

EXTRACTIVE INDUSTRIES AND THEIR LINKAGES WITH THE REST OF THE ECONOMY

Keynote paper 1

Contents

List of tables, figures and boxes.....	2
Acronyms and abbreviations	3
Executive summary	4
1. Introduction: natural resource abundance, a blessing or a curse?	7
2. Key challenges of extractives revenue management	8
3. Strengthening resources sector linkages with the rest of the economy	12
3.1 Fiscal linkages: robust and predictable fiscal regime to capture resource rents	13
3.2 Spatial linkages: stimulating local economic development	15
3.3 Backward linkages: developing local content and suppliers	17
3.4 Forward linkages: raw materials for further downstream value addition.....	21
3.5 Knowledge linkages: human resources development and technological innovation	22
4. Conclusion.....	26
References	28
Annex 1: Royalty-based fiscal regimes.....	30
Annex 2: Mining and oil/gas fiscal regimes	31
Annex 2: Mining and oil/gas fiscal regimes	34
Acknowledgements.....	35

List of tables, figures and boxes

Tables

- Table 1: Growth vs human development
Table 2: Macroeconomic impacts from the TFM in the DRC

Figures

- Figure 1: Sub-Saharan Africa, average growth of 4.5 per cent
Figure 2: Natural resources as a growth accelerator
Figure 3: Natural resource extraction linkages
Figure 4: Impact of fiscal regimes on an indicative Bauxite mine
Figure 5: Skills development as a critical accelerator in Tanzania
Figure 6: The Vale Foundation's social investment framework
Figure 7: Plastics Industry Skills Development and Innovation Centre
Figure 8: Mining taxes in Tanzania, 1997–2034
Figure 9: Principal revenue streams from gas and LNG

Boxes

- Box 1: Natural resources as a growth accelerator
Box 2: Downstream beneficiation in Tanzania
Box 3: Shared value at Tenke Fungurume Mine (TFM), Katanga province, DRC
Box 4: Critical development accelerators in Tanzania
Box 5: Local content and multiplier effect in Brazil
Box 6: The downstream plastics industry in South Africa

Acronyms and abbreviations

CABRI	Collaborative African Budget Reform Initiative
DRC	Democratic Republic of Congo
FDI	foreign direct investment
GDP	gross domestic product
GNI	gross national income
LC/SD	local content and supplier development
NGO	non-governmental organisation
NSR	net smelter return
PPP	public-private partnership
PSC	production-sharing contract
PSGP	Plastics Sector Growth Plan
R&D	research and development
RRT	resource rent tax
SME	small and medium-sized enterprise
TFM	Tenke Fungurume Mine
UNCTAD	United Nations Conference on Trade and Development
WTO	World trade Organisation

Executive summary

The discovery of natural resources does not necessarily lead to higher economic growth – and even if it does, this does not necessarily translate into better human development outcomes. A country's natural resource exploitation can become an 'enclave economy', disconnected from the rest of the national economy, making macroeconomic indicators look better, but without creating jobs or broad-based prosperity.

To avoid this, linkages between the extractives sector and the rest of the economy need to be strengthened. This requires policy, legislative and regulatory frameworks that are not only pro-growth but also pro-development – mobilising human, financial and technical resources, often through public-private collaboration, to enable other economic sectors to leverage opportunities created by a growing extractives sector.

Good governance is generally regarded as the sine qua non for these linkages to be effective. Investors look for predictability of fiscal, regulatory and related governance frameworks, to reduce uncertainty and project risk. Good governance involves co-ordination between the diverse government ministries and regulatory bodies that can develop and implement policy relevant to linking the resource economy to broader economic development.

Successfully linking natural resource exploitation to the broader economy can enable a low-income economy to use natural resources as a platform to jump to a path of higher and sustained growth, catching up with middle-income peers and creating an industrialised, diversified economy. To do so, five main types of linkage need to be strengthened.

Fiscal linkages: capture and strategic use of resource rents

A country's fiscal regime consists of the laws, regulations and/or individual agreements that determine the channels through which cash from the exploitation of natural resources accrues to the government. These can include taxes, royalties and production share agreements. The balance of these fiscal linkages can crucially affect the type and pace of a country's economic development. The government needs to balance its interest in maximising its income with the investors' need to be confident of realising a worthwhile return in a risky environment.

Governments also need to use the revenue that accrues to them strategically to boost the wider economy. It may be prudent to save some revenue, with a view to either providing stability in the event of future resource price volatility or making overseas investments to provide returns for future generations. In the spending of revenue, choices include capital expenditure on infrastructure funds (see spatial linkages), incentives for local content/supplier development (see backward linkages) or incentives for domestic utilisation of natural resources (see forward linkages).¹

Spatial linkages: critical infrastructure to enable resource extraction

Extractives companies typically need to invest in infrastructure such as pipelines, electricity generation plants, roads and ports, and governments often contribute significant funding towards some components of the required infrastructure. Such investments can be designed to maximise benefits

¹ The keynote paper on Revenue Management in the Extractives Sector, which will be the central focus of the forthcoming CABRI dialogue workshop, explores these fiscal challenges in greater depth. The purpose of this background paper is to provide an overview that locates them in the broader context of other ways in which extractives can be harnessed for economic development.

to other economic sectors – for example, electricity generation plants that also serve local villages, or roads that improve the functioning of local markets.

Investments in new infrastructure should be planned carefully, with governments working in partnership with extractives companies. Regulatory frameworks should clearly define the rationale for investments and the rights and obligations of all parties involved.

Backward linkages: development of suppliers to the resources sector

Backward linkages involve extractives companies employing local people and procuring goods and services from local companies. This can bring significant social and economic benefits, with the multiplier effect of wages and revenue spent locally providing a further boost to local economic development. From the extractives companies' perspective, it can help to secure their 'social licence' to operate. However, local content and supplier development (LC/SD) policies take time to have effect, and there is no consensus on the best approach.

The success of an LC/SD strategy depends on the political will of governments, the willingness of the private sector to engage, and the feasibility of building the capacity of the local economy to meet the extractives sector's demands for particular goods, services and types of labour, in terms of both quantity and quality. LC/SD policies could include government funding of training institutions, creating incentives for extractives companies to provide on-the-job training, or partnering with extractives companies and development agencies to enable local small and medium-sized enterprises (SMEs) to access the financing and support they need to gain necessary skills and grow.

Forward linkages: resource utilisation for further value addition

Forward linkages involve boosting the broader economy by processing the natural resources extracted and using them to produce finished goods, rather than exporting them in their raw state. This can help to retain more of the wealth created by natural resource exploitation in the country, as well as promoting employment, industrialisation and economic diversification. However, it has generally proved counterproductive simply to obligate investors to beneficiate raw materials in the country as part of their extraction licenses, because many lack integrated forward linkages.

Instead, governments can provide fiscal instruments to incentivise investors to support beneficiation (even if they do not themselves invest), and enter into strategic public-private partnerships to boost downstream industries. Such fiscal incentives should be used with care, however – they are complex, costly to administer and carry the risk of unintended consequences. There is also a trade-off, in that money spent on fiscal incentives for forward linkages cannot also be spent in other ways, such as infrastructure or skills development.

Knowledge linkages: sector skills development and technological innovation

Success in creating other kinds of linkages is closely related to success in creating knowledge linkages. Often, governments lack experience and, therefore, skills in analysing and regulating the extractives industry, which can lead to the mismanagement of macroeconomic challenges and the foregoing of opportunities to boost the wider economy. Local workers and companies frequently lack the knowledge necessary to service the needs of extractives companies, and technology imported by extractives companies is often not shared with or taken up by local companies.

The benefits of investment in creating knowledge linkages are commonly not immediately politically evident, but they can be significant in the longer term. New technology, innovation and research and development (R&D) introduced to the country by foreign extractives companies can become an essential input into the country's industrial growth agenda, if mechanisms are put in place to transfer

the technology and related skills to the host country. One approach is to require firms to spend a percentage of turnover on domestically based R&D and applied innovation, often in conjunction with local universities and technology institutes.

1. Introduction: natural resource abundance, a blessing or a curse?

Significant as it may be, the discovery of natural resources should not be seen as a reason to change a country's vision; it should be regarded, rather, as an opportunity for the development vision to be more achievable through the extra wealth produced. In other words, natural resource windfalls should be seen as an accelerator towards a development end-goal. However, economic history is littered with examples of failure to manage the exploitation of natural resources effectively for the betterment of current and future generations. Indeed, such has been the prevalence of the poor stewardship of natural resources that the term 'resource curse' has been coined to describe the paradox whereby countries with abundant resources exhibit worse developmental outcomes – including slower growth rates – than countries with fewer natural resources.

The suggested causes of the resource curse include: the volatility of revenue from natural resources due to global commodity market swings; government mismanagement of resource revenue; and weak, ineffectual, unstable or corrupt institutions. Another cause is the 'Dutch disease': unless steps are taken to avoid such an outcome, resource-rich countries tend to experience an appreciation of the real exchange rate as resource revenue is spent, resulting in a decline in the competitiveness of other economic sectors. The Dutch disease must be avoided if resource-rich countries are to achieve diversified economic growth. Frankel (2012) stresses that commodity abundance does not necessarily lead to inferior economic or political development, but is best viewed as a double-edged sword, with both benefits and dangers.

Even if governments manage to avoid the above causes of the resource curse, and the exploitation of natural resources leads to a higher rate of growth, this will not necessarily translate into improved human development outcomes. It is possible for a resource-rich country to have macroeconomic indicators that suggest a healthy national economy but mask jobless growth. In such an 'enclave economy', the extractives sector has few linkages to the domestic economy – growth is sustained by the export of unrefined or semi-refined commodities, and opportunities to create downstream economic development and diversification are lost (Stevens, Lahn & Kooroshy 2015). Strengthening the economic linkages throughout the economy and aligning these efforts with national development efforts is a challenge but, as Frankel (2012) points out, 'it is a priority for any country in order to sidestep the pitfalls of the resource curse and to find the path of success'.

2. Key challenges of extractives revenue management

To avoid an ‘enclave economy’ with jobless growth, resource-rich countries should create policy, and legislative and regulatory frameworks that are not only pro-growth but also pro-development (UNCTAD 2013).² A pre-emptive development agenda maximises the integration of the resource economy into the broader economy through the mobilisation of human, financial and technical resources to respond flexibly in building capacity to meet the demands of the growing economy.

As shown in Figure 1, sub-Saharan Africa was forecast to have the highest growth rate in 2015 of any region other than Asia. Nonetheless, apart from Congo and

Zambia, which have medium human development indices, many African countries still exhibit low human development indices – as defined by the African Development Bank (AfDB) – even those that have had economic growth (GDP) of over 6 per cent per annum in recent years (see Table). For some of these countries, it is their natural resources base – and the relatively high commodity prices that prevailed until 2013/14 – that help to explain their recent high growth rates.

