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LOCAL CONTENT POLICIES IN THE MINING SECTOR:

Fostering downstream linkages

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Local Content Policies in the Mining Sector: Fostering downstream linkages

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EXECUTIVE SUMMARY

There is a strong belief in many resource-rich developing countries that in order to achieve industrial development raw materials should be processed domestically rather than being exported in their unprocessed form. Driven by this objective of fostering industrialization, some governments have undertaken measures to either prescribe or incentivize downstream beneficiation.

International experience suggests the outcomes of such policies have been mixed at best. In several cases, policy decisions to foster downstream beneficiation were not always grounded in economic analyses. In addition, fundamental prerequisites necessary for successful implementation were not always in place. Instead, policies were driven by short-term political considerations, leading to unsustainable outcomes in the long term.

Despite the risks, policies to stimulate downstream beneficiation remain a prominent feature in many resource-rich countries. This paper examines the factors determining downstream investments. These include: the importance of having a guaranteed market demand, both domestically and internationally; the relevance of geographical location and good infrastructure; access to reliable and cost-effective energy; the need to have a competitive labour force; the importance of policy coherence and a sound business environment; the need to have monetary and macroeconomic stability; and proximity to raw materials.

The paper summarizes key policy options generally adopted by governments to encourage downstream activities, pointing to the strengths and weaknesses of each type of policy. These include various forms of fiscal and non-fiscal incentives; prescriptive measures such as export duties; bans or legal obligations to engage into beneficiation; the use of bargaining power in negotiations; beneficiation conditions linked to bidding processes; and government-led investments. The paper concludes with policy recommendations.

The discussion is built on a selection of geographically and economically diverse case studies and several commodities, namely copper, diamonds, iron ore, nickel and oil. Five of them, namely [Australia](#), [Botswana](#), [Nigeria](#), [Indonesia](#) and [Singapore](#) have been published as stand-alone notes on the IGF local content guidance webpage. The paper is part of a set of expert documents to substantiate the [IGF Guidance for governments on local content policies](#), released in July 2018.



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1.0 INTRODUCTION

There is a strong belief in many resource-rich developing countries that in order to achieve industrial development raw materials should be processed domestically rather than being exported in their unprocessed form. Driven by the objectives of fostering industrialization, notably through domestic value addition, some governments have undertaken measures to either prescribe or incentivize downstream beneficiation.¹

However, these policy decisions are not always grounded in economic analyses based on a set of prerequisites necessary to ensure the success of downstream policies. They are also not always informed by cost-benefit analyses that determine whether it is beneficial to move downstream. Instead, in many cases, decisions to foster downstream policies are driven by short-term political considerations, leading to unsustainable outcomes in the long term.

This paper aims to provide the contours of such analysis by leveraging case studies from countries that have implemented downstream beneficiation policies. The country case studies selection for this paper are geographically diverse: they include [Australia](#), [Botswana](#), [Nigeria](#), [Indonesia](#) and [Singapore](#), and they review several commodities, namely copper, diamonds, iron ore, nickel and oil.²

It is important to emphasize that the economic case for and against downstream beneficiation is very context-specific and therefore needs to be analyzed on a case-by-case basis. This paper aims to provide some lessons learned from previous experiences.

¹ By downstream beneficiation in this report we refer to “first-degree” downstream industries such as refineries, smelters and mills.

² All case studies are available online on IGF’s web page under Local Content Guidance. Additional examples that are referred to are based on CCSI’s accumulated knowledge on the topic.



2.0 OBJECTIVES OF DOWNSTREAM POLICIES

The desire to move downstream is based on the perception that in order to develop, countries need to move from an extractive/commodity-based economy to a manufacturing-based economy. Downstream value addition is prominently featured as a key policy objective in most resource-rich developing countries and strongly supported by continental initiatives, as set forth by the Africa Mining Vision adopted by African Heads of States in 2009, for example.

This development model is often tied to the necessity to redress the situation inherited from colonial times, during which commodities were extracted and exported in their raw forms from colonies to supply the needs of industrial nations. Indeed, some commodities (such as gold) can fetch a very high price in their processed form but transformation is rarely done domestically in producing countries. As a result, many developing countries import higher-value products for consumption, which is paid for by low value exports of unprocessed commodities, leading to persistent balance of payments challenges.

Leveraging domestically produced minerals to develop higher-value-added manufacturing industries, including for exports, is therefore often considered as one policy option to reverse this historical legacy. The Indonesian Government, for example, justified the latest export ban of unprocessed minerals arguing that industrial upgrading was necessary to avoid remaining “a nation of slaves” (Burton, 2017).

Moreover, downstream industries are seen as a way to diversify the economy into other sectors that are less prone to boom and bust cycles than the commodity sector. As with other types of economic development policies, economic growth, improving the trade balance, tax revenue generation, employment creation and skill development are further factors put forward by advocates for moving downstream.

For certain commodities, such as petroleum and steel, national security concerns are a key driver to process domestically. Countries are eager to achieve self-sufficiency of strategic feedstocks to address geopolitical concerns and be less dependent on other countries.



