

Mining in Africa after the supercycle: New directions and geographies

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Abstract: Mining in Africa is at a pivotal moment. For most of the period 2000 to 2012, the extractive industries were in a 'supercycle' of sustained high commodity prices. Driven by resource-intensive growth in emerging market economies, prices were anticipated to continue for decades to come. However, this 'supercycle' ended in 2012 and there followed a severe slump in mineral prices from 2014 onwards. On the one hand, a new era of commodity market dynamics has begun, with changing patterns of economic activity, minerals governance, and environmental regulation. On the other hand, the end of the supercycle has continued or intensified pre-existing trends towards mechanisation, automation, and enclavity while distributive pressures on companies by local communities and host nations increases. We argue that the end of the supercycle has reconfigured the geographies of extraction in ways that are not yet reflected in existing research nor taken into consideration in policy implementation, particularly around corporate strategy, state-business relations and models for mineral-based development strategies. In this paper we map the terrain of research on the supercycle in Africa and identify emerging post-supercycle trends - some of which have overtaken research. The paper is structured around examining four themes: (1) new geographies of investment and extraction, (2) new geographies of struggle, (3) national minerals-based

development and (4) labour and livelihoods, for which we identify key trends during the supercycle and post-supercycle and areas for future research and policy development.

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1 INTRODUCTION

Mining is at a pivotal moment. For much of the previous two decades, observers considered mining to be in a ‘supercycle’ driven by rapid resource-intensive growth in China and other emerging economies, and a lag in supply growth (Humphreys, 2015; Morris et al., 2012). Mining’s history is defined by successive cycles of boom and bust. However, prolonged high prices across multiple commodities, and expectations that this would continue due to demand from emerging economies, convinced many that this time was different. This sustained high investment levels, and mining companies expanded into regions previously deemed marginal or risky, including many parts of Africa (Humphreys, 2015). Artisanal and small-scale mining (ASM) also proliferated, particularly in the gold sector - estimated to provide direct income to over 10 million people (Hayes 2008). Optimism about the prospects for minerals-based development grew amongst African policy makers (African Union, 2009), as economists identified in the supercycle a once in a generation opportunity for growth and poverty reduction through improved fiscal management of mineral rents (Collier 2015) and minerals-based industrial policies (Morris et al., 2012).

Driven by changing patterns of economic activity and natural resource policy, this supercycle ended in the mid-2010s and a new, more complex period of commodity market dynamics

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began. The euphoria of prolonged high prices, which quickly rebounded after the 2008 global financial crisis, spurred excessive investment, creating oversupply in multiple commodities and high levels of corporate indebtedness. In a severe period of economic distress from 2014 onwards, prices plummeted, corporates rapidly cut costs, and revenues dwindled for commodity-dependent governments. Even before the impacts of COVID-19, recovery had been faltering and uneven. Key mineral-energy industries - notably coal and oil - are widely anticipated to face declining long-term demand (International Energy Agency (IEA), 2019). However, there has been increased investor interest - both from private and state actors - in 'clean energy' minerals like copper, coltan and lithium, while gold prices have surged as investors seek a counter-cyclical safe-haven amid increased global economic uncertainty.

Notwithstanding these examples, the mining industry has faced difficult circumstances. Multinational mining companies have become more cautious, focusing on lowering costs and risks: in some cases shedding tens of thousands of jobs and reducing costs through organisational and technological innovation, while repositioning project portfolios away from more 'complex' operating environments. This has important consequences for economic development and political change in mineral-rich African countries. Having often borrowed heavily –particularly on infrastructure– and expanded public spending during the boom, lower growth and resource rents have fiscally strained governments. The IMF (2019) observes a dualistic pattern among African economies, with resource-intensive nations experiencing slower growth and increasing fiscal distress relative to non-resource intensive economies. Mining labour migration (large-scale and ASM) has incited demographic shifts that continue spurring economic diversification and new spatial and occupational patterns (Mususa 2012).

Inflated expectations have been built around the developmental benefits of an industry whose future is uncertain. Policy mechanisms conceived during a boom have been implemented during a slump. This creates socio-political tension at local and national scales (Bebbington et al., 2018), reconfiguring state-business relations and the dimensions of 'resource nationalism' (Andreasson 2015; Childs 2016). Perceptions of the limited developmental benefits deriving from extractive industries and the unsatisfactory fiscal contribution of multinational investors are driving new demands for the state to retake control of mineral resources. However, with declining resource rents, the balance of bargaining power between fiscally-constrained African states and multinational firms is shifting.

The booming extractive sector spurred a concomitant research boom. Geographers have been quicker to examine the consequences of commodity ‘booms’ than resource ‘busts’ in emerging economies. In academic and policy circles, research has focussed on capturing and using the rewards of a super-cycle than on managing the industry’s volatility and busts (exceptions noted below). In this paper we map the terrain of research on the minerals supercycle in Africa in Geography, identify emerging post-supercycle trends in mining - some of which have overtaken research - and establish key questions for geographers and policymakers. The paper combines an analysis of industry trends with critical reflections on literature on extractive industries by geographers from the last two decades, prioritising work by African scholars. Though not a comprehensive formal systematic review, this paper reflects on key trends and absences to identify future directions. We write at a level of generalisation which exceeds country or mineral specific research. Industry- or location-specific dynamics may differ from the more general trends we posit and we examine metals mining, not oil and gas.

