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**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

THESIS

**MANAGEMENT OF AFRICA'S RARE EARTH MINING
SECTORS**

by

Danielle M. Garbarino

December 2021

Thesis Advisor:
Second Reader:

Rachel L. Sigman
Anne M. Baylouny

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MANAGEMENT OF AFRICA'S RARE EARTH MINING SECTORS

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Lieutenant, United States Navy
BA, University of Wisconsin-Madison, 2013

Submitted in partial fulfillment of the
requirements for the degree of

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from the

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ABSTRACT

Africa's rare earth mining sectors are growing rapidly due to the international strategic significance of these minerals. Whether or not countries privatize or nationalize their rare earth sectors has important strategic implications for U.S. access to these minerals. At present, most African countries have adopted privatized models of rare earth mining. What motivations have prompted African countries not to nationalize their rare earth industries? This thesis examines five potential drivers of Africa's rare earth management: international pressures, economic viability, weak state capacity, political/public pressures, and environmental concerns, and investigates these hypotheses using two case studies from South Africa and Zambia. In both countries, economic viability is the most important guiding factor, while political pressures have also influenced Zambia's resource management model. The remaining three factors exhibited weak explanatory evidence. In order to diversify U.S. rare earth supply outside of China, the strength of the economic viability hypothesis suggests the U.S. must implement programs that support private investment in Africa's rare earth projects to ensure sustainable production and supply of these strategic minerals. U.S. policy objectives should promote privatization by incentivizing investment in Africa's rare earth industries to ensure operations remain economically viable for the host nation.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACR	African Consolidated Resources
ANC	African National Congress
BEE	Black Economic Empowerment
CIT	corporate income tax
DMRE	Department of Mineral Resources and Energy
EFF	Economic Freedom Fighters
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
IFI	international financial institution
IMF	International Monetary Fund
KCM	Konkola Copper Mines
KORES	Korea Resources Corporation
MMD	Movement for Multiparty Democracy
MMMD	Ministry of Mines and Minerals Development
MPMSP	Mineral Production Monitoring Support Project
PFS	Pre-Feasibility Study
REE	rare earth elements
REI	Rare Earth Internal LTD.
UNIP	United National Independence Party
VAT	value-added tax
ZCCM	Zambia Consolidated Copper Mines
ZCCM-IH	Zambia Consolidated Copper Mines Investment Holdings
ZEMA	Zambia Environmental Management Agency

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I. INTRODUCTION

A. RESEARCH QUESTION

How countries manage their mineral resources has important consequences for their economic growth prospects, political outcomes, environmental protection, and international relations. Of particular concern is whether countries nationalize or privatize their mining operations. These questions are important for African countries as they develop their rare earth mining sectors, which are growing rapidly thanks to their potential international strategic significance. In order to deepen our understanding of the factors that dictate African governments' rare earth management, this thesis investigates the motivations that have prompted African countries not to nationalize these strategic minerals. This research examines the following question: Why are African countries not nationalizing their rare earth mining sectors?

The findings conclude that the main drivers of privatized management models are economic viability and instances of political pressures. International pressures, weak state capacity and environmental concerns provide weak explanations for a country's decision not to nationalize its rare earth mining sector.

B. SIGNIFICANCE OF THE RESEARCH QUESTION

Understanding how African governments make decisions about their rare earth sector will inform U.S. strategy to ensure adequate rare earth supply in the face of rising competition with China. Even though China accounts for one third of the world's rare earths, it controls nearly all rare earth mineral processing facilities, including 80% of the United States' rare earth mineral imports.¹ This evidence suggests China's monopoly over rare earths could serve as a potential weapon in the trade war with the United States. These minerals are strategically significant owing to their high-tech consumer and defense applications, to include the production of airplanes, weapon systems, electric cars, laser

¹ Ernest Scheyder and Zandi Shabalala, "Exclusive: Pentagon eyes rare earth supplies in Africa in push away from China," *Reuters*, June 5, 2019, <https://www.reuters.com/article/us-usa-rareearths-pentagon-exclusive/>.

range finders, night vision goggles, and cell phones.² In an effort to become less dependent on China, the United States is looking to Africa as a viable option for future sourcing of its rare earth imports. However, in order to gain access to rare earth markets in Africa, it is important to understand the drivers of mining sector management. The United States desires a free market supply of rare earth minerals. Nationalization of a country's rare earth sector could weaken the supplies of these strategic minerals by disincentivizing investors and stifling production.³ The United States can leverage its understanding of nationalization and privatization by adjusting its rare earth policy and strategy in favor of maintaining sufficient access to Africa's rare earth reserves.

The thesis also has theoretical significance. Government management of minerals such as oil and diamonds has received considerable attention in the academic literature, but much less is known about how African countries manage their rare earth mineral sectors. Studying the drivers of government management decisions is important for gaining a more holistic view of the political economy of mineral resources in Africa. An examination of factors leading to rare earth privatization will offer comprehensive insight into the priorities and concerns of African governments surrounding their mineral sectors.

C. LITERATURE REVIEW

I examine the broader literature on mining sector management to understand the potential reasons why African governments are opting not to nationalize their rare earth mining industries. I begin with a brief overview of how African countries typically manage their rare earth minerals. I then discuss several reasons why we would expect countries to nationalize rare earth mining, including both political and economic motivations for the nationalization of a country's resources. I conclude with a discussion of explanations as to why countries do not nationalize their mineral resources.

² Gustavo Ferreira, Jamie Critelli, and Wayne Johnson, "The Future of Rare Earth Elements in Africa in the Midst of a Debt Crisis," *Eunomia Journal*, August 15, 2020, <https://www.civilaffairsassoc.org/post/the-future-of-rare-earth-elements-in-africa-in-the-midst-of-a-debt-crisis>.

³ Stephen Burgess, *The Effect of China's Scramble for Resources and African Resource Nationalism on the Supply of Strategic Southern African Minerals: What Can the United States Do?*, ADA559883 (Colorado Springs, CO: U.S. Air Force Academy, 2010), 3, <https://www.usafa.edu/app/uploads/Burgess-2011-China-and-South-African-Minerals.pdf>.

1. Management of Rare Earth Minerals

Of the nine African countries that currently have rare earth operations, none have fully nationalized arrangements. Instead, governments have pursued one approach to the management of their rare earth minerals. This arrangement is one in which the state retains control of the land and grants mining permits or concessions to private companies to operate on that land. For example, Australian mining company Peak Resources retains 100% ownership of Tanzania's Ngualla Rare Earth Project.⁴ Similarly, mining sites in Burundi, Kenya, Malawi, Mozambique, Namibia and South Africa are licensed to private mining companies while the state retains land ownership.⁵

In order to conduct mining operations, mining licenses must be issued by the state to grant a company the right to mine in a defined area for a specified amount of time. The licenses often acquired by prospective mining companies include a prospecting license, exploration license, retention license, mining license or special mining license.⁶ For example, following the recommendation of its Mining Commission, a rare earth Special Mining License application for the Ngualla Hill project was submitted to Tanzania's Ministry of Minerals for approval in October 2019.⁷ In Tanzania, the issuance of a Special Mining License is standard procedure for large-scale mining operations exceeding 100 million USD in capital investment.⁸ Typically, host countries have ministries or

⁴ "Peak Resources to acquire full ownership of Ngualla Rare Earth Project," *Proactive Investors*, <https://www.proactiveinvestors.com/companies/news/27140/peak-resources-to-acquire-full-ownership-of-ngualla-rare-earth-project-32395.html>.

⁵ Robin Harmer and Paul A. M. Nex, "Rare Earth Deposits of Africa," *Episodes* 39, no. 2 (November 2016): 393-99, <https://doi.org/10.18814/epiiugs/2016/v39i2/95784>.

⁶ Victoria R. Nalule, "Regulation of Mining in Africa," in *Mining and the Law in Africa: Exploring the social and environmental impacts*, ed. Palgrave Macmillan (Switzerland: Springer Nature Switzerland AG, 2020), 46, <https://doi.org/10.1007/978-3-030-33008-8>; The Mining Act, Republic of Tanzania, No. 14 (2010): 13, <http://extwprlegs1.fao.org/docs/pdf/tan97360.pdf>.

⁷ Rocky Smith, CEO, "Tanzania Special Mining Licence Update," Peak Resources, March 30, 2020, <https://wsecure.weblink.com.au/pdf/PEK/02219801.pdf>.

⁸ Thomas M. Sipemba and Jacqueline Matiko, "The Mining Law Review: Tanzania," *The Law Reviews*, November 10, 2020, <https://thelawreviews.co.uk/title/the-mining-law-review/tanzania>.

departments designated to grant licenses, as well as the authority to renew, transfer, cancel or suspend these licenses if desired or required.⁹

2. Why We Expect Nationalization

Much of the literature on mineral management in Africa focuses on the strong political incentives for leaders to nationalize their mining industries. Leaders may gain a number of political benefits from nationalization. Mahdavi, for example, explains that leaders often choose resource nationalization to secure their position in power and maintain access to rents while keeping revenue flows out of the hands of private corporations. By assuming ownership of the means of production, leaders may seize revenues to purchase political support and deter opposition.¹⁰ Leaders may also leverage their control over state-owned management positions as a patronage tool to secure loyal supporters.¹¹ Weak leaders with few constraints are likely to take such actions to retain power at the expense of future economic gains.¹² Mahdavi concludes that nationalization “offers long-term risks but high short-term rewards at the cost of societal development.”¹³

Societal pressure might also influence leaders to nationalize their mining sector. Communal uprisings or discontent pertaining to a foreign-owned mining project can impact a government’s decision to terminate a project or refuse further foreign-owned mining developments.¹⁴ As discussed by Kernaghan Webb in his analysis of political risks pertaining to the mining sectors of less developed nations, “...a primary motivation for developing countries expropriating or otherwise interfering with a particular project is the

⁹ Nalule, “Regulation of Mining,” 46.

¹⁰ Paasha Mahdavi, *Power Grab: Political Survival through Extractive Resource Nationalization*, ed. Aseem Prakash (United Kingdom: Cambridge University Press, 2020), 4.

¹¹ Mahdavi, 107.

¹² Mahdavi, 109.

¹³ Mahdavi, 225.

¹⁴ Kernaghan Webb, “Political risk insurance, CSR and the mining sector: An illustration of the regulatory effects of contracts,” *International Journal of Law and Management* 54, no. 5 (September 2012): 396, <https://doi.org/10.1108/17542431211264287>.

perception by the governments of developing countries that communities are not benefiting from the project.”¹⁵

In addition to political explanations, economic motivations may influence a state’s decision to assume ownership of their mining sector. The desire to have direct control over a country’s long-term economic growth is a potential driver for nationalization. For example, this kind of economic nationalism drove Zambia to nationalize its mining industry in 1969.¹⁶ The policy strategy of Zambia’s United National Independence Party (UNIP) was to achieve Zambian economic independence through government control of the mining sector.¹⁷ The UNIP assumed 51% ownership of its mining companies to gain control of its economy and promote Zambia’s long-range economic interests.¹⁸ The government reasoned it could not rely on private industry to guarantee the expansion of its mining industry and advance Zambia’s economic growth.¹⁹ The UNIP intended to use its position as majority stakeholder to increase investments in new plant facilities and mining sites to establish permanent and economically independent mining communities.²⁰ Similarly, in the early years of its independence, South Africa’s government assumed control of failing private enterprises in the interest of the nation’s socio-economic security. State intervention in private enterprise was observed as a tool to solve unemployment and reduce inequalities between urban and rural areas.²¹

Furthermore, the potential for private companies to capitalize on revenue gains without providing the host nation sufficient compensation for its mineral extraction may

¹⁵ Webb, 396.

¹⁶ Ronald T. Libby and Michael E. Woakes, “Nationalization and the Displacement of Development Policy in Zambia,” *African Studies Review* 23, no. 1 (April 1980): 33, <https://doi.org/10.2307/523462>.

¹⁷ Libby and Woakes, 40.

¹⁸ Libby and Woakes, 39.

¹⁹ Libby and Woakes, 34.

²⁰ Libby and Woakes, 35.

²¹ Sam Kongwa, “Nationalization: Lessons from Southern Africa,” *Africa Insight* 20, no. 3 (May 1990): 189, https://journals.co.za/doi/pdf/10.10520/AJA02562804_1202.

prompt leaders to transition to state-ownership of their mining industries.²² In 2011, Zimbabwean Minister Saviour Kasukuwere announced plans to partially nationalize Zimbabwe's mining sector in response to the exploitation of the country's mineral wealth by foreign companies. President Mugabe's regime criticized the small revenue return from the extraction of Zimbabwe's natural resources.²³ Pertaining to Zimbabwe's diamond mines, the government received a 61 million USD decrease in royalties and other fees between 2014 and 2015. In an effort to seize revenue gains and return the wealth to Zimbabwe, President Mugabe announced his plan in 2016 to fully nationalize all diamond mining operations.²⁴

3. Why Not Nationalization?

While there are political and economic reasons for state-ownership, international pressures and low state capacity can compel African countries to privatized management models. A wave of reforms in Africa, spanning from the mid-1980s to mid-1990s and beyond, emphasized free market ideology and state withdrawal from the management of the mining sector.²⁵ The rationale for these reforms stemmed from the underperformance of Africa's mining sector. Accounting for a small percentage of the global mining capital expenditures, Africa was recognized as having untapped potential in the industry, disadvantaged by its technological incapacity, lack of geological information, poor management and insufficient capital.²⁶ While Campbell acknowledges a reduction in demand for most minerals in the 1980s, as well as a global shortage of mining investment

²² Terhemba Ambe-Uva, "Whither the state? Mining codes and mineral resource governance in Africa," *Canadian Journal of African Studies* 51, no. 1 (March 2017): 95, <https://doi.org/10.1080/00083968.2016.1277148>.

²³ John Mutenyo and Brandon Routman, "Nationalization of the Zimbabwe Mining Sector: Another Blunder by the Mugabe Regime?" *Brookings*, March 21, 2011, <https://www.brookings.edu/opinions/nationalization-of-the-zimbabwe-mining-sector-another-blunder-by-the-mugabe-regime/>.

²⁴ "Robert Mugabe to nationalize Zimbabwe's diamond industry," *The Guardian*, March 3, 2016, <https://www.theguardian.com/world/2016/mar/03/robert-mugabe-to-nationalise-zimbabwes-diamond-industry>.

