

The application of economy-wide techniques as a tool to understand policy impacts

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ABSTRACT

Over the past few decades, the pursuit of sustainable growth and development has been the focus of economic policy in Africa. The challenges confronting Africa range from poverty, unemployment, inequality, insufficient and sometimes, inefficient public service provision, through to environmental degradation. In attempting to solve these problems, African governments have traditionally used a variety of policies: and it is upon the effectiveness and efficiency of such policies that people's livelihoods depend. However, the practical implementation of a policy may not only fail to achieve the desired outcomes, but may in fact unfairly privilege one group or sphere over another. In this article, it is argued that in order to fully understand the effects of the range of policies available to policy makers, as well as their interconnectivity and cohesiveness, a valuable framework to use is the economy-wide analysis. The article explains such a framework and exposes some applied studies that have employed the framework in order to gain insights into policy analysis. An advantage of the methodology is its quantitative nature which allows for measurement of impacts. It is recommended that such methods ought to be part of a toolkit for policy makers.

INTRODUCTION

Over the past four decades, the pursuit of sustainable growth and development has been the focus of economic policy in Africa. The concept of *development economics* has grown tremendously during this period, as supported by empirical studies which have revitalised the tradition of applied theory. As a result, much practical progress has been achieved, evidenced by continuous improvements in economic management, the business environment, and in general governance. But significant challenges remain. The recent global



economic crisis has created worldwide concern and continues to exert a negative impact on developing countries, even several years later. Simultaneously, additional pressure has been placed on the economies and governments of the Global South, particularly those located in Africa. Such hardships include, but are certainly not limited to the following: imbalanced globalisation and shifting wealth, population growth, environmental challenges, the depletion of natural resources, and the constant race to catch up with the rapidly changing technological dynamics.

Beyond these more emerging concerns, further socio-economic problems have seemingly perpetually, plagued Africa. These challenges range from poverty, high unemployment, inequality, insufficient and sometimes inefficient public service provisions, to environmental degradation. In attempting to solve these problems, African governments have traditionally used a variety of policies: and it is upon the effectiveness and efficiency of such policies that people's livelihoods depend. It can be argued, therefore, that understanding policy impacts is a paramount function of the government.

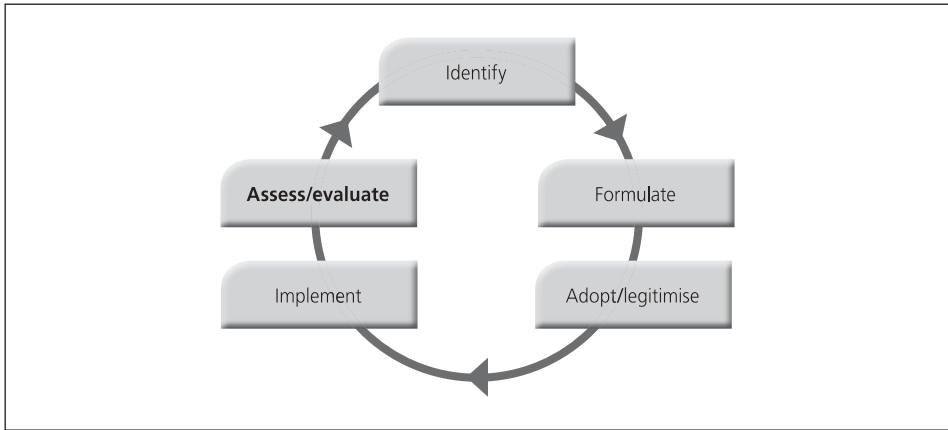
Policy evaluation allows for evidence based policy making. The advantages of evidence based policy making are many, ranging from leading policy makers to be better informed, more efficient, more confident, and aware of different options and ranges of related policies, (Strydom, Funke, Nienaber, Norje and Steyn 2010). Hence evidence based policy making has the ability to "improve the quality of policy decisions, actions and consequences" (Cloete 2009:294).

