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MULTIPLIERS FROM MINING:
UPSTREAM DEVELOPMENT AS AN ALTERNATIVE TO BENEFICIATION POLICY IN SOUTH AFRICA

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MULTIPLIERS FROM MINING

Introduction

In a Policy Brief published by the South African Treasury and based on a 2008 paper[1], Harvard economist Riccardo Hausmann and his collaborators, Bailey Klinger and Robert Lawrence, argue that 'Beneficiation is a pervasive policy paradigm in South Africa'.[2] Although their warnings against placing too much faith in this development path are both cogent and now widely accepted among development economists – having been subsequently repeated with specific reference to South Africa by such eminent scholars as Oxford University's Paul Collier[3] and Nobel laureate and former World Bank chief economist Joseph Stiglitz[4] – the paradigm still appears to dominate government thinking in 2019.

Strictly speaking, beneficiation means any process which improves (benefits) the value of a mineral. This has traditionally referred to the process of separating valuable minerals from waste through crushing, separating and smelting (activities sometimes referred to as 'primary processing'). However, in South Africa the term is usually used to refer to further downstream value-addition processes, including manufacturing. It has thus become a synonym for 'industrial development' through the expansion of the manufacturing sector.

But it is precisely this paradigm which Hausmann, Klinger and Lawrence reject when they write: '… we would argue that beneficiation is a bad policy paradigm and should be dropped from South Africa's development strategy'.[5] Collier makes a similar point: 'Governments become wrongly fixated about value added downstream. For most minerals, beneficiation does not make sense – there are far better prospects upstream … The big opportunities to generate jobs lie in the setting up of infrastructure around a mine, like putting in roads, a railway line, power and water to supply the mine.'[6]

> *This paper will argue that beneficiation has been pursued at the cost of two other important, more viable growth vectors: maximising minerals production; and the development of upstream industries, including the manufacture of mining supplies and services.*

This may seem entirely counter-intuitive. After all, a government has a clear responsibility to maximise the development of its resource endowment, and beneficiation, in its wider South African definition, seems an obvious strategy. It seems to have worked in the past,[7] and, in the face of the current imperatives to raise South Africa's growth rate and increase labour absorption, the case against beneficiation has to be clearly motivated and the alternative spelled out.

This paper will present such a case. It will argue that beneficiation has been pursued at the cost of two other important, more viable growth vectors: maximising minerals production; and the development of upstream industries, including the manufacture of mining supplies and services.

It should be noted that the beneficiation paradigm criticised here is a macro-strategy. Micro strategies (which work with sub-sectors and even firms), such as the work done on hydrogen cell technologies (and previously other fuel technologies such as some of those used by Sasol), do have a place in the national development mosaic, so long as they are implemented in a realistic and market-friendly fashion. Indeed, it will be seen that one of the problems with beneficiation as practised in South Africa is the merging of (viable) micro-strategies with a damaging macro strategy.

Finally, the overarching purpose of this paper is to show how South Africa can maximise returns from its resource endowment. To anticipate the paper's conclusion, it will be seen that beneficiation policy has had negative implications for mining. It has been a part of the uncertainty that assails the sector's regulatory framework. This has not only played its part in inhibiting investment and thus volumes of minerals produced, consequently affecting tax returns and job creation. More than this, it has allowed policy-makers to ignore the upstream development vector in mining, to the cost of the entire economy.

Ramaphosa: Doubling down on Beneficiation

In light of the international scholarly consensus against beneficiation (outlined in the next section), it might have been expected that President Cyril Ramaphosa – needing to distinguish his policies from those of his predecessor – would have chosen a new and more nuanced approach to developing South Africa's resource endowment. But the opposite has been the case. Ramaphosa has chosen to double down on the beneficiation strategy, possibly thinking the problem in recent years has been in implementation and not the strategy itself.