²⁵ Bonnie K. Campbell, "Regulating mining in Africa: for whose benefit?" (discussion paper 26, Uppsala: Nordiska Afrikainstitutet, 2004), 7, <https://www.diva-portal.org/smash/get/diva2:240515/FULLTEXT02.pdf>.

²⁶ Campbell, 16.

funds, she attributes underperformance primarily to the inability of African countries to attract the risk capital required for investment.²⁷ She explains: “During this period, a deteriorating financial situation has forced many countries to reconsider the role of the state. State-owned enterprises, including in the mineral sector, have been privatized, inter alia to reduce fiscal deficit.”²⁸ International financial institutions (IFIs) and international donors attributed the economic crises of African states to state monopoly, state economic intervention and poor state management as a means to justify liberalization reforms.²⁹

State-withdrawal from the mining sector was driven by pressures from financial agencies and donors, whose loans were essential for the restoration of the state’s mining industry and its overall economy.³⁰ Anne Pitcher explains: “Requests for aide coincided with heightened activism on the part of IFIs to attach conditions to aid disbursements. To receive funds, grants, or loans, governments had to agree to a package of reforms, recommended and overseen by the IFIs and bilateral donors.”³¹ Attached to the loans were strict provisions, including the sale of public industry to the private sector, as well as state prevention from administering its own economy.³² While countries may have been pressured by financial agencies and donors to accept these conditions for financial assistance, Pitcher’s primary argument claims that despite IFI influence, state responses and the level of commitment toward reforms varied among African countries. Governments whose interests were not advanced by the reforms were less inclined to institutionalize the proposed changes. In some instances, states even modified reforms to meet the interests of the state.³³

²⁷ Campbell, 16.

²⁸ Campbell, 10-1.

²⁹ Anne Pitcher, *Party Politics and Economic Reform in Africa’s Democracies* (New York: Cambridge University Press, 2012), 51, <https://play.google.com/books/reader?id=vj0hAwAAQBAJ&hl=en&pg=GBS.PA30>.

³⁰ Campbell, “Regulating mining in Africa.” 12.

³¹ Pitcher, *Party Politics and Economic Reform*, 51.

³² Anne Pitcher, “Conditions, Commitments, and the Politics of Restructuring in Africa,” *Comparative Politics* 36, no. 4 (July 2004): 384, https://www.jstor.org/stable/4150167?seq=6#metadata_info_tab_contents.

³³ Pitcher, *Party Politics and Economic Reform*, 21-2.

In many cases, what actually drove leaders to embrace privatization reforms were the dire conditions of their economies and the need to access foreign capital for economic recovery. In Zambia and Mozambique, for example, copper production was in such decline that union workers advocated for the privatization of the industry to bolster investment.³⁴ A new political party, the Movement for Multiparty Democracy (MMD), advocated for privatization as part of its campaign and won the election in 1991. Donors increased aid in support of the MMD and its promise of privatization.³⁵ By 2002, Zambia's copper mines were officially privatized.³⁶ Likewise, Mozambique's transition to privatization helped the country recover financially following a 17-year war ending in 1992.³⁷ Ghana also adopted reforms promulgated by the International Monetary Fund (IMF) and World Bank to attract investment capital and salvage its failing economy. Prior to implementing these reforms, the government had full control over numerous enterprises within Ghana's mining sector.³⁸ However, decreased productivity compounded by drought resulted in at least two-thirds of Ghanaians living in absolute poverty by 1983.³⁹ In order to receive financial assistance, Ghana agreed to economic reforms calling for the gradual transference of public enterprise to the private sector.⁴⁰ Between 1983 and 1998, Ghana's mining sector received over 6 billion USD of private investment for mine development, restructuring, and exploration. National export earnings from the mining sector alone increased from 20% in the mid-1980s to 40% in 1992.⁴¹

In addition to economic rehabilitation, low state capacity for effective mining operations is another motivation for privatization. Many African countries lack the

³⁴ Pitcher, 124.

³⁵ Pitcher, 125.

³⁶ Pitcher, 126.

³⁷ Pitcher, 164.

³⁸ Gavin M. Hilson, "Structural Adjustment in Ghana: Assessing the Impacts of Mining-Sector Reform," *Africa Today* 51, no. 2 (Winter 2004), 59, <https://www.jstor.org/stable/4187650>.

³⁹ Hilson, 58.

⁴⁰ Hilson, 59.

⁴¹ Campbell, "Regulating mining in Africa." 25.

technical and management capabilities necessary to run an efficient mining sector.⁴² Africa's extractive industry often relies on foreign industries to provide the superior technology and infrastructure required for mineral extraction and processing. Limpitlaw states: "Mining is a high risk, capital intensive industry that requires access to large numbers of highly skilled people...There are very few examples of efficiently run state-owned mines that make a positive contribution to their country's economy."⁴³ The success of a mining industry depends on the skilled mining professionals, to include metallurgists, engineers, geologists and operators.⁴⁴ Furthermore, African states may have difficulty upholding environmental protection laws without the proper technology, infrastructure, and professional workforce. Foreign investment potentially provides knowledgeable personnel, as well as cleaner mineral processing and waste disposal technologies to mitigate the impacts on the environment and surrounding communities.⁴⁵

4. Conclusion

African countries have largely eschewed direct state involvement in rare earth mining operations, preferring instead to let private companies operate their rare earth mines. These decisions are surprising given the array of political and economic pressures that many African leaders face to nationalize their country's mineral resources. Nonetheless, several factors, including international reform pressures and weak state capacity, may prevent African countries from nationalizing their mineral resource operations. Given the strong political and economic motivations for state ownership, why has nationalization not occurred in Africa's rare earth mining sector?

⁴² Campbell, 16.

⁴³ Daniel Limpitlaw, "Nationalization and Mining: Lessons from Zambia," *The Southern African Institute of Mining and Metallurgy* 111, no. 10 (October 2011): 738, https://www.researchgate.net/publication/262479273_Nationalization_and_Mining_Lessons_from_Zambia.

⁴⁴ Limpitlaw, 738.

⁴⁵ Colin N. Boocock, "Environmental Impacts of Foreign Direct Investment in the Mining Sector in Sub-Saharan Africa," in *OECD Global Forum on International Investment: Conference on Foreign Direct Investment and the Environment* (Paris: Boocock, 2002), 20, <https://www.oecd.org/env/1819582.pdf>.

D. POTENTIAL EXPLANATIONS AND HYPOTHESES

I propose five hypotheses to examine why African countries have not nationalized their rare earth mining operations. These hypotheses draw from observations in the literature pertaining to the broader mining sector development in Africa. The five hypotheses include (1) international pressure, (2) economic viability, (3) weak state capacity, (4) political/public pressure, and (5) environmental concerns.

The first hypothesis focuses on pressures exacted by international actors and organizations to advance the adoption of privatization policies for rare earth operations in African countries. States requiring financial assistance are often subject to the conditions imposed by donors, who frequently advocate for the privatization of principal industries such as mining. Evidence from the wave of free-market oriented reforms initiated in the mid-1980s supports this argument by revealing donor capacity to dictate policy transformations. A leader's decision to nationalize their country's rare earth minerals could have significant political implications with foreign countries who rely on the privatization of these strategic minerals. To investigate this hypothesis, I assess whether and how international actors and organizations have exerted influence over rare earth mining, and whether such pressures have militated against nationalization.

The second hypothesis, economic viability, suggests that African countries do not nationalize their rare earth sectors because they are dependent on private investment for economic viability. Evidence from the case studies of Zambia, Mozambique and Ghana suggests that countries whose mining operations are not profitable regard privatization as a more economically viable model. This logic implies that African countries might turn to privatization as a means to finance their rare earth mining. In order to determine if economic sustainability from privatization justifies why countries have not nationalized their rare earth operations, I examine whether decision-makers have expressed concern about profitability and/or the level of investment required, as well as the types of concession arrangements negotiated between government and private actors.

The third hypothesis, weak state capacity, acknowledges that African countries may lack the technical knowledge necessary to conduct effective mining operations. This

hypothesis maintains that countries do not nationalize their rare earth mining sectors because they do not have the requisite domestic capacity. African countries often rely on the technical capabilities and expertise of foreign mining entities to operate and improve their mining sectors. Depending on the technological capacity of the country, however, influences from western mining entities may only be necessary for components of its rare earth mining operations as opposed to the entirety of its rare earth sector.⁴⁶ I examine the technological and knowledge-based capacity of a country's mining industry to assess whether weak state capacity prevents the nationalization of its rare earth mining operations.

The fourth hypothesis, political/public pressure, addresses the political and social motivations that dictate a country's management of its rare earth minerals. This hypothesis suggests that countries resist state-ownership because they worry about political or public resistance to nationalization. This claim is derived from the logic that a leader's decision to nationalize their country's natural resources produces short-term rewards for the leader but long-term economic drawbacks for the nation.⁴⁷ A decision to nationalize rare earth minerals for political gains could increase the potential for public and political backlash. To investigate this hypothesis, I examine the political dynamics surrounding decisions about how to manage rare earth mining.

Although not thoroughly examined in the literature, my fifth hypothesis argues environmental concerns are better addressed through the privatization of rare earth mining operations. This hypothesis draws on observations that African countries rely on foreign investment to provide the sophisticated technology and trained personnel required for mining efficiency, cleaner minerals processing and waste disposal.⁴⁸ However, some authors argue privatization and foreign investment promote greater mining activity which can increase pollution and natural habitat degradation.⁴⁹ In order to understand whether

⁴⁶ Boocock, 20.

⁴⁷ Mahdavi, *Power Grab*, 109.

⁴⁸ Boocock, "Environmental Impacts," 20.

⁴⁹ David P. Edwards, Sean Sloan, Lingfei Weng, Paul Dirks, Jeffrey Saye, and William F. Laurance, "Policy Perspective: Mining and the African Environment," *Conservation Letters* 7, no. 3 (June 2014): 303, <https://doi.org/10.1111.conl.12076>.

environmental concerns drive governments to pursue privatized management of rare earth mining, I assess whether environmental concerns are present in rhetoric and decisions about how to manage rare earth minerals. I also examine environmental policies promulgated by the host nation, as well as those established by private mining corporations, to determine the level of engagement in addressing environmental concerns.

E. RESEARCH DESIGN

1. Case Selection

This thesis investigates the five hypotheses using two case studies from South Africa and Zambia. I have chosen South Africa and Zambia on the basis of information availability and their wealth of rare earth mineral deposits. For each country, I assess evidence related to the proposed hypotheses to identify or disqualify causal relationships, and then compare the findings across the two countries. This type of analysis is the most appropriate method for answering the research question as it allows for an in-depth examination of each hypothesis.

2. Overview of Rare Earth Mining Operations in South Africa and Zambia

In South Africa, there are four rare earth mining projects currently under development: Zandkopsdrift, Steenkampskraal, Glenover, and Phalaborwa. Nearly operational, Zandkopsdrift rare earth project is a joint venture between Frontier Rare Earths Ltd. and South Korean company Korea Resources Corporation (KORES). Located 280 miles from Cape Town in South Africa's Northern Cape province, it contains an estimated 800,000 tons of rare earth elements (REE) with a projected lifespan of 45 years.⁵⁰ South Africa's Steenkampskraal rare earth project has the potential to become the most lucrative rare earth mining venture on the continent. Owned by Steenkampskraal Holdings and located 200 miles from Cape Town in South Africa's Western Cape province,

⁵⁰ "Zandkopsdrift – The World's Next Major Rare Earth Producer," Frontier Rare Earths Ltd., last modified June 2015, <https://frontierrareearths.com/wp-content/uploads/2015/06/Frontier-Corporate-Presentation-June-2015.pdf>.

Steenkampskraal has the highest-grade rare earth deposits in the world.⁵¹ While still in its construction phase, the mine is estimated to contain 86,900 tons of REE and will encompass infrastructure for mining, minerals concentration and chemical processing.⁵² South Africa's Glenover mine is also nearing production and is jointly owned by British company Galileo Resources PLC and South African company Ferminore Pty Ltd.⁵³ Located in the northern Limpopo province, it is estimated Glenover mine contains over 167,100 tons of REE with a projected lifespan of 24 years.⁵⁴ Finally, South Africa's latest rare earth venture, the Phalaborwa project, is a joint venture between London-based company Rainbow Rare Earths Ltd. and South African company Bosveld Phosphates.⁵⁵ Also located in the Limpopo province, this historic phosphate mining site offers approximately 35 million tons of gypsum estimated to contain 210,000 tons of REE.⁵⁶

Rare earth mining operations in Zambia are still in their infancy stages despite the country's abundance of rare earth mineral deposits. Located in the Isoka district of Zambia's north-eastern Muchinga province, the Nkombwa Hill rare earth project is a joint venture between African Consolidated Resources and Australian company Rare Earth International Ltd.⁵⁷ While still in its exploration phase, the mine will encompass mineral

⁵¹ Trevor Blench, "South Africa could play a key role in world rare earth supplies," *Mining[dot]com*, June 26, 2017, <https://www.mining.com/web/south-africa-play-key-role-world-rare-earth-supplies/>.

⁵² Blench, "South Africa could play a key role.;" Anine Kilian, "Feasibility study on Western Cape rare earths mine to be completed in 6 to 12 months," *Creamer Media's Mining Weekly*, June 29, 2018, <https://www.miningweekly.com/print-version/feasibility-study-on-western-cape-rare-earths-mine-to-be-completed-in-6-to-12-months-2018-06-29>.

⁵³ "08 Sep Final Results," Galileo Resources PLC, September 2020, <https://galileoresources.com/investors/rns/final-results-2/>; Fawad Mir, "Galileo, Fer-Min-Ore to advance Glenover project to phosphate production" *S&P Global: Market Intelligence*, July 7, 2017, https://www.spglobal.com/marketintelligence/en/news-insights/trending/rpj1hcfm_61uhnwbuc1t-g2.

⁵⁴ Alastair Ford, "Galileo's Glenover rare earth project already boasts a PEA and a large stockpile of ore that's already been mined," *Proactive Investors*, June 19, 2019, <https://www.proactiveinvestors.co.uk/companies/news/222414/galileos-glenover-rare-earths-project-already-boasts-a-pea-and-a-large-stockpile-of-ore-thats-already-been-mined-222414.html>.