3.0 FACTORS THAT DETERMINE DOWNSTREAM INVESTMENTS

Prior to deciding whether a government should aim to attract investors or invest directly in downstream sectors, it is important to assess the prerequisites that are necessary for viable downstream industries. If these are not in place or are not improved over time, then the policies outlined below will not lead to a self-sustaining downstream industrial sector. While these prerequisites can vary by context and commodity, there are some common factors that should be taken into account.

3.1 GUARANTEED MARKET DEMAND: DOMESTIC OR INTERNATIONAL

Because the downstream industrial sector requires large upfront capital investments and the repayment periods are relatively long, investors seek sufficient and stable demand. In [Australia](#), in order to guarantee domestic demand, the government imposed steel import tariffs to protect the local industry from cheaper international suppliers. Further, in the early 1980s during the time of the “steel crisis” in Australia, a safety mechanism was put in place, whereby the government would review its assistance to the sector if the domestic producers’ market share fell below 80 per cent or rose above 90 per cent.

The challenge of securing guaranteed demand also explains why [Singapore](#) is increasingly feeling threatened by increasing petroleum refining capacity being developed in neighbouring countries. For years, Singapore has benefitted from Asian demand as a first mover into refined products in the region. When it comes to [Nigeria](#), this prerequisite seems to be fulfilled, as large domestic demand has always existed. However, Nigerian refineries have not managed to leverage this domestic guaranteed demand to thrive, due mainly to mismanagement and poor governance.

The increasing importance of secure demand versus proximity to raw materials also helps explain why over the years there has been a shift of downstream investors favouring investments close to consumer markets. This enables companies to react quickly to changing consumer demands, provides the opportunity to build consumer relationships and reduces the risk of potential import restrictions on finished products (e.g., steel tariffs).

3.2 LOCATION AND GOOD INFRASTRUCTURE

The temporary success of the [Australian](#) steel industry in the 1960s and 1970s and the spectacular growth of [Singapore](#) as an export base for refined petroleum products have partly been enabled by large-scale infrastructure investments by the respective governments and positioning in suitable locations. In [Australia](#), the steel industry started as a result of railway construction linking iron ore- and coal-rich regions with steel plants and Sydney, a commercial hub from which demand emanated. It continued with the development of Port Kembla where, in 1954, the government of New South Wales and BHP, the steel monopoly producer of the time, co-invested to enlarge the harbour and add more material storage capacity. The port was designed to accommodate the anchorage of 37 ships simultaneously to unload raw materials from other parts of the country as needed, in order to feed the steel mills near the port.

In [Singapore](#), the unique location of the city-port at the crossing of the European-Asian trading routes, as well as the government's decision in the 1980s to invest in a major infrastructure program to develop the port and turn Jurong Island into an industrial cluster that could host petroleum-related industries, have been decisive in the country's success in attracting refineries and petrochemical industries. In Europe, Rotterdam plays a similar role, hosting one of the largest oil and chemical centres. It is no coincidence that it is also Europe's largest port and a major logistics hub (van Zanden, 2005).

3.3 RELIABLE AND INEXPENSIVE ENERGY ACCESS

Many downstream industrial developments are power-intensive. Power consumption can constitute a big share of the operational costs (see Figure 1). The success of downstream industries, particularly those related to energy-intensive processes such as aluminum smelters, is linked to reliable and inexpensive energy access. This explains why many aluminum smelters are located or are looking to locate in countries with significant hydropower resources, which are the cheapest source of energy (see the examples of Mozambique [Further Africa, 2017], Norway [Hydro.com, 2016], Ghana [Inside Aluminum, 2016] and Paraguay [Toledano & Maennling]).



FIGURE 1. INSTALLED POWER CAPACITY NECESSARY TO OPERATE A MEDIUM-SIZE MINE OF SMELTER FOR SELECTED MINERALS

MINERAL	ANNUAL PRODUCTION (t)	REQUIRED POWER CAPACITY, MAXIMUM BENEFICIATION (MW) ^a	ELECTRICITY COSTS AS A SHARE OF OPERATING COSTS, MAXIMUM BENEFICIATION (PERCENT) ^b	
			10 CENTS PER kWh	20 CENTS PER kWh
Aluminum	200,000	443	117 ^c	234
Bauxite	2,000,000	177	29	45
Coal	10,000,000	53	10	18
Cobalt	20,000	23	—	—
Copper	100,000	95	15	26
Diamond ^d	0.6	3	—	—
Gold (open-pit)	12	45	9	17
Gold (underground)	12	80	16	28
Ilmenite	300,000	15 ^e	15	26
Iron ore/steel	3,000,000	338	16	28
Manganese	50,000 ^f	121	11	20
Nickel	30,000	42	10	18
Platinum group metals	5.6	41	14	25
Uranium	1,814	46	30	46
Zinc	200,000	31	8	15

Source: World Bank, via Banerjee, et al., 2015.