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Even before assuming the presidency, Ramaphosa announced a 'New Deal' at an ANC conference in Soweto in 2017.[8] Promising to create 'at least one million jobs in 5 years', Ramaphosa identified the primary strategy as 'largely manufacturing led':

> *This must include far more effective exploitation of our natural resources … We must seek to target specific items where we can replace imports with locally-produced goods. The judicious use of such import substitution policies will help to accelerate our "buy and build local" campaign and will assist in stimulating job creation and investment … we will revitalise and expand our manufacturing capacity. Among other things, this requires measures such as preferential procurement in both the public and private sectors to stimulate demand for local goods. Our trade policy stance must combine active policies to promote and diversify South Africa's exports to countries around the world with well-targeted import substitution policies, aimed at stimulating job creation and the building of new, competitive local industries.*

But import substitution is the policy of a different past, disproven by Latin American countries' (and others') attempts to diversify their economies in the 1950s and 1960s.

Yet Ramaphosa repeated the formula in his January 8 Statement in 2018 where he spoke as president of the ANC.[9] A few weeks later, in his 2018 State of the Nation Address, Ramaphosa, now wearing his government leadership hat, affirmed the intention of his government to 'address the decline over many years of our manufacturing capacity, which has deeply affected employment and exports. We will seek to re-industrialise on a scale and at a pace that draws millions of job seekers into the economy.'[10]

Ramaphosa's stance has been supported by some of his key ministers. Mineral Resources minister Gwede Mantashe argued in his budget speech that 'beneficiation … was adopted as government policy in 2011'[11], a reference to his own department's Beneficiation Strategy, published that year.[12] In the introduction to the 10th iteration of the Industrial Policy Action Plan (IPAP), Trade and Industry minister Rob Davies, writes: 'The key challenge to industrial policy is to incentivise investment in plant, technologies and skills that would have medium to long term benefits to the economy, but which the market would

screen out because there is lower hanging fruit for short term returns.'[13] In truth, some in Davies' department – Trade and Industry (DTI) – have become lukewarm on beneficiation as a macro strategy but it remains the custodian of industrial policy and appears to have done nothing to talk down Ramaphosa's ambitions.

Far from being a break with the ideas of the Zuma Presidency, this resonates with ANC and government policy ideas going back at least as far as the 1993 Reconstruction and Development Programme (RDP).[14] Beneficiation was one of the policy ideas posited by President Zuma's 2015 Nine Point Plan, intended to accelerate GDP growth by an additional 0.8 percentage points.[15] Even before the Department of Mineral Resources published its Beneficiation Strategy in 2011, the policy was advocated in the Department of Trade and Industry's 2006 National Industrial Policy Framework[16] and has made repeated appearances in DTI presentations.[17] It is provided for in the original Minerals and Petroleum Development Act (2002)[18] and its now-withdrawn 2014 Amendment Act.

Indeed, the idea of beneficiation has deep and entangled roots in South Africa. The original Mining Charter (2004) and its subsequent iterations (2010 and 2018[19]) specifically stipulate that mining companies will be able to offset the value of the level of beneficiation achieved by the company against its Historically Disadvantaged South African ownership commitments. In practice this has never been properly implemented because the DMR has failed to enact the necessary regulations.

> *Beneficiation appears to be the unchallenged central policy plank of the Ramaphosa government's economic growth ambitions.*

The result is that beneficiation appears to be the unchallenged central policy plank of the Ramaphosa government's economic growth ambitions. The paper trail outlined above has been accompanied by a barrage of further statements, policy positions, action plans, legislation and institutional innovation, all reinforcing this impression. The roots are sufficiently deep that the Industrial Development Corporation established a beneficiation unit in 2015.[20] Yet one very significant document stands against the trend: the National Development Plan (NDP).

The NDP was the plan produced by the National Planning Commission chaired by former finance minister Trevor Manual and adopted as government policy in 2012. It took a notably market-friendly stand on many issues and, although it had only a limited discussion of the beneficiation issue, what it did have to say was notably sceptical.

