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**Extractive industries: enclaves or a means to transform economies?**

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**Abstract:** This paper argues for a change in government attitudes to their extractive industries: as enclaves useful primarily as revenue sources. This is too narrow a perspective: it fails to recognize the broader economic linkages that are invariably possible. Achieving greater economic impact requires governments to redefine how best to encourage economic diversification. Specifically, manufacturing activities tend to be over-emphasized, especially those based on a narrow view of local content ignoring competitiveness, while opportunities in the renewable resource economy are underemphasized (especially agriculture, the livelihood of millions of poor people, and ecosystem services). Moreover, industrial policy will not succeed when policies and investments in energy, enterprise development (especially for small and medium-sized enterprises), and financial systems are neglected. Stronger development finance institutions can be key players—one lesson from Latin American successes. Sharing power and transport infrastructure can further strengthen further the linkages from extractive industries to local and national economies.

**Key words:** agriculture, extractive industries, industrial policy, mining, natural gas, oil

**JEL classification:** L71, L72, Q18, N16

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## 1 Introduction

In the advanced economies with significant extractives sectors—Australia, Canada, Norway, the United States and others—multiple linkages have been created from mining and oil and gas production to the local and national economies. This has encouraged enterprise development and job creation outside of the extractive industries themselves thereby helping to create the diversified economies characteristic of many wealthy countries. And given the technical and logistical challenges of finding and then extracting resources that lie far below the earth’s surface, the mining and oil and gas industries have always been sources of scientific and technological advance—even more so today as information technologies, artificial intelligence (AI), and robotics are increasingly deployed. The extractive industries therefore potentially provide a source of productivity growth that spills over to the rest of the economy, creating a demand for the requisite skills.<sup>1</sup>

These economies set a high standard of achievement which might seem unattainable for poorer countries today. Their economies are undiversified, technical skills are in short supply, and enterprise development is very limited (most businesses are informal and generate only modest incomes). Hence, an extractives industry often ends up as an enclave, largely disconnected from the local (and national) economy.

Success in creating diversified economies with closer linkages to the extractive industries certainly cannot be accomplished overnight. Human capital, innovative businesses, and supporting infrastructure (energy, not least) all take time and money to build. Yet countries must set out on the journey and even slow progress is better than living with the risks inherent in undiversified and commodity-dependent economies. Eventually mineral resources will be depleted or (commercially) stranded, making it imperative to invest in agriculture, manufacturing, and services, as well as renewable natural capital, so that they become stronger sources of growth, livelihoods, and public revenues.<sup>2</sup>

So how should this journey begin? Our suggestion is that governments must take a hard look at what has been possible in successful countries, abandon fatalism, and construct realistic national plans to build a greater economy-wide impact from the huge opportunities and investment that the extractive industries continue to offer. This can only be done by working together with companies in the sector—most would welcome such a government approach—and with communities who should be the ultimate beneficiaries. The extractive industries can then be turned into a positive force for economic development (with the caveat that the sector’s emissions may continue to grow unless mitigating action is taken). The alternative risks ending up with communities disappointed by the limited local benefits, a citizenry unclear whether investment brings any benefit at all, and a government that views the sector merely as a generator of revenue (and is therefore inclined to maximize its tax squeeze on companies, often to the detriment of further investment and potential longer-term development benefits).

Accordingly, this paper argues for abandoning the ‘enclave mind set’ that is otherwise pervasive. We discuss how closer linkages from the extractives industries to the rest of the economy require an active ‘industrial policy’—meaning the promotion of *all* sectors of the economy, not just manufacturing. There are opportunities for more local content and downstream processing for

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<sup>1</sup> Fears of ‘Dutch Disease’ have periodically surfaced in Australia and Norway; e.g., see Garton (2008). Bjørnland and Thorsrud (2015) find positive impacts, via spillovers, from the resource sectors in Norway and Australia.

<sup>2</sup> See Stevens (2018).

sure, but these need to be promoted in the context of a broader programme of enterprise development that addresses explicitly the multiple constraints on the creation and survival of businesses. The paper briefly provides examples of how this might be done at the local, regional, and national levels—thereby highlighting the role played by different mechanisms for coordinating private and public actions. Infrastructure is also a massive constraint to diversifying economies, and we discuss ways for sharing infrastructure between the extractive industries and other sectors. The paper’s central point is that there is a set of identifiable public and private actions that can deliver broader sustainable development. But these look somewhat different from those that are more commonly placed at centre stage.

## 2 Ending the enclave mindset

There is a strong but understandable tendency to see mining and oil and gas as *enclaves* disconnected from the *national* economy, and with limited *local* economic impact. Policy is then largely confined to the question of how best to maximize and spend the windfall in public revenues. We call this the ‘enclave mindset’.

Extractive industries unquestionably do have strong enclave characteristics. These include: a lack of significant linkages to the local economy; foreign-owned capital often remitting abroad significant profits; a limited set of commodities mostly exported with limited local beneficiation; a dependence on highly specialized capital goods and inputs beyond the capacity of the typical low-income country (LIC) and lower-middle-income country (LMIC) economy to produce domestically; and high labour productivity resulting in only limited local employment (with foreign workers sometimes dominating technical and managerial positions, a tendency now accentuated by robotics and information technology). Disconnection from the national economy is exacerbated by the remoteness of many mines and oil and gas production sites from major economic centres. Mozambique’s new offshore gas reserves are 2,000 kilometres from the capital, Maputo, for example. Mines are often similarly remote: Chile’s large Antofagasta mines are 1,000 km north of Santiago, and the Oyu Tolgoi mine complex is in Mongolia’s South Gobi Desert. Yet while geographic isolation is an impediment, it is rarely the case that at least some linkages cannot be built—at least to the local economy through, at minimum, the mine facility sharing its power generation capacity with local communities and businesses.

Once the enclave view embeds itself into policy-making, the focus narrows down to mobilizing revenue from the extractives sector and spending it—i.e., fiscal policy dominates. Opportunities to accelerate local enterprise development, job creation and broader development in the producing area then risk neglect (evident in the missed opportunities attending Tanzania’s gold mining boom in the 1990s, for instance).<sup>3</sup> Once the area’s resources are depleted or commercially stranded, they are left with little economic activity to fall back on.

Market forces are powerful drivers of economic growth but left to themselves they do not always yield other desirable outcomes: resilience to economic shocks, respect for nature, and rapid poverty reduction. Market forces alone can result in development paths characterized by social inequality and its close relative, regional inequality especially when the extractives industry constitutes an enclave.<sup>4</sup>

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<sup>3</sup> Roe (2016, 2017) discusses Tanzania.

<sup>4</sup> Collier (2018) discusses market forces and spatial inequalities.

Market failures are pervasive in poorer countries, occurring on both the supply and demand sides, and public goods are undersupplied. The result is often distorted patterns of private investment with an emphasis on low-risk urban businesses over riskier, but higher potential, investments elsewhere.<sup>5</sup> Offsetting public action is required, and this is especially the case for the extractive industries, with many ways in which public and private actions together can reduce these enclave characteristics. African leaders are among those recognizing the need to act (see Box 1).

#### **Box 1: African leaders on ditching the enclave mindset**

Africa is the region where mining and oil and gas enclaves have been at their most extreme (often a legacy of unbalanced colonial development). In their Africa Mining Vision (AMV) of 2009, the region's heads of state set out an action agenda to address this, including these statements (African Union 2009):

- 'Africa should face up to the challenge of working for new directions founded on *not* taking the enclave nature of mining as an inevitable part of the continent's destiny but rather as a product of a particular phase of history; as something which can be overcome.' (p.3)
- 'A central premise of the AMV is that mining in Africa must be constantly re-evaluated by its contribution to broad and long-term development goals. It insists that mineral operations need not—and should not—be activities of an enclave.' (p.19).
- 'The restructuring of African mining from its enclave nature is *the* fundamental task of African policy makers and those committed to having it play a transformative role.' (p.151).

