 2012 | 14.2 | n.a. | 2 Aracaju | 2013 | 23.9 | 4.2 |
| 1 Recife | 2014 | 1.2 | n.a. | 2 Cuiabá | 2013 | 8.8 | 2.1 |
| 1 Porto Alegre | 2012 | 22.6 | 17.0 | 2 Juiz de Fora | 2013 | 4.5 | n.a. |
| 1 Goiânia | 2012 | 3.3 | n.a. | 2 São J. R. Preto | 2014 | 7.6 | 3.0 |
| 1 Guarulhos | 2011 | 33.5 | 19.4 | 2 Piracicaba | 2013 | 0.1 | n.a. |
| 1 Campinas | 2013 | 17.5 | 11.1 | 2 Pelotas | 2013 | 28.1 | n.a. |
| 1 São Bernardo | 2013 | 7.7 | 1.7 | 2 Itajaí | 2013 | 10.5 | 6.7 |
| 1 Santo André | 2012 | 7.1 | n.a. | 2 Palmas | 2012 | 6.9 | 2.5 |
| 1 Osasco | 2013 | 17.6 | 8.9 | 2 S. J. dos Pinhais | 2013 | 7.7 | 5.3 |
| 1 Sorocaba | 2012 | 5.3 | n.a. | 3 Betim | 2012 | 73.1 | n.a. |
| 1 Santos | 2013 | 8.6 | 8.1 | 3 São Gonçalo | 2013 | 0.6 | 3.6 |
| 1 Mogi das Cruzes | 2012 | 4.6 | 11.2 | 3 Olinda | 2013 | 5.6 | 8.2 |
| 1 São Vicente | 2014 | 3.4 | 1.5 | 3 Magé | 2013 | 1.0 | 2.8 |
| 1 Vitória | 2012 | 28.3 | 15.8 | 3 Caruaru | 2013 | 1.6 | n.a. |
| 1 Barueri | 2013 | 9.6 | n.a. | 3 Vitória da Conquista | 2013 | 1.2 | n.a. |
| | | | | 3 Juazeiro Norte | 2013 | 0.4 | n.a. |
| | | | | 3 Juazeiro | 2016 | 1.0 | n.a. |
| | | | | 3 Corumbá | 2013 | 16.5 | 8.6 |

Data Source: Municipal Tax Departments (various municipalities).



Table E6: Selected municipalities' statutory tax rates and mechanisms of discretion (2012, per property class, in percentage)

| Municipality | Values Range | | | Mechanism of Discretion | | |
|------------------|--------------|----------------|------------|-------------------------|----------------|------------------------|
| | Residential | Nonresidential | Vacant | Residential | Nonresidential | Vacant |
| 1 São Paulo | 0.8 - 1.6 | 1.2 - 1.8 | 1.2 - 1.8 | Progressive | Progressive | Progressive |
| 1 Rio de Janeiro | 1.2 | 2.8 | 3.5 | Proportionate | Proportionate | Proportionate |
| 1 Salvador | 0.1 - 1.0 | 1.0 - 1.5 | 1.0 - 3.0 | Progressive | Progressive | Progressive |
| 1 Brasília | 0.3 | 1.0 | 3.0 | Proportionate | Proportionate | Proportionate |
| 1 Fortaleza | 0.6 - 1.4 | 1.0 - 2.0 | 1.0 - 2.0 | Progressive | Progressive | Location |
| 1 B. Horizonte | 0.6 - 1.0 | 1.2 - 1.6 | 1.0 - 3.0 | Progressive | Progressive | Location |
| 1 Manaus | 0.9 | 0.9 | 1.5 - 3.0 | Proportionate | Proportionate | Urban Facilities |
| 1 Curitiba | 0.2 - 1.1 | 0.35 - 1.8 | 1.0 - 3.0 | Progressive | Progressive | Progressive |
| 1 Recife | 0.6 - 1.4 | 1.0 - 2.0 | 3.0 | Progressive | Progressive | Proportionate |
| 1 Porto Alegre | 0.85 | 1.1 | 0.95 - 6.0 | Proportionate | Proportionate | Progressive, Loc. |
| 1 Goiânia | 0.2 - 0.55 | 0.5 - 1.0 | 1.0 - 6.0 | Location | Location | Location |
| 1 Guarulhos | 0.3 - 1.4 | 0.8 - 2.0 | 3.5 | Progressive | Progressive | Proportionate |
| 1 Campinas | 0.4 - 0.7 | 1.1 - 2.9 | 2.3 - 2.8 | Progressive | Progressive | Progressive |
| 1 São Bernardo | 0.3 - 0.7 | 0.7 - 1.5 | 1.6 - 2.5 | Progressive | Progressive | Progressive |
| 1 Santo André | 0.3 - 1.0 | 0.5 - 1.2 | 2.0 | Progressive | Progressive | Proportionate |
| 1 Osasco | 1.1 | 1.1 | 2.0 | Proportionate | Proportionate | Proportionate |
| 1 Sorocaba | 1.5 | 1.5 | 3.0 - 6.0 | Proportionate | Proportionate | Progressive |
| 1 Santos | 1.0 | 1.0 | 2.5 | Proportionate | Proportionate | Proportionate |
| 1 Mogi Cruzes | 1.0 | 1.5 | 2.0 - 6.0 | Proportionate | Proportionate | Size and Location |
| 1 São Vicente | 1.3 | 1.3 | 2.0 | Proportionate | Proportionate | Proportionate |
| 1 Vitória | 0.16 - 0.2 | 0.2 - 0.4 | 2.0 - 3.0 | Progressive | Progressive | Progressive |
| 1 Barueri | 0.5 | 0.5 | 1.0 | Proportionate | Proportionate | Proportionate |
| 2 Teresina | 0.2 - 1.0 | 0.2 - 1.2 | 1.2 - 2.6 | Progressive | Progressive | Progressive |
| 2 João Pessoa | 1.0 | 1.5 - 2.0 | 1.5 - 3.0 | Proportionate | Type of Use | Location |
| 2 Ribeirão Preto | 0.4 - 0.6 | 0.4 - 0.6 | 1.6 - 2.2 | Progressive | Progressive | Progressive |
| 2 Uberlândia | 0.4 - 1.0 | 0.4 - 1.0 | 1.0 - 2.0 | Location | Location | Location |
| 2 Contagem | 1.0 | 1.5 | 2.4 - 3.0 | Proportionate | Proportionate | Urban Facilities |
| 2 Diadema | 0.7 - 1.9 | 0.8 - 2.3 | 0.8 - 6.0 | Progressive | Progressive | Progressive |
| 2 Carapicuíba | 0.5 | 0.5 | 1.0 | Proportionate | Proportionate | Proportionate |
| 2 Aracaju | 0.8 | 1.0 - 2.4 | 2.5 - 4.0 | Proportionate | Type of Use | Property Size |
| 2 Cuiabá | 0.4 | 0.4 | 2.0 | Proportionate | Proportionate | Proportionate |
| 2 Juiz de fora | 0.5 - 1.2 | 0.6 - 1.5 | 1.1 - 1.7 | Progressive | Progressive | Progressive |
| 2 S.J. Rio Preto | 1.0 | 1.0 | 3.0 | Proportionate | Proportionate | Proportionate |
| 2 Piracicaba | 0.7 - 4.0 | 0.7 - 4.0 | 2.0 - 5.5 | Progressive | Progressive | Progressive |
| 2 Pelotas | 0.15 - 1.0 | 0.15 - 1.0 | 0.5 - 5.0 | Progressive | Progressive | Progressive |
| 2 Itajaí | 0.3 - 0.45 | 0.75 | 1.25 | Urban Facilities | Proportionate | Proportionate |
| 2 Palmas | 0.25 - 0.5 | 0.4 - 0.8 | 1.5 - 5.0 | Location | Location | Location |
| 2 S. J. Pinhais | 0.3 | 0.3 | 0.1 - 4.0 | Proportionate | Proportionate | Location |
| 3 Betim | 0.3 - 1.0 | 1.0 - 4.0 | 2.5 - 4.5 | Property Size | Use and Size | Property Size |
| 3 São Gonçalo | 0.05 - 1.5 | 0.05 - 1.5 | 0.6 - 2.5 | Progressive | Progressive | Progressive |
| 3 Olinda | 0.8 - 1.0 | 0.8 - 1.0 | 3.0 | Progressive | Progressive | Proportionate |
| 3 Magé | 1.0 - 1.2 | 1.25 - 1.4 | 2.5 - 3.0 | Progressive | Progressive | Progressive |
| 3 Caruaru | 1.0 | 1.0 | 2.0 | Proportionate | Proportionate | Proportionate |
| 3 Vit. Conquista | 1.0 | 1.0 | 1.5 - 2.0 | Proportionate | Proportionate | Urban Facilities |
| 3 Juazeiro Norte | 0.5 | 0.5 | 1.0 - 1.5 | Proportionate | Proportionate | Urban Facilities |
| 3 Juazeiro | 0.75 | 1.0 | 1.8 - 4.0 | Proportionate | Proportionate | Facilities, Size, Loc. |
| 3 Corumbá | 1.0 | 1.0 | 3.0 | Proportionate | Proportionate | Proportionate |

Data Source: Carvalho Jr. (2009) and Municipal tax legislations.



Table E7: Selected municipalities' taxation on assessed values (2011-2014, per property class, in percentage)

| | Municipality | Year Base | Residential | Nonresidential | Vacant Land | Total |
|---|-----------------------|------------------|--------------------|-----------------------|--------------------|--------------|
| 1 | São Paulo | 2011 | 0.75 | 1.48 | 1.47 | 1.02 |
| 1 | Rio de Janeiro | 2011 | 0.83 | 1.82 | 1.91 | 1.30 |
| 1 | Salvador | 2012 | 0.48 | 0.89 | 0.65 | 0.65 |
| 1 | Brasília | 2011 | 0.27 | 0.91 | 2.80 | 0.63 |
| 1 | Fortaleza | 2011 | 0.60 | 1.07 | 1.11 | 0.83 |
| 1 | Belo Horizonte | 2012 | 0.63 | 1.08 | 1.38 | 0.81 |
| 1 | Manaus | 2013 | n.a. | n.a. | n.a. | 0.77 |
| 1 | Curitiba | 2012 | n.a. | n.a. | n.a. | 0.88 |
| 1 | Recife | 2014 | 0.92 | 1.38 | 3.08 | 1.11 |
| 1 | Porto Alegre | 2012 | 0.53 | 0.44 | 0.76 | 0.52 |
| 1 | Goiânia | 2012 | 0.45 | 0.80 | 2.50 | 0.72 |
| 1 | Guarulhos | 2011 | 0.57 | 1.45 | 1.63 | 1.01 |
| 1 | Campinas | 2013 | 0.60 | 1.81 | 1.37 | 0.97 |
| 1 | São Bernardo | 2013 | 0.38 | 0.91 | 1.06 | 0.64 |
| 1 | Santo André | 2012 | 0.45 | 1.00 | 2.00 | 0.76 |
| 1 | Osasco | 2013 | 1.14 | 1.03 | 1.12 | 1.09 |
| 1 | Sorocaba | 2012 | 0.35 | 0.62 | 1.36 | 0.53 |
| 1 | Santos | 2013 | 0.49 | 0.60 | 1.33 | 0.55 |
| 1 | Mogi Cruzes | 2012 | 0.95 | 1.38 | 1.60 | 1.17 |
| 1 | São Vicente | 2014 | 1.26 | 1.28 | 4.00 | 1.82 |
| 1 | Vitória | 2012 | 0.19 | 0.24 | 1.71 | 0.27 |
| 1 | Barueri | 2013 | 0.49 | 0.50 | 1.00 | 0.53 |
| 2 | Teresina | 2014 | 0.38 | 0.55 | 1.58 | 0.50 |
| 2 | João Pessoa | 2013 | 0.90 | 1.11 | 1.36 | 0.99 |
| 2 | Ribeirão Preto | 2011 | 0.45 | 0.55 | 1.22 | 0.61 |
| 2 | Uberlândia* | 2012 | 0.75 | n.a. | 2.00 | 0.84 |
| 2 | Contagem | 2012 | 0.06 | 0.63 | 1.97 | 0.39 |
| 2 | Diadema | 2012 | n.a. | n.a. | n.a. | 1.15 |
| 2 | Carapicuíba* | 2012 | 0.50 | n.a. | 0.91 | 0.66 |
| 2 | Aracaju | 2013 | 0.78 | 1.18 | 3.69 | 1.07 |
| 2 | Cuiabá | 2013 | 0.40 | 0.40 | 2.00 | 0.55 |
| 2 | Juiz de Fora | 2013 | 0.63 | 0.72 | 2.12 | 0.74 |
| 2 | São José do Rio Preto | 2014 | 0.94 | 1.00 | 1.74 | 1.12 |
| 2 | Piracicaba | 2013 | n.a. | n.a. | 1.99 | 1.00 |
| 2 | Pelotas* | 2013 | 0.40 | n.a. | 1.20 | 0.47 |
| 2 | Itajaí | 2013 | 0.40 | 0.63 | 0.85 | 0.56 |
| 2 | Palmas | 2012 | 0.38 | 0.77 | 1.63 | 0.99 |
| 2 | São José dos Pinhais | 2013 | 0.37 | 0.35 | 1.89 | 0.48 |
| 3 | Betim | 2012 | 0.05 | 2.50 | 2.80 | 0.90 |
| 3 | São Gonçalo | 2013 | 0.51 | 0.96 | 1.28 | 0.59 |
| 3 | Olinda | 2013 | 0.85 | 0.97 | 3.00 | 1.01 |
| 3 | Magé | 2013 | 1.15 | 1.35 | 2.78 | 1.40 |
| 3 | Caruaru | 2013 | 0.99 | 1.20 | 2.00 | 1.20 |
| 3 | Vitória da Conquista | 2013 | 0.99 | 1.00 | 2.00 | 1.10 |
| 3 | Juazeiro do Norte | 2013 | 0.65 | 0.65 | 1.00 | 0.79 |
| 3 | Juazeiro* | 2016 | 0.80 | n.a. | 2.00 | 1.01 |
| 3 | Corumbá* | 2013 | 0.79 | n.a. | 1.63 | 0.87 |

