



Developing Economies and Natural Resource Revenues: A Review of the Macroeconomic Challenges for Eastern Africa



About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is an independent, non-profit research institution dedicated to researching energy economics, policy, technology, and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

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Key Points

Recent Eastern African hydrocarbon discoveries bring opportunities hand-in-hand with challenges, including:

- ‘Dutch disease’, which results in reduced international competitiveness because the real exchange rate rises;
- The ‘resource curse’, where resource wealth adversely affects governance and leads to rent seeking behaviors. These may cause natural resource-rich economies to perform worse than others which remain resource poor.
- Uncritical adherence to the ‘permanent income hypothesis’ (PIH), which advocates converting resource capital into non-resource assets, then spending only the income generated from it (in real terms), so the principal will be preserved for future generations.
- ‘Absorptive capacity’ constraints, which may limit the ability of workers and institutions to fully adopt and employ both new strategies and new infrastructure so the economy can expand.

Our summary of the literature relating to these four challenges and their potential solutions lays the groundwork for two related KAPSARC research papers detailing a calibrated macroeconomic model of the Ugandan economy and a quantification of the scale of social benefits that might follow from oil development. These will help ground discussions in the context of Uganda's macroeconomic conditions.

Summary for Eastern Africa Policymakers

Recent natural resource discoveries in Eastern Africa provide an enormous opportunity to boost economic development. However, success is not inevitable and the causes of failure have been extensively researched during recent years. This paper summarizes the challenges that can beset such opportunities, including:

- ‘Dutch disease’, recognized as the loss of competitiveness in the tradeable sectors of the

economy because of a strengthening of the real exchange rate.

- ‘Resource curse’, a term coined to describe the negative impact on the economy of resource wealth that may arise from deteriorating governance, rent seeking behaviors and entrenchment of government regimes through their ability to distribute benefits to supporters. It may seem counterintuitive, but many economies with natural resources have performed worse over long periods of time than their neighbors with fewer resources.
- Rethinking the ‘permanent income hypothesis’, a long touted ‘best practice’ in managing resource wealth. It makes logical sense, holding that the capital represented by natural resources should be turned into non-resource assets and only the income generated from the capital (in real terms) should be spent, in order to preserve the wealth for future generations.

In practice, though, it can represent an overly conservative approach to wealth management. Small populations with large resource endowments may indeed be able to divert sufficient revenues to sovereign wealth funds that ultimately provide enough income to support a population regardless of the performance of the rest of the economy. The uncritical application of it in poorer, populous nations relies on a belief that there is little value for future generations in short-term investments that improve health, education and infrastructure in an economy.

- ‘Absorptive capacity’ constraints can hinder the ability of the economy to benefit from the investment of resource revenues. Developing a realistic understanding of the ability of the country’s labor force and institutions to adopt and incorporate skills, new knowledge and infrastructure efficiently into growth in the economy is essential if short- and medium-term spending is to generate wealth for future generations. Failure to recognize the existence of these constraints and to take action to expand the absorptive capacity of an economy runs the risk of squandering the windfall.



We summarize here the literature covering these four challenges and opportunities for overcoming them. This lays the groundwork for two further KAPSARC research papers:

- i. a description of our calibrated macroeconomic model of the Ugandan economy under three scenarios for deploying the expected fiscal revenues; and
- ii. a quantification of the scale of social benefits that might arise from such deployment in order to help ground the expectations of the Ugandan population in reality.

This introductory paper provides a context for policymakers to consider whether their proposals risk repeating the mistakes of others, or can chart a different path to avoid falling into the four traps described—which could provide a role model for future policymakers.

Introduction

The recent discovery of significant reserves of oil and gas in Eastern Africa could provide a boost to economic development in the region. Exploration in Uganda's Albertine Graben region has delineated some 2.5 billion barrels of oil, Kenya has discovered several hundred million barrels of oil, while Tanzania and Mozambique have, between them, discovered more than 200 trillion cubic feet of natural gas. Consequently these governments expect to receive significant revenues from the oil and gas sectors which can be used to implement policies for enhancing economic growth opportunities, promoting long-term, economically sustainable development, alleviating poverty and improving standards of living.