⁵⁵ "Phalaborwa Rare Earths Project," Rainbow Rare Earths, <https://rainbowrareearths.com/wp-content/uploads/2020/11/2020-11-RRE-Fact-Sheet-Phalaborwa.pdf>.

⁵⁶ "Phalaborwa Project," Rainbow Rare Earths, accessed September 2021, <https://rainbowrareearths.com/our-projects/phalaborwa-project/>; Rainbow Rare Earths, "Phalaborwa Rare Earths Project."

⁵⁷ Harmer and Nex, "Rare Earth Deposits," 386; Nkombo Kachemba, "Isoka births rare earth," *Zambia Daily Mail*, July 19, 2017, <http://www.daily-mail.co.zm/isoka-births-rare-earth/>.

refinement and processing plants in addition to mining operations. There is also the potential for future railway construction connecting Nkombwa Hill to the Tanzania-Zambia Railway to facilitate the transportation of rare earths. Moreover, the mine is projected to create more than 5,000 job opportunities for the local population, bringing about considerable anticipation for its opening.⁵⁸

3. Key Sources

To examine the five hypotheses, I use a variety of sources including economic data, donor and aid documentation, government documentation and news reports. Economic data and donor documentation, including concessions arrangements or loans, will clarify the level of international influence in South Africa's and Zambia's rare earth mining operations, as well as concerns over profitability and investment. Government documentation such as briefings, policy papers, memorandums, regulations, and technical analyses provide evidence to test hypotheses for weak state capacity, political/public pressure and environmental concerns. News reports provide supporting evidence for official sources and offer additional information in regards to all five hypotheses.

F. THESIS STRUCTURE

The following two chapters investigate the case studies of Zambia and South Africa individually. Following a brief overview of the country's rare earth mining sectors, each chapter systematically examines the significance of all five hypotheses to determine how each impacted the country's decision to not nationalize its rare earth mining operations. The final chapter, Chapter IV, compares the two case studies, assesses implications, recommends policy actions, and discusses areas of future research.

⁵⁸ Kachemba, "Isoka births rare earth."

II. CASE STUDY 1: SOUTH AFRICA

A. INTRODUCTION

Drawing from South Africa's broader mining sector, this chapter seeks to explain why South Africa does not nationalize its rare earth industry. The country has a robust mining infrastructure and is a major producer of coal, diamonds, platinum, gold and minerals.⁵⁹ With four rare earth projects in various stages of development, South Africa has the most rare earth reserves of any country in Africa. It has enormous potential for quickly becoming the leader in rare earth production on the continent. This chapter will provide an overview of each of the four rare earth reserves, followed by an in-depth analysis of the individual hypotheses to determine why South Africa chooses to operate its rare earth industry under a privatized model.

B. OVERVIEW OF SOUTH AFRICA'S RARE EARTH MINES

South Africa currently has four rare earth projects under development: Zandkopsdrift, Steenkampskraal, Glenover and Phalaborwa. Located 280 miles from Cape Town in South Africa's Northern Cape Province, Zandkopsdrift is one of the largest undeveloped rare earth deposits in the world and is predicted to become South Africa's most promising rare earth mine. It contains an estimated 800,000 tons of REE with a projected lifespan of 45 years.⁶⁰ Acquired in 2008 by Luxembourg-based company Frontier Rare Earths Ltd., the Zandkopsdrift rare earth mining project is now a joint venture between Frontier and South Korean company KORES. In December 2012, KORES invested 10% interest in the Zandkopsdrift mine and in 2013, Frontier submitted an application to South Africa's Department of Mineral Resources for a 30 year mining

⁵⁹ "Mines in South Africa," Africa Mining IQ: Africa's Mining Portal, 2019, <https://www.projects iq.co.za/mines-in-south-africa.htm>.

⁶⁰ Frontier Rare Earths Ltd., "Zandkopsdrift – The World's Next Major Rare Earth Producer."

right.⁶¹ Frontier’s joint venture with KORES, a more senior company within the rare earth mining sector, is a strategic partnership owing to Frontier’s heavy reliance on South Korea’s technology and support for the mine’s construction and operation.⁶²

Zandkopsdrift is predicted to become South Africa’s largest rare earth producer and has the potential to become the largest rare earth deposit in the world. Due to its immense size, the mine is expected to produce 20,000 tons of REE annually, nearly seven times more than South Africa’s other major mine, Steenkampskraal.⁶³ The results of the Pre-Feasibility Study (PFS) conducted in 2014 indicate that Zandkopsdrift is capable of producing a variety of economically lucrative rare earths. This mining project encompasses three primary operational components: Mining and processing activities, a seawater desalination plant intended to provide potable water for mining and processing operations, and a rare earth separation plant.⁶⁴ The rare earth separation plant is a key component of the rare earth supply chain and one that is dominated by China.⁶⁵ Frontier’s plan to develop a separation plant in close proximity to the mine will make it a viable alternative to China’s well-established separation and processing plants in Ganzhou, Jiangxi Province.⁶⁶

While Zandkopsdrift is one of the largest rare earth deposits in the world, Steenkampskraal mine is the world’s highest grade rare earth deposit, increasing its

⁶¹ “Zandkopsdrift – Africa’s leading Rare Earth project,” Frontier Rare Earths Ltd., last modified February 2014, 10, https://www.proactiveinvestors.com/upload/SponsorFile/File/400_2015_10/frontier_corporate_presentation_jan_feb_2014.pdf; Frontier Rare Earths Ltd., “Frontier Announces Positive Pre-feasibility Study for its Zandkopsdrift Rare Earth Project in South Africa,” *CISION*, May 12, 2015, <https://www.newswire.ca/news-releases/frontier-announces-positive-pre-feasibility-study-for-its-zandkopsdrift-rare-earth-project-in-south-africa-517698331.html>.

⁶² Frontier Rare Earths Ltd., “Zandkopsdrift – Africa’s leading Rare Earth project.”

⁶³ Nicholas Jepson, “A 21st Century Scramble: South Africa, China and the Rare Earth Metals Industry” (Occasional Paper 113, South African Institute of International Affairs, 2012), https://media.africaportal.org/documents/saia_sop_113_jepson_20120315.pdf.

⁶⁴ Frontier Rare Earths, “Frontier Announces.”

⁶⁵ Brent C. Jellicoe, “The Relevance of Rare Earths to South Africa: Critical High-Tech Materials for the Future of South African Manufacturing” (presentation, National Science and Technology Forum: Advanced Manufacturing and Automation, September 13, 2019), <http://www.nstf.org.za/wp-content/uploads/2019/09/Mr-Brent-Jellicoe-NSTF-Presentation-13-09-2019-v3-cut.pdf>.

⁶⁶ Leslie Liang and Yiwei Yin, “Rare earths: Roskill visits Ganzhou – A key RE production base in China,” *Roskill Interactive*, March 25, 2021, <https://roskill.com/news/rare-earth-roskill-visits-ganzhou-a-key-re-production-base-in-china/>.

likelihood of becoming one of the most profitable and low-cost producers of rare earths. Located about 350 km north of Cape Town in South Africa's Western Cape Province, Steenkampskraal is a joint venture with 74% of the mine owned by Steenkampskraal Holdings Ltd. and the remaining 26% owned by the Steenkampskraal Worker's Trust (SWT).⁶⁷ The combined grade of the mine's rare earths is 14.4%, which is the highest grade of all the world's rare earth deposits.⁶⁸ To gain perspective, one of Steenkampskraal's rare earth minerals, neodymium, has a grade of 2.58% which is higher than the total rare earth grades of most other rare earth deposits.⁶⁹ Due to its high-grade rare earths, the mine will produce low volumes averaging 2700 tons of REE annually with a mining life expectancy of 30 years.⁷⁰ Surrounding farmland belonging to Steenkampskraal Holdings Ltd. may permit future expansion of the mine to extend its lifespan.⁷¹

While Steenkampskraal is significantly smaller than Zandkopsdrift, it is regarded as a prospective global supplier of high quality rare earth oxides with a low production cost. The cost of reconstructing and reopening the mine is much lower than Zandkopsdrift due to its status as a pre-existing monazite mine dating back to the 1950s.⁷² Steenkampskraal has a robust infrastructure consisting of generators, a reverse osmosis plant, mobile offices, communications and security systems, and a transportation network to facilitate the transport of materials and products to and from Cape Town. The primary activities that will take place at the mine include mining operations and the production and treatment of rare earth carbonate. The intention to build a rare earth separation plant to separate the individual rare earth oxides from the carbonate is not well defined as part of the mine's projected operations. However, this potential addition would certainly enhance

⁶⁷ "Welcome to Steenkampskraal Rare Earths Mine," Steenkampskraal Monazite Mine (PTY) LTD, accessed April 25, 2021, <https://www.steenkampskraal.com/#>.

⁶⁸ Steenkampskraal Monazite Mine (PTY) LTD, "Welcome to Steenkampskraal."

⁶⁹ Steenkampskraal Monazite Mine (PTY) LTD, "Welcome to Steenkampskraal."

⁷⁰ Steenkampskraal Monazite Mine (PTY) LTD, "Welcome to Steenkampskraal."

⁷¹ Steenkampskraal Monazite Mine (PTY) LTD, "Welcome to Steenkampskraal."

⁷² Jepson, "A 21st Century Scramble."

the value of the mine. Until proposals to construct a separation plant become more concrete, all carbonate will be sold for separation. A South African New Order Mining Right was awarded to Steenkampskraal in June 2010 which allows for mining operations until June 2030, at which time the Mining Right will be eligible for renewal.⁷³

As Steenkampskraal nears production, Steenkampskraal Holdings Ltd. intends to launch the mine in 2022.⁷⁴ The mine is predicted to generate at least 100 jobs, with the potential for an additional 100 jobs at the separation plant.⁷⁵ Even though the labor force required may be less than that of Zandkopsdrift due to a lower rate of production, Steenkampskraal will prioritize job opportunities for those living in the immediate surrounding areas. It intends to employ the majority of its labor force from the town of Vanrhysndorp, which is located 80 km from the mine and has a population of 5,000.⁷⁶

Although less prominent than Zandkopsdrift and Steenkampskraal, South Africa's Glenover mine is located 88 km from the iron mining town of Thabazimbi in the Limpopo Province.⁷⁷ The Glenover Project is a joint venture between South African companies Galileo Resources PLC and Ferminore. While Ferminore initially acquired the phosphate mine in 2000, Galileo Resources PLC acquired 36% of the Glenover mine in March 2011 and submitted its application for a Mining Right in November 2017. The Mining Right was granted to Galileo by the Department of Mineral Resources.⁷⁸

Glenover's prior history as an open pit phosphate mine has made it a viable venture for South Africa's rare earth mining industry. Although the original mine was abandoned

⁷³ Steenkampskraal Monazite Mine (PTY) LTD, "Welcome to Steenkampskraal."

⁷⁴ "Factbox: Miners gear up global rare earth projects as prices surge," *Reuters*, March 1, 2021, <https://www.reuters.com/article/us-rareearths-mining-factbox/factbox-miners-gear-up-global-rare-earth-projects-as-prices-surge-idUSKBN2AU0FX>.

⁷⁵ Jepson, "A 21st Century Scramble."

⁷⁶ Steenkampskraal Monazite Mine (PTY) LTD, "Welcome to Steenkampskraal."

⁷⁷ "Glenover Rare Earth Project- Limpopo Province, South Africa," Galileo Resources PLC, accessed July 2021, <https://galileoresources.com/glenover-rare-earth-project/>.

⁷⁸ "Galileo Resources: Gold in Nevada with a Rare Earth Kicker in SA!" *MiningMaven*, accessed May 2, 2021, <https://miningmaven.com/mining-blog/393-galileo-resources-gold-in-nevada-with-a-rare-earth-kicker-in-sa>; "Glenover Project Update," Galileo Resources PLC, February 4, 2018, <https://markets.ft.com/data/announce/full?dockey=1323-13520787-1QF57E1CH474T2VBSDNICDJO8J>.

in 1984, its phosphate production resulted in an abundance of leftover stockpiles containing REE. The economic potential of the mine's stockpiles was confirmed by a Chinese laboratory charged with conducting the mine's PFS and metallurgy testing.⁷⁹ The mine carries an advantage over Zandkopsdrift and Steenkampskraal due to its three million ton stockpile of already mined ore.⁸⁰ It has a robust infrastructure including paved roads, railway transportation, weighbridge and workshop.⁸¹ With a rare earth oxide grade of 2.13%, Glenover's life expectancy is predicted to be 24 years, during which time it will produce approximately 167,100 tons of rare earths.⁸²

South Africa's latest rare earth project, the Phalaborwa project, consists of an industrial chemical facility located in the Limpopo Province containing two large gypsum stacks abundant with rare earth minerals.⁸³ Historic phosphate mining at the site resulted in 35 million tons of gypsum estimated to contain 210,000 tons of rare earths at a grade of 0.45%.⁸⁴ Phalaborwa has a robust local infrastructure already in place consisting of paved roads, railways, an established power grid, office space, machinery suppliers and a local airport.⁸⁵

Phalaborwa is a joint venture with 70% of the project owned by London-based company Rainbow Rare Earths Ltd. and the remaining 30% owned by South African company Bosveld Phosphates.⁸⁶ In July 2021, Rainbow announced the commencement of its Preliminary Economic Assessment for the project. With an expected production lifespan of 17 years, the mine is projected to include an onsite processing plant capable of

⁷⁹ Jepson, "A 21st Century Scramble.;"Galileo Resources PLC, "Glenover Rare Earth Project."

⁸⁰ Ford, "Galileo's Glenover rare earths project."

⁸¹ "Glenover Phosphate-rare earth project: Fact Sheet," Ferminore, accessed April 25, 2021, <http://www.glenover.com/img/Glenover%20Rare%20Earth.pdf?v=1>.

⁸² Ford, "Galileo's Glenover rare earths project."

⁸³ "Rainbow Rare Earths Initiating Coverage: Low capex, high margin developer for critical NdPr," Sprott Equity Research, 2021, <https://sprott.com/media/4157/210804-rbw-scp-initiation.pdf>.

⁸⁴ Rainbow Rare Earths, "Phalaborwa Project.;" Rainbow Rare Earths, "Phalaborwa Rare Earths Project."