Note: — = not available

a. It is assumed that the plant has a capacity power of 80 per cent.

b. Operating costs are calculated as 70 per cent of the average July 2013 price of the metal. Operations extend to the refining or otherwise furthest stage in the process.

c. Due to the high power requirements per output value, aluminum smelters rarely operate unless power costs less than 3 cents per kWh.

d. A carat equals 0.2 grams; thus, there are 5 million carats in a ton of diamonds. The kWh requirement for diamonds includes separation.

e. This is for basic processing without refining. The amount of power varies greatly, depending on the end use.

f. Ferro-manganese.

3.4 LABOUR FORCE COMPETITIVENESS AND SPECIALIZED EXPERTISE

The competitiveness of the labour force is determined by the quality and output per worker in relation to the wage rate. Even if wage rates are lower, it does not necessarily mean that a country's labour force has a competitive advantage. [Botswana](#)'s diamond polishing industry, for example, is competing with higher-wage India where productivity is significantly higher. Without the guaranteed supply of rough diamonds from De Beers, which is expected to end after the depletion of Botswana's diamond fields, it appears unlikely that the polishing industry will survive, unless the productivity-to-wage ratio in Botswana increases and/or the country can identify a niche market where it develops a competitive edge. Being aware of this, the government of Botswana has promoted technical institutions to build transferrable skills of the workforce. An educated labour force is more likely to be able to adapt to changing circumstances even if the industrial policy to develop downstream industries fails.



Within the diamond sector, Antwerp is an example that has developed a niche expertise to cut the largest and most valuable gems. It does not attempt to compete with India and other Asian countries in the cutting and polishing business of smaller diamonds. Spain provides another good example where expertise has been developed in a niche market. Its steel industry is world-leading in the production of corrosion-resistant superalloys steel. The development of this unique knowledge and expertise can be traced back to the mid-1980's (United States International Trade Commission, 1987) and is not linked to the country having iron ore (CCSI, 2013). Similarly, with the help of federal government-funded research, [Australia](#) developed special knowledge to process bauxite into alumina (Australian Aluminium Council, n.d.). While the steel industry is about to shut down in Australia due to its lack of competitiveness, the alumina industry thrives as a result of the unique knowledge of the process.³

Sampath and Ayitey (2016) confirm these findings in their study of sub-Saharan African countries from 2005 to 2013. They observe that policy emphasis on building innovation capabilities and skills was associated with a positive impact on increased industry value addition and higher participation in the global value chain (Sampath & Ayitey, 2016).

3.5 BUSINESS ENVIRONMENT, GOVERNMENT SUPPORT AND POLICY COHESION

As for any sector—and particularly for downstream capital-intensive investments with a long payback period—a complicated business environment with high political insecurity adds a risk premium, a premium that is difficult to accommodate when the profitability of the project is low. The success of [Singapore's](#) export promotion strategies in the 1970s, for instance, is partly attributed in the literature to its conducive business environment facilitating investment processes, and to its perceived political stability as compared to other countries in the region. There was also a strong government commitment to support refineries and the petrochemical sector. Significant resources were invested in the Jurong Economic Zone, with dedicated institutions overseeing the developments and promoting investments. Similarly, in [Botswana](#), the government committed itself to establishing a dedicated diamond office to support the cutting and polishing companies to link up with ancillary businesses such as banking, logistics, gemology, security and brokering companies.

[Nigeria](#) provides a counter-example, where the domestic crude allocation for the refinery sector has “been the main nexus of waste and revenue loss from NNPC [the Nigerian National Petroleum Corporation] oil sales” (Sayne, Gillies, & Katsouris, 2015, p. 4). Originally, the domestic crude allocation was designed to provide the national refineries with sufficient crude oil to serve their capacity. However, the downstream subsidiary of NNPC responsible for piping and refining the crude petroleum was not set up with a sound business model that would allow for cost-recovery mechanisms, provide a governance framework or allow for sufficient financial and operational autonomy. This has led the refineries to underperform significantly, processing only around 20 per cent of domestic crude as of 2010. Rather than adapting the domestic crude oil allocation to refinery production figures, NNPC continues to allocate the nameplate capacity volumes of the refineries. As a result, 80 per cent of domestic crude allocation has been sold through ad hoc and opaque oil-for-refined product swaps and as crude to international traders. Without clear regulatory and oversight mechanisms for the sales of crude to the domestic refineries and international traders, it has been estimated that discretionary spending from the domestic crude allocation has averaged USD 6 billion per year between 2010 and 2013 (Sayne, Gillies, & Katsouris, 2015).

³ While there is some smelting to aluminum going on in Australia, most alumina is exported given the expensive power requirements associated with smelting.



A lot of this money is withheld to cover fuel subsidies, which have been plagued by misappropriation. For the refinery sector, the subsidy policy became particularly problematic after 2003, when the crude subsidies for the domestic allocation were cut while the fuel subsidies at the pump station were kept in place. This further led to the refinery sector losing millions of dollars and not being able to cover its costs (Sayne, Gillies, & Katsouris, 2015).

