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The impact of financial regulation on economic growth in developing countries

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Abstract

Financial regulation is a topical; issue particularly its potential negative impact on economic growth. Literature indicates that researchers have divided opinions on the subject. There is a group that believes higher financial regulation will deter economic growth and another group that believes that current financial regulations should be increased. The aim of the study was to investigate the impact of financial regulation on economic growth in developing countries.

The study was undertaken by formulating one overall research question, which was supported by two hypotheses. The study employed quantitative methodology to analyse the data. Secondary data was collected on a sample of ten developing countries in three regions (Africa, Americas and Asia Pacific). Time series data was obtained on the following variables: gross domestic products, inflation rate, interest rate, unemployment rate and financial freedom index. The data was initially analysed using trend analysis, which was followed by regression analysis. Trend analysis indicates that financial regulation is good for economic growth in developing countries. Financial regulation was measured by the financial freedom index and economic growth was measured by growth in gross domestic products.

The results show a negative correlation between the two variables. When strict financial regulations are imposed, growth in gross domestic product increases. This relationship was tested statistically to quantify the percentage of change in gross domestic product attributable to financial regulation as well as its significance. It was discovered that financial regulation on its own can explain up to 17.8% of the change in gross domestic product and is a very significant explanatory variable.

Keywords: Financial regulation, banking supervision, economic growth, developing countries.

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or in any examination in any other University. I further declare that I have obtained the necessary authorization and consent to carry out this research.

Michael Manamela

7th November 2012

Date

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Chapter 1 – Introduction to the research

1.1 Introduction

The 2008/9 global financial crisis triggered efforts to review and enhance banking regulations, as well as supervision in the banking sector. According to Allen and Carletti (2010, p. 11), banks and governments have spent billions of dollars in the past; designing and implementing banking regulatory agreements. However, these agreements failed to prevent the recent crisis and seem to have had very little effect in reducing its severity. This failure raises a concern and speculation that perhaps the constant change in regulatory framework is indicative of the lack of full comprehension of banking risks as well as lack of due consideration prior to implementation. On the other hand, it is perhaps unreasonable to expect a set of rules to cover all eventualities of the future.

Perhaps the dynamic landscape in banking is constantly forcing regulators to review policies to ensure appropriate supervision and stability in the sector. Davis and Karim (2008, p. 89) highlight the ongoing innovation in banking, as well as the increased number of liberalised economies and the development of their financial systems as a possible driving force behind constant change in regulations. According to Klomp and de Haan (2011), previous research has come up with – at best – mixed results concerning the effectiveness of banking regulations and supervision in reducing banking risk.

Demirguc-Kunt and Detragiache (2011) studied Basel compliance matters and have collected data from 3000 banks across 86 countries. Their study did not find support for the hypothesis that better regulation and supervision result in sounder banks. However, the reality is that regulators are introducing stringent regulations, believing that these would deter risk-taking in the sector. These measures appear

to have been ineffective as evidenced by the failure to prevent the recent banking crises. This makes one to wonder if regulation is indeed beneficial to society. Furthermore, one could also wonder if the banking sector should be strictly regulated or if the market should rather be permitted to regulate the sector. The obvious answer to these enquiries is probably that there should be no need to regulate the sector if it conducted itself in a way that does not threaten to cause damage to society. The impact of self-regulation could be higher, particularly in sectors that have the potential to cause severe moral hazard.

It is well documented that among prime reasons for tighter banking regulations is that some of the banks became greedy and engaged in excessive risk-taking that have subsequently led to the banking crises. Liu and Seeiso (2012, p. 848), point out that among many alleged causes of the 2008/09 financial crisis, the instability of the financial sector, more specifically the banking sector, stands out and is reported to have contributed significantly to the emergence of the crisis. Allen and Carletti (2010) advocate for tighter regulations and argue that the benefit of regulation is that it can potentially stop banking crisis before it occurs. However, the main concern is that the regulation needed to prevent these crises could effectively prevent the financial system from doing its task of allocating resources, and could in turn slow down economic growth (Allen and Carletti, 2010, p. 11).

Perhaps there is an optimal point that allows regulation, risk taking and economic growth to co-exist. This study aims to assess the impact of financial regulation on economic growth, particularly in developing countries. The view that banking is one of the sectors that act as a catalyst to achieve economic growth is widely held (Moshirian and Wu, 2009; Tchana Tchana 2012; Demirguc-Kunt & Detragiache, 2011; and others). Studies indicate that there is a correlation between financial regulation and economic growth, and that countries have experienced banking crises that have led to banking failure and subsequent economic disruptions (Liu and Seeiso, 2012 and others). This research contributes to the body of knowledge

on the ongoing debate about the impact of increased banking regulation on economic growth, particularly in developing countries.

1.2 Problem statement

Over the years, the banking sector has evolved into one of the bedrocks in an economic setting and a key feature in supporting economic growth (Moshirian and Wu, 2009). Banking is among the most sophisticated sectors and has the potential to cause the entire financial system to collapse. The effects of a collapse in a financial system were seen during the 2008/9 global financial crises and are still being felt to-date. The crises that started in developed countries quickly spread to developing countries throughout the world.

The potential destruction linked to the banking sector has opened a window of opportunity for regulators to pass stricter regulations in a bid to bring some level of control and supervision over the sector. However, some of the proposed regulations may not be appropriate for developing economies. As a significant contributor to economic growth, tighter regulation in the financial sector may indeed suffocate economic growth by imposing rules that may limit capital advancement in an economy. Banks play a role of channelling capital into productive sectors in an economy and strict regulation may reduce efficiencies in capital allocation process and thereby hold back economic growth (Tchana Tchana, 2012).

The latest proposal that is intended for the regulation of banks around the world was the introduction of Basel III framework in 2010. While banking supervision and regulations in the sector are intended to protect the world from another major financial crisis, it is important to note that excessive or undue regulation can unintentionally impact an economy in a negative way. This argument is particularly compelling for developing countries that are still in transition. That stated; it is important to recognise the role played by banking regulation, especially in the wake of the recent banking crisis that had its roots in the developed world. While this

argument is valid, there is also a need to exercise caution in implementing these regulations as they may stifle economic growth in developing countries.

Barth, Gan and Nolle (2004) highlight differences between banking sectors in developing and developed countries. They maintain that high-income group of countries account for 81 percent of the world's gross domestic product. These countries also hold 87 percent of world banking assets, 93 percent of world equity market capitalisation, and 97 percent of world bond capitalisation (Barth, Gan and Nolle, 2004). Banks in developed economies often have a large with global footprint compared to those in developing countries. This could potentially be a hint that banks in developing countries should be treated differently to those in developed countries in terms of regulation.

Recent newspaper articles highlight that the cost of compliance to the proposed Basel III framework is huge. Kamhunga (May 2012, p.9) of the Business Day newspaper ("Business Day") published an article warning that the implementation of Basel III in its current form will result in a funding shortfall of about R900 billion liquidity gap for South African banks. The article further warns that this could cut the country's economic output by 1.1% and result in an increase in lending rates by 75 basis points. Masters (2012, p.15) of the Financial Times newspaper ("Financial Times") reported that the financial industry is on track to spend €33 billion in the next three years to comply with the European Union's regulatory demands and that this number could balloon to €50 billion once the Basel III bank capital requirements and solvency insurance take effect (Masters, 2012, p.15).

Kamhunga (July, 2012, p.11) of the Business Day reported that South African Banks are well capitalised but would not comply with the liquidity coverage ratio and the net stable funding ratio as proposed by the Basel III. This is because of a lack of access to stable funding for their lending operations (Kamhunga, July, 2012, p. 11). The main challenge is that developing economies are generally dependent on bank credit to fund economic activities and can hardly afford the cost

implication associated with these new rules. Curtailing the supply of capital in a form of regulation may in fact stand in the way of economic growth in developing countries. Countries generally develop from primary economies made up of primary sectors (agriculture, mining etc) into secondary sectors (manufacturing) and eventually into tertiary sectors (services). Developing economies are generally made up of primary and secondary sectors which rely on banks for the supply of large capital necessary for investments in these sectors.

1.3 Research motivation

As indicated above, the global economy is made up of countries with varying stages of development and unique characteristics. Consequently, a universal set of rules that cut across all economies may suffocate those countries that are in transition and more so, those that are still underdeveloped. Financial regulation forcing banks to hold excessive levels of capital as security may very well constrain liquidity in the broader economy.

The study is motivated by the need to understand the impact of financial regulation in developing countries. The counter argument to financial regulation is that developing countries need to be allowed the platform to develop their economies without a stringent regulatory burden that may not necessarily be appropriate for those markets. The recent global financial crises started and continued in developed countries such the United States of America ("USA"), United Kingdom and other countries in the Europe. Moshirian and Wu (2012, p. 429) point out that the banking crises were triggered by the subprime mortgage crisis in the USA and have caused a contagious chaos in the global financial. In response to the financial cries of 2008-2009, policymakers have proposed substantial changes to the regulation of banks aimed at reducing the likelihood and severity of similar crises going forward (Francis and Osborne, 2012, p. 803). The point is that it may not be fair to impose blanket standards on all countries despite the differences in economic development.

1.4 Research objectives

The study aims to investigate the impact of financial regulation on economic growth in developing nations. The motives and benefits of regulating the banking industry have been studied and are well documented. However, the negative impact of higher regulation in transition economies needs to be explored and understood. Economic growth is measured by the following macroeconomic factors: gross domestic products (GDP), inflation, interest rate and unemployment. Financial regulation is measured by the financial freedom index developed by The Heritage Foundation. This study will be of assistance to developing countries in taking a view on the subject of financial industry regulation.

1.5 Brief outline of the report

The following chapter presents the literature review on the subject of financial regulation. Chapter 3 poses the research question as well as presents two hypotheses supporting the umbrella question. Chapter 4 outlines the research methodology used for the study. The study was conducted on a sample of ten developing countries, namely, Algeria, Argentina, Brazil, China, Egypt, India, Indonesia, Mexico, Russia and South Africa. Secondary data used was collected from the World Bank as well as The Heritage Foundation.

To address the posed research question, trends were plotted for GDP growth and the financial freedom index to establish the relationship between these variables in each country. Statistical analyses were subsequently conducted to support the trends. Analyses conducted were correlation matrix, followed by simple and multiple regression analyses. These results are presented in Chapter 5. Chapter 6 concludes the study and Chapter 7 provides recommendations.

Chapter 2 - Literature review

2.1 Introduction

There is a growing and widening acceptance of the view that financial markets are an essential ingredient in promoting economic growth, development, and stability (Barth, Gan & Nolle, 2004, p.2). Countries everywhere are encouraged to do everything possible not to impede the development of financial markets, including the banking system (Barth, Gan & Nolle, 2004, p.2). The financial system is predominantly made up of the banking sector and governments consider this an especially sensitive sector of the economy (Krayenbuehl, 1993. p. 30).

In 2008, it became evident that failure in the banking sector can quickly spread and cause deep financial crises in the global economy. According to Beck, Laeven, Levine and Pennacchi (2008), the recent global financial crisis has intensified the century-old debate on whether banks are properly governed and regulated. The debate advocates for stricter regulation and supervision of banks because of the sector's potential to cause major economic crises.

Beck *et al* (2008) argue for tighter regulation of banks as an instrument to deter excessive risk-taking. Francis and Osborne (2012, p. 803) point out that assessing the efficiency of such tools requires, at a minimum, an understanding of their potential behavioural and macroeconomic effects. Beck *et al* (2008) have put their argument neatly as follows:

> *"When bank managers are subject to sound regulations and governance mechanisms, the likelihood that banks will efficiently mobilize and allocate savings is enhanced, and sound governance of the firms they fund is encouraged. Thus, appropriate regulations and governance systems can*

reduce inefficient bankruptcies, lower firms' cost of capital, and accelerate economic growth" (Beck *et al*, 2008, p. 509).

Authors like Tchana Tchana (2012) highlight the main challenge of high regulation. The challenge lies in striking the right balance between ensuring financial stability and promoting economic growth. Tchana Tchana (2012) is among authors that have found that regulation improves welfare by reducing the possibility of a banking crisis, but warns that it has the potential to slow down economic growth. This is achieved by shifting banks' portfolios from more productive, risky investment projects toward less productive and safe projects (Tchana Tchana, 2012).

Banking regulation has traditionally taken various forms. One form has been an obligatory deposit insurance fund to ensure that no depositor suffers a loss in the event of a bank failure (Van den Heuvel, 2008). Another form of regulation has been the implementation of rules that force banks to hold more capital to be able to withstand large amounts of withdrawals. Banks could also be required to have a minimum amount of equity as a fraction of risk-weighted assets (Van den Heuvel, 2008). Tighter regulation includes significant increases in capital requirements, achieved through new policy tools such as leverage ratios and countercyclical capital requirements (Francis and Osborne 2012, p. 803).

According to Miyake and Nakamura (2007, p.14), capital adequacy regulations work as a stabilizer in the sense that they reduce the macroeconomic effects of negative productivity shocks. In addition, the strengthening of regulations increases the long-run capital stock, although it may lead the economy into a recession in the short run (Miyake and Nakamura, 2007, p.14). As such, the timing for the introduction of tighter regulations is paramount. It is well known that bank lending decreases during periods of poor macroeconomic performance, which in turn affects bank capital. (Miyake and Nakamura, 2007, p.14).

2.2 The role of the financial sector in an economy

According to Moshirian and Wu, 2009 (p. 352), a well-functioning banking system is an important catalyst of economic development. Dell'Aricca, Detragiache and Rajan (2008) support this view and have also found that a well functioning financial system significantly promotes economic growth. Banks are instrumental not only in extending credit to finance both consumption and investment projects, but are also the conduit through which monetary policy is conducted (Barth, Gan & Nolle, 2004, p.2). Barth, Gan and Nolle (2004), indicate that the role of banks has been evolving as countries move through various stages of economic development. As countries mature economically, the credit role of banks diminishes, while the role of the capital markets becomes more important (Barth, Gan and Nolle, 2004, p. 2).

According to Blejer (2006, p. 3431), the financial system's efficiency can be gauged by the efficiency with which it transforms resources into capital. In other words, the financial sector functions efficiently if it intermediates at a minimum price and reduces the comprehensive cost of capital to its optimal level (Blejer, 2006, p. 3431). In a financial system, the banking sector provides financial services to households, and to small and large businesses. With a bank, customers can deposit and withdraw capital as and when they need to. As such, depositors provide liquidity services in a financial system by providing capital to the banks in a form of deposits (Van den Heuvel, 2008).

Since the banking industry plays such an important role, policy makers and regulators want to ensure soundness of the banking system and thereby prevent the occurrence of a major banking crisis (Moshirian and Wu, 2009. P.352). According to Angkinand (2009, p. 240),

> *"banks and financial institutions are valuable in an economy, as they fulfil the role of intermediaries, channelling funds from depositors-savers to producers-borrowers with productive investment opportunities. They collect*

funds from depositors and lend it to producers. By so doing, these institutions contribute to an efficient allocation of capital and a reduction in transaction costs".

As alluded to, the crucial role played by the financial sector in an economy cannot be emphasized by anything other than the consequences of an unstable financial sector (Liu and Seeiso, 2012, p. 848). In developing countries, financial sectors are generally still in the early phases of development and capital markets are generally thought to be weak or almost non-existent (Turk-Ariss, 2009, p. 694). As a result, financial markets are dominated by bank-financed credit mechanisms (Liu and Seeiso, 2012).

Banks are the main suppliers of credit to private and public investment projects, and financing government deficits; and this feature is common to many emerging economies (Turk-Ariss, 2009, p. 694). Because financial intermediaries and markets are generally thought to reduce moral hazard and adverse selection problems that can make raising external funds difficult and expensive for firms, well-functioning and well-developed financial intermediaries and markets should disproportionately benefit firms that are most dependent on external funds to finance their growth (Kroszner, Laeven and Klingebiel, 2007, p. 189).

Among firms that depend heavily on outside financing, young firms with short histories and firms with a large fraction of hard-to-measure intangible assets, for example, may encounter particular difficulty raising funds from the market and thus are particularly likely to depend on banks and other intermediaries (Kroszner, Laeven and Klingebiel, 2007, p. 189). Barth, Gan and Nolle (2004), summarise the role of banks as follows:

- Financial systems mobilize savings better by offering savers a range of savings vehicles.