⁸⁵ Sprott Equity Research, "Rainbow Rare Earths Initiating Coverage."

⁸⁶ Rainbow Rare Earths, "Phalaborwa Rare Earths Project."

converting minerals contained within the gypsum into rare earth carbonate.⁸⁷ Additionally, Rainbow’s CEO George Bennett expects Phalaborwa to retain the capacity to separate and purify rare earth oxides without dependence on China for downstream processing.⁸⁸

C. EXAMINING THE HYPOTHESES

The remainder of this chapter turns to the question of why South Africa does not nationalize its rare earth mining sector. The possible explanations, outlined in the previous chapter, include international pressure, economic viability, weak state capacity, political/public pressure, and environmental concerns. As the following analysis will show, economic viability is the key driver of rare earth privatization in South Africa.

1. International Pressure

The first hypothesis, international pressure, suggests South Africa does not nationalize its rare earth sector due to pressures exacted by international lenders and donors to advance the adoption of privatization policies for rare earth mining operations. South Africa is currently experiencing a debt crisis driven in large part by the COVID-19 pandemic. In a 2020 Supplementary Budget Speech delivered by Tito Mboweni in June 2020, the Minister of Finance emphasized South Africa’s need for international financial support to revive its economy.⁸⁹ South Africa received a 4.3 billion USD loan in 2020 from the IMF to provide support for the country’s economic and social responses to the pandemic.⁹⁰ While states who require financial assistance are often subject to stringent conditions imposed by their donors, the IMF’s loan is considered a rapid finance instrument intended for emergency assistance without stringent conditions. Conditions attached to the

⁸⁷ Sprott Equity Research, “Rainbow Rare Earths Initiating Coverage.”; Jessica Casey, “Rainbow Rare Earths commences Phalaborwa PEA,” *Global Mining Review*, July 30, 2021, <https://www.globalminingreview.com/finance-business/30072021/rainbow-rare-earths-commences-phalaborwa-pea/>.

⁸⁸ Casey, “Rainbow Rare Earths.”

⁸⁹ “Minister Tito Mboweni: 2020 Supplementary Budget Speech,” South African Government, June 24, 2020, <https://www.gov.za/speeches/minister-tito-mboweni-2020-supplementary-budget-speech-24-jun-2020-0000>.

⁹⁰ Thando Maeko, “South Africa gets \$4.3bn IMF loan. In return, the country must reform,” *Mail & Guardian*, July 29, 2020, <https://mg.co.za/business/2020-07-29-south-africa-gets-4-3bn-imf-loan-in-return-the-country-must-reform/>.

loan require that South Africa implement the reforms outlined in its Supplementary Budget to decrease the national debt.⁹¹ International concerns about South Africa's national debt may create pressure on the South African government not to nationalize.

While South Africa's Supplementary Budget 2020 lists the suspension of funds for mining and minerals programs in light of COVID-19, these reforms are not an indication of international pressure over its rare earth sector or pressures militated against nationalization.⁹² Based on the evidence, there is little indication that international pressures are meaningfully influencing South Africa's mining sector.

2. Economic Viability

The second hypothesis, economic viability, suggests South Africa does not nationalize its rare earth sector due to its dependence on private investment for economic sustainability. Mining sector profitability in general is heavily dependent upon changes in commodity prices, as well as increasing input costs including labor, machinery and equipment.⁹³ The volatility of mineral prices implies mining companies must remain highly competitive on the basis of investment and greater productivity. By reasons of complex technology, specialization and operational requirements, the rare earth mining sector is capital intensive and must attract investors to ensure long-term sustainability. The price alone from discovery to production of rare earth mines can exceed 100 million USD over a duration of 10 to 15 years.⁹⁴ In her address to the 2011 Indaba Mining Conference in Cape Town, Anglo American Ltd. CEO Cynthia Carroll stated, "Mining companies simply will not invest if they cannot be assured that the assets they create will be secure...[those] who argue for nationalization are advocating the road to ruin..."⁹⁵ South

⁹¹ Maeko, "South Africa gets \$4.3bn IMF loan."

⁹² National Treasury, *Supplementary Budget Review 2020* (Republic of South Africa, 2020), 90, <http://www.treasury.gov.za/documents/National%20Budget/2020S/review/FullSBR.pdf>.

⁹³ "Facts and Figures Pocketbook 2020," Minerals Council South Africa, 2020, 27-8, <https://www.mineralscouncil.org.za/industry-news/publications/facts-and-figures>.

⁹⁴ Jellicoe, "The Relevance of Rare Earths to South Africa."

⁹⁵ Ian Bickis, "South African Miners fall behind," *Northern Miner*, February 28, 2011, <https://www.northernminer.com/news/south-african-miners-fall-behind/1000403533/>.

Africa's Protection of Investment Act 2015 emphasizes the state's commitment to protecting its investments required for development and economic growth.⁹⁶ In a globally competitive sector such as mining, private investments bring indispensable capital which the South African government has failed to adequately provide its publicly owned enterprises.⁹⁷

Since South Africa's rare earth sector remains underdeveloped, it is necessary to review the state's collective mining sector and its contribution to GDP to understand its influence on the national economy. According to the most recent mining sector review by South Africa's Minerals Council, the mining industry contributed 8.2% to GDP in 2020. This direct contribution to GDP equates to R361.6 billion (20 billion USD), an approximate 4% decrease since 2019.⁹⁸ The nationalization of natural resources discourse is more common in countries that hold a monopoly of one or more commodities that constitute a significant portion of their economy and tax base. In these countries there is a risk of currency appreciation in light of a high commodities boom while the profit margins of private companies increase.⁹⁹ This is not the case for South Africa's rare earth sector, whose mineral reserves remain highly competitive on account of China's monopoly of these strategic minerals. Public ownership would likely become a financial burden from compensation and increasing costs of maintaining and expanding the mines in order to remain globally competitive.

While the nationalization of South Africa's mining sector is an ongoing debate, it is an expensive endeavor that would place the country in greater debt in the short-term.

⁹⁶ Protection of Investment Act 2015, Pub.L. No. 22, 606 (2015), <https://investmentpolicy.unctad.org/investment-laws/laws/157/south-africa-investment-act>.

⁹⁷ Mathabo Mohwaduba, "Mitigating Socio-Economic Considerations of Resource Sector Nationalization: Lessons for South Africa," (PhD diss., University of Pretoria, 2018), 22, https://repository.up.ac.za/bitstream/handle/2263/69931/Mohwaduba_Mitigating_2018.pdf?sequence=1&isAllowed=y.

⁹⁸ Minerals Council South Africa, "Facts and Figures Pocketbook 2020."

⁹⁹ Stan du Plessis, "Nationalizing South African Mines: an economic assessment," *Journal of the Southern African Institute of Mining and Metallurgy* 113, no. 1 (January 2013): 36, <http://www.scielo.org.za/pdf/jsaimm/v113n1/07.pdf>.

South Africa's constitution protects the holders of mining rights.¹⁰⁰ Therefore, in the event of expropriation, the state is bound by various bilateral investment treaties to pay private mining companies and shareholders compensation.¹⁰¹ The legal requirement for compensation in the event of expropriation was emphasized by South Africa's Deputy President Kgalema Motlanthe in 2012, who reiterated that the African National Congress (ANC) has no intention of nationalizing the mines.¹⁰² The price of initial acquisition, as well as compensation of shares, requires capital.¹⁰³ Sector sustainment also requires funding for exploration and development of the mines, as is particularly applicable to South Africa's underdeveloped rare earth sector, which will require further research and expansion of its reserves.¹⁰⁴ It is likely that the capital for these endeavors would need to be funded by budgets from other sectors, exacerbating the short-term fiscal burden of state ownership.¹⁰⁵

In order to test the economic viability of mining nationalization, a case study was conducted by Keeton and White in 2011 that demonstrates the short-term financial pitfalls of expropriation. Basing their study off of the likelihood that South Africa's mining sector would be entirely nationalized, they calculated that a 60% government stake in the local mining companies would cost R970 billion (approximately 68 billion USD), doubling the government's standing debt of R820 billion. This increased debt would raise the government's interest by at least R46.6 billion per year. Therefore, 60% share in the sector would increase the government's revenue by R20.9 billion at the cost of a R46.6 billion

¹⁰⁰ International Comparative Legal Guides, "South Africa: Mining Laws and Regulations 2022," in *ICGL- Mining Laws and Regulations* (London: Global Legal Group, 2021), <https://iclg.com/practice-areas/mining-laws-and-regulations/south-africa>.

¹⁰¹ Michael Solomon, *The Rise of Resource Nationalism: A Resurgence of State Control in an Era of Free Markets or the Legitimate Search for a New Equilibrium?* (Cape Town, ZA: 2012), 209, <https://www.saimm.co.za/download/MEC/Release%20Mining%20Dialogues%2023%20July%202012.pdf>. ; S. du Plessis, "Nationalizing South African Mines: an economic assessment," 37.

¹⁰² "South Africa's mines 'will never be nationalized,'" March 05, 2012, BBC News, video, 2:44, <https://www.bbc.com/news/world-africa-17256723>.

¹⁰³ Mohwaduba, "Mitigating Socio-Economic Considerations," 23.

¹⁰⁴ Mohwaduba, 23.

¹⁰⁵ Mohwaduba, 22-3.

per year project.¹⁰⁶ Based on these findings, the revenue gains would not outweigh the costs of mining sector nationalization in the short-term. Similarly, the ANC determined in its published State Intervention in the Mining Sector (SIMS) report that the cost to acquire 51% state ownership of all mining companies was estimated at R500 billion, exceeding the state's budget.¹⁰⁷ While the ANC acknowledges the possibility of targeted mineral extraction nationalization, this option is intended for the strategic monopolization of a mineral. This would not apply to South Africa's rare earth sector, which remains internationally competitive.¹⁰⁸

If these trends hold true for the rare earth sector, it means that economic viability may be a key driver for the privatization of South Africa's rare earth industry. South African President Cyril Ramaphosa reemphasized in his address to members of Parliament on 15 February 2018 that he has no intention of nationalizing the mining sector, including those mines that have failed to abide by the Mining Charter, due to fiscal risks.¹⁰⁹ He maintains that the nationalization of the mining industry is not an economically viable solution. Although he acknowledges desires for expropriation without compensation as a result of non-compliance, he understands that South Africa is legally bound by the constitution to provide compensation to its investors.¹¹⁰ In an address to Members of Parliament in Cape Town on 15 February 2018, Ramaphosa emphasized that compensation is not fiscally reasonable. He also reiterated the importance of investment, emphasizing that the Mining Charter must offer "certainty, stability and [a] clear transformational path" to attract investors.¹¹¹ This implies that the President and his party are aware of the economic ramifications associated with decreased investment in its mining sector.

¹⁰⁶ Stan du Plessis, "Nationalizing South African Mines," 37.

¹⁰⁷ African National Congress, "State Intervention in the Minerals Sector (SIMS)" (Discussion Paper, ANC, 2012), 28, <https://www.sahistory.org.za/sites/default/files/archive-files3/sims.pdf>.

¹⁰⁸ African National Congress, "State Intervention," 28.

¹⁰⁹ Lindsay Dentlinger, "Ramaphosa Rules out Nationalization of Mines," *Eyewitness News*, 2018, <https://ewn.co.za/2018/03/14/ramaphosa-rules-out-nationalisation-of-mines>.

¹¹⁰ BBC, "South Africa's mines."

¹¹¹ Dentlinger, "Ramaphosa Rules out Nationalization."

While South Africa has refrained from implementing nationalization policies, greater effort has been made toward including local communities in economic activities. According to South Africa's Mining Charter, a 2020 revision of the mining laws and regulations requires that all new mining right applicants have a 30% Black Economic Empowerment (BEE) shareholding. BEE is a South African growth initiative aimed at reducing inequality by providing the black majority population with greater access to South Africa's economic arena.¹¹² Existing mining right holders, such as Steenkampskraal Holdings LTD, which has a 26% BEE shareholding to the SWT, must increase this shareholding to 30% after five years.¹¹³ ANC's intention is for mining companies to increase the extent to which local communities have access to ownership and economic activities in their area while promoting socio-economic development and continued investment.

The evidence suggests economic viability is a key driver for privatization of South Africa's rare earth industry since nationalization would significantly increase the outflow of capital while dissuading private investors and exacerbating national debt. Although there have been efforts set forth by the government to ensure local communities maintain a share in the mines, the studies conducted by Keeton and White and the ANC indicate initial costs associated with substantial state-ownership would outweigh revenue in the short-term, exacerbating the nation's debt crisis.

3. Weak State Capacity

The rare earth sector is a complex industry that requires specialized knowledge and technology to process REE ore into REE metals. The complexities involved with rare earth mining are substantiated by the fully integrated REE mine-to-market model. This model begins with the exploration phase, followed by the mining of ore, the milling of REE minerals, the separation and purification of REE oxides, metal making, alloy production,

¹¹² "Brush up on your BEE knowledge [Updated]," *SME South Africa*, July 3, 2020, <https://smesouthafrica.co.za/Brush-up-on-your-BEE-knowledge/>.

¹¹³ International Comparative Legal Guides, "South Africa."

and manufacturing.¹¹⁴ The separation phase, considered the most fundamental stage for producing high purity rare earth oxides, requires advanced equipment and technical expertise to implement. This phase of production is currently dominated by China, who remains a key component in the REE value chain.¹¹⁵

The primary question to answer for the third hypothesis is as follows: does South Africa choose not to nationalize its rare earth mining sector because it does not have the requisite domestic capacity? South Africa possesses a rich mining sector with advanced resource extractive capabilities. The country consists of 526 mines dedicated to the production of platinum, coal, gold, diamonds, and 22 different types of minerals.¹¹⁶ It also has a workforce that is less expensive and well-versed in mining operations than countries such as Australia and Canada. Furthermore, South Africa possesses railways, paved roads and deep sea ports suitable for the transportation of minerals to market, as well as the capacity to supply water and generate electricity.¹¹⁷ However, despite the country's rather robust mining infrastructure, the ANC describes within its 2012 SIMS report a decrease in the research and development capacity of the state's mineral processing technology. The governing party also acknowledges significant shortcomings pertaining to education in math and science resulting in the low production of technicians and engineers for South Africa's mining and mineral processes.¹¹⁸

Despite the complexities of the REE value chain and concerns expressed by the ANC, South Africa does possess expert engineers and technologists experienced in rare earth mineral mining operations. Mintek is a world-class, state-owned mineral and metallurgical innovation organization specializing in minerals processing and extractive metallurgy. The company provides minerals testing and processing/separation plant development services to industries worldwide, including the metallurgical test work for

¹¹⁴ Jellicoe, "The Relevance of Rare Earths to South Africa."