The practical implementation of a policy may not only fail to achieve the desired outcomes, but might result in unintended consequences that unfairly privilege or disadvantage certain population groups. With this awareness, it is critical that the entire policy-making process, including the impact evaluation of that process, be well-designed and executed. It is equally vital that policy makers understand and project the potential costs and benefits of the policies they consider, in addition to clearly understanding the projected impacts of alternative funding arrangements of the policies implemented.

To be able to comprehensively understand these issues, a methodology that involves analysing policy impact using an economy-wide approach that interrogates the direct effects of any given policy, in addition to the indirect and often unintended consequences of such policy implementation, is recommended. Such a methodology would need to produce comprehensive evidence of the impacts of policies. This article argues that an economy-wide methodology, such as computable general equilibrium (CGE) modelling, best suits this function. Such methodology has however not gained prominence with many Public Administration scholars. The aim of this article is to briefly explain this methodology and show that it is useful for both scholars and practitioners.

The rest of the article is arranged as detailed below. The first two sections are devoted to theoretical discussions and definitions of both policy as well as this proposed methodology, respectively. A discussion of a few selected illustrations of the methodology then follows. This discussion is not meant at all to be a comprehensive review but rather a demonstration of some insights that can be gleaned from economy-wide frameworks. The last part of this article concludes by giving the recommendation that these tools are essential elements of a policy makers' toolkit.

Figure 1: Policy cycle summary



DEFINING POLICY

All governments use public policies to guide and inform the implementation of various programmes and activities in an effort to achieve desired goals. This means policy defines principles and programmes that should be followed in order to attain specific outcomes with the aim of changing a previous undesirable situation for the better (Cloete 2009:294). It follows that a policy is an indicator of the government’s intentions. Public policies are usually embodied in legislation and applied to a whole state or country.

Public policy can be divided into political policy, which might be considered as essentially, legislative, and executive policy which might be defined as relating to Cabinet decisions, as suggested by de Coning (2006:19). De Coning (2006:19) usefully outlines possible policy classifications as (a) *extractive*, with tax policies as a good example; (b) *allocative* or *redistributive*, which would incorporate distributions like social grants; (c) *regulatory*, which includes those pertaining to pollution for instance; and (d) *symbolic*, which might be thought of as having *nation-building* functions within the local context. Whilst it is vital for governments to put sound public policy in place, it is equally important to assess the impact of such public policies on the target and other affected population groups.

A holistic policy process includes the identification of a problem or need, initiation, design, analysis, formulation, dialogue and advocacy, implementation, evaluation, and revisions or reformulations, as necessary, as summarised in Fig 1. The policy evaluation process allows for evidence based policy making.

Practically, even before a policy is identified, it is ideal to carry out an evaluation of a suite of policies that could address the intended goal, but that might have different impacts. From this perspective, one may consider policy analysis to be “the systematic analysis of the dimensions and variables influencing public policy,” (De Coning 2006:4). Furthermore, De Coning (2006:4) argues that policy analysis is a part of policy management by constituting “a deliberate method of dealing with policy issues and processes from start to finish”. Consequently, a well-performed policy impact analysis holds the potential of assisting policy makers to:

- understand the channels through which their policies might work;

- identify the beneficiaries of policy implementation;
- identify those groups or spheres that may be negatively impacted upon by such policy implementation; and
- rectify negative effects of policies by improving on policy selection and on the population sector resultantly targeted.

A thorough policy impact analysis may indicate the need for an alternative mix of policies and thereby assist in the selection of the most beneficial policies in this regard. Alternatively, such an analysis may lead to other complementary policies being recommended to counter any possible negative impacts on certain groups or segments of the economy. A holistic look at policy impacts is thus crucial in order to be aware of all spill-over effects as well.

