MACROECONOMIC MANAGEMENT OF NATURAL RESOURCE REVENUES IN DEVELOPING COUNTRIES

Tilak Doshi, KAPSARC, Phone: +966 11 261 3932, E-mail: tilak.doshi@kapsarc.org
Fred Joutz, KAPSARC, Phone: +966 11 261 3933, E-mail: fred.joutz@kapsarc.org
Baltasar Manzano, KAPSARC and Universidad de Vigo, Phone: +34 69 000 0271, E-mail: baltasar.manzano@kapsarc.org

Overview

The recent discovery of significant reserves of oil and gas in East Africa provides an enormous opportunity for economic development in the region. Kenya, Mozambique, Tanzania and Uganda have the chance to transform their economies. However, this opportunity comes along with some risks and challenges too. Dependence on natural resources for economic growth has been frequently linked to poor macroeconomic performance and growing inequality, particularly in developing countries. The issue has been coined the *natural resource curse*.

Governments in those countries expect to obtain a significant amount of revenues from natural resources, mainly through taxes and royalties. Natural resource rents can be used to implement policies for enhancing economic growth opportunities, promoting sustainable economic development, alleviating poverty and improving standards of living. However, dependence on natural resources and windfall profits also implies to deal with macroeconomic vulnerabilities. The main macroeconomic issues regarding natural resource booms are on one side the potential deterioration of non-resource exporting sectors (the so-called Dutch Disease); and on the other side the uncertainty and volatility in the fossil fuels market.

The term Dutch Disease refers to the damaging impacts of real exchange rate appreciation on the non-resource tradable sectors (in particular agriculture and manufacturing). Resource revenues increase the demand (and therefore production) for non-tradable sector (namely construction and most services) pushing wages and profits upwards. Thus, it leads to a reallocation process of labor and capital from the tradable to the non-tradable sector, shrinking labor, investment and output in the tradable sector. Although Dutch Disease is generally seen as a "natural" reallocation phenomenon, it is still a problem for two reasons. First, agriculture is the largest sector in terms of employment in many developing countries, so any contraction of this sector would have a large impact on the labor market. Second, when the resource boom is over it would be costly for the economy to recover activity in the export sectors.

Another important macroeconomic issue has to do with the uncertainty and volatility that occurs in energy markets. One source of uncertainty is the size of the new resource discoveries and/or the reappraisal of the existing fields. Second, and perhaps more important is the fact that world energy commodity prices are extremely volatile and difficult to forecast. These fluctuations in oil and gas prices are transmitted to government revenues. As resource rents are expected to cover a large share of government budgets, the uncertain rise and fall in government revenues causes fiscal planning problems and produces an inefficient pro-cyclical policy. This makes government investment and spending less efficient and less productive. There are fiscal expansions when energy prices are high and budget deficits when prices are low creating fiscal contractions.

In this paper we analyze the impact of alternative policies regarding natural resource revenues in developing countries, addressing Dutch Disease and volatility in an dynamic stochastic general equilibrium model calibrated for the Ugandan economy. Simulations of the model allow us to compare the results of front-load spending policies on transfers versus public investment. We also analyze the traditional policies prescriptions based on the Permant Income Hypothesis, comparing front-load policies of public investment versus more gradual investment policies.

Methods

We analyze the impact of alternative policies regarding natural resource revenues in developing countries, addressing Dutch Disease and volatility in an dynamic stochastic general equilibrium model calibrated for the Ugandan economy. The model consist of an infinitely lived representative households and two representative firms producing tradable and a non-tradable respectively. Production and prices of natural resources are assumed to be exogenous and stochastic. We consider a government that collect revenues from conventional taxation and from the

natural resources in the form of taxes and royalties. Simulations of the model allow us to compare the results of front-load spending policies on transfers versus public investment. We also analyze the traditional policies prescriptions based on the Permant Income Hypothesis, comparing front-load policies of public investment versus more gradual investment policies.

Results

We compare front-load policies of transfers and public investment. Transfers policy provides an immediate raise of consumption of 8%, reaching a maximum increase of 20% after 20 years, decresing quickly afterwards. Public investment provides a slower and smaller increase of consumption, reaching a maximun increase of 15%, although the increase of consumption can be sustained for longer as the productivity effect lasts for. GDP exhibits a similar response to the simulated policies, with a rapid increase (ranging from 6-8%) that lasts for the period of natural resource extraction under the transfers policy, while the increase is lower, much more gradual and more persistent under the public investment policy. Both front-load spending policies show the Dutch Disease symptom, with a substantial appreciation of the real exchange rate, that lasts for the whole period of the resource exploitation. The real exchange rate reflects the reallocation process from the tradable sector to the non tradable sector that can be seen for instance, in the response of labor or in sectoral GDP. The transfers policy makes GDP in the tradable sector to shrinks around 5% for the whole period of the resource extraction, while the decrease only last for a few periods under the public investment policy, as the subsequent increase in productivity outweighs the effects of Dutch Disease. GDP in the non tradable sector is booming under both front-loading spending policies, increasing wages largely in the economy. The effect on both non-tradable GDP and wages is larger when oil revenues are allocated to public investment because of the increase in productivity.

We explore the differences between front-load versus gradual public investment policies, to see how this could lessen the impact of Dutch Disease, comparing the results of a front-load public investment policy versus a more gradual approach consisting of saving the oil revenues abroad (sovereign wealth fund) and allocating the returns of the funds plus a 10% more to public investment. Scaling-up public investment offsets part of the real exchange appreciation, allowing for a larger and more sustainable increase in consumption. The fall in the tradable sector GDP is initially larger with the gradual policy, as the productivity increase is delayed because of the slower pace of public investment. However, the gradual approach enables a subsequent recovery which is compatible with a larger expansion of the non-tradable sector. Gradual policies also allows for larger and more sustainable increases in wages and the GDP in the non tradable sector. The initial decrease of labor in the tradable sector is larger with the front-load investment policy as the effect of real exchange appreciation dominates the productivity effect on job creation, but the comparison is reversed soon afterwards

Conclusions

We explore the macroeconomic management of natural resource revenues in resource-rich developing countries. Our simulation allowed us to asses the cost and benefits not only of spending and investment policies, but also of the traditional policies based on the permanent income hypothesis.