¹¹⁵ Jellicoe, "The Relevance of Rare Earths to South Africa."

¹¹⁶ Africa Mining IQ, "Mines in South Africa."

¹¹⁷ Jepsen, "A 21st Century Scramble," 30.

¹¹⁸ African National Congress, "State Intervention," 7-8.

Zandkopsdrift's PFS.¹¹⁹ According to Mintek's 2016 Annual Integrated Report, 359 of its 675 employees were ranked at the level of technically skilled and junior management, 137 semi-skilled, 97 specialists and middle management, 63 unskilled and 19 employees at the senior/top management level. In order to maintain Mintek's level of expertise in minerals processing, the company offers full-time undergraduate and postgraduate degree scholarships to its future science and engineering candidates.¹²⁰ Mintek also offers training programs in rare earth analytical techniques and extraction processes.¹²¹ These figures indicate that South Africa has the specialized workforce necessary for local rare earth mining and processing.

In addition to specialized workforce capacity, South Africa retains the technical capacity to conduct REE mining and processing. In June 2015, Mintek launched its REE solvent extraction pilot plant in South Africa.¹²² The versatile facility is dedicated to the separation of REE into various types of extractive elements and fractions for purification, demonstrating the company's rare earth processing capabilities.¹²³ The company has also developed a smelting process called the PyEarth technique aimed at improving the concentration of REE during extraction.¹²⁴ Furthermore, in an effort to optimize the REE value chain and maximize the value of REE, Mintek has announced its intention of developing a South African Centralized Refinery to bolster South Africa's downstream refining capacity for REE producers in the country.¹²⁵ According to Mintek's Technology Division GM, Alan McKenzie, a centralized refinery will allow for the processing of REE's

¹¹⁹ "Corporate profile," MINTEK, accessed August 26, 2021, <https://www.mintek.co.za/corporate-profile/corporate-information/>.

¹²⁰ "MINTEK 2016 Annual Integrated Report," MINTEK, accessed August 26, 2021, 62, <https://www.mintek.co.za/wp-content/uploads/2016/10/MINTEK-Annual-Report-2016.pdf>.

¹²¹ MINTEK, "MINTEK 2016," 55.

¹²² MINTEK, 47.

¹²³ MINTEK, 47.

¹²⁴ MINTEK, 46.

¹²⁵ MINTEK, 47.

from a variety of South African deposits, especially from deposits that are too small to justify investing billions on individual refineries.¹²⁶

South Africa also possesses the mining, transportation, water, and electrical networks necessary to carry out its rare earth mining operations. In the case of Zandkopsdrift mine, pre-existing commercial extraction processes will be used for the mining of REE.¹²⁷ Road networks connect the processing plant to the separation plant in Saldanha Bay Industrial Development Zone, which is an industrial zone established by the South African government in October 2013.¹²⁸ Surrounding the separation plant is the paved N7 road to Cape Town, as well as the rail head at nearby Bitterfontein for the transportation of REE to market.¹²⁹ Water is supplied to the mine by a seawater desalination plant located 35 km away in Volwaterbaai, while water to the separation plant will be provided by Saldanha municipality.¹³⁰ In order to generate power to its mines, South Africa has an established power supply network provided by publicly-owned company Eskom, which supplies over 90% of South Africa's electricity, including Zandkopsdrift and Steenkampskraal mines.¹³¹

Based on the workforce and technical capacity provided by Mintek, as well as established mining, transportation, water and power supply networks, weak domestic capacity is not a driving factor for the privatization of South Africa's rare earth sector. South Africa is capable of improving its infrastructure and utilizing its technical expertise to implement rare earth processing and separation technologies aimed at increasing the value of its REEs.

¹²⁶ "Mintek unveils pilot rare earth solvent extraction plant," June 17, 2015, CMTV, 4:08, https://www.youtube.com/watch?v=DhvgjNJ-d_Y.

¹²⁷ Frontier Rare Earths Ltd., "Zandkopsdrift – Africa's leading Rare Earth project," 15.

¹²⁸ Frontier Rare Earths Ltd., 15.

¹²⁹ Frontier Rare Earths Ltd., 14.

¹³⁰ Frontier Rare Earths Ltd., "Frontier Announces."

¹³¹ "South Africa's mining industry calls for action to end power crisis," *Reuters*, January 13, 2020, <https://www.reuters.com/article/us-safrica-eskom-mining/south-africas-mining-industry-calls-for-action-to-end-power-crisis-idUSKBN1ZC214.>; Frontier Rare Earths Ltd., "Frontier Announces."

4. Political/Public Pressure

The fourth hypothesis addresses political and public pressures to determine whether fear of political and/or public resistance has deterred South Africa's administration from implementing state-ownership of its rare earth mining industry. It is important to consider the opinions of the public and political groups regarding the nationalization of South Africa's collective mining industry to determine the potential for political and/or public opposition. South Africa's organized labor community demands a solution to the wealth inequality and absence of local socio-economic development, especially in mining communities. Persistent income inequality despite periods of high commodity prices lends the perception of unfair revenue distribution by private corporations.¹³² Meanwhile, South Africa's business community is a proponent for investment and cooperation between the private and public sectors, while the government remains divided on the issue of state-ownership.

Evidently, South Africa's fiscal issues pertaining to mine nationalization have become politicized. Although it did not advocate for total nationalization, the ANC's 2012 SIMS report under the presidency of Jacob Zuma proposed a 50% resource rent tax on the profits of mining companies.¹³³ The proposal received intense scrutiny from ANC's largest opposition party, the Democratic Alliance, as well as the Chamber of Mines, each agreeing that a super tax would deter foreign investors from conducting business with South Africa.¹³⁴ Meanwhile, the Economic Freedom Fighters (EFF) opposition party remains a staunch advocate for state-ownership of mines deemed non-compliant with the Mining Charter. The EFF was formed in 2013 and although it is a small leftist opposition party, it appeals to the rural poor who are most affected by South Africa's unequal wealth distribution. As part of its 2019 presidential campaign, the EFF promised to nationalize all

¹³² Stan du Plessis, "Nationalizing South African Mines," 34.

¹³³ African National Congress, "State Intervention," 36.

¹³⁴ Erin Conway-Smith, "Is South Africa nationalizing its mining industry?" *The World*, June 30, 2012, <https://www.pri.org/stories/2012-06-30/south-africa-nationalizing-its-mining-industry>.

mines by 2023.¹³⁵ Finally, the ANC Youth League aligns its grievances with the EFF, proposing the transfer of state-ownership to redistribute wealth to the communities.¹³⁶

Recent statements by Members of Parliament indicate the current administration's choice to privatize its mining industry is more fiscally driven than politically. While there is little evidence that explicitly suggests President Ramaphosa refrains from nationalizing the mining sector out of fear of political and social resistance, his understanding of the economic consequences from the transfer to state-ownership implies he is aware of the political and public retributions that are likely to follow.

5. Environmental Concerns

The final hypothesis aims to determine whether environmental concerns are factors driving the privatization of South Africa's rare earth sector. The extraction and processing of REE pose significant environmental risks to the immediate territory and surrounding communities. The introduction of toxic chemicals during processing operations, as well as exposed waste disposal areas, increase the likelihood of air, water and soil pollution in surrounding communities.¹³⁷ Included in a study conducted by the U.S. Environmental Protection Agency, the refinement of one ton of REE equates to nearly one ton of radioactive waste and 75 cubic meters of acidic waste water.¹³⁸ China has been subject to catastrophic environmental degradation near its rare earth extractive and separation plants, polluting the air with harmful emissions while plaguing nearby fields and water sources

¹³⁵ "South Africa's EFF party says in election manifesto to nationalize mines," *Reuters*, February 02, 2019, <https://www.reuters.com/article/us-safrica-politics-eff/south-africas-eff-party-says-in-election-manifesto-to-nationalize-mines-idUSKCN1PR0F9>.

¹³⁶ Stan Du Plessis, "Nationalizing South African mines: Back to a prosperous future, or down a rabbit hole?" (working paper, University of Stellenbosch, 2011), 10, <https://core.ac.uk/download/pdf/6274285.pdf>.

¹³⁷ Jellicoe, "The Relevance of Rare Earths to South Africa."

¹³⁸ Justin Paul and Gwenette Campbell, *Investigating Rare Earth Element Mine Development in EPA Region 8 and Potential Environmental Impacts*, EPA Report No. 908R11003 (Washington, DC: US Environmental Protection Agency, 2011), 14, https://reviewboard.ca/upload/project_document/EA1011-001_Investigating_Rare_Earth_Element_Mine_Development_in_EPA_Region_8_and_Potential_Environmental_Impacts.PDF.

with acid and radioactive waste.¹³⁹ Similarly, radioactive waste spills from Malaysia's rare earth separation plant in Bukit Merah is presumed to have caused health problems and birth defects among its local population.¹⁴⁰

The environmental integrity of South Africa's largest rare earth projects, Steenkampskraal and Zandkopsdrift, is a natural cause for concern due to the mines' close proximity to nearby communities and Namaqualand National Park.¹⁴¹ Foreign investors may provide knowledge and technology to enhance protection against environmental degradation; however, due to the infancy of South Africa's rare earth sector, as well as the country's sophisticated mining capacity, there is little evidence to support this assumption.¹⁴²

Noteworthy, however, are the strict environmental regulations implemented by South Africa's Department of Mineral Resources and Energy (DMRE), responsible for enforcing compliance with the environmental legislation outlined in the National Environmental Management Act, 1998.¹⁴³ In order to acquire environmental authorization by the DMRE, the prospective mining right holder must conduct an extensive Environmental Impact Assessment Report (EIAR) that encompasses a thorough environmental impact assessment of the mine, as well as a review conducted by members of affected communities. This report is submitted to the DMRE for final approval.¹⁴⁴ Furthermore, all mining right holders are required by law to adhere to an approved Environmental Management Programme (EMP) that delineates monitoring, management, mitigations and reporting objectives throughout the mine's life cycle. Failure to comply with the EMP may result in the cancellation or suspension of a mining right by the Minister

¹³⁹ Lindsey Hilsum, "Chinese pay toxic price for a green world," *Sunday Times*, December 6, 2009, <https://www.thetimes.co.uk/article/chinese-pay-toxic-price-for-a-green-world-slw72zmpxhq>.

¹⁴⁰ Jepsen, "A 21st Century Scramble," 32.

¹⁴¹ Jepsen, 32.

¹⁴² Boocock, "Environmental Impacts."

¹⁴³ International Comparative Legal Guides, "South Africa."

¹⁴⁴ Herbert Smith Freehills LLP, "Snapshot: environmental regulations for mining activities in South Africa," Lexology, June 3, 2020, <https://www.lexology.com/library/detail.aspx?g=85e36159-2406-4057-8c99-d59a1f94a8a3>.

of Environmental Affairs.¹⁴⁵ While the DMRE entrusts private mining companies to comply with mining legislation, government involvement and external monitoring has increased to ensure environmental protection and to avoid tragedies comparable to China and Malaysia. This is most evident through recent changes to the Mining Charter, which now requires mining companies to report their compliance annually.¹⁴⁶

These austere environmental policies demonstrate the state's level of engagement in addressing environmental concerns. DMRE approval of an EIAR and EMP reflects its confidence in private mining companies and their ability to manage operations and mitigate potential impacts to the environment. Similarly, the EIAR and the EMP are indicative of the mining company's level of engagement in addressing environmental concerns. Zandkopsdrift's report identifies several stages of operation that may have a significant impact on the environment, as well as plans to alleviate these issues. Specific mitigation measures are also outlined for impacts to ecology, water and air. Moreover, the report indicates the level of community involvement in the project and its objectives, as well as the opportunity afforded the public to voice questions and concerns pertaining to environmental sustainability.¹⁴⁷

While environmental concerns may not be a driver for privatization of rare earth mining in South Africa, they are certainly not a driver for nationalization. It is too early to tell whether foreign investor knowledge and technology will have a greater positive impact on the environment; therefore, this cannot be considered a factor for the privatization of South Africa's rare earth industry. However, South Africa's stringent requirements for environmental authorization is indicative of its ability to manage environmental fallout under a privatized model with strict regulation and monitoring.

¹⁴⁵Kola O. Odeku, "Effective implementation of Environmental Management Plan for sustainable mining," *Environmental Economics* 8, no. 1 (April 2017): 32, https://www.businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/8277/EE_2017_01_Odeku.pdf; International Comparative Legal Guides, "South Africa: Mining Laws and Regulations 2022."

¹⁴⁶ International Comparative Legal Guides, "South Africa."

¹⁴⁷ J.C. Vivier and L. Stolp, *Environmental Impact Assessment Report and Environmental Management Programme: Proposed Zandkopsdrift Mine*, NCP/EIA/0000149/2012 (South Africa: AGES, 2014), https://sahris.sahra.org.za/sites/default/files/additionaldocs/DraftEIA-EMPR_ZandkopsdriftMine%20primo.pdf.

D. CONCLUSION

An investigation into five potential explanations for South Africa's rare earth management model indicates that economic viability is the most convincing driver of privatization. South Africa's constitution protects investors by requiring compensation in the event of expropriation. The cost of compensation, in addition to the costs of operations and expansion, make nationalizing South Africa's rare earth sector an expensive endeavor. Public declarations made by the president and Members of Parliament suggest South Africa's decision to privatize its rare earth sector is financially driven, while studies show that state-ownership will result in short-term financial consequences by rendering the country into further national debt. Meanwhile, international pressures, weak state capacity, political/public pressures and environmental concerns offer weak explanatory support for South Africa's decision to privatize its rare earth industry and are not major factors influencing the country's rare earth management.