- Financial systems allocate savings better by using expertise that individual savers do not possess to ascertain potential borrower creditworthiness.
- Financial systems facilitate risk reduction to individual savers by diversifying pooled assets across many investment opportunities.
- Financial systems augment liquidity by allowing savers to readily access savings while at the same time financial intermediaries fund long-term projects.
- Financial intermediaries contribute to better risk management by monitoring borrowers and managers of enterprises to which credit has been extended.

According to Marini (2005, p. 2558), the primary purpose of financial systems is to channel funds from agents with positive saving to agents with negative saving. They process information to allocate resources efficiently and allow inter-temporal smoothing of consumption by households (Marini, 2005, p. 2558).

2.3 The effect of banking crises in an economy

Dell'Ariccia, Detragiache and Rajan (2008) studied the real effects of banking crises and found that banking crises are usually followed by low credit and GDP growth. They found that sectors that are more dependent on external finance grew relatively less than sectors less dependent on external finance as banks cut back their lending (Dell'Ariccia, Detragiache and Rajan, 2008). If the banking system is the key institution allowing credit constraints to be relaxed, then a sudden negative shock to these intermediaries in a system in which such intermediaries are important should have a disproportionately contractionary impact on the sectors whose growth is dependent on the services provided by banks (Kroszner, Laeven and Klingebiel, 2007, 188). As such, crises in the financial sector have a disproportionately negative impact on firms that rely heavily on external sources of finance (Kroszner, Laeven and Klingebiel, 2007, p. 188).

The economic cost of bank failures is huge and this can be aggravated if the collapse of banks interrupts the financial intermediation function; thereby cutting off the supply of credit, causing a loss in liquidity (Angkinand, 2009). Davis and Karim (2008, p. 90) distinguish between the direct and indirect costs resulting from a bank failure. They found that historically, direct costs average 5.6% of GDP while twin crises average 29.9% of GDP (Davis and Karim, 2008, p. 90). The indirect cost is the forgone economic output owing inter alia to credit rationing and uncertainty (Davis and Karim, 2008, p. 90).

Bank failure can spread throughout the financial system and very quickly affect other sectors of the economy. This phenomenon can cause societal problems that could potentially affect the whole world as banks lose mount, capital erodes and economic activities contract sharply (Angkinand, 2009). Moshirian and Wu, (2012) studied the relationship between banking industry volatility and future economic growth. They tested the channels by which banking industry volatility is associated with economic growth and found that systematic banking crises exert a negative impact on future economic growth (Moshirian and Wu, 2012).

Francis and Osborne (2012), have reviewed trends in real credit activity in the United Kingdom (UK) over the past 25 years to provide a sense of periods of slowdown and, very broadly, the factors that may have contributed to these. Figure 1 below shows credit activity as a percentage of GDP and the risk-weighted capital ratio of the UK banking sector from 1989 to year-end 2007. The chart clearly shows a slowdown in outstanding credit during the early part of the 1990s through 1996, after which credit supply picked up again (Francis and Osborne, 2012). Credit activity then grew particularly rapidly between 2002 and 2008 (Francis and Osborne, 2012).
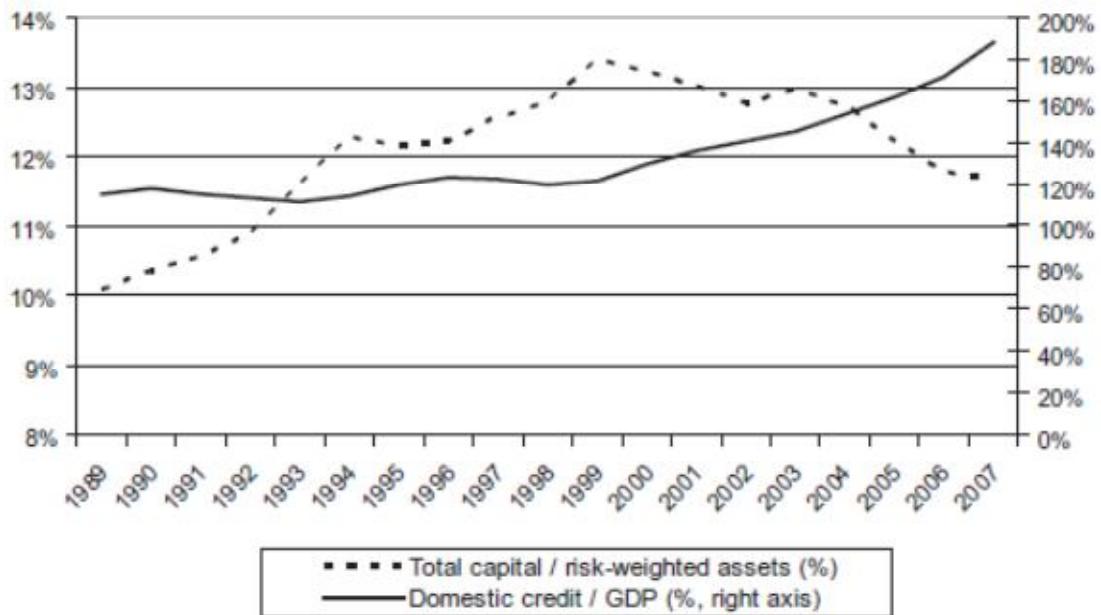
Figure 1: Trends in lending and capital adequacy for the UK from 1989 to 2007 (Source: Francis and Osborne, 2012, p.806)

The period 1990–1991 included a notable decline in economic output, which may explain part of the drop in credit formation during that time. However, this period also saw a pronounced upward trend in banks' risk-weighted capital ratios, possibly due to the introduction of the Basel I capital regime in the early 1990s (Francis and Osborne, 2012). Figure 1 suggests that higher capital requirements under Basel I may have dampened lending growth during the early part of the 1990s. An additional feature of these trends which backs this regulatory hypothesis is the absence of a corresponding increase in the capital to (non-risk-weighted) assets ratio over the same period (Francis and Osborne, 2012, p. 805).

According to Francis and Osborne (2012), the bank capital channel for the transmission of financial shocks into the real economy may explain the contraction of credit supply during the early 1990s (and also during the distressed period of 2008-2009). Under these conditions,

- banks do not have excess capital with which to sustain credit supply following a shock to the capital position; i.e. a tightening of capital regulation or monetary policy, or decline in asset values (Francis and Osborne, 2012); and

- there is an imperfect market for bank equity such that raising new capital is costly for banks, the financial structure of the bank affects the bank's supply of credit (Francis and Osborne, 2012).

Hence, a bank may find it optimal, following an increase in regulatory capital standards, to reduce growth in higher risk-weighted assets; for example, by raising rates on lending, requiring higher collateral or rationing credit at existing rates. These responses may lead to changes in macroeconomic outcomes if firms and consumers in the economy depend on banks to obtain credit (Francis and Osborne 2012, p. 806.)

2.4 Factors causing banking crises

Davis and Karim (2008, p. 89) define banking crisis as the occurrence of severely impaired ability of banks to perform their intermediary role. These crises can be caused by numerous factors that could be difficult to anticipate. Angkinand (2009, p.241) points out that:

> "banking failure can be caused by weakening financial position of banks due to excessive risk taking, loan losses or consumer panic followed by simultaneous large deposit withdrawals".

Other authors point out different factors that can also cause the banking sector to fail. According to Klomp (2010, p. 72),

> "banking crises is caused by deregulation, which lead to overly rapid credit expansion. This in turn increases asset prices, which are unwarranted by

fundamentals. At some point the bubble will burst, with a dramatic fall in prices and disruption of the asset markets and widespread bankruptcies. This is accompanied by an increase in non-performing loans, credit losses, and acute liquidity problems within the banking system".

Davis and Karim (2008, p. 92) also allude to the fact that consumer panic can cause a banking crises and that individual bank failure may spread through contagion associated with asymmetric information. Davis and Karim (2008) also make reference to counterparty claims between banks (i.e. via interbank exposures) as another possibility that could lead to widespread failures.

Klomp (2010) found that a higher than normal credit growth, a negative GDP growth and high real interest rate are on average the most important causes of a banking crisis. Davis and Karim (2008, p. 92), identified macroeconomic movements that crystallize risks particular to banking systems. These include interest rate, credit, liquidity and market risk. These variables have been the key determinants of banking crises in the last 20 years (Davis and Karim, 2008, p.92).

2.5 Banking crises, financial regulation and regulatory indexes

Klomp (2010) plotted a correlation matrix (shown on table 1) indicating the relationship between high credit growth, a negative GDP growth, high real interest rate, globalization and the ratio of M2 to the foreign exchange reserves. It can be discerned from the table that there is a high correlation (0.70) between financial regulation and real GDP growth rate.

Table 1: Correlation matrix of factors causing banking crises (Klomp, 2010)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
GDP per capita	(1)	1.00																					
Real GDP growth rate	(2)	0.15	1.00																				
Real interest rate	(3)	0.02	−0.10	1.00																			
Inflation	(4)	−0.22	−0.18	0.22	1.00																		
M2 to reserves	(5)	−0.09	0.01	0.03	0.02	1.00																	
Change terms of trade	(6)	0.03	0.02	0.06	−0.15	−0.01	1.00																
Credit to the private sector	(7)	0.71	0.16	−0.11	−0.30	−0.03	0.02	1.00															
Growth rate of credit	(8)	0.10	0.05	−0.01	−0.11	−0.03	0.02	0.15	1.00														
Net financial flows	(9)	−0.03	0.27	−0.08	−0.02	−0.06	−0.11	−0.04	0.01	1.00													
Bank assets to reserves	(10)	−0.41	−0.13	−0.03	0.35	−0.03	−0.16	−0.43	−0.11	0.13	1.00												
Depreciation	(11)	0.23	0.34	−0.10	−0.85	0.04	0.17	0.26	0.10	0.03	−0.33	1.00											
Government budget balance	(12)	−0.26	−0.37	−0.12	0.19	0.02	0.02	−0.08	0.00	0.13	0.17	−0.20	1.00										
Institutional quality	(13)	0.69	0.27	−0.10	−0.33	0.01	0.06	0.65	0.19	0.06	−0.32	0.33	−0.14	1.00									
Financial regulations	(14)	0.70	0.18	−0.05	−0.41	−0.07	0.08	0.44	0.09	−0.04	−0.35	0.38	−0.30	0.43	1.00								
Deposit insurance	(15)	−0.02	−0.09	−0.01	−0.04	0.04	−0.07	−0.07	−0.03	0.01	0.07	−0.01	0.07	−0.05	0.06	1.00							
Central bank independence	(16)	0.00	0.05	−0.06	0.07	−0.01	−0.04	−0.03	−0.03	0.00	−0.04	0.01	−0.03	0.01	0.07	0.03	1.00						
Democratic history	(17)	0.06	0.15	0.01	−0.15	−0.17	−0.10	−0.15	0.06	0.04	0.02	−0.19	0.05	−0.14	−0.03	−0.14	0.11	1.00					
Regime instability	(18)	−0.07	−0.01	−0.13	0.02	−0.04	−0.15	−0.11	0.00	0.03	0.08	−0.11	−0.05	0.02	−0.15	0.09	−0.08	0.13	1.00				
Government instability	(19)	−0.19	0.15	0.02	0.00	0.14	−0.05	−0.18	0.20	−0.20	−0.02	0.12	0.20	−0.01	0.04	0.08	0.04	0.09	0.11	1.00			
Globalization	(20)	−0.01	0.07	0.02	0.10	0.01	0.12	0.02	−0.14	0.15	−0.13	−0.14	−0.08	0.19	0.08	0.07	0.16	−0.13	−0.16	0.18	1.00		
Interest differential	(21)	0.13	−0.20	−0.23	−0.27	0.26	−0.08	−0.17	−0.25	−0.28	−0.05	0.01	0.04	−0.08	−0.28	−0.12	0.18	−0.27	0.27	−0.04	−0.22	1.00	
External debt	(22)	0.04	0.30	−0.12	−0.11	−0.09	0.02	−0.21	−0.20	−0.26	0.25	−0.18	0.17	−0.01	−0.23	0.22	−0.02	0.05	−0.29	0.28	0.23	0.19	1.00

Moshirian and Wu (2009, p. 352) have used a variety of macroeconomic variables to predict systemic banking crises. These variables include real GDP, real interest rates, inflation rates, changes in exchange rates, domestic credit growth rates, ratios of M2 against reserves, and volatility of GDP growth rates. They found that systemic banking crises tend to occur in a stagnated economy for developed markets, characterized by higher banking volatility, falling of inflation rates, lower growth volatility, and lower domestic credit growth (Moshirian and Wu, 2009).

Furthermore, the banking system is more vulnerable to systemic banking crises in an emerging market with falling inflation rates, higher variations of GDP growth rates, lower domestic credit growth and higher M2 to reserves ratio (Moshirian and Wu, 2009, p. 366). Klomp (2010), found that real interest rate increases the likelihood of a banking crises in 49% of the banking crises cases, while credit growth has a significant positive effect in about 51% of the cases (Klomp, 2010, p.78). They found that the most significant variable is economic growth, which has a negative effect in about 53% of the banking crises cases and this is because a negative economic shock affects the economy as a whole including the banking sector (Klomp, 2010, p.78).

Some researchers use indexes to determine the level of financial regulation in an economy. Klomp (2010) used credit market regulations index from the Fraser Institute to quantify the degree of financial regulation. Other authors, like Feldmann (2012), quantify financial regulation as the index of regulation of the banking industry, which is an unweighted average of five sub-indices as follows:

- interest rate controls, such as floors or ceilings;
- credit controls, such as directed credit and subsidized lending;
- competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks;
- the degree of state ownership in banks; and
- the quality of banking supervision and regulation, including power of independence of bank supervisors, adoption of Basel capital standards and a framework for bank inspections.

The Heritage Foundation (2012) reports on what is known as the financial freedom index. According to the Heritage Foundation (2012), this is a measure of banking efficiency as well as a measure of independence from government control and interference in the financial sector. Furthermore, state ownership of banks and other financial institutions, such as insurers and capital markets, reduces competition and generally lowers the level of available services. According to the Heritage Foundation (2012), in an ideal banking and financing environment where a minimum level of government interference exists, independent central bank supervision and regulation of financial institutions are limited to enforcing contractual obligations and preventing fraud. According to the Heritage Foundation (2012), the following outcomes are achieved:

- Credit is allocated on market terms, and the government does not own financial institutions;
- Financial institutions provide various types of financial services to individuals and companies;

- Banks are free to extend credit, accept deposits, and conduct operations in foreign currencies; and
- Foreign financial institutions operate freely and are treated the same as domestic institutions.

2.6 Banking regulation and supervision

The above discussion illustrates that the banking sector can fail and cause major economic disasters. One of the ways to protect the banking sector from failing is by regulating the industry. Authors like Angkinand (2009), Viwes (2008), Klomp and de Haan (2011) and Mungan (2011) argue in favour of banking regulation. Viwes (2008) reiterates the fragile nature in this sector and the need for regulation as follows:

> *"banking is fragile and institutions face an important probability of failure and a potentially severe moral-hazard problem. Failure has been associated with a large social cost, which may be of a systemic nature. Regulation has somewhat anchored stability in this sector".*

The general objective of most regulations is to prevent or decrease the probability of harm by making certain conduct illegal (Mungan, 2011). Kilinc and Neyapti (2012), have explored the welfare implications of bank regulation and supervision. They provide empirical evidence on the positive relationship between bank regulation/supervision and growth in transition economies. Kilinc and Neyapti (2012) developed a model that indicates a linkage between bank regulation, supervision and economic performance. Their model shows that increasing bank regulation and supervision is associated with higher economic growth in transition to higher steady state.

Despite the discussion on the negative impacts of regulation, there are some advantages. According to Becher and Frye (2011), the presence of regulators can

put pressure on firms to adopt effective corporate governance. Good corporate governance in banking promotes safety and soundness of banks (Becher and Frye, 2011). The purpose of banking supervision is to enforce rules that have been set out to protect the financial system and to prevent banks from taking excessive risks. The need for regulation is particularly acute when incentives to take risks are high, and the social cost of banking failure is high (Vives, 2008, p.445).

Angkinand, (2009, p.243) points out that regulation requiring banks to hold sufficient capital and bank supervisors to monitor banks' capital adequacy are important ways to control banks' risk taking. Capital adequacy requirements and strong bank supervision should limit banks' risky lending and the adverse impacts of bank failures on the real economy (Angkinand, 2009, p.243). As such, soundness of the banking system and prevention of the occurrence of a banking crisis is undoubtedly the ultimate goal for policy makers and regulators (Moshirian and Wu, 2009, p. 352).