The broad trends and new geographies in commodities investment and production of the supercycle are reviewed in Section 2, followed by three sections exploring emerging themes from the supercycle and existing research, around: new geographies of struggle (Section 3), national minerals-based development (Section 4) and labour and livelihoods (Section 5). In each section we sequentially (1) examine key trends during the supercycle, (2) examine the emerging post-supercycle picture, and (3) identify core areas for future research and policy development (summarised in Table 3).

2 KEY ECONOMIC TRENDS OF THE SUPERCYCLE AND BEYOND

From the early 2000s, rising emerging-market demand, particularly from China, drove rapid mineral commodity price increases of a kind not seen since the 1960s (Figure 1). Interrupted by the 2007/08 global financial crisis, the trend recommenced immediately thereafter. This reinforced dominant industry narratives that commodity prices were not in an ordinary price cycle, but a ‘supercycle’ that would continue for decades (Humphreys, 2015). These narratives shaped investor, corporate and government expectations.

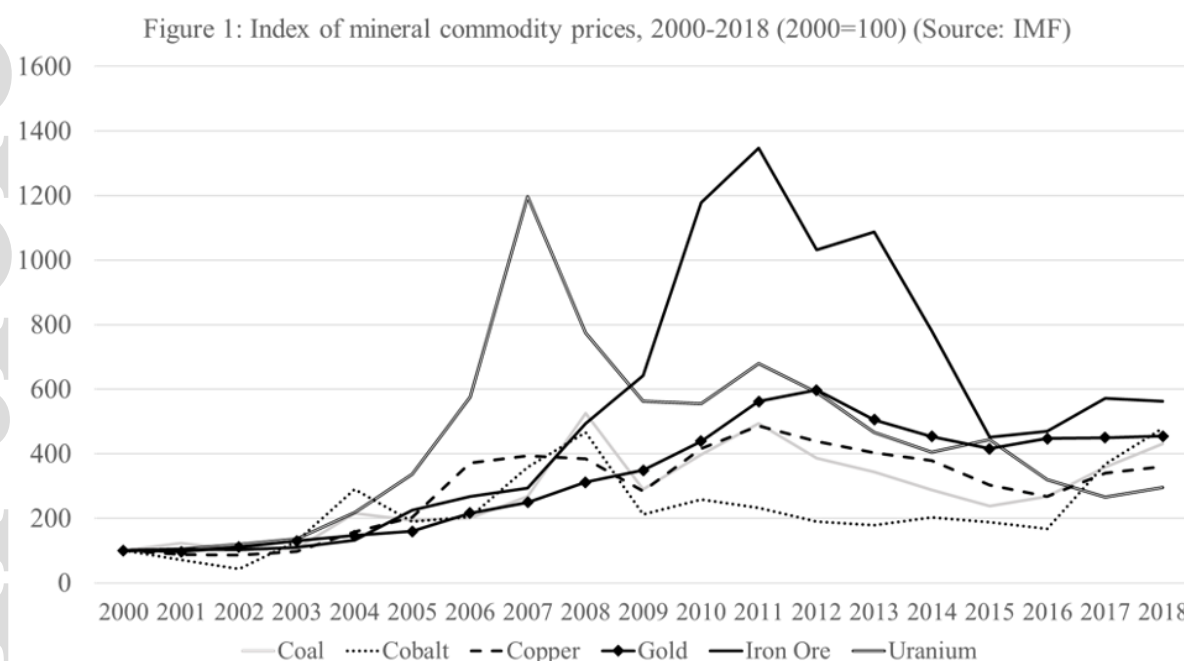


Figure 1: Index of commodity prices, 2000-2018 (2000=100)

Source: IMF

Mining is defined by the imperative for continual spatial expansion to secure new reserves, but this took on a new character during the boom (Bridge, 2008). Inflated price expectations made projects previously deemed uneconomic or excessively risky newly attractive to multinationals, while concerns over scarcity compelled strategic investment from state-backed emerging market companies, particularly from China (Carmody, 2011). Industrial mining's geographic scope expanded rapidly, exemplified by increased multinational interest in high-risk post-conflict jurisdictions such as the DRC, Mozambique and Sierra Leone, as well as large increases in FDI to reach unexploited deposits in more established mining jurisdictions like Zambia, Ghana and Guinea. There was also a spatial shift to the deep-ocean as a new space of mineral extraction with diamonds and phosphate now mined from the seabed within the exclusive economic zones of Namibia and South Africa (Childs 2020). Similarly, the search for new, 'unconventional' rare earth mineral deposits focused on land (e.g. Mkango Resources in Malawi), and water, such as the tellurium-rich Tropic Seamount, 500km off the coast of northwest Africa (Cornwall 2019).

Neoliberal reforms of previous decades designed to improve investor shares of resource rents (Campbell, 2013) fueled extractive expansion. Interpretations ranged from a new 'scramble for Africa' (Carmody, 2011) entrenching Africa's neo-colonial insertion in the global

economy (Taylor, 2014; Bush, 2010), to optimistic reappraisals of the role of minerals in Africa's economic development as 'Africa Rising' (African Union, 2009; Morris et al. 2012) (see Section 4). Scholars and policymakers shared a common assumption of continued high prices and rapid expansion of mining.

Subsequent events confounded these assumptions. Triggered by slowing Chinese growth and excess capacity created by over-investment during the boom, mineral prices fell in near unison in the mid-2010s. As of 2018, most minerals remained well below 2007/08 peaks, a notable exception being battery metals like cobalt.