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III. CASE STUDY 2: ZAMBIA

A. INTRODUCTION

The Nkombwa Hill project is Zambia's only rare earth venture currently under development. Nkombwa Hill is managed under a privatized model in a joint venture between companies African Consolidated Resources and Rare Earth International Ltd.¹⁴⁸ Despite recent efforts to nationalize parts of Zambia's mining sector, there are no signs that Zambia intends to nationalize its rare earth sector. Given that Zambia is in the early stages of developing its rare earth mineral resources, the analysis in this chapter draws on Zambia's broader mining sector to better understand the government's decisions regarding natural resource management. Since this analysis is reliant on data outside of Zambia's rare earth sector, I examine how various factors have driven either privatization or nationalization.

Zambia has a noteworthy and disadvantageous history of mining sector nationalization. Following Zambia's independence in 1964, President Kenneth Kaunda aimed to reduce poverty and unemployment by nationalizing Zambia's mining sector.¹⁴⁹ The mines were consolidated under state-owned company Zambia Consolidated Copper Mines (ZCCM).¹⁵⁰ The results were catastrophic as Zambia's economy plummeted from a global economic crisis and a decline in copper prices.¹⁵¹ The ZCCM lacked sufficient capital to invest in the exploration, infrastructure and operations of its mines. As a result, production suffered and unemployment within the mining sector increased.¹⁵² Zambia's external debt increased to nearly 5.8 billion USD by 1987.¹⁵³ The arduous and expensive

¹⁴⁸ Harmer and Nex, "Rare Earth Deposits," 386; Kachemba, "Isoka births rare earth."

¹⁴⁹ Anthony Bebbington, Abdul-Gafaru Abdulai, Denise Humphreys Bebbington, Marja Hinfelaar and Cynthia Sanborn, *Governing Extractive Industries: Politics, Histories, Ideas* (United Kingdom: Oxford University Press, 2018), 121, <https://doi.org/10.1093/oso/9780198820932.001.0001>.

¹⁵⁰ Bebbington, *Governing Extractive Industries*, 122.

¹⁵¹ Bebbington, *Governing Extractive Industries*, 123; Limpitlaw, "Nationalization and Mining."

¹⁵² Limpitlaw, "Nationalization and Mining," 738.

¹⁵³ Limpitlaw, 738.

process of re-privatizing Zambia's mining sector began in 1996, however the economic fallout from more than two decades of nationalization extended well beyond the nation's return to privatization. It is assessed that from 1973 to 2003, the contribution of Zambia's mining sector to GDP fell nearly 77%, a decline from 32.9% to 7.7%.¹⁵⁴

Presently, mining is Zambia's major productive industry contributing approximately 77% to exports, 27.77% of government revenues, 10% to GDP and 2.4% of employed persons.¹⁵⁵ Copper is Zambia's principle mining resource, making Zambia the second-largest producer of copper in Africa and seventh-largest globally. Zambia's mines have experienced both public and private ownership. Today, the mining sector is predominately owned and operated by the private sector while minority interests are retained by Zambia's state-owned investment company, Zambia Consolidated Copper Mines Investment Holdings (ZCCM-IH). According to Zambia's Extractive Industries Transparency Initiative, "the state deliberately promotes a policy of a private sector-driven mining industry."¹⁵⁶ However, ZCCM-IH's recent acquisition of Zambia's largest copper mines has investors concerned Zambia is trending toward nationalizing its entire mining sector. Presently, there is no indication that Zambia intends to transfer ownership of its rare earth sector to the state.

B. ZAMBIA RARE EARTH MINE OVERVIEW

Zambia's Nkombwa Hill project is a joint venture between Australian company Rare Earth Internal LTD. (REI) and African Consolidated Resources (ACR).¹⁵⁷ The mine is located in the upper Luangura Valley of the Isoka district, situated in Zambia's northeast Muchinga Province. Nkombwa Hill is approximately 22 km east of the T2 paved national

¹⁵⁴ Limpitlaw, 738.

¹⁵⁵ Zambia EITI Council, "Zambia," Zambia Extractive Industries Transparency Initiative, last modified October 4, 2021, <https://eiti.org/zambia>.

¹⁵⁶ Zambia EITI Council, *Zambia EITI Report 2019* (Republic of Zambia, 2020), 46, https://eiti.org/files/documents/zeiti_report_2019.pdf.

¹⁵⁷ Kachemba, "Isoka births rare earth."

road which runs between the capital city of Lusaka and the Tanzanian border.¹⁵⁸ It is estimated to contain approximately 200 million metric tons of REE embedded within the mine's phosphate. The lifespan of the mine is predicted to reach 100 years and will include mineral refinement and processing capabilities. However, there is no mention of a separation plant in the overall scheme of the mine, suggesting that minerals will be shipped elsewhere for separation. Both REI and ACR are in the process of developing a plan for rare earth extraction from the phosphate prior to commencing mining operations. The mine is expected to create at least 5,000 jobs for the local communities within Zambia's Isoka district.¹⁵⁹

C. EXAMINING THE HYPOTHESES

While there is no present indication that Zambia will nationalize its rare earth industry, recent trends toward nationalization within Zambia's mining sector have brought to question the potential for future state ownership of these strategic minerals. By means of examining international pressure, economic viability, weak state capacity, political/public pressure, and environmental concerns, this chapter aims to identify explanations that shape decisions about Zambia's resource management. As the following analysis will show, economic viability and political pressures are the most convincing drivers of Zambia's natural resource management.

1. International Pressure

The first hypothesis suggests that international pressures shape whether a country privatizes or nationalizes its mining operations. A review of Zambia's earlier history of resource nationalization reveals that Zambia's decisions to nationalize in the past have gone against donor pressure. In the 1980s, the World Bank provided Zambia with sizeable loans equaling 212 million USD.¹⁶⁰ Attached to these loans were conditions aimed at

¹⁵⁸ Vast Resources PLC, "Exploration Results Define Additional Area of REE Mineralization at Nkombwa Hill Rare Earth Project in Zambia," *Intrado Gobe News Wire*, January 30, 2013, <https://www.globenewswire.com/news-release/2013/01/30/1597938/0/en/Exploration-Results-Define-Additional-Area-of-REE-Mineralisation-at-Nkombwa-Hill-Rare-Earth-Project-in-Zambia.html>.

¹⁵⁹ Kachemba, "Isoka births rare earth."

¹⁶⁰ Pitcher, *Party Politics and Economic Reform*, 51-2.

promoting privatization and foreign investment to reduce state intervention in the economy and alleviate the economic crisis plaguing the continent. Despite the considerable amount of loans received, Zambia did not adopt the reforms intended by the World Bank.¹⁶¹

To analyze this hypothesis, it is also necessary to examine Zambia's debts, which are central to its interactions with international donors and investors and which raise questions about international pressures to adopt particular management models. As of December 2020, Zambia's Ministry of Finance reported Zambia's external debt at 12.74 billion USD, a 1.1 billion USD increase from 2019 attributed primarily to international bonds and private creditors for purposes such as infrastructure development. Major debts are attributed to creditors including Chinese lenders (3,305.64 million USD), Eurobonds (3,000 million USD) and the World Bank (1,308.58 million USD).¹⁶² Eurobonds account for 23.6% of Zambia's 46.4% commercial debt, while bilateral and multilateral creditors account for a combined 53.6% of Zambia's external debt.¹⁶³

Zambia's resource management model is evidently not driven out of fear of loan refusal by the IMF and other multilateral organizations. Zambia became the first African nation to default on its loans during the COVID-19 pandemic and is requesting financing from the IMF to assist with salvaging its economy.¹⁶⁴ Even though the IMF has advised the Zambian government to refrain from accruing further debts, the recent government takeover of its largest copper mine has added 1.5 billion USD to the national debt, increasing the potential for the IMF to refuse loans in the wake of perceived reckless nationalization of Zambia's mining sector.¹⁶⁵ In an interview with Reuters in January

¹⁶¹ Pitcher, 51-2.

¹⁶² Ministry of Finance, *Annual Economic Report 2020* (Lusaka, ZM: Republic of Zambia, 2020), 38, https://www.mof.gov.zm/?wpfb_dl=358.

¹⁶³ Ministry of Finance, 39.

¹⁶⁴ Kate Hairsine, "Zambia braces for IMF crunch talks," *DW*, August 2, 2021, <https://www.dw.com/en/zambia-braces-for-imf-crunch-talks/a-56496748>.

¹⁶⁵ Joseph Cotterill, "Mining deal adds to Zambian debt woes," *Financial Times*, January 24, 2021, <https://www.ft.com/content/4f8b4dca-41df-40e1-a12a-450c37e7cf09>.; Alexander Wexler and Nicholas Bariyo, "After Default, Zambia's Outsized Bet on Copper Could Play Into China's Hands," *Wall Street Journal*, April 27, 2021, <https://www.wsj.com/articles/after-default-zambias-outsized-bet-on-copper-could-play-into-chinas-hands-11619514520>.

2021, the IMF admitted it was not informed of Zambia's deal with Glencore concerning state-ownership of Mopani Copper Mines and that it was "...working on understanding the details of the transaction."¹⁶⁶ Analysts speculate this recent transaction may discourage the IMF from providing sustainable debt relief to Zambia.¹⁶⁷ Based on subsequent reactions to the Mopani deal, the potential for loan refusal by the IMF and other multilateral organizations in reaction to state-ownership of Zambia's rare earth mine is likely. However, risk of loan refusals did not deter Zambia from nationalizing at least one major mining operation; therefore, it is also unlikely to influence the management model of Zambia's rare earth industry.

Although there is little evidence that Zambia has selected its management model in response to international pressure, lenders do provide support to Zambia to help them manage private mining entities. According to Zambia's Ministry of Mines and Minerals Development (MMMD), the Republic of Zambia has undertaken projects funded primarily by international organizations with the intent of improving the country's governance over its mining sector while maintaining a policy of privatization. The Mineral Production Monitoring Support Project (MPMSP) was launched in 2015 and funded by the European Union with an estimated budget of 4.7 million euros. The purpose of the MPMSP is to improve the MMMD's economic governance over the mining sector through reforms aimed at increasing the ministry's monitoring capacity, improving officer training, and procuring analytical equipment to acquire accurate mining production data and royalty calculations for Zambia's mining projects. The project also calls for a thorough review of the country's mining legislation and regulations to ensure the government is optimizing its domestic revenue while guaranteeing private investor compliance.¹⁶⁸

¹⁶⁶ Chris Mfula, "Zambia expects to find new Mopani investor by year-end, IMF examines Glencore transaction," *Reuters*, January 20, 2021, <https://www.reuters.com/article/uk-zambia-mining-glencore/zambia-expects-to-find-new-mopani-investor-by-year-end-imf-examines-glencore-transaction-idUSKBN29Q0SI>.

¹⁶⁷ Mfula, "Zambia expects to find."

¹⁶⁸ "Mineral Production Monitoring Support Project (MPMSP)," Ministry of Mines and Minerals Development, accessed August 2, 2021, https://www.mmmd.gov.zm/?page_id=5241.

Another project undertaken by the Zambian government is the Zambia Mining and Environmental Remediation and Improvement Project (ZMERIP). This project was launched in January 2015 and is funded by the World Bank with a total budget of 50 million USD. The objective of the project is to enhance the state's capacity to enforce environmental protection and pollution prevention from local mining operations while reducing health risks to the surrounding communities.¹⁶⁹ Finally, launched in 2015, the Preparatory Assistance Project for the advancement of Zambia's mining sector capacity was a one-year joint project between the Republic of Zambia and the United Nations Development Program with a budget of 1,063,800 USD. The aim of the assistance project was to recognize challenges within Zambia's mining sector and identify gaps within Zambian mining policy and regulatory frameworks.¹⁷⁰ Due to significant donor investments in these three projects designed to increase Zambian government oversight over private actors, it is expected that international lenders would not welcome actions taken toward nationalization.

It is possible that China may discourage the nationalization of Zambia's rare earth industry by leveraging its financing to Zambia and demanding access to the country's rare earth mineral deposits.¹⁷¹ Based on Zambia's reported 2020 external debt stock, China has solidified itself as Zambia's number one creditor.¹⁷² In January 2021, the Zambian government took over its largest copper mine, Mopani Copper Mines PLC, from Swiss-based company Glencore PLC. Zambia's potential failure to make repayments to Glencore creditors could result in Zambia offering the mine to China as collateral in exchange for debt forgiveness, thus demonstrating the potential influence of Chinese loans on Zambia's mining sector.¹⁷³ However, this is purely speculation and Zambia's recent nationalization

¹⁶⁹ "Zambia Mining and Environmental Remediation and Improvement Project (ZMERIP)," Ministry of Mines and Minerals Development, accessed August 15, 2021, https://www.mmmd.gov.zm/?page_id=5241.

¹⁷⁰ "Preparatory Assistance Project Advance for Mining Sector Capacity Development in Zambia (PAPAMSCDIZ)," Ministry of Mines and Minerals Development, accessed August 15, 2021, https://www.mmmd.gov.zm/?page_id=5241.

¹⁷¹ Ferreira, "The Future of Rare Earth Elements."

¹⁷² Ministry of Finance, *Annual Economic Report 2020*, 38.

¹⁷³ Wexler and Bariyo, "After Default."

efforts demonstrate that the country is not deterred by the potential for greater Chinese access to its mines.

The evidence suggests Zambia's resource management model is not significantly influenced by international pressure. The reactions of analysts and the IMF in response to the recent nationalization of Zambia's largest copper mine suggest further actions taken toward resource nationalization may dissuade multilateral organizations from providing Zambia with the loans it needs for debt sustainability. However, it is clear that the risk of loan refusal has not dissuaded Zambia from nationalizing at least one of its major mining operations. Notably, the international community has applied pressure to Zambia not to nationalize its mining sector by providing its government with the support it needs to govern operations effectively under a privatized model. Projects aimed at improving Zambian governance over its mining sector are significantly, if not entirely, funded by international organizations. Since these efforts did not discourage Zambia from acquiring state-ownership of its largest copper mines, it is unclear whether they hold any substantial influence over Zambia's decisions to keep much of its mining sector privatized.