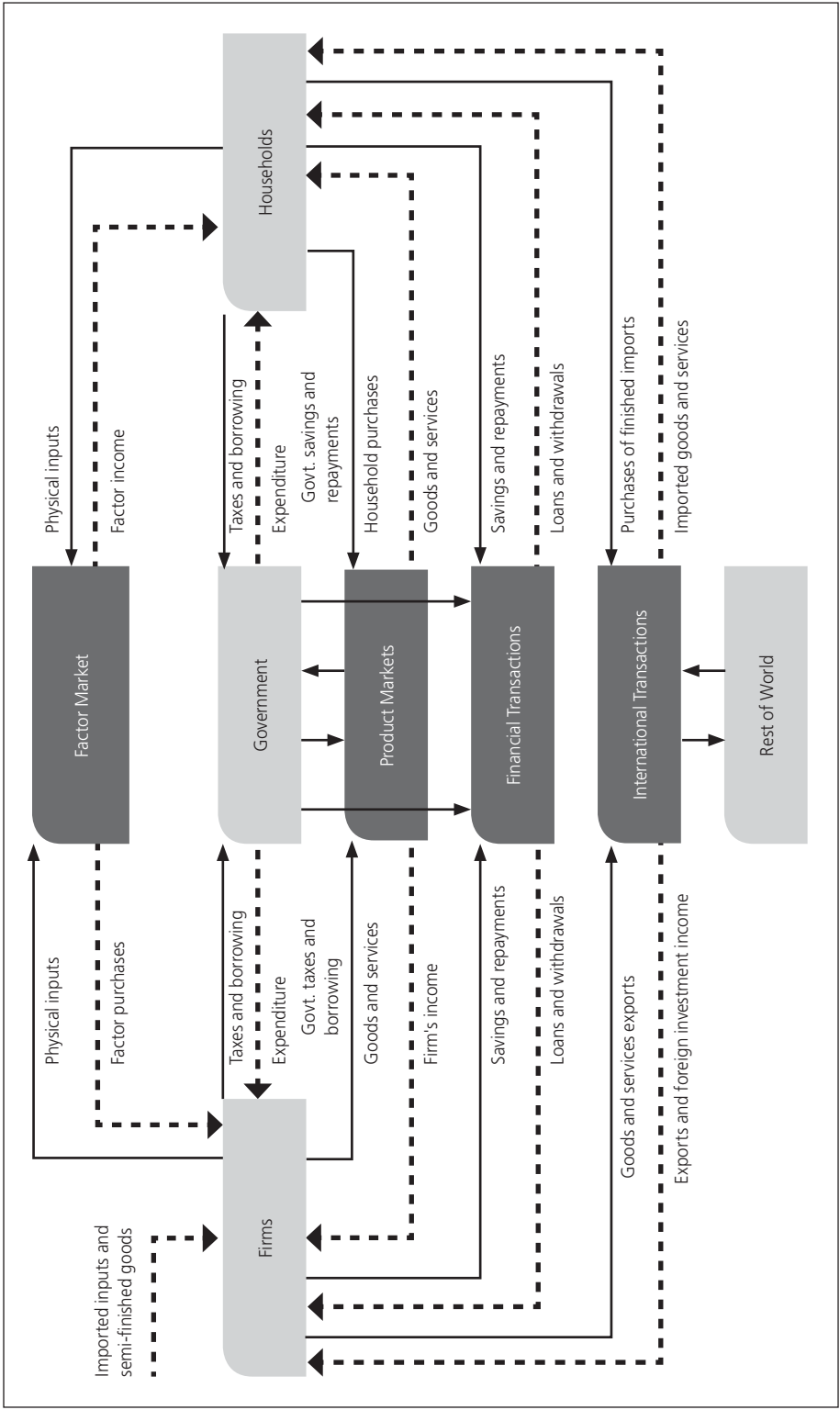
ECONOMY-WIDE POLICY ANALYSIS

In some sense, policy analysis is a compilation of costs and benefits of the policy. Venetoklis (2002:33) argues that there are two levels at which any such cost and benefit analysis can be conducted: at the micro-level, which is termed partial equilibrium analysis; and at a macro-level, which is general equilibrium analysis. Within the general equilibrium analysis framework, CGE models, tend to be an increasingly popular way of understanding how policies work and interlink, in addition to the impact thereof. Wing (2004:25) suggests that CGE models are “the primary tool for analysing the impacts across multiple markets of changes in one or more policy variables”. These models simulate the functioning of a real economy by incorporating all the agents, markets and institutions involved therein. Wing (2004:25) further holds that “the advantage of this approach is its ability to measure policies’ ultimate impact on aggregate welfare in a theoretically consistent way”. This advantage is achieved through quantifying the representative agent’s income and consumption changes, resulting from the interaction of multiple markets, supplying feedbacks across the broader economy.

To relate this thinking back to the African context, by as early as the eighties it was clear across the continent that the benefits of growth do not automatically trickle down to generate more equal societies. Today, more than ever, there is an urgent need to question whether growth-enhancing policy reforms will offer positive or negative side-effects on income inequality. In simultaneously pursuing growth and redistribution strategies, policy makers should identify possible synergies or trade-offs between these twin objectives. For this reason, the economic programmes and policies of African governments are increasingly aimed at the dual objective of accelerating growth and fighting poverty, often through challenging unequal access to opportunities. This would be informed by a clear understanding of economy-wide policy analysis. It may well be that policies need to be combined in order to be most effective. Policy combinations, consequently stand to yield a double dividend by reducing income inequality and poverty whilst concurrently boosting long-run growth in GDP. The range of policies applied primarily includes:

- policies affecting public spending in terms of shifts in size and composition;
- taxation policies invariably focussed on transfers and subsidies;
- structural policies that include trade liberalisation, other regulations and labour market reforms; and

Figure 2: Circular Flow of Income



Source: Configuration of author.