However, this opportunity is not without its risks and challenges, including what is often referred to as the 'resource curse'. Dependence on natural resources in the form of hydrocarbons for economic growth has been frequently linked to low income countries experiencing poor macroeconomic performance and growing inequality resulting from deteriorating governance and inefficient use of

resource revenues. The topic has long been an important research area. Papers by Gelb (1988), Sachs and Warner (1999 and 2001) are good examples; van der Ploeg (2011) presents a useful survey of the research.

The macroeconomic risks present themselves in two main ways:

- First, there is a potential deterioration of non-resource tradeable—exporting and import—competing sectors, which has been called 'the Dutch Disease'.
- Second, the consequences of uncertainty and volatility in global oil prices on government revenues, noted in a recent speech by the Governor of the Bank of Uganda (Tumusiime-Mutebile, 2015), can complicate fiscal planning, often resulting in inefficient, pro-cyclical 'stop-go' government expenditures.

The four countries in Eastern Africa that are the subject of KAPSARC's research are not the first to be faced with the challenges of developing natural resources. Their governments have stated their commitment to learning from the experiences of others and to charting a course that recognizes both their specific needs and the lessons that can be applied to each of their unique situations in terms of population, stage of economic development, absorptive capacity and growth ambitions.

Macroeconomic Challenges to Resource Development

We will cover the four main areas in the management of natural resource revenues. They are the 'Dutch disease', the 'resource curse', the 'permanent income hypothesis' (PIH), and 'absorptive capacity'.

Dutch Disease

The term 'Dutch Disease' was first used to refer to the negative effects on Dutch manufacturing from natural gas discoveries and exports from the Groningen field during the 1970s.



First, the increase in profitability in the resources sector—caused by the discovery of resources and by favorable price shifts for the resource owner—bids up prices of economic factors of production such as labor and materials, and draws away such factors from other sectors in the economy. Since the prices of tradeable goods and services (tradeables) are exogenously fixed by world prices, the movement of factors of production into the oil sector contracts the non-oil tradeables sector. Second, to the extent that some of the oil revenue windfalls are spent on non-tradeables, the price of non-tradeables, determined by supply and demand within the economy, is bid up relative to the price of tradeables. This phenomenon—the contraction of the non-oil tradeables sector and the associated real exchange rate appreciation defined as the rise in the price of non-tradeables relative to tradeables as a result of the general equilibrium effects of a booming sector—is what has been termed the Dutch disease.

Governments can mitigate the impact of this by delaying consumption or investment in the domestic economy in favor of purchasing foreign financial and capital or property assets instead. This deferral of domestic spending can be achieved through oil trusts and sovereign wealth funds (SWFs) managing a portfolio of foreign investments and mandated with the objective of achieving the highest risk-adjusted returns for the nation's natural resource rents. This avoids excessive domestic investment or consumption expenditures, which lead to appreciation of the real exchange rate and collateral effects of the Dutch disease. The optimal trade-off between choosing to invest in the domestic economy or to save in an SWF depends not only on the relative risk-adjusted rates of return to capital invested overseas and in the domestic economy. It also depends crucially on the constraints arising from the domestic economy's absorptive capacity, which determine the efficiency of public investments. We will address absorptive capacity more fully later in this report.

The spending effect on the domestic economy from the surge of natural resource rents that accompanies

resource booms—either due to new resource extraction or to resource price increases—is accentuated when the rents are used to expand the public sector. Government consumption expenditures are skewed towards non-tradeables like the construction and services sectors. A government can use windfall gains to reduce deficit on its external trade account, while keeping the rate of domestic investment of such windfall gains within the country's (growing) absorptive capacity. This helps mitigate the appreciation of the exchange rate associated with the Dutch disease. Warr (1984) for instance suggests that Indonesia's unusually good economic performance since the mid-1970s can be explained as a result of the low proportion of windfall revenues consumed in favor of investments in the tradeable goods sectors such as agriculture, and the use of foreign exchange receipts to reduce the deficit on the balance of payments account (Doshi, 2015).