Data Source: Municipal Tax Departments (selected municipalities).

*Aggregated values for residential and nonresidential properties. n.a. (not available data).



Table E8: Selected municipalities' taxation on market values (2011-2014)

| Municipality | Year Base | Total | Municipality | Year Base | Total |
|-------------------|-----------|-------|-------------------------|-----------|-------|
| 1 São Paulo | 2011 | 0.43 | 2 João Pessoa | 2013 | 0.18 |
| 1 Rio de Janeiro | 2011 | 0.33 | 2 Teresina | 2014 | 0.16 |
| 1 Salvador | 2012 | 0.29 | 2 Ribeirão Preto | 2011 | 0.27 |
| 1 Brasília | 2011 | 0.21 | 2 Uberlândia | 2012 | 0.09 |
| 1 Fortaleza | 2011 | 0.23 | 2 Contagem | 2012 | 0.24 |
| 1 Belo Horizonte | 2012 | 0.45 | 2 Diadema | 2012 | 0.40 |
| 1 Manaus | 2013 | 0.17 | 2 Carapicuíba | 2012 | 0.36 |
| 1 Curitiba | 2012 | 0.27 | 2 Aracaju | 2013 | 0.27 |
| 1 Recife | 2014 | 0.36 | 2 Cuiabá | 2013 | 0.48 |
| 1 Porto Alegre | 2012 | 0.22 | 2 Juiz de Fora | 2013 | 0.38 |
| 1 Goiânia | 2012 | 0.33 | 2 São José do Rio Preto | 2014 | 0.49 |
| 1 Guarulhos | 2011 | 0.39 | 2 Piracicaba | 2013 | 0.29 |
| 1 Campinas | 2013 | 0.38 | 2 Pelotas | 2013 | 0.23 |
| 1 São Bernardo | 2013 | 0.38 | 2 Itajaí | 2013 | 0.16 |
| 1 Santo André | 2012 | 0.39 | 2 Palmas | 2012 | 0.26 |
| 1 Osasco | 2013 | 0.34 | 2 S. J. dos Pinhais | 2013 | 0.11 |
| 1 Sorocaba | 2012 | 0.24 | 3 Betim | 2012 | n.a. |
| 1 Santos | 2013 | 0.45 | 3 São Gonçalo | 2013 | 0.18 |
| 1 Mogi das Cruzes | 2012 | 0.42 | 3 Olinda | 2013 | 0.14 |
| 1 São Vicente | 2014 | 0.84 | 3 Magé | 2013 | 0.25 |
| 1 Vitória | 2012 | 0.15 | 3 Caruaru | 2013 | 0.49 |
| 1 Barueri | 2013 | 0.05 | 3 Vitória da Conquista | 2013 | 0.15 |
| | | | 3 Juazeiro Norte | 2013 | 0.14 |
| | | | 3 Juazeiro | 2016 | 0.18 |
| | | | 3 Corumbá | 2013 | 0.17 |

Data Source: Municipal Tax Departments (selected municipalities) and IBGE (2011).



Table E9: Property tax collection rate in a sample of 180 municipalities (2000 and 2012)

| | Municipality | Population | 2000 | 2012 | | Municipality | Population | 2000 | 2012 |
|----|-------------------|------------|------|------|-----|---------------------|------------|------|------|
| 1 | São Paulo | 11,376,685 | 0.85 | 0.88 | 91 | Sumaré | 246,247 | 0.52 | 0.69 |
| 2 | Rio de Janeiro | 6,390,290 | 0.77 | 0.82 | 92 | Barueri | 245,652 | 0.84 | 0.90 |
| 3 | Salvador | 2,710,968 | 0.52 | 0.44 | 93 | Embu | 245,148 | 0.74 | 0.56 |
| 4 | Brasília | 2,648,532 | 0.70 | 0.61 | 94 | Palmas | 242,070 | 0.33 | 0.35 |
| 5 | Fortaleza | 2,500,194 | 0.67 | 0.61 | 95 | Viamão | 241,190 | 0.21 | 0.35 |
| 6 | Belo Horizonte | 2,395,785 | 0.81 | 0.82 | 96 | Magé | 228,972 | 0.30 | 0.41 |
| 7 | Manaus | 1,861,838 | 0.23 | 0.44 | 97 | São Carlos | 226,322 | 0.67 | 0.75 |
| 8 | Curitiba | 1,776,761 | 0.83 | 0.84 | 98 | Marília | 219,664 | 0.77 | 0.63 |
| 9 | Recife | 1,555,039 | 0.69 | 0.85 | 99 | Sete Lagoas | 218,574 | 0.35 | 0.75 |
| 10 | Porto Alegre | 1,416,714 | 0.68 | 0.74 | 100 | Divinópolis | 217,404 | 0.48 | 0.72 |
| 11 | Belém | 1,410,430 | 0.22 | 0.43 | 101 | São Leopoldo | 217,189 | 0.47 | 0.75 |
| 12 | Goiânia | 1,333,767 | 0.78 | 0.73 | 102 | Jacareí | 214,223 | 0.58 | 0.71 |
| 13 | Guarulhos | 1,244,518 | 0.62 | 0.69 | 103 | Parnamirim | 214,199 | 0.46 | 0.60 |
| 14 | Campinas | 1,098,630 | 0.75 | 0.76 | 104 | Maracanaú | 213,404 | 0.24 | 0.58 |
| 15 | São Luís | 1,039,610 | 0.25 | 0.25 | 105 | Araraquara | 212,617 | 0.44 | 0.80 |
| 16 | São Gonçalo | 1,016,128 | 0.35 | 0.60 | 106 | Pres. Prudente | 210,393 | 0.76 | 0.75 |
| 17 | Maceió | 953,393 | 0.39 | 0.50 | 107 | Indaiatuba | 209,859 | 0.83 | 0.85 |
| 18 | Duque de Caxias | 867,067 | 0.74 | 0.60 | 108 | Cotia | 209,027 | 0.70 | 0.60 |
| 19 | Teresina | 830,231 | 0.42 | 0.54 | 109 | Itabuna | 205,885 | 0.11 | 0.40 |
| 20 | Natal | 817,590 | 0.32 | 0.60 | 110 | Santa Luzia | 205,666 | 0.31 | 0.43 |
| 21 | Campo Grande | 805,397 | 0.56 | 0.91 | 111 | Rondonópolis | 202,309 | 0.56 | 0.60 |
| 22 | Nova Iguaçu | 801,746 | 0.44 | 0.50 | 112 | Dourados | 200,729 | 0.35 | 0.69 |
| 23 | São Bern. Campo | 774,886 | 0.63 | 0.83 | 113 | Alvorada | 197,441 | 0.74 | 0.65 |
| 24 | João Pessoa | 742,478 | 0.50 | 0.60 | 114 | Criciúma | 195,614 | 0.17 | 0.42 |
| 25 | Santo André | 680,496 | 0.79 | 0.81 | 115 | Cach. Itapemirim | 192,156 | 0.34 | 0.50 |
| 26 | Osasco | 668,877 | 0.60 | 0.32 | 116 | Cabo Frio | 190,787 | 0.79 | 0.43 |
| 27 | Jaboatão | 654,786 | 0.21 | 0.30 | 117 | Cabo St Agostinho | 189,222 | 0.17 | 0.32 |
| 28 | Ribeirão Preto | 619,746 | 0.78 | 0.95 | 118 | Chapecó | 189,052 | 0.54 | 0.78 |
| 29 | Uberlândia | 619,536 | 0.41 | 0.75 | 119 | Rio Claro | 188,977 | 0.62 | 0.90 |
| 30 | Contagem | 613,815 | 0.35 | 0.66 | 120 | Itajaí | 188,791 | 0.36 | 0.66 |
| 31 | Sorocaba | 600,692 | 0.66 | 0.74 | 121 | Passo Fundo | 187,298 | 0.60 | 0.80 |
| 32 | Aracaju | 587,701 | 0.51 | 0.65 | 122 | Rio Verde | 185,465 | 0.29 | 0.95 |
| 33 | Feira de Santana | 568,099 | 0.34 | 0.45 | 123 | Araçatuba | 183,441 | 0.36 | 0.50 |
| 34 | Cuiabá | 561,329 | 0.28 | 0.29 | 124 | Nova Friburgo | 183,391 | 0.32 | 0.60 |
| 35 | Joinville | 526,338 | 0.59 | 0.90 | 125 | Sta Bárbara d'Oeste | 181,509 | 0.88 | 0.82 |
| 36 | Juiz de Fora | 525,225 | 0.63 | 0.55 | 126 | Luziânia | 179,582 | 0.65 | 0.75 |
| 37 | Londrina | 515,707 | 0.64 | 0.72 | 127 | Angra dos Reis | 177,101 | 0.44 | 0.60 |
| 38 | Niterói | 491,807 | 0.67 | 0.75 | 128 | Ferraz Vasconcelos | 172,222 | 0.49 | 0.65 |
| 39 | Belford Roxo | 474,596 | 0.17 | 0.20 | 129 | Guarapuava | 169,252 | 0.41 | 0.50 |
| 40 | Aparecida Goiânia | 474,219 | 0.85 | 0.75 | 130 | Itu | 156,983 | 0.64 | 0.88 |
| 41 | Campos Goytacazes | 472,300 | 0.31 | 0.50 | 131 | Lages | 156,604 | 0.43 | 0.45 |
| 42 | Caxias do Sul | 446,911 | 0.73 | 0.90 | 132 | Poços de Caldas | 154,974 | 0.73 | 0.85 |
| 43 | Porto Velho | 442,701 | 0.18 | 0.30 | 133 | Teixeira Freitas | 143,001 | 0.12 | 0.30 |
| 44 | Florianópolis | 433,158 | 0.74 | 0.85 | 134 | Palhoça | 142,558 | 0.21 | 0.48 |
| 45 | Mauá | 425,169 | 0.56 | 0.75 | 135 | Barreiras | 141,081 | 0.27 | 0.44 |
| 46 | Vila Velha | 424,948 | 0.22 | 0.40 | 136 | Sapucaia do Sul | 132,197 | 0.85 | 0.60 |