- monetary policies that often involve exchange rate controls.

The application of such varied policies requires rigorous analysis to assess not only their social and economic effectiveness, but also their interconnectivity and cohesiveness. One of the most effective frameworks within which to achieve such integrated insight, specifically within the African context is the economy-wide general equilibrium analysis. A major attraction to this framework is that it is theoretically well grounded.

THEORETICAL FOUNDATIONS FOR GENERAL EQUILIBRIUM ANALYSIS

Relative to other policy analysis methodologies, the practical application of the general equilibrium analysis is fairly new in the African context. The theoretical conception of general equilibrium, however, goes back to as early as the late nineteenth century, driven by the work of Walras (1877). This thinking progressed, but purely as theory, through the work of Arrow and Debreu (1954) in the 1950s. Central to the general equilibrium is the notion that within any given economic system comprising many actors and multiple markets, a critical point is reached at which supplies and demands equalise. This differentiates the model from partial equilibrium analysis which considers the matching of supply and demand within only one market. Within the general equilibrium framework is the concept of the interaction of all markets and all agents in an economy. At this point, a visual depiction is of use to briefly consider the circular flow of income upon which the general equilibrium concept is based, so as to better understand this economy-wide framework.

In Figure 2, the complex interrelations in the economy are indicated by various arrows connecting the boxes representing markets or agents. The essence of this visual depiction is explained in the next sentences below. Households sell factors of production, such as labour to the factor market, which in turn pays wages and salaries to the factors supplied. In continuation, the factor market sells factors to firms for use in the production of goods and services. Firms then sell their products to the product market. Cyclically, households use income from factor payments to buy products from the product market. Overall, from the payments received by firms and households, government deducts a portion in taxes. These taxes are then dispersed, including distributions to households and firms. Simultaneously, some products from firms are sold globally while these foreign markets, sell to the country in question: and these transactions can also attract taxation. Still further interactions are implied, including those between firms, agent saving and inter-agent transfers and these too are impacted by policies.