Figure 1: Sub-Saharan Africa, average growth of 4.5 per cent

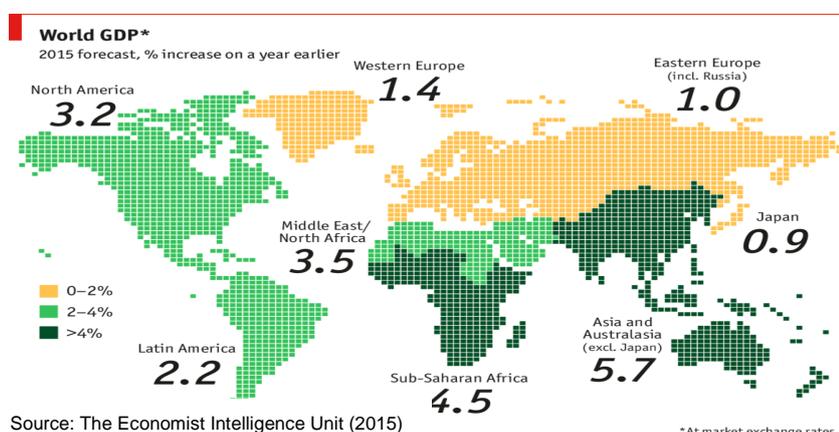


Table 1: Growth vs human development (AfDB 2015)

Low human development (below 0.55)	Real GDP growth(%) greater than 6%
Chad	9.0
Congo, Dem. Rep.	9.0
Côte d'Ivoire	7.9
Djibouti	6.0
Ethiopia	8.5
Kenya	6.5
Mozambique	7.5
Niger	6.0
Rwanda	7.5
Tanzania	7.4
Uganda	6.3

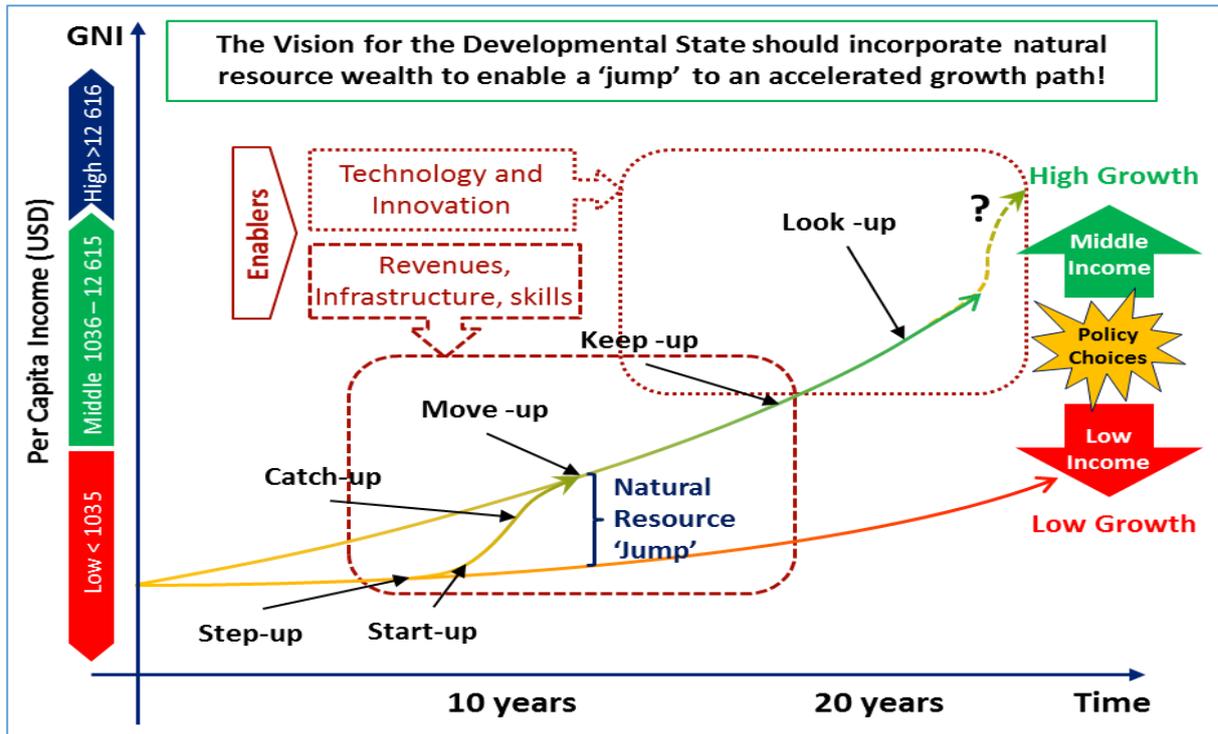
If managed prudently, the exploitation of natural resources should in theory allow low income, but resource-rich, countries to ‘catch up’ and ‘move up’ onto an accelerated and sustained growth path – the ‘natural resource jump’ illustrated in Figure .

After achieving this jump, countries need to ‘look up’ and find the means to bring themselves from resource dependence to the realisation

of an industrialised and diversified economy. This is likely to be driven by the identification of supplying industries that need to achieve global competitiveness over time, and by innovation that emerges from the expansion, diversification and deepening of extractives services’ supply sectors in response to the extractives sector-led growth (Moran 2014).

² An enclave economy is defined in Cardoso and Faletto (1979) as follows: ‘In enclave economies, foreign invested capital originates in the exterior, is incorporated into local productive processes...and produce(s) goods...sold in the external markets.’

Figure 2: Natural resources as a growth accelerator



Box 1: Natural resources as a growth accelerator

Because natural resources are finite, they should not change the developmental goals of a country; rather, they should be used to enhance the development process by enabling the economy to 'jump' to an accelerated growth path. Figure depicts how some factors, labelled 'Enablers', can provide the opportunity for a country to 'move up' to a higher growth rate, 'keep up' or sustain this higher growth rate, and 'look up' to use the next enabling factors to meet long-term development targets.

To achieve the 'natural resource jump', it is necessary concurrently to secure the requisite investments in human capital, physical and economic infrastructure, and new downstream industries, and to increase trade in the commodities and services produced. This requires the country to 'step up' to the challenges and 'start up' the resource economy to enable extraction and capture rents. After the country has 'caught up' and 'moved up', all human, physical and financial capital developed primarily for the natural resources sector should be used to leverage growth in other sectors, to create further jobs and wealth.

The increased pace of learning by doing, enabled by skills and technology transfers and augmented by, inter alia, amortised capital, lowers the overall costs of production in the relevant sectors, and the country is now in a position to 'keep up': it can consolidate its development and anchor itself in the relevant global commodity value chains. For example, hotel industry investments to meet demand from the oil and gas sector could make the tourism sector more competitive, or an agricultural sector with cheaper fertiliser inputs could be more productive and competitive (see Box 2).

Economic diversification also translates into additional revenue, which should be invested in R&D to leverage the new skills sets, goods and services needed to develop new technologies, such as new mining methods, that improve efficiency and reduce costs. Continuous improvements through research and innovation should be promoted, as the country continues to 'look up' to identify the next growth-accelerating jump that may take the economy to the next aspirational level, such as from 'middle-income' to 'high-income' status.

Strengthening linkages between the natural resources sector and the rest of the economy should focus on sectors that can achieve competitiveness in global markets and enable cost-effective import substitution domestically. Many countries implement domestic supply obligations, prescribing levels of utilisation of the country's resources for further beneficiation and industrial diversification by using the refined raw materials in value-adding downstream activities, such as transforming natural gas into liquid fuels. However, this can be financially viable only if an adequate market for the transformed products exists. This presents a considerable challenge for many low-income countries, where both local and regional demand are often limited. Box 2 describes the challenges faced by Tanzania with regard to the implementation of a downstream beneficiation option.

Box 2: Downstream beneficiation in Tanzania

Tanzania is currently assessing various options for the downstream beneficiation of its gas resources, as it has a domestic supply obligation requiring producers to allocate at least 5 per cent of the gas for domestic use. Given Tanzania's extensive agricultural sector and low levels of fertiliser coverage (World Bank 2015),³ one option could be constructing a petrochemicals plant to produce ammonia from the gas and then convert it to urea – the nitrogen source for manufacturing fertiliser, in combination with phosphates and/or potassium.

However, to compete with the cost of imported fertiliser, such a plant would have to produce enough urea to make five times as much as the total Tanzanian demand for fertiliser (IFDC 2012).⁴ Only the identification of viable export markets would make the option worthwhile. The cost of such a plant – around US\$1.5 billion – would most likely have to be met by private sector investors, who would want protectionist measures on imported fertilisers. Although allowed by World Trade Organisation (WTO rules), this would still be a risky move.⁵

³ Tanzania's fertiliser usage is second lowest only to Uganda, and it was the only country in the East African Community that showed a decline in usage between 2010 and 2015 (World Bank 2015).

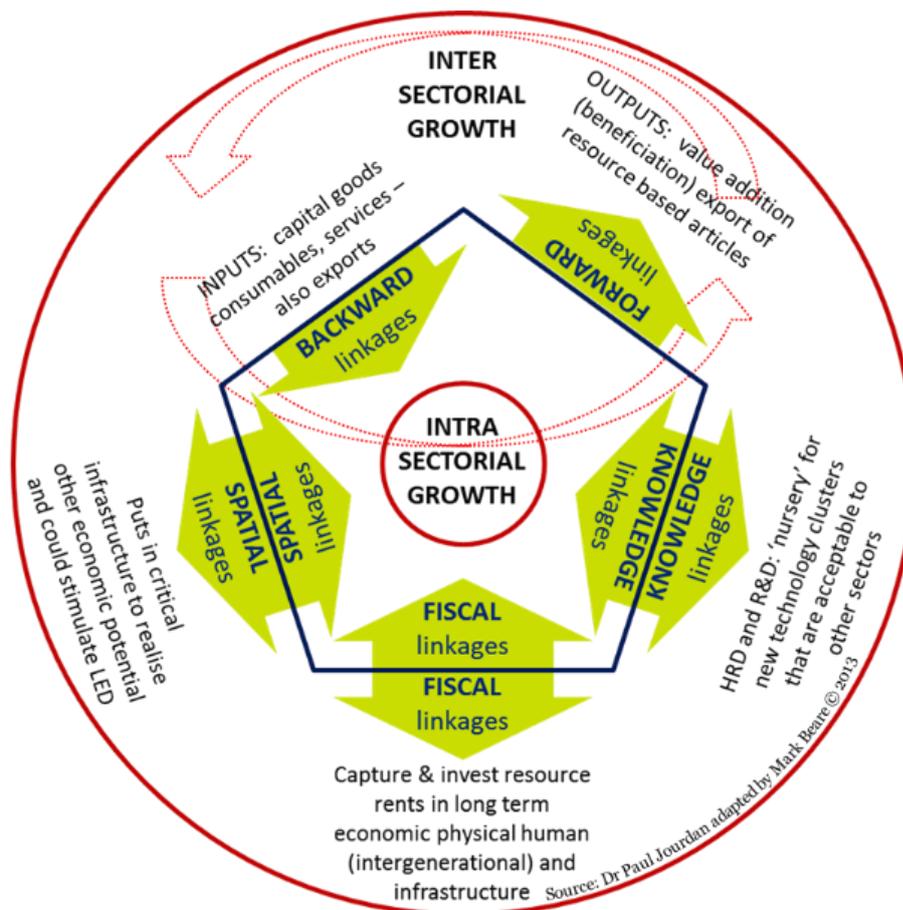
⁴ A standard gas-to-ammonia-urea plant produces about 2 200 tonnes of ammonia per day, and if the ammonia supply and urea production are optimised, this converts into 3 500 tonnes of urea per day (i.e. 1.3 million tonnes of urea per annum (SPE 2015). In comparison, Tanzania's annual demand for fertiliser (converted to urea demand) is approximately 263 000 tonnes at current productivity (IFDC 2012).