Many major mining companies were placed in financial difficulty, with excess capacity, over-leveraged balance sheets from increasingly financialised accumulation strategies, and high operating costs from prioritising volume over efficiency, and accessing lower-quality and harder to access ore bodies (Humphreys, 2019b). Market valuations for listed mining companies slumped as returns and investor optimism dwindled (Figure 2).

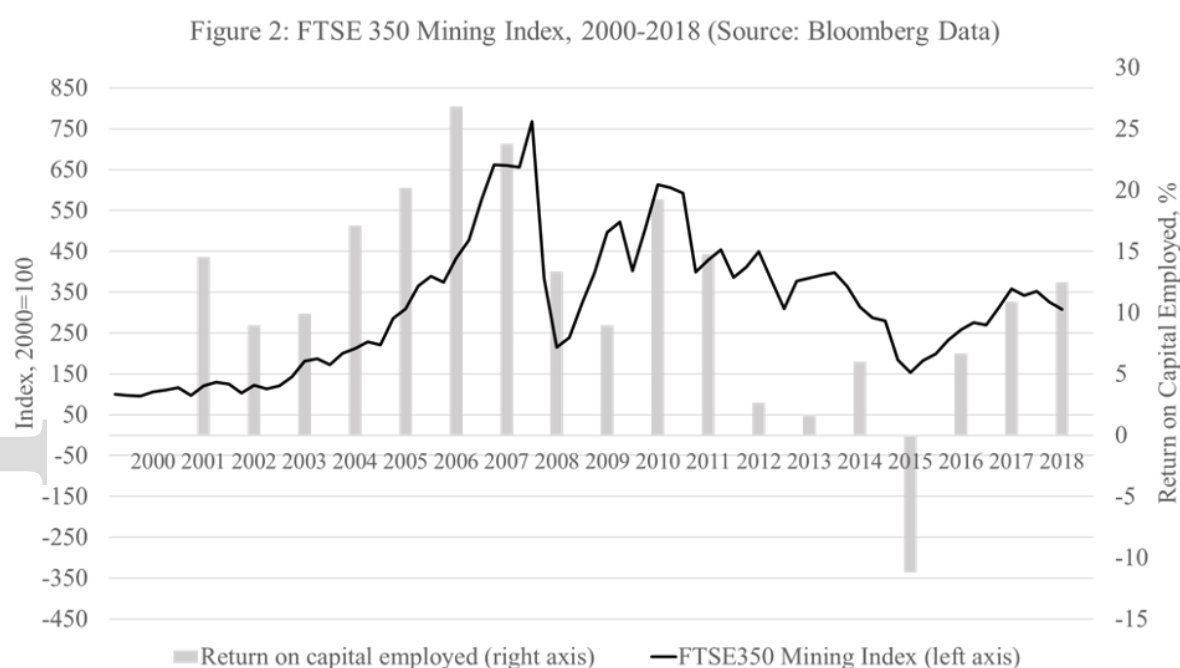


Figure 2: FTSE 350 mining index 2000-2018

Source: Bloomberg Data

Post-2016 trends reflect these cost challenges. Revenues for PWC's largest listed mining companies - a global sample which now includes 19 emerging market-headquartered firms,

10 of them Chinese - are just below their 2012 peak, but margins remain considerably lower (Figure 3).

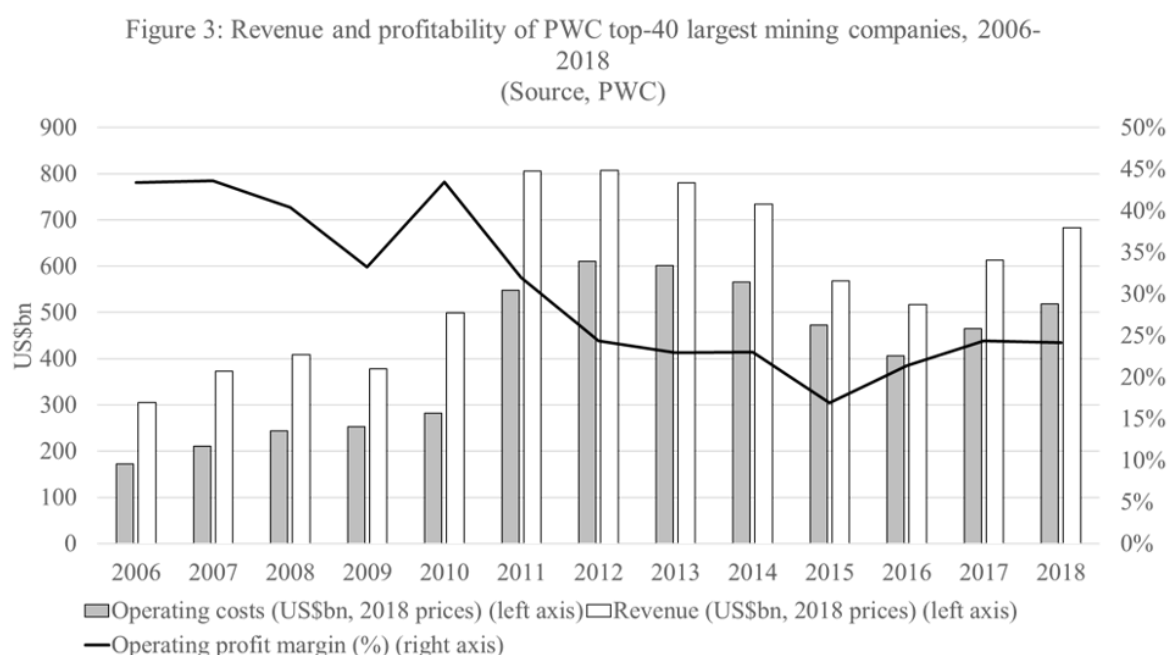


Figure 3: Revenue and profitability of PWC top-40 largest mining companies, 2006-2018