The challenge is how to deliver on this agenda: 14 years on from the bold statements, progress remains disappointing.<sup>6</sup>

### **3 Strategies and sector choices**

As the AMV recognizes, structural transformation should be at the core of the strategy for the extractives sector. Historically, successful economies have shifted over time into sectors with increasingly value-added, higher labour-productivity and skill intensity and therefore higher earnings. In those ways economic growth has yielded poverty reduction, and this is accentuated when governments choose to use their expanding tax bases to fund more education, healthcare, and social protection. Clearly, countries with resource-wealth can enjoy rapid growth, and even a high gross domestic product (GDP) per capita for a while, until their resources are exhausted. However, without structural transformation they will not sustain economic growth nor that higher standard of living—and risk going into reverse on poverty reduction. Furthermore, unless the state is very redistributive—providing large cash transfers, for example—then a high per capita income is a misleading indicator: it can sit alongside deep and pervasive poverty and inequality. Equatorial Guinea, historically a large oil producer and an upper-middle-income (UMIC) country, is an unfortunate example: the population is only around 1.5 million, but three-quarters of Guineans are poor—its oil revenues having been largely captured and squandered by the country's elite.<sup>7</sup>

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<sup>5</sup> On market failure see Stiglitz (1989, 1994).

<sup>6</sup> See Hilson (2020).

<sup>7</sup> World Bank poverty definition: <https://data.worldbank.org/indicator>.

### 3.1 Opportunities in the renewable resource economy

Discussion of economic transformation typically focuses primarily on manufacturing. Instead, it is preferable to begin by emphasizing opportunities in the renewable resource economy when it comes to choosing investment priorities.

For most LICs, agriculture is the most important livelihood based on renewable resources, depending as it does on soils, waters, biodiversity, and the ecosystem in general. There are also livelihoods from fisheries, pastoralism, forestry and, increasingly, from the provision and maintenance of ecosystem services including carbon sinks.

Although the world is urbanizing, 44 per cent of people still live in rural areas.<sup>8</sup> The percentage is well above 50 per cent in most LICs and LMICs: 72 per cent in Kenya and 82 per cent in both Malawi and Rwanda for example. Even India, with its massive cities, has 65 per cent of the population still living in rural areas. Most of the world's poor must find their livelihoods in the rural economy: as smallholder farmers using rudimentary technology (often without irrigation), as farm labourers, as pastoralists, and in the many small and informal enterprises that characterize the non-farm economies of villages and rural towns.<sup>9</sup> Agriculture and non-farm employment also offer an alternative to hazardous artisanal mining.

The survival of the poor therefore depends on a base of natural capital and on the quality of those natural assets, as does food security at both the household and national levels (including food security in the rapidly growing cities and towns of the developing world). For these reasons, the rural economy and especially agriculture is fundamental to ending poverty. For the developing world on average, and looking at a wide range of studies, a one per cent (annual) increase in agricultural growth potentially yields up to 2 to 3 per cent of income growth for the poor.<sup>10</sup> This is especially so for the 81 per cent of the world's poor who live in sub-Saharan Africa (SSA) and South Asia.<sup>11</sup> Many of the poorest female-headed households work in agriculture (in many African LICs women account for well over half the agricultural workforce).<sup>12</sup> Consequently, if better ways are found to connect the extractive industries to rural economic activity then the benefits could be profound, and not least for society's very poorest and for gender equality.

While there are many success stories in rural development—and success is vital to achieving middle-income (MIC) status—there remains much rural stagnation, especially in Africa where large parts of the rural economy are yet to see the productivity-enhancing technologies successfully adopted in Asia over the last half century and more. Africa's agriculture requires a major transformation if it is to provide higher incomes as well as just more employment. Higher earnings are associated with higher productivity, which requires a shift from extensive to intensive land use, more irrigation, mechanization, improved seeds, and more fertilizer to boost yields. Investment by large and small enterprises to supply the rapidly growing cities, towns and any new centres of

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<sup>8</sup> All population data are from: <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>

<sup>9</sup> On the rural economy see: <https://www.ifpri.org>

<sup>10</sup> de Janvry and Sadoulet (2009: 6); World Bank (2007: 30). On African economic development, including agriculture, see: Addison et al. (2015) and Addison et al. (2019).

<sup>11</sup> <https://pip.worldbank.org/home>

<sup>12</sup> FAO (2023: 7). For cross-country data see: <https://databank.worldbank.org/metadataglossary/world-development-indicators/series/SP.HOU.FEMA.ZS>

growth arising from the extractive industries should pay-off.<sup>13</sup> However, unless food production and marketing are transformed, then urbanization—and the manufacturing and services growth that accompanies it—will either stall or become ever more dependent on food imports (a source of vulnerability).

As a strategy, if the goal is to benefit the maximum number of livelihoods per dollar of investment, and especially poorer people, then the renewable resource economy should top the list—especially in countries blessed with good soils and water resources. The economic potential of these resources is often unrealized due to limited storage and transport infrastructure: food crops are lost because of inadequate storage—thereby exacerbating local food insecurities—and poor-quality roads make it costly to move food surpluses from high-yield areas to those which are food-deficit. Similarly, to gain the most from agricultural exports requires low-cost transport to ports. Investing in infrastructure that serves agriculture and other rural livelihoods can help offset the ‘Dutch Disease’ effects of non-renewable resource windfalls, which can otherwise be calamitous for agriculture.<sup>14</sup> Extractives companies can help by sharing some of their infrastructure, but this requires careful project preparation (which we discuss later).

Ecosystem services also offer increasing opportunities, especially in the context of carbon capture not only through forests but other natural capital including soils.<sup>15</sup> Governments can encourage ecosystem services and the associated livelihoods by stepping up carbon pricing to help redress the imbalance in incentives which still under-value renewable natural capital in all its forms.

In sum, aside from its intrinsic worth, there is an imperative to protect nature given its importance to livelihoods, food security and the elimination of poverty.<sup>16</sup> This is no easy task given the pressures of population growth and is made harder by climate change which is damaging the renewable resource base of many countries, with fossil fuels being a prime culprit. It is one of the paradoxes of poverty that countries with some of the greatest agricultural potential and highest rates of rural poverty—Angola, Mozambique, and Nigeria, for example—also have large fossil fuel sectors which their governments are likely to grow further. This is a tough dilemma to manage, especially when climate finance remains so limited. Yet one government—that of Colombia (where coal and oil account for around half of all exports)—has an ambitious strategy to reduce its fossil fuel dependence, and President Gustavo Petro is adamant that: ‘the economy has potential aside from just oil: the development of a productive agriculture industry, tourism, taking advantage of the country’s beauty, and the possible export of clean energies’.<sup>17</sup>

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<sup>13</sup> AGRA (2016); Reardon (2015); Richards et al. (2016); Timmer (1988).

<sup>14</sup> If badly managed, an oil or mineral revenue windfall can appreciate the real (and nominal) exchange rates, thereby cheapening the cost of imported versus domestically produced food. This creates a strong disincentive to domestic production (Nigeria in the first decades of its oil economy is a prime example). By lowering the unit costs of producers, infrastructure investment can offset some of the disincentive effect of currency appreciation for farmers selling to domestic as well as foreign markets.

<sup>15</sup> On the variety of ecosystem services see Potschin et al. (2016). Note, however, that carbon capture is not a ‘magic-bullet’ for the climate; Anderson and Peters (2016) provide a critique.

<sup>16</sup> Dasgupta (2021) discusses the economic role of nature, especially biodiversity. On nature’s role in economic development from an historical perspective see Barbier (2011). Collier (2010) discusses the damage to our planet.

