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Macro-econometric modelling for the Nigerian economy: A growth–poverty gap analysis

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ABSTRACT

This study develops comprehensive full-sector macro-econometric models for the Nigerian economy with the aim of explaining and providing a long-term solution for the persistent growth–poverty divergence experienced by the country. The models are applied to test the hypothesis of existing structural supply-side constraints versus demand-side constraints impeding the economic growth and development of the country. A review of the historical performance of the Nigerian economy reveals significant socio–economic constraints as the predominant impediments to high and sticky levels of poverty in the economy. Thus, a model which is suitable for policy analyses of the Nigerian economy needs to capture the long-run supply-side characteristics of the economy. A price block is incorporated to specify the price adjustment between the production or supply-side sector and real aggregate demand sector. The institutional characteristics with associated policy behaviour are incorporated through a public and monetary sector, whereas the interaction with the rest of the world is represented by a foreign sector, with specific attention being given to the oil sector. The models are estimated with time-series data from 1970 to 2006 using the Engle–Granger two-step co-integration technique, capturing both the long-run and short-run dynamic properties of the economy. The full-sector models are subjected to a series of policy scenarios to evaluate various options for government to improve the productive capacity of the economy, thereby achieving sustained accelerated growth and a reduction in poverty in the Nigerian economy.

1. Introduction

The Nigerian economy, naturally endowed with immense wealth, still finds a substantial portion of its population in poverty. During the past three decades the country earned over US $300 billion from oil sources alone. This should have transformed into a considerable socio–economic development of the country, but instead, Nigeria's basic social indicators now place her as one of the 25 poorest countries in the world. Ironically, it was among the 50 richest countries in the early 1970s.

The Nigerian economy has recorded rising growth in its Gross Domestic Product (GDP), especially over the past decade. But this has not translated to accelerated employment and a reduction in poverty among its citizens. This development has also been the case for most African countries. The endowment of crude oil can be seen as the major factor fuelling the country's economic growth. It is, however, expected that the oil revenue should spill over to the rest of the economy leading to a higher shared income for the owners of the factors of production.

The objective of the Millennium Development Goals (MDG) is to reduce poverty in developing and poor economies. This cannot be achieved if the socio–economic impediments to domestic investment and employment creation persist. Structural constraints limit socio–economic development and discourage foreign direct investment. These constraints include the poor state of physical infrastructure in the country and the absence of an appropriate institutional framework.

Therefore, in order to analyse the various sets of policy interventions that will generate pro-poor growth in Nigeria, there is a need for an appropriate framework to adequately capture the underlying structural characteristics existing within the country's institutional environment.

Based on the above background, the main objective of this study is, however, to develop and estimate full-sector macro-econometric models for the Nigerian economy. These may provide a long-term solution for the major socio–economic problems facing the country. The models are then applied to:

- Test the hypothesis of existing structural supply constraints versus demand-side constraints impeding the growth and development of the country;
- Analyse different policy simulations in order to ascertain the optimal policy options for the country.

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The rest of the study is organised as follows: Section 2 presents a theoretical analysis of growth and poverty. In Section 3 the performance of the Nigerian economy is evaluated in which the structural constraints embedded in the country is identified. Section 4 presents an empirical analysis which contains the model specification, methodology, data description, core structural equations, model closures and the policy simulations. Section 5 concludes the study, provides policy recommendations and highlights some limitations encountered in the study.

2. Theoretical analysis: growth and poverty

The theoretical analysis presented in this section focus on the literature dealing with growth and pro-poor growth (poverty trap) theories. The last few decades have experienced resurgence in both the growth theory (development of the endogenous growth models) and the pro-poor growth models in the macroeconomic literature.

The framework of neoclassical economics can be viewed as a summation of the various contributions of authors to the model of long-run economic growth. Solow (1956) made a huge contribution to the growth theory in which he has been revered as the pioneer of the neoclassical growth model (Domar, 1957:8).

The implications of the neoclassical growth model (i.e. Solow (1956), Tobin (1955), Pilvin (1953), and Harrod (1953)) can be viewed on a short and long-run basis. In the short-run analysis, policy measures such as tax cuts will affect the steady-state level of output. This is not the case with the long-run economic growth rate. Instead, economic growth will be affected as the economy converges to the new steady-state level of output, which is determined mainly by the rate of capital accumulation. This, in turn, is determined by the proportion of output that is not consumed but used to create more capital (savings rate) and also the rate at which the level of capital stock depreciates. This implies that the long-run growth rate will be exogenously determined and the economy can therefore be predicted to converge towards a steady-state growth rate which depends on the rate of technological progress and labour force growth. Therefore, a country's economy will grow faster if it has a higher savings rate.