| Municipality | Population | 2000 | 2012 | Municipality | Population | 2000 | 2012 |
|-----------------------|------------|------|------|-------------------------|------------|------|------|
| 47 Serra | 422,569 | 0.28 | 0.44 | 137 Botucatu | 130,201 | 0.72 | 0.80 |
| 48 Santos | 419,614 | 0.88 | 0.85 | 138 Varginha | 125,208 | 0.76 | 0.52 |
| 49 São José Rio Preto | 415,769 | 0.54 | 0.80 | 139 Cachoeirinha | 119,896 | 0.23 | 0.65 |
| 50 Macapá | 415,554 | 0.16 | 0.30 | 140 Sinop | 118,833 | 0.61 | 0.60 |
| 51 Mogi das Cruzes | 396,468 | 0.95 | 0.76 | 141 Ji-Paraná | 118,092 | 0.18 | 0.52 |
| 52 Diadema | 390,980 | 0.83 | 0.89 | 142 Votorantim | 108,809 | 0.65 | 0.70 |
| 53 Campina Grande | 389,995 | 0.26 | 0.60 | 143 Passos | 107,661 | 0.46 | 0.76 |
| 54 Betim | 388,873 | 0.24 | 0.50 | 144 Três Lagoas | 105,224 | 0.24 | 0.60 |
| 55 Olinda | 379,271 | 0.30 | 0.35 | 145 Corumbá | 104,912 | 0.27 | 0.39 |
| 56 Jundiá | 377,183 | 0.82 | 0.85 | 146 Ourinhos | 104,420 | 0.59 | 0.75 |
| 57 Carapicuíba | 373,358 | 0.64 | 0.83 | 147 Eunápolis | 102,628 | 0.17 | 0.30 |
| 58 Piracicaba | 369,919 | 0.74 | 0.80 | 148 Ituiutaba | 98,392 | 0.59 | 0.52 |
| 59 Maringá | 367,410 | 0.71 | 0.90 | 149 Erechim | 97,404 | 0.64 | 0.90 |
| 60 Cariacica | 352,431 | 0.11 | 0.52 | 150 Barra do Piraí | 95,726 | 0.25 | 0.57 |
| 61 Rio Branco | 348,354 | 0.78 | 0.25 | 151 Jataí | 89,902 | 0.65 | 0.70 |
| 62 Bauru | 348,146 | 0.65 | 0.87 | 152 Cáceres | 88,897 | 0.06 | 0.25 |
| 63 Anápolis | 342,347 | 0.72 | 0.75 | 153 Moji Mirim | 87,266 | 0.84 | 0.82 |
| 64 Vitória | 333,162 | 0.53 | 0.56 | 154 Pará de Minas | 85,908 | 0.52 | 0.83 |
| 65 Pelotas | 329,435 | 0.87 | 0.60 | 155 Sarandi | 84,573 | 0.17 | 0.55 |
| 66 Itaquaquecetuba | 329,144 | 0.45 | 0.60 | 156 Cachoeira do Sul | 83,217 | 0.52 | 0.68 |
| 67 Canoas | 326,505 | 0.40 | 0.65 | 157 Paranavaí | 82,472 | 0.73 | 0.95 |
| 68 Franca | 323,307 | 0.70 | 0.82 | 158 Esteio | 80,862 | 0.70 | 0.85 |
| 69 Ponta Grossa | 317,339 | 0.63 | 0.65 | 159 Bebedouro | 75,069 | 0.19 | 0.70 |
| 70 Blumenau | 316,139 | 0.30 | 0.81 | 160 Alfenas | 74,804 | 0.66 | 0.52 |
| 71 Vitória Conquista | 315,884 | 0.37 | 0.57 | 161 Caçador | 71,886 | 0.45 | 0.80 |
| 72 Paulista | 306,239 | 0.24 | 0.30 | 162 Sorriso | 71,190 | 0.38 | 0.60 |
| 73 Petrolina | 305,352 | 0.15 | 0.60 | 163 Telêmaco Borba | 71,176 | 0.63 | 0.65 |
| 74 Uberaba | 302,623 | 0.50 | 0.40 | 164 Ouro Preto | 70,886 | 0.25 | 0.59 |
| 75 Petrópolis | 297,192 | 0.84 | 0.75 | 165 São Seb. Paraíso | 65,984 | 0.36 | 0.79 |
| 76 Boa Vista | 296,959 | 0.57 | 0.50 | 166 Nova Odessa | 52,627 | 0.56 | 0.60 |
| 77 Cascavel | 292,372 | 0.34 | 0.67 | 167 Porto Ferreira | 51,999 | 0.58 | 0.75 |
| 78 Taubaté | 283,899 | 0.82 | 0.80 | 168 Alta Floresta | 49,494 | 0.22 | 0.52 |
| 79 Limeira | 280,096 | 0.63 | 0.63 | 169 Diamantina | 46,125 | 0.57 | 0.60 |
| 80 Suzano | 267,583 | 0.48 | 0.73 | 170 Sidrolândia | 44,949 | 0.47 | 0.25 |
| 81 Mossoró | 266,758 | 0.11 | 0.20 | 171 São Francisco Sul | 44,064 | 0.43 | 0.73 |
| 82 Gov. Valadares | 266,190 | 0.49 | 0.58 | 172 Guajará-Mirim | 42,202 | 0.25 | 0.40 |
| 83 Santa Maria | 263,662 | 0.68 | 0.70 | 173 Casimiro de Abreu | 37,340 | 0.72 | 0.50 |
| 84 Volta Redonda | 260,180 | 0.80 | 0.70 | 174 Arcos | 37,188 | 0.54 | 0.64 |
| 85 Gravataí | 259,138 | 0.17 | 0.58 | 175 Eldorado do Sul | 35,412 | 0.22 | 0.53 |
| 86 Várzea Grande | 258,208 | 0.16 | 0.20 | 176 Sta Maria de Jetibá | 34,992 | 0.38 | 0.30 |
| 87 Foz do Iguaçu | 255,718 | 0.36 | 0.65 | 177 Iporá | 31,271 | 0.36 | 0.50 |
| 88 Juazeiro do Norte | 255,648 | 0.07 | 0.23 | 178 Tibagi | 19,482 | 0.64 | 0.35 |
| 89 Camaçari | 255,238 | 0.39 | 0.60 | 179 Santa Fé | 10,668 | 0.83 | 0.80 |
| 90 Imperatriz | 250,063 | 0.21 | 0.30 | 180 São Jorge do Ivaí | 5,506 | 0.39 | 0.80 |

Data Source: IBGE (2001b) and Online regional news (2013).



Table E10: Selected municipalities' collection rates (2011-2014, per property class, in percentage)

| Municipality | Year Base | Built | Vacant Land | Total | Municipality | Year Base | Built | Vacant Land | Total |
|-------------------|-----------|-------|-------------|-------|---------------------|-----------|-------|-------------|-------|
| 1 São Paulo | 2011 | 89 | 78 | 88 | 2 Teresina | 2014 | n.a. | n.a. | 69 |
| 1 Rio de Janeiro | 2011 | 85 | 40 | 82 | 2 João Pessoa | 2013 | 66 | 67 | 66 |
| 1 Salvador | 2012 | 80 | 36 | 72 | 2 Ribeirão Preto | 2011 | 85 | 70 | 80 |
| 1 Brasília | 2011 | 76 | 38 | 60 | 2 Uberlândia | 2012 | n.a. | n.a. | 60 |
| 1 Fortaleza | 2011 | 77 | 42 | 71 | 2 Contagem | 2012 | 77 | 50 | 66 |
| 1 B. Horizonte | 2012 | 87 | 51 | 82 | 2 Diadema | 2012 | n.a. | n.a. | 89 |
| 1 Manaus | 2013 | n.a. | n.a. | 46 | 2 Carapicuíba | 2012 | 66 | 43 | 53 |
| 1 Curitiba | 2012 | n.a. | n.a. | 84 | 2 Aracaju | 2013 | 77 | 51 | 72 |
| 1 Recife | 2014 | n.a. | n.a. | 81 | 2 Cuiabá | 2013 | 48 | 35 | 44 |
| 1 Porto Alegre | 2012 | n.a. | n.a. | 74 | 2 Juiz de Fora | 2013 | n.a. | n.a. | 81 |
| 1 Goiânia | 2012 | 80 | 57 | 74 | 2 S.J. do Rio Preto | 2014 | 85 | 72 | 80 |
| 1 Guarulhos | 2011 | 73 | 50 | 70 | 2 Piracicaba | 2013 | n.a. | n.a. | 71 |
| 1 Campinas | 2013 | 90 | 65 | 83 | 2 Pelotas | 2013 | n.a. | n.a. | 61 |
| 1 São Bernardo | 2013 | 81 | 95 | 83 | 2 Itajaí | 2013 | 68 | 56 | 66 |
| 1 Santo André | 2012 | 81 | 54 | 78 | 2 Palmas | 2012 | n.a. | n.a. | 65 |
| 1 Osasco | 2013 | n.a. | n.a. | 77 | 2 S. J. dos Pinhais | 2013 | 83 | 53 | 74 |
| 1 Sorocaba | 2012 | 77 | 65 | 74 | 3 Betim | 2012 | n.a. | n.a. | 61 |
| 1 Santos | 2013 | 86 | 75 | 85 | 3 São Gonçalo | 2013 | 50 | 35 | 49 |
| 1 Mogi das Cruzes | 2012 | 77 | 70 | 76 | 3 Olinda | 2013 | 49 | 13 | 44 |
| 1 São Vicente | 2014 | 80 | 45 | 70 | 3 Magé | 2013 | 54 | 17 | 41 |
| 1 Vitória | 2012 | 83 | 46 | 69 | 3 Caruaru | 2013 | n.a. | n.a. | 50 |
| 1 Barueri | 2013 | n.a. | n.a. | 90 | 3 Vit. Conquista | 2013 | n.a. | n.a. | 58 |
| | | | | | 3 Juazeiro Norte | 2013 | 34 | 13 | 28 |
| | | | | | 3 Juazeiro | 2016 | n.a. | n.a. | 11 |
| | | | | | 3 Corumbá | 2013 | 49 | 44 | 48 |

Data Source: Municipal Tax Departments (selected municipalities).