These problems are recognized by the government, and there have been multiple attempts to reform NNPC. However, entrenched interests and important stakeholders with significant power are profiting from the current opaque and complex setup of the domestic crude allocation system. This experience highlights the importance of setting up the right regulatory and oversight mechanism to encourage downstream beneficiation at the outset. Once interests become entrenched, it is very difficult to implement corrective policy measures.

3.6 MONETARY AND MACROECONOMIC STABILITY

Macroeconomic stability with a currency that is not overvalued (where companies operate in the national currency) will help export-oriented products be competitive. The [strength of the Australian dollar](#), for instance, played an important role in the development of the steel industry. When the Australian dollar depreciated after the recession in 1983, BHP became the third most profitable steel producer globally behind China Steel and Nisshin. In 2008, the opposite occurred and the strong Australian dollar, coupled with the financial crisis and global oversupply, imposed a severe blow to the industry.

While depreciation of the local currency makes exports more competitive, it can have disastrous effects on the project economics of downstream projects if these rely on inputs that are traded in other currencies. For instance, in [Nigeria](#) the national oil company buys oil from producers in U.S. currency and sells it in the national currency, the Nigerian naira, to domestic refineries. The naira depreciated from NGN 0.77 per USD 1 in 1982 to around NGN 300 per USD 1 in 2017. This has had a disastrous impact on government refining revenues and has contributed to the failure of the sector (Wapner, 2017).

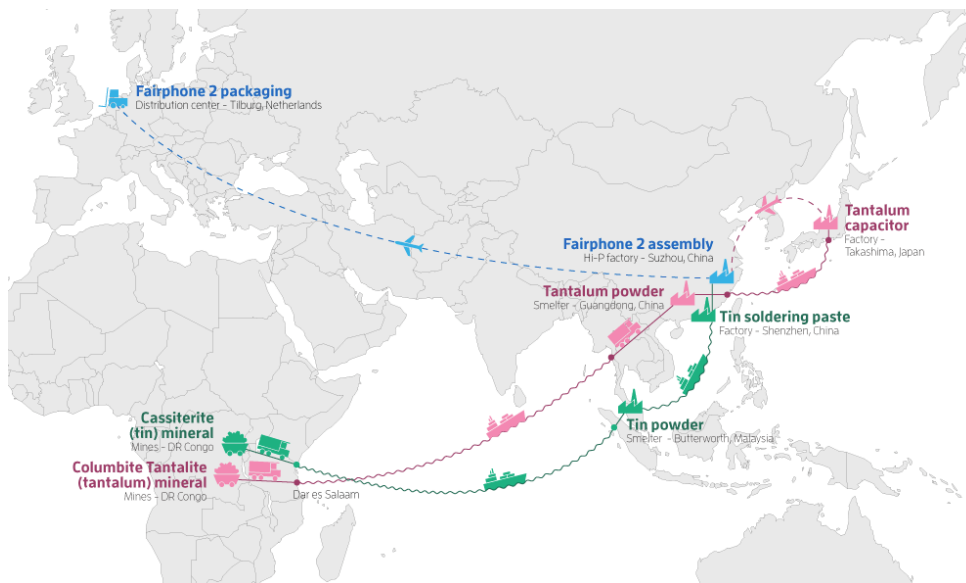
3.7 PROXIMITY TO RAW MATERIALS

Though it is counterintuitive, proximity to raw materials does not seem to be a key prerequisite to downstream sector viability. Using export data, Hausman, Klinger, and Lawrence (2008) find that there is very weak correlation between the production of raw materials and downstream industries. This finding persists when separating out sectors with high transport costs and for both developing and developed countries. Their argument is even more pertinent with falling transport costs and trade barriers. Trade barriers have fallen as a result of the implementation of the General Agreement on Trade and Tariffs and World Trade Organization (WTO) frameworks. Transportation costs have fallen with the development of increasingly large ocean carriers (e.g., capesize and Chinamax vessels).

Taken together, falling transportation costs and lowered trade barriers combined with considerable improvements in information and telecommunications systems has enabled globalization and the breakup of traditional value chains (see example in Figure 2). Consequently, for downstream industries the importance of being located close to the raw materials has fallen, while the importance of being located close to consumers has increased.