Source: PWC

Corporate strategy shifted from expansion to cost-cutting and repairing balance sheets. Capital expenditure for PWC's top-40 dropped almost 60% between 2012-2018, alongside near identical decreases in exploration expenditure and debt issuance globally (Table 1). In recent years alternative mine financing provided by royalty and streaming companies has become increasingly significant, though aggregate data is not available.

Table 1: Global mining industry investment, 2012-2018 (US\$bn, 2018 prices)

	Exploration expenditure	Equity capital raised	Debt capital raised	Capital expenditure
	Global (PDAC/S&P)	Global (PDAC/S&P)	Global (PDAC/S&P)	Top40 largest mining companies (PWC)
2012	23	37	110	140
2013	16	26	103	140

2014	11	40	70	110
2015	9	31	59	87
2016	7	29	35	51
2017	8	32	56	52
2018	10	21	45	57
% change 2012-2018	-58%	-45%	-59%	-59%

Efforts to improve productivity fuelled interest in automation and mechanisation (Durrant-Whyte et al., 2015), with implications for labour. Major mining companies already show signs of significant shifts in labour intensity (Humphreys, 2019a). For example, Rio Tinto, Anglo American and BHP Billiton have reduced employee numbers by 35-50% since 2012, even as asset values per-employee have increased (Table 2).

Table 2: Employment and capital intensity of production for Rio Tinto, Anglo American and BHP, 2008-2018 (Source: company reports)

	Rio Tinto		Anglo American		BHP	
	Employees	Asset value per employee (\$m)	Employees	Asset value per employee (\$m)	Employees	Asset value per employee (\$m)
2008	105,733	0.85	105,000	0.47	41,732	1.82
2018	47,458	1.92	61,527	0.85	27,161	4.12
% change	-55%	126%	-41%	81%	-35%	126%

Beneath these general trends is considerable heterogeneity. Major mining firms in Africa have become more diverse due to emerging market investment, most significantly from Chinese companies, some of which are state-owned or benefit from forms of state support. Investments often involve unconventional financing arrangements like resource-for-infrastructure deals, and are often motivated by strategic concerns about resource security rather than solely commercial imperatives (Power et al, 2012). Whilst Power et al (2012, pp. 191-220) highlight differing approaches to environmental governance and labour relations, Lee (2018) suggests that some Chinese mining investors may be more long-term in orientation and thus less sensitive to market and political risks.

Deeper discussion of trends relating specifically to emerging market investment in African minerals is beyond this paper's scope, but indicators suggest that the pace of Chinese expansion in African mining may have slowed. The annual value of Chinese investment transactions in sub-Saharan Africa's metals' sector has been falling over recent years, from \$4.4bn in 2014 to \$2.2bn in 2018, compared to a 2011 peak of \$5.6bn.¹ While overall Chinese FDI in Africa continued increasing, Chinese FDI stock in African mining remained stationary between 2016 and 2018.²

Declining profitability and investor caution has clear implications for mineral-dependent African countries. For the 2013-2017 period, 90% were commodity dependent (commodity exports > 60% total merchandise export value) (Figure 4), with 18 classified as mineral-commodity dependent (UNCTAD, 2019). Altered conditions in mining have had significant macroeconomic consequences for many countries' growth prospects. The IMF has observed a dualistic pattern, with resource intensive countries averaging 2-3% annual GDP growth since 2013 - meaning relatively stagnant per capita growth - compared to above 5% in non-resource intensive countries (IMF, 2019).