Table E11: Selected municipalities' share of Residential (Res), Nonresidential (NRes) and Vacant Land (Vac) properties on total properties, assessed values, liabilities and collection (2011-2014)

| Municipality | Year Base | Properties | | | Assessed Values | | | Liability | | | Collection | |
|----------------------|-----------|------------|------|-----|-----------------|------|------|-----------|------|------|------------|------|
| | | Res | NRes | Vac | Res | NRes | Vac | Res | NRes | Vac | Built | Vac |
| 1 São Paulo | 2011 | 83 | 13 | 04 | 60 | 37 | 03 | 45 | 51 | 04 | 97 | 3 |
| 1 Rio de Janeiro | 2011 | 79 | 12 | 09 | 55 | 41 | 03 | 39 | 54 | 07 | 97 | 3 |
| 1 Salvador | 2012 | 81 | 12 | 06 | 47 | 34 | 19 | 17 | 36 | 47 | 90 | 10 |
| 1 Brasília | 2011 | 77 | 13 | 10 | 71 | 20 | 09 | 30 | 30 | 40 | 75 | 25 |
| 1 Fortaleza | 2011 | 67 | 19 | 14 | 52 | 33 | 14 | 38 | 43 | 19 | 89 | 11 |
| 1 B. Horizonte | 2012 | 74 | 18 | 08 | 67 | 24 | 09 | 52 | 32 | 16 | 90 | 10 |
| 1 Manaus | 2013 | 77 | 13 | 10 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1 Curitiba | 2012 | 67 | 23 | 10 | 62 | 33 | 05 | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1 Recife | 2014 | 76 | 18 | 07 | 65 | 33 | 02 | 53 | 41 | 05 | n.a. | n.a. |
| 1 Porto Alegre | 2012 | 75 | 20 | 05 | 49 | 40 | 11 | 50 | 34 | 15 | n.a. | n.a. |
| 1 Goiânia | 2012 | 67 | 11 | 22 | 64 | 27 | 08 | 40 | 31 | 29 | 77 | 23 |
| 1 Guarulhos | 2011 | 74 | 10 | 17 | 53 | 34 | 13 | 30 | 49 | 22 | 84 | 16 |
| 1 Campinas | 2013 | 69 | 07 | 24 | 62 | 18 | 20 | 37 | 32 | 31 | 79 | 21 |
| 1 São Bernardo | 2013 | 83 | 09 | 08 | 53 | 39 | 08 | 31 | 55 | 14 | 84 | 16 |
| 1 Santo André | 2012 | 80 | 11 | 09 | 54 | 41 | 05 | 32 | 54 | 14 | 90 | 10 |
| 1 Osasco | 2013 | 87 | 09 | 05 | 54 | 39 | 06 | 57 | 37 | 06 | n.a. | n.a. |
| 1 Sorocaba | 2012 | 66 | 09 | 25 | 64 | 25 | 11 | 42 | 30 | 28 | 75 | 25 |
| 1 Santos | 2013 | 88 | 11 | 01 | 71 | 25 | 04 | 63 | 27 | 09 | 92 | 8 |
| 1 Mogi Cruzes | 2012 | 67 | 10 | 27 | 57 | 29 | 14 | 47 | 34 | 19 | 82 | 18 |
| 1 São Vicente | 2014 | 88 | 07 | 04 | 66 | 14 | 20 | 57 | 12 | 31 | 65 | 35 |
| 1 Vitória | 2012 | 71 | 26 | 02 | 47 | 49 | 04 | 32 | 46 | 22 | 86 | 14 |
| 1 Barueri | 2013 | 53 | 29 | 18 | 53 | 41 | 06 | 50 | 38 | 12 | n.a. | n.a. |
| 2 Teresina | 2014 | 69 | 07 | 24 | 62 | 32 | 07 | 47 | 35 | 18 | n.a. | n.a. |
| 2 João Pessoa | 2013 | 75 | 13 | 12 | 61 | 36 | 03 | 56 | 40 | 04 | 95 | 5 |
| 2 Ribeirão Preto | 2011 | 68 | 11 | 22 | 61 | 22 | 18 | 49 | 20 | 31 | 72 | 28 |
| 2 Uberlândia | 2012 | 66 | 10 | 24 | n.a. | n.a. | 07 | n.a. | n.a. | 16 | 84 | 16 |
| 2 Contagem | 2012 | 76 | 15 | 09 | 59 | 33 | 08 | 08 | 52 | 39 | 70 | 30 |
| 2 Diadema | 2012 | 78 | 18 | 05 | 53 | 45 | 03 | n.a. | n.a. | n.a. | n.a. | n.a. |
| 2 Carapicuíba | 2013 | n.a. | n.a. | 12 | n.a. | n.a. | 40 | n.a. | n.a. | 55 | 56 | 44 |
| 2 Aracaju | 2013 | 75 | 12 | 13 | 64 | 30 | 06 | 47 | 33 | 20 | 86 | 14 |
| 2 Cuiabá | 2013 | 70 | 10 | 20 | 58 | 33 | 10 | 42 | 24 | 35 | 72 | 28 |
| 2 Juiz de Fora | 2013 | 67 | 17 | 17 | 67 | 27 | 06 | 57 | 26 | 17 | n.a. | n.a. |
| 2 S. J. do Rio Preto | 2014 | n.a. | n.a. | 24 | n.a. | n.a. | 21 | n.a. | n.a. | 33 | 70 | 30 |
| 2 Piracicaba | 2013 | n.a. | n.a. | 25 | n.a. | n.a. | 19 | n.a. | n.a. | 38 | n.a. | n.a. |
| 2 Pelotas | 2013 | 72 | 11 | 17 | n.a. | n.a. | 10 | n.a. | n.a. | 22 | n.a. | n.a. |
| 2 Itajaí | 2013 | 64 | 13 | 23 | 47 | 37 | 15 | 34 | 42 | 23 | 80 | 20 |
| 2 Palmas | 2012 | 55 | 10 | 35 | 42 | 14 | 44 | 16 | 11 | 73 | n.a. | n.a. |
| 2 S. J. dos Pinhais | 2013 | 73 | 06 | 21 | 54 | 38 | 08 | 43 | 26 | 32 | 77 | 23 |
| 3 Betim | 2012 | 74 | 05 | 21 | 67 | 20 | 13 | 03 | 55 | 42 | n.a. | n.a. |
| 3 São Gonçalo | 2013 | 72 | 07 | 20 | 83 | 14 | 03 | 63 | 35 | 13 | 94 | 6 |
| 3 Olinda | 2013 | 76 | 09 | 15 | 75 | 18 | 07 | 71 | 17 | 13 | 96 | 4 |
| 3 Magé | 2013 | 56 | 07 | 37 | 70 | 17 | 13 | 51 | 14 | 35 | 85 | 15 |
| 3 Caruaru | 2013 | 43 | 31 | 26 | n.a. | n.a. | 15 | n.a. | n.a. | 25 | n.a. | n.a. |
| 3 Vit. da Conquista | 2013 | 47 | 08 | 45 | 66 | 23 | 11 | 59 | 21 | 20 | n.a. | n.a. |
| 3 Juazeiro do Norte | 2013 | 51 | 08 | 42 | 41 | 20 | 39 | 34 | 16 | 50 | 74 | 26 |
| 3 Juazeiro | 2016 | 59 | 05 | 36 | n.a. | n.a. | 17 | n.a. | n.a. | 34 | n.a. | n.a. |
| 3 Corumbá | 2013 | 58 | 09 | 32 | n.a. | n.a. | 09 | n.a. | n.a. | 18 | 84 | 16 |

Data Source: Municipal Tax Departments. n.a. (not available).



Table E12: Selected municipalities' compliance and enforcement policies applied (2011-2014)

| Municipality | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 São Paulo | x | - | 10 | 6% | x | x | x | - | - | x | - |
| 1 Rio de Janeiro | - | x | 10 | 7% | x | x | x | - | - | x | x |
| 1 Salvador | n.a. | n.a. | 11 | 10% | x | x | x | - | - | x | - |
| 1 Brasília | x | - | 6 | 5% | x | - | x | - | x | x | - |
| 1 Fortaleza | n.a. | n.a. | 11 | 10% | x | x | x | - | x | x | - |
| 1 Belo Horizonte | x | x | 11 | 7% | x | - | x | - | x | x | x |
| 1 Manaus | n.a. | n.a. | 10 | 17% | x | - | x | - | x | x | - |
| 1 Curitiba | n.a. | n.a. | 10 | 6% | x | x | x | - | - | x | - |
| 1 Recife | x | - | 10 | 5% | x | x | x | - | x | x | - |
| 1 Porto Alegre | - | x | 10 | 12% | x | x | x | - | - | - | - |
| 1 Goiânia | - | - | 11 | 10% | x | x | x | - | - | x | - |
| 1 Guarulhos | n.a. | n.a. | 12 | 15% | x | - | x | - | x | x | - |
| 1 Campinas | - | - | 11 | 8% | x | x | x | - | x | x | - |
| 1 São Bernardo | - | - | 12 | 5% | x | x | x | - | x | x | - |
| 1 Santo André | n.a. | n.a. | 10 | 10% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1 Osasco | n.a. | n.a. | 10 | 5% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1 Sorocaba | - | - | 10 | 5% | x | x | x | - | - | - | - |
| 1 Santos | - | - | 12 | 2% | x | - | x | - | - | x | x |
| 1 Mogi das Cruzes | n.a. | n.a. | 6 | 5% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1 São Vicente | - | - | 12 | 6% | x | x | x | - | x | x | x |
| 1 Vitória | n.a. | n.a. | 10 | 8% | x | x | x | - | - | x | - |
| 1 Barueri | - | x | 2 | 0% | x | - | x | - | - | x | - |
| 2 Teresina | - | x | 6 | 7% | x | - | x | - | - | x | - |
| 2 João Pessoa | x | - | 10 | 15% | x | - | x | - | - | x | - |
| 2 Ribeirão Preto | - | x | 12 | 10% | x | - | x | - | x | x | x |
| 2 Uberlândia | n.a. | n.a. | 6 | 10% | x | - | x | - | - | x | - |
| 2 Contagem | - | - | 10 | 7% | x | - | x | - | - | - | x |
| 2 Diadema | n.a. | n.a. | 10 | 10% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 2 Carapicuíba | n.a. | n.a. | 10 | 15% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 2 Aracaju | - | x | 10 | 10% | - | - | x | - | - | x | x |
| 2 Cuiabá | n.a. | n.a. | 6 | 10% | x | - | x | - | x | n.a. | n.a. |
| 2 Juiz de Fora | - | x | 10 | 8% | x | - | x | - | - | x | - |
| 2 S.J. Rio Preto | x | - | 10 | 9% | x | - | x | - | - | - | - |
| 2 Piracicaba | - | x | 10 | 5% | x | x | x | - | - | - | - |
| 2 Pelotas | x | - | 10 | 15% | x | - | x | - | - | - | - |
| 2 Itajaí | - | - | 10 | 15% | x | x | x | - | - | x | - |
| 2 Palmas | - | - | 10 | 30% | x | - | x | - | - | x | - |
| 2 S. J. dos Pinhais | - | x | 8 | 10% | x | x | x | - | - | x | - |
| 3 Betim | x | - | 6 | 6% | x | - | x | - | - | x | x |
| 3 São Gonçalo | n.a. | n.a. | 12 | 12% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 3 Olinda | x | x | 10 | 30% | x | - | x | - | - | x | - |
| 3 Magé | n.a. | n.a. | 9 | 10% | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 3 Caruaru | x | x | 10 | 10% | - | - | x | - | - | x | - |
| 3 Vitória da Conquista | x | - | 9 | 10% | x | - | x | - | - | x | - |
| 3 Juazeiro Norte | x | - | 4 | 20% | x | - | x | - | - | x | - |
| 3 Juazeiro | - | x | 9 | 30% | x | - | x | - | x | x | - |
| 3 Corumbá | x | - | 8 | 30% | x | x | x | - | - | x | - |
| Respondents | 32 | 32 | 47 | 47 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Respondents as "yes" | 13 | 13 | - | - | 38 | 17 | 40 | 0 | 12 | 34 | 8 |

Data Source: Municipal Tax Departments. n.a. (not available data)

Q1: Advertising of property taxation; Q2: Recurrent taxpayers' re-registration;

Q3: Number of maximum installments; Q4: Discount for advanced lump-sum payment;

Q5: Possibility of payment in most of banking network and lottery offices;

Q6: Possibility of automatic direct debit on taxpayer banking account or credit cards;

Q7: Judicial tax liens to recover the arrears; Q8: Tax arrears outsourcing;

Q9: Inclusion of delinquent taxpayers on the national black list registers "SPC" and "Serasa Experian";

Q10: Inclusion of delinquent taxpayers on own running municipal black list register;

Q11: Public auction of the properties in arrears.