Modifications of the neoclassical growth model can be made along the lines of thought of Ramsey (1928), Cass (1965) and Koopmans (1965), which are all centred on social planning problems (not market determined outcomes) that use dynamic optimization analyses of households' savings behaviour (which is taken as a constant fraction of income by Solow). Their basic assumptions are that agents in the community are identical and that they live forever. This means that they will maximise their utility over their lifetime.

The new growth theory (also known as the endogenous growth theory) started gaining popularity in the growth literature of the early 1980s in response to a series of criticism on the assumptions made in neoclassical theory. These tend to discard the assumption of constant returns to scale, replacing it with increasing returns to scale and thus determining growth mainly by endogenous variables. Technology and human capital are regarded as endogenous, unlike the neoclassical model that assumed these to be exogenous. However, the main emphasis of the long-term growth model is that it does not depend on exogenous factors and, most importantly, that it allows for policies that tend to affect savings and investment (King and Rebelo, 1990).

The assumption of increasing returns posed a major challenge to the new growth models since it does not apply to a perfectly competitive market because production factors cannot be paid from the amount produced. However, by only using increasing returns that are external to the firm, this problem can be circumvented, as was observed by Romer (1986), Lucas (1988), and Barro (1990). Increasing returns have been fully specified in Romer (1986) as a major requirement in achieving endogenous growth, while emphasis on human capital accumulation as endogenous in growth models was explicit in Lucas (1988). The new growth theory has gained tremendous popularity over the past few decades and its strength can be attributed to its ability to solve most of the limitations of neoclassical growth models as well as to include some socio–economic factors that will propel growth over the long run.

Against these backgrounds on neoclassical and endogenous growth theories, accelerated economic growth may not necessarily be sustainable or may not translate into accelerated economic development. Most developing economies are characterized by structural supply (capacity) constraints impeding the effects of any policy interventions targeted towards increasing growth (Focus, 2007).

It is expected that as an economy grows, one would see an improvement in the welfare of its citizens. In other words, the economic growth of a country should have a significant positive impact on its overall level of poverty. But this is not the case, especially if the experiences of most developing countries, where increases in the growth rates have not translated into a reduction in poverty, are taken into account. The Nigerian situation is an example where good economic performance in terms of GDP growth over a few years did not improve the living standards of its citizens. However, this occurrence might have been caused by a lack of persistent or insufficient rate of growth experienced by most developing economies. (World Bank, 2006:103).

It is therefore imperative for any economy experiencing a poverty trap to implement a focused strategic macroeconomic policy that relies either on pro-growth or pro-poor principles, since there is a bi-directional link between growth and poverty. In addition, it will be difficult to create growth if the conditions of the poor are not addressed. On the other hand, poverty will also not decline if there is no growth.

The growth–poverty relationship as a path to improved development may be viewed from two perspectives:

i. The traditional view;
ii. The poverty trap view.

The traditional view of development describes a country's characteristics, institutions and its policies as major determinants of its pattern of growth. If these constraints are not favourable to growth, poverty levels will rise. The traditional view is that these constraints are exogenous, in other words they are not determined by the system (World Bank, 2006).

The poverty trap perspective sees poverty as a major setback to growth. In other words, a country that is initially poor will tend to develop distinct features, like ineffective institutions and policies, and will thus transform into an unfavourable pattern of growth. A country that is initially poor will remain poor while those that are rich will remain rich. Growth models with increasing returns to scale (as explained by Matsuyama) are good examples of poverty traps since countries will tend towards different equilibrium, depending on their initial positions.

The reasons for poor economies not performing as well as rich economies, and for the benefits of good policies failing to materialize in poor economies are all embedded in the poverty trap models (Azariadis and Stachurski, 2005; World Bank, 2006).

3. Evaluating the performance of the nigerian economy — some stylized facts

The stylized facts presented in this section focus on detecting the productive capacity of the Nigerian economy over the years. It reveals the oil dependency and structural constraints embedded in the economy. It also shows how the economic growth performance of the economy has not translated into a significant reduction in poverty. As mentioned earlier, the growth performance of the Nigerian economy over the years has not been pro-poor. Poverty remains a huge challenge despite the growth in the country's gross domestic product.