⁵ Under WTO rules, protection may be granted on the grounds of market imperfections and dynamic external economies of scale; however, it must be clear that, at a certain point, domestic producers are required to compete. Protection may be considered subject to two primary conditions: a timetable for the reduction and eventual elimination of restrictions should be spelled out in advance, so as to motivate firms to catch up in terms of productivity and competitiveness; and if firms fail because they cannot compete when protection is relaxed, they should be allowed to go out of business.

3. Strengthening resources sector linkages with the rest of the economy

Governments can be seen as the custodians of natural resource wealth. It is their responsibility to develop approaches to maximise linkages with the rest of the economy, so as to reap the rewards of well-managed resource extraction. Figure 33 depicts typical linkages that can be leveraged.

Figure 3: Natural resource extraction linkages



Source: Adapted from Jourdan (2012)

Relevant stakeholders need to leverage the full range of available linkages throughout the economy in a manner that is closely integrated with the broader national effort to achieve sustainable economic development.⁶ This implies active roles for both the government and the private sector. Figure 3 identifies five key linkages to be addressed:

- fiscal linkages – capture and strategic use of resource rents;
- spatial linkages – critical infrastructure to enable resource extraction;
- backward linkages – development of suppliers to the resources sector;
- forward linkages – resource utilisation for further value addition (e.g. beneficiation); and

⁶ Arguably, if these linkages cannot be made, there may be a case for preserving resource rents for future generations by leaving the natural resources unexploited.

- knowledge linkages – sector skills development and technological innovation.

These linkages reinforce each other through several interdependencies – for example, fiscal spend is necessary to help promote the other four, while improved knowledge helps develop backward and forward linkages. For the sake of clarity, the linkages are considered separately below.

3.1 Fiscal linkages: robust and predictable fiscal regime to capture resource rents

Fiscal linkages are the channels through which resource rents flow from the extractives industry to provide governments with cash. In addition to income taxes and other more common fiscal tax instruments, the revenue accruing can be enhanced through such instruments as resource rent taxes (RRTs)⁷ or production and profit shares from production-sharing contracts (PSCs). The next challenge is to determine how best to use the revenue, whether for saving for future generations (e.g. via sovereign wealth funds or national pension schemes), smoothing volatility (e.g. via stabilisation funds), or current spending (with decisions needing to be made about how to allocate this spending among various competing uses).

The magnitude and characteristics of possible fiscal linkages depend on choices made about the extent and quality of the resource (the technical assessment from the exploration), how the revenue is to be acquired (the fiscal regime governing the production), and how the new revenue is to be managed (in particular, how and when the revenue is to be spent. These choices are explored further in the Extractives Dialogue keynote paper.⁸

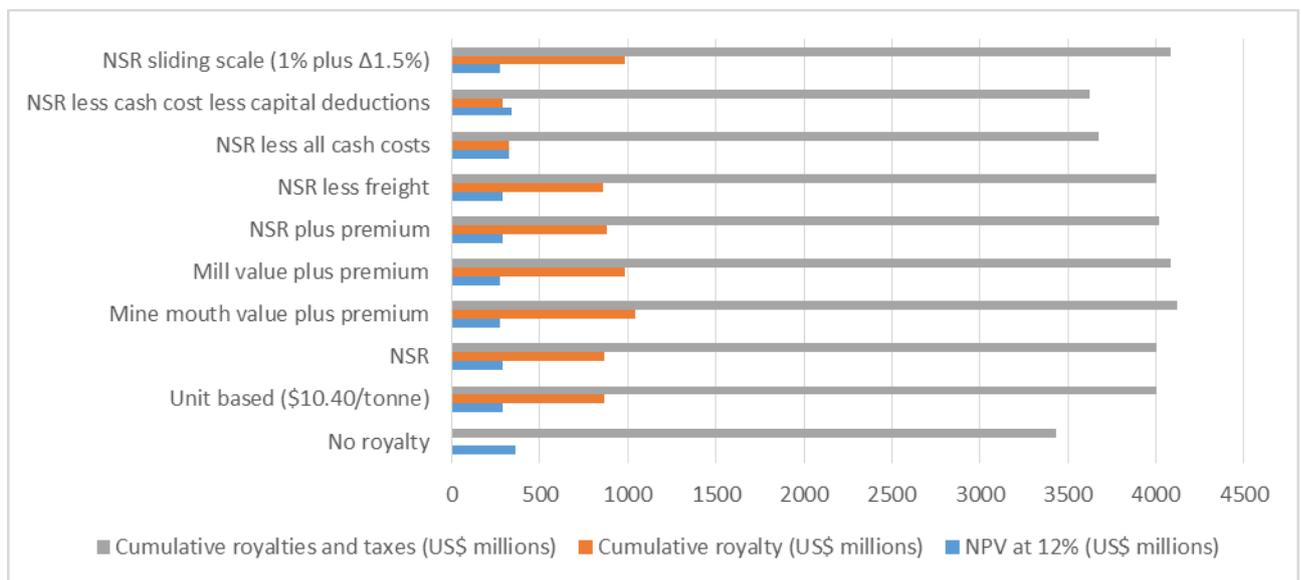
In the context of the extractives sector, the term ‘fiscal regime’ refers to the set of laws, regulations and/or individual agreements that determine the primary fiscal benefits that will accrue to the government from the exploitation of resources. It has been shown that the design and structure of the fiscal regime can crucially affect the type and pace of economic development that a country may be able to achieve. For example, Otto et al. (2006) assess the impact of nine different royalty schemes on three different mineral commodities, demonstrating that the choice between different types of royalty can have a dramatic impact on the return of a project, the risk-sharing between the investor and the government and, therefore, the revenue stream that the government receives (see Figure).

⁷ In principle, the RRT relies on the strategic premise that the investor would not walk away from a world-class resource deposit so long as it is able to recover all its costs and earn a rate of return sufficient to justify having made the investment. The principle underlying RRT is to tax only the rent and leave alone the return required by the investor to undertake an investment. This should not, in principle, distort investment decisions, in so far as it should not alter the pre-tax merits of the investment. Thus, RRT is a neutral tax with the objective of capturing rent while leaving to the investor at least the minimum required return on investment; it is, however, far easier to state this objective than it is to design taxes that can achieve such an end. From a PFM risk perspective, RRT is procyclical, which is to say that it tends not only to replicate cycles in economic circumstances but to amplify the revenue effects of this, leading to even higher degrees of volatility than would otherwise be the case. Experience would appear to show that ‘pure’ RRT may impose an unacceptable level of fiscal risk on the host country. In practice, RRT has always been imposed together with other taxes to offset these disadvantages. Thus, in a typical royalty/tax regime, RRT is combined with royalty and corporation tax, either as a final tax or as a supplementary levy on pre-tax income, payment of which would be deductible for corporation tax purposes. The effect is that the government receives some revenue before the project reaches the point at which RRT is imposed. Volatile revenue must be suitably managed by the government and is dealt with in Section 5 of the keynote paper.

⁸ The keynote paper, ‘Revenue Management in the Extractives Sector’ provides a platform on which discussion can be built at the Dialogue. It is referred to here simply as the ‘keynote paper’.

Given the obvious impact that the choice of fiscal regime has on the subsequent management of revenue, this section briefly considers the main aspects of the design and structure of such regimes. Figure outlines how the different royalty regimes provide different returns to the investor, as represented by the net present value (NPV) (further detail is provided in Annex 1). The figure shows cumulative royalties separately from the cumulative value of royalties plus taxes. In the case of the net smelter return (NSR) approach, for example, the royalties are low, the cumulative government revenue is significant but the NPV is better than for most other options, indicating increased attractiveness to the investor. By way of contrast, the ‘mine mouth value plus premium’ produces the greatest royalty and tax take, but produces the worst returns for the investor and might deter the investor in a more risky environment – for example where the regulatory framework is vague and ambiguous, resulting in greater uncertainty.

Figure 4: Impact of fiscal regimes on an indicative Bauxite mine



Source: (Otto et al. 2006)

The various fiscal regimes are also affected by the channel selected for the government revenue – taxes, royalties or PSAs. See Annex 2 for a brief look at the difference between the hard-mineral mining and oil and gas regimes.

Beyond issues related to the capture of resource revenue, intergenerational equity and macroeconomic matters, there is the issue of how to allocate or spend the revenue in a manner that best strengthens linkages with developmental outcomes for both current and future generations, such as:

- capital expenditure for economic development (e.g. infrastructure funds related to the spatial linkages depicted in Figure 3);
- rebates as incentives to promote other policy objectives such as local content/supplier development (backward linkages in Figure 3); and
- rebates for value added by domestic utilisation of natural resources (forward linkages in Figure 3).

The challenges of capturing and spending rents wisely result from the significance of the revenue streams that flow from resource projects. In more democratic countries, these tend to be closely

monitored by the media and civil society organisations. Both investors and governments can realise high windfall returns on extractives investments, generally due to the resource rents (both differential⁹ and scarcity rents¹⁰) embodied in the resource. These rents relate to the value of the resource to the nation, and come under intense scrutiny when their benefits are not realised. Issues relating to transparency and accountability are covered in Section 4.6 of the keynote paper.