ANNEXURE F

**OUTCOMES GENERATED BY
THE LINEAR REGRESSION MODEL
USING IBM/SPSS 19.0**



Table F1: Selected municipalities' terms of the property tax performance model (2011-2014)

| | Municipality | Revenues per GDP | Market Values per GDP | Values Coverage | Assessment Ratio | Taxation Assessed Values | Taxation Market Values | Collection Rate | Error Term |
|---|----------------|------------------|-----------------------|-----------------|------------------|--------------------------|------------------------|-----------------|------------|
| 1 | São Paulo | 0.0095 | 2.51 | 0.95 | 0.42 | 0.0102 | 0.0043 | 0.88 | 1.06 |
| 1 | Rio de Janeiro | 0.0073 | 2.90 | 0.90 | 0.25 | 0.0130 | 0.0033 | 0.82 | 1.05 |
| 1 | Salvador | 0.0067 | 3.48 | 0.80 | 0.45 | 0.0065 | 0.0029 | 0.72 | 1.14 |
| 1 | Brasília | 0.0027 | 2.30 | 0.90 | 0.33 | 0.0063 | 0.0021 | 0.60 | 1.05 |
| 1 | Fortaleza | 0.0041 | 3.16 | 0.90 | 0.28 | 0.0083 | 0.0023 | 0.71 | 0.87 |
| 1 | Belo Horizonte | 0.0119 | 3.47 | 0.95 | 0.55 | 0.0081 | 0.0045 | 0.82 | 0.99 |
| 1 | Manaus | 0.0018 | 2.31 | 0.90 | 0.22 | 0.0077 | 0.0017 | 0.46 | 1.11 |
| 1 | Curitiba | 0.0066 | 2.99 | 0.90 | 0.31 | 0.0088 | 0.0027 | 0.84 | 1.07 |
| 1 | Recife | 0.0068 | 3.10 | 0.80 | 0.32 | 0.0111 | 0.0036 | 0.81 | 0.95 |
| 1 | Porto Alegre | 0.0059 | 3.78 | 0.90 | 0.43 | 0.0052 | 0.0027 | 0.74 | 1.05 |
| 1 | Goiânia | 0.0088 | 3.55 | 0.90 | 0.46 | 0.0072 | 0.0033 | 0.74 | 1.12 |
| 1 | Guarulhos | 0.0053 | 2.17 | 0.95 | 0.39 | 0.0101 | 0.0039 | 0.71 | 0.92 |
| 1 | Campinas | 0.0082 | 2.70 | 0.90 | 0.39 | 0.0097 | 0.0038 | 0.83 | 1.07 |
| 1 | São Bernardo | 0.0072 | 2.12 | 0.95 | 0.59 | 0.0064 | 0.0038 | 0.83 | 1.14 |
| 1 | Santo André | 0.0094 | 2.96 | 0.90 | 0.51 | 0.0076 | 0.0039 | 0.81 | 1.12 |
| 1 | Osasco | 0.0040 | 1.76 | 0.80 | 0.31 | 0.0109 | 0.0034 | 0.77 | 1.09 |
| 1 | Sorocaba | 0.0045 | 2.65 | 0.90 | 0.46 | 0.0053 | 0.0024 | 0.75 | 1.03 |
| 1 | Santos | 0.0065 | 2.11 | 0.90 | 0.81 | 0.0055 | 0.0045 | 0.85 | 0.90 |
| 1 | Mogi Cruzes | 0.0085 | 2.74 | 0.90 | 0.36 | 0.0117 | 0.0042 | 0.76 | 1.08 |
| 1 | São Vicente | 0.0201 | 3.88 | 0.85 | 0.46 | 0.0182 | 0.0084 | 0.70 | 1.04 |
| 1 | Vitória | 0.0017 | 2.05 | 0.90 | 0.56 | 0.0027 | 0.0015 | 0.69 | 0.88 |
| 1 | Barueri | 0.0006 | 1.31 | 0.90 | 0.10 | 0.0053 | 0.0005 | 0.90 | 1.07 |
| 2 | Teresina | 0.0032 | 3.28 | 0.90 | 0.31 | 0.0050 | 0.0016 | 0.69 | 1.01 |
| 2 | João Pessoa | 0.0033 | 3.58 | 0.90 | 0.18 | 0.0099 | 0.0018 | 0.66 | 0.87 |
| 2 | Ribeirão Preto | 0.0056 | 2.86 | 0.90 | 0.45 | 0.0061 | 0.0027 | 0.80 | 0.99 |
| 2 | Uberlândia | 0.0016 | 2.49 | 0.90 | 0.11 | 0.0084 | 0.0009 | 0.60 | 1.29 |
| 2 | Contagem | 0.0026 | 2.19 | 0.85 | 0.61 | 0.0039 | 0.0024 | 0.66 | 0.89 |
| 2 | Diadema | 0.0073 | 2.09 | 0.85 | 0.35 | 0.0115 | 0.0040 | 0.89 | 1.15 |
| 2 | Carapicuíba | 0.0069 | 3.76 | 0.90 | 0.55 | 0.0066 | 0.0036 | 0.53 | 1.06 |
| 2 | Aracaju | 0.0062 | 3.51 | 0.90 | 0.25 | 0.0107 | 0.0027 | 0.72 | 1.02 |
| 2 | Cuiabá | 0.0058 | 3.18 | 0.90 | 0.88 | 0.0055 | 0.0048 | 0.44 | 0.95 |
| 2 | Juiz de Fora | 0.0086 | 3.42 | 0.90 | 0.51 | 0.0074 | 0.0038 | 0.81 | 0.91 |
| 2 | S.J. Rio Preto | 0.0104 | 3.11 | 0.90 | 0.44 | 0.0112 | 0.0049 | 0.80 | 0.94 |
| 2 | Piracicaba | 0.0051 | 2.60 | 0.90 | 0.29 | 0.0100 | 0.0029 | 0.71 | 1.06 |
| 2 | Pelotas | 0.0049 | 3.40 | 0.95 | 0.49 | 0.0047 | 0.0023 | 0.72 | 0.91 |
| 2 | Itajaí | 0.0014 | 1.49 | 0.85 | 0.29 | 0.0056 | 0.0016 | 0.66 | 1.03 |
| 2 | Palmas | 0.0051 | 3.44 | 0.80 | 0.26 | 0.0099 | 0.0026 | 0.65 | 1.11 |
| 2 | S. J. Pinhais | 0.0011 | 1.77 | 0.85 | 0.23 | 0.0048 | 0.0011 | 0.74 | 0.89 |
| 3 | Betim | 0.0010 | 1.28 | 0.90 | 0.15 | 0.0090 | 0.0014 | 0.63 | 1.02 |
| 3 | São Gonçalo | 0.0033 | 3.38 | 0.90 | 0.31 | 0.0059 | 0.0018 | 0.50 | 1.19 |
| 3 | Olinda | 0.0030 | 3.80 | 0.90 | 0.18 | 0.0100 | 0.0018 | 0.44 | 1.11 |
| 3 | Magé | 0.0031 | 3.35 | 0.80 | 0.18 | 0.0140 | 0.0025 | 0.41 | 1.12 |
| 3 | Caruaru | 0.0051 | 3.31 | 0.80 | 0.41 | 0.0120 | 0.0049 | 0.45 | 0.87 |
| 3 | Vit. Conquista | 0.0025 | 3.06 | 0.85 | 0.14 | 0.0110 | 0.0015 | 0.58 | 1.08 |
| 3 | Juazeiro Norte | 0.0012 | 3.33 | 0.85 | 0.18 | 0.0079 | 0.0014 | 0.28 | 1.06 |
| 3 | Juazeiro | 0.0005 | 3.76 | 0.90 | 0.16 | 0.0101 | 0.0016 | 0.11 | 0.83 |
| 3 | Corumbá | 0.0014 | 2.01 | 0.80 | 0.20 | 0.0087 | 0.0017 | 0.48 | 1.04 |

Data Source: Municipal Tax Departments (selected municipalities) and IBGE (2011, 2015).

Table F2: Selected municipalities' property tax per GDP: baseline and established scenarios (2012, in percentage)

| Municipality | Baseline | Scen. 1a | Scen. 2a | Scen. 3a | Scen. 1b | Scen. 2b | Scen. 3b |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|
| 1 São Paulo | 0.95 | 0.96 | 0.96 | 1.11 | 0.97 | 0.97 | 1.42 |
| 1 Rio de Janeiro | 0.73 | 0.79 | 0.79 | 1.19 | 0.80 | 0.85 | 1.62 |
| 1 Salvador | 0.67 | 0.80 | 0.92 | 1.59 | 0.82 | 0.97 | 2.11 |
| 1 Brasília | 0.27 | 0.40 | 0.40 | 0.95 | 0.41 | 0.43 | 1.29 |
| 1 Fortaleza | 0.41 | 0.50 | 0.50 | 1.08 | 0.51 | 0.53 | 1.46 |
| 1 Belo Horizonte | 1.19 | 1.28 | 1.28 | 1.42 | 1.31 | 1.31 | 1.83 |
| 1 Manaus | 0.18 | 0.34 | 0.34 | 1.00 | 0.35 | 0.37 | 1.37 |
| 1 Curitiba | 0.66 | 0.68 | 0.68 | 1.25 | 0.69 | 0.73 | 1.70 |
| 1 Recife | 0.68 | 0.74 | 0.85 | 1.18 | 0.75 | 0.90 | 1.57 |
| 1 Porto Alegre | 0.59 | 0.70 | 0.70 | 1.29 | 0.72 | 0.76 | 1.76 |
| 1 Goiânia | 0.88 | 1.03 | 1.03 | 1.56 | 1.05 | 1.11 | 2.12 |
| 1 Guarulhos | 0.53 | 0.64 | 0.64 | 0.83 | 0.66 | 0.66 | 1.06 |
| 1 Campinas | 0.82 | 0.86 | 0.86 | 1.13 | 0.88 | 0.93 | 1.54 |
| 1 São Bernardo | 0.72 | 0.76 | 0.76 | 1.00 | 0.78 | 0.78 | 1.29 |
| 1 Santo André | 0.94 | 1.01 | 1.01 | 1.30 | 1.04 | 1.09 | 1.77 |
| 1 Osasco | 0.40 | 0.45 | 0.52 | 0.77 | 0.46 | 0.55 | 1.02 |
| 1 Sorocaba | 0.45 | 0.51 | 0.51 | 1.07 | 0.52 | 0.55 | 1.45 |
| 1 Santos | 0.65 | 0.67 | 0.67 | 0.74 | 0.68 | 0.72 | 1.01 |
| 1 Mogi Cruzes | 0.85 | 0.97 | 0.97 | 1.16 | 1.00 | 1.05 | 1.58 |
| 1 São Vicente | 2.01 | 2.51 | 2.71 | 2.71 | 2.56 | 2.87 | 2.87 |
| 1 Vitória | 0.17 | 0.21 | 0.21 | 0.71 | 0.22 | 0.23 | 0.96 |
| 1 Barueri | 0.06 | 0.06 | 0.06 | 0.57 | 0.06 | 0.06 | 0.76 |
| 2 Teresina | 0.32 | 0.38 | 0.38 | 0.88 | 0.40 | 0.41 | 1.24 |
| 2 João Pessoa | 0.33 | 0.40 | 0.40 | 0.83 | 0.42 | 0.44 | 1.17 |
| 2 Ribeirão Preto | 0.56 | 0.55 | 0.55 | 0.75 | 0.58 | 0.60 | 1.06 |
| 2 Uberlândia | 0.16 | 0.21 | 0.21 | 0.86 | 0.22 | 0.23 | 1.20 |
| 2 Contagem | 0.26 | 0.32 | 0.34 | 0.52 | 0.33 | 0.37 | 0.73 |
| 2 Diadema | 0.73 | 0.73 | 0.77 | 0.77 | 0.73 | 0.80 | 0.95 |
| 2 Carapicuíba | 0.69 | 1.03 | 1.03 | 1.06 | 1.08 | 1.12 | 1.49 |
| 2 Aracaju | 0.62 | 0.70 | 0.70 | 0.95 | 0.73 | 0.76 | 1.34 |
| 2 Cuiabá | 0.58 | 1.04 | 1.04 | 1.04 | 1.10 | 1.13 | 1.13 |
| 2 Juiz de Fora | 0.86 | 0.86 | 0.86 | 0.86 | 0.89 | 0.92 | 1.17 |
| 2 São José do Rio Preto | 1.04 | 1.03 | 1.03 | 1.03 | 1.08 | 1.12 | 1.12 |
| 2 Piracicaba | 0.51 | 0.58 | 0.58 | 0.73 | 0.60 | 0.62 | 1.03 |
| 2 Pelotas | 0.49 | 0.54 | 0.54 | 0.87 | 0.57 | 0.57 | 1.19 |
| 2 Itajaí | 0.14 | 0.17 | 0.18 | 0.41 | 0.18 | 0.19 | 0.58 |
| 2 Palmas | 0.51 | 0.64 | 0.71 | 1.02 | 0.67 | 0.78 | 1.43 |
| 2 São José dos Pinhais | 0.11 | 0.12 | 0.12 | 0.42 | 0.12 | 0.14 | 0.59 |
| 3 Betim | 0.10 | 0.10 | 0.10 | 0.16 | 0.10 | 0.11 | 0.28 |
| 3 São Gonçalo | 0.33 | 0.35 | 0.35 | 0.42 | 0.39 | 0.40 | 0.83 |
| 3 Olinda | 0.30 | 0.36 | 0.36 | 0.44 | 0.41 | 0.42 | 0.87 |
| 3 Magé | 0.31 | 0.40 | 0.45 | 0.45 | 0.45 | 0.52 | 0.77 |
| 3 Caruaru | 0.51 | 0.60 | 0.67 | 0.67 | 0.68 | 0.79 | 0.79 |
| 3 Vitória da Conquista | 0.25 | 0.24 | 0.26 | 0.38 | 0.25 | 0.28 | 0.68 |
| 3 Juazeiro Norte | 0.12 | 0.22 | 0.24 | 0.37 | 0.25 | 0.28 | 0.73 |
| 3 Juazeiro | 0.05 | 0.24 | 0.24 | 0.33 | 0.27 | 0.28 | 0.64 |
| 3 Corumbá | 0.14 | 0.15 | 0.17 | 0.22 | 0.17 | 0.20 | 0.43 |