The NDP factored in constraints like South Africa's rising energy costs, poor investment climate and distance from markets, pointed out that beneficiated products like ferrochrome were losing global market share and concluded that 'beneficiating all of the country's minerals is neither feasible nor is it essential for developing a larger manufacturing sector.' In the first official public reference to the possibility that other strategies were being screened out by the commitment to beneficiation, it argued that 'there are important trade-offs to be considered in mineral beneficiation'.[21]

The implication of the NDP's criticism is that there are two useful things to do with South Africa's mineral endowment: extract and sell as much of it as possible and support the (consequent) emergence of further upstream industries. These industries could be exported into Southern Africa, taking advantage of South Africa's location and technological advantages and boosting the country's balance of payments. Yet policy remains blind to these options. Indeed, on examination, Ramaphosa's stand is incoherent. He claims to support the NDP while simultaneously espousing beneficiation. On occasion he actually advocates both in the same speech.[22]

Mining and industrialisation in South Africa

At the inception of democracy, as Apartheid's 'siege economy' was unwinding, mining accounted for 7.3 percent and manufacturing for 20.9 percent of GDP.[23] But this was an artificial situation, with manufacturing bolstered by tariff barriers and restrictions on capital flows. When tariff protection was removed the following year, South Africa's manufacturing sector rapidly declined. Many of its product lines were simply not cost competitive. By the turn of the century local manufacturers were expressing concerns about the state of the market, noting that they were finding it difficult simply to source inputs at a price lower than finished Chinese-made goods reaching the market.[24] By 2017, manufacturing accounted for only 13 percent of GDP while mining remained in more or less the same position at 8 percent. Far from democracy heralding economic development along the industrialisation vector, the opposite had happened. The beneficiation paradigm is an attempt to reverse this 25-year trend.

The main representative of South Africa's manufacturing sector, the Manufacturing Circle, is unambiguously opposed to beneficiation as a macro strategy. In its November 2017 *Map to a Million New Jobs in a Decade*,[25] the organisation says:

> *The negative impact of the Mining Charter has been well-documented elsewhere. This impact is, however, not only limited to the mining industry, but also has a twofold negative effect on the manufacturing industry, by severe negative impacts on investor sentiment, which raises the cost of capital for SA firms, and also because demand for manufactured goods for the mining industry has slowed down due to uncertainty created by the Charter.*

The Manufacturing Circle's 'Map' diagnoses the key problem facing the manufacturing sector – which has shed 500 000 jobs in the last two decades – as 'weak aggregate demand'.

These are telling criticisms, coming as they do from a business organisation with a mandate to promote the manufacturing sector. The Manufacturing Circle's 'Map'[26] stresses the role of investment climate reform as its preferred primary driver of manufacturing development. The 'Map' diagnoses the key problem facing the manufacturing sector – which has shed 500 000 jobs in the last two decades – as 'weak aggregate demand'.

The Manufacturing Circle's solutions include explicit references to the role of mining in increasing demand for domestic manufactured goods and services. As an example, it refers to the possibility of a 'new pipeline to bring natural gas from Rovuma in Mozambique into SA, using SA steel and pipe'. More generally, the Manufacturing Circle's proposals are rooted in a deep understanding of the historical relationship between mining and industrialisation in South Africa.

It writes that:

> *'The Gold Rush of the 1880s established Johannesburg as the centre of economic activity and transformed the economy into one dominated by mining and mineral processing. A strong manufacturing base then developed inland around the goldfields to support the mining industry .... The post-war apartheid state was able to draw on mineral rents and use the levers of the state to embark on massively ambitious projects in the energy and chemical sector, which saw the establishment and growth of Sasol and Mossgas (later PetroSA) as well as significant investment in electricity generation.'*

In a nutshell, it has been South Africa's thriving mining industry which has facilitated the development of the rest of the economy. This started with mining engineering and services as well as associated industries like finance (Standard Bank opened the first bank in Johannesburg in 1886, two years after the discovery of gold[27]). The continent's biggest and most industrialised economy can thus be explicitly linked to the development of the country's mineral resources.

The DTI hopes to replicate past industrialisation by designating certain mineral sub-sectors for support. The designated areas are: ferrous (metals), polymers, titanium and platinum group metals. It also designated 'mining inputs' as an area for support.[28]

Impact on Mining

The beneficiation issue is one of the factors which has had a negative impact on the mining sector in recent years. It has been a part of the pattern of regulatory uncertainty which has bedevilled investment in the sector. With the finalisation of the Mining Charter and the withdrawal of proposed amendments to the Minerals and Petroleum Resources Amendment Act, the regulatory environment stabilised in the second half of 2018. This has seen the Johannesburg Stock Exchange Mining Index recover somewhat, although even with the uptick, the index is still where it was 12 years ago.[29] According to PwC, the only minerals where production had increased substantially over the last 15 years were manganese, iron ore and chrome.[30] Hard-rock, deep-level mining (gold and platinum) have declined especially strongly. (See Appendix 1 for changes in volumes of main minerals mined 2007-2017).