3.2 Spatial linkages: stimulating local economic development

Extractives companies invariably rely on considerable investments in infrastructure to meet their commercial needs. Typically, governments are required to contribute significant funding towards some components of the required infrastructure (for e.g. roads, ports or pipelines), though there is frequently ambiguity about the responsibilities of companies and the government. With careful planning and active partnering between the government and others, broader benefits can accrue from this process: for example, improved efficiency, whereby new or upgraded infrastructure lowers transaction costs and removes bottlenecks, stimulating growth. This type of ‘externalised’ benefit is likely to arise if the investments made by companies are designed to take into account the needs of all potential users, not just the extractives companies. Governments can help in this process either through persuasion or by committing some of their own funds to support the corporate spending. The Tenke Fungurume Mine (TFM), Katanga province, DRC, is a good illustration of the potential here (see Box 3).

⁹ Differential rent arises because of differences in the quality of a resource (e.g. production sites). Consider two companies that extract coal of identical quality. The market price of coal is \$50/t. Company X operates at a production site where it is very easy to extract coal. Its costs (including normal returns) amount to \$20/t. Company Y operates at a site where it is relatively difficult to extract coal. Its costs (including normal returns) amount to \$30/t. Company X will ‘create’ more resource rent because of the more accessible resource.

¹⁰ Scarcity rent is defined as the marginal opportunity cost imposed on future generations by extracting one more unit of a resource today. Alternatively, it is the cost of ‘using up’ a finite resource, because benefits of the extracted resource would have been available to future generations had they not been extracted.

Box 3: Shared value at Tenke Fungurume Mine (TFM), Katanga province, DRC

Apart from the macroeconomic impacts (see Table), the most important consequence of the TFM project is the substantial improvement in infrastructure, which has contributed to increased trade and economic activity. While a regional highway (Lubumbashi to Kolwezi) predated the mine, it had not been maintained for years and was of little benefit to the local population: it took at least a day to drive the 200 km from Lubumbashi to Fungurume with a 4x4 vehicle. TFM financed the renovation of a large portion of this road, closest to the concession, cutting the driving time to about four hours. As a result, access to commercial and public services has improved considerably for the inhabitants of the concession area. Similarly, while TFM's investment in a hydro power station (N'Seke) provides TFM with power, it has also brought electricity to other users.

Activity generated directly and indirectly by TFM led to significant inward migration to the city of Fungurume and, to address the growing needs in infrastructure and urban planning, TFM sponsored a series of urban planning studies. The city grew from 40 000 people in 2006 (when mine construction began) to more than 120 000 in 2013. TFM financed an urban development management plan (consisting of a zoning plan for land use based on forecasts of urban expansion by 2025) and an integrated development programme (to upgrade social and physical infrastructure) so as to prepare the urban area for expected population growth. The first project implemented under the Fungurume/Tenke Integrated Development Plan was a US\$650 000 road rehabilitation and drainage project, financed through the TFM Social Community Fund, which is funded by a 0.3 per cent contribution of TFM net sales. Beyond health and education projects, the fund was also used to rehabilitate agriculture access roads, which improved market linkages. These projects contributed to both commercial activity and the economic well-being of the population located in the concession area, with many new types of business being established in recent years.

Possibly the most important piece of new commercial infrastructure was the new market building financed by TFM, which provides consumers with a wider choice of products and local farmers with a ready outlet for their produce. By reducing transaction costs, it has also fostered trade and generated broader tax revenue.

Table 2: Macroeconomic impacts from the TFM in the DRC

Macroeconomic indicator	Economic impact
Gross domestic product (GDP)	TFM's activities contributed around 4 per cent, or US\$555 million, of the DRC's GDP in 2011
Gross national income (GNI)	GNI contribution was estimated at US\$373 million, or 2.9 per cent of the country's total GNI in 2011.
Fiscal contributions (taxes, royalties etc.)	TFM's fiscal contribution represented around 3 per cent of the DRC's total fiscal intake in 2011.
Exports	TFM's production of copper and cobalt represented around 26 per cent of the total DRC exports in 2010.

Employment (direct and indirect)	TFM accounts for 5 per cent of all formal employment in the DRC's private sector, equivalent to nearly 18 000 jobs in 2011.
<i>Source: Chadwick (2012); Tenke Fungurume Mining (2013a, 2013b)</i>	

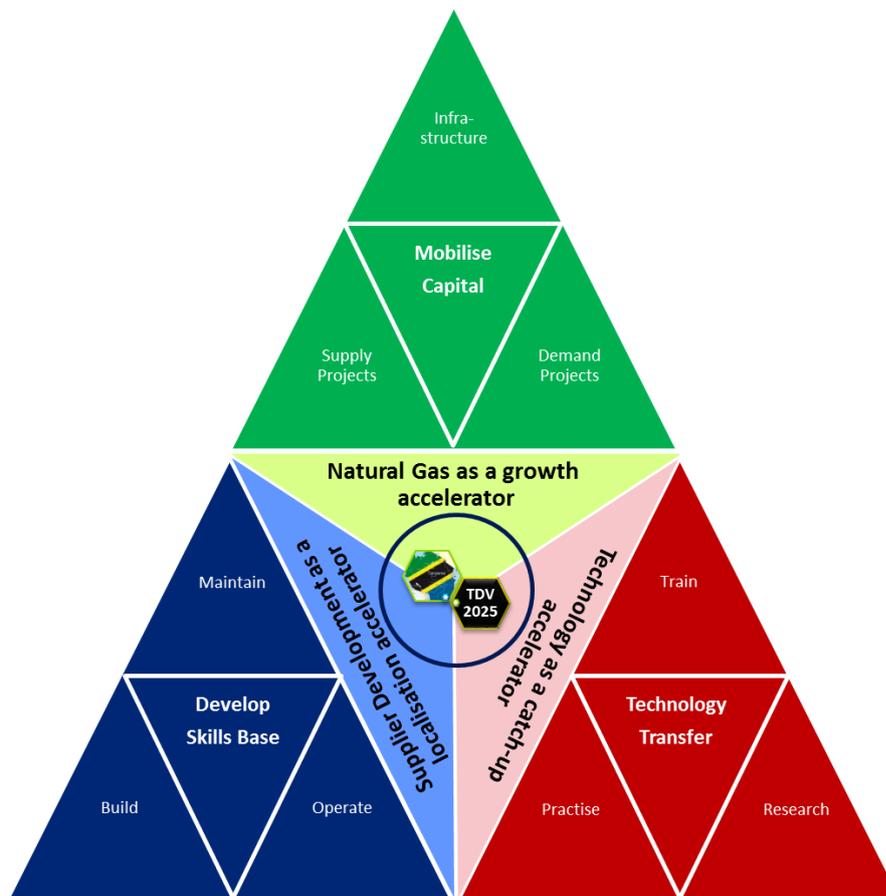
A further, more ambitious, example is that of regional development schemes (or ‘corridors’) where extractive activities are seen as a possible catalyst to support broader types of regional development. Notwithstanding the potential for promoting externalised social benefits from such extractives projects, it is important that any investment in new infrastructure linked to extractives is undertaken on the basis of a regulatory framework that clearly defines the obligations and rights of all involved parties, especially where there are concerns about a natural monopoly. The role of the regulatory framework is to provide an enabling environment that will leverage the envisaged benefits of the infrastructure investment and explain the rationale for its promotion in the first place. For example, if investment in a road is justified by its social benefit, but the investor intends to implement user tariffs that the local population cannot afford, the regulatory framework could stipulate mandatory toll-free third party access to maximise the social benefit obtained.

3.3 Backward linkages: developing local content and suppliers

Local content and supplier development (LC/SD) issues have become hot topics in many extractive countries and in the donor community. However, there is no straightforward consensus about the best way to maximise the local value added that can potentially be built on large injections of foreign direct investment (FDI) in extractives. In many cases, there is overreliance on ‘cookie-cutter’ advice, in which elements of established policy frameworks from one country are simply ‘cut and pasted’ to another. LC/SD outcomes are not achieved quickly, especially where the operating environment has a weak or limited industrial base, where skills and technical capacity are not well aligned to the needs of a changing industrial sector, and where the business-enabling environment is not yet fully investor friendly. While early progress is possible at the lower end of a supply chain, opportunities for greater economic value and more advanced technologies take time to develop. This paper, therefore, does not attempt to deliver a defining treatise on local content/supplier development; instead, it points to some of the key linkages and how they intersect with the fiscal regime.

The success or failure of an LC/SD strategy or programme depends on both the political will of the government to implement it and the willingness of the private sector (international and local) to engage with it. Equally important is the capacity of the local economy to meet the demand for goods, services and labour, in both quantity and quality. Despite these strategic challenges, it is broadly accepted that procuring from local SMEs and employing locally can bring significant social and economic benefits to communities, while the extractive companies can reap the benefits of gaining a ‘social licence’ to operate in a particular area. Incorporation of local content commitments by investors can generate business opportunities for suppliers, while local procurement can stimulate economic activity. Expanding economic activity, in turn, may attract further investment as suppliers trade with each other, and through the multiplier effects of local employees spending some or all of their wages in their communities.

Figure 5: Skills development as a critical accelerator in Tanzania



Box 4: Critical development accelerators in Tanzania

In the Tanzanian example (see Figure 5), three key policy areas were regarded as critical to the initiation of gas projects and the leveraging of their long-term benefits at a national, regional and local levels:

- *green triangle – mobilising capital* as a growth accelerator to invest in supplier development and enable suppliers to win contracts from the gas companies building the liquefaction plant, as well as later maintenance contracts;
- *blue triangle – mobilising skills development* as a localisation accelerator, which is part of a broader LC/SD strategy, and enabling higher levels of employment as direct and immediate benefits of the anticipated FDI; and
- *red triangle – mobilising innovation and research* as a ‘catch-up’ accelerator to enable firms and workers that leveraged the first two benefits to develop new goods and services, which is necessary to build a competitive Tanzanian industrial base in the future.

Figure 5 and Box 4 outline how the three policy areas interrelate to deliver on the Tanzanian 2025 Development Vision. The rationale is that natural gas is the growth accelerator from which human resource and knowledge linkages should be leveraged. The blue triangle locates the skills development accelerator in the broader framework, showing the systemic nature of leveraging human capital development and R&D opportunities from the primary gas project.

With this end in mind – and encouraged by the success of, for example, the Norwegian local content policy framework¹¹ and the Anglo Zimele Development and Empowerment Initiative in South Africa – various governments have endorsed local content policies. Contemporary local content policies in extractives activities vary in the scope, level and type of regulation applied. In some cases, they are designed for, and targeted at, groups that are clearly identified in spatial, industrial or social terms. In other cases, they are part of a strategy to fundamentally transform the local economy. The level of complexity and uncertainty attached to different interventions varies with three main factors: the number of actors expected to benefit from the intervention; the initial state of the local economy relative to expected outcomes; and the alignment of local content interventions with other industrial and developmental policy interventions. In addition to these uncertainties, there is often ambiguity over commitment by the government to fund ‘its share’ of the development cost that may be involved, such as investment in training and related institutions, incentivising on-the-job training and promoting in-service training programmes that develop the skill sets required by companies supplying the expanding extractives sector.