Data Source: Municipal Tax Departments and IBGE (2011, 2015).



Table F3: Residential cadastral coverage in 2012: linear regression statistical outcomes from the prediction model

Model Summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------------------|----------|-------------------|----------------------------|
| .728 ^a | .530 | .508 | .13820 |

a. Predictors: (Constant), Ln(Cov2004_{res}), Ln(1+ΔPT_{pc}2000-12)

ANOVA^b

| | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|--------|-------------------|
| Regression | .925 | 2 | .463 | 24.224 | .000 ^a |
| Residual | .821 | 43 | .019 | | |
| Total | 1.747 | 45 | | | |

a. Predictors: (Constant), Ln(Cov2004_{res}), Ln(1+ΔPT_{pc}2000-12)

b. Dependent Variable: Ln(Cov2012_{res})

Coefficients

| Model | Unstandardized Coefficients | | Stand. Coefficients | | |
|---------------------------------|-----------------------------|------------|---------------------|--------|------|
| | B | Std. Error | Beta | t | Sig. |
| (Constant) | -.208 | .056 | | -3.718 | .001 |
| Ln(Cov2004 _{res}) | .536 | .120 | .466 | 5.306 | .000 |
| Ln(1+ΔPT _{pc} 2004-12) | .314 | .059 | .555 | 4.4517 | .000 |

a. Dependent Variable: Ln(Cov2012_{res})

Correlations Matrix

| | Ln(1+ΔPT _{pc} 2004-12) | Ln(Cov2004) |
|---------------------------------|---------------------------------|-------------|
| Ln(1+ΔPT _{pc} 2000-12) | 1.000 | -.100 |
| Ln(Cov2004 _{res}) | -.100 | 1.000 |

a. Dependent Variable: Ln(Cov2012_{res})



Table F4: Ratio of residential to total market values in 2012: linear regression statistical outcomes from the prediction model

Model Summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|----------|-------------------|----------------------------|
| .842a | .710 | .709 | .04605 |

a. Predictors: (Constant), Ln(2012GDP_{ser_pc}), d_holiday

ANOVA^b

| | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|------|-------------|----------|-------|
| Regression | 8.375 | 2 | 4.187 | 1974.817 | .000a |
| Residual | 3.426 | 1616 | .002 | | |
| Total | 11.801 | 1618 | | | |

a. Predictors: (Constant), Ln(2012GDP_{ser_pc}), d_holiday

b. Dependent Variable: Ln(ValuesShare_{res})

Coefficients

| Model | Unstandardized Coefficients | | Stand.Coefficien | | |
|--------------------------------|-----------------------------|------------|------------------|----------|------|
| | B | Std. Error | Beta | t | Sig. |
| (Constant) | -.161 | .001 | | -137.232 | .000 |
| Ln(2012GDP _{ser_pc}) | -.122 | .002 | -.929 | -59.311 | .000 |
| d_holiday | .143 | .011 | .202 | 12.905 | .000 |

a. Dependent Variable: Ln(ValuesShare_{res})

Correlations Matrix

| | Ln(2012GDP _{ser_pc}) | d_holiday |
|--------------------------------|--------------------------------|-----------|
| Ln(2012GDP _{ser_pc}) | 1.000 | -.517 |
| d_holiday | -.517 | 1.000 |

a. Dependent Variable: Ln(ValuesShare_{res})

Table F5: Collection rate in 2012: linear regression statistical outcomes from the prediction model

Model Summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------------------|----------|-------------------|----------------------------|
| .757 ^a | .574 | .566 | .21917 |

a. Predictors: (Constant), Ln(SharePT2012), Ln(1+ Δ P_{T_{pc}}2000-12), Ln(Col2000)

ANOVA^b

| | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|-----|-------------|--------|-------------------|
| Regression | 10.664 | 3 | 3.555 | 74.000 | .000 ^a |
| Residual | 7.926 | 165 | .048 | | |
| Total | 18.590 | 168 | | | |

a. Predictors: (Constant), Ln(SharePT2012), Ln(1+ Δ P_{T_{pc}}2000-12), Ln(Col2000).

b. Dependent Variable: Ln(Col2012)

Coefficients

| Model | Unstandardized Coefficients | | Stand. Coefficients | | |
|---|-----------------------------|------------|---------------------|--------|------|
| | B | Std. Error | Beta | t | Sig. |
| (Constant) | .196 | .085 | | -2.298 | .023 |
| Ln(Col2000) | .307 | .043 | .512 | 7.140 | .000 |
| Ln(SharePT2012) | .156 | .028 | .167 | 5.506 | .004 |
| Ln(1+ Δ P _{T_{pc}} 2000-12) | .140 | .048 | .363 | 2.897 | .000 |

a. Dependent Variable: Ln(Col2012)

Coefficient Correlations^a

| Model | | Ln(SharePT2012) | Ln(1+ Δ P _{T_{pc}} 2000-12) | Ln(Col2000) |
|--------------|---|-----------------|---|-------------|
| | Ln(SharePT2012) | 1.000 | -.283 | -.637 |
| Correlations | Ln(1+ Δ P _{T_{pc}} 2000-12) | -.283 | 1.000 | -.469 |
| | Ln(Col2000) | -.637 | -.469 | 1.000 |

a. Dependent Variable: Ln(Col2012)

APPENDIX

**MAIN PARTICULARS, MUNICIPAL FINANCES AND
PROPERTY TAX ADMINISTRATION OF THE
SELECTED MUNICIPALITIES**

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014)

| Municipality | | Metropolitan Area | | | Municipal GDP 2013 | | | | Households' indexes of 2010 Census | | | Main Own Tax Revenues 2014 | | | Governmental Transfers 2014 | |
|-------------------------|--------------|---|--------------|--------------|----------------------|-------------------------|------------|--------------------------|------------------------------------|-----------------------|----------------------|----------------------------|-----------------|-----------------------------------|-----------------------------|--------|
| Name | Population | Name | No of Munic. | Population | Value (R\$ Billions) | Per capita (R\$ Thous.) | Industries | Govern. sector and taxes | Average monthly income (R\$) | Sewer services access | Informal Settlements | Property tax | Tax on Services | Taxes on public servers' salaries | Sharing on state taxes | Others |
| São Paulo | 11.9 million | São Paulo | 39 | 20.3 million | 570.71 | 48.28 | 16% | 25% | 1,624 | 92% | 10% | 14.7% | 28.0% | 6.0% | 22.1% | 14.6% |
| Rio de Janeiro | 6.45 million | Rio de Janeiro | 21 | 12.1 million | 282.54 | 43.94 | 11% | 35% | 1,608 | 77% | 20% | 10.1% | 27.1% | 5.6% | 14.7% | 23.4% |
| Salvador | 2.90 million | Salvador | 13 | 3.92 million | 52.67 | 18.26 | 14% | 26% | 1,070 | 91% | 32% | 9.3% | 17.2% | 5.6% | 16.0% | 31.9% |
| Brasília (Federal Dist) | 2.85 million | No metropolitan area, however divided into 31 administrative zones. | | | 175.36 | 62.86 | 6% | 60% | 1,950 | 81% | 5% | 2.8% | 7.5% | 20.8% | - | 17.6% |
| Fortaleza | 2.57 million | Fortaleza | 19 | 3.82 million | 49.75 | 19.49 | 17% | 26% | 942 | 54% | 15% | 6.1% | 12.0% | - | 20.8% | 41.6% |
| Belo Horizonte | 2.49 million | Belo Horizonte | 33 | 5.78 million | 81.43 | 32.84 | 14% | 27% | 1,642 | 96% | 12% | 10.3% | 14.1% | 5.2% | 17.1% | 34.4% |
| Manaus | 2.02 million | Manaus | 8 | 2.36 million | 64.03 | 32.30 | 39% | 30% | 900 | 37% | 16% | 3.2% | 14.3% | 5.0% | 33.5% | 29.9% |
| Curitiba | 1.86 million | Curitiba | 28 | 3.47 million | 79.38 | 42.93 | 16% | 28% | 1,743 | 92% | 8% | 6.6% | 15.5% | 5.9% | 17.3% | 25.5% |
| Recife | 1.61 million | Recife | 14 | 3.89 million | 46.45 | 29.04 | 15% | 30% | 1,270 | 55% | 22% | 7.0% | 17.4% | 4.9% | 24.2% | 28.1% |
| Porto Alegre | 1.51 million | Porto Alegre | 34 | 4.18 million | 57.38 | 39.09 | 12% | 29% | 1,936 | 76% | 11% | 6.7% | 14.8% | 7.8% | 17.7% | 26.2% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014, continuation)