<sup>17</sup> ‘Colombia’s Petro Woos Foreign Investors with Oil-Free ‘Potential’. *The Financial Times*, 21 July 2023. Colombia is home to nearly 10% of the Amazon rainforest.

### 3.2 Opportunities in manufacturing and services

Manufacturing is often the centre-piece of strategies for economic transformation, influenced by the histories of the now advanced economies as well as East Asia's huge strides over the last half century, beginning in South Korea and Taiwan, followed by Singapore and Thailand and then subsequently the spectacular rise of China and Vietnam.<sup>18</sup> Yet similar success has largely eluded SSA partly because its earlier industrialization strategies focused too much on substituting for imports (in small domestic markets) and too little on export manufacturing (where scale economies can be reaped and skills accumulated).<sup>19</sup> Exporting is a surer route for small LICs, with labour-intensive manufacturing providing only the first step. However, low labour costs are insufficient on their own to catalyse industrialization. Reliable power supplies, transport infrastructure, regulatory clarity and accessible enterprise finance are all essential, and these are often deficient.

Manufacturing today involves engaging in a global race in which any early advantage of low-labour costs dissipates—a sign of success as labour markets tighten and wages rise—so that matching the global leaders requires shifting to more capital- and skill-intensive industries. Ever closer integration into global value chains (GVCs) facilitates the transfer of advanced technologies, knowledge, and skills from foreign investors. Successful economies like Vietnam have met this challenge, but not without investing public money into energy, training, and transport as well.<sup>20</sup> With hard work (and luck) a country can reach the global technological frontier, and then perhaps become a leader like China, South Korea and Taiwan (China).

Although manufacturing can help boost economic development, it usually requires significant private investment, and a very judicious use of any public money that may be committed: unsuccessful industrial projects can end up draining, rather than filling, the public purse. Success in manufacturing does, however, increase and diversify the tax base, an important goal for economies that are over-dependent on resource taxes.<sup>21</sup> Large manufacturing enterprises sit in the formal sector: they are registered for corporate taxes and value-added tax (VAT), their employees pay income tax, and both employer and employee pay into social security systems. This is not the case for smallholder farmers nor for micro-enterprises and even some quite big enterprises operating informally, perhaps to avoid taxes and business regulation.

Setting up a factory is only the first step. Competitiveness must be sustained. Unlike a copper, cobalt or nickel deposit, a manufacturing firm can shift countries if its initial host becomes unattractive. It is also unwise to hope that manufacturing will be a big generator of jobs. As Joseph Stiglitz points out, manufacturing has been the victim of its own success: productivity globally has grown faster than global demand and so manufacturing's share of total employment is declining in almost all countries.<sup>22</sup> New and successful export industries are now far less labour intensive than previously—even when located in low-wage Africa. That region should certainly promote manufacturing, but this will only ever absorb a small fraction of Africa's many jobseekers: the

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<sup>18</sup> Nayar (2019a; 2019b). Lin (2011) and Lin and Wang (2015) discuss the lessons from China's success for structural transformation in the rest of the developing world, including Africa.

<sup>19</sup> For example, Tanzania in 1964 anticipated an increase in the share of manufacturing and processing in GDP from 4% to over 13% by 1980 (Government of Tanzania 1964: Table 111). But much of the industrial base collapsed in the 1980s. Most SSA countries have seen manufacturing's GDP share decline over the last 40 years (Newfarmer et al. 2018).

<sup>20</sup> On Vietnam, see Tarp (2017, 2019).

<sup>21</sup> Chang and Lebdioui (2020).

<sup>22</sup> Stiglitz (2018: 1).



majority will resort to agricultural or informal employment—in which incomes will be low unless skills, productivity and market access all improve.

There are also emerging opportunities in the services industries. LICs can draw four main advantages from any emphasis they may attach to services industries: (i) these will assuredly be growth industries globally; (ii) modern communication and information technologies (IT) open up significant new types of services with relatively low entry costs; (iii) many of the services are relatively easily tradeable internationally provided that the requisite IT infrastructure is in place; and (iv) the unit sizes of successful service companies can be quite small scale. There are already impressive and notable successes, including from Africa.<sup>23</sup> The potential for high-value services, especially those integrated into GVCs, reinforces the case for investing a good portion of resource revenues into education and training.

In summary, what is commonly referred to as ‘industrial policy’ no longer relates narrowly to manufacturing but to government strategies and actions to influence change in a wide range of activities also including agriculture, construction, finance, communication, and other services.<sup>24</sup> The transformation and modernising ambitions that drive such a policy in *all sectors* need to ensure that the economy has the capacity to both learn and apply new ideas (from whatever sources)—it will then be equipped to innovate and create new activities and livelihoods.

These considerations apply to the prospects for manufacturing development in general, and very much to the two most common strategies for the extractive industries: local content and downstream processing. They also very much determine the prospects for adopting new and exciting technologies such as hydrogen.

### 3.3 Local content

Industrial policy in resource-dependent counties frequently focuses on increasing the share of local content, including manufactured inputs and services supplied to the resource sectors. There has been much success in local content, and we provide some examples later, but there are reasons to be cautious.

If local suppliers are not internationally competitive their market will be confined narrowly to the local extractive industries, so it is important to assess the prospects for any local content supplier to become internationally competitive within a reasonable timescale. Mandated local content can encourage the over-reliance of supplier firms on the extractive industries leaving them vulnerable to the same shocks as commodities (which increases the correlation of the domestic business cycle with the commodity cycle). If the local resources become commercially stranded, then any uncompetitive local manufacturer will also struggle.

Moreover, if local manufacturers remain internationally uncompetitive then mandated local content targets will act as an implicit tax, raising the production costs of the extractives industry.

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<sup>23</sup> Examples from Africa include: Sproxil (Ghana) which provides an IT-based anti-counterfeiting system; Chil Artificial Intelligence Lab (Uganda) which uses AI-guided e-oncology services to detect cervical and breast cancer; Jumia Ivory Coast an online retail platform which according to Forbes magazine was the first African unicorn (a start-up valued at over US\$1 billion); and the Isizwe Project which was one of South Africa’s first mobile location-based service providers.

<sup>24</sup> Industrial policy now has an extensive literature, see in particular: Lebdioui (2024); Noman and Stiglitz (2017); Oqubay et al. (2020). Rodrik (2009); and Page and Tarp (2018). On the extractive industries and industrial policy see: Chang and Lebdioui (2020); Dietsche (2018); and Dietsche et al. (2013). The UNU-WIDER website ([www.wider.unu.edu](http://www.wider.unu.edu)) also has much material on industrial policy, especially in Africa.

If these additional costs are large, they will reduce the amount of taxable economic rent from the extractive industry and thereby the expected public revenue from the sector. They can also easily deter new investment.

Lobbying and rent-seeking are facts of political life, and policies such as mandated local content are vulnerable to such behaviours. A few well-connected local companies can easily capture the market, impose high prices on buyers who have no alternative and, if those rent seekers subsequently struggle, they may capture public subsidies as well.

Two big global trends also affect the prospects for success of local content policies. First, local content policies swim against the strong tide of automation in a sector characterized by increasingly high levels of technology and skill intensities. Those MICs with a technological base might have enough expertise to enter these markets, perhaps through joint ventures with MNCs, as do the Gulf region's national oil companies (NOCs) with their deep pockets and technical expertise. But LICs and LMICs could find themselves confined to supplying the least technologically advanced inputs at best. Second, and more positively, countries with clean energy systems are potentially better placed to create the green manufacturing of inputs and so step-up local content by that means. This offers an opportunity given the impetus for companies to reduce their emissions. This is a strong reason to coordinate the national strategies for the extractive industries and energy supply.

Ultimately, success in achieving greater local content hinges on overcoming the numerous constraints that afflict enterprise creation and growth generally in poorer countries—an important point developed later.