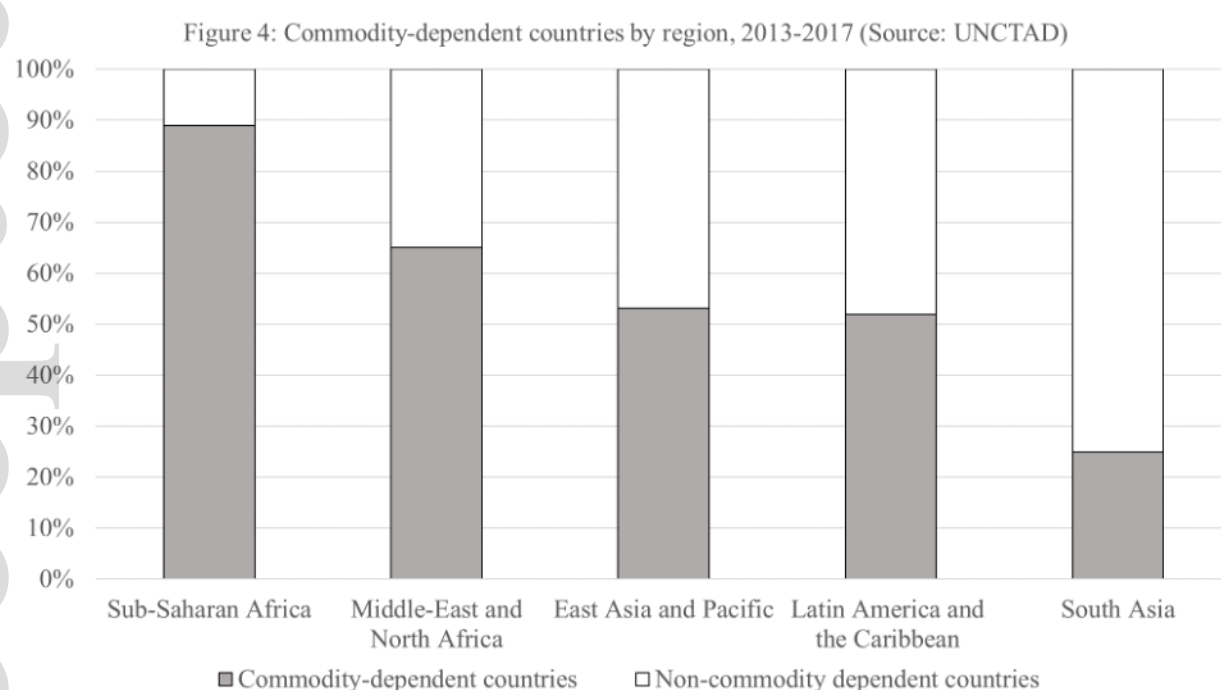


Figure 4: Commodity-dependent countries by region, 2013-2017

Source: UNCTAD

This has fiscal consequences. Since the 1980s, African countries have had significantly larger resource rents (oil, gas, mineral and forest rents) relative to GDP than low and middle income country averages, rents that are important to government revenues given thin tax bases. Resource rents grew spectacularly during the 2000s, averaging just under 15% of GDP compared to 8% during the 1990s, but have now fallen back to 1990s levels (Figure 5). This has created severe fiscal strains as many governments increased public expenditure and borrowing in anticipation of a sustained supercycle.

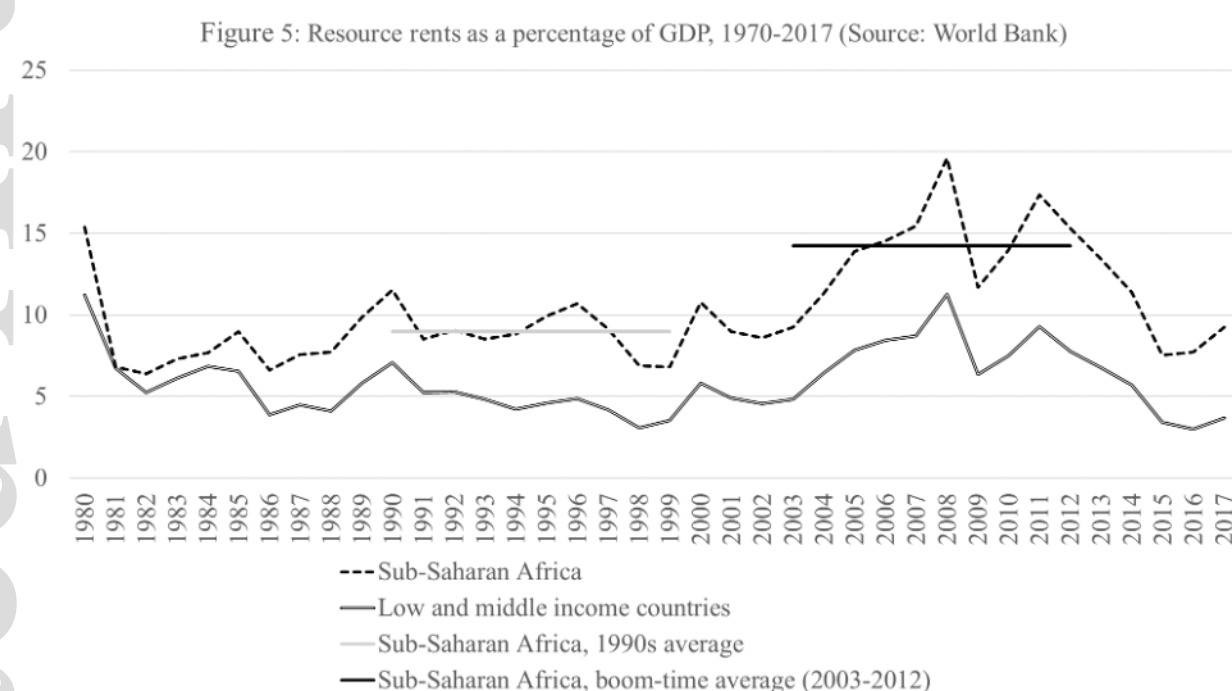


Figure 5: Resource rents as a percentage of GDP, 1970-2017

Source: World Bank

As the following sections show, these changing economic dynamics prompt a reframing of recent scholarship on mining and development and raise new questions while giving fresh salience to earlier work on the social, political and economic consequences of boom-bust cycles (e.g. Ferguson 1999, Karl 1997). The following sections interrogate how the changing economic context altered the trajectory of mining across different countries and commodity groups. Leaving aside examples such as battery metals, the framing assumption of a ‘scramble’ –inexorable rapid expansion of frontiers to secure scarce resources– no longer appears certain. Instead, a more complex picture is emerging. Major mining companies have generally adopted more conservative approaches, favouring lower-cost, higher-grade deposits in less ‘risky’ jurisdictions. China’s growth is slowing and expected to shift to a less mineral-

intensive economic model, slowing demand growth, though not necessarily causing absolute declines. These dynamics highlight the need for research that examines what heightened corporate investment caution and withdrawal might mean for (a) policy in commodity-dependent African states such as Zambia, the DRC and Guinea, (b) relations and bargaining between mining, states and communities, and (c) the role of artisanal and small-scale mining in exploiting high-risk deposits (Verbrugge & Geenen, 2018).