| Municipality | Other Relevant Revenues 2014 | Total Current Revenues 2014 | | Property Taxes 2014 | | | | | | | | | All taxes administrative costs | Municipal Public Servers | |
|-------------------------|-------------------------------|-----------------------------|------------------|---------------------|------------------|----------------|-----------------|----------------------|--------------|-------------------------|----------------|-----------------|--------------------------------|--------------------------|------------------|
| | | | | Revenues | | | Re-registration | | Revaluations | | Exempted units | Collection rate | | Per 1,000 people | Higher education |
| | | (R\$ Billions) | Per capita (R\$) | (R\$ Billions) | Per capita (R\$) | Per GDP (2013) | Year | Residential coverage | Year (s) | Assessment level (2010) | | | | | |
| São Paulo | - | 40.70 | 3,421 | 5,963.75 | 501 | 0.95% | 2006 | 63% | 2010 2014 | 42% | 32.3% | 88% | 0.02% | 11.8 | 64% |
| Rio de Janeiro | - | 19.74 | 3,059 | 2,002.16 | 310 | 0.65% | 2014 | 59% | 1994 1998 | 25% | 60.7% | 82% | n.a. | 15.4 | 53% |
| Salvador | - | 5.09 | 1,755 | 474.71 | 164 | 0.54% | 2013 | 55% | 2010 2014 | 45% | 21.9% | 72% | 0.07% | 7.8 | 50% |
| Brasília (Federal Dist) | 34.3% (State VAT) | 19.67 | 6,896 | 550.83 | 193 | 0.30% | 2004 | 76% | 2005 2008 | 33% | n.a. | 60% | n.a. | 47.6 | 65% |
| Fortaleza | - | 5.04 | 1,958 | 308.83 | 120 | 0.43% | 2013 | 57% | 2012 2014 | 28% | 16.4% | 71% | 0.08% | 11.9 | 61% |
| Belo Horizonte | - | 7.96 | 3,194 | 816.19 | 328 | 0.93% | 2014 | 62% | 2002 2011 | 55% | 10.9% | 82% | 3.3% | 16.7 | 54% |
| Manaus | - | 4.02 | 1,989 | 126.97 | 63 | 0.16% | 2011 | 86% | 1984 2012 | 22% | 7.0% | 46% | 0.9% | 17.9 | 43% |
| Curitiba | 13.3% (public transport fees) | 6.35 | 3,404 | 418.40 | 224 | 0.50% | 2004 | 59% | 2005 2015 | 31% | 1.2% | 84% | 0.16% | 22.7 | 43% |
| Recife | - | 4.08 | 2,534 | 287.18 | 179 | 0.57% | 2000 | 59% | 1975 1981 | 32% | 14.2% | 81% | 0.22% | 15.1 | 57% |
| Porto Alegre | 10.0% (water and sewer fees) | 5.06 | 3,434 | 337.74 | 229 | 0.52% | 2014 | 70% | 1990 1992 | 51% | 22.6% | 74% | 0.6% | 12.1 | 53% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014)

| Municipality | | Metropolitan Area | | | Municipal GDP 2013 | | | | Households' indexes of 2010 Census | | | Main Own Tax Revenues 2014 | | | Governmental Transfers 2014 | |
|-----------------------|--------------|----------------------|--------------|--------------|----------------------|-------------------------|------------|--------------------------|------------------------------------|-----------------------|----------------------|----------------------------|-----------------|-----------------------------------|-----------------------------|--------|
| Name | Population | Name | No of Munic. | Population | Value (R\$ Billions) | Per capita (R\$ Thous.) | Industries | Govern. sector And taxes | Average monthly income (R\$) | Sewer services access | Informal settlements | Property tax | Tax on Services | Taxes on public servers' salaries | Sharing on state taxes | Others |
| Goiânia | 1.41 million | Goiânia | 20 | 2.38 million | 40.46 | 29.03 | 15% | 27% | 1,501 | 70% | - | 9.6% | 15.5% | - | 21.0% | - |
| Guarulhos | 1.32 million | São Paulo | 39 | 20.3 million | 49.39 | 38.02 | 49% | 26% | 929 | 79% | 16% | 9.5% | 10.4% | - | 36.4% | 21.4% |
| Campinas | 1.15 million | Campinas | 20 | 2.98 million | 51.35 | 44.85 | 17% | 26% | 1,497 | 86% | 12% | 10.9% | 18.0% | 7.1% | 27.9% | 19.0% |
| São Gonçalo | 1.03 million | Rio de Janeiro | 21 | 12.1 million | 14.06 | 13.71 | 14% | 40% | 731 | 64% | - | 5.0% | 8.4% | 4.2% | 20.8% | 48.6% |
| Teresina | 840,600 | No metropolitan area | | | 14.80 | 17.70 | 18% | 30% | 865 | 19% | 16% | 2.3% | 8.5% | 6.0% | 21.1% | 49.6% |
| São Bernardo do Campo | 811,489 | São Paulo | 39 | 20.3 million | 47.67 | 59.15 | 40% | 27% | 1,342 | 89% | 18% | 8.7% | 9.6% | 5.8% | 35.8% | 22.2% |
| João Pessoa | 780,738 | João Pessoa | 12 | 1.24 million | 14.84 | 19.28 | 22% | 33% | 1,083 | 57% | 12% | 2.5% | 9.8% | - | 19.2% | 46.3% |
| Santo André | 707,613 | São Paulo | 39 | 20.3 million | 25.03 | 35.50 | 26% | 23% | 1,445 | 94% | 11% | 10.4% | 12.7% | 5.5% | 24.1% | 18.1% |
| Osasco | 693,271 | São Paulo | 39 | 20.3 million | 55.52 | 80.27 | 8% | 26% | 1,071 | 84% | 11% | 11.3% | 19.7% | 5.0% | 26.8% | 23.7% |
| Ribeirão Preto | 659,059 | No metropolitan area | | | 23.51 | 36.19 | 16% | 21% | 1,468 | 97% | - | 11.2% | 10.6% | 7.8% | 28.7% | 19.9% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014, continuation)

| Municipality | Other Relevant Revenues 2014 | Total Current Revenues 2014 | | Property Taxes 2014 | | | | | | | | All taxes administrative costs | Municipal Public Servers | | |
|-----------------------|---------------------------------|-----------------------------|-------|---------------------|------------------|----------------|-----------------|----------------------|--------------|-------------------------|----------------|--------------------------------|--------------------------|------------------|------------------|
| | | | | Revenues | | | Re-registration | | Revaluations | | Exempted units | | Collection rate | Per 1,000 people | Higher education |
| | | | | (R\$ Billions) | Per capita (R\$) | Per GDP (2013) | Update Year | Residential coverage | Year (s) | Assessment level (2010) | | | | | |
| Goiânia | - | 3.33 | 2,361 | 320.15 | 227 | 0.71% | 1993 | 80% | 2006 2015 | 46% | 3.3% | 74% | n.a. | 23.8 | - |
| Guarulhos | 8.0% (water and sewer fees) | 3.50 | 2,665 | 331.51 | 253 | 0.69% | 2012 | 68% | 2002 2013 | 39% | 33.5% | 70% | 3.4% | 18.3 | 45% |
| Campinas | - | 3.87 | 3,354 | 421.03 | 365 | 0.75% | 2003 | 63% | 1999 2006 | 39% | 17.5% | 83% | n.a. | 14.8 | 42% |
| São Gonçalo | - | 1.03 | 1,001 | 51.92 | 50 | 0.31% | 2008 | 72% | 2004 2007 | 31% | 0.6% | 49% | n.a. | 11.9 | 62% |
| Teresina | - | 2.02 | 2,406 | 46.47 | 55 | 0.25% | 2002 | 85% | 1984 2003 | 31% | 16.9% | 69% | n.a. | 11.9 | 48% |
| São Bernardo do Campo | - | 3.24 | 3,998 | 281.72 | 347 | 0.56% | 2007 | 66% | 1994 2002 | 59% | 7.7% | 83% | 0.15% | 18.4 | 51% |
| João Pessoa | 5.3% (property transfer tax) | 1.85 | 2,369 | 45.97 | 59 | 0.27% | 2012 | 96% | 1973 | 18% | 10.8% | 44% | 6.9% | 30.0 | 37% |
| Santo André | - | 1.99 | 2,808 | 206.13 | 291 | 0.73% | 2014 | 62% | 1994 2003 | 51% | 7.1% | 81% | 1.7% | 14.1 | 44% |
| Osasco | - | 1.82 | 2,625 | 205.29 | 296 | 0.34% | n.a. | 56% | 2006 2013 | 31% | 17.6% | 85% | n.a. | 30.9 | 47% |
| Ribeirão Preto | - | 1.98 | 3,002 | 220.96 | 336 | 0.83% | n.a. | 78% | 2004 2013 | 45% | 0.9% | 80% | n.a. | 14.0 | 56% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014)

| Municipality | | Metropolitan Area | | | Municipal GDP 2013 | | | | Households' indexes of 2010 Census | | | Main Own Tax Revenues 2014 | | | Governmental Transfers 2014 | |
|-----------------------|------------|----------------------|--------------|--------------|----------------------|-------------------------|------------|--------------------------|------------------------------------|-----------------------|----------------------|----------------------------|-----------------|-----------------------------------|-----------------------------|--------|
| Name | Population | Name | No of Munic. | Population | Value (R\$ Billions) | Per capita (R\$ Thous.) | Industries | Govern. sector and taxes | Average monthly income (R\$) | Sewer services access | Informal settlements | Property tax | Tax on Services | Taxes on public servers' salaries | Sharing on state taxes | Others |
| Uberlândia | 654,681 | No metropolitan area | | | 25.77 | 39.86 | 20% | 30% | 1,120 | 97% | - | 2.7% | 11.3% | - | 30.7% | 27.4% |
| Contagem | 643,476 | Belo Horizonte | 33 | 5.78 million | 24.24 | 38.00 | 27% | 24% | 915 | 89% | 9% | 5.8% | 8.3% | 5.8% | 34.3% | 29.8% |
| Sorocaba | 637,187 | Sorocaba | 26 | 1.87 million | 26.91 | 42.76 | 31% | 26% | 1,201 | 97% | - | 4.5% | 13.0% | 5.6% | 26.2% | 19.7% |
| Aracaju | 623,766 | Aracaju | 4 | 912,647 | 13.92 | 22.65 | 16% | 33% | 1,184 | 72% | 10% | 5.4% | 14.8% | 5.6% | 14.0% | 46.2% |
| Cuiabá | 575,480 | Vale do Rio Cuiabá | 4 | 982,258 | 17.67 | 31.02 | 15% | 29% | 1,312 | 58% | 9% | 8.6% | 21.9% | - | 28.2% | 25.7% |
| Juiz de Fora | 550,710 | No metropolitan area | | | 13.28 | 24.32 | 23% | 29% | 1,170 | 94% | - | 8.8% | 10.4% | 6.0% | 18.8% | 40.4% |
| Santos | 433,565 | Baixada Santista | 9 | 1.73 million | 19.27 | 44.48 | 10% | 64% | 1,837 | 95% | - | 15.7% | 20.9% | 6.8% | 21.2% | 19.1% |
| São José do Rio Preto | 438,354 | No metropolitan area | | | 13.26 | 30.55 | 15% | 21% | 1,280 | 90% | - | 10.3% | 11.7% | - | 24.0% | 26.8% |
| Mogi das Cruzes | 419,839 | São Paulo | 39 | 20.3 million | 12.92 | 31.13 | 25% | 26% | 1,043 | 77% | - | 11.1% | 8.8% | - | 31.8% | 33.3% |
| Diadema | 409,613 | São Paulo | 39 | 20.3 million | 13.43 | 33.02 | 39% | 24% | 722 | 97% | 21% | 9.9% | 7.0% | 6.3% | 32.7% | 31.0% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014, continuation)