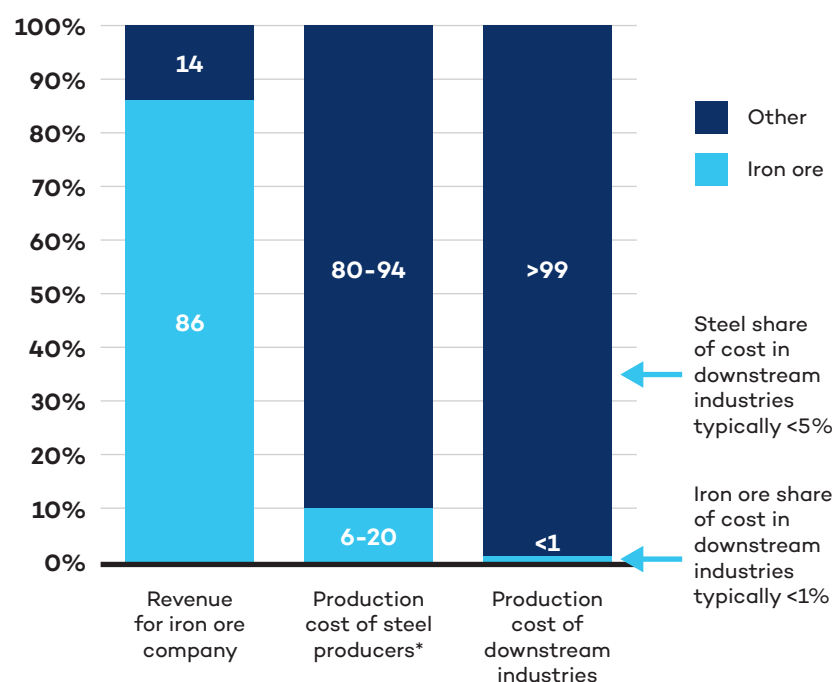
FIGURE 2. TIN AND TANTALUM IN THE VALUE CHAIN OF FAIRPHONE 2



Source: Fairphone, 2015.

This finding is supported by a study of the South African steel sector by AngloAmerican (2011). Its analysis shows that iron ore accounts for only 6 per cent of input costs in the steel sector and less than 1 per cent of the cost of the manufacturing industries using steel (see Figure 3). Thus the study concludes that “the availability and price of iron ore ... are not meaningful determinants of economic viability and competitiveness” of the steel sector (AngloAmerican, 2011, p. 3).

FIGURE 3. ECONOMIC IMPORTANCE OF IRON ORE AND STEEL PRICES ACROSS THE VALUE CHAIN



*High range indicates AMSA cost of iron ore at spot level. Low range indicates cost of iron ore for small EAF based steel producer.

Source: AngloAmerican, 2011.



It should be highlighted, however, that there are specific downstream processes that are geographically bound. For instance, gas that has to be transported over long distances where pipelines cannot be used has to be liquefied for transporting purposes. This process reduces the volume to 1/600th of the natural gas in its gaseous state. Another example comes from the iron ore sector. While it can be economically feasible to export high-grade iron ore without further processing (it is therefore also often referred to as direct shipping iron ore), low-grade iron ore requires in-country concentration prior to shipment (CCSI, 2016).



4.0 POLICY OPTIONS

This study identifies five broad mechanisms that countries have used to embark on downstream beneficiation. These include incentives, prescriptive measures, negotiations, bidding and government-led investments. In practice, these mechanisms are often intertwined. Each policy option is explained below in more detail, highlighting the strengths and weaknesses of each approach.

4.1 INCENTIVES

Governments can incentivize downstream activities by reducing costs for investors. Incentive measures can take the form of tax reductions/exemptions, energy or water subsidies, provision of advantageous loans or building industry-specific infrastructure such as industrial parks to cater to first-degree downstream industries.

To move downstream, incentives provided to downstream investors may also be coupled with the “upstream” fiscal package. For example, vertically integrated companies that build downstream processing plants may be granted tax reductions/exemptions on the upstream fiscal regime where government’s take (i.e., government’s share of the profits) is usually higher.

Other incentives, in the form of customs tariffs and import restrictions, aim at guaranteeing domestic markets and protecting domestic players from global competition. These incentives are meant to address the economics of downstream projects that are capital intensive and often exposed to a drop in margins due to global competition and frequent supply overcapacity.⁴

The [Australia](#) and [Singapore](#) case studies illustrate these types of policies. [Singapore](#) granted companies investing in the refinery sector exemptions from paying taxes on profits for 5 years, 10 years or even longer time periods. In addition, Singapore developed an industrial zone for the refinery and petrochemical sectors on Jurong Island, investing in infrastructure necessary to serve the sector. [Australia](#) resorted to protective measures in the form of custom duties and import restrictions to incentivize investments in the steel industry, which shielded the sector from competition from the 1920s until the late 1970s when import duties began to be slowly phased out.⁵ Australia also used bounties (a lump sum paid to steel producers) as direct government subsidies.

⁴ Rousseau and Caruso (2016) found that the return on capital employed in the cement, paper, aluminium and steel industries is at 5.4 percent. EconMatters (2009) suggest that the low margins of the refinery business put off private investments. According to Arrium Mining and Metals, margins in the steel sector are between -7.5 percent and 5 percent.

⁵ See also CCSI (2016a).

[Botswana](#) also used incentives, to support the cutting and polishing industry. After negotiating a downstream package with De Beers, the government convinced 16 international cutting and polishing companies to set up factories in the country with the promise of a guaranteed long-term allocation of De Beers's diamonds at 20 to 30 per cent below the market price.

4.1.1 STRENGTHS

Granting incentives is an attractive policy tool, as it can make a marginal⁶ downstream project economically viable. Incentives are the preferred policy option from an investor's viewpoint. Furthermore, incentives might be granted in exchange for infrastructure investments that the government would not have the financial capacity to undertake upfront. The builders of the Mozal aluminum smelter in Maputo, for example, invested heavily in road, power and port infrastructure to make the project viable. For these reasons, governments around the world have adopted incentives as a key strategy to attract investments in downstream industries.