> *Regulatory uncertainty in South Africa's mining sector can be traced back to the Minerals and Petroleum Resources Development Act (MPRDA) of 2002 (implemented from 2004), which took minerals ownership into state ownership.*

Regulatory uncertainty in South Africa's mining sector can be traced back to the Minerals and Petroleum Resources Development Act (MPRDA) of 2002 (implemented from 2004), which took minerals ownership into state ownership. Control was exercised through a system of 'New Order' mining licences for which all companies active at the time were forced to reapply. The Scorecard for the Broad-Based Socio-Economic Charter for the South African Mining Industry[31] – enacted a few months after the passing of the MPRDA – required that companies re-applying for licences report on their 'baseline' beneficiation activities and the extent to which they can 'grow' these.[32]

Although the Scorecard is clear that beneficiation activities can be offset against its Black-ownership requirements, its 'Notes' made it clear that this was work in progress and that the precise requirements were by no means clear. It said:[33]

> *In terms of beneficiation commitments and the offset option the key issue is to capture the actual beneficiation activities of a company and to convert it to the same unit of measurement of ownership e.g. attributable units of production … and offset accordingly. The attributable ounces that are beneficiated above the base state may be offset against HDSA ownership targets. Considering that some 59 different minerals are mined in South Africa – the detailed discussions on the base state for each mineral are ongoing.*

The issue of 'baseline' beneficiation has not been further clarified although beneficiation has continued to complicate the regulatory environment through the second iteration of the Mining Charter (2010)[34] and further development of the empowerment Codes of Conduct. This is presumably because it is a responsibility of the Department on Mineral Resources, whose capacity to do so is questionable.

The 2018 Mining Charter attempts to 'empower' Black South Africans through a 30 percent Black-ownership requirement. But it allows mining companies to claim 'offsets', excusing them from up to 11 percentage points of BEE compliance if they engage in beneficiation activities. Unfortunately, this partial escape clause is enmeshed in red tape. Companies need to submit an 'Equity Equivalent Plan' to the Department of Mineral Resources (DMR) in advance of any beneficiation activities and then report 'progress' to the DMR at the end of every calendar year.

The Mining Charter effectively requires mining companies to subsidise Black-owned manufacturing entities by offering 'mineral ore … at a discount to the mine gate price.'[35] This is what the Department of Trade and Industry calls a 'developmental price' (usually calculated at the international – or import parity – price, less the costs of transport). This might sound good in theory but 'developmental pricing' is experienced as an additional cost by the mining industry and thus a further disincentive to mining investment. In any case, mining is a specialised activity, distinct from manufacturing. Miners do not have the skills, aptitudes and interest to run factories.

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The heavy bureaucratisation of the Mining Charter's provisions is also evident in its specifying very precise requirements for procurement and supplier development. For instance, it requires that 70 percent of total mining goods procurement spend and 80 percent of spending on services should be sourced from South African companies. In procurement, 21 percentage points of spending must be on South African manufactures produced by Black-owned companies, 5 percentage points from female-owned companies (of which 51 percent can be off-set against 'youth suppliers') and 44 percent on South African goods produced by BEE compliant companies. Mining companies are responsible for checking each supplier's credentials and the suppliers are responsible for producing the paperwork needed to confirm that they qualify. These are new criteria not contained in either of the two previous iterations of the Mining Charter.

The mining industry's official representative in Charter negotiations, the Minerals Council South Africa (MCSA) – previously the Chamber of Mines – has been relatively quiescent about this onerous bureaucratic edifice. It would seem that the big mining companies, who make up the backbone of MCSA's membership, believe they can comply with requirements. But junior and aspiring miners face a massive disincentive as investment in South African mining means either finding a Black partner or getting involved in the manufacturing sector, or both.