3 NEW GEOGRAPHIES OF STRUGGLE

Recent decades have seen a rise in mining related conflicts - between 2002 and 2013 the ICMM documented an eight-fold rise in conflict (ICMM 2015). This trend has been extensively analysed by geographers who have documented a rise in levels of struggle and violence exacerbated by the industry entering 'new' areas and implementing new forms in previously mined areas across Africa (e.g. from shaft to open pit mining). These struggles were 'geographic' because they operated unevenly across both space and time. They occurred locally and were often connected with global activist communities.³ These struggles were also examples of the mining industry's 'politics of time', where the speed environmental impacts were made knowable shapes the ensuing kinds of struggle (Kirsch 2014).

There are various catalysts: (1) Struggles over resources - many people were displaced and thus dispossessed of access to critical resources, especially land and water (Frederiksen and Himley 2020), causing widespread losses to livelihoods (Abuya 2016, Akiwumi 2011). (2) Struggles over environmental impacts and pollution, especially of water (Abuya 2016, Akabzaa 2009, Akiwumi 2011). (3) Struggles over resource rent distribution - at the national level, rising 'resource nationalism' often played out as a struggle over taxation levels (see Section 4), whilst resource rents created newly powerful political actors (including regional) (Akabzaa 2009, Bebbington et al. 2018, Lungu 2008, Tsuma 2010). (4) Struggles over access to mining wealth - 'enclave' models of extraction reduced opportunities to spread benefits widely (Ferguson 2006, Negi 2011), while contracting and service tenders affected local level access to employment. Communities frequently challenge extractive operations use of capital-intensive, low-labour methods (Ofori & Ofori 2018). Despite evidence that CSR programmes scope and resources have expanded, their development impacts were questioned and contested (Andrews 2019, Franks et al. 2014, Frederiksen 2018).

As the supercycle ended, dynamics changed. Some conflicts associated with expansion lessened; simply because mining companies were less active and not entering new areas. As revenues declined, communities' bargaining power over mining companies decreased and their 'dependence' exposed (Verbrugge & Geenen 2018). Other forms of struggle increased, sometimes catalysing in protests against layoffs (see Section 5). Where operations continued, expectations of company behaviour sometimes rose, particularly in areas with a history of mining conflicts (e.g. Ghana). Declining mining revenues generated pressure to focus community investment budgets on conflict amelioration. For some industry observers, corporations took an instrumental approach to spending and CSR, further reducing corporate/community relations (Thomson pers. comm.). Community development became secondary to 'shared value', risk management, 'social performance' and 'measurable results'; while 'social license' remained, despite its faults (Frederiksen 2018).

These trends raise important questions for researchers about the new geographies of struggle. How do conflicts over extractive industry change as mining shrinks or retreats? Are new emerging market actors, often with less experience of managing impacts, running 'poorer performing' mines? How can 'enclave' mining generate benefits (and therefore legitimacy) for local communities? How can changing discourses and pressures on CSR shape development outcomes? How does resurgent CSR instrumentality affect patronage and clientelism in areas of operation? And finally what are the long-term consequences of automation and retrenchment on political volatility?

4 NATIONAL MINERALS-BASED DEVELOPMENT

The 'supercycle' induced significant shifts in thinking about mining's role in economic development in many Africa countries, and the state's role in governing mineral extraction. The rise of 'resource nationalism' broke a period of consensus around neoliberal models of mineral governance that emphasised favourable conditions for FDI, minimising risks and increasing investors' share of resource rents (Campbell, 2013). Simultaneously, dominant thinking in economics around the 'resource curse' framed mineral rents as economically and politically distorting (Siakwah 2017; Collier et al., 2011), a problem to be solved by 'good-governance' institutions for mineral extraction and marketing which minimised political discretion and state intervention. Dissatisfaction over the benefits of these policies, despite the supercycle, led many resource-rich governments to consider alternatives (Besada, 2016). Reviews of mining legislation and contracts with a view to increasing state and/or community

shares in mineral rents took place in multiple African countries (Tanzania, Ghana, Sierra Leone, South Africa, Liberia, the DRC, Zambia, and Zimbabwe), aimed at higher taxes or royalties, indigenous ownership requirements, and domestic value addition or local content requirements (Humphreys, 2019a). Pejoratively termed ‘resource nationalism’ by critics, this represented a reframing of mining’s role in national development (Childs, 2016; Andreasson, 2015). New policies sought to use state intervention to increase domestic economic linkages with large-scale mining, boost domestic industrial capacity with requirements for local content upstream in the value chain and encouraged mineral beneficiation downstream (Morris et al, 2012). Such ideas were influential in African policy circles, as reflected in the 2009 Africa Mining Vision (AU, 2009; Busia & Akong, 2017), and saw new legislation, local content policies and mining licence renegotiations across the continent (Ayisi, 2015; Ambe-Uva, 2017). However, much research into commodity based development seemed to take for granted that the supercycle, and the increased relative bargaining power of mineral-rich states accompanying it, would continue for decades. Moreover, research focused on material linkages to mining, and paid too little attention either to the relative power of multinational corporations or the political economy that shapes the design and delivery of industrial policy on the ground (Fessehaie & Rustomjee, 2018). Outcomes of local content and linkage development initiatives to-date have frequently been poor (Hilson & Ovadia, 2020).