### **3.4 Downstream processing**

It is too often uncritically assumed that processing mined resources locally will invariably add more value to the economy than exporting an unprocessed or partially processed mineral. This may be so, and again there are success stories, but also many salutary examples of failure.<sup>25</sup> The risks need careful assessment before promoting any downstream processing. If there is no industrial base, then the inputs needed for processing must be imported—which constitutes an offset to any gain in local value-added. Consequently, processing margins may be small and even more volatile than the prices of unprocessed minerals. Furthermore, most LICs have only tiny domestic markets for processed metals, and therefore need to export the bulk of any produced. But export markets can be expensive to reach—especially when ports and railways are deficient—and just-in-time management systems may preclude distant suppliers. Competitive processors of metals, notably China, already enjoy huge economies of scale. Achieving cost competitiveness against this reality is difficult even for large miners of metals such as Chile with its ample copper deposits and well-developed industrial base. It is even more difficult for smaller suppliers and later entrants.

Metals refining requires huge amounts of cheap energy, reliably supplied: many LICs lack this in comparison to China and other principal refining centres.<sup>26</sup> Therefore one first step must be to invest in a solid domestic energy system. But this is not enough: refineries using coal-fired power risk become commercially unviable—perhaps sooner than expected—as demand for 'green' metals grows. Renewable energy might give countries an edge in the growing global market for

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<sup>25</sup> Östensson and Löf (2018).

<sup>26</sup> For example, in both Nigeria and South Africa electricity is not only expensive but the supply is intermittent.

green metals, but this again requires large-scale investment (notably in geothermal—the best of all).

Indonesia, with its large investments in *nickel refining* (especially from China), provides a good example of the pros but also the cons of downstream processing. On the plus side, the market for the refined nickel seems secure—Indonesia’s own nascent electric vehicle (EV) manufacturing industry (including joint ventures with Chinese companies) and exports to EV companies in China itself. On the negative side, the refining is heavily dependent on coal-fired power (using Indonesia’s abundant reserves). This provides cheap reliable electricity but runs counter to positioning Indonesia in the growing market for green nickel. Indonesia has already burnt through considerable sums trying to establish a domestic bauxite processing industry.<sup>27</sup>

If a country cannot realistically meet the conditions necessary for competitive refining—and especially if it cannot realize the necessary scale economies—then its downstream investments will be value-reducing. The worst-case scenario is one that ends up with a domestically produced metal that is both uncompetitive in export markets and more expensive than imports, making it unattractive to domestic manufacturers as well. Governments then typically resort to high tariffs and import quotas to force domestic manufacturers to buy the more expensive domestic product. But this raises the domestic prices of any final product, and prices domestic manufacturers out of export markets. If the processing is subsidized, there is also a burden on the public purse and one which it is likely to endure for the lifetime of the project if international competitiveness is never achieved.

Infant industries *can* grow up, and achieve competitiveness, but to do so they need very careful preliminary analysis of their viability and their prospects for achieving international competitiveness on a reasonable timescale. There is also an opportunity cost—any public money committed might have been better deployed in other ways to reduce the enclave nature of the extractive industry (via infrastructure investment, for example). Hence, our general emphasis on the need to build excellent analytical capacity in government, and to protect this from undue political influence and corporate lobbying.

The oil and gas sector has downstream traps of its own. Building more national refining capacity, including providing feedstock for a domestic petrochemical sector, is a popular strategy in the Middle East and North Africa (MENA) region’s hydrocarbon-rich economies. This can make commercial sense (though not environmental sense). But the typical LIC has far less public money to invest in oil refining than the Gulf region, and so the opportunity cost of failure is much higher. Uganda is a case in point. Following major onshore oil discoveries in Uganda’s Lake Albert Rift Basin in 2006, a plan developed to build a refinery. But this has been mired in controversy and years of delay over whether it will be commercially viable given the likely volumes, the necessary tariffs, and competition for the East African market from the more accessible capacity at Kenya’s Mombasa port.<sup>28</sup>

The general message from this brief review is not to eschew either downstream processing or local content as policy options but to be alert to the possible downsides, and to recognize that they are only one part of the potential diffusing role of extractives. In particular, any commitment of public

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<sup>27</sup> Another example is India’s iron-ore processing and steel industry. See Östensson and Löf (2018) on Indonesia and India.

<sup>28</sup> Kayizzi-Mugerwa (2020) discusses Uganda. Hicks (2015) argues that in Uganda, Chad, and Niger the political priority given to refining has distracted, and seriously delayed, development of the more commercially assured export trades that the new oil makes possible.

money, or other policies to promote/subsidize greater local content and downstream processing must take full account of the challenging market realities that face local industries; must weigh up the possible risks and prospective fiscal costs; and do that with a clear eye on possible alternative methods of promoting structural transformation.

#### 4 The investment surge

Resource economies have received unprecedented inflows of foreign direct investment (FDI) since the millennium, and these large flows seem set to continue and indeed accelerate for critical minerals. The past two decades have easily been the most successful for new investment in Africa, a continent which has often found it especially hard to attract FDI. Africa's resource economies have seen very large absolute and percentage increases in their FDI stocks since 2000 (see Table 1). The mining and oil and gas sectors dominate Africa's FDI, and probably will do so for at least another decade.

Table 1: FDI stocks in selected African countries (US\$ million) and export dependence (%)

Country	FDI Stocks				Extractives Dependence 2018 (%)	Country	FDI Stocks				Extractives Dependence 2018 (%)
	2000	2010	2022				2000	2010	2022		
Ghana	1,554	10,080	42,493		70.0	Ethiopia	941	4,206	35,281		12.9
Guinea	263	486	5,252		83.8	Kenya	932	5,449	11,232		11.0
Guinea Bissau	38	63	315		4.7	Madagascar	141	4,383	9,092		38.1
Liberia	3,247	10,206	9,002		60.7	Somalia	4	566	4,923		0.5
Mali	132	1,964	6,272		68.0	Uganda	807	5,575	18,089		23.9
						United Republic of					
Mauritania	146	2,372	12,161		46.6	Tanzania	2,781	9,712	18,634		41.9
Niger	45	2,251	8,238		43.5	Angola	7,977	32,458	14,719		99.8
Nigeria	23,786	66,797	88,202		93.6	Botswana	1,827	3,351	5,211		91.7
Cameroon	917	3,099	6,446		49.5	Lesotho	330	929	958		32.3
Central African Republic	104	511	715		46.0	Malawi	358	963	1,605		3.0
Chad	576	3,594	8,372		90.3	Mozambique	1,249	4,331	54,114		74.1
Congo	1,893	9,261	34,026		79.0	Namibia	1,276	3,595	7,848		40.0
Congo Democratic Republic	617	9,368	30,995		90.9	South Africa	43,451	179,565	173,584		43.0
Equatorial Guinea	1,060	9,413	15,892		95.0	Swaziland/Es watini	536	929	4,151		0.7
Gabon	-227	3,287	16,591		72.0	Zambia	3,996	7,433	15,236		75.2
Rwanda	55	422	3,327		56.9	Zimbabwe	1,238	1,814	6,499		50.2
						Sub-Total	69,844	267,269	383,198		
Sub-Total	34,206	133,174	288,299			TOTAL	104,050	400,443	671,497		

Note: numbers in red relate to 2014 rather than 2018.