Fundamentally, then, markets and agents such as households, government, firms and the rest of the world, supply and demand various goods and services from each other. These transactions rely on the exchange of money: determining expenditure for one agent and income for another agent. Given this framework, it is easy to imagine that policies introduced at any point would have ripple effects throughout the economy. As an example, policies on instituting minimum wages in one sector would affect that sector as well as the individuals targeted by the policy. But, in addition, the circular flow discussed above shows that the

impacts do not end there. Other sectors too are affected as well as other households that are not the targets of the policy.

Other institutions such as the government and the rest of the world are in turn also affected through the interconnections in the economy. The circular flow concept thus offers itself as a framework for policy analysis. To apply this framework, however, various sets of data are required. The main data sets required for such a framework are usually arranged in the form of a social accounting matrix. This matrix is normally supplied by national statistics bureaux but may also be supplied by other national and international institutions. The main source of these matrices is either input-output data or supply and use data. However, a CGE framework also requires knowledge of the degree or strength of the connectedness between transactions, known as elasticities. Still, beyond these requisites, regarding public policies specifically, it is additionally important within the government system to identify variables modified by policy and their magnitudes.

Figure 2 very usefully demonstrates the massive data demands made by this model, which is the primary reason for applied economy-wide research lagging behind other types of analysis, especially in the eighties and nineties. In terms of operationalising the general equilibrium theory, it was only in 1960 that Johansen developed the first applied 'general equilibrium' model (Piermartin and Teh 2005). Through the seventies and eighties, however, developed nations, made substantial strides in developing computer software to analyse the masses of data used and the interconnections implied by this methodology.

APPLIED ECONOMY-WIDE POLICY ANALYSIS FRAMEWORKS

General equilibrium policy analysis can be static or dynamic in nature. Static analysis does not consider a time path as one of the variables while dynamic analysis specifically tracks policy effects within a given time span (Bellù and Pansini 2009). The earlier frameworks used for applied general equilibrium policy analysis were essentially static in nature, with aggregated agents, especially, households. In terms of time frames, static modelling indicates the *before and after* effects of policies. This is very useful, especially to understand the short to medium term policy impacts. Policies that may lead to adverse effects on certain groups soon after implementation certainly benefit from such an analysis. In this kind of static analysis, however, there is no path analysis, and hence, in this case, a limitation might then be that policy makers might miss the time differential policy impacts.

For certain policies, time is an essential factor regarding policy impact assessment, especially considering that certain policy implementation might only produce impacts over a long time span. Furthermore, it may be argued that policy impacts will differ, regarding short term and long term considerations, particularly where policy impacts across multiple economic sectors. The importance of taking a dynamic analysis of policy is underscored by changes in the stock accumulation of wealth being directly connected to changes in income. The consideration of such a dynamic analysis allows an even clearer picture of the evolution of poverty, inequality and the general working of the



economy. The amount of assets accumulated over time by an individual has a strong effect on the future income of that individual, and this maxim applies at household as well as at national levels. Hence, policy impacts today may be different from impacts a few years later depending on the saving or the loss incurred over time, among others. In addition, a dynamic framework allows for a better understanding of the channels through which an economy might grow, therefore, affording policy makers a clearer comprehension of the impact, in turn enabling better planning. Thus, given that some effects may take a considerable time to be felt, dynamic analysis is an additionally useful tool with which to consider policy impact.

In both static and dynamic CGE models, data is generally arranged in such a way as to group households with fairly similar characteristics together, thereby enabling a process of contrasting information, such as between rural and urban households. However, this model produces generalisation or average results on effects on households, precisely by assuming that households in a particular group are affected in the same way by given policies. And so, whilst some idea of the average effects of policies on welfare might be achieved, micro detail, such as household poverty and inequality, is not obtained via this type of framework.