Training and skills enhancement programmes are fairly common in both the mining and the oil and gas sectors. Among other things, they are a good way of upskilling where basic skills exist but are not up to the standard required by the firms investing (e.g. different grades of welders). An important opportunity for many countries lies in the emergence of partnerships between industry, governments, support institutions and development agencies to establish supplier linkage programmes that can:

- enable SMEs to access financing and skills development programmes;
- provide technical mentoring; and
- support the development of business management skills (Deloitte 2004; Jenkins et al. 2007; Nelson 2007).

Although possibly focused on skills development, such programmes play an important part in reaching the bigger objective of developing increased local content. Linkage programmes may focus heavily on institutional strengthening activities to encourage an enabling environment for SME development by providing them with access to legal, business and financial systems, thereby reducing the preparedness gap. Investments in the enabling environment are increasingly being made through public-private partnerships (PPPs), such as training centres and technical institutes. These linkage programmes are often developed in partnership between the government and other stakeholders. This is where the interface with the fiscal regime is most likely to be encountered, as the resources to fund such programmes (or at least the government’s share) might come from extractives-derived taxes and royalties or earmarked payroll levies.

¹¹ In 1965, the Norwegian Petroleum Law was enacted and in 1972, Article 54 of the Royal Decree of 1972 enshrined the local content law and stipulated that the government should vigorously pursue the goal of ensuring that Norwegian goods and services be given preference in the running of the oil and gas industry, provided they were competitive in terms of price, quality, schedule and service.

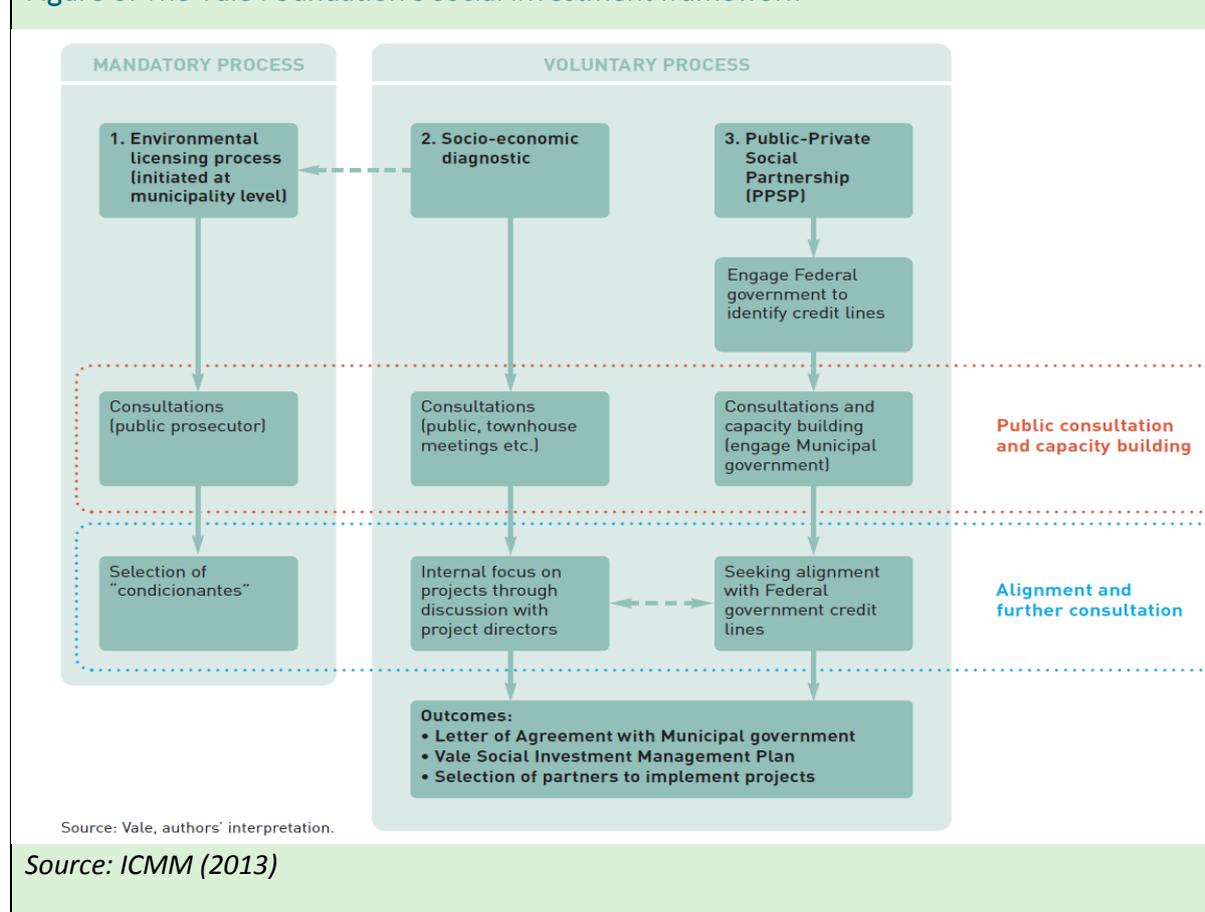
Box 5: Local content and multiplier effect in Brazil

Brazil's environmental licensing process requires the establishment of social obligations, *condicionantes*, which are determined after an extensive consultation processes between the mining company, communities and other stakeholders. These obligations reflect partly the *de jure* obligations of the firm, but also voluntarily accepted commitments – including a range of support to local government and communities – which form a *de facto* social license to operate. The social investment framework of the major Brazilian mining company Vale (see Figure 6) illustrates the widespread consultation activities leading to a consensus on the work required and a definition of the roles and responsibilities of the different actors.

The inclusion of local employment and procurement targets in these social obligations has created substantial linkages between the mining sector and the rest of the local economy. For example, the mining sector's procurement from the underdeveloped Pará State increased dramatically from R\$379 million in 2001 to R\$4 161 million in 2010. Many indirect jobs have been created as a result of the procurement needs of the mining companies and their local suppliers.

Furthermore, spending by local employees of the mine and its suppliers creates a demand for goods and services that generates further induced employment. This 'wage linkage' is significant due to the high share of employees sourced from local communities and the fact that employees of mining companies are typically paid three times more than unskilled workers in the informal sector. An analysis of the indirect and induced impacts for Southeast Pará indicates that for every R\$1 in output generated by the mine, an additional R\$1.3 of income is generated in the rest of Southeast Pará (i.e. a multiplier of 2.3). The induced employment multipliers are expected to be three or four times larger than this.

Figure 6: The Vale Foundation’s social investment framework



3.4 Forward linkages: raw materials for further downstream value addition

Increasingly, governments are seeking to leverage investment in downstream beneficiation of natural resources, through to conversion to intermediates and the production of finished goods, in order to increase value addition. If successful, this will increase further the revenue flows to the government and help to retain more of the wealth created in the country. From an industrial development perspective, the strengthening of forward linkages achieves both growth and developmental objectives, such as job creation and technology transfer, and provides security of demand for upstream investors who need to achieve economies of scale to maximise the efficiency of their own operations.

One option is simply to obligate investors to beneficiate raw materials as part of their extraction licenses. This has often been attempted in relation to mining, but has had a poor success rate: it often constitutes a disincentive, as most extractives upstream players are not forward-integrated beyond basic refining. The situation is somewhat different in the oil and gas sector, where vertical integration is fairly common. Even there, however, global players are increasingly divesting downstream assets in markets where scale and competition are

making operations unprofitable or, at least, causing them to fall short of the required rates of return.¹²

It may be more successful to incentivise investors, through fiscal instruments, to support downstream beneficiation even if they do not invest themselves. This may be more attractive to both upstream and downstream players, as their commercial conditions are often different (e.g. in the cost of capital, risks and labour costs). A portion of any mining RRT (discussed in section 0 above) could be used to incentivise investors to beneficiate raw material such as iron ore into a domestic steel industry that allows rebates against the RRT for value added downstream (e.g. a RRT value-added offset) – assuming a formula would be derived to manage this as part of the regulatory framework. A simple formula that rewards local value addition (e.g. steel and downstream steel manufacturing from domestic iron raw materials) by reducing the RRT rate could be formulated to encourage the miners to facilitate downstream beneficiation.

This could be achieved through incentives to potential beneficiation projects, leveraged by the use of affordable domestically procured raw materials. For example, resource rents could be capitalised in an industrial development fund to facilitate PPPs in the downstream industry. To make domestically produced raw materials more affordable, producers (e.g. iron ore miners) could be encouraged to discount the raw material price through a reduction of the RRT rate for every unit sold to ‘external customers’ to create added value in the raw material conversion sector.¹³ Such fiscal incentives are complex to set up and must be grounded on thorough evidence, rigorous application, effective monitoring and severe censure in proven cases of abuse, to minimise the potential for unintended consequences. While, theoretically, any tax could be used to fund the rebates, linking downstream rebates with the specific tax (such as the RRT) both provides political visibility to the measures and incentivises upstream players to support downstream programmes, even if they are not invested in the downstream.

Two aspects, in particular, need to be considered by the legislating authority: the systems are often complex and costly to administer; and any proposal to use a RRT for such purposes reduces the revenue stream to the fiscal authorities and, consequently, also the resources available for allocation to other priorities.

3.5 Knowledge linkages: human resources development and technological innovation

Knowledge and know-how are crucial to the full realisation of the benefits of extractive industries. This applies in both the corporate sector, where various technical skills are inadequate and need to be improved, and the government sector, where the skills base for appropriately analysing and regulating the industry (and, for example, managing the macroeconomic challenges) is invariably weak, in African and other low- and middle-income

¹² Large players such as Shell, British Petroleum and Chevron have divested of downstream operations across most regions of sub-Saharan Africa and are focusing on their upstream assets where astute cost and risk management deliver higher returns on investment.

¹³ Sales to companies within the same group or owned by the same investors, as typically the extraction is ring-fenced into one company and the refining is ring-fenced into another and raw materials are ‘sold’ between companies, while they are, in fact, internal customers of the same integrated business.

countries. In the absence of deep knowledge and skills, many developing countries delegate the responsibility to the foreign investors, and invite them to develop projects, some of which may have only limited linkages to the rest of the economy – thereby allowing them to operate as enclave economies.