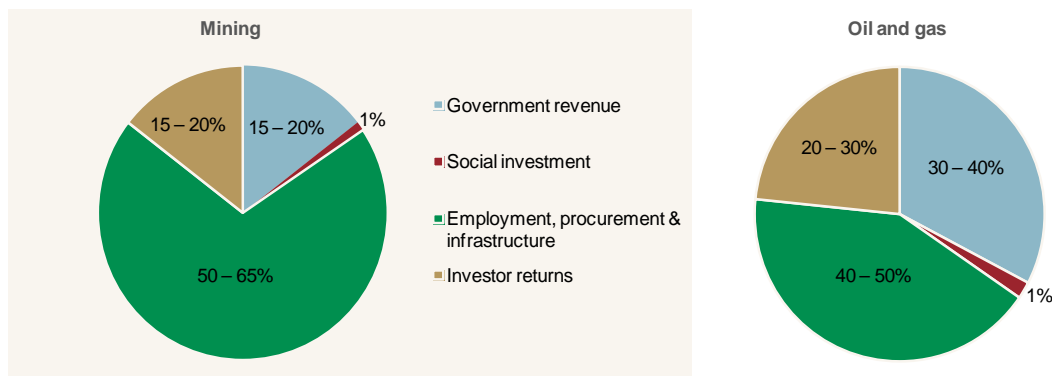
Source: authors' elaboration based on UNCTAD (2023).

To do so we note that the injection of demand into the domestic economy, causes waves of increased spending on domestic goods and services as well as increased imports. Even in cases where the import share of the corporate spend is high, the absolute magnitudes of the remaining domestic spend can have major macroeconomic significance—depending on the scale of the project and the supply response of domestic producers. This can create a macro-economic problem (Dutch Disease) but also an opportunity, if well-handled, to transform the economy’s structure. Specifically, the domestic supply response can be enhanced by appropriate supply-side policies and judicious public and private investments that build upon (‘leverage’) the demand impulse arising from the project itself.

#### 4.1 Leveraging the potential of the investment surge

So, what are the potential linkage benefits of these large FDI flows and how do they arise? First, there are the *direct* expenditures by mining and oil and gas companies. These capital and operating expenditures (CAPEX and OPEX) invariably exceed government revenues from the extractives sector—three to four times greater in some mining projects, and some 50 per cent greater in oil and gas projects even before additional (‘multiplier’) effects are accounted for (see Figure 1).<sup>29</sup>

Figure 1: Typical share of total spending (direct) in the extractives industries



Source: reproduced from Östensson (2018: 506), under the Creative Commons Attribution-Non Commercial-Share Alike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO).

Local content policies often target these direct expenditures on local goods and services. All major mining companies now maintain suppliers’ development programmes that provide support with technical guidance and finance etc. These undoubtedly help to produce substantial new capacity in agriculture, services and sometimes manufacturing, and can be enhanced when integrated with broader public programmes and support from such bodies as Chambers of Commerce. This also extends their reach and longevity well beyond the narrower needs and lives of the mining or oil and gas sectors. Similarly, company provision of technical and other vocational training can be linked into broader government programmes to accumulate a significant base of transferable skills (e.g., of construction skills for housing development).

Leveraging effects can be further enlarged via indirect expenditures: enterprises supplying the extractive industries using their own additional revenues to purchase more goods and services from other enterprises, which then give rise to further rounds of spending—rippling right across the entire economy. Economy-wide programmes for enterprise and skill development can intensify these indirect expenditure effects, enabling domestic producers to competitively supply

<sup>29</sup> As estimated by Östensson (2018).

the market (relative to imports) not just for the extractives sector but for other sectors as well. Committing public money to such programme can have good returns.

Additional domestic demand also originates in households with members earning the relatively high wages available in the extractive industries: sometimes 5-10 times greater than other local wage rates.<sup>30</sup> The items involved in their expenditures may be individually quite small, but they are numerous (food items, clothing and footwear, household goods, personal services, transport services etc.) and so cumulatively of benefit to many local enterprises.

## 4.2 The enterprise constraints

In sum, the investment surge arising from extractive industries represents a clear opportunity to build up an economy's supply-side: by strengthening existing sectors—including the renewable resource economy (agriculture, ecosystem services etc.)—and by developing new activities in manufacturing and services. Success does, however, depend on overcoming the multiple constraints that hold enterprises back. The responsiveness of the economy's supply-side in poorer economies has been a central, and much debated, question in development economics for decades as it determines the scale of public action required to compensate for deficient market forces.<sup>31</sup>

Entrepreneurship is rarely in short supply even in the poorest countries. Rather, most of the many millions of microenterprises—often home-based or street-based—remain informal (unregistered) with little capital. Such businesses need considerable help in adopting technologies, and above all a fixed property location and a proper registration that are more amenable to commercial scale operation: for most a seemingly daunting and risky step. Many small and medium enterprises (SMEs), which are the next step up in size from micro-enterprises, also remain informal, and are therefore subject to a multitude of constraints in responding to additional demand when markets grow.<sup>32</sup>

Even those that do formalize (becoming registered businesses paying taxes) have difficulty developing beyond the SME stage. The many constraints are well documented across countries.<sup>33</sup> These typically include: a lack of capital; a lack of access to credit (with commercial banks unwilling to absorb much loan risk); unreliable/expensive power and water supplies; lack of transport infrastructure to ensure timely and reliable access to local and international markets; cumbersome procedures for registering business and over-zealous and complex regulation (a stimulant to corruption); and complex and onerous tax systems.

Consequently, despite the many apparent opportunities, enterprises in poorer economies find it hard to supply the large volumes of goods and services required directly or indirectly by the extractive industries. In Mozambique, for example, only about 15 per cent of the upstream

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<sup>30</sup> Roe and Round (2018) discuss such induced demand effects.

<sup>31</sup> Economists can be placed on a spectrum from 'structuralism' to 'market liberalism', implying greater or lesser reliance on state action in driving development (see Addison 2014).

<sup>32</sup> The failure of these informal businesses to respond and expand turnover even in response to large demand increases is explained in part by the paradox noted by Banerjee and Duflo (2011). Specifically, they tend to achieve high marginal rates of return but on very small turnovers and consequently have abysmally low total returns.

<sup>33</sup> Fields et al. (2023).

construction value chain is produced domestically.<sup>34</sup> Much of the equipment and skilled labour used directly in the mining and oil and gas sectors is therefore imported.

Unless reduced, these constraints will conspire to limit the benefit of any investment surge for the broader economy: i.e., the direct, but also the indirect and induced multiplier impacts (that together can be 5-6 times the direct impacts). These realities can fuel deep scepticism about the benefits of extractive industries and many countries respond by imposing local content requirements rather than encouraging its competitive development.<sup>35</sup> This policy response is not surprising, but it is often not sensible for the reasons already set out. If mandated, local content regulations will be unlikely to achieve the desired results when the fundamental constraints holding back enterprise development remain binding.

In sum, host governments hold the solutions in their own hands. They know clearly what the constraints are on enterprise development—there is ample research evidence, not least from interviews with entrepreneurs—they just need to take more decisive action.

### **4.3 Broadening linkages: local, regional, and national**

Market forces can deliver some benefit for the broader economy from the investment surge in oil, gas and mining as domestic firms seek opportunities to profitably supply the sector. But larger impacts invariably require public action including new public goods and services financed partly by the extra tax revenue generated from the sector itself. Market forces alone cannot do the job.

Although the national government must be the custodian of any overarching development vision—ideally via a well-articulated national plan—it should avoid a tight and highly centralized control of the process. Rather the government should build a good understanding of how the different actors can work together to leverage even further the various impacts of the large investments associated with the extractives sector itself. These actors include companies, financial institutions, private sector bodies (such as chambers of commerce) and government institutions (central, regional, and local).

To illustrate this theme, we now discuss three promising ways forward, moving from the local to the regional to the national levels, each illustrating the principle of co-ordination. The first is a company programme to stimulate increased local content with a local chamber of commerce (an example from South Africa). The second is a regional programme to increase local content via a regional federation of industries (an example from Brazil). The third relates to the benefit of building strong development finance institutions (examples from Brazil and Chile). Each of these offers a possible template for adaption to individual country circumstances. All involve institution-building to achieve the level of co-ordination necessary and each requires a public-private partnership to work.<sup>36</sup> Neither the market nor the state alone can achieve the desired outcome which is to reduce the enclave nature of the extractive industries by building stronger linkages—thereby stimulating more economic activity and livelihoods at the local, regional, and national levels.