In general, authors agree that regulation is a good instrument to make sure that there is control in the sector. Klomp and de Haan (2011) found that banking regulation and supervision have had a positive impact in deterring excessive risk taking among banks. Angkinand (2009) supports this view and states that rules that force banks to hold sufficient capital can reduce their excessive risk taking and as such, capital adequacy regulation and bank supervision are jointly needed to prevent socially undesirable excessive risk taking. These authors argue that regulation requiring banks to hold "sufficient" capital and banking supervision to monitor banks' capital adequacy are important ways of managing risk in the banking sector. According to Angkinand (2009),

> *"capital adequacy requirements and strong bank supervision, should limit banks' risky lending and the adverse impact of bank failures on the real economy".*

Fragility and potential excessive risk taking in banking have led to the establishment of facilities to stabilize the system and prudential measures to monitor risk taking (Vives, 2008). While there is evidence that regulation is a good thing, other authors argue against the idea of regulating the banks. The argument is that regulation can in fact fuel excessive risk taking if not implemented correctly.

Van den Heuvel (2008), argued that security instruments such as deposit insurance can create a moral hazard problem because it gives banks an incentive to engage in excessive risk taking. Van den Heuvel's argument is not unreasonable because of the sense of protection associated with security instruments – such as deposit insurance, cash collateral, guarantees, and other instruments – banks are more open to the idea of relaxing the criteria of lending in the presence of a security package. This is one of the ways in which regulation can produce unintended consequences.

Hakenes and Schnabel (2011) studied capital regulation, competition and financial stability. They found that capital regulation may destabilize the banking sector through its effect on banking competition. Stricter capital requirements attenuate competition for loans, implying higher loan rates and hence higher risk taking (Hakenes and Schnabel, 2011, p. 256).

2.6.1 Banking sector stability

Stability in the banking sector is vital to the prevention of economic disruptions that come about as a consequence of the collapse of banks. In essence, regulations are being implemented to prevent failure in the banking sector. Jokipii and Monnin (2012) studied the relationship between the degree of banking sector stability and the subsequent evolution of real growth and inflation. In their study, they found a positive link between banking sector stability and real output growth. However, they found no clear link between the banking sector stability and inflation. They have summarized their results as follows:

"banking sector stability is an important driver of future GDP growth. Periods of bank sector stability are generally followed by an increase in real output growth and vice versa, a finding which appears to be driven predominantly by periods of relative instability rather than by periods of stability. In addition, they show that banking sector instability is followed by higher uncertainty about output growth (Jokippi and Monnin, 2012, p. 2)".

Furthermore, they found that the banking sector stability and real output growth is a two-way relationship. Real output growth is important for subsequent stability in the banking sector and similarly, banking sector stability is important for subsequent output growth (Jokippi and Monnin, 2012, p. 11). According to Blejer (2006, p. 3430), bank lending tends to be strongly pro-cyclical (credit booms and busts are positively correlated with the cycle). This correlation has been considered a source of financial instability and a justification for financial regulation and supervision.

2.6.2 Banking supervisory powers

Supervisory authorities play a vital role in creating an appropriate landscape for banking regulation. To this end, the Basel committee has made proposals aimed at regulating global banks. Some authors argue against the idea of a single regulatory authority. According to Barth, Gan & Nolle (2004, p. 15), a key policy decision in designing the structure of banking supervisory system is whether there should be a single bank supervisory authority or multiple bank supervisors.

Boyer and Ponce (2011) analysed whether banking supervision responsibilities should be concentrated in the hands of a single supervisor or split among different supervisors. Their study was motivated by the debate regarding home-host country supervision. They warn against a banking supervisory architecture, which aims to concentrate supervisory powers into single supervisors (Boyer and Ponce, 2011). Somewhat this argument challenges the idea of putting in place a universal

regulatory framework which does not recognize differences in economic development. It has been suggested above that compliance with such a global framework has the potential to suffocate smaller developing countries by forcing banks to hold higher capital.

Boyer and Ponce (2011) supports this notion that fragmented supervisory powers could also allow smaller economies to influence regulatory landscape. They found that splitting supervisory powers among different supervisors is a superior arrangement in ensuring societal welfare than concentrating these powers in a single supervisory body. The rationale behind this is that supervisors may be persuaded into unscrupulous practices and pursue self-interests (for example, accepting bribes) rather than ensuring the well being of the society. According to Boyer and Ponce (2011), allocation of powers may be a useful mechanism to improve societal welfare.

2.7 Banking deregulation

According to Feldmann (2012), many countries have substantially liberalized important aspects of their banking regulation between the late 1970s and the late 1990s, with some more deregulations in the early 2000s. Financial liberalization can mean many things, such as decreasing reserve requirements, increasing competition in the banking sector, abolishing interest rate ceilings on bank deposits, liberalizing capital markets, etc (Marini, 2005, 2558).

Figure 2 below depicts the evolution of global banking regulation from 1977 to 2004. The figure illustrates a downward trend in bank regulation, interest rate controls, credit controls, competition restrictions, state ownership and low quality of banking supervision between 1977 and 2004. However, as a result of the global financial crises of 2007-09, the phenomenon is being reversed and banking regulation is now being tightened again in many countries and many restrictions

going much further than the current regulations have been proposed (Feldmann, 2012).
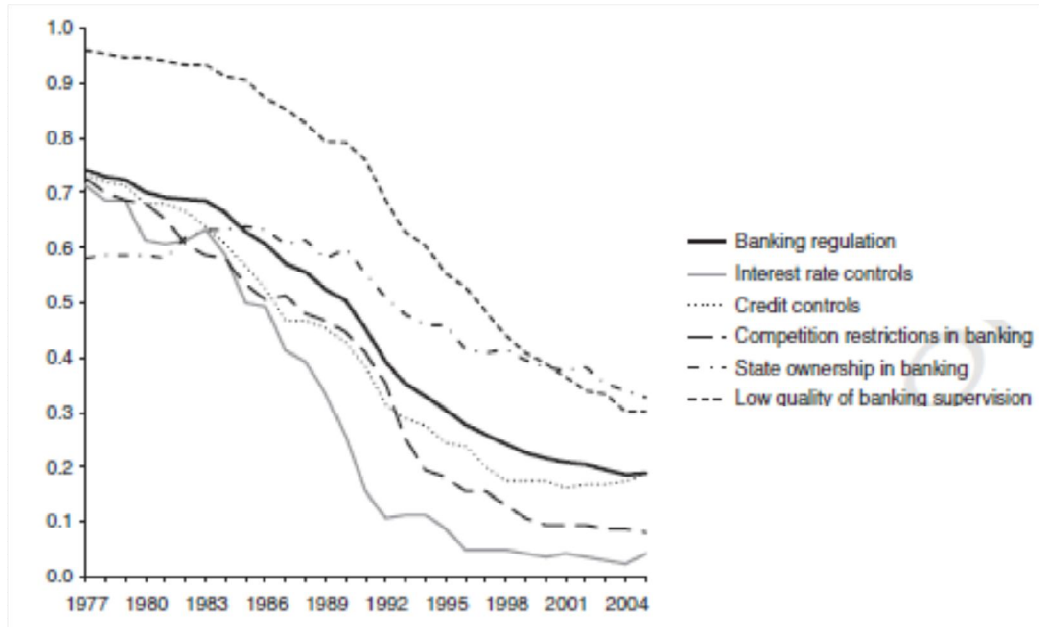
Figure 2: Global banking regulation between 1977 and 2004 (Source: Feldmann, 2012)

Feldmann (2012) studied the impact of this deregulation regime, particularly on unemployment. He argued that an economy with flexible credit markets will channel funds quickly and smoothly to new firms that take advantage of the new technologies, thus avoiding the loss of jobs in firms that are adversely affected by the technological shock. By contrast, in economies with rigid credit markets, entrepreneurs cannot borrow the funds necessary to start up new businesses, leading to persistent rise in unemployment Feldmann (2012).

While banking deregulation has economic benefits, it also has its own challenges, particularly when implemented in an irresponsible manner. Becher and Frye (2011) warned that deregulation can cause firms to adapt their governance to handle the increased opportunity set and managerial discretion. Without regulatory pressure, some firms may decide to reduce monitoring that was too high under regulation (Becher and Frye, 2011).

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Moshirian and Wu (2009) found that better banking disclosure improves the ability of market participants to discipline the excessive risk-taking of banks. In a market with more transparent banking disclosure, higher bank volatility is less likely to lead to banking crises. Furthermore, effective auditing could ensure that banks abide by the banking accounting standards, and identify problem banks in a timely manner (Moshirian and Wu, 2009, p. 367).

Chen (2007) studied the effects of banking regulation on credit risk and supports Feldman's findings. Chen (2007) developed a theoretical model showing that removing entry restrictions increases banks' incentives to screen loan applicants while lending rates are driven lower. The study shows that a bank is willing to invest more resources in screening borrowers when there is an entry threat, even though loan rates are driven lower (Chen, 2007). Based on these findings, Chen (2007) argues that deregulation may result in improved loan quality and lower credit risk.

2.8 Self versus government regulation

The changing landscape has focused policy makers' and industry participants' attention on the appropriate role and structure of banking supervision and regulation (Barth, Gan & Nolle, 2004, p.1). As countries make different choices in these regards, it is useful to inquire if there are fundamental principles countries can follow to ensure financial system stability and growth (Barth, Gan & Nolle, 2004, p.1).

There are various instruments that governments can use to regulate the economy. Broadly, these encompass self-regulation as well as government regulation. Authorities may apply two broad types of intervention when a crisis emerges. On the one hand, an ''accommodative'' approach, adopting measures such as blanket deposit guarantees, liquidity support, forbearance by tolerating violations of bank

solvency rules, government recapitalizations, or nationalizations (Cubillas, Fonseca and Gonzalez, 2012, p.3). On the other hand, the alternative is a ''strict'' approach, where authorities intervene by restraining the actions of a bank that gets into severe liquidity problems or by requiring undercapitalized banks to raise sufficient additional capital to meet minimum capital requirements (Cubillas, Fonseca and Gonzalez, 2012, p.3).

According to Grajzl and Murrell (2007), politicians in transition or developing economies generally choose excessive government regulation. One exceedingly common arrangement in developed countries is self-regulation (Grajzl and Murrell, 2007). Chen (2007, p. 357) reports that due to the common believe among central bankers that competition promotes efficiency and stability, the European Union removed cross border bank entry restrictions by enacting the Second Banking Directive in the mid 1990s. The USA has until recently adopted self-regulation. Self-regulatory arrangements are less formalized than public regulatory regimes and hence less rigid (Cubillas, Fonseca and Gonzalez, 2012). Self-regulation relies on market discipline to bring order to the sector. Market discipline can be described as a situation in which depositors penalize riskier banks by requiring higher interest rates or by withdrawing deposits (Cubillas, Fonseca and Gonzalez, 2012).

According to Grajzl and Murrell (2007), self-regulation increases firms' profits and may increase welfare. This theory supports the argument that excessive regulation can have detrimental effects on society at large. Blejer (2006, p. 3431) asked if the invisible hand would get the financial market to optimal efficiency? The answer is, in general, ''No''. Market forces alone will – as a rule – not lead to an efficient outcome, for various reasons (Blejer, 2006). The prime reason is the fact that in an inefficient market, outside participants pay inside participants a higher than optimal price for financial services (Blejer, 2006, p. 3431).

2.9 Proposed global regulatory framework

The 2008 global financial crisis has prompted the Basel Committee on Banking Supervision to improve the banking regulatory framework and supervision with the introduction of Basel III in 2010. This follows on Basel I and II which were introduced in early and mid 2000's respectively. The objective behind these regulatory frameworks is to strengthen global capital and liquidity regulations in order to promote a more resilient banking sector (Klomp and de Haan, 2011). The Basel III framework is intended to reform the international financial system and improve the banking sector's resiliency in times of financial and economic distress by instituting higher global capital and new liquidity standards on a more uniform basis globally (Lyons and Casey, 2011).

According to Trepeano (2011, p. 51), the Basel Committee is introducing two further indicators of financial stability for banks: the liquidity coverage ratio and the stable funding ratio. The liquidity coverage ratio imposes a certain fixed relation between a part of total assets (those eligible to be included) and the estimated net cash flow over a monthly period (Trepeano, 2011, p. 51). The idea is that the bank must have enough liquid assets to cover expected cash flow for a month (Trepeano, 2011). The overarching aim is to strengthen the banking regulatory framework and to enhance supervision over the global banking industry. According to Lyons and Casey (2011, p 22), Basel III aims to:

- *" increase the required quality and quantity of the capital base;*
- *create a capital conservation buffer to promote the build-up of capital that can be used in times of stress and encourage market discipline;*
- *create a countercyclical buffer to be implemented when regulators perceive signs that credit has grown to excessive levels;*
- *increase risk-weighted asset assessment for certain types of activities;*
- *introduce a leverage ratio as an addition to the risk-capital ratios that historically have been the exclusive capital measure in Basel II; and*

- *address systemically important financial institutions".*

According to Lyons and Casey (2011), policy makers proposed these significant revisions to the Basel capital standards aimed at raising both the level and quality of capital held by the industry. They further state that the previous regulations permitted banks to satisfy capital requirements with a mixture of capital elements, many of which had features of both equity and debt, but which, during the crisis, proved ineffective in absorbing losses (Lyons and Casey, 2011). Basel III focuses on a ''core'' component of tier 1 capital, consisting of equity capital, with much higher minimum requirements at all levels of capital (Lyons and Casey, 2011).

The Basel III package also includes a counter-cyclical capital requirement designed to constrain lending growth and ensure that banks build capital buffers during favourable economic conditions (Francis and Osborne, 2012, p. 805). Evidence also shows that under Basel I and II banks built up excessive leverage and took on additional credit risk within their trading activities over time, while still meeting risk-based capital rules overall (Francis and Osborne, 2012, p. 805). In response, Basel III includes a leverage ratio based on non risk-weighted assets and higher risk weights in the trading book to account for unexpected credit losses (Francis and Osborne, 2012, p. 805).

While the intentions of Basel III are good, the main issue is to determine how these new requirements will impact on society, considering that high levels of regulation can hamper economic growth. Miyake and Nakamura (2007) have studied and analyzed the effect of a change in the capital adequacy regulation on the economy. They found that when financial authorities strengthen capital requirements, the economy gets to a point where it reaches a steady state with higher production, and goes into depression in the short term. However, if both the shock and the introduction of new regulation occur simultaneously, the economy may fall into a long and serious slump (Miyake and Nakamura, 2007, p. 25).

Miyake and Nakamura (2007) have depicted this phenomenon in Figure 3. They have examined the dynamics of when banks tighten their loans as a result of higher regulation, and explained it as follows:

"If a negative productivity shock occurs and the regulation is simultaneously strengthened, then the economy moves instantaneously from point E to B6. After that, the economy moves gradually to a new steady state E'."
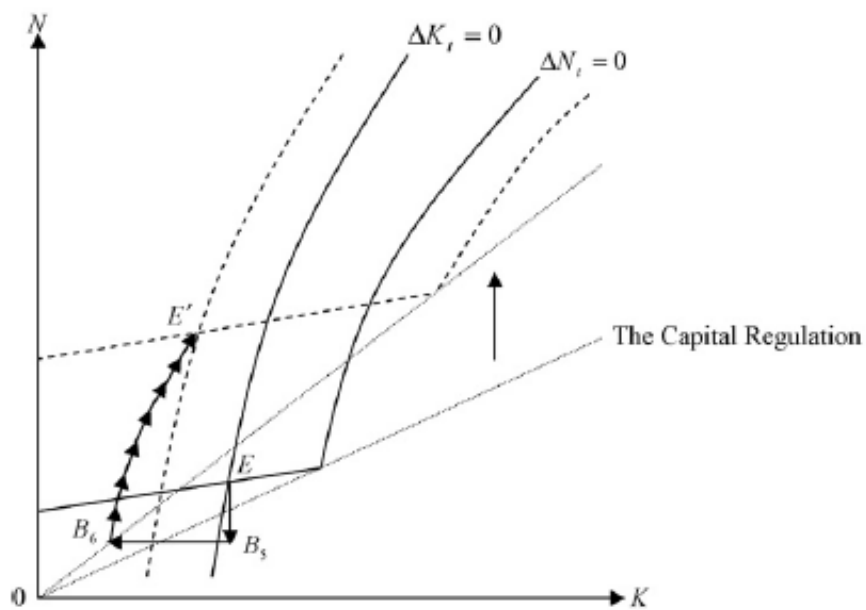
Figure 3: The effect of strengthening of the regulation (Source: Miyake & Nakamura, (2007, p. 24).