2. Economic Viability

The second hypothesis suggests that economic viability influences a country's decision to either privatize or nationalize its mining operations. Looking at Zambia's copper sector, it's clear that serious debt has not constrained the nationalization of its natural resources, even if it undermines economic viability. With a national debt of 12 billion USD, Zambia's debt-to-GDP ratio reached nearly 140% in 2020.¹⁷⁴ Half of Zambia's revenue is dedicated toward paying back its loans, while nearly 40% is allocated toward civil servant wages. This leaves little revenue to be distributed across Zambia's other budgetary services.¹⁷⁵ As the first African nation to default on its debt during COVID-19, Zambia failed to make two large Eurobond payments of nearly 50 million USD each in November 2020 and January 2021. Zambia has recently accumulated an additional

¹⁷⁴ Hairsine, "Zambia braces."; Chris Mfula, "Zambia president announces greater state role in mines, says 'this is not nationalization,'" *Reuters*, December 17, 2020, <https://www.reuters.com/article/ozabs-uk-zambia-economy-idAFKBN28R1LU-OZABS>.

¹⁷⁵ Hairsine, "Zambia braces."

debt of 1.5 billion USD from its purchase of the Mopani Copper Mine from Swiss-based company Glencore PLC.¹⁷⁶ The discussion of debt does not support the economic viability hypothesis since debt does not seem to influence Zambia's decision to privatize or nationalize its mining operations.

Another reason why economic viability does not appear to influence Zambia's decisions regarding resource management is an apparent indifference toward the short-term financial burdens that supervene resource nationalization. Much like South Africa, Zambia's constitution promotes foreign investment by protecting its investors; therefore, all expropriation of mining operations requires reasonable compensation.¹⁷⁷ ZCCM-IH plans to provide 3% of Mopani's gross revenue to Glencore creditors from 2021–2023, followed by an increase in payments between 10% and 17.5%.¹⁷⁸ However, the Mopani Copper Mine is already losing profitability and requires at least 300 million USD in investment capital to expand the mine and increase production. The Zambian government has already considered Turkey, Canada, China and the United States as prospective investors.¹⁷⁹ Nationalization would therefore imply considerable short-term costs for the Zambian government.

While there is evidence suggesting nationalization is not economically viable, government claims of insufficient revenue return for Zambia's natural resources indicate at least some concern for economic viability, as privatization is not profitable for the Zambian government. In order to ease the fears of investors in light of the recent state acquisition of Mopani Copper Mines, Zambia's government has emphasized it does not intend to nationalize the entire mining sector. This implies that economic viability does

¹⁷⁶ Chris Mfula, "The bucket is leaking: Zambia opposition leader denounces debt-funded Mopani deal," *Reuters*, January 21, 2021, <https://www.reuters.com/article/zambia-election/the-bucket-is-leaking-zambia-opposition-leader-denounces-debt-funded-mopani-deal-idUSL8N2JW6JP>.

¹⁷⁷ International Comparative Legal Guides, "Zambia: Mining Laws and Regulations 2022" in *ICLG-Mining Laws and Regulations* (London: Global Legal Group, 2021), <https://iclg.com/practice-areas/mining-laws-and-regulations/zambia>.

¹⁷⁸ Mfula, "The bucket is leaking."

¹⁷⁹ Wexler and Bariyo, "After Default."

indeed play a factor in the resource management decision-making of the Zambian government.

Zambia's Finance Minister Bwalya Ng'andu insists the government is attempting to find a balance between private operations in its mining sector and fair compensation to Zambia for its natural resource revenues.¹⁸⁰ This type of balance is exhibited by Zambia's onerous tax regime. In 2018, Zambia implemented a 1.5% increase in mine royalty rates to ensure Zambia receives sufficient tax revenues, making it the country with the highest tax burden on mining companies.¹⁸¹ In 2019, Zambia's five primary taxes including Mineral Royalty, VAT, Import VAT, Pay-As-You-Earn, and CIT accounted for 84.6% of payments from extractive companies, amounting to 18,353.22 million ZMW.¹⁸² The Zambian Revenue Authority collected 17,383 million ZMW while the remaining 970.03 million ZMW in tax revenues were distributed among government organizations to include the ZCCM-IH, local councils, social payments, and the Ministry of Mines and Minerals Development.¹⁸³ Increased taxation on mining companies, coupled with government reassurance to investors, strongly indicate that economic viability does indeed influence the management model of Zambia's natural resources.

Mixed evidence suggests that while economic viability did not seem to influence the government's decision to nationalize Mopani Copper Mines, it does drive the management model for the remainder of Zambia's mining sector. State ownership of the Mopani Copper Mines serves as an example of how Zambia's significant debt crisis creates considerable short-term costs and undermines attempts at nationalization by requiring further private investment to increase production and maintain profitability. However, Zambia's significant debt crisis and the enormous costs of expropriation have not prevented the state from exercising state-ownership of a major mining operation.

¹⁸⁰ Taonga C. Mitimngi and Matthew Hill, "Zambia is done for now with taking over mining companies," *Bloomberg*, February 4, 2021, <https://www.bloomberg.com/news/articles/2021-02-05/zambia-is-done-for-now-with-taking-over-mining-companies>.

¹⁸¹ Zambia EITI Council, "Zambia."

¹⁸² Zambia EITI Council, *Zambia EITI Report 2019*, 103

¹⁸³ Zambia EITI Council, 104

Conversely, government reassurance to its investors that it does not intend to nationalize its mining sector implies that the government values private investment, indicating that economic viability does influence the management model of Zambia's remaining mining sector.

3. Weak State Capacity

The primary question to answer for the third hypothesis is as follows: does weak domestic capacity influence Zambia's decision to privatize or nationalize its mining operations? Much like South Africa, Zambia possesses a rich mining sector with advanced extractive capabilities for copper, gold, industrial minerals and other mineral deposits.¹⁸⁴ With 13 mining projects either under development or operational, Zambia's mining industry remains one of its primary industries, contributing to the country's ranking as the second-largest producer of copper in Africa.¹⁸⁵ Moreover, Zambia's extractive industry employs approximately 73,000 individuals accounting for nearly 2.4% of its workforce.¹⁸⁶

Former President Lungu and his administration expressed confidence in Zambia's domestic capacity. Increased production at the Konkola Copper Mines (KCM) during liquidation proves the adeptness of Zambian mine workers to operate Zambian copper mines. In his address to KCM workers in January 2021, Lungu praised the mine's increase in copper production despite its liquidation, remarking that Zambians are highly skilled workers capable of operating Zambia's mining industry.¹⁸⁷ However, the former president did not discern between Zambia's extractive resources when addressing the country's domestic mining capacity.

¹⁸⁴ Webby Banda, *Zambia's Domestication of the Africa Mining Vision: A Gap Analysis* (Lusaka, ZM: Center for Trade Policy and Development, 2019), 5, <https://engrxiv.org/utbp3/>.

¹⁸⁵ "Mining Companies in Zambia," Africa Mining IQ: Africa's Mining Portal, 2019, [https://www.projects iq.co.za/mining-companies-in-zambia.htm.](https://www.projects iq.co.za/mining-companies-in-zambia.htm.;); Zambia EITI Council, "Zambia."

¹⁸⁶ Glory Mushingi, "Nationalizing Zambia's copper mines," *DW*, March 12, 2021, <https://www.dw.com/en/nationalizing-zambias-copper-mines/a-56843152.>

¹⁸⁷ "We desire to see mines in Zambian hands- President Lungu," *Lusaka Times*, January 7, 2021, <https://www.lusakatimes.com/2021/01/07/we-desire-to-see-mines-in-zambian-hands-president-lungu/>.

Unlike South Africa, Zambia does not possess a state-owned organization dedicated to the extraction, processing and separation of rare earth minerals. Despite no apparent existence of a trained rare earths workforce, the former administration publicly declared its confidence in the skillset and capacity of its indigenous workers to assume control of Zambia's mining industry.

Overall, there is unclear evidence that weak state capacity influences Zambia's natural resource management. Based on the success of KCM following its liquidation, former President Lungu has publicly declared his confidence in Zambian mine workers and their ability to effectively run Zambia's mining industry. While he does not discern between the various extractive resources that encompass Zambia's mining industry, it is evident the former administration is confident in the nation's domestic mining capacity. However, this does not prove that capacity actually exists within Zambia's rare earth mineral domain.

4. Political/Public Pressure

The fourth hypothesis addresses whether fear of political and/or public resistance has influenced Zambia's decision to privatize or nationalize its mining operations. In order to analyze this hypothesis, it is necessary to address recent nationalization efforts rendered within the copper mining industry by Zambia's former ruling party, the Patriotic Front, while also examining the position of Zambia's current ruling party, the United Party for National Development.

The nationalization of two of Zambia's largest copper mines within the last two years implies the former administration was not deterred by fear of political and/or public resistance to state-ownership. In fact, it seems government attempts to garner public support over state ownership of the country's largest copper mines was rather successful. In 2019, the government liquidated Konkola mines and removed the majority stakeholder, Indian company Vedanta Resources.¹⁸⁸ More recently, in January 2021, ZCCM-IH acquired ownership of the Mopani Copper Mines for 1.5 billion USD from Glencore

¹⁸⁸ Peter Fabricius, "Is Zambia defaulting to nationalization," *ISS Today*, June 27, 2019, <https://www.dailymaverick.co.za/article/2019-06-27-is-zambia-defaulting-to-nationalisation/>.

PLC.¹⁸⁹ Former President Lungu and his administration, the Patriotic Front, insisted the liquidation of Konkola mines was ignited by Vedanta's failure to pay its taxes.¹⁹⁰ Likewise, the government justified state-ownership of Mopani mines due to unauthorized shutdowns during the COVID-19 pandemic, as well as conflicts over taxes.¹⁹¹

According to author Paasha Mahdavi, "the likelihood of nationalization will be particularly pronounced in states with leaders who perceive lower odds of future survival."¹⁹² Fear of impending loss of power may prompt the president to capture immediate capital from the country's resources and use this financial gain to solidify a loyal governing union to maintain a position in power.¹⁹³ It is quite possible that former President Lungu's attempts at nationalization stemmed from fear of not being re-elected. This seems especially plausible considering the decrease in political support for the Patriotic Front and a by-election loss in April 2019 for Lungu in the Copper Belt.¹⁹⁴

Rather than fear political and public resistance, the state acquisition of Konkola and Mopani copper mines prior to the 2021 presidential elections lends the perception that former President Lungu and his party were using nationalization as a means to leverage their popularity among the masses. The Patriotic Front framed public perception of Vedanta Resources, who employed 13,000 workers, by accusing the company of polluting the environment and failing to pay its taxes, workers and mining supply companies.¹⁹⁵ Likewise, the former president justified state acquisition of Mopani Copper Mines as a necessary effort to salvage nearly 15,000 jobs.¹⁹⁶ The Patriotic Front's campaign manager, Chishimba Kambwili, claimed the decisions made by Lungu concerning Konkola and

¹⁸⁹ Wexler and Bariyo, "After Default."

¹⁹⁰ Fabricius, "Is Zambia defaulting to nationalization."

¹⁹¹ Wexler and Bariyo, "After Default."; Mushingi, "Nationalizing Zambia's Copper Mines."

¹⁹² Mahdavi, *Power Grab*, 224.

¹⁹³ Mahdavi, 216 & 225.

¹⁹⁴ Fabricius, "Is Zambia defaulting to nationalization."

¹⁹⁵ "Zambia's president collision course with mining giant," *France 24*, June 23, 2019, <https://www.france24.com/en/20190623-zambias-president-collision-course-with-mining-giant>;

Fabricius, "Is Zambia defaulting to nationalization."

¹⁹⁶ Wexler and Bariyo, "After Default."

Mopani copper mines were “brave” and demonstrated his commitment to the Zambian people.¹⁹⁷ Mineworkers perceived the government was ensuring the protection of Zambian employees and their interests. Two years after the liquidation of Konkola mines, the president of the Mineworkers Union of Zambia, Joseph Chewe, publicly thanked the government for supporting its mineworkers and pledged to support Lungu and his Patriotic Front in the 2021 presidential elections.¹⁹⁸ This signifies that nationalization may have been an opportunistic political tool utilized by former President Lungu to garner loyalty in an attempt to remain in power, thereby suggesting that political pressure is indeed a factor of Zambia’s natural resource management.

Newly-elected president and leader of the United Party for National Development, President Hakainde Hichilema, has openly criticized the government’s acquisition of the country’s largest copper mines. He claims that no amount of growth will compensate for the debt incurred by the government to acquire these mines.¹⁹⁹ Furthermore, he is against the increased tax burden on mining companies which, due to the likelihood of companies scaling back operations, laying off workers and reducing capital expenditure, could decrease Zambia’s overall production, investment, and employment in its mining sector.²⁰⁰ While his position clearly opposes that of former President Lungu, there is no concrete indication that the stance of President Hichilema was the product of political pressure to defeat Lungu in the August 2021 presidential election.

It is evident that fear of political and/or public resistance did not deter former President Lungu and the Patriotic Front from acquiring ownership of two of Zambia’s largest copper mines. Rather, the evidence suggests political pressure played into former

¹⁹⁷ “There are better economic prospects for Zambia in the near future- Kambwili,” *Lusaka Times*, June 4, 2021, <https://www.lusakatimes.com/2021/06/04/there-are-better-economic-prospects-for-zambia-in-the-near-future-kambwili/>.

¹⁹⁸ *Lusaka Times*, “We desire to see.”

¹⁹⁹ Mfula, “The bucket is leaking.”

²⁰⁰ “Is Hichilema the lapdog of Zambia’s mining companies?” *Lusaka Times*, January 29, 2019, <https://www.newslocker.com/en-us/profession/mining/zambia-is-hichilema-the-lapdog-of-zambias-mining-companies-lusaka-times/view/>.

President Lungu's decision to nationalize Zambia's largest copper mines, signifying that political pressure may be an important factor of Zambia's natural resource management. While public reaction to the nationalization of Konkola and Mopani copper mines was generally favorable, it did not ultimately impact the results of the election. As such, there is little reason to believe the future leaders will use nationalization (or privatization) to garner political/public support.

5. Environmental Concerns

The final hypothesis aims to determine whether environmental concerns influence Zambia's natural resource management. Comparable to South Africa, policies implemented by Zambia's MMMD demonstrate its commitment to environmental protection within Zambia's mining industry. Zambia's National Policy on Environment requires the holder of a mining right to execute an EIAR prior to the development of a mine or commencement of mining operations. It also requires an established method for auditing and monitoring mining operations to determine sustainability for the protection of the environment and surrounding communities.²⁰¹ In accordance with the Mines and Minerals Development Act 2015, all EIAR's must receive approval from the Zambia Environmental Management Agency (ZEMA) prior to the commencement of mining exploration or operations.²⁰² Furthermore, the Environmental Management Act 2011 is dedicated to ensuring public awareness of mining projects and their possible effects on the environment while affording communities the opportunity to voice their concerns.²⁰³ There are several shortcomings identified within Zambia's environmental legislation as it pertains to mining, including no clear policy for post-mine closures or policies that prohibit mining in specified areas.²⁰⁴ However, despite these shortcomings, Zambia has proved it has a robust policy framework necessary to manage environmental fallout under a privatized model.