Even the MCSA has objected to the local content requirements. Its CEO, Roger Baxter, argued in a radio interview in October 2018 that the organisation had reservations about 'how practical' the effective 70 percent local capital equipment requirement is and suggested that exemptions are needed.[36]

The bottom line here is that development along the procurement and supplier development vectors is not a misguided way of reaping benefits from South Africa's mineral wealth. Indeed, in the next section it will be seen that this, the upstream sector, offers the best possible way of generating multipliers from mining. But this development vector needs at all costs to avoid the bureaucratic and prescriptive approach of the Mining Charter lest it compromise the activity on which development is to based – minerals extraction itself.

The Upstream Alternative

In 2017, according to the Minerals Council of South Africa, the total value of minerals mined in South Africa was R630 billion. In the same year, the value of the sector's spending on goods and services was R300 billion.[37] So for every R2.1 earned on the core activity of mining and selling minerals, R1 was spent on upstream activities. It is in this area that gains are to be had if mining activity were to increase strongly in South Africa.

Upstream activities include: manufacturing, chemicals, supply of consumables (e.g. diesel, timber), rail, port and electricity, capital goods including equipment and machinery, and services, including geological, engineering, health and safety and educational as well as related services such as banking, the stock market, auditing and consulting, and business services. It includes activities like civil engineering, iron and steel products for use in mines, plastics, underground vehicles and machinery, explosives, hydraulic drills, safety equipment and more. Mining specialist services are especially important as well as highly mobile (and therefore able to be exported).

UCT economist David Kaplan has pointed out that the technical competencies required for upstream activities represent a competitive advantage for the South African mining industry. He argued in a 2011 paper that 'South Africa is a world leader in a host of mining equipment products (including): spirals for washing coal; pumping up water; hydropower; tracked mining underground locomotives; ventilation shaft sinking; turnkey new mine design and many others.'[38] These 'others' include crushers, cutters, hydromet plant, smelters, furnaces, hauling and hoisting equipment, robotics, fabrication capital goods like rolling, moulding and assembling machines, grinding machines and agents, GIS, IT analytics, drills, survey technologies and the whole world of mining chemicals and reductants.

UCT economist David Kaplan has pointed out that 'South Africa is a world leader in a host of mining equipment products (including): spirals for washing coal; pumping up water; hydropower; tracked mining underground locomotives; ventilation shaft sinking; turnkey new mine design and many others.'

Kaplan was clear in 2011 that South Africa's advantages lay especially in the high-tech areas of mining services. He found that mining and related areas was the only area where South African firms held a disproportionate (higher) number of high-value patents given the size of its economy.

Patents are a measurable indicator of the extent of innovation in a sector. Kaplan found that, in contrast with mining, in two of the DTI's designated sectors – liquid fuels and biotechnology – 'patent numbers are very limited and the quality is low'. But mining, in 2011, was, in Kaplan's phrase, 'located at the global technology frontier'.[39]

The present status of this technological advantage in mining is unclear. The work on patents is now seven years old and has not been repeated.

Kaplan noted in 2011 that:[40]

> *South Africa's competitive position is however being undermined – both at the 'lower' manufacturing end and at the 'higher' end of R&D and new product development … These issues are not currently being addressed. The sector receives very little state support and, other than downstream beneficiation, which is in any event ill-advised, there is no defined strategy for the sector. Polices to meet these challenges, both at the 'bottom' and at the 'top', are urgently required.*

Moreover, the mining subsectors which accounted for much of South Africa's technological edge – gold and platinum – are in decline and are not attracting the same Research and Development interest that they previously did. Against this should be set the fact that declining ore grades and high labour costs (as a proportion of total costs) in gold mining have seen much research into technology-intensive methods of extraction.

Exports of mining equipment and specialist services are a clear manifestation of global competitiveness. Paul Jourdan argued in 2016 that the Southern African Development Community mining markets offered a US$4 billion market which was geographically well-placed for South African upstream exports, being 'in South Africa's back yard'. 42 percent of mining projects in this market were outside of South Africa. Yet, Jourdan found, 'the SADC mining capital goods market is dominated by imports, particularly from the EU'.[41] This may underplay South Africa's regional role. Another 2016 paper found that 'the share of capital equipment imports sourced by South Africa amounted to 73 per cent in Botswana, 37 percent in Zambia, and 57 per cent in Zimbabwe.'[42] In 2016, Zambia alone spent US$1.75 billion on procurement of mining goods, mostly for its copper industry.[43]