Following the first Basel Accord of 1988, banks in many countries have been subject to a common set of regulatory capital requirements which require banks to meet a minimum ratio of regulatory capital to risk-weighted assets (Francis and Osborne, 2012). According to Francis and Osborne (2012), Basel III regulatory capital comprises:

- tier 1 capital, which includes higher-quality, more loss-absorbent capital elements such as common equity; and

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- tier 2 capital, which includes subordinated debt and other instruments with capital-like properties.

Since 1988, policymakers have made refinements to account for other risks not fully captured in the initial Basel Accord (Francis and Osborne, 2012. P.805). Basel II explicitly emphasizes the strengthening of market discipline (Pillar 3) as well as official supervision (Pillar 2) and capital requirements (Pillar 1) as tools to improve bank stability (Cubillas, Fonseca and Gonzalez, 2012).

Basel III was essentially introduced to deal with the areas of weakness in the current international bank capital regulation framework exposed by the 2007/08 financial crisis, such as excessive on and off-balance sheet leverage, accompanied by a gradual erosion of the level and quality of the capital base, and insufficient liquidity buffers (Liu and Seeiso, 2012, p.848). Under the proposed Basel regime, all banks were subject to a flat minimum capital requirement of 8% to ensure that a sufficient buffer of capital is available during periods of economic contraction (Francis and Osborne, 2012, P.803).

The objectives of increasing capital requirements during more favourable economic conditions are to raise the cost of lending and hence slow over-exuberant credit activity, and to provide a capital cushion with which to absorb unexpected losses after the onset of a crisis (Francis and Osborne, 2012, p. 804). Chiuri, Ferri and Majnoni (2003), studied the macroeconomic impact of bank capital requirements under Basel I. They found that higher capital requirements seem to exert a rather general and negative effect on bank lending in emerging economies, whether affected by crises or not. While this may have beneficial effects – possibly reducing ill-advised lending engaged in by banks exploiting the safety net provided by their governments – capital asset requirement (CAR) enforcement may also induce an aggregate credit slowdown or contraction in the examined emerging countries, thus exacerbating liquidity constraints and negatively affecting real activity (Chiuri, Ferri and Majnoni, 2002).

In view of the potential damage of such evolution, their analysis suggests using caution in the process of raising minimum capital requirements in emerging economies, where financing channels alternative to the banking system are generally weaker (Chiuri, Ferri and Majnoni, 2002).

2.10 Recent regulatory changes in developed world

Changes to the banking regulatory framework were proposed in the United States of America as well as in Europe. In July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into law in the United States of America (Tropeano, 2011). The Dodd-Frank Act introduced several structural changes in the shape of financial markets in the United States (Tropeano, 2011, p.46). However, Tropeano (2011) argues that the changes in regulation would not hinder big banks from seeking the same rate of profit they achieved before the financial crisis and from eluding capital regulations by extending their links to the shadow banking system.

Tropeano (2011) criticizes the Dodd-Frank Act for not being comprehensive enough and for the notably insufficient consideration of the shadow banking system. Tropeano (2011, p.55) propose alternative reform in the financial system as follows:

> *"The state must be brought back into the financial system to change the corporate governance practice of financial firms that favor speculation and maximization of short-term profits and bonuses. Non-bank financial institutions must be tightly regulated, and the links between banks and non-banks must be cut by hindering banks from purchasing assets issued by non-banks. The state must warrant liquidity and insolvency provision only to those institutions that follow strict rules. In particular, pension funds and other financial institutions whose performance is crucial to the well-being of*

citizens should be run by public management and should invest in safe assets with low but stable returns".

2.11 Conclusion

Literature indicates that the financial sector plays an important intermediary role of facilitating the flow of capital in an economy. The foregoing literature also indicates that the banking sector is facing major regulatory challenges following the recent global banking crises. As pointed out by Klomp and de Haan (2011), authors have mixed opinions about the subject of regulating the banking sector. Some view regulation as a good instrument while others argue that deregulation would be beneficial for economic growth. The essence of the debate for those in favour of higher regulation is that it would deter excessive risk taking and subsequently lead to safer banking.

Those who argue against banking regulation point out that higher regulation will slow down economic growth. For example, Van den Heuvel (2008) argues that capital adequacy regulation can impose a cost on society by reducing the ability of banks to create liquidity in the economy. For policy makers, it is important to take into consideration the fact that capital will in most cases follow investments with higher returns. Banks might well find it difficult to offer such returns in the future than they have done in the past (Krayenbuehl, 1993, p. 33).

Chapter 3 – Research question and hypotheses

3.1 Introduction

This chapter presents the overarching research question as well as two research hypotheses that were developed in light of the literature discussed in Chapter 2. It was established that tighter regulation in the financial sector may lead to slower economic growth due to restricted flow of capital in an economy.

3.2 Research question

The study aims to answer the following fundamental research question:

Does higher financial regulation deter economic growth in developing countries?

3.3 Research hypotheses

The following hypotheses have been developed to test the relationship between financial regulation and economic growth:

3.3.1 Hypothesis # 1

Null hypothesis: High financial regulation contributes negatively to economic growth in developing countries.

Research hypothesis: High financial regulation contributes positively to economic growth in developing countries.

3.3.2 Hypothesis # 2

Null hypothesis: The financial freedom index is not a significant predictor of economic growth in developing countries.

Research hypothesis: The financial freedom index is a significant predictor of economic growth in developing countries.

It is important to note that financial the freedom index is entrenched in financial regulation and that the first hypothesis is testing if there is a relationship between the two variables. The second hypothesis is testing aims to determine if the financial freedom index is a significant explanatory variable of gross domestic products.

3.4 Conclusion

The research question and hypotheses above supports the overall research objective of investigating the impact of financial regulation on economic growth in developing countries. They will assist in determining whether financial regulation is good or bad for economic growth in developing countries. The next chapter presents the research methodology employed in this study.

Chapter 4 - Research methodology

4.1 Introduction

This chapter presents research methodology that was used for the study. The chapter is organized according to the following sub-sections: research method, research design, type of data, population, sampling, data collection, method of analysis, assumptions, limitations and ethical issues.

4.2 Research method

Broadly, there are two distinct study methods employed in this research. These are qualitative and quantitative studies. According to Blumberg, Cooper and Schindler (p. 191, 2008), the distinction is based mainly on the kind of information used to study a phenomenon. Quantitative studies rely of quantitative information such as numbers and figures, while qualitative studies base their accounts on qualitative information such as words, sentences and narratives (Blumberg, Cooper and Schindler, p. 191, 2008). Quantitative data has been used in this study and as such the research methodology employed was a quantitative study.

4.3 Research design

According to Blumberg, Cooper and Schindler (2008, p. 195), research design allows the researcher to plan and structure the investigation to obtain answers to research questions/hypothesis tests. Quantitative research methodology was chosen partly because of the casual nature of the study and also due to the availability of secondary data on the subject matter. The objective was to investigate the nature of a relationship between financial regulation and economic growth (measured as gross domestic products).

These variables (financial freedom index and gross domestic products) were measured quantitatively to substantially determine the significance of this relationship. This type of study in which one variable produces a change in another variable is known as the casual study. According to Zikmund (2003), a typical causal study involves a change of one variable followed by an observation of its effect on another variable. Zikmund (2003, p.56) describes the main goals of causal research as to identify cause-and-effect relationships among variables. This study involved trend analysis between the financial freedom index and gross domestic products in developing countries. The strength of this relationship was tested with the use of correlation matrix as well as regression analyses.

Zikmund (2003, p. 65) indicates that there are four basic research methods for descriptive and causal research. These are: surveys, experiments, secondary data studies and observations. As such, the researcher is not always required to collect primary data because often the information required to address a research problem is readily available and the researcher can rely on secondary data (Blumberg, Cooper and Schindler, 2008, p. 197). In this case, secondary data on the financial freedom index as well as a number of macroeconomic variables were used. These macroeconomic variables were: GDP growth percentage, inflation rate, interest rates and unemployment rate.

The following sub-sections discuss the research variables that were used in the study.

- *4.3.1 Financial freedom index*

The financial freedom index was chosen because it is strongly linked to financial regulation. This index acts as a good proxy for financial regulation. According to the Heritage Foundation (2012), the financial freedom index scores an economy's financial freedom by looking into the following five broad areas as follows:

- The extent of government regulation of financial services;
- The degree of state intervention in banks and other financial firms through direct and indirect ownership;
- The extent of financial and capital market development;
- Government influence on the allocation of credit; and
- Openness to foreign competition.

These five areas are considered to assess an economy's overall level of financial freedom that ensures easy and effective access to financing opportunities for people and businesses in the economy (The Heritage Foundation, 2012). An overall score on a scale of 0 to 100 is given to an economy's financial freedom through deductions from the ideal score of 100 (The Heritage Foundation, 2012). The Heritage Foundation (2012) gave an elaborate criterion of measuring the financial freedom index as follows:

- **100—Negligible government interference**.
- **90—Minimal government interference**. Regulation of financial institutions is minimal but may extend beyond enforcing contractual obligations and preventing fraud.
- **80—Nominal government interference**. Government ownership of financial institutions is a small share of overall sector assets. Financial institutions face almost no restrictions on their ability to offer financial services.
- **70—Limited government interference**. Credit allocation is influenced by the government, and private allocation of credit faces almost no restrictions.

Government ownership of financial institutions is sizeable. Foreign financial institutions are subject to few restrictions.

- **60—Significant government interference**. The central bank is not fully independent, its supervision and regulation of financial institutions are somewhat burdensome, and its ability to enforce contracts and prevent fraud is insufficient. The government exercises active ownership and control of financial institutions with a significant share of overall sector assets. The ability of financial institutions to offer financial services is subject to some restrictions.

- **50—Considerable government interference**. Credit allocation is significantly influenced by the government, and private allocation of credit faces significant barriers. The ability of financial institutions to offer financial services is subject to significant restrictions. Foreign financial institutions are subject to some restrictions.

- **40—Strong government interference**. The central bank is subject to government influence, its supervision of financial institutions is heavy-handed, and its ability to enforce contracts and prevent fraud is weak. The government exercises active ownership and control of financial institutions with a large minority share of overall sector assets.

- **30—Extensive government interference**. Credit allocation is extensively influenced by the government. The government owns or controls a majority of financial institutions or is in a dominant position. Financial institutions are heavily restricted, and bank formation faces significant barriers. Foreign financial institutions are subject to significant restrictions.

- **20—Heavy government interference**. The central bank is not independent, and its supervision of financial institutions is repressive. Foreign financial institutions are discouraged or highly constrained.

- **10—Near repressive**. Credit allocation is controlled by the government. Bank formation is restricted. Foreign financial institutions are prohibited.

- **0—Repressive**. Supervision and regulation are designed to prevent private financial institutions. Private financial institutions are prohibited.

- *4.3.2 Gross Domestic Products (GDP)*

GDP is the subject matter of this research and a proxy for economic growth. The selection or inclusion of this variable was a natural one as a measure of economic growth. According to Bodie, Kane and Marcus (2011, p. 731), GDP is a measure of the economy's total production of goods and services. Rapidly growing GDP indicates an expanding economy with ample opportunities for a firm to increase sales (Bodie, Kane and Marcus, 2011, p. 731). As discussed in chapter 2, literature review showed a strong correlation between financial regulation and GDP growth. GDP growth is measured as a percentage.

- *4.3.3 Inflation*

Inflation was included in the study as an explanatory variable for multiple regression analysis. The reason for its inclusion is that it is closely linked to GDP growth and is expected to improve the regression model. The concept of multiple regression analysis is discussed later in this chapter. According to Bodie, Kane and Marcus (2011, p. 731), the rate at which general level of prices increases is called inflation. High rates are often associated with overheated economies, that is, economies where demand for goods and services is outstripping productive capacity, which leads to upward pressure on prices (Bodie, Kane and Marcus, 2011, p. 732). Inflation rate is also measured as a percentage.

- *4.3.4 Interest rates*

Interest rate represents the cost of capital. Similar to inflation, interest rates are closely linked to GDP growth and have been included as an explanatory variable to improve the regression model. High interest rates reduce the present value of future cash flows, and thereby reducing the attractiveness of investment opportunities (Bodie, Kane and Marcus, 2011, p. 732). One of the main drivers of interest rate is large amounts of government borrowing which can force interest

rates up by increasing the total demand for credit in an economy (Bodie, Kane and Marcus, 2011, p. 732). Interest rates are also expressed in percentages.

- *4.3.5 Unemployment*

Unemployment is a key macroeconomic factor and has been included as one of the explanatory variables of GDP growth. This was selected to also improve the multiple regression model. The unemployment rate is a percentage of the total labour force (those who are either working or actively seeking employment) yet to find work (Bodie, Kane and Marcus, 2011, p. 732). Unemployment rate measures the extent to which the economy is operating at its full capacity (Bodie, Kane and Marcus, 2011, p. 732). Most governments hope to stimulate their economies enough to maintain full employment, but not so much to bring on inflationary pressures (Bodie, Kane and Marcus, 2011, p. 732).

4.4 Type of data

As mentioned above, secondary data has been used in this study. Zikmund (2003, p. 136) describes secondary data as data that has been previously collected for some purpose other than the one at hand. Secondary data on a country's financial freedom, GDP growth, inflation, interest rates and unemployment has been used.

Zikmund (2003) justifies the use of secondary data by a simple quotation that states: *"nowhere in science do we start from scratch"*. It is inefficient to discover anew through the collection of primary data or original research what has been done and reported at a level sufficient to solve the research problem (Blumberg, Cooper and Schindler, 2008, p. 202). In this case, secondary data has been collected and made available to the general public. Some of the advantages and disadvantages of secondary data are highlighted as follows:

Advantages of secondary data

According to Zikmund (2003), the main advantages of using secondary data are as follows:

- Acquiring secondary data is almost always less expensive than acquiring primary data; and
- Moreover, secondary data can be obtained rapidly.

According to Blumberg, Cooper and Schindler (2008, p.316), a researcher can immediately start to analyze the data and to find answers to his or her research problem. The often-time consuming activities of setting up the research, approaching the respondents, collecting information from respondents and recording information obtained in a way suitable for analysis is not necessary (Blumberg, Cooper and Schindler, 2008, p.316). Another advantage of secondary data is that, depending on the source of the data; such data is often of high quality (Blumberg, Cooper and Schindler, 2008, p.317).

Disadvantages of secondary data

Blumberg, Cooper and Schindler (2008, p. 317) highlight problems with secondary data as follows:

- Secondary data was initially not collected for the research problem at hand; and
- Thus, the data might not perfectly fit with the requirements of the current research problem.

Fortunately in this case, the variables were aligned to the subject matter of this investigation and links to financial regulation as well as economic growth.

4.5 Population and Sampling

According to Zikmund (2003, p. 369), the process of sampling involves any procedure using a small number of items or parts of the whole population to make conclusions regarding the whole population. A population in this case was all the developing countries in the world. Blumberg, Cooper & Schindler (2008, p. 228) describes a population as the total collection of elements about which we wish to make some inferences. A sample is a subset, or some part, of a larger population (Zikmund, 2003, p. 369).

It is fair to say that collecting data from the whole population would have been impractical; firstly because of the time it would have taken and secondly, the resources that would have been needed. According to Saunders and Lewis (2012, p. 133), researchers usually collect data from a sample simply because it is not practical to collect data from the whole population. Given these limitations, a sample has been taken from a few developing countries. A sample made up of ten developing countries was taken from three regions namely: the Americas, Africa and Asia Pacific. The countries in the sample were: Algeria, Argentina, Brazil, China, Egypt, India, Indonesia, Mexico, Russia and South Africa.

A quota sampling method has been used in selecting countries included in the sample. It is important to note that quota sampling is a non-probability procedure but it ensures that certain characteristics of a population sample are represented to the exact extend that the investigator desires (Zikmund, 2003, p. 383). In this case, the sample was divided equally among three regions. There might have been an element of bias in selecting countries for a sample as these were selected according to convenience sampling procedure rather than on a probability basis (Blumberg, Cooper & Schindler, 2008). This is one of the limitations of quota sampling. Although there are many problems with quota sampling, careful supervision of the data collection may provide a representative sample of various subgroups within a population (Blumberg, Cooper & Schindler, 2008, 254).