An important reason why policy analysis is carried out is to assess its impact on society. In this regard, policy makers are interested to establish the impact of policies on welfare. By the late nineties, it seemed that researchers and policy makers had increasingly realised that clearly not every firm or agent benefitted from policy application, and the potential benefits the poor might achieve through, for instance, trade liberalisation, remained questionable. That inequality would be reduced through such beneficitation was further questionable (Davies 2004; Mabugu and Chitiga 2009). This led to policy makers needing to understand the impact of policies on specific measures of poverty and inequality. Since poverty and inequality are measured at micro-level, the representative household assumption outlined above, proves insufficient. As a result, a more detailed general equilibrium analysis capable of tracking changes in poverty and inequality more precisely was required, so as to better understand the welfare costs and benefits of policies.

This need, to assess the micro-welfare effects of policies, propelled the development of applied micro-simulation policy frameworks. Advances in computer technology have since enabled modelling to reflect greater complexity and intricacies. To briefly consider the context of micro-simulation, two broad types of models have been primarily applied to date. One methodology involves the application of a macro-CGE model and a micro-model based on household data working in sequence. The other methodology combines these macro and micro models by incorporating nationally-representative household data into the CGE model itself. Upon achieving household results, poverty analysis can typically be carried out using, for instance, the Foster, Greer and Thorbecke (FGT) measures (Foster, Greer and Thorbecke 1984). And from this information, in turn, the analysis of the poverty headcount, poverty gap and poverty severity indexes, can be achieved. Such computations also allow the construction of inequality indexes such as Gini and Theil, which are specifically suited to consider the impact policies exert on inequality. What must be stressed, however, is that these three variations of CGE modelling outlined above, static, dynamic and micro-simulation are not meant to necessarily substitute each other, but rather to complement each other or to work together in sequence.

ADVANCEMENT OF ECONOMY-WIDE POLICY ANALYSIS IN AFRICA

Given that these types of analysis are massive and demand daunting amounts of data, Africa took up CGE modelling in any significant way only in the eighties due to the general paucity of information and the then lack of capacity. CGE modelling was applied in Southern Africa in mid-1990 in studies pertaining to Botswana, South Africa and Zimbabwe (Wobst 2001). By the nineties, there was a sizable and steady increase in such types of policy analysis, mainly due to increased awareness of this methodology at university level, coupled with the greater availability of both software and data. In this regard, Southern Africa led this shift in Africa, with South Africa emerging as the regional leader in these applied policy analysis studies. However, it was not uncommon over this period for international researchers to undertake such analyses on behalf of African governments. Still, currently this analysis is not yet firmly in the hands of policy makers.

Wobst (2001) cites the following studies as being some of the earliest in Africa. The first environmental CGE model discussed below, in Southern Africa, undertaken by Unemo in 1995, analysed the impact of government policies on the environment in Botswana. Additionally, in South Africa, early CGE modelling was used to study a variety of policy issues that include macroeconomic stability, development plans, agricultural programmes, tax policy and international trade (Wobst 2001). According to Rossouw and Krugell (2012) the first South African CGE model was built by Naudé and Brixen in 1993. This first South African CGE model, Wobst (2001) points out, focused on economic restructuring and the impact of a flexible exchange rate on the mining sector. Later, Gibson and Van Seventer (1996) projected a growing mining sector and exchange rate devaluation over a five-year period in 1996 while Coetzee, Swanepoel, Gwarada, and Naude (1997) focused on exchange rate policy and trade liberalisation. In Zimbabwe, CGE studies focused on impacts of macroeconomic restructuring and land reform (Davies, Rattsø and Torvik 1994; Davies and Rattsø 1996; Davies, Rattsø and Torvik 1998), and on tax and income distribution policies (Mabugu 2001; Chitiga 2000) respectively.

After the new millennium, there has been an increase in this type of economy-wide policy analysis, but insufficient application of this methodology remains a concern in Africa. Notwithstanding these reservations, certain African governments have initiated the use of these methods, particularly in Southern Africa, including South Africa, which has implemented the use of an internal model within National Treasury. Furthermore, data are contemporarily more available in this region, notably through alternative institutions such as the Development Bank of Southern Africa, broadening access where, for instance, social accounting matrices were previously only constructed every half to full decade, by Statistics South Africa.