> *In South Africa, technology spillover effects have been particularly important to the development of a wider industrial capacity. Capital goods and support services for the mining industry have potential in other markets and other sectors.*

In South Africa, technology spillover effects have been particularly important to the development of a wider industrial capacity. Capital goods and support services for the mining industry have potential in other markets and other sectors. This was the historical pattern in South Africa's mining-based development story. From local manufacturing of dynamite (1894) to drill bits (1934) to ferro-silicon for diamond recovery (1950),[44] all have both been available for export to other mining jurisdictions and provided inputs, including skills, to other industries. For example, the development of the cyanide process to extract gold in the 1890s '... led to an influx of metallurgical professionals from around the world and gave birth to one of the early professional societies in Johannesburg, the Chemical and Metallurgical Society or the "Cyanide Club" as it was popularly known.'[45]

However, although 'mining inputs' is one of the DTI's focal areas, and this speaks to the advantages of further developing upstream industries, the strategy of supporting manufacturers has its limitations. The DTI does offer subsidies for capital expenditure and subsidised loans for Black industrialists but these are extremely limited compared to the boost (in demand) which could be achieved were the mining industry to grow exponentially. The resources exist in the ground. It is the regulatory regime which is currently the main hurdle to such growth.

As Roger Baxter, CEO of the MCSA, pointed out in a radio interview in 2018:[46]

> *What's a real shame is that most of the growth in our upstream supplier contractor industries has actually been growth outside of South Africa, because the mining industry in South Africa has been shrinking over the course of the last decade. And so growth in the mining sector will definitely spur not only the contracting and services sector, the consulting engineers etc, but also have a big impact on our supplier base – that's steel, that's explosives, that's timber, that's all the different materials that go into mining on a day-to-day basis.*

One of government's primary concerns about mining is its ability to generate jobs. Employment in mining has fallen from 535 457 in June 2012[47] to 457 000 in September 2018.[48] But skills availability, in both mining and manufacturing, is the second biggest hurdle (after the regulatory environment).[49]

The manufacture of mining equipment is unlikely to provide the sort of backward linkages the government hopes for, given the skills shortages in the economy. The ANC itself admits that the current graduation of artisans (13 000 – 16 000 per year) is well below the 30 000 a year needed.[50] The DTI's own 'Resources Capital Goods Development' study identifies the shortage of science, technology, engineering and mathematics (STEM) skills as one of the two major obstacles to development of this vector, alongside declining R&D spending.[51]

The South African manufacturing sector has complained about skills bottlenecks for the past 50 years. Mining is however different. South Africa did have the skills needed but has shed these over the years as the industry has declined. The *Mail & Guardian* reported as long ago as 2010 that 85 percent of South Africa's mining engineering graduates do not work long-term in the country.[52] This has continued to be a concern. Three Wits University School of Mines academics write that 'in fields (such) as ventilation, rock engineering, mine planning, mineral resource evaluation, and mineral asset valuation …chronic shortages continue to hamper the development of the industry and may well frustrate its ambitions to be safe, healthy, and profitable into the future.'[53]

Nor it seems are skills in mining being made up by mandatory training. Although the Mining Charter requires that five percent of payroll is spent on skills development and the Mining Qualifications Authority (the sectoral education and training authority for mining) receives a further one percent, key skills are still in short supply. In its 2018 *SA Mine* publication, PwC listed 'maintenance and loss of critical skills' as a risk factor with the second notable impact on mining – South Africa, it remarked, is a 'good exporter of skills'. [54]

Three Wits University School of Mines academics write that 'in fields (such) as ventilation, rock engineering, mine planning, mineral resource evaluation, and mineral asset valuation …chronic shortages continue to hamper the development of the industry and may well frustrate its ambitions to be safe, healthy, and profitable into the future.'

A 2018 study published by a consortium including mining lawyers Webber Wentzel, found that South African mining was not seamlessly moving towards greater skills-based capital intensity. Instead the core deployment of less skilled workers had surged, from 27 percent in 2012 to 40 percent in 2017. The percentage of 'general workers' in the study's sample had grown from 7 percent in 2012 to 21 percent in 2017.[55]

If skills in South Africa's mining industry are indeed being 'hollowed out' as these figures suggest, this has negative implications for both mining and its backward linkages into manufacturing mining equipment. A similar 'hollowing out' may also be affecting mining services as these skills, too, are highly mobile and prone to emigration. The sector is also negatively affected by retirements, the aged profile of its skilled workforce and difficulties (work permits) recruiting abroad. It is not clear how wide the window of opportunity currently is; it has certainly narrowed in recent years.