²⁰¹ Banda, *Zambia's Domestication of the Africa Mining Vision*, 15.

²⁰² Banda, 15-6.

²⁰³ Banda, 16.

²⁰⁴ Banda, 17.

The level of government engagement in environmental affairs is also evident through the ZMERIP, a program recently implemented to bolster government institutions for the protection of the environment and mining communities. The project commenced in 2015 with the intent to improve the capacity of key institutions to monitor mining activities. These institutions include the Mines Safety Department, Radiation Protection Agency, the MMMD, and ZEMA. Not only does ZMERIP aim to improve state enforcement of mining company compliance, but it also intends to include the public in mining affairs by providing methods for the community to monitor and report the impacts of local mining operations on the environment.²⁰⁵

Zambia's strict policies and requirements for environmental authorization, as well as its investments in institutions that can effectively enforce these policies, indicate that environmental concerns are neither drivers for privatization, nor drivers for nationalization. The establishment of state institutions dedicated to certifying sustainable mining operations, as well as their inclusion of local mining communities in the decision-making process, demonstrate a robust environmental management framework. Zambia's undertaking of reforms to improve institutional capacity to enforce and monitor environmental compliance is indicative of the country's ability to manage environmental outcomes under a privatized model.

D. CONCLUSION

An in-depth analysis of the five hypotheses seeks to offer potential explanations for decisions on natural resource management in Zambia. Due to the infancy of Zambia's rare earth project, Nkombwa Hill, this analysis draws from Zambia's broader mining sector data. This investigation finds that economic viability and political pressures are the most compelling drivers of Zambia's resource management model, though evidence for these hypotheses is to some extent mixed; but international pressures, weak state capacity and environmental concerns do not appear to exert any significant influence on Zambia's decisions to privatize or nationalize its natural resources. While economic viability may

²⁰⁵ Ministry of Mines and Minerals Development, "Zambia Mining and Environmental Remediation."

not have played a factor in the government's decision to nationalize its largest copper mines, government reassurance to investors certainly proves that economic viability matters in regards to Zambia's management of its remaining mining sectors. Furthermore, political pressures are evidenced by the former administration's use of nationalization as a political tool to garner public support in light of an upcoming presidential election. Even though public support for the nationalization of Zambia's largest copper mines did not ultimately sway the results of the August 2021 presidential election, it does indicate the influence of political pressures on the management of Zambia's natural resources.

IV. KEY FINDINGS AND IMPLICATIONS

This concluding chapter analyzes the combined case study findings, explains how the findings have advanced the understanding of why African countries have not nationalized their rare earth mining operations, offers policy recommendations, and highlights areas of future research. Drawing from the broader mining sectors of South Africa and Zambia, the findings from this analysis conclude that economic viability and instances of political pressure are the main drivers of privatized models of Africa's rare earth management. International pressure, weak state capacity and environmental concerns offer only weak explanatory support for why African countries choose not to nationalize their rare earth sectors.

I discuss how the necessity to diversify rare earth suppliers outside of China will increase the international strategic significance of Africa's rare earth reserves. An appreciation for how African countries choose to manage their rare earth industry is vital to ensuring an adequate global supply of these strategic minerals. In the U.S. interest of maintaining privatization across Africa's rare earth industries, the findings of this thesis lend focus on the dynamics wielding significant influence over a country's resource management.

A. COMPARATIVE DISCUSSION OF KEY FINDINGS

This research sought to understand why African countries have not nationalized their rare earth mining operations. Using case studies from South Africa and Zambia, this analysis drew on the evidence related to five proposed hypotheses to identify or disqualify potential drivers of privatization in mining and rare earth sectors. South Africa and Zambia were examined on the basis of information availability and the presence of rare earth mining projects. As shown in Table 1, the findings suggest that, for the case of South Africa, economic viability is the most convincing hypothesis as it pertains to governance over its rare earth sector. In the case of Zambia, both economic viability and political pressure shape Zambia's rare earth management. Based on the overall findings, international pressures, weak state capacity, and environmental concerns are not significant

factors, while economic viability and cases of political pressure appear most important for understanding rare earth sector management in African countries.

Table 1. Summary of Findings

Hypothesis	Level of Support: South Africa	Level of Support: Zambia
International pressure	Weak	Weak
Economic Viability	Strong	Medium
Weak State Capacity	Weak	Weak
Political/Public Pressure	Medium	Strong
Environmental Concerns	Weak	Weak

It is clear that neither South Africa or Zambia are influenced by international pressure when considering a management model for their rare earths. South Africa’s recent 4.3 billion USD loan from the IMF is dedicated to economic and social recovery efforts in light of COVID-19. There is no evidence of international funds directed at South Africa’s mining and minerals programs to reinforce rare earth operations under a privatized model. Unlike South Africa, publicized reports from the Republic of Zambia indicate Zambia received financial support from the international community to implement projects aimed at facilitating mining operations under a privatized model. However, this support did not discourage Zambia from nationalizing its largest copper mines and it is unclear whether it will influence the management of Zambia’s remaining mining sector. Furthermore, in the midst of a debt crisis, the risk of loan refusal from multilateral organizations in reaction to Zambia’s recent trends toward nationalization has not dissuaded the Zambian government from acquiring state-ownership of its most lucrative copper mines. Overall, international pressure does not significantly influence either country’s mining sector management.

The second hypothesis, economic viability, serves as a prominent driver of rare earth privatization in both South Africa and Zambia. A transition to state ownership in these countries, were it to occur, is an expensive endeavor with, at a minimum, short-term financial consequences. The constitutions of South Africa and Zambia offer protection to investors by requiring compensation in the event of expropriation. The economic burden stemming from the costs of compensation, as well as the subsequential costs of mine

operations and expansion, would therefore exacerbate the national debt of both nations. The ANC reported the cost of initial acquisition of majority ownership of all mining companies would exceed South Africa's budget. This conclusion is also supported by South Africa's President Ramaphosa, who has publicly acknowledged the amount of capital needed to acquire state ownership of its mines while reinstating his intention to maintain a privatized mining sector.

Despite evidence that state-ownership is not an economically viable solution (especially in the short-term), Zambia has continued to experiment with mining sector nationalization as demonstrated by the recent state acquisition of two of its largest copper mines. The debt accumulation of an additional 1.5 bn USD following state ownership of Mopani Copper Mines suggests the Zambian government does not consider debt a constraint to the nationalization of its natural resources. However, government reassurance to investors that Zambia does not intend to nationalize its entire mining sector, coupled with austere tax laws on mining companies, signifies that economic viability does have a considerable impact on Zambia's decision-making over the management of its remaining mining sector, including rare earths.

The third hypothesis, weak state capacity, is not a major driver for the management of either country's rare earth sector. In fact, it is even less of a driver for South Africa due to the specialized rare earth workforce and technical capacity provided by the South African corporation, Mintek. Based on recent technological advances spearheaded by Mintek, South Africa has the potential to establish a centralized rare earth processing center to facilitate downstream processing and improve the value of its REEs. Therefore, weak state capacity is not a driver for rare earth sector privatization in South Africa.

Although Zambia lacks a workforce specialized in rare earth processing, it consists of a robust mining industry with transportation, water and power supply networks required for mining operations. The former administration regards Zambia's workforce as fully capable of effectively running Zambia's mining industry under a nationalized model. However, the evidence is unclear whether or not Zambia actually possesses the domestic capacity required to assume control of Zambia's rare earth industry. As a result, weak state capacity is not a compelling driver for the management of Zambia's rare earth industry.

The fourth hypothesis, political/public pressure, is a driver of Zambia's resource management, but does not considerably influence South Africa's management model. In South Africa, political party outlooks over mining sector nationalization indicate recognition of the fiscal ramifications associated with state-ownership. While there is no mention of fear of political/public resistance to nationalization, it is implied by South Africa's leadership that resistance will likely ensue in response to the economic drawbacks of state-ownership. Based on his awareness of the financial repercussions of nationalization, President Ramaphosa's decision to privatize South Africa's mining sector is more fiscally driven than politically.

In Zambia, however, political pressure may be an important factor in understanding how Zambia's rare earth management is likely to play out. This conclusion is drawn from the former administration's perceived exploitation of public endorsement for the state acquisition of two of the country's largest copper mines. The evidence indicates political pressures influenced former President Lungu and his administration to employ resource nationalization as a political tool to leverage public support for the 2021 presidential election. Unlike South Africa, whose resource management model is more influenced by economic repercussions than political pressures, Zambia's political pressures have certainly played a factor in the country's resource management and may influence the future management of its rare earth sector.

The final hypothesis, environmental concerns, is also not a major driver for the management of either country's rare earth sectors. A review of the environmental regulations implemented by South Africa's DMRE and the environmental legislation outlined in the NEMA reveal a stringent environmental management network. In order to receive environmental authorization, mining companies are responsible for mandated deliverables that are extensive and all-encompassing. Furthermore, recent reforms to South Africa's Mining Charter demonstrate increased government engagement in addressing environmental concerns. South Africa's strict requirements for environmental authorization to mining companies suggests environmental regulation is tightly managed under a privatized model and is neither a driver of privatization or nationalization.

Likewise, Zambia demonstrates a robust environmental management framework that embraces the inclusion of local mining communities in the decision-making process, as well as efforts to improve the state's monitoring capacity under a privatized model. A review of Zambia's National Policy on Environment, Mines and Minerals Development Act 2015, and the Environmental Management Act 2011 indicates extensive impact assessments are required of prospective mining companies in order to receive the environmental authorization necessary for a mining license. Like South Africa, Zambia has undergone reforms to increase government engagement in environmental affairs, including its capacity to monitor environmental impacts and ensure compliance. Zambia's strict regulations and robust management framework indicate environmental concerns are neither a driver of privatization or nationalization.

B. IMPLICATIONS

The policy question that motivated this research is that, in order to decrease reliance on China, the United States and its allies must diversify their rare earth supply. As the U.S. seeks new suppliers in Africa, an increase in the international strategic significance of these natural resources will prompt African countries to augment the development of their rare earth sectors. Nationalization of these sectors could decrease production and curb supply of these strategic minerals, exacerbating the global search for sustainable rare earth reserves.²⁰⁶ The legal and regulatory uncertainty attributed to resource nationalization, coupled with the potential increase in cost needed to finance Africa's rare earth projects, are likely to disincentive investors. A decline in capital may result in production stagnation and decreased supply, negatively impacting U.S. industries dependent on these minerals.²⁰⁷ In the strategic interest of solidifying a sustainable supplier, privatization offers the U.S. and its allies more assured access to Africa's rare earth resources.

To ensure adequate supplies of these minerals, it is important for the United States and its allies to understand what motivates African governments to privatize their rare earth industries. The findings from the South Africa and Zambia case studies indicate African

²⁰⁶ Burgess, "The Effect of China's Scramble for Resources," 3,7.

²⁰⁷ Burgess, 7.

countries with rare earth reserves are more influenced by economic viability and, in some cases, political pressures when considering the management model of their rare earth sectors. International pressures from multilateral organizations and state actors, weak state capacity, and environmental concerns are not major drivers of resource management and are unlikely to dictate rare earth industry management in Africa. These findings suggest that in the strategic interest of maintaining a free market for rare earths, the U.S. needs to direct added attention toward the economic viability and political debates and dynamics surrounding resource nationalization in African countries.

The findings also have theoretical implications. Despite indications that both economic viability and political pressures have significantly influenced resource management in South Africa and Zambia, the evidence between the two case studies shows that economic viability is the most important factor motivating African countries to privatize their rare earth mineral industries. This finding challenges existing literature that emphasizes the importance of international and political pressures. Contrary to Campbell, whose analysis highlights the impact of international pressures on resource privatization, this research reveals that international pressures do not have as strong of an influence over resource management. Furthermore, in his analysis of extractive resource nationalization, Mahdavi argues that political pressures have considerable influence over a country's resource management model. While I find support for his argument within my Zambia case study, political pressures are not the only motivating factors. I find that economic viability is the most prominent driver of resource management because it is seen as a factor across both South Africa and Zambia.

C. POLICY RECOMMENDATIONS

Based on the conclusion that economic viability is the most convincing factor driving Africa's resource management, policy objectives should be aimed at incentivizing investment to render rare earth operations more economically viable for the host nation. The United States should promote the privatization of Africa's rare earth industries by implementing programs that support private investment. These policy endeavors align with the United States' Prosper Africa initiative, which aims to increase investment between the

United States and African nations.²⁰⁸ With the resources and support provided by U.S. government agencies, private sector actors and African governments can identify investment partners, advance market opportunities and distinguish areas that need strengthening within Africa’s rare earth industries. Providing incentives to private actors to invest and make production of rare earths more cost effective is essential for ensuring sustainable production and supply of these strategic minerals, while also diversifying the rare earth downstream processes currently dominated by China.

The conclusions drawn from this analysis also show that policy development should stem less from international pressures, weak state capacity and environmental concerns. While program implementation designed to assist with enhancing rare earth operations under a privatized model should continue, donors interested in privatization should be more cognizant of economic viability and political dynamics and tailor their programs accordingly.

D. AREAS OF FUTURE RESEARCH

Due to the infancy of Africa’s rare earth industry, much of this research was drawn from the broader mining sectors of South Africa and Zambia. Field research can generate detailed information and uncover social complexities and processes that may affect decision-making but are difficult to discern using other methods of research. Access to policymakers, as well as rare earth project planners and operators on the continent, would impart more comprehensive information into Africa’s rare earth industries that may be applied to each of the five hypotheses examined in this analysis. Additionally, comparisons with more established rare earth projects in other regions would offer to further test the findings to more accurately assess the validity of conclusions drawn from this research.

²⁰⁸ “About Prosper Africa,” Prosper Africa, accessed September 15, 2021, <https://www.prosperafrika.gov/about/>.

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