Developing knowledge linkages in the extractives sector is difficult. Increasingly, observers point to foreign firms' failure to train and employ local labour, evasion of local participation, inadequate support to local business, and refusal to transfer technology and skills as severe constraints to harnessing developmental outcomes from large FDI projects. For example, China's growing presence in Africa is characterised by 'vertically integrated' investments, whereby each component of the investment, from design to funding through to implementation and commissioning and, in some cases, operation are tendered exclusively to Chinese firms. In many instances, inputs originate from overseas, with little or no local content, limited local employment and minimal, if any, local supplier development.

These observations are countered by private investors who argue that identifying appropriate African sources and partners is difficult and that, ultimately, project completion and quality could be compromised if they are compelled to use local workers (Shelton & Kabemba 2012). Herein lies the problem: while one can argue that foreign investors across Africa underinvest in the localisation of their projects, the government and private sector in African countries often lack a coherent and adequately funded plan to improve the quality and availability of skills, goods and services. Furthermore, few or no resources are allocated to address the problem, and knowledge linkage programmes are frequently funded only by donors.

In Tanzania, a recent industrial development study clearly articulated the need for strengthening knowledge linkages, recognising the role of technology as a catch-up accelerator for economic and developmental growth (see bottom right triangle in Figure 5). However, many governments are slow to foster these linkages, as they are often less visible than more politically tangible outcomes, such as increased employment and better healthcare.

Technology, innovation and R&D are essential elements on any industrial growth agenda; otherwise, industrialisation will depend on the importation of critical inputs. Secondary industries need to arise in parallel with the growth of the extractives industry, to service upstream and downstream demands. The challenge, however, is that much of the technology required and the innovations and inventions that promote increasing efficiency and scale are derived from the laboratories of developed countries, and investors typically import the necessary technology and equipment to developing markets. In order to strengthen knowledge linkages, a dedicated technology and skills transfer agenda is required, which both transfers the skills required to use technology and leverages the transfer of technology to the host countries.

In countries such as Malaysia and Brazil, firms are required to spend a percentage of turnover on domestically based R&D and applied innovation – often in conjunction with local universities and technology institutes. This approach is designed to establish a home-grown R&D base that builds local capacity to receive new technology. The improved capability to use and disseminate technologies promotes the penetration of new technology in the domestic

market, as increased numbers of operators and scientists become familiar with it and promote its uptake.

While it may be useful to analyse technological development and human resource development separately, in reality they are often inseparable as increased availability of one often stimulates the development of the other. Consequently, alongside a technology development agenda, governments need to have a skills development strategy that identifies skills gaps and promotes upskilling and training to fill the gaps and provide labour for the extractives sector to grow. In many countries with undeveloped or developing extractives sectors, there is a dearth of engineers and related technicians, so investors often import labour to install, operate and maintain equipment. As it is simply not economic to develop some scarce skills locally, due to insufficient continuous work to absorb them into the labour market, it may remain necessary to import some of these skills; however, many engineers and technicians can be trained and subsequently sourced locally. An example of the challenge related to the shortage of skilled labour, from the South African downstream plastics sector, is outlined in Box 6.

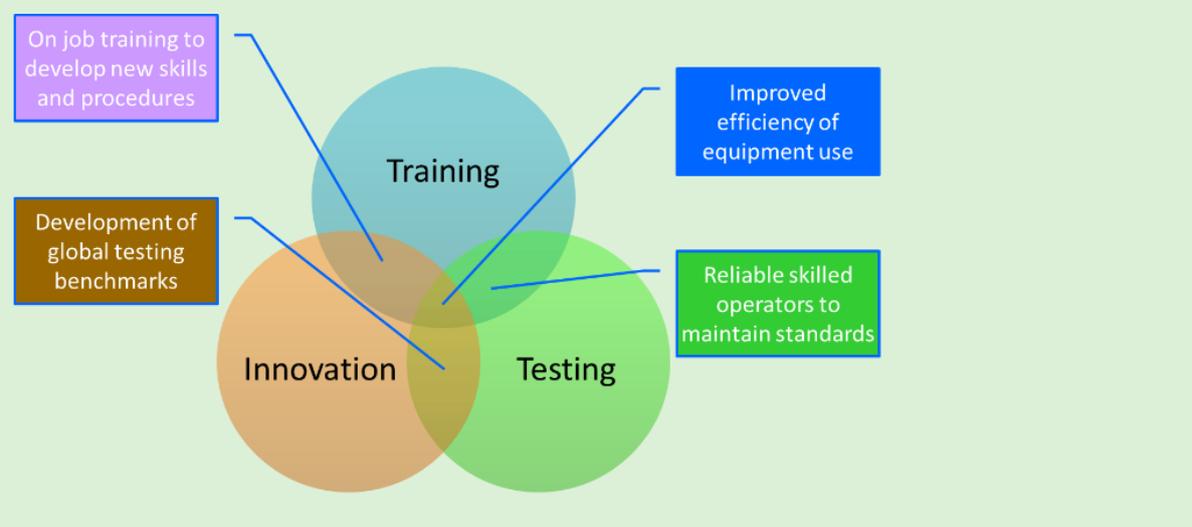
Box 6: The downstream plastics industry in South Africa

In South Africa, the downstream plastics industry is faced with the double dilemma of overpriced polymer feedstocks,¹⁴ which is being addressed by regulation, and a critical skills shortage that is hampering growth in the sector (as the cost of importing labour makes local firms uncompetitive) and technology transfer/penetration.

A recent study recommended that the South Africa Plastics Sector Growth Plan (PSGP) considers critical elements such as standards monitoring and verification, innovation and development, and skills development and training. One focus of the intervention is to address the structural problem in the industry of poor training and weak skills undermining the efficiency of the sector and, therefore, reducing its competitiveness against imports. Efforts are underway to set up a training and innovation centre (see the mandate depicted in Figure 7). Plastics SA, the recognised industry association, believes that such a centre should also address training of artisans, testing of products to meet stringent specifications, and R&D to stimulate innovation in the plastics sector. From a public sector finance management perspective, the study recommended that revenue leveraged from adjustment to the upstream fiscal regime (which included the imposition of RRTs and other imposts) be allocated to support the centre.

The study also recommended that the PSGP play a role in co-ordinating deeper knowledge linkages, which could exploit synergies across primary research, innovation and development, along with promoting ‘learn by doing’ skills and expertise. The report suggested that PSGP should initiate and co-ordinate interventions such as state involvement in establishing combined R&D and human resource development facilities, where skills and technology improvements could be rolled out, along with technology incubation to crowd in investors and leverage South Africa’s first-mover advantages with technological breakthroughs.

Figure 7: Plastics Industry Skills Development and Innovation Centre



Source: Author’s interpretation from interviews with Plastics SA

¹⁴ At the recent Competition Tribunal polymer pricing hearings, all downstream polymer producers and plastics converters indicated that the high cost of polymers in South Africa constrains investment in the downstream and subsequent sectoral growth and employment creation opportunities. Recent Competition Tribunal settlements point to excessive or monopoly feedstock and intermediate prices being a continual issue, especially with regard to Sasol’s role in the market. We here refer to the polymer pricing hearings before the Competition

4. Conclusion

This background paper describes some aspects of the actual and potential linkages of extractive industries with the rest of the economy. In doing so, it also provides the context for understanding how resource-rich countries might best acquire and deploy their resource revenue and other policy instruments or interventions to leverage growth and development. There is no attempt here to be prescriptive about the specific objectives and methods that the authorities might adopt. Rather, there is merely an underlying premise that the effective management of a country's extractive wealth involves longer-term planning agendas that go well beyond the immediate fiscal task of revenue budgeting.

The background paper elucidates and explains, where appropriate, the various ways to link the extractives sector to the rest of the economy. While these linkages are not discrete or concrete channels, they help to explain how the various sectors in the economy can supplement each other to produce benefits beyond the direct impacts expected from the extractives sector. The five linkages discussed in Section 3 are interrelated, and it is good policy practice to identify which line ministry is accountable and should lead the interventions to strengthen a particular linkage, despite the possibility of facilitation and cross-cutting support from other ministries.

As the CABRI dialogue is centred on issues related to revenue management and associated PFM matters, the fiscal linkage is emphasised in conclusion. Commonly, the finance ministry is accountable for the strengthening of the fiscal linkages and, consequently, promotes policies that capture resource rents (e.g. via an RRT), while managing the resource revenue in a manner that enables adequate spending on education and training to support skills and technology transfers. Good revenue management is necessary to maximise the impact of the fiscal linkage, and is the specific focus of the keynote paper. With regard to the fiscal linkages, two elements bridge the gap between extraction and monetisation of the resource: the fiscal regime and its related governance framework.

A robust policy and legislative framework that provides regulatory certainty for a reasonable and predictable fiscal regime should create the foundation for attracting extractives investments that leverage accelerated growth and development. Whatever specific efforts are made to develop and strengthen the linkages between the extractive sector and the rest of the economy, good governance is generally regarded as the *sine qua non* for these linkages to become effective, and this hinges on 'optimum contractual terms, revenue transparency, institution-building, use of stabilisation funds and local capacity-building to service, and benefit from, the sector' (Stevens et al. 2015).

The issues of governance are multiple and interlinked, cutting across the sectors, and the major and often underestimated challenge is co-ordinating good governance. Co-ordination relates to both government and non-government entities – different government ministries and regulatory bodies need to co-ordinate their governance efforts, as do organisations involved in promoting and funding good governance. In most resource-rich countries, sector ministries develop and implement policy for managing resources and the related extractives industries (which often involves the sector regulators),

Tribunal, April 2012 (Case No: 2007Nov3338) and the Competition Tribunal hearing into the Sasol polymers excessive pricing, June 2013 (Case No: 48/CR/Aug10).

while the finance ministry is responsible for the fiscal regime, resource revenue management and related national budgeting. Many governments have planning ministries that have direct access to the president or similar executive level, and which often work closely with the finance ministry to align the national development strategy and sectoral strategic plans with the budgeting framework.

In addition to the inherent challenge of co-ordinating policy and regulations that faces the responsible government agencies, co-ordinating good governance is further complicated by the imperatives of investors as they consider upstream, midstream and industrial scale downstream investments.¹⁵ As these are often multi-billion dollar investments, all with long life cycles, and considered in the context of unpredictable commodity cycles and asset fixity,¹⁶ investors look for regulatory and related governance frameworks to reduce uncertainty and project risk. This anxiety of investors relates to the other element of the bridge between the extractives sector and the rest of the economy: a predictable fiscal regime. The design and structure of the fiscal regime has been shown to crucially affect the type and pace of economic development that a country may be able to achieve (Otto et al. 2006). There are also commonly big differences in the designs of fiscal regimes required by mining countries and by oil and gas countries.