Conclusion

The South African government has devoted much attention to revitalising the country's industrial sector through beneficiation of the minerals that South Africa mines. Unfortunately, this approach flies in the face of international best practice and expert advice and has, in any case, become distorted by the clumsy, race-based regulatory regime faced by the mining sector.

Nevertheless, beneficiation policies, including discredited approaches like import substitution, appear to have been selected by the Ramaphosa government as its chosen development vector. They are

affirmed in the 2018 iteration of the Mining Charter which seeks to boost local industry through Black ownership offsets, as well as local (Black) procurement and supplier development. But the Charter's excessively detailed criteria (and reporting conditions) will be experienced as a tax on mining activities and are therefore destined to discourage investment in the sector.

2017 minerals production and sales figures suggest that for every R2.1 in minerals mined, a further one rand is spent on upstream inputs into the industry. The Minerals Council of South Africa has argued, based on a membership survey, that if South Africa's regulatory regime were to be ranked in the Fraser Institute's top 25 percent, they would invest a further R125 billion into their South Africa operations. That would be a massive boost, up from 2017's R80.9 billion capital expenditure. The impact on minerals production and upstream multipliers can only be guessed at but it would certainly be considerable. That would make for demand-driven growth (rather than the government's policy of supply-side measures) which is inherently more sustainable because it is based on goods and services that the market wants.

> *A turnaround in the local industry will offer unanticipated opportunities as the native genius of South Africa's miners and mine suppliers plays through. That is where economic growth lies, not in the forced manufacture of downstream products.*

It might be argued that South Africa's best export prospects are not downstream manufactured goods but the upstream goods and services that go into the mining sector. The countries of the Southern African Development Community offer a US$4 billion market in goods alone. The technological edge that South African mining has had for decades is fading as the local industry declines. But a turnaround in the local industry will offer unanticipated opportunities as the native genius of South Africa's miners and mine suppliers plays through. That is where economic growth lies, not in the forced manufacture of downstream products.

Policy suggestions:

- Shift focus from downstream beneficiation to upstream value addition, in keeping with international best practice and advice.
- Unshackle the mining sector from restrictive regulations, including the Mining Charter's provisions for racial ownership, local content and procurement, and allow more cost-effective market mechanisms to shape this space.
- Remove regulations which have the unintended consequence of restricting mining production, exploration and development and thus allow an increase in mining activity to boost domestic demand.
- Allow mining companies to concentrate on mining activities rather than having to worry about industrial development using their products.

APPENDIX 1

South Africa Production of Major Minerals 2007-2017

Year	Gold (tonnes)	PGMs (tonnes)	Coal ('000 tonnes)	Manganese (tonnes)	Iron Ore ('000 tonnes)	Chromite ('000 tonnes)
2007	252.6	304	247 666	5 996 086	42 083	9 665
2012	154.2	254	259 012	8 943 415	67 100	11 317
2017	136.8	260	252 343	14 143 794	74 643	16 587

Source: Minerals Council South Africa, *Facts and Figures 2017*, 2018, pp. 34, 39, 43, 50, 54

APPENDIX 2

Equity Equivalence and Procurement Requirements

2018 Mining Charter

'1. OBJECTIVES OF MINING CHARTER

… (h) Catalyse growth and development of local mining inputs sector by leveraging the procurement spend of the mining industry;

and (i) Promote beneficiation of South Africa's mineral commodities. (p.13)

2.1.4 EQUITY EQUIVALENCE AGAINST THE OWNERSHIP TARGET

a) A right holder may claim the equity equivalent mechanism against a maximum of 11 percentage points of BEE shareholding.

c) A right holder must submit an Equity Equivalent Plan to the Department for approval as outlined in the Mining Charter implementation guidelines.

d) The following activities undertaken by a right holder will entitle the right holder to apply for equity equivalent credits:

i. Mineral ore or mineral products supplied to independent local beneficiation entities at a discount to the mine gate price.