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<sup>34</sup> Cruz et al. (2020: 195) discuss Mozambique. Tanzania faces similar constraints (Kikwasi and Escalante 2020).

<sup>35</sup> These vary in ambition, ranging from requiring the purchase of local inputs and labour up to requirements on local ownership. See Lange and Kinyondo (2016).

<sup>36</sup> See Page and Tarp (2017) on Asian and African experiences.

#### 4.4 The local level

All responsible oil, gas and mining companies now operate supplier development programmes, combining technical, training, and financial support to existing or potential suppliers. Some have long histories and high rates of success such as the Anglo Zimele (AZ) scheme set up in 1989 by Anglo American in South Africa. Over thirty years it has supported over 2,000 local businesses and created some 50,000 jobs in South Africa.<sup>37</sup> This programme goes beyond the narrow need to increase local supplies to a mining company by also supporting enterprise development not directly linked to one particular mine, as well as offering community hubs that provide information and guidance on business practices and communication technologies more generally.<sup>38</sup> The Zimele approach to enterprise development could be a model for other countries.

Local chambers of industry and commerce can be ideal vehicles for co-ordinating a variety of different company stakeholders to contribute finance, training, and other support. Chambers of mines in some counties such as Brazil have achieved the same goal for a grouping of geographically clustered mines and have also helped to intermediate the often-difficult issues that partnering between competitive entities—to achieve economies of scale—can involve.

#### 4.5 The regional level

A good example of the possibilities comes from the Brazilian state of *Pará* which attracted very large mining investments at the turn of the century and not least from Vale lda and Hydro.<sup>39</sup> The areas around their mines, despite being relatively underdeveloped, quickly succeeded in supplying inputs (also to non-mining businesses). By 2008 *Pará* state accounted for 25 per cent of Vale's own procurement, while a further 50 per cent was from other Brazilian states. Much of the credit for this goes to the *Pará* State Government's state-wide supplier development program REDES, managed by *Pará's* Federation of Industries (FIEPA).<sup>40</sup> REDES responded to the new opportunities offered by *Pará's* large mining investments, aiming to increase the competitiveness of local companies in supplying large investors from any sector. REDES obtained its initial funding from 15 large companies that constitute FIEPA's 'funders', but significantly these were operating in various sectors including energy, and food, as well as mining.

The general point illustrated by the REDES example is that partnerships co-ordinated by bodies other than government or any mining (or oil and gas) company can stimulate new economic activity in a region that had not seen much industrial development prior to the arrival of new investment. There is no need for national or local governments to envision local content as being limited to just those goods and services procured by a mining or an oil and gas company. Greater ambition can pay off.

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<sup>37</sup> <https://southafrica.angloamerican.com/our-difference/zimele>, the AZ scheme offers support to: SMEs within the mining value chain; to other businesses outside that value chain; and to young entrepreneurs in starting their businesses (Anglo American and IFC 2008).

<sup>38</sup> In relation to some of its work, AZ delegates delivery to TechnoServe, a not-for-profit organization set up to harness the capabilities of South Africa's private sector.

<sup>39</sup> This 'new' mining area in the north of Brazil is characterized by below average economic and social development and hosts part of the Amazon rainforest.

<sup>40</sup> *Redes de Desenvolvimento de Fornecedores do Pará* (Supplier Network Development Program of *Pará*). *Federação das Industrias do Pará* (Federation of Industries of *Pará*).



## 4.6 The national level

In a functioning market economy, the co-ordinating role of governments is complemented and sometimes over-shadowed by the co-ordinating role played by banks and other financial institutions (OFIs). These financial institutions typically intermediate large amounts of investible funds between savers and investors, helping to shape the sectoral pattern of economic development. In LICs, this co-ordinating/intermediary role is present but limited because of the restricted development (and national coverage) of banks and OFIs and the narrow range of financial intermediation instruments (tiny stock markets, thin forward markets etc.). Furthermore, the banks—invariably the largest financial institutions—typically focus on larger companies (often trading traditional export commodities) and they tend to buy safe government securities rather than lend to new enterprises, both characteristics limiting innovation and new development, especially among SMEs.<sup>41</sup>

Consequently, governments should consider promoting less conventional banking institutions such as development banks or development finance institutions (DFIs).<sup>42</sup> These institutions were popular in the 1960s and 1970s and they received much financial and technical support from donors, before falling out of fashion in the 1980s as many succumbed to politicization and poor management leading to large losses for the taxpayer.

However, DFIs are back in fashion and 20 per cent of those currently operating were established after the Millennium, based on new and effective operating models—especially in Latin America. However, Africa and Asia also offer a wide variety of DFI experiences.<sup>43</sup> DFIs have now become important facilitators of structural transformation and technical change. Latin America's DFIs successfully finance longer term and riskier investments that are largely ignored by private capital markets which overwhelmingly prefer short-term and safer investments.<sup>44</sup> Brazil's national development bank, BNDES, has filled this gap in a country where, despite its MIC status, securities markets remain relatively shallow.<sup>45</sup> Its long experience, reinforced by the reform in 2017, enable BNDES to support private developers in building a pipeline of technically sound and bankable projects, and it either provides direct financial and technical support to projects or fosters new instruments to leverage additional resources from private banks and other institutional investors.<sup>46</sup> Similarly the Start Up initiative of Chile's development bank, CORFO, has generated one 'unicorn' (a start-up now valued at over US\$1 billion) and many other companies of smaller but growing

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<sup>41</sup> A study on long-term development finance in Tanzania found that banks account for no less than 75% of all the funds intermediated by the financial system. Moreover, the two next important types of financial institutions (pension funds and insurance companies) also deposit large percentages of their own investible funds in the commercial banks (OPM 2011).

<sup>42</sup> There are various labels for these publicly supported institutions. To keep matters simple, we use the DFI label throughout.

<sup>43</sup> Africa has over 70 DFIs that are members of the Association of African Development Finance Institutions (AADFI) AADFI including: the Development Bank of Southern Africa (DBSA); the Industrial Development Corporation also of South Africa (IDC); the Botswana Development Corporation (BDC); and the Development Bank of Namibia (DBN) (AADFI 2019). Asian examples include: *Bank Pembangunan Malaysia Berhad* (BPMB); SME Bank also of Malaysia; *Bank Rakyat Indonesia* (BRI); and the large Chinese development banks.

<sup>44</sup> Griffith-Jones and Ocampo (2018).

<sup>45</sup> *Banco Nacional de Desenvolvimento Economico e Social* (BNDES), Brazilian Economic and Social Development Bank.

<sup>46</sup> Studart and Ramos (2018) discuss BNDES.

size, a success that OECD (2016) concludes is comparable to Singapore (which is in the vanguard of private-sector development).<sup>47</sup>

In sum, while DFIs differ in their mandates and *modus operandi*, they have a common characteristic: a commitment to address the market failures arising from traditional commercial banking, notably inadequate longer-term financing, avoidance of innovative but riskier investments, and underinvestment in SMEs. Well-managed DFIs can amplify the boost to the national economy arising from the large direct and indirect expenditures associated with the oil, gas and mining industries. For example, a DFI with a mandate to promote SMEs can provide finance and project preparation support to suppliers of local content to extractives companies as well those SMEs riding the tide of higher domestic demand.

Historically successful countries have pursued this strategy of close public-private partnership to diffuse the benefits of the resource sector's growth across the broader economy.<sup>48</sup> Yet success also depends on building and maintaining the infrastructure that boosts enterprise productivity, and which connects the local economy to the regional, and the regional economy to the national. It is therefore to infrastructure that we now turn.