4.6 Unit of analysis

According to Blumberg, Cooper & Schindler (2008, p. 224), unit of analysis describes the level at which the research was performed and which objects were researched. The unit of analysis for this study were the gross domestic products and the financial freedom index of the selected countries.

4.7 Data collection

The secondary data used in this study was collected from the Heritage Foundation as well as the World Bank. Founded in 1973, the Heritage Foundation is a research and educational institution (described as a think tank) whose mission is to formulate and promote conservative public policies based on the principles of free enterprise, limited government, individual freedom, traditional American values, and a strong national defense (The Heritage Foundation, 2012).

The World Bank is an international financial institution made up of five organizations which provides loans, advice and an array of customized resources to more than 100 developing countries (World Bank, 2012). Data on financial regulation index was sourced from The Heritage Foundation while data on economic variables were sourced from the World Bank. This data was saved electronically on Microsoft Excel and access to the databases was gained through the internet.

Table 2: Type of data and its sources

Data Type	Data Source	Website address
Macroeconomic data	World Bank	www.worldbank.org
Financial freedom index	The Heritage Foundation	www.heritage.org

4.8 Method of data analysis

The data was first arranged according to its variables (in columns) on Microsoft Excel and these variables were stacked by country before importing into SPSS (Statistical Package for the Social Science). It is important to mention that some variables had few missing data points. These missing points were replaced with averages of the data on a particular variable. Although this has the potential to skew the results, it was the best alternative in the absence of true figures. It is also important to highlight that missing data points were very few. Methods used to analyse the data were: descriptive statistics, trends analyses, correlation matrix, simple and multiple regression analyses. A major advantage of these methods was that the analyses were quick and results produced were statistically sound.

Initial analyses in a form of time series analyses were performed on Microsoft Excel. The data was then imported into SPSS for statistical analysis. The first step that was performed on SPSS was to compute a summary of descriptive statistics on the data collected. Descriptive statistics refers to the transformation of raw data into a format that will make them easy to understand and interpret, as well as to rearrange, order, and manipulate data to provide descriptive information (Zikmund, 2003, p. 473). This included computation of mean, minimum value, maximum value, standard deviation, and number of observations.

The next step was to progress from descriptive analysis into inferential statistics. This process was initiated by computing a correlation matrix to establish the strength of the relationship between the variables involved. Correlation matrix provided statistical information regarding the relationship between variables. The relationship was measured by the percentage of correlation as well as its significance level.

This step was followed by the computation of simple as well as multiple regression analyses on dependent and independent variables. Albright, Winston & Zappe (2009) described regression analysis as the study of the relationship between variables. The method can be used to understand how the world operates as well as making predictions. A simple regression includes a single explanatory variable, whereas a multiple regression can include any number of explanatory variables (Albright, Winston & Zappe, 2009, p. 572).

Simple regression analysis was performed on GDP growth and the financial freedom index to determine the percentage of change in GDP that could be explained by the change in the financial freedom index. The model was measured by its R-square, F-value as well as the significance level which was tested at a P-value of 5%. Anything lower than 5% meant that the relationship between the two variables was significant; while anything above 5% meant that the relationship is weak.

The Simple regression was followed by a multiple regression analysis. This was performed to build a good model that would explain a larger percentage of the change in GDP. This was done by adding the following explanatory variables: financial freedom index, inflation rate, interest rate, unemployment as well as dummy variables. Similar to simple regression analysis, multiple regression analysis was also tested at a significance level of 5%.

The expected output from multiple regression analyses were: the model summary with an R-square, the Anova table with an F-value and significance level, the table of coefficients with significance levels, table of outliers statistics, the P-P plot of regression standardized residuals, error plot of the dependent variables. Table of outliers, the P-P plot and the error plot were run on multiple regressions for completeness of the statistical output and were not absolutely necessary for the analysis.

The P-P plot is usually used only to obtain a general idea of whether the data is normally distributed or not. If the data is normally distributed, then the data points will tend to cluster around a 45-degree line (Albright, Winston & Zappe, 2009). Any large deviations from a 45-degree line signal some type of abnormality (Albright, Winston & Zappe, 2009)

The data was also analysed to determine if there were any outliers that would have skewed the results. Zikmund (2003, p. 490) describes an outlier as a value that lies outside the normal range of a set of data. This was done by using box and whisker plots which is a graphic device that represents central tendencies, percentiles, variability and frequency distributions (Zikmund, 2003, p. 490).

Subsequent to identifying these outliers, multiple regression analysis was run with the outliers removed from the data. This was done to improve the model by increasing the percentage of the change in GDP (or R-square) that would be explained by a combination of explanatory variables. In most cases, multiple regression models are better because they allow researchers to explain a large percentage of change in the dependent variable. For ease of reference, key statistical terms used in regression analyses are presented in table 3 below. These definitions were extracted from Albright, Winston & Zappe (2009) as well as Zikmund, (2003).

Table 3: Summary of key statistical terms (Source: Albright, Winston & Zappe, 2009 and Zikmund, 2003)

P-value	The p-value of a sample is the probability of seeing a sample with at least as much evidence in favour of the alternative hypothesis as the sample actually observed. The smaller the p-value, the more evidence there is in favour of the alternative hypothesis. If a p-value is less that 0.05, it provides strong evidence that the alternative hypothesis is true.
R-square	R-square is the percentage of variation of the dependent variable explained by an explanatory or a set of explanatory variables. R-square measures the goodness of the linear fit. The better the linear fit is, the closer R-square is to 1.
Probability – Probability (P-P) plot	P-P plot is a scatter plot of the standardized values from the data set versus the values we would expect if the data were perfectly normally distributed.
F-value	A procedure used to determine whether there is more variability in the scores of one sample than in the scores of another sample. F-value is used to evaluate the goodness of the regression line's fit.
Df	The number of degrees of freedom is equal to the number of observations minus the number of constraints or assumptions needed to calculate a statistical term.
Simple regression	A regression model with a single explanatory variable.
Multiple regression	A regression model with any number of explanatory variables.
Anova table	A table that presents the results of a regression calculation.
Dummy variable	A dummy variable is a variable with possible values 0 and 1. It equals 1 if the observation is in a particular category and 0 if it is not.
Significance level	The critical probability in choosing between the null and alternative hypotheses. In this case, the probability level of 0.05 or 5% was

	considered to be too low to warrant support of the null hypothesis.

4.9 Assumptions and limitations

The assumption was that the sample was a fair representation of a population of developing countries. The sample included ten countries from three regions in the world. As such, it was assumed that differences as well as similarities among developing countries were captured in the sample. However, it was acknowledged that the sample was relatively small to draw any meaningful inference outside the ten countries. While the sample is considered to be a fair representation of a population of developing countries, the result may not be generalised to the entire population of developing countries because of its small size and non-probabilistic nature.

4.10 Ethical issues

Ethical issues have been considered throughout the study. No human being or animals were used in addressing the research problem as the study was conducted entirely on secondary data made available to the general public by the World Bank and the Heritage Foundation. No prior permission was required to use the data and no physical or psychological harm has been caused to anyone during the study.

4.11 Conclusion

This chapter presented and outlined research methodology employed during the study. Secondary data was used in the study and this was analyzed using trend analysis as well as regression analysis. The next chapter presents the results obtained during the study.

Chapter 5: Results

5.1 Introduction

The results of this study are presented in this chapter. The chapter starts by describing the data as well as statistics performed on it. This is followed by a presentation of the results which was done in accordance with the two hypotheses formulated in chapter 3. The results addressing hypothesis#1 are presented in a form of time series graphs of financial freedom index and GDP growth over a period of 17 years. The results addressing hypothesis#2 are presented in a form of correlation matrix, simple regression and multiple regression outputs.

5.2 Data collected and descriptive statistics

Secondary data on the financial freedom index was collected from The Heritage Foundation's website for a period of 17 years from 1995 to 2011. Similarly, secondary data on GDP growth, inflation, interest rates and unemployment was collected from the World Bank website for a period of 17 years (over the same period as the financial freedom index). The data was made available in an electronic format captured on Microsoft Excel.

The data was first analysed per country using the time series trend analysis method. This method was used to observe the change in GDP growth in relation to the change in the financial freedom index. Time series analysis was followed by the regression analysis method. For this technique, data from the ten sample countries was combined to determine the statistical significance of the financial freedom index in explaining the change in GDP growth in developing countries. A summary of the descriptive statistics on the combined data is presented on table 4 below.

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The table shows a number of observations per variable, its minimum and maximum values, mean as well as the standard deviation. A total of 170 observations were analysed. SPSS was used to compute the summary table of descriptive statistics, correlation matrix, box & whisker plot, and the regression model. For regression analysis, inflation, interest rate, and unemployment were used as independent variables. Two dummy variables were computed and used in a multiple regression model. Furthermore, logarithms of inflation and interest rates were computed to handle outliers.

Table 4: Summary of descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Financial freedom index	170	30	70	43.47	13.599
GDP growth (annual %)	170	-13.1	14.2	4.564	4.0508
Log_Inflation	170	.47	5.30	2.2716	.68165
Inflation (%)	170	-1.4	197.5	10.062	18.0662
Interest rate (%)	168	4.9	320.3	20.340	29.6095
Unemployment (%)	140	2.1	31.2	10.659	7.4021
Dummy Variable Africa	170	.0	1.0	.300	.4596
Dummy variable Americas	170	.0	1.0	.300	.4596
Log_Interest	168	1.59	5.77	2.6734	.69641
Dummy_Russia	170	0	1	.10	.301
Dummy_Indonesia	170	.00	1.00	.1000	.30089
Valid N (listwise)	122				

5.3 Hypothesis #1

5.3.1 Time series graphs

Figures 4 to 13 present time series analysis on trends between the financial freedom index and GDP growth for each country. The financial freedom index was plotted on the primary vertical axis and GDP growth was plotted on the secondary vertical axis. Time series graphs were computed on Microsoft Excel.