Although the Dutch disease is generally seen as a 'natural' reallocation phenomenon—the normal outcome of a market economy adjusting to the effects of a natural resource based windfall—it is a major problem in low income developing countries for two reasons. First, agriculture is the largest sector in terms of employment for most of the least developed economies, such as those in Eastern Africa. Any contraction in that sector as a result of the resource 'boom' will have large adverse impacts on rural incomes and the labor market. Second, when the resource boom is over, it will be costly for the economy to ensure the recovery of activity in traditional export sectors, both in agriculture and in manufacturing, to the extent that the latter existed before the resource boom. The decline in the tradeables sector during the resource boom may lead to a costly reduction in physical and human capital—at the expense of the long-term development of the economy (Van Wijnbergen, 1984).

Most developing economies undergoing resource booms typically channel revenue windfalls into the treasury via taxes and royalties. Natural resource extraction industries such as oil and gas are typically



capital intensive, based on foreign direct investments engaged in ‘enclave’ activity with limited linkages to the domestic economy. Inputs of skilled labor, intermediate goods and capital have to be imported because of the low levels of domestic capacity and because local wages constitute a small fraction of the value added in the sector. It is in this context that governments pursue local content and industrial development policies. Local content regulations, in particular, have been very widely advocated in the resource-rich developing countries of sub-Saharan Africa as a means of integrating extractive sector activity with the domestic economy. Thus the effects of the Dutch disease are strongly influenced by how governments, as the major domestic recipients of resource rents, leverage and spend their resource rent windfalls.

Resource Curse

Auty (1993) is credited with coining the term ‘resource curse’ to describe why macroeconomic performance and development outcomes in resource rich developing countries (RDCs) proved inferior to those in other developing countries. RDCs where the resource curse struck include Iran, Nigeria and Venezuela. The hypothesis is counterintuitive: countries with greater natural resource endowments should be able to perform better than resource poor countries, other things being equal. Sachs and Warner (1997) showed that economies with a high ratio of natural resource exports to GDP in 1971 (the base year) tended to have low growth rates during the subsequent period, 1971-89. The observation held, even after controlling for variables found to be important for economic growth, such as initial per capita income, trade policy, government efficiency, investment rates and other variables.

The public choice argument about the resource curse phenomenon is that resource rents provide an opportunity for governments to derive the political benefits of an expanded public sector without having to bear the political costs of increasing tax rates. On the other hand, Acemoglu and Verdier (2000) argue that the existence of these natural resource rents

is a motivating source for corruption and misappropriation of public resources. Bebbington et al. (2008), Ross (1999) and Collier and Hoeffler (2005) discuss how natural resource windfalls create weak institutions that undermine sustainable and inclusive development, leading to a concentration of benefits in a narrow beneficiary group.

Resource booms can lead to the entrenchment of government regimes, the onset and persistence of civil conflict and the undermining of legal and constitutional norms, as explained in Collier (2008), Le Billon (2001), and Ross (1999). Predatory governmental institutions, factional fights and rent seeking behavior by entrenched elites are well covered in the literature on the resource curse in resource rich, developing country contexts (Auty, 2001). Ebrahimzadeh (2012) shows that even developed economies, with well established governance and legal institutions, can also be afflicted by the resource curse. In Holland and Australia, for instance, government policy responses to large windfall gains from resource rents have tended to support unsustainable social welfare transfers which then could not be easily dismantled following the resource boom period. Doraisami (2015) finds that in the wake of the 2008 global financial crisis, Malaysia also began to exhibit ‘resource curse’ characteristics, where previously there were none. Thus the real factors behind the ‘resource curse’ phenomenon are a propensity to weaken institutions, deteriorating governance and rent seeking.

The Permanent Income Hypothesis

Hydrocarbon and other non-renewable reserves are essentially finite and eventually the resource revenues to the government will cease as the resource constraints are increasingly binding. For some countries with low populations and vast resources, including Abu Dhabi, Kuwait and Qatar, the problem of resources being finite is highly attenuated. Resource booms usually end, either because the country runs out of easily accessible extractive resources and costs of production increase



or commodity prices enter a prolonged slump. Given some level of substitutability between a depleting natural asset and capital goods in any economy's 'production possibility' frontier, an optimal policy would convert the depleting resource into productive human and capital assets over time.