| Municipality | Other Relevant Revenues 2014 | Total Current Revenues 2014 | | Property Taxes 2014 | | | | | | | | All taxes administrative costs | Municipal Public Servers | | |
|-----------------------|------------------------------|-----------------------------|------------------|---------------------|------------------|----------------|-----------------|----------------------|--------------|-------------------------|----------------|--------------------------------|--------------------------|------------------|------------------|
| | | | | Revenues | | | Re-registration | | Revaluations | | Exempted units | | Collection rate | Per 1,000 people | Higher education |
| | | (R\$ Billions) | Per capita (R\$) | (R\$ Millions) | Per capita (R\$) | Per GDP (2013) | Update Year | Residential coverage | Years | Assessment level (2010) | | | | | |
| Uberlândia | 8.5% (garbage fee) | 1.62 | 2,477 | 43.00 | 66 | 0.15% | n.a. | 89% | 1984 2014 | 11% | 6.9% | 76% | n.a. | 23.2 | 56% |
| Contagem | - | 1.36 | 2,107 | 78.82 | 122 | 0.27% | 2005 | 82% | 2010 2014 | 61% | 75.2% | 89% | 0.85% | 13.9 | 64% |
| Sorocaba | 7.8% (water and sewer fees) | 2.23 | 3,495 | 100.87 | 158 | 0.35% | 2006 | 85% | 2007 2014 | 46% | 5.3% | 61% | 0.24% | 17.3 | 43% |
| Aracaju | - | 1.49 | 2,385 | 81.00 | 130 | 0.48% | 1995 | 78% | 1990 1996 | 25% | 23.9% | 44% | n.a. | 23.5 | 43% |
| Cuiabá | - | 1.44 | 2,509 | 96.24 | 167 | 0.48% | 2006 2015 | 93% | 2001 2011 | 88% | 8.8% | 53% | 1.5% | 31.7 | 45% |
| Juiz de Fora | - | 1.21 | 2,191 | 106.68 | 194 | 0.72% | 2010 | 65% | 2007 2014 | 51% | 4.5% | 71% | n.a. | 20.8 | 68% |
| Santos | - | 1.95 | 4,488 | 306.32 | 707 | 1.37% | 2005 | 88% | 2009 2014 | 81% | 8.6% | 70% | n.a. | 27.4 | 58% |
| São José do Rio Preto | 9.5% (water and sewer fees) | 1.24 | 2,837 | 128.49 | 293 | 0.79% | 2002 | 89% | 2010 2014 | 44% | 7.6% | 61% | n.a. | 13.1 | 58% |
| Mogi da Cruzes | - | 0.91 | 2,159 | 100.18 | 239 | 0.70% | 2007 | 69% | 1998 2002 | 36% | 4.6% | 69% | n.a. | 11.0 | 49% |
| Diadema | - | 1.06 | 2,597 | 104.96 | 256 | 0.69% | 2005 | 48% | 2009 2014 | 35% | 6.2% | 50% | 0.9% | 22.7 | 29% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014)

| Municipality | | Metropolitan Area | | | Municipal GDP 2013 | | | | Households' indexes of 2010 Census | | | Main Own Tax Revenues 2014 | | | Governmental Transfers 2014 | |
|----------------------|------------|----------------------|--------------|--------------|----------------------|-------------------------|------------|--------------------------|------------------------------------|-----------------------|----------------------|----------------------------|-----------------|-----------------------------------|-----------------------------|--------|
| Name | Population | Name | No of Munic. | Population | Value (R\$ Billions) | Per capita (R\$ Thous.) | Industries | Govern. sector and taxes | Average monthly income (R\$) | Sewer services access | Informal settlements | Property tax | Tax on Services | Taxes on public servers' salaries | Sharing on state taxes | Others |
| Betim | 412,003 | Belo Horizonte | 33 | 5.78 million | 22.49 | 55.34 | 43% | 26% | 763 | 85% | 12% | 2.2% | 5.4% | 6.7% | 49.8% | 25.4% |
| Olinda | 388,821 | Recife | 14 | 3.89 million | 4.82 | 12.41 | 19% | 36% | 721 | 41% | 23% | 3.0% | 10.0% | 6.3% | 25.4% | 42.1% |
| Carapicuíba | 390,073 | São Paulo | 39 | 20.3 million | 4.44 | 11.44 | 20% | 27% | 774 | 81% | 7% | 7.5% | 9.2% | - | 30.0% | 38.5% |
| Piracicaba | 388,412 | No metropolitan area | | | 20.27 | 52.62 | 30% | 24% | 1,272 | 96% | - | 5.7% | 11.6% | - | 28.9% | 25.8% |
| São Vicente | 353,040 | Baixada Santista | 9 | 1.73 million | 4.39 | 12.52 | 14% | 29% | 891 | 87% | 24% | 11.8% | 5.8% | 6.1% | 14.8% | 40.4% |
| Pelotas | 342,053 | No metropolitan area | | | 5.92 | 17.35 | 20% | 29% | 988 | 58% | - | 3.3% | 7.7% | - | 18.4% | 47.0% |
| Vitória | 325,104 | Grande Vitória | 7 | 1.88 million | 22.29 | 64.00 | 18% | 42% | 2,063 | 97% | 7% | 3.6% | 23.0% | 6.1% | 25.0% | 26.4% |
| Caruaru | 349,602 | No metropolitan area | | | 5.24 | 15.53 | 15% | 35% | 642 | 76% | - | 4.4% | 8.8% | - | 19.5% | 50.9% |
| Vitória da Conquista | 340,199 | No metropolitan area | | | 4.94 | 14.65 | 16% | 28% | 646 | 50% | - | 2.4% | 8.4% | - | 16.9% | 61.9% |
| São José dos Pinhais | 292,934 | Curitiba | 28 | 3.47 million | 25.24 | 87.70 | 32% | 23% | 989 | 69% | - | 6.6% | 11.6% | - | 48.4% | 25.3% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014, continuation)

| Municipality | Other Relevant Revenues 2014 | Total Current Revenues 2014 | | Property Taxes 2014 | | | | | | | | All taxes administrative costs | Municipal Public Servers | | |
|----------------------|---------------------------------|-----------------------------|-------|---------------------|------------------|----------------|----------------|----------------------|--------------|-------------------------|----------------|--------------------------------|--------------------------|------------------|------------------|
| | | | | Revenues | | | Reregistration | | Revaluations | | Exempted units | | Collection rate | Per 1,000 people | Higher education |
| | | | | (R\$ Billions) | Per capita (R\$) | Per GDP (2013) | Update Year | Residential coverage | Years | Assessment level (2010) | | | | | |
| Betim | - | 1.55 | 3,761 | 34.82 | 85 | 0.13% | 2012 | 91% | 2002 | n.a. | 73.1% | 58% | 1.4% | 33.8 | 44% |
| Olinda | - | 0.53 | 1,376 | 15.92 | 41 | 0.27% | 2013 | 79% | 1998 2005 | 14% | 5.6% | 74% | 0.8% | 18.8 | 43% |
| Carapicuíba | - | 0.38 | 972 | 78.01 | 200 | 0.47% | n.a. | 77% | 1984 2011 | 55% | 1.5% | 88% | n.a. | 13.9 | 40% |
| Piracicaba | 11.0% (water and sewer fees) | 1.28 | 3,304 | 72.58 | 187 | 0.33% | 2013 | 82% | 1990 2010 | 29% | 0.1% | 82% | n.a. | 19.7 | 48% |
| São Vicente | 4.2% (garbage fee) | 0.75 | 2,137 | 89.18 | 253 | 2.01% | 2000 | 77% | 2003 2011 | 46% | 3.4% | 72% | n.a. | 20.2 | 54% |
| Pelotas | 10.3% (water and sewer fees) | 0.67 | 1,967 | 22.01 | 64 | 0.49% | 2009 | 79% | 2010 2015 | 49% | 28.1% | 60% | 2.5% | 22.3 | 52% |
| Vitória | - | 1.58 | 4,492 | 56.88 | 162 | 0.24% | n.a. | 95% | 1998 2007 | 56% | 28.3% | 71% | 0.25% | 42.3 | 53% |
| Caruaru | - | 0.51 | 1,503 | 22.58 | 66 | 0.42% | 2005 | 100% | 2000 2010 | 41% | 1.6% | 82% | n.a. | 19.6 | 24% |
| Vitória da Conquista | - | 0.53 | 1,547 | 12.64 | 37 | 0.22% | 2001 | 71% | 1995 2014 | 14% | 1.2% | 46% | n.a. | 24.4 | 32% |
| São José dos Pinhais | - | 0.94 | 3,202 | 21.47 | 73 | 0.07% | 2004 | 73% | 1989 2007 | 23% | 7.7% | 84% | n.a. | 24.3 | 62% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014)

| Municipality | Population | Metropolitan Area | | | Municipal GDP 2013 | | | | Households' indexes of 2010 Census | | | Main Own Tax Revenues 2014 | | | Governmental Transfers 2014 | |
|-------------------|------------|----------------------|--------------|--------------|----------------------|-------------------------|------------|--------------------------|------------------------------------|-----------------------|----------------------|----------------------------|-----------------|-----------------------------------|-----------------------------|--------|
| | | Name | No of Munic. | Population | Value (R\$ Billions) | Per capita (R\$ Thous.) | Industries | Govern. sector and taxes | Average monthly income (R\$) | Sewer services access | Informal settlements | Property tax | Tax on Services | Taxes on public servers' salaries | Sharing on state taxes | Others |
| Juazeiro do Norte | 263,704 | Cariri | 9 | 590,209 | 3.22 | 12.33 | 15% | 31% | 520 | 35% | - | 0.7% | 4.7% | 4.4% | 13.7% | 63.1% |
| Barueri | 259,555 | São Paulo | 39 | 20.3 million | 44.12 | 171.83 | 15% | 27% | 1,223 | 91% | - | 1.0% | 33.6% | 6.0% | 34.4% | 18.4% |
| Itajaí | 201,557 | Foz do Rio Itajaí | 9 | 609,177 | 15.38 | 77.73 | 9% | 42% | 1,166 | 39% | - | 3.2% | 9.4% | 5.0% | 32.0% | 28.7% |
| Palmas | 265,409 | Palmas | 16 | 446,737 | 5.82 | 22.58 | 17% | 37% | 1,273 | 43% | - | 5.7% | 9.1% | 5.7% | 12.4% | 48.5% |
| Magé | 233,634 | Rio de Janeiro | 21 | 12.1 million | 3.05 | 13.11 | 13% | 46% | 646 | 48% | - | 1.8% | 4.5% | - | 12.9% | 72.0% |
| Juazeiro | 216,588 | Petrolina-Juazeiro | 8 | 770,832 | 2.59 | 12.07 | 11% | 32% | 474 | 54% | - | 0.4% | 4.6% | 2.5% | 13.1% | 79.2% |
| Corumbá | 108,110 | No metropolitan area | | | 2.78 | 25.92 | 17% | 28% | 747 | 6% | - | 1.3% | 5.9% | - | 34.4% | 38.9% |

Appendix: Selected municipalities' economic, demographic, revenue and property tax indicators (2010-2014, continuation)

| Municipality | Other Relevant Revenues 2014 | Total Current Revenues 2014 | | Property Taxes 2014 | | | | | | | | All taxes administrative costs | Municipal Public Servers | | |
|-------------------|--------------------------------|-----------------------------|------------------|---------------------|------------------|----------------|----------------|----------------------|--------------|-------------------------|----------------|--------------------------------|--------------------------|------------------|------------------|
| | | | | Revenues | | | Reregistration | | Revaluations | | Exempted units | | Collection rate | Per 1,000 people | Higher education |
| | | (R\$ Billions) | Per capita (R\$) | (R\$ Millions) | Per capita (R\$) | Per GDP (2013) | Update Year | Residential coverage | Year (s) | Assessment level (2010) | | | | | |
| Juazeiro do Norte | - | 0.40 | 1,506 | 2.91 | 11 | 0.10% | 2008 | 81% | 2003 2007 | 18% | 0.4% | 81% | 0.12% | 27.5 | 47% |
| Barueri | - | 2.13 | 8,205 | 20.97 | 81 | 0.04% | 2013 | 39% | 1989 | 10% | 9.6% | 74% | n.a. | 55.1 | 46% |
| Itajaí | 9.7% (water and sewer fees) | 1.03 | 5,108 | 32.98 | 164 | 0.19% | n.a. | 79% | 1998 2013 | 29% | 10.5% | 74% | n.a. | 26.7 | 54% |
| Palmas | 9.2% (leases and interests) | 0.86 | 3,238 | 49.15 | 185 | 0.42% | 2003 | 65% | 2004 2013 | 26% | 6.9% | 70% | 4.7% | 35.2 | 35% |
| Magé | - | 0.41 | 1,745 | 7.42 | 32 | 0.28% | n.a. | 92% | 2010 | 18% | 1.0% | 83% | n.a. | 32.2 | 27% |
| Juazeiro | 6.0% (water and sewer fees) | 0.42 | 1,947 | 1.63 | 7 | 0.06% | 2006 | 100% | 2010 2015 | 16% | 1.0% | 11% | 9.5% | 34.0 | 41% |
| Corumbá | - | 0.42 | 3,890 | 5.64 | 52 | 0.21% | 1998 | 82% | 2007 2014 | 20% | 16.5% | 49% | 32.9% | 36.4 | 55% |