Figure 4: Graph of financial freedom index versus GDP growth in Algeria

Figure 5: Graph of financial freedom index versus GDP growth in Egypt

Figure 6: Graph of financial freedom index versus GDP growth in South Africa

Figure 7: Graph of financial freedom index versus GDP growth in Argentina

Figure 8: Graph of financial freedom index versus GDP growth in Brazil

Figure 9: Graph of financial freedom index versus GDP growth in Mexico

Figure 10: Graph of financial freedom index versus GDP growth in China

Figure 11: Graph of financial freedom index versus GDP growth in India

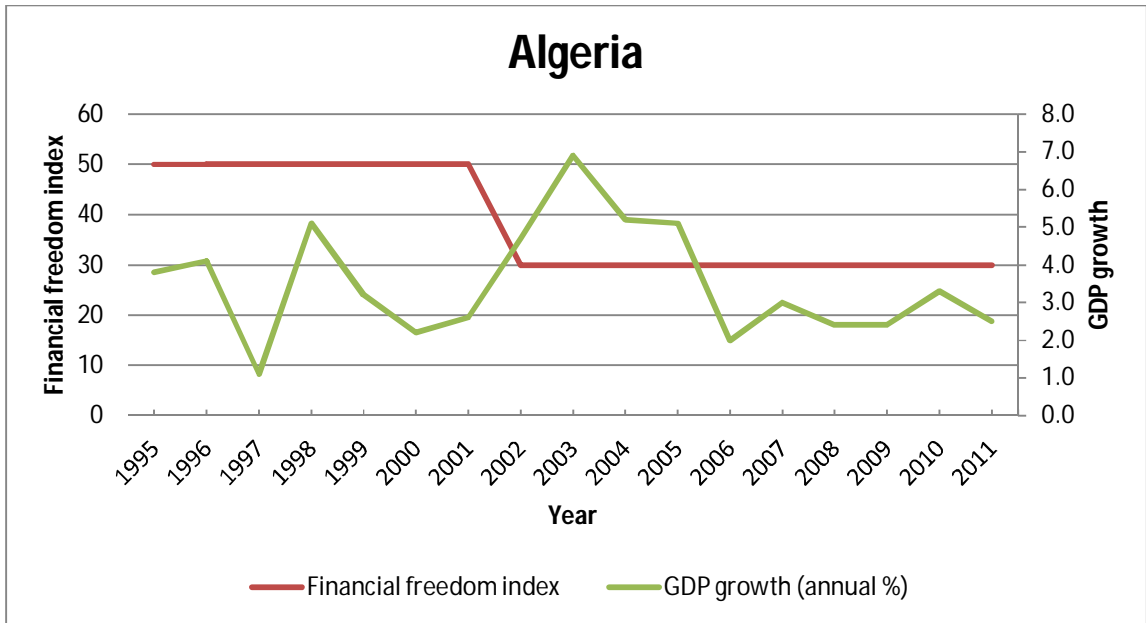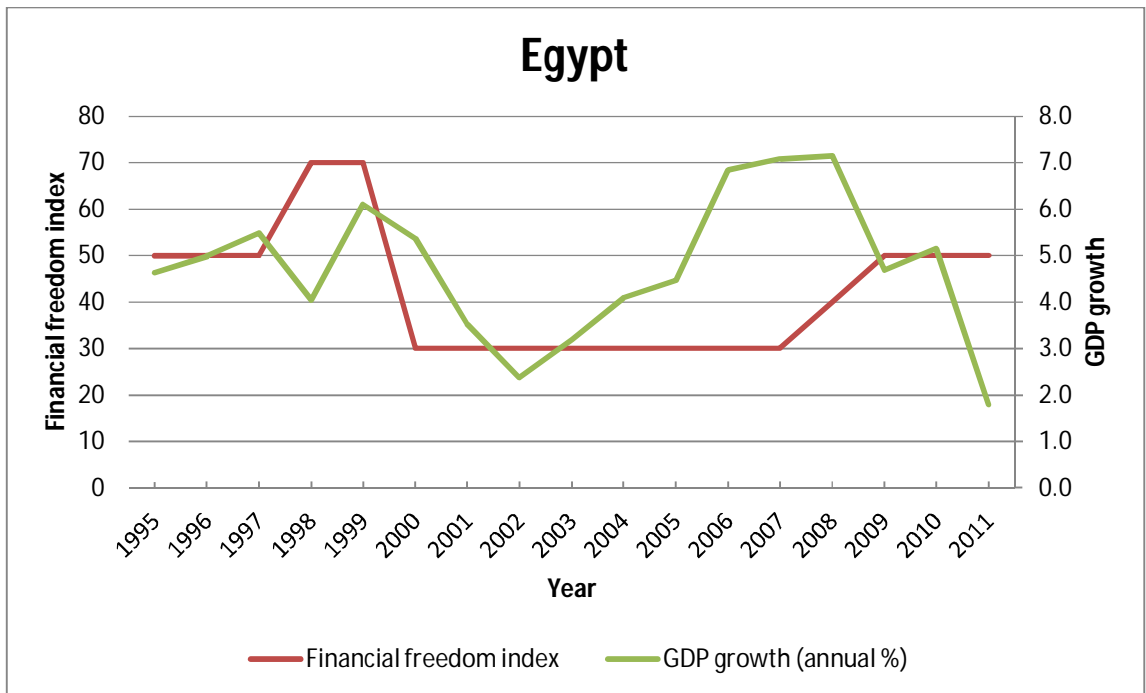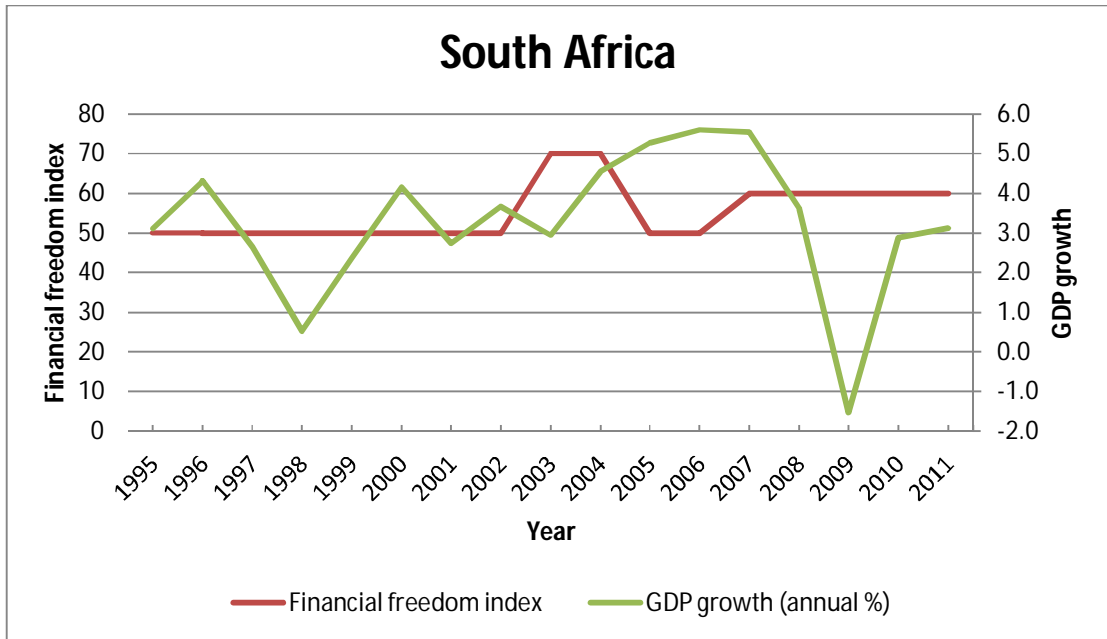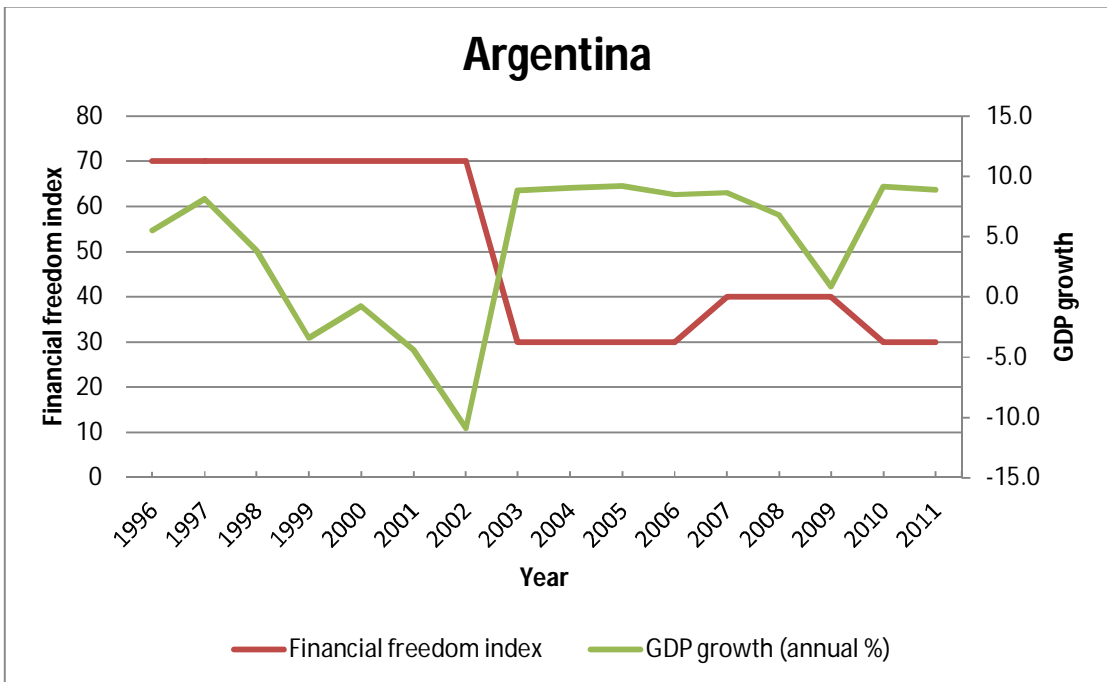*Figure 12: Graph of financial freedom index versus GDP growth in Indonesia*
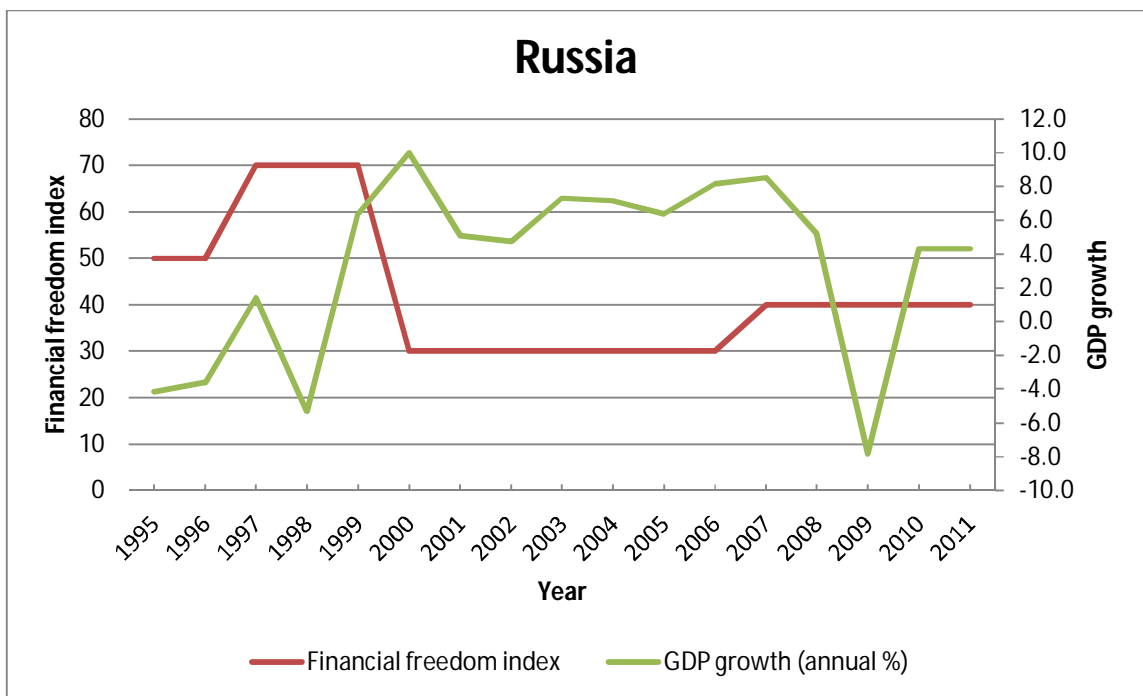
Figure 13: Graph of financial freedom index versus GDP growth in Russia
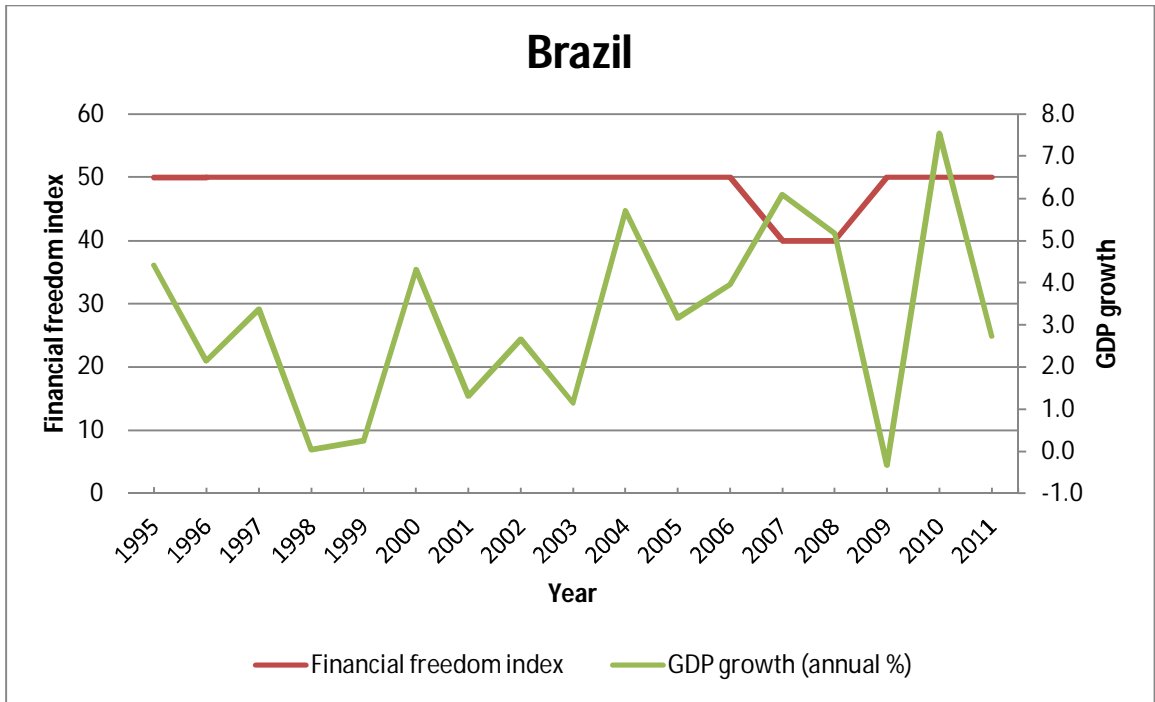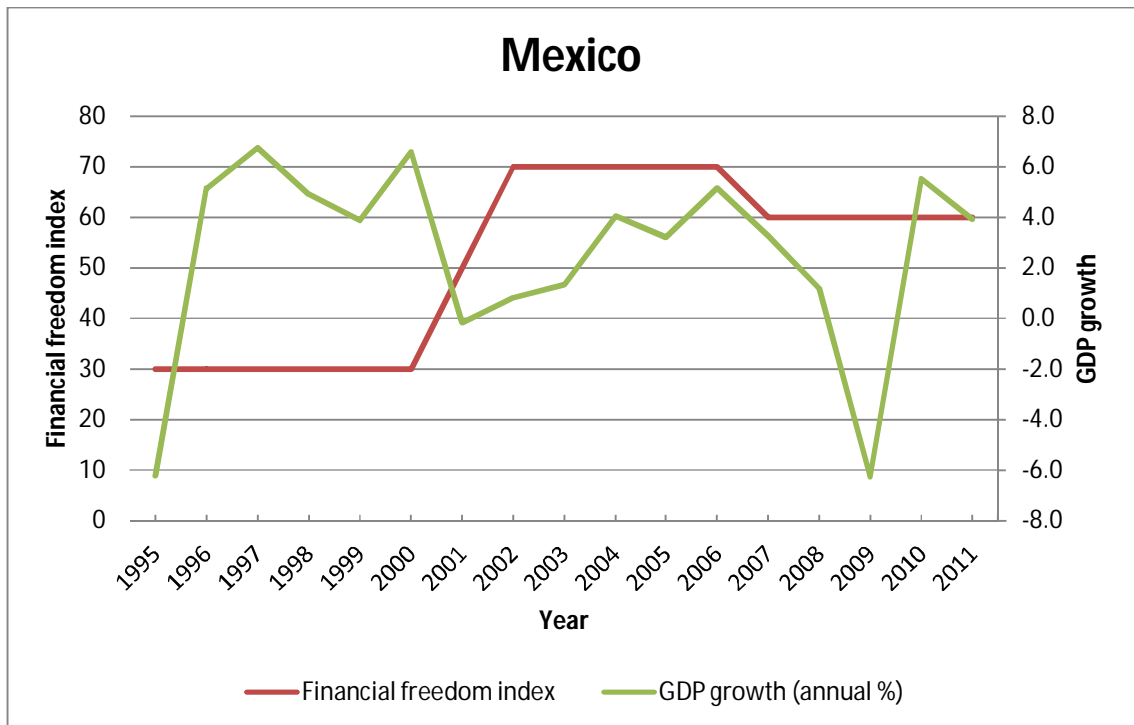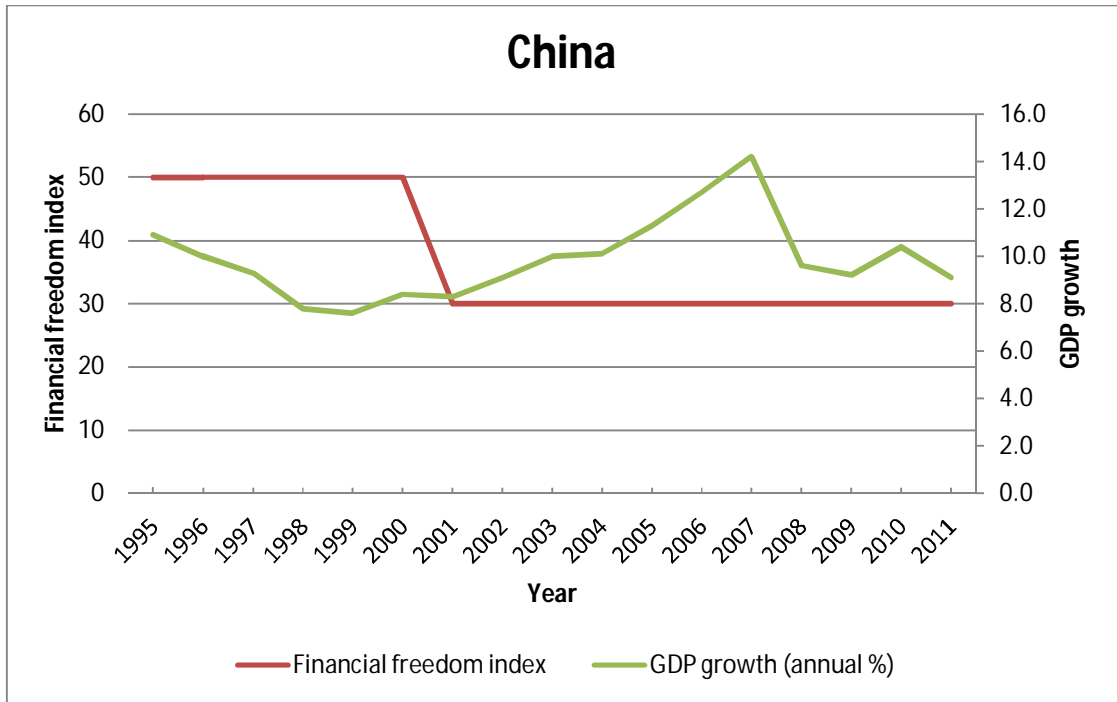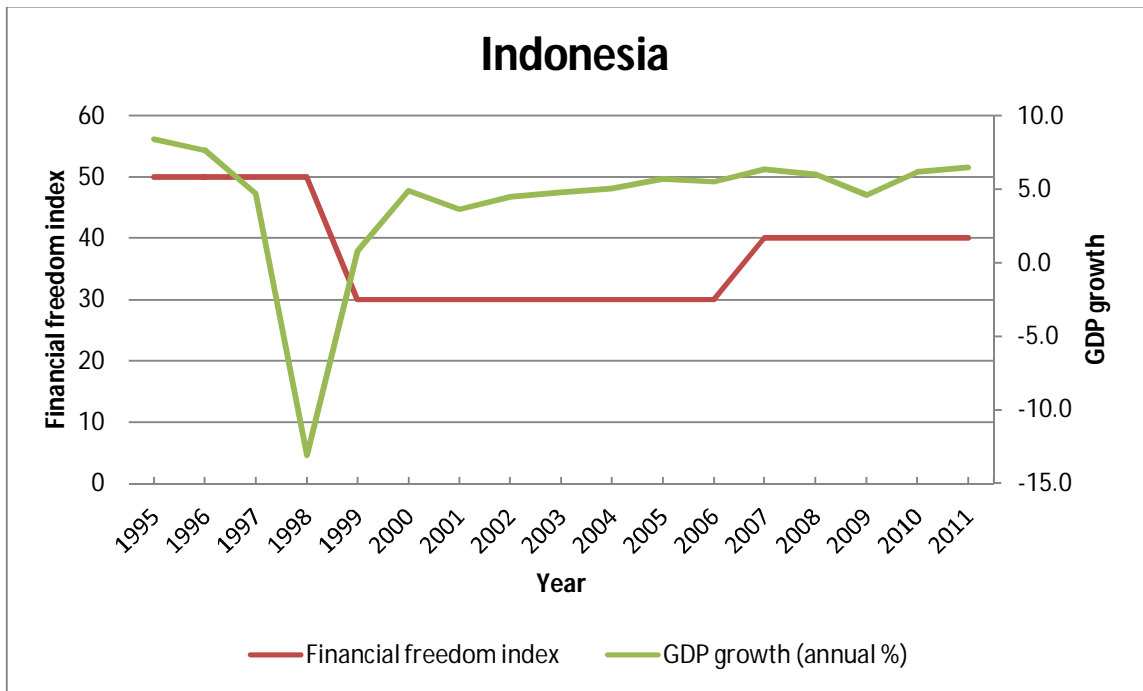
5.4 Correlations matrix

Table 5 presents a correlation matrix of the financial freedom index, GDP growth, inflation, interest rate, unemployment, dummy variable of the Africa region and dummy variable of the Americas region.