SELECTED REVIEW OF POLICY IMPACTS ON POVERTY

In this section, a selected number of papers that have used the economy-wide methodology, and analysed poverty effects of policies is given. The aim is to demonstrate the possible usefulness of this methodology and the insights that can be gleaned by employing these



methods. This review is not meant to be exhaustive, but rather illustrative. The focus is on the African studies where poverty is one of the main challenges facing the continent.

In a paper to assess economy-wide effects of minimum wages on the South African economy, Pauw and Leibbrandt (2012) developed a CGE micro-simulation model. Pauw and Leibbrandt (2012) test the effects of applying the minimum wage only to low skilled workers. Skilled workers were assumed to be fully employed at flexible wages, but could move between sectors (Pauw and Leibbrandt 2012). The CGE part analysed different wage elasticity scenarios: the low elasticity ($\eta=0.3$), medium-low elasticity ($\eta=0.5$), medium-high elasticity ($\eta=0.7$) and ($\eta=1$) as the high elasticity (Pauw and Leibbrandt 2012:775). The medium-high elasticity ($\eta=0.7$) served as the benchmark simulation. Inter-sectoral migration of skilled workers was observed mainly from the sectors affected more by minimum wage to sectors less affected or unaffected by minimum wages (Pauw and Leibbrandt 2012).

Pauw and Leibbrandt (2012) found that poverty and overall inequality declined marginally as a result of minimum wages. However, the poorest among minimum wage workers were more likely to be affected due to job losses, while overall household welfare was reduced by rising production costs. The minimum wage policy, Pauw and Leibbrandt (2012) asserted, is not an effective anti-poverty instrument in South Africa in view of poor targeting and adverse pricing. Such information is critical to policy makers because it is easy to assume that minimum wage policy solves poverty and inequality problems. If one tracks the effects of minimum wages in the agriculture sector in South Africa, it seems that the results of this study were observed. Since the introduction of minimum wages in 2003 in this sector, there has been a gradual decrease in unskilled labour employment and a move to casualisation of labour in the sector (Bureau for Food and Agricultural Policy, (BFAP) 2015; Kleinbooi 2009; Dinkelman and Ranchhod 2012). The main group affected negatively by this were the unskilled workers, thus confirming the results of the study by Pauw and Leibbrandt (2012).

Thurlow and Wobst (2012) used CGE micro-simulation modelling to assess the impact on poverty reduction of different growth rate scenarios in Zambia. The CGE model is recursive dynamic with parameters updated based on inter-temporal behaviour. They simulated the impacts on poverty reduction up to 2015. The simulations carried out are: renewed growth of the 1999 to 2001 period; current growth path; alternative growth paths as copper-led growth; non-agriculture-led growth; agriculture-led growth. Thurlow and Wobst (2012) pointed out that poverty declined as a result of rising per capita GDP and because of balanced growth under the renewed growth scenario. The largest poverty declines were observed within urban areas and among medium-scale farm households (Thurlow and Wobst 2012). Under the current growth path scenario, results indicated that poverty should fall, however, with a persisting limited ability of the poor to participate in the growth process. Thus, maintaining the current growth scenario meant that poverty reduction would remain slow (Thurlow and Wobst 2012).

Thurlow and Wobst (2012) observe that even in the presence of high urban poverty, reintroducing urban-based manufacturing and mining had less favourable results than faster diversification and intensification of agriculture. Hence, although growth in general may be good for the poor, Thurlow and Wobst (2012) observe that not all growth was equally good. They conclude that the country's national development strategy should focus on increasing the poor's participation in the growth process and not only on accelerating growth in order to make the growth more pro-poor. This article is an illustration of the

usefulness of the economy-wide methodology in offering comparative insights into impacts of alternative policies.

Chitiga, Fofana and Mabugu (2012) analysed how the government policy response to increases in oil prices on the international market impact on poverty in South Africa. An energy-focused CGE micro-simulation model was used in the study. The types of energy products included in the model were crude oil, petroleum products, coal as well as electricity (Chitiga *et al.* 2012).