It is in this context that the background paper is provided as a complement to the keynote paper on revenue management in the extractives sector, which will be the central focus of the forthcoming CABRI Dialogue workshop. The keynote paper shows that once resource extraction investments start producing unencumbered revenue, even with abundant resources and efficient extraction, a weak fiscal regime and poor revenue management can undermine the best intentioned development agenda in different ways. It is hoped that this additional background paper on extractives linkages provides a broad overview of how the revenue produced is impacted by choices, decisions and interventions elsewhere in the economy and how these can then best be harnessed to maximise the benefit of the extractives industries now and in the future.

¹⁵ 'Upstream' generally refers to primary production such as iron ore or crude oil, while 'midstream' generally refers to refining operations such as turning oil into basic fuel components or concentrating iron ore into feedstock for steel mills. 'Downstream' generally refers to beneficiation or conversion to usable forms such as manufacturing intermediates such as rolled steel for reforming into steel construction products like roofing sheets.

¹⁶ The asset fixity principle infers that an asset becomes more specific to a particular use or user as the cost of transferring the asset to alternative uses increases. This cost may reflect technical characteristics of the asset itself, the spatial dispersion of production, or poorly functioning factor markets. As an asset becomes more specific, its resale or salvage value diverges from its acquisition value. In other words, once a liquefied natural gas (LNG) plant is built it is not easy to relocate or substitute its use – for example, an LNG plant cannot simply be converted to refine crude oil, hence its scrap resale (or salvage) value will be a fraction of the cost of its construction, and the capital invested will become a sunk cost with little chance of recovery. This explains why investors seek long-term certainty when making multibillion dollar investments.

References

- AfDB (African Development Bank) (2015) *African economic outlook*. Available at: www.africaneconomicoutlook.org/en [accessed 10 March 2016].
- Cardoso FH & Faletto E (1979) *Dependency and development in Latin America*. Berkeley: University of California Press.
- Chadwick J (2012) *Great mines – Democratic Republic of Congo: Tenke Fungurume*. Available at: <http://www.infomine.com/publications/docs/InternationalMining/Chadwick2012g.pdf> [accessed 23 March 2016].
- Deloitte (2004) *Partnerships for small enterprise development*. New York: United Nations Development Programme.
- Economist Intelligence Unit (2015) *Gauging growth in 2015*. Available at: <http://www.economist.com/blogs/graphicdetail/2015/01/daily-chart> [accessed 20 March 2016].
- Frankel J (2012) *The natural resource curse: A survey of diagnoses and some prescriptions*. HKS Faculty Research Working Paper Series RWP12-014, John F. Kennedy School of Government, Harvard University. Available at: <http://nrs.harvard.edu/urn-3:HUL.InstRepos:8694932> [accessed 9 March 2016]
- Henstridge M & Rweyemamu D (forthcoming) *Tanzania: Path to prosperity – managing hydrocarbon resources*. Oxford Policy Management and Uongozi Institute.
- ICMM (International Council on Mining and Metals) (2009) *Mining in Tanzania: What future can we expect?* Available at: <https://www.icmm.com/document/702> [accessed 23 March 2016].
- ICMM (2013) *The mining sector in Brazil: Building institutions for sustainable development*. Mining Partnerships for Development, ICCM. Available at: <https://www.icmm.com/document/5423> [accessed 23 March 2016].
- IFDC (International Fertilizer Development Centre) (2012) *Tanzania fertilizer assessment*. Muscle Shoals Alabama: The African Fertilizer and Agribusiness Partnership. Available at: <https://ifdcorg.files.wordpress.com/2015/04/tanzania-fertilizer-assessment.pdf> [accessed 11 March 2016].
- Jenkins B, Ahalkatsi A, Roberts B & Gardiner A (2007) *Business linkages: Lessons, opportunities, and challenges*. Cambridge: IFC, International Business Leaders Forum, and the Kennedy School of Government, Harvard University.
- Jourdan P (2012) State intervention in mining. Presentation of the SIMS report, 6th Annual FlexiCadastre User Conference, Cape Town, February.
- Moran T (2014) *Foreign investment and supply chains in emerging markets: Recurring problems and demonstrated solutions*. Peterson Institute for International Economics Working Paper 2014-12.
- Nelson J (2007) *Building linkages for competitive and responsible entrepreneurship*. John F Kennedy School of Government, Harvard University.
- Otto J, Andrews C, Cawood F, Doggett M, Guj P, Stermole F, Stermole J & Tilton J (2006) *Mining royalties. A global study of their impact on investors, government, and civil society*. Washington DC: The World Bank.
- Shelton G & Kabemba C (2012) *Win-win partnership: China, southern Africa and the extractive industries*. Johannesburg: Southern Africa Resource Watch.

- SPE (Society of Petroleum Engineers (2015) *Gas as fertilizer feedstock*. Available at:
http://petrowiki.org/Gas_as_fertilizer_feedstock [accessed 11 March 2016].
- Stevens P, Lahn G & Kooroshy J (2015) *The resource curse revisited*. The Royal Institute of International Affairs, Chatham House. Available at:
https://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20150804ResourceCurseRevisitedStevensLahnKooroshy_0.pdf [accessed 9 March 2016].
- Tenke Fungurume Mining (2013a) *An investment in the future of the Democratic Republic of Congo*. Available at: http://www.fcx.com/operations/tenke/fastfacts/Tenke_fast_facts_english.pdf [accessed 23 March 2016].
- Tenke Fungurume Mining (2013b) *Generating economic benefits for the Democratic Republic of Congo*. Available at:
http://www.fcx.com/operations/tenke/fastfacts/Tenke_Fast_facts_economic2013_eng.pdf [accessed 23 March 2016].
- UNCTAD (United Nations Conference on Trade and Development) (2013) *Growth with employment for inclusive and sustainable development: The least developed countries report*. UNCTAD/LDC/2013.
- World Bank (2015) *Fertilizer consumption (kilograms per hectare of arable land)*. Available at:
<http://data.worldbank.org/indicator/AG.CON.FERT.ZS/countries?display=default> [accessed 11 March 2016].

Annex 1: Royalty-based fiscal regimes

Royalty approaches

Most approaches to royalty assessment fall within the three general categories of unit-based, value-based and profit- or income-based. In addition, within each category are numerous specialised methods that are used to calculate the amount of royalty payable. In Section 3.1, Figure 4, the following definitions are applied (the reader should note that indicative values were used by the authors; while these may vary on a case-by-case basis, they are provided here as a comparison to indicate how the different fiscal regimes impact the profitability and government revenues comparatively in a 'like-for-like' environment, where the other projects' costs are kept constant to reflect the impact of the fiscal regime):

- (1) *Unit-based royalty*: A set fee assessed per unit of resource recovered from the smelter (i.e. refinery process).
- (2) *Ad valorem royalty – net smelter return times percentage*: Assessed as a percentage of net smelter or refinery return. This royalty might also be described as the net smelter return (NSR) before any adjustments for freight, handling or other transportation charges.
- (3) *Ad valorem royalty – metal contained in ore at mine mouth*: Valued at international reference price, times percentage. Assessed as a percentage of the value of the pure mineral contained in the ore, as determined by the average recovery, adjusted for the international market price premium.
- (4) *Ad valorem royalty – metal contained in concentrate at the mill*: Valued at international reference price, times percentage. Assessed as a percentage of the value of the pure mineral contained in the concentrate, as determined by the weight of the contained pure mineral times mill recovery times international market price premium.
- (5) *Ad valorem royalty – metal contained in smelter product*: Valued at international reference price, times percentage. Value of the metal contained in the ore after adjustment for average recoverability from both the mill and the smelter, assuming the commodity traded at the market price adjusted for the international market premium.
- (6) *Ad valorem royalty – gross sales, less transportation, handling and freight, times percentage*.
- (7) *Profit-based royalty – percentage of gross sales, less operating costs, transportation, handling and freight*: Operating profit includes deductions for mining, milling, processing and mine overhead. It also includes costs such as interest paid, withholding taxes, local taxes, import duties and reclamation costs (applicable percentage of 3.9412).
- (8) *Profit-based royalty – percentage of gross sales, less capitalised costs, operating costs, transportation, handling and freight*: Operating profit includes deductions for mining, milling, processing and mine overhead. It also includes costs such as interest paid, withholding taxes, local taxes, import duties, and reclamation costs. The basis is reduced by the allowable non-cash deductions for depreciation and amortisation of tangible and intangible assets.
- (9) *Ad valorem – sliding-scale percentages of NSR*: Based on an increasing, or sliding, percentage relative to the magnitude of value associated with the NSR.

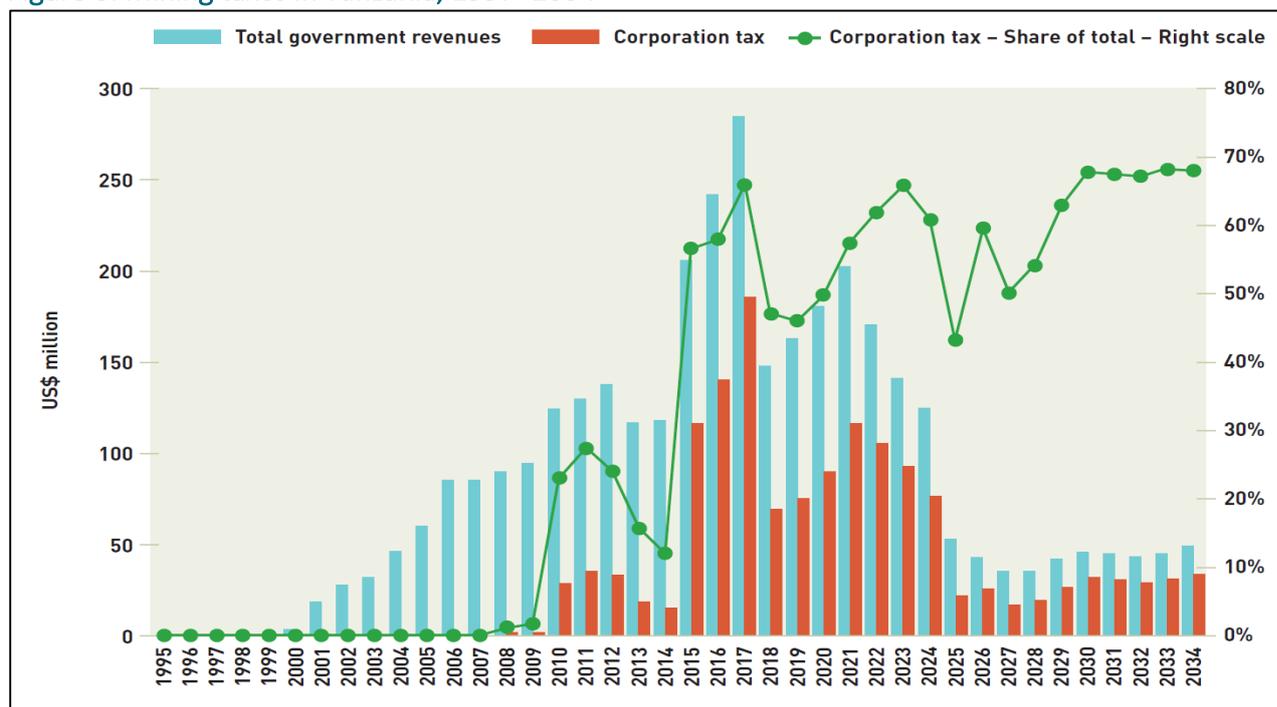
Source: Otto et al. (2006)

Annex 2: Mining and oil/gas fiscal regimes

In the mining sector, governments typically use concessions or ‘tax and royalty regimes’. Under a concession, the investor usually owns 100 per cent of the minerals produced, but bears all the risk and funds all operations. Government revenue generally consists of a royalty (a fixed or variable percentage of the value of the resource) and a tax on company profits. In some cases, additional corporate income tax is levied on ‘excess’ or ‘windfall’ profits. In addition, mining companies are typically subject to the national standard tax laws, which include VAT, import duties, employment levies, payroll taxes and local levies. In countries with weak legal and fiscal frameworks for mining, companies have often preferred to enter into mining development agreements (MDAs).