Table 5: Correlation matrix

Correlations

		Financial freedon index	GDP growth (annual %)	Inflation (%)	Interest rate (%)	Unemployment (%)	Dummy Variable Africa	Dummy variable Americas
Financial freedon index	Pearson Correlation	1	-.422**	.056	.128	.257**	.088	.315**
	Sig. (2-tailed)		.000	.469	.098	.002	.254	.000
	N		170	170	168	140	170	170
GDP growth (annual %)	Pearson Correlation	-.422**	1	-.276**	-.369**	-.228**	-.116	-.224**
	Sig. (2-tailed)	.000		.000	.000	.007	.130	.003
	N	170	170	170	168	140	170	170
Inflation (%)	Pearson Correlation	.056	-.276**	1	.788**	-.048	-.123	-.031
	Sig. (2-tailed)	.469	.000		.000	.573	.111	.687
	N	170	170	170	168	140	170	170
Interest rate (%)	Pearson Correlation	.128	-.369**	.788**	1	-.026	-.171*	.180*
	Sig. (2-tailed)	.098	.000	.000		.760	.027	.020
	N	168	168	168	168	138	168	168
Unemployment (%)	Pearson Correlation	.257**	-.228**	-.048	-.026	1	.665**	-.203*
	Sig. (2-tailed)	.002	.007	.573	.760		.000	.016
	N	140	140	140	138	140	140	140
Dummy Variable Africa	Pearson Correlation	.088	-.116	-.123	-.171*	.665**	1	-.429**
	Sig. (2-tailed)	.254	.130	.111	.027	.000		.000
	N	170	170	170	168	140	170	170
Dummy variable Americas	Pearson Correlation	.315**	-.224**	-.031	.180*	-.203*	-.429**	1
	Sig. (2-tailed)	.000	.003	.687	.020	.016	.000	
	N	170	170	170	168	140	170	170

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation matrix was run at 0.05 or 5% significance level. Those outputs that were very significant (i.e. had a significance level of less than 1%) were automatically run at 1% significance level to illustrate the strength of the relationship. Variables with significance levels that are greater than 5% indicate that the relationship is insignificant.

5.5 Box and whisker plots

Box and whisker plots of GDP growth are presented in Figure 14 below. This figure highlights that there are outliers in the data which could influence statistical analyses on the data. The data was split into two regions, being the Americas and the Non-Americas (i.e. Africa and Asia Pacific) to highlight the outliers for the two regions. The plot shows that the Non-Americas region had a slightly higher average GDP growth with an extreme outlier for Indonesia. However, this region had a number of outliers. The Americas region had one outlier for Argentina.
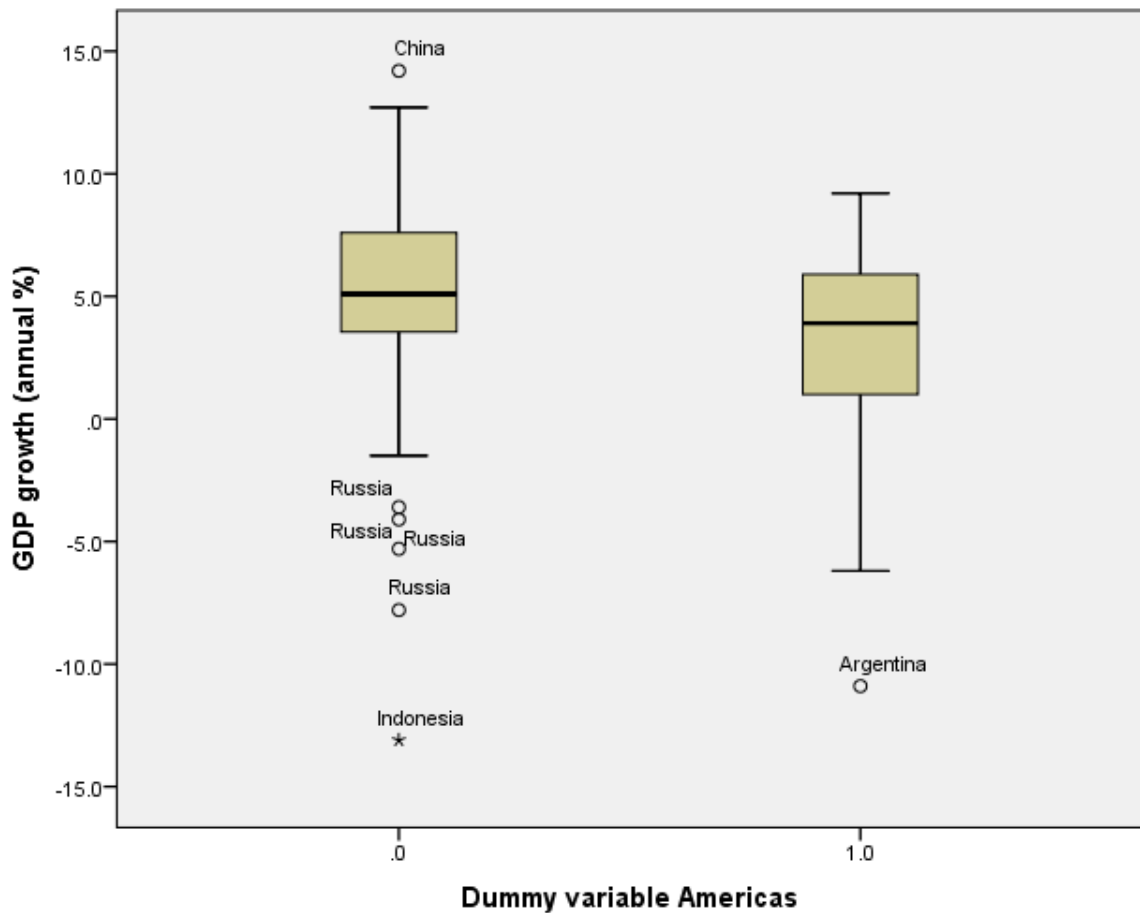
Figure 14: Box and Whisker plot GDP growth variable

5.6 Hypothesis #2

5.6.1 Simple regression analysis

Simple regression analysis was employed to ascertain the relationship between the financial freedom index and GDP growth. For this analysis, data from all ten countries was combined to determine the statistical significance of the relationship. Table 6 presents a summary of the model with an R-square of 0.178.

Table 6: Summary of simple regression model[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.422[a]	.178	.174	3.6825	1.308

a. Predictors: (Constant), Financial freedom index

b. Dependent Variable: GDP growth (annual %)

Table 7: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	494.824	1	494.824	36.489	.000[b]
	Residual	2278.250	168	13.561		
	Total	2773.074	169			

a. Dependent Variable: GDP growth (annual %)

b. Predictors: (Constant), Financial freedom index

Table 7 shows the ANOVA table, which indicates that the model works very well with significance level of 0.000. Table 8 presents the coefficients of the simple regression model.

Table 8: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.033	.949		10.578	.000
	Financial freedom index	-.126	.021	-.422	-6.041	.000

a. Dependent Variable: GDP growth (annual %)

5.6.2 Multiple regression analysis

Simple regression was followed by multiple regression analysis with the addition of more independent variables. Table 9 presents a summary model of multiple regression analysis. It should be noted that the table presents two models (model #1 and model #2). The difference is that independent variables in model #1 excludes the financial freedom index while independent variables in model #2 includes the financial freedom index. From the table, it is noticeable that the inclusion of the financial freedom index improves the R-Square in model #2 to 0.399.

Table 9: Summary of multiple regression model[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.577a	.333	.308	3.3687	.333	13.560	6	163	.000	
2	.632b	.399	.373	3.2078	.066	17.772	1	162	.000	1.529

a. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas

b. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas, Financial freedom index

c. Dependent Variable: GDP growth (annual %)

Table 10 presents an ANOVA table of multiple regression analysis. This table indicates that both models (model #1 and model #2) have significance levels of 0.00; indicating that both models are working well in predicting GDP growth.

Table 10: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	923.277	6	153.879	13.560	.000[b]
	Residual	1849.797	163	11.348		
	Total	2773.074	169			
2	Regression	1106.146	7	158.021	15.357	.000[c]
	Residual	1666.928	162	10.290		
	Total	2773.074	169			

a. Dependent Variable: GDP growth (annual %)

b. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas

c. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas, Financial freedom index

Table 11 presents the coefficients of the multiple regression analysis. The most important variables are those with lower significance figures. In model #1, the only variable that is not significant is Log_inflation, with a significance figure of 0.573. Even with the addition of the financial freedom index in model #2, the independent variables are still significant except for the Log_inflation with significance level of 0.841.

Table 11: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.606	1.179		10.695	.000
	Dummy_Russia	-3.431	1.132	-.255	-3.032	.003
	Dummy_Indonesia	-2.932	1.048	-.218	-2.798	.006
	Dummy Variable Africa	-3.977	.759	-.451	-5.238	.000
	Dummy variable Americas	-3.633	.820	-.412	-4.431	.000
	Log_Inflation	.276	.488	.046	.565	.573
	Log_Interest	-2.151	.481	-.368	-4.471	.000
2	(Constant)	15.789	1.353		11.672	.000
	Dummy_Russia	-2.517	1.099	-.187	-2.290	.023
	Dummy_Indonesia	-2.594	1.001	-.193	-2.592	.010
	Dummy Variable Africa	-3.027	.757	-.343	-3.997	.000
	Dummy variable Americas	-2.358	.837	-.268	-2.816	.005
	Log_Inflation	-.095	.473	-.016	-.201	.841
	Log_Interest	-1.921	.461	-.328	-4.164	.000
	Financial freedom index	-.086	.020	-.289	-4.216	.000

a. Dependent Variable: GDP growth (annual %)

Figure 15 shows the Probability-Probability Plot of regression standardized residual on the dependent variable while Figure 16 shows a scatter plot of errors of the dependent variable (i.e. GDP growth).
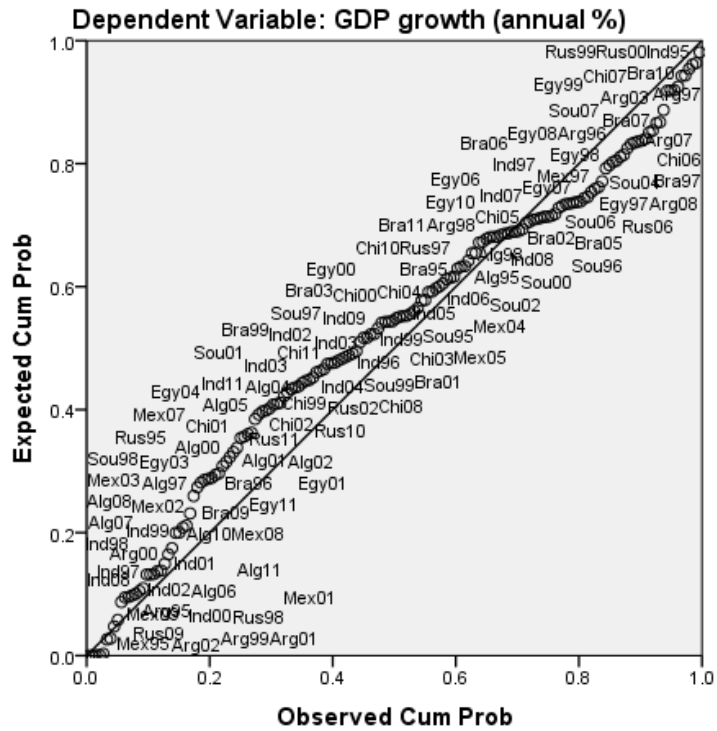
Figure 15: Probability-Probability plot of regression standardized residual
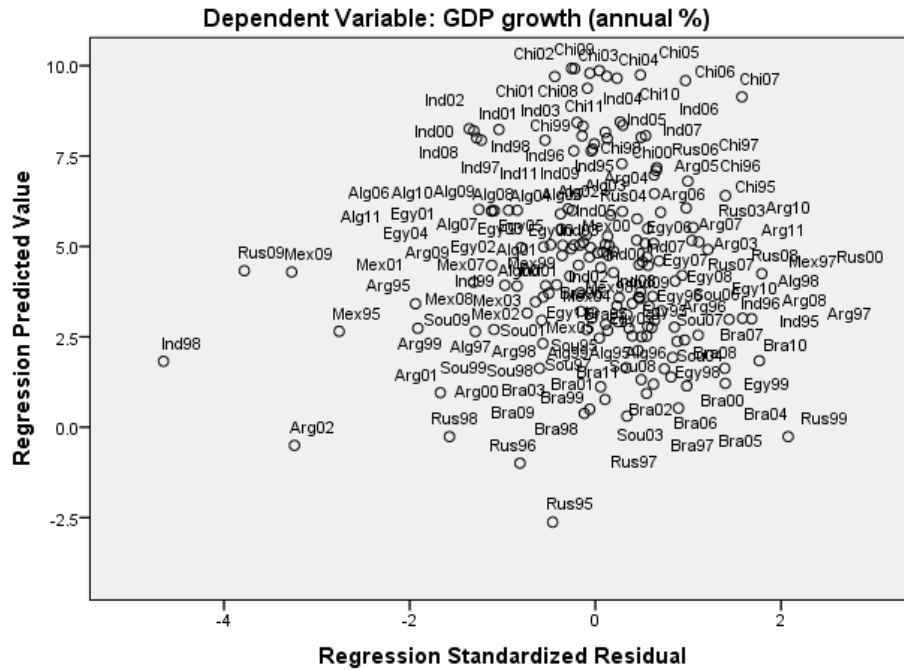
Figure 16: Error plot of the dependent variable (GDP growth)

Table 12 shows the outliers in the data.

Table 12: Outlier Statistics[a]

		Case Number	Id	Statistic	Sig. F
Stud. Deleted Residual	1	106	Ind98	-5.348	
	2	151	Rus09	-4.090	
	3	25	Arg02	-3.462	
	4	134	Mex09	-3.458	
	5	120	Mex95	-2.923	
	6	141	Rus99	2.256	
	7	22	Arg99	-2.006	
	8	18	Arg95	-1.976	
	9	142	Rus00	1.869	
	10	50	Bra10	1.808	
Cook's Distance	1	106	Ind98	.394	.923
	2	151	Rus09	.127	.998
	3	25	Arg02	.096	.999
	4	141	Rus99	.094	.999
	5	120	Mex95	.073	1.000
	6	134	Mex09	.065	1.000
	7	22	Arg99	.039	1.000
	8	24	Arg01	.039	1.000
	9	140	Rus98	.036	1.000
	10	142	Rus00	.030	1.000
Centred Leverage Value	1	137	Rus95	.191	
	2	141	Rus99	.126	
	3	35	Bra95	.114	
	4	138	Rus96	.113	
	5	106	Ind98	.108	
	6	140	Rus98	.090	
	7	24	Arg01	.087	
	8	139	Rus97	.086	
	9	38	Bra98	.076	
	10	148	Rus06	.069	

a. Dependent Variable: GDP growth (annual %)

5.8 Repeat of multiple regression analysis with outliers removed

From the box and whisker plot above, case #106, (Indonesia, 1998) was identified as an extreme outlier in the data. The presence of this extreme outlier has the potential to skew the result. As such, a multiple regression analysis was repeated, with case #106 deleted from the data. A summary of the model is presented in table 13, ANOVA table in table 14 and the coefficients of the model in table 15.