4.1.2 WEAKNESSES

It is difficult for governments to assess what constitutes a "marginal" project and to what extent and what level of incentives are needed for the investment to go ahead. Apart from lacking the industry-specific knowledge of what constitutes a reasonable return on an investment in a downstream project, the "hurdle rate"⁷ is also investor-specific.

Once the government grants project-specific incentives, it not only complicates the task of tax administration, but also creates an environment conducive to corruption and lobbying if there are no clear, transparent and time-bound criteria laid out to grant project-specific incentives. Time-bound incentives are crucial to avoid creating dependency and breed inefficient industries in the long run. Measures also need to be phased out gradually to avoid big financial shocks for beneficiaries. Setting such boundaries at the outset is crucial to managing expectations.

Moreover, the excessive use of incentives internationally has led to a "race to the bottom" whereby investors use the incentive package offered by one jurisdiction to negotiate incentive packages elsewhere. The biggest weakness of incentives is therefore the potential unnecessary loss of government revenues, which is one of the main benefits associated with capital-intensive industries such as the first-degree downstream sector.

4.2 PRESCRIPTIVE MEASURES

Prescriptive measures can take the form of export duties, quotas and bans on unprocessed minerals. In Africa alone 21 countries apply export taxes on extractive industries to encourage local processing (Ramdoo & Bilal, 2014). [Indonesia](#) has gone a step further by imposing an export ban since 2014. The ban distinguishes between two types of minerals: Type 1 minerals (includes bauxite, nickel, tin, chromium, gold, and silver) must be fully processed prior to being exported; Type 2 minerals (includes copper, iron, lead, manganese, ilmenite, tantalum, and zinc) can be exported as concentrates without further refining until January 2022⁸ under the conditions that the industry 1) develops smelting facilities individually or collectively, and 2) pays export duties that vary depending on the degree of concentration. The level of export duties is set to increase over time.

⁶ We define a marginal project as an investment that would go ahead with the incentive and would not go ahead without the incentive.

⁷ The hurdle rate is the minimum rate of return the investor needs in order for the project to go ahead.

⁸ The 2014 regulations put a deadline for January 2017—the deadline was pushed to January 2023 by the 2017 regulations.



The [State of Western Australia](#) had imposed similar rules in 1996. It passed two legislative acts that required iron ore exporters to engage in beneficiation beyond stages of just iron ore concentration and pelletization. In response, BHP Billiton and Rio Tinto invested billions in a hot briquetted iron plant in the Boodarie and Hismelt operations respectively, using experimental technologies. Neither of these projects reached economic viability and both had to be shut down shortly after completion. Since then, the Australian government has steered away from prescriptive downstream beneficiation policies.

4.2.1 STRENGTHS

In theory, the major strength of prescriptive measures is that they can induce existing extractive companies to invest in downstream industries where other policies may fail. This is done by either making exports of raw minerals less attractive (export tax) or by making exports conditional on processing (export ban on unprocessed minerals). However, success is conditional on the prerequisites highlighted above.

The government does not have to give up tax revenues in return for downstream beneficiation investments, as may be the case when using the incentives or negotiation policy option. In fact, additional revenues may be collected from mining projects in the form of export taxes and corporate income taxes on downstream activities if projects are not shut down due to such a policy (see below).

4.2.2 WEAKNESSES

Prescriptive measures are the least favourite policy option from an investor's point of view. They provide an overall negative perception of the investment environment and make the jurisdiction less attractive for future mining investments, given that the project economics and risks of local processing have to be taken into account when making the investment decision. These measures may also lead to the shutdown of marginal projects that do not have the cash flow to invest in downstream industries.

Furthermore, some prescriptive measures may violate bilateral and multilateral trade and investment commitments: companies that have invested in the mining sector before such measures are introduced may challenge the government in court when they change the economics of the project (Bernasconi-Osterwalder et al., 2011).

To provide the private sector with sufficient time to build up downstream processing capacity, the introduction of prescriptive measures requires long timeframes between announcement of the policy and implementation. However, as shown in the case of [Indonesia](#), the volatile commodities market may complicate the implementation of these policies. While the project economics for additional processing capacity may be favourable when commodity prices are high, this may change when prices fall.

4.3 NEGOTIATIONS

Governments might successfully impose downstream requirements when they have the upper hand in negotiations over a mining contract. Governments have more leverage when the company:

- a. Boasts a world-class deposit
- b. Has already invested a substantive amount of money
- c. Wants to renew its licence and/or
- d. Relies on the country's deposit for its commercial survival.



A case in point comes from [Botswana](#). Since the country is responsible for about 60 to 70 per cent of De Beers' revenues, the government of Botswana negotiated a sophisticated downstream package with the company as a condition of its mining licence renewal. De Beers was required to move its diamond aggregation business from London to Gaborone and allocate a set amount of diamonds domestically for polishing purposes. Twenty years earlier, the government had already tried to negotiate with De Beers to move downstream, but was unsuccessful. What had changed in 20 years was both the criticality of Botswana's world-class deposits for De Beers' survival and the window of opportunity represented by the renewal of the licence.