Policies conceived and implemented during the latter stages of a boom have continued into the slump. Many African governments are pursuing a harder line against multinational mining companies in worsening economic conditions. In recent years this has notably included protracted disputes between governments and multinational investors over efforts to increase rates of taxation on mining in Tanzania, Zambia and the DRC, even as mineral prices and investment levels have remained low. This suggests the durability of ‘resource nationalist’ policy agendas given competition for resources from new emerging market mining investors, increasingly strained fiscal circumstances, and populist political pressures (e.g. see Jacob & Perseson, 2018). The situation emphasises how changing market dynamics intersect with the political economy of minerals-based industrial and fiscal policies, which can create new interest groups, patronage networks and political claims on the mining industry (Ibid, Hansen et al, 2014). The shift in economic policy towards mining has also been accompanied, in many instances, by changing political rhetoric about natural resources’ contribution to development, and rising popular expectations related to public expenditure,

employment and opportunities for domestic business elites (see Frynas et al, 2017; Barlow, 2020). This combination of factors has contributed to an increasingly fraught politics of mining and more adversarial state-business relations in many contexts.

The evolution of national minerals-based development policies in a commodity slump compounded by Covid-19 depends upon the balance of forces within society, how new and existing interest groups develop and relate to one another, and what this means for the distribution of rents from mining and commitment to broad-based economic development – including the development of industrial activities. Given the current context, will changing economic conditions continue to entrench ‘resource nationalism’ or spur a return to more ‘investor-friendly’ governance modalities? Will mining companies previously willing to engage with voluntary local content and beneficiation initiatives continue to do so, or will cost-cutting and productivity imperatives spur capital-intensive, ‘enclave’ operating models? Can nascent domestic industries around mining survive continued instability and uncertainty? What forms of counter-cyclical industrial policy support might help protect the limited progress made to date?

5 LABOUR AND LIVELIHOODS

The supercycle led to the expansion of formal and informal mining in many African countries with important consequences for labour and livelihoods. Struggles between mining companies and labour expanded with industry growth and increased profits, with companies organising their corporate and operational structure to minimise (organised) labour’s power, most notably through the use of subcontracting (Fraser and Lungu 2007, Negi, 2011, Verbrugge & Geenen 2018). In areas with accessible deposits, rising prices also made ASM a lucrative livelihood option, leading to booms in areas previously overlooked (e.g. Tanzania, eastern DRC, Jonsson & Bryceson 2017, Verbrugge & Geenen 2018). While augmented local and national state resources enabled expanded welfare programmes and state employment (Bebbington et al. 2018), the impact of mining booms on livelihoods remained complex. For example, in rural areas, increased competition for land and water, negative environmental externalities, and changing rural labour force composition all impacted existing agrarian livelihoods (see Section 3); while the corporate priority of securing reserves for future growth generated increased contestation over resource access between the formal and informal sectors (E.g. DRC, Tanzania, Ghana, see Hilson & Potter 2005, Verbrugge & Geenen 2018). Areas witnessing both artisanal and formal booms saw influxes of migrant labour, for both

employment in mining and the attendant service-sector around operations (Akiwumi 2011, Bryceson & Geenen 2016, Nyame et. al. 2009). This strained existing natural resource-based livelihoods, infrastructure/social services, and created social tension as communities linked migration to crime and prostitution (Akiwumi 2011). More widely, increased competition for qualified mining talent drove wage inflation in skilled job categories exacerbating already stark expat/local wage disparities.

Post-supercycle, this picture changed. As focus shifted to cost control over expansion, emphasis on technological innovation and digital technologies expanded to enable automation and mechanisation and to more efficiently manage resources and reduce costs (Durrant-Whyte et al., 2015). With labour a key cost, labour intensive extraction techniques were under pressure, creating labour struggles. Redundancies and layoffs (or prospects thereof) from the formal mining sector have political and economic ripple effects. For example, unemployment and constraints on government spending increases pressure on mines as a source of livelihoods and generator of employment (Hilson & Potter 2005). However, as the formal sector stalls on deposits that are no longer economic, more artisanal producers can occupy space left by the formal sector, absorbing its labour (Verbrugge & Geenen 2018). The outlook for communities that grew up around now-closed mining operations, can be bleak. Historically, many communities have taken decades to recover. For example, South African ex-gold and coal mining towns have suffered widespread unemployment and deprivation (Binns & Nel 2003, Siyongwana & Shabalala 2018). By contrast, company lay-offs can spur surges in ASM as unemployed miners resort to artisanal mining at familiar sites (Yankson and Gough 2019). Particularly gold diggers have proliferated in mineral-rich mining sites, acting inadvertently as prospectors for large-scale mining interests. Artisanal miners, who benefitted from the gold price rise of the supercycle were most likely to move to nearby towns, where they could invest in diversified businesses and improved housing, thereby contributing to urbanization, while being readily at hand should prospects of mineral investment return (Bryceson & MacKinnon 2012, Jonsson & Bryceson 2017).