ii. Portion of an integrated producer's production that is beneficiated.

iii. Mineral ore supplied to black owned beneficiation entities at a discount to the mine gate price.

iv. Investments in locally based mineral beneficiation entities. v. Any other existent beneficiation related activities undertaken or investment made since 2004.

e) A right holder must submit a progress report against the approved equity equivalent plan to the Department at the end of each calendar year. (p. 18)

2.2.1 MINING GOODS

A minimum of 70% of total mining goods procurement spend must be on South African manufactured goods. The above mentioned 70% of the total mining goods procurement spend shall be apportioned in the following manner:

(a) 21% of total mining goods procurement budget must be spent on South African manufactured goods by Black entrepreneurs;

(b) 5% of total mining goods procurement budget must be spent on South African manufactured goods by BEE women entrepreneurs or 51% youth owned and controlled enterprises;

and (c) 44% of total mining goods procurement budget must be spent on South African manufactured goods by BEE compliant company.

2.2.2 SERVICES

A minimum of 80% of the total spend on services (excluding non-discretionary expenditure) must be sourced from South African companies. The above mentioned 80% of the total services procurement spend shall be apportioned in the following manner:

(a) 60% of the total services budget must be spent on BEE entrepreneurs;

(b) 10% of total services budget must be spent on BEE women entrepreneurs or 51% youth owned and controlled enterprises;

and (c) 10% of total services budget must be spent on a BEE compliant company.

The above-mentioned procurement targets must be complied with within a period of five (5) years as outlined in the transitional arrangements.

2.2.3 VERIFICATION OF LOCAL CONTENT

A right holder shall submit an annual Mining Charter report and provide proof of local content for mining goods in the form of certification from the South African Bureau of Standards (SABS) or any other entity designated by the Minister. (p20)'

Source: Department of Mineral Resources, Publication of the Draft Broad-Based Socio-Economic Empowerment Charter for the Mining and Minerals Industry, 2018 (herein referred as the Draft Mining Charter, 2018) for Public Comment, *Government Gazette*, Vol. 636, No. 41714, 15 June 2018

APPENDIX 3.

Why a Beneficiation Macro Strategy is Doomed to Fail

The availability of mineral inputs is only one of several factors that drive competitiveness in global manufacturing and it is not the most important. From a survey conducted by Deloitte in 2013, adapted by Williams, Cunningham and De Beer:

Factor	Global Rank	SA Rank
Talent-driven innovation	1	7
Economic, trade, financial and tax system	2	4
Cost and availability of labour and minerals	3	1
Supplier network	4	6
Legal and regulatory structure	5	9
Physical infrastructure	6	5
Energy cost and policies	7	3
Local market attractiveness	8	2
Healthcare system	9	10
Government investments in manufacturing and innovation	10	8

Source: Williams, G, Cunningham, S and de Beer, D, 'Advanced Manufacturing and Jobs in South Africa: An Examination of Perceptions and Trends', Paper presented at the International Conference on Manufacturing-Led Growth for Employment and Equality Johannesburg, 20 and 21 May 2014, p10

APPENDIX 4.

Expert opinion commissioned by the South African government and delivered in 2008

In 2008, the International Panel on ASGISA, appointed to advise President Mbeki, argued that '...both theory and practice provide reasons to question the presumption that downstream processing is an appropriate development path (for South Africa). The skills and other inputs required to process raw material and market finished products could be very different from those required to mine or grow them … As transportation costs have declined, and global markets have become more integrated, the advantage of proximity to raw material production has diminished … Beneficiation should not be used as the basis for selective intervention and industrial promotion. Greater processing of natural resource exports does not constitute either an easy or a natural next step in the process of structural transformation, especially in South Africa. Downstream sectors already benefit from proximity to input and South Africa's re-

moteness from the rest of the world. If these sectors have not developed on their own, it is prima facie evidence that either they face low social returns or confront obstacles similar to those of other sectors. Privileging beneficiation is unwarranted and it takes government's attention away from other opportunities that may have more potential to create export jobs in South Africa.

Source: Hausmann, R, Klinger, B and Lawrence, R, *Policy Brief: Examining Beneficiation*, CID Working Paper No. 162, Center for International Development, Harvard University, 2018

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