China provides another example; its dominant market share in the production of rare earths has meant that the country's export restrictions resulted in downstream companies moving to China in order to get access (Klaver, 2017; Hornby, 2015). If global rare earths sources would have been more diversified, it is unlikely that companies would have reacted this way.

The government's bargaining power is further strengthened if a company has sunk its capital. For example, as of this writing Freeport-McMoran is holding on to its first-class Grasberg mine even though the government of Indonesia is imposing downstream processing requirements and increasing its stake in the project.

4.3.1 STRENGTHS

Including downstream requirements in government's negotiation position can be a powerful tool when the government has strong bargaining position (valuable deposit, high market interest in deposit, renewing licences). While negotiating benefits for the country (e.g., local content, downstream, community investment) comes generally at the cost of tax concessions, the strong bargaining position might help obtain the "downstream benefit" without foregoing tax revenues.

Relying on negotiations also offers the flexibility to adjust the requirements depending on the project economics, allowing marginal projects to go ahead without processing requirements and pursuing downstream policies for the more profitable projects.

4.3.2 WEAKNESSES

Successfully negotiating the downstream package requires well-governed, transparent and solid institutions and technical skills to understand the project economics as well as strong negotiation skills by the government. These skills are not always available in resource-rich developing countries. Strong negotiating capabilities are particularly needed to avoid companies' requests for tax concessions in exchange for downstream investments. However, the fact that contract negotiations most often happen behind closed doors with significant discretion given to the negotiators creates opportunities for corruption.

4.4 BIDDING

Governments can include downstream processing as part of their bidding processes. Companies that bid for a mining concession and include processing activities are rewarded in the evaluation of their bid.

This approach was chosen by the government of Afghanistan for the Aynak copper deposit. In 2007, Afghanistan, with the support of the international community, tendered the Aynak copper concession for a public bidding process. Several companies applied, and the evaluation also included points rewarding the processing of the copper ore domestically. China Metallurgical Group Corporation (MCC) won the bid by offering the highest payments to the government, building rail and power infrastructure and smelting the copper domestically.



This case provides cautionary lessons. While the bidding process was considered transparent and in line with international best practice (Stanley & Ekaterina, 2011) the project has yet to produce one tonne of copper. MCC has approached the government of Afghanistan to renegotiate terms—including the provision of building the smelter. MCC had clearly overbid to win the tender with the project not being economically viable under the terms promised. While the government of Afghanistan could re-tender the project rather than enter into negotiations, significant time and resources went into the bidding process, and political pressures may make the re-tendering of the project difficult. Furthermore, the market conditions have changed, and it is questionable whether the government would receive similar bids in another round.

4.4.1 STRENGTHS

When market interest for a deposit is high and companies compete to attain the licence, a competitive bidding process can help the government secure the best possible deal (including downstream package)—following the well-known principle of price discovery enabled by a competitive bidding process

4.4.2 WEAKNESSES

As explained in the context of the Aynak project in Afghanistan, there is a risk of companies overbidding to win the tender for an asset and then asking for renegotiation. Good technical expertise is needed to assess the bids and evaluate whether these are feasible. If the bid process does not include objective transparent evaluation criteria, it may also create opportunities for corruption.

4.5 GOVERNMENT-LED INVESTMENTS

Instead of enticing the private sector to invest in downstream activities, the government can take the lead. [Nigeria](#), for example, has invested directly into the refinery sector since the 1960s to serve the domestic and export markets. By the 1980s, Nigeria owned four refineries and managed them through the national oil company and its subsidiaries. In 2015, Nigeria commissioned the construction of an additional state-owned refinery.

While Nigeria has dreamed of becoming a net exporter of refined petroleum products, these government-owned refineries have not even managed to satisfy internal demand. Mismanagement and corruption have led to low production levels (at times below 10 per cent of nameplate capacity) and Nigeria having to import petroleum products while having spent significant resources in building the refineries. To be successful, government-led investments through state-owned companies need to be structured with clear roles, a financing model that promotes a commercial mandate, limited political interference in technical decisions, and in a way that ensures transparency and oversight.

4.5.1 STRENGTHS

Government-led downstream interventions give the country control over economic development (international companies might still be invited to the sector but more like service providers rather than investors). Thus, government-led downstream development might isolate the country from the challenges of dealing with external investors (explained in the other policies outlined above).

4.5.2 WEAKNESSES

The government's expertise in industrial development is often limited, including in downstream industries, which often therefore results in weak business models, lack of competitiveness and mismanagement. An industrial development policy requires upfront capital investments, which many



resource-rich developing countries may not have: the limited budget available ought to be invested in public service provision such as education, health and infrastructure rather than constructing downstream projects and building up the capacity of state-owned companies.