The guiding fiscal policy framework for instituting fiscal benchmarks in many resource rich countries has typically relied on the Permanent Income Hypothesis (ODI, 2013). Fiscal planning takes place within the intertemporal budget constraint from expected resource revenues in addition to other revenues from the non-resource sectors. The PIH has been used to prescribe the saving of resource wealth in external financial and capital assets to avoid macroeconomic instability from spending volatile natural resource revenues in a 'stop-go' pattern. The PIH requires that, for a country with only resource revenues, the intertemporal budget constraint is satisfied when the yearly spending—that is, the non-resource primary deficit—is limited to the perpetuity that can be supported by the present value of all resource wealth (Baunsgaard et al., 2012). The constraint determines the highest level of smoothed spending over time which maximizes social welfare.

PIH proponents suggest that a substantial portion of a country's resource wealth should be saved externally, typically in a SWF with a diversified portfolio. These include: Davis et al. (2001), Barnett and Ossowski (2003), and Bems and de Carvalho Filho (2011). While this policy alleviates Dutch disease effects and avoids macroeconomic instability resulting from spending volatile natural resource revenues in a 'stop-go' pattern, it fails to fully address concerns about the current poor living conditions and investment needs in capital scarce low income economies. Since the mid-2000s, calls to re-evaluate PIH inspired conventional advice and to promote earlier investment spending of resource windfalls in developing countries have emerged. These include: UNCTAD Secretariat (2006), Collier et al. (2010), Independent Evaluation Office (2011), Baunsgaard et al. (2012), International Monetary Fund (2012)). The PIH has been criticized for setting

spending constraints which are too tight for low income economies. For instance, Ghura and Patillo et al. (2012) argue that PIH based consumption, spending and investment paths are not optimal for these countries. Productive government spending can beat external saving as an optimal strategy to manage resource revenue in credit constrained, capital scarce economies. Examples of this thinking include: Takizawa et al. (2004), Venables (2010), van der Ploeg and Venables (2011), and Araujo et al. (2013)). When countries face high borrowing costs and debt service requirements, the optimal use of their resource revenue may well be to pay down external debt, as discussed in Daban and Helis (2010) and van der Ploeg and Venables (2011).

Two alternatives to the traditional PIH approach have been proposed. The first is a 'modified PIH' which allows for an initial scaling up of spending. Berg et al (2013) develop a model for 'sustainable investing' which combines public investments with a sovereign wealth fund. This can meet the immediate demands in poor countries for both consumption spending and public investment. Fiscal policy remains anchored to the long-term sustainable use of resource revenue. Spending can be front- end loaded and financed through a drawdown from resource revenues. However, intertemporal budget constraint forces spending to be lower in further out years. This has been likened to a 'Big Push' development strategy to get the country out of poverty (Rosenstein-Rodan, 1943) .

The second alternative is referred to as the fiscal sustainability framework. This alternative takes into account the intertemporal budget constraint, but stabilizes net resource wealth over a longer term than that proposed by the PIH. The fiscal sustainability framework allows for an actual drawdown of government wealth accumulated from the natural resources. The rationale for this drawdown is to stabilize public spending at a higher level because domestic public investment—for example, in infrastructure and human capital—enhances productivity and growth, yielding fiscal returns in the form of larger non-resource revenues.



This can be referred to as an ‘investing to invest’ policy. Proponents of the FSF argue that some front-loading of consumption spending benefits the current poor. This is welfare enhancing as their marginal utility of consumption is assumed to be higher than that of future potentially richer generations.

Absorptive Capacity

Public investment can be subject to constraints in absorptive capacity, reflecting a minimum threshold level of human capital, institution coherence, developed financial markets, trade openness, and technological and institutional capacities that determine the efficiency of public investments. For instance, it requires an educated labor force to spread the benefits of new technologies across all industries (Farkas, 2012). Constraints on human and institutional capacities can reduce the effectiveness of sudden and large increases in public investment. A more gradual approach can lead to greater absorption and efficiency of spending. An optimal policy, therefore would scale up public investments only in line with the growing ‘absorptive capacity frontier’ that an economy can achieve.