All this raises questions for future research. Automation and mechanisation leads to a smaller labour force, with higher skill requirements. Technology has often been used as a means to control labour, what now? How will these trends interact with expectations for employment creation? If the retreat of the formal sector sees a concomitant growth in the artisanal sector,

how best to manage the social and environmental impacts of ASM? How do mining and other livelihoods (particularly, agrarian) interact in changing rural spaces? What do these changing livelihood opportunities mean for patterns of migration in extractive zones? How can mine closure impacts on local communities be best managed? Can deindustrialisation lead to economic innovation and alternative paths to development (Binns & Nel 2003)? How are former mine sites remembered and what material and emotional geographies do they leave behind with what consequences for justice (Pini et al 2010)?

6 CONCLUSIONS

In this article we have explored recent research on the mining sector in Africa and reflected on this considering the supercycle's end. We have explored the changing geographies of investment and sectoral shifts in mining before examining the changes brought by the supercycle, its end, and what questions emerge for future research in three key areas of: struggle, national development strategies and labour and livelihoods. The last half decade has seen a fundamental shift in the possibilities of extraction-led development and the reconfiguring of governance of the extractive sector. New trends have emerged around corporate strategy and actors, including the increasing presence of emerging market-based companies with implications for state-business relations and models for mineral-based development strategies. Equally, the end of the supercycle has perpetuated or intensified pre-existing trends towards mechanization, automation, and enclavity while distributive pressures on companies by local communities and host nations increase. While, at the global level at least, it remains that Africa is not that important to mining, mining is important to Africa. As scholars we need to grapple with the changes afoot in Africa since the end of the supercycle, not least those spurred by the Covid-19 pandemic. The research directions suggested here offer initial ways to chart how mining can offer more constructive pathways towards development in both boom and bust.

NOTES

¹ Data from American Enterprise Institute's China Global Investment Tracker <https://www.aei.org/china-global-investment-tracker/>

² Data from the China-Africa Research Initiative <http://www.sais-cari.org/chinese-investment-in-africa>.

³ The Environmental Justice Atlas (ejatlas.org) is one tool that visually describes the spatiality of mining related conflict. Evidencing over 3000 instances of socio-environmental conflict, the mineral sector accounts for nearly a third of cases worldwide, many of which are found on the African continent.

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Area	Key supercycle dynamics	Key post-supercycle dynamics	Key questions for research and policy
Economic trends	<ul style="list-style-type: none"> Sustained high commodity prices MNC's Expansion into areas previously 'too risky' or uneconomic by both large-scale mining and ASM Expectations of sustained high mineral rents in many African countries 	<ul style="list-style-type: none"> Many –but not all– mineral prices have significantly fallen Many mining companies in financial difficulty, retreating from areas and retrenching staff Mining investment and mineral rents declined to pre-supercycle levels 	<p>What do these changes mean for:</p> <ul style="list-style-type: none"> Policy in commodity-dependent African states? Relations and bargaining between mining, states and communities? the role of ASM in exploiting high-risk deposits?
Geographies of struggle	<p>Expansion into new areas and modes of extraction increased conflict over:</p> <ul style="list-style-type: none"> access to resources, especially land environmental impacts and pollution resource rents and other forms of benefit distribution such as CSR spending and jobs 	<ul style="list-style-type: none"> Forms of conflict associated with expansion into new areas lessened Expectations of increased benefit distribution and conflicts over them remain with some intensified (e.g. around layoffs) CSR spending squeezed and less emphasis on community development 	<ul style="list-style-type: none"> How do conflicts over extractive industry change as mining shrinks or retreats? E.g. What does automation and retrenchment mean for political volatility? How can 'enclave' mining generate benefits for local communities? How can changing discourses and pressures on CSR shape development outcomes?
National minerals-based development	<ul style="list-style-type: none"> Rise of 'resource nationalism' Revised minerals legislation to secure greater share of rents for national development and counter enclave tendencies e.g. local content Increased bargaining power of 	<ul style="list-style-type: none"> Countries pursuing harder line against international mining companies despite worsening investment climate Protracted disputes over raising rents and taxation in the context of fiscal strains Fraught popular politics of mining and 	<ul style="list-style-type: none"> Will changing economic conditions entrench 'resource nationalism' or spur a return to more 'investor-friendly' governance modalities? Will cost-cutting and productivity imperatives spur capital-intensive, 'enclave' operating models?

	states over international mining companies	deteriorating state-business relations	<ul style="list-style-type: none"> What forms of counter-cyclical fiscal policy and industrial policy support might help mitigate the effects of slumps and protect nascent domestic industries around mining?
Labour and livelihoods	<ul style="list-style-type: none"> Growth of employment – both formal and ASM Increased labour struggles and use of subcontracting Migration and service sector growth in areas of mining growth Skilled wage inflation 	<ul style="list-style-type: none"> Focus on cost control, accelerated automation and mechanisation leading to retrenchment ASM remains large - formal sector withdrawal transitions some deposits to ASM Challenges for former mining towns and areas 	<ul style="list-style-type: none"> How will retrenchment, automation and mechanisation interact with expectations for employment, and other rural livelihoods? How to manage the social and environmental impacts of a larger ASM sector? What do these changing livelihood opportunities mean for migration in extractive zones? How can mine closure impacts on local communities be best managed both culturally and economically?