Creating state-owned enterprises that invest and operate in the downstream sector can also create conflicts of interest between commercial, regulatory and development objectives. In turn, this can lead to opportunities for corruption and political interference to crowd out private investment in the value chain.



5.0 CONCLUSIONS AND POLICY RECOMMENDATIONS

Policies to process commodities in-country are often driven by political factors rather than an economic rationale. There are plenty of examples where governments have implemented policies to move processing downstream that have resulted in costly and unproductive “white elephant” projects both in developed (e.g., Australia) and developing countries (e.g., Nigeria). Given the context and commodity specificities, it is important for resource-rich governments to take a selective approach regarding downstream policies rather than implementing blanket policies that affect all minerals. To help in this decision-making process, governments should rely on **market analyses, a comparative advantage review and cost-benefit analyses**.

The market analysis should review the supply and demand fundamentals of that particular sector to determine whether there is a need for additional processing/smelting capacity at the regional and global level. Forecast demands for the commodities, projects in the pipeline and the likelihood of such projects going ahead should also be taken into account in this analysis. An ensuing comparative advantage analysis should review the factors highlighted in the determinants section and assess whether the country in question is well placed to fill the processing capacity gap. If there is a clear market case for downstream beneficiation, investors will likely be interested in building processing plants.

There are several complexities with cost-benefit analyses that need to be addressed. First, environmental externalities are difficult to price and are often not sufficiently accounted for. Smelters and refineries are energy-intensive and polluting industries.⁹

Second, it is difficult to estimate the total employment benefits of such investments. First-degree downstream industries tend to be capital-intensive processes that do not create many direct employment opportunities. For instance, in Timor-Leste, the proposed LNG plant to develop the Greater Sunrise gas field would double Timor-Leste’s GDP but account for less than 1 per cent of national employment (Maennling, 2012). The entire Australian steel sector never employed more than 1 per cent of the national workforce even in years when the sector was performing well (Talkin, 2016). Employment creation opportunities increase when moving further downstream (Lundall, Maree & Godfrey, 2008) and due to other indirect and induced employment opportunities.

⁹ See, for example: Singh & Li (2013); for copper smelters see U.S. Congress, Office of Technology Assessment (1988); for aluminum smelters see Gosnell (2012).



However, moving further downstream after attracting “first-degree” beneficiation is not a given. As Toledano and Maennling (2013) observe, only one third of the sampled largest aluminum smelters process 50 per cent or more domestically. In most cases, the aluminum is exported in ingot form and processed elsewhere. A case in point is Mozambique, where domestic aluminum processing only started to emerge a decade and a half after the Mozal aluminum smelter investment (SAmag, 2016). Other indirect and induced employment opportunities are difficult to estimate, and it is often unclear whether they will materialize (Cordes, Ostensson, & Toledano, 2016).

Third, it is difficult to predict long-term costs and benefits, as these may be very different from the short-term impacts which are easier to quantify. For example, it may be possible to analyze which marginal mine sites are not viable if the government requires downstream investments. However, it is much harder to predict whether the downstream activities imposed by policies today will become competitive in the future and as a result attract further investments in the country.

Downstream (as well as upstream) investments in the oil and gas sector face additional medium- to long-term risks that are difficult to accurately account for. In order to stay below the 2° global warming target set out in the UNFCCC’s Paris Agreement, the world needs to decarbonize by the middle of the century. While it is unclear whether this target will be reached and/or whether innovations in technologies such as carbon capture and sequestration will mean that petroleum will continue to be able to play a role in the world’s energy system, there is significant risk of the stranding of petroleum and downstream processing assets. For instance, it has been assessed that 22 per cent of the capital expenditure of the Nigerian oil value chain until 2025 is not needed in a world that decarbonizes by mid-century (Schlösser, Schultze, Ivleva, Wolters, & Scholl, 2017). Building the value chain of oil puts countries at risk of stranding assets within a couple of decades.

If after these assessments the government is interested in pursuing downstream policies and there is no clear business case for investors, the government may still make the political choice to use incentives, prescriptive measures, negotiations, bidding, government-led investments, or a combination of these.

However, in the absence of a strong business case, the risk is that such measures may not lead to economically viable outcomes in the long run, but instead breed inefficiencies, crowd out investments and waste scarce resources that could have been invested in other public goods, such as health and education. Success or failure will depend on whether the country can become competitive in the identified downstream sector over the medium term, despite the lack of a short-term business case. It is therefore important for governments to provide policy coherence and support downstream investment incentives/requirements by committing resources to supporting infrastructure and investing in education and technical institutions to build up capacity and skills of the labour force. As shown by the cases of Spain (corrosion-resistant superalloys steel) and Antwerp (specialization in high-value diamond cutting) governments should review whether there are niche markets within the downstream sector in which the country/region could establish itself and develop a competitive advantage.

While commitment by the government is key, it is equally important to clearly indicate how long such support will last, to make downstream companies competitive and avoid draining public resources and creating dependencies. There should be clear timelines and criteria for judging whether a supported downstream sector is ultimately not viable. As such, downstream policies should be regularly reviewed and adapted to market and country developments.



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