## 5 Leveraging infrastructure investment

Mines and oil and gas installations are huge consumers of electricity and water, they need reliable telecoms and IT services (especially as automation accelerates), and the necessary road, rail, pipeline, and port infrastructure (which also transports the equipment and other inputs), entails large-scale construction. Resources have no market value unless transport infrastructure is in place. Thus, Bolivia has talked about becoming a lithium 'Saudi Arabia' for years (it has the world's largest estimated reserves) but its lithium-abundant deposits in Salar de Uyuni high in the Andes are remote from the nearest port in neighbouring Chile, and there is little in the way of the necessary power and transport infrastructure. To get Uganda's oil to a port at Tanga on neighbouring Tanzania's coast involves the construction of a 1,440 km pipeline. Offshore gas necessitates expensive liquified natural gas (LNG) 'trains' (the liquification and purification facilities) to ship the gas to export markets, or pipelines connected to onshore gas-fired power stations.

Such infrastructure investment is hugely expensive. Construction must be undertaken well in advance of any revenues and much of it is debt-financed. Usually the financing is a mix of public and private (with the mine or oil and gas facility constituting the 'anchor project') sometimes through public-private partnerships (PPPs), and often catalysed by multilateral development banks (MDBs) providing the initial risk capital and funding for the appraisal and planning process (the African Development Bank (AfDB) has a programme for this).<sup>49</sup> This results in complex financial packages, requiring close coordination and a clear delineation of the financial and other responsibilities of each investor. Private investors will only commit when they are convinced that the project has a satisfactory rate of return and an acceptable level of risk, and MDBs must be satisfied that the project has a strong 'social' rate of return and does not pose an environmental

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<sup>47</sup> Griffith-Jones et al. (2018) discuss CORFO (Corporación de Fomento de la Producción or Production Development Corporation).

<sup>48</sup> See Auty (1987, 1989); Porter (1990).

<sup>49</sup> On PPPs see: <https://www.ifc.org/en/what-we-do/sector-expertise/public-private-partnerships>.

risk (also now required by the best private investors). Governments must be careful not to overcommit public funds and take on too much fiscal risk.

Guinea illustrates the difficulties. The country has some of the world's richest bauxite and iron ore deposits, but many potential mines are distant from the coast. Plans to invest more in the necessary railways and ports pre-date Guinea's independence from France in 1958 but it is only recently that real progress has been made. Guinea's Simandou project, which includes a 600-kilometre multi-use railway and port facilities, is Africa's largest greenfield integrated mine and infrastructure project (Simandou is the world's largest untapped iron ore reserve). It is now proceeding after repeated delays caused by periods of low iron ore prices, disputes between investors and the government, and political instability.<sup>50</sup>

In sum, getting large-scale infrastructure projects off the ground is a demanding task but one that has considerable economic benefits if successful. The construction phase is a good way to generate jobs including more at local level (especially if complemented by investments in skills training).<sup>51</sup> More ambitiously, infrastructure investment in the extractives sector can potentially serve other sectors, thereby leveraging the investment's benefits and diluting the tendency of the extractives sector towards enclavism.

Such leverage is especially important for Africa which has the biggest infrastructure deficit of any region, a deficiency which deters domestic investment and FDI into agriculture, manufacturing, services, and tourism—thereby limiting economic transformation and job creation.<sup>52</sup> Greater FDI would help integrate Africa more effectively into GVCs and encourage exporting firms which tend to pay more than firms just focused on the domestic market: the former operate at a larger scale, use more capital, and consequently require skilled workers who are more productive and therefore better paid.<sup>53</sup>

Africa's enterprises are much more likely to cite infrastructure deficiencies as an obstacle to investment than lack of finance or skills shortages (though those are important too).<sup>54</sup> Enterprises, large and small, suffer chronic power deficiencies when grid supplies are erratic. Nigeria and South Africa are notorious for their power shutdowns: firms stop working or resort to expensive diesel generators. Transport is especially deficient.<sup>55</sup> Trucks crawl along pot-holed roads, trains creep along colonial-era track, and exports and essential imports back-up in choked ports. One study found that an increase in inland transit time by one day reduces African exports by 7 per cent on average, and that Africa's export volumes are about 16 per cent lower than the level predicted by the standard determinants of trade.<sup>56</sup>

Rural transport and energy infrastructure is especially important to raising yields in African agriculture—by increasing irrigation (which requires electric pumps for water management)—as

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<sup>50</sup> Rio Tinto is the lead investor: <https://www.riotinto.com/en/news/releases/2023/simandou-iron-ore-project-update>.

<sup>51</sup> Estache et al. (2013).

<sup>52</sup> The cost of closing Africa's infrastructure is estimated to be at least US\$150 billion per annum (Lakmeeharan et al. 2020).

<sup>53</sup> Eifert et al. (2008).

<sup>54</sup> Fox and Oviedo (2013).

<sup>55</sup> Page and Söderbom (2012: 16).

<sup>56</sup> Freund and Rocha (2011).

well as by reducing the cost of delivering produce to local, urban markets and global markets. In Asia, much of the success of the last 50 years in reducing rural poverty is down to infrastructure investment.<sup>57</sup> Getting Africa's infrastructure closer to international standards will raise its productivity in agriculture, and not just in manufacturing and services.

This is a big and expensive challenge. Identifying ways for farmers and local enterprises, large and small, to share in the railways, roads, ports, and energy infrastructure built for mining and oil and gas production can help to close the infrastructure deficit. However, while the principle has widespread acceptance, the devil is in the details of project design, financing, and regulation.<sup>58</sup> Rail transport, for example, requires sorting out the practicalities of how to share the track, maintenance and upgrade costs, rolling stock investment, and insurance. Given the reliance on project cash flow for debt repayment, the higher the complexity of the shared-use structure, the less bankable it is likely to be. In sum, sorting out multi-user demands on infrastructure can be complicated and demands a high level of project management skill: assistance from the MDBs is invaluable to achieving this.

There are some significant successes with sharing arrangements at local level. One example is the subsidiary road projects linked to the Tenke Fungurume Mining project near the large copper mine site in Katanga DRC: its feeder roads benefited community livelihoods by radically reducing transport times for farmers.<sup>59</sup> But many similar ideas never get implemented and companies and governments must work together to gather this 'low hanging fruit' for local community development.

Achieving greater impact beyond the local level, via diffused economic development and diversification at the regional and national levels, is a tougher task. Resource corridors are one tool of this more ambitious approach. The Maputo Development Corridor (MDC) linking Mozambique and South Africa is a well-known example, with the Mozal aluminium smelter near Maputo acting as the anchor investment, and with road and rail linkages to South Africa. MDC's impact has been positive (including encouraging further investment) despite some setbacks and deficiencies (it could have done more to open up opportunities for SMEs, for instance).<sup>60</sup> India, Malaysia, and Thailand also provide examples of successful economic corridors.<sup>61</sup>

Inevitably there have been failures as well, enthusiasm for resource corridors has waned somewhat, and there are still too few examples of successful greenfield multi-client/multi-user mining-related infrastructure PPPs in the world.<sup>62</sup> As is often the case with apparently simple concepts, implementation has proven trickier than expected. The root of the problem is often a lack of government capacity and experience in coordinating the actions of a wide range of stakeholders, both public and private, ranging in scale from community organizations and local authorities up to multinational companies (MNCs) and MDBs. Overcoming this constraint requires engagement and leadership from the highest levels. A clear legal and regulatory framework is essential for attracting private investment finance, both to the anchor project as well as ancillary projects, and

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<sup>57</sup> Especially in Indonesia (Timmer 2019; Vos 2019).

<sup>58</sup> Collier and Ireland (2015); Östensson (2018); Östensson (2020).

<sup>59</sup> Östensson and Roe (2013: 46); OPM (2013).