One key metric in the measure of absorptive capacity is the impact of each dollar of public—and private—investment on increases in the capital stock. Not all investment—specifically gross fixed capital formation expenditure—contributes to capital accumulation. Two factors limit the growth in capital stock and efficiency of investment. First, public infrastructure needs can be very large. Second, if absorptive capacity is limited, then high investment rates lead to large cost overruns. These can be due to supply bottlenecks, coordination issues in the implementation phase of the project, errors in measuring, reporting and verification of public investment projects and so on.

When absorptive capacity is limited, the productivity of capital investment is reduced in the public and private sectors. There is inefficient use of investment expenditures leading to lower capital accumulation, knowledge accumulation and technology adoption per dollar spent. One measure of efficiency suggested by Pritchett (2000) is the ratio of change in public capital to investment expenditure. Hurlin and Arestoff (2010) estimate that this ratio is frequently below one-half for sub-Saharan Africa and Latin America. Such poor investment efficiency ratios constrain productivity, the ability to compete in international markets and, ultimately, economic growth prospects.

Investment costs rise in an environment of rapid scaling up and absorptive capacity constraints. The IMF has estimated that the average project cost overrun was 74 percent of initially budgeted investment in sub-Saharan countries (IMF, 2012). Typically, 70 percent of public investment goes to capital expenditures and the rest goes to operations and maintenance. The concept of efficiency for public investment for modeling purposes would translate this value into a 70 percent efficiency parameter. This compares with a benchmark value from the Buffie et al. (2012) study of 60 percent for sub-Saharan Africa.

While it is generally believed that large scale public investment programs are important to speed up economic development, the many examples of wasteful white elephant projects in many developing countries enjoying natural resource revenue windfalls exhibit the risks of breaching the limits of absorptive capacity. Heller (1974) and Rioja (2003) emphasize the need for ongoing expenditure to cover recurrent costs for operation and maintenance. This reduces the rate of capital depreciation and makes public investment projects remain productive in the medium- to long-term. The appropriate example here is the building and maintenance of all-weather roads.



Conclusions

Expected revenues from the oil sector can provide Eastern African economies with significant increases in GDP, consumption and welfare during the next decades. The trajectories of these various macroeconomic variables over the coming decades depend on the policies implemented.

Along with the benefits associated with expansion of the economy, a negative impact on the non-oil tradeable sectors can also be expected. This particularly applies to agriculture, because the nascent manufacturing sector in this area is typically comparatively small. As observed in resource rich developing countries undergoing resource booms, real exchange rates rise and the agriculture sector becomes less competitive.

The spending shock that follows the increase in government revenues lifts demand, raising wages and corporate profits and thus damaging international competitiveness through real exchange rate appreciation—the Dutch disease phenomenon. To sustain economic growth during a resource boom, regaining competitiveness in the tradeable goods sector in the post-boom period is critical.

Developing economies are typically afflicted by widespread poverty and higher levels of morbidity and mortality. It is assumed that the population value the future less, compared with the present, than do

people in richer, developed countries. However, the preference for policies that immediately increase disposable income—and so consumption and welfare—can only be justified to the degree of the society's rate of time preference.

The relevance of this for developing countries is clear. The lack of infrastructure and human capital require a program of public investment that can coexist with the situation where a significant share of the population is living below the poverty line—which tends to favor front-end loaded spending. In this context the policy of 'expectation management' on the part of government may come to the fore.

Developing countries have specific institutional capacity constraints and development characteristics and face different challenges than their developed country counterparts. Policies successfully applied in rich countries might not be optimal for low income countries. Absorptive capacity constraints support the implementation of gradual investment policies, which over time alleviate such constraints. On the other hand, the higher social discount rates related to immediate poverty alleviation make policies leading to short-term income transfers more attractive. The challenge is to find the appropriate balance between these competing needs since, taken too far, short-term income transfers can lead to entrenched political patronage and the resource curse that policymakers wish to avoid.



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About the Project

KAPSARC is engaged in a long-term research project examining the dynamics of natural resource-driven growth in Eastern Africa. The principle research question we are seeking to answer is, how can natural resources be developed in a way that promotes inclusive economic development. We are answering this question through a comprehensive framework that examines macroeconomic issues of natural resource development, the impact of local content policies, and understanding the expectations of stakeholders in countries' oil and gas sectors.