Table 13: Summary of multiple regression model[c]

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.608a	.370	.347	3.0921	.370	15.869	6	162	.000	
2	.651b	.424	.399	2.9652	.054	15.168	1	161	.000	1.519

a. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas

b. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas, Financial freedom index

c. Dependent Variable: GDP growth (annual %)

Table 14: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	910.328	6	151.721	15.869	.000[b]
	Residual	1548.899	162	9.561		
	Total	2459.227	168			
2	Regression	1043.689	7	149.098	16.958	.000[c]
	Residual	1415.538	161	8.792		
	Total	2459.227	168			

a. Dependent Variable: GDP growth (annual %)

b. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas

c. Predictors: (Constant), Log_Interest, Dummy_Indonesia, Dummy_Russia, Dummy Variable Africa, Log_Inflation, Dummy variable Americas, Financial freedom index

Table 15: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.746	1.093		10.749	.000
	Dummy_Russia	-3.976	1.043	-.313	-3.811	.000
	Dummy_Indonesia	-2.108	.973	-.162	-2.166	.032
	Dummy Variable Africa	-4.076	.697	-.491	-5.847	.000
	Dummy variable Americas	-3.747	.753	-.451	-4.977	.000
	Log_Inflation	.784	.457	.137	1.713	.089
	Log_Interest	-2.207	.442	-.399	-4.997	.000
2	(Constant)	14.552	1.272		11.443	.000
	Dummy_Russia	-3.146	1.023	-.248	-3.076	.002
	Dummy_Indonesia	-1.883	.935	-.145	-2.015	.046
	Dummy Variable Africa	-3.251	.701	-.391	-4.636	.000
	Dummy variable Americas	-2.641	.776	-.318	-3.404	.001
	Log_Inflation	.424	.448	.074	.946	.346
	Log_Interest	-2.005	.427	-.362	-4.699	.000
	Financial freedom index	-.074	.019	-.264	-3.895	.000

a. Dependent Variable: GDP growth (annual %)

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5.9 Summary of results

The trend analysis indicates that there is a negative correlation between the financial freedom index and economic growth. The general trend shows that GDP increases with the decrease in the financial freedom index. This relationship was confirmed with a correlation matrix, which shows a significant negative correlation between the two variables. Based on these results, the research hypothesis #1, which states that high financial regulation contributes positively towards economic growth in developing countries, is accepted.

Furthermore, research hypothesis #2, which states that the financial freedom index is a significant predictor of economic growth in developing countries, is also accepted. Both null hypothesis #1 and #2 are rejected. This relationship was further tested for statistical significance using simple as well as multiple regression analysis. The models in both cases show that financial freedom is a significant predictor of GDP growth.

5.10 Conclusion

The chapter presented results of the study. Trends between GDP growth and the financial freedom index were analyzed for each country. This was followed by statistical analysis in a form of correlation and regression analysis. The next chapter presents detailed analyses of these results.

Chapter 6: Discussion

6.1 Introduction

This chapter provides a discussion of the results presented in the previous chapter. The objective is to link the research question and the two hypotheses formulated in chapter 3 to the results of the study. Furthermore, the discussion provides an analysis of the results in light of the literature reviewed in chapter 2.

6.2 The objective of the study

The study was inspired by a need to understand the impact of financial regulation on economic growth in developing countries. A relationship between financial regulation and economic growth in developing countries was tested and results were presented in chapter 5. Financial regulation was measured through the financial freedom index compiled by the Heritage Foundation. Economic growth was measured by the GDP growth percentage.

As noted in chapter 2, Klomp and de Haan (2011) argued that previous studies have come up with conflicting conclusions on the subject. A group of researchers suggested that the imposition of stricter regulations particularly in the banking sector is good for the economy, while others have warned against the negative impact that this has on economic growth. This chapter serves as an analysis of the results provided in chapter 5. The data was initially analyzed over a period of time using time series analysis. This was then followed by more advanced statistical regression analysis to validate the relationship.

6.3 Interpretation of descriptive statistics

Basic statistical analysis was conducted to establish the mean, range, number of observations as well as standard deviation. Table 4 presents a summary of descriptive statistics. It is important to note that this summary was derived from a combined data of all the sample countries. From table 4, it can be discerned that the number of observations was 170.

Some of the variables had missing data, which was replaced with average numbers for the purpose of completing the analyses. The most interesting output is the analysis on standard deviations. It can be seen that the interest rates and inflation had high standard deviations at 29 and 18 respectively. Larger standard deviations indicate that the data range is wide and highlights the possibility of outliers in the data. The presence of outliers was confirmed by the box and whiskers plots, which will be discussed later in this chapter. To deal with wide variation, data on these variables was transformed into logarithm format to facilitate ease of analyses.

6.4 Hypothesis #1

Null hypothesis: High financial regulation contributes negatively to economic growth in developing countries.

Research hypothesis: High financial regulation contributes positively to economic growth in developing countries.

6.4.1 Time series analysis

Time series graphs were computed to illustrate the relationship between the financial freedom index and GDP growth. The analyses were conducted for each country and the results were grouped per region (Africa, Americas and Asia Pacific) to determine the similarities in the regions. At first glance, time series analysis generally indicates a negative correlation between the financial freedom index and GDP growth. Although there seems to be other factors that influence the movement in GDP growth, generally the movement in GDP growth correlates negatively to the movement in financial freedom index. One should remember that the financial freedom index is measured as a number between 0 and 100. A lower number means tighter regulation and the vice versa.

The time series results from the African region were presented in Figure 4 to Figure 6. From Figure 4 (Algeria), the financial freedom index declined from 50 in 2001 to 30 in 2002. This had a positive impact on GDP as it grew from 3% in 2001 to 7% in 2003. A similar negative correlation was seen in Egypt. Figure 5 indicates that the financial freedom index increased from 50 in 1997 to 70 in 1998. At the same time GDP fell from about 5% to 4% before increasing to 6% the following year. In 2000, it appears that both the financial freedom index and GDP decreased at the same time, and thereby indicating occasional positive correlation. However, negative correlation resumed in 2007 when the financial freedom index increased from 30 to 50 in 2009. Although there was a lag, GDP fell from 7% in 2008 to 5% in 2009.

The South African graph on Figure 6 is erratic and the correlation is not obvious. However, there was a slight drop in GDP in 2002 following in increase in the financial freedom index. The same phenomenon (negative correlation is apparent in 2004 and 2007 (with a short lag). In 2004, the financial freedom index decreased from 70 to 50 the following year. However, GDP increased slightly to just under 6%

before falling in 2007 following an increase in the financial freedom index in the previous year.

The results from the Americas region were presented from Figure 7 to Figure 9. Figure 7 depicts a relationship between the financial freedom index and GDP growth in Argentina. Here the relationship is clearly correlated in a negative way. In 2002, the financial freedom index tumbled from 70 to 30 in 2003. During the same period, GDP growth rallied from -10% to +10%. In 2006, the financial freedom index increased slightly to 40 while GDP decreased slightly the following year. The year 2009 shows another clear negative correlation when the financial freedom index decreased slightly to 30 in 2010. At the same time GDP growth increased from 0% to just under 10% in 2010.

Brazil exhibits a similar trend with a lot a volatility in GDP growth, suggesting that there might be other factors (other than the financial freedom index) influencing GDP growth. However, a negative correlation was also evident when the financial freedom index decreased in 2006 and increased in 2008. Mexico (shown in Figure 9) followed the same trend in 2000; however, there was a positive correlation in 2006.

Time series analyses for the Asia Pacific region are depicted from Figure to 10 Figure 13. In China, the financial freedom index changed once in 2000. This was followed by an increase in GDP growth in 2001. In India, the picture is different with an erratic GDP growth. The financial freedom index also changed once in 2008. However, this was followed by an increase in GDP growth in the same year. Indonesia and Russia exhibit negative correlations. In 1998, there was an up-tick in GDP growth after a decline from the previous year. In Indonesia, this occurred at the same time that the financial freedom index decreased. In 1999, there was a decline in the financial freedom index which coincided with an increased in GDP growth. The same phenomenon was seen in 2006, but the change in GDP growth was small.

From the time series analysis, it is evident that the general trend follows a pattern where the financial freedom index is negatively correlated to GDP growth. This observation was confirmed with a correlation matrix presented in table 5. The matrix indicates that correlation between the financial freedom index is -0.422 with a significance level of 0.000%. The significance level was tested at 5%, which means anything less than 5% is significant while anything above 5% is insignificant.

From the above analyses, there is overwhelming evidence in the sample that higher financial regulation is good for GDP growth in developing countries. Based on this evidence, null hypothesis #1 stating that high financial regulation negatively impacts economic growth in developing counties is rejected and the research hypothesis is accepted.

These results support findings by various authors advocating for higher financial regulation. Kilinc and Neyapti (2012), provided empirical evidence on the positive relationship between bank regulation/supervision and growth in transition economies. They indicated a linkage between bank regulation, supervision and economic performance. Their model showed that increasing bank regulation and supervision is associated with higher economic growth in transition to a higher steady state. Allen and Carletti (2010) also advocated for tighter regulations and argue that the benefit of regulation is that it can potentially stop banking crisis before it actually occurs. Klomp and de Haan (2011) found that banking regulation and supervision has had a positive impact in deterring excessive risk taking among banks. Klomp (2010) also found high correlation (0.70) between financial regulation and real GDP growth rate.

6.5 Hypothesis #2

Null hypothesis: The financial freedom index is not a significant predictor of economic growth in developing countries.

Research hypothesis: The financial freedom index is a significant predictor of economic growth in developing countries.

6.5.1 Analysis of simple regression model

A simple regression analysis was run to ascertain the relationship between financial freedom index and GDP growth. Tables 6 to 8 presented the output of the model. GDP was the dependent variable while the financial freedom index was used as a predictor independent variable. Table 6 (summary model shown below) shows an R-Square of 0.178 with a significance level of 0.000 (the significance was tested at 5%).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.422	.178	.174	3.6825	1.308

This indicates that the financial freedom index explains 17.8% of the change in GDP growth. This percentage (17.8%) is not a big percentage but it is very significant as indicated by the Anova table (table 7). The significance level was tested at 5% and the Anova table indicates this to be 0.00%. Anything less than 5% is significant and anything higher is not significant. The other 82.2% is explained by other variables, supporting the random noise in GDP growth movement that was seen in the trend analysis for some of the countries. The model was refined by running a multiple regression analysis.

6.5.2 Analysis of multiple regression model

Multiple regression analysis was used to validate results from simple regression model and to illustrate the financial freedom index is a significant explanatory variable of the change in GDP. Two multiple regression analyses were run simultaneously to determine the R-Square with and without the addition of the financial freedom index as an explanatory variable. The reason for that was; firstly to indicate the percentage of change in GDP that could be explained by other explanatory variable (except for financial freedom index) and secondly; to show the impact of the financial freedom index in the presence of other explanatory variables. A snapshot of the multiple regression model is presented below for ease of reference.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.577	.333	.308	3.3687	.333	13.560	6	163	.000	
2	.632	.399	.373	3.2078	.066	17.772	1	162	.000	1.529

Model #1 was run with other independent variables except financial freedom index. From table 9, it can be seen that the R-Square in model #1 is 0.333. The independent variables were:

- Log of interest rates;
- Log of inflation;
- dummy variable of Indonesia;
- dummy variable of Russia;
- dummy variable of Africa; and
- dummy variable of Americas.

Model #2 includes the financial freedom index as well as all other variables in model#1. The objective was to ascertain the significance of the financial freedom index as a reliable predictor of GDP growth in the presence of other independent variables presented above. The results were presented on tables 9 to 11. Model #2 had the financial freedom index in addition to other independent variables in model #1.

By adding financial freedom in model #2, the R-Square improves to 0.399. This means that model #2 can explain up to 39.9% change in GDP growth in the sample countries. The ANOVA table presented on table 10 indicates that both models are significant at 0.000%, which means that the model is very significant (the significance level was again tested at 5%). Table 11 shows the coefficients of the model and it can be seen that all independent variables are significant predicators of GDP growth with the exception of Log of inflation in both models.

The multiple regression output indicates that the addition of the financial freedom index improves the model from 33.3% to 39.9% and the financial freedom index is still a significant predictor of GDP. As such, model #2 is better model as it explains a larger percentage (~40%) of the change in GDP growth in developing countries.

Figures 15 and 16 shows the probability-probability plot and errors plot of the dependent variable respectively. These plots were included for the completeness of the statistical analysis on multiple regressions. All they illustrate is that the data follows a normal distribution pattern, which is important in statistical analysis. The probability-probability plot on Figure 15 shows that the data is normally distributed as it follows the 45-degree line. Figure 16 confirms this normality with random scattering of the residual plot.

6.5.3 Analysis of multiple regression model (with the outlier removed)

It was established that the data had outliers that could potentially skew the output of the results. For this reason, multiple regression analysis was repeated with those outliers removed. Figure 14 presented a box and whisker plot showing the mean, range and outliers in the Americas and non-Americas regions (i.e. Africa and Asia Pacific). It can be seen that Argentina, China, Indonesia and Russia had outliers. However, Indonesia had the highest deviation from the rest. As such, multiple regression analysis was repeated with the absence of the Indonesian outlier (case #106 as presented in table 12). The summary model of the multiple regression (with case#106 removed is presented below).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.608	.370	.347	3.0921	.370	15.869	6	162	.000	
2	.651	.424	.399	2.9652	.054	15.168	1	161	.000	1.519

The output of the model shows improved R-Square with 0.370 in model #1 (from 0.333 in the previous model) and 0.424 in model #2 (from 0.399 in the previous model). Table 14 shows that both models are still significant and table 15 shows the coefficients of the models. It is possible to improve the model further by removing other outliers as indicated in table 12 (outlier statistics), but point has been demonstrated by removing case #106.

From the output of both multiple regression models, it can be seen that the financial freedom index is a significant predictor of economic freedom. As such the research hypothesis#2 is accepted while null hypothesis #2 is rejected. The model can explain up to 42.4% of the change in GDP growth when outliers are removed.

6.6 Conclusion

This chapter presented analyses of the results obtained in this study. The analyses show that higher financial regulation is indeed good for economic growth in developing countries. In most cases, GDP growth increased when higher regulations were imposed. Statistical regression models were used to ascertain this relationship. It was found that the financial freedom index is a significant predictor of GDP growth. The next chapter presents a conclusion as well as recommendations for future studies on the subject.

Chapter 7: Conclusion and recommendations

7.1 Conclusion

This chapter presents concluding remarks, limitations of this study as well as recommendations for developing countries on the subject of financial regulation. The results obtained in this study indicate that financial regulation is good for economic growth in developing countries. The general trend shows that financial regulation and economic growth are negatively correlated in developing countries. Stricter financial regulation has resulted in increased economic growth and the reverse statement is also true.

Trend analyses were validated with a series of statistical models, which shows that the financial freedom index is a significant predictor of economic growth and can explain up to 42% (as indicated by the R-square) of the change in GDP growth. The study aimed to answer the umbrella research asking whether financial regulation deters economic growth in developing countries. The literature reviewed in chapter 2 showed that researchers are divided on this subject. There is a group of researchers that believe that financial regulation deters economic growth and another group that believes that regulation is good for the economy.

The results of this study presented evidence that higher financial freedom does in fact result in higher economic growth. This research question was supported by two research hypotheses, which were both accepted. That said, the statistical model that was used in this study can only explain up to 42% of the change in GDP. The other 58% has not been explored. There may be other factors that have occurred at the same time with a change in the financial freedom index that have also affected GDP growth. That said, financial regulation is still a big factor in economic growth.

The findings of this study suggest that developing countries should embrace high financial sector regulations. However, it is recommended that other factors that have not been explained by the model in this study be explored. Nevertheless, this research contributed to the body of knowledge by clarifying the ongoing debate on the subject of financial regulation. Understanding the implications of the subject is important as it carriers material impact on economic growth.

7.2 Limitations of this study

Several researchers have expressed concerns over the recent move to impose higher regulations in the financial sector. While the findings of this study indicate that financial regulation is good for economic growth, it should be noted that the sample was small, with only ten developing countries.

The sampling method employed in this study was non-probabilistic in nature and as such, there might have been biases in choosing countries included in the sample. The findings of this study may only apply to the countries in the sample and may not be generalised to the entire population of developing countries. Furthermore, the study was only limited to developing countries and the picture may be different for developed countries.

Another limitation was that the data obtained for each country was not sufficient to perform an analysis that would produce statistically significant results for each country. The limitation was that each country had seventeen data points on the financial freedom index (The Heritage Foundation began capturing this index in 1995 and it has been reported on an annual basis since then).

7.3 Recommendations for future research

The sample size used in the study was relatively small to draw meaningful conclusion that may be generalised to all developing countries. It would be useful to run the study with a larger sample. Furthermore, only seventeen data points were available to run a statistically significant analysis for each country. It would be useful to run the analysis with more data points (at the time when sufficient data is available) for each country of interest.

The results of this study largely indicate a negative correlation between the financial freedom index and GDP growth. Negative correlation in this means that when the financial freedom index goes up (when regulators are less strict), then GDP growth falls and the reverse is also true. However, the trend analyses results showed occasional positive correlation between the financial freedom index and it would be useful to find the drivers behind that phenomenon.

Another interesting study would be a comparison of the impact of the financial freedom index on economic growth in developing and developed countries. This may be conducted by running the study with a large random sample of developed countries to determine if the same phenomenon is true for the developed world. This would then be followed by a comparison exercise between developing and developed countries.

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