<sup>60</sup> Baxter et al. (2017); Bowland and Otto (2012). Cruz et al. (2023) discuss the challenges of regional development in Mozambique.

<sup>61</sup> Hill and Menon (2020).

<sup>62</sup> Östensson (2018) provides a review.

PPPs need especially effective management with a clear delineation of the responsibilities to be borne by each stakeholder.

Resource corridors and other forms of large-scale infrastructure investment need to prioritize community engagement and environmental impact assessment from the appraisal stage onwards (with regular data collection to monitor impact, especially on community poverty and natural capital). The history of global development is unfortunately replete with projects that resulted in large-scale social and environmental damage, and aggrieved communities. The ‘Law of Unintended Consequences’ applies here: governments and companies are often surprised by outcomes that could have been avoided or mitigated by early community engagement. Moreover, people will inevitably migrate to the new growth poles and the job opportunities they offer, resulting in excess demand on housing and community infrastructure unless the necessary investment is stepped up.

## 5.1 Cross-border challenges

Resource-wealthy, but landlocked, countries face special difficulties in bringing their commodities to the global export market: distances to ports are long, and building and managing the transport infrastructure necessitates cooperation between neighbours—often complicating the project’s risks. In Africa 16 out of the region’s 55 countries are land-locked (the highest percentage of any region). The costs of intra-African transport are exceedingly high in any case (because of the generally poor state of infrastructure). Improving transport infrastructure between countries has many benefits and cross-border integration in trade offers large and well documented returns. Progress on cross-border infrastructure in Africa has, however, been painfully slow, and projects such as the MDC linking Mozambique and South Africa are still too few. Across Africa, road transport is still used to transport large amounts of ore from mines in the interior to ports when it should really go by rail.

There are now signs of renewed life in cross-border projects. Despite the ups and downs of metals prices—with slumps often leading to investments stalling—forecasts of strong long-term demand, especially for critical minerals, are encouraging renewed investor interest, as is competition between western countries and China over access to Africa’s mineral resources (leading the US government in particular to play a more active and supportive role). The ‘Liberty Corridor’, a multi-user infrastructure corridor to transport iron ore by rail from mines in Guinea (operated by a US mining company) to a new port facility in Liberia is underway, after many false starts. The railway will also transport freight and agricultural products, and the project includes additional investments in telecommunications and roads; hydro power will be supplied by Cote d’Ivoire. The Mbalam-Nabeba project to ship iron ore from a large deposit straddling the border between the Republic of Congo and Cameroon to an export terminal in the Cameroon has also been signed off (with Chinese investment replacing Australian, leading to an investor dispute).

Most ambitious of all among the new mining infrastructure projects is the ‘Lobito Corridor’, a 1,300 km railway connecting Zambian and DRC mines with an existing (to be upgraded) rail link to an Angolan port, with the aim of supplying cobalt and copper to EV battery manufacturers in the United States and the European Union. China earlier announced an investment to upgrade the Tazara railway between Zambia and Tanzania (which was originally built with Chinese aid in the 1970s) to ship copper and cobalt to its EV industry.

The organisational complexity of cross-border infrastructure investments in oil and gas, as well as the risks, is well-illustrated by the East Africa Crude Oil Pipeline (EACOP) project. The pipeline will transport oil from Uganda’s Lake Albert oil fields to an export terminal near Tanga Port in

Tanzania.<sup>63</sup> The cost is estimated at more than US\$3.5 billion, and is one of the world's largest ever pipeline projects.<sup>64</sup> The project is planned to improve the trade corridor between Uganda and Tanzania via better road and communications infrastructure investments which should benefit economic activity unrelated to the oil sector itself. An ambitious project for sure, but one that has been delayed by ruling out an alternative pipeline route to a Kenyan port, wrangling over tax issues and project financing, and the complexities of a project involving multiple regional and district authorities.<sup>65</sup> Community organizations and non-governmental organizations (NGOs) have highlighted deficiencies in compensation to communities for displacement and land acquisition (and related livelihood loss) and there is criticism over the scale of the project's environmental impact.<sup>66</sup> Ineffective community and environmental assessment has been associated with project failure in Africa (and globally). Problems often arise in community-company relations in extractives projects, and large-scale projects that cross borders must be especially well-managed.

In sum, there are many challenges in implementing cross-border infrastructure projects. However, governments and MDBs have given considerable thought and attention to resource corridors, PPPs and other mechanisms in recent years, the strategy enjoys considerable political support, and its underlying logic is basically sound. Putting it into practice requires upgrading national capacities, not least better national planning systems to identify the investments with good prospects for growth and poverty reduction and to avoid white elephants.

## 6 Conclusions

This paper has discussed various ways in which the enclave mindset within governments might be overcome, so that more linkages from the extractive industries to local, regional, and national economies can be created. This is a tough agenda, but it can be delivered. And as Joseph Stiglitz has pointed out: '...the fact that in the past such linkages appear to have been weak may only reflect the lack of effort in developing them'.<sup>67</sup>

There are considerable opportunities arising from the huge investment flows into the extractive sectors and their very large direct and indirect expenditures. These provide the prospect for catalysing enterprise development. However, realizing these opportunities, requires proactive support for *all* enterprises—not just those directly connected to the extractive industries—and especially for SMEs trying to transition from informal to formal status. Strong cooperation between public and private players is necessary—neither can deliver success acting alone—and, on the state side, strong DFIs can help fill the large gaps in enterprise finance left unfilled by commercial banks which are less risk tolerant.

Greater local content and downstream processing is achievable, but narrowing policy down to just these approaches is risky. Local manufacturing can become over-exposed to the shocks that

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<sup>63</sup> <https://eacop.com/>

<sup>64</sup> On Uganda, see Abigaba et al. (2021); Kayizzi-Mugerwa (2020); Wolf and Potluri (2020).

<sup>65</sup> Tanzania's terrain was also more favourable than Kenya's. Security is also an issue as Kenya's Lamu port is closer to Somalia making it a potential target for al-Shabaab militants.

<sup>66</sup> For instance, see the report by Human Rights Watch (2023). In May 2019 a coalition of African and international bodies wrote to leading banks to ask them to refrain from financing the project on the grounds of likely damage to both livelihoods and nature.

<sup>67</sup> Stiglitz (2018: 15).



bedevil the markets for oil, gas, and metals as well as to the eventual exhaustion of the resources or their commercial stranding (an increasing danger with hydrocarbons). We advocate a broader approach in which the renewable resource sectors, and especially agriculture and husbanding natural capital, are central—certainly in generating better livelihoods for the poorest citizens. This calls for much greater attention to fostering the potential linkages than is normally seen.

Without better livelihoods, poverty reduction must rely on establishing comprehensive social protection and redistributive policies which, while highly desirable, is a tough ask for countries with limited state capacity, let alone limited public revenues. Moreover, unless the resource revenues are especially ample relative to the population size, they are rarely sufficient to fund transfers sizeable enough to move everyone above the poverty line. Further, such a redistributive approach to relieve poverty becomes unsustainable once the resources yielding the revenues are depleted. And social programmes are also vulnerable to revenue shocks, not least fluctuating commodity prices and their fiscal impact.

When policy has successfully reduced enclavism, the economic growth resulting from the extractive industry will diffuse more widely than in economies where oil, gas or mining is seen merely as an enclave. Greater wage employment in manufacturing will result in workers remitting more income back to their extended rural families. Greater investment of resource rents into promoting the adoption of new crops and new farm technologies will result in rising yields, higher rural incomes, and more jobs in villages and rural towns. Greater support to the thousands of micro- and small- businesses can release their energies to boost domestic output. Like throwing a stone into a pond to cause the largest ripple, policy should aim to generate the largest and widest gain in incomes across the nation. When enclavism prevails, the stone just sinks, barely disturbing the water.

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