The following scenarios were simulated:

- No government intervention—the rise in world oil prices was passed on to end users, and no changes were made in government policy instruments.
- Alternative scenarios with government intervention:
 - government providing a price subsidy to fully compensate for the increase in international oil prices; and
 - price-subsidy, combined with a 50 percent tax on the profits of the synthetic petroleum industry

Poverty indicators were observed to worsen in the first scenario. Under the government intervention scenario, an increase in poverty was still observed, and was attributed to the financing method used (Chitiga *et al.* 2012). Revenues generated from the 50% tax-subsidy scenario, Chitiga *et al.* (2012) argue, minimised government revenue loss but do not help to reduce the rising poverty trend because growth, employment and income distribution were restricted by declining savings and investment.

The results from Chitiga *et al.* (2012) have policy implications in different areas of environmental issues like environmental regulation, transportation and climate change. The study provides valuable lessons for South Africa as well as other upper-middle income oil-importing developing countries that try to find solutions to rising oil prices in the presence of extreme degrees of inequality (Chitiga *et al.* 2012).

Cockburn, Fofana, Decaluwe, Mabugu and Chitiga (2007) used CGE micro-simulation approach to analyse how the elimination of tariffs impacts on men and women in South Africa. A complete removal of all tariffs was simulated, with government revenue assumed constant by letting indirect taxes adjust. Cockburn *et al.* (2007) observed that the trade liberalisation simulation has a strong gender bias. Results indicated that women's labour market participation decreases while that of men increases. This was because male workers tend to be more involved in export-oriented sectors than women (Cockburn *et al.* 2007). Thus, Cockburn *et al.* (2007) concluded, male-headed households gain from trade reform policy, but female-headed households suffer. Once again, these insights can greatly assist policy makers to plan. In this case, other complementary policies could be formulated that reduce the burden of the trade policy on women.

Chitiga and Mabugu (2008) used CGE micro-simulation approach to analyse a counterfactual picture of the impacts of land reform in Zimbabwe, had it been handled differently. The objective of the study was to evaluate the poverty, inequality and production impacts of land redistribution. To mimic what happened during the fast-track land reform in Zimbabwe that began after 1997, the study simulated a land transfer of 40% from commercial farmers to communal farmers, while maintaining arable land as in the base year.

Had the land re-distribution been done in a more structured and organised manner, it could have resulted in substantial reductions in poverty as well as in income disparities, especially for the household group receiving the redistributed land (Chitiga and Mabugu 2008). This article showed that it is not land redistribution *per se* that contributed to a rapid increase in poverty in Zimbabwe post 1997, but rather the manner in which it was carried out. The lessons learnt from this study, are valuable for Zimbabwe as well as other neighbouring countries such as South Africa.

These few illustrative examples of the use of economy-wide techniques to analyse policy impacts, before or after the policy are clearly powerful. The results of such studies, were they to reach policy makers, offer invaluable insights to allow better policy formulation and implementation. They allow for a comprehensive view of the whole economy and how different facets of it are affected differently by policy.

CONCLUSION

This article aimed to introduce a valuable methodology for policy impact analysis. This method allows for an economy-wide view, and therefore, analysis of policies. It allows policy makers and researchers to test the effects of policies, before, during and after implementation. Because the methodology is economy-wide, it means both direct and indirect effects can be uncovered, thereby offering a fuller understanding of policies, compared to partial methodologies. The article gives a few illustrative examples of the use of such techniques, showing what invaluable lessons can be learnt from these types of analyses. It is argued that the complexity of the public sector, required sharper tools for policy evaluation. It is suggested that these techniques are therefore tools that ought to be in the toolkit of all policy makers. Of course it is important to mention that these types of techniques should be used in combination with other methodologies for policy impact evaluation. They are thus not meant to replace, but rather complement the range of other tools in the toolkit for policy evaluation methodologies.

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