Under the structure of taxation commonly used for mining projects, revenue from mining operations is normally modest during the first few years of production. To begin with, the largest fiscal contributions are paid in the form of royalties. Substantial corporation tax payments only begin once the mining company has recouped the costs of the initial capital investment. Figure 8 illustrates this by using data from Tanzania, where a mining resurgence began in 2000. Corporation tax receipts were negligible during a long lead time of about eight years, but then rose rapidly to become both a large absolute source of government revenue and also the largest single contributor from the mining sector revenue – much larger than the royalty payments.

Figure 8: Mining taxes in Tanzania, 1997–2034



Source: ICMM (2009)

By contrast, in the oil and gas sector, production sharing agreements (PSAs) are the most common form of contract:¹⁷ the government contracts a private company to carry out oil or gas operations,

¹⁷ PSAs or production sharing contracts (PSCs) vary across countries and projects. They set out the terms according to which production is shared, after deduction of (some or all) production costs. Associated service agreements are

while the government retains ownership of the oil or gas reserves. If oil or gas is discovered and subsequently extracted, the contractor is entitled to a share of production to recover capital expenditure and reimburse operating costs, usually up to a ceiling or 'cost recovery limit'. This share of production is called 'cost oil' (or 'cost gas'). The rest of production ('profit oil') is shared between the government and the contractor according to the terms set out in the PSA. In addition, the contractor is normally required to pay corporation tax on 'taxable income' or profit.

In contrast to the mining sector, direct revenue from the production of oil or gas is typically generated as early as the first or second year of production. This is largely due to the limit on the costs that the private contractor can recover each year from these profits. The government's share of the profits under a typical PSA may be delivered in kind (i.e. through physical shipments of oil or gas) but is usually delivered as cash, with the government using the contractor as an agent to sell the government's share of oil or gas on its behalf.

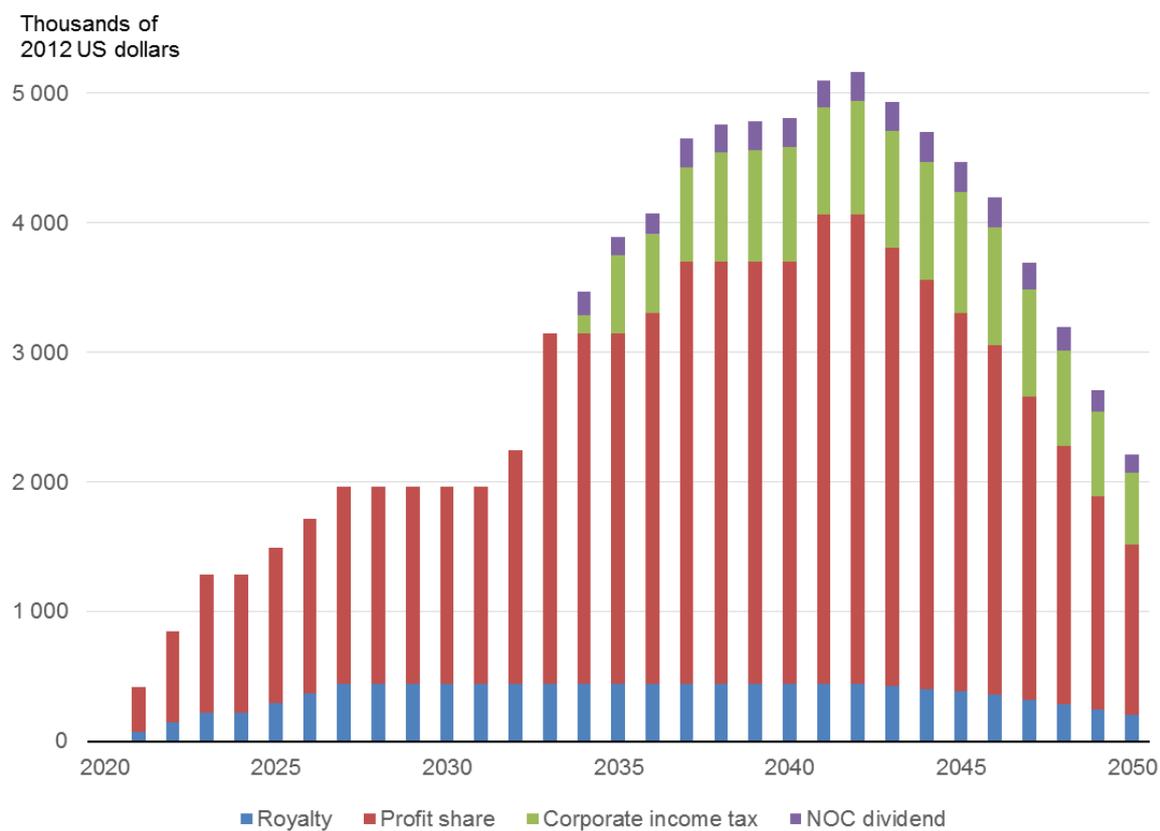
Another example from Tanzania – this time based on the expected cash flows from the large gas and LNG investments in the Indian Ocean – makes this point (see Figure 9). The project will produce its first saleable gas only in about 2021 (Year 1) and will begin paying corporation tax a decade later. It should also be noted that from Year 2 onwards, the profit share is already very significant: more so, even at this early stage, than royalty payments.¹⁸

commonly divided into pure service and risk service agreements. These agreements are often used in cases where state owned enterprises (national oil companies) undertake the extraction but buy in technological support and other services.

¹⁸ An interesting organisational issue for budgetary policy in this case and other similar cases is as follows.

Under PSAs, the government's share of production is often assigned to a national oil company (NOC) – in Tanzania's case to the Tanzania Petroleum Development Corporation (TPDC). The issue, therefore, arises as to whether the NOC should retain the use of the associated revenue (e.g. to invest in necessary infrastructure and downstream processing such as power generation) or should instead transfer this revenue to the consolidated Treasury accounts. In the former case there is obviously a major expenditure planning issue for governments to resolve – how and how far the expenditures of the NOC can be integrated into mainstream government planning and budgeting.

Figure 9 : Principal revenue streams from gas and LNG



Source: Henstridge & Rweyemamu (forthcoming)

Annex 3: Mining and oil/gas fiscal regimes

The Tanzanian government institutions responsible for gas sector governance include the following:¹⁹

- a)** The Ministry of Energy and Minerals (MEM) as the lead policy and administrative institution; with various line agencies that report to the ministry:
 - i. the Tanzania Petroleum Development Corporation (TPDC) (presently the NOC) , as the national partner in all petroleum ventures;
 - ii. the Petroleum Upstream Regulatory Authority (PURA), which will soon take over the regulatory functions of the TPDC; and
 - iii. the Energy and Water Utility Regulatory Authority (EWURA), whose role is confined to midstream and downstream regulation.Via the TPDC, the MEM collects the large share of non-tax revenue from petroleum activities, including royalties, licence fees, application fees and annual rent, and profit oil and gas.
- b)** The Ministry of Finance (MOF), the lead policy institution in setting royalty and profit-sharing terms at the project level and which is responsible for the following agencies:
 - i. the Tanzania Revenue Authority (TRA), which collects income taxes from gas companies; and
 - ii. the National Planning Commission, which is responsible for monitoring and analysing development trends and providing advice on macro and sectoral policies;From a PFM perspective, the MOF collects revenue from equity holdings, including income and company taxes.
- c)** The Attorney General's Office, which is also involved in negotiation and devising contracts. This may be significant should it involve signing a resource development agreement.
- d)** Local Authorities, which collect a local service levy from extractives companies and manage local environmental issues.
- e)** Under the previous administration (pre-October 2015), the Vice-President's Office (VPO) was:
 - i. the lead co-ordinator on overall policy and the Division of Environment, which is accountable for
 - ii. the National Environment Management Council (NEMC), which in co-ordination with Local Authorities also manages environmental issues and has only in the last two years begun training staff in oil- and gas-related matters, despite gas exploration having been in progress for a decade.
- f)** The Ministry of Labour and Employment, leads on the formulation of labour, labour market, social security and employment policies, while the Ministry of Lands, Housing and Human Settlements Development has to approve land allocations for extractives use.
- g)** The Ministry of Industry and Trade oversees all trade- and investment-related projects, and is responsible for administering various incentives:
 - i. the Tanzania Investment Centre (TIC), to co-ordinate, encourage, promote and facilitate investment and, importantly, to issue the Certificates of Incentives (ColIs) necessary to access the raft of investment incentives offered. Mining and petroleum companies have to follow the terms of their licenses and other contractual and legislative requirements, but sub-contractors would need ColIs.
- h)** The Tanzania Bureau of Standards, which is responsible for administering Tanzania's multitude of standards and procedures and has to approve all specifications relating to any projects, such as oil and gas projects and related construction.

¹⁹ Where possible the institutional relationships have been updated to reflect the post-2015 election changes, where these have been well publicised and are verifiable.

Acknowledgements

This report was put together by the Oxford Policy Management for the policy dialogue on Extractives Revenue Management organised by the Collaborative Africa Budget Reform Initiative (CABRI). The report was written by Alan Roe, Marke Beare, Nicholas Travis and Esmeralda Sindou. Comments were provided by the CABRI Secretariat.

This project was funded with UK aid from the British people.

