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THE IMPACTS ON AFRICAN OIL & MINERAL TRADE AS A RESULT OF CHINESE
FOREIGN DIRECT INVESTMENT IN AFRICA'S EXTRACTION SECTOR

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ABSTRACT

This thesis examines the recent inflow of Chinese foreign direct investment (FDI) into the extraction sector throughout Africa and its impacts on African trade with China and the rest of the world, with a focus on oil and mineral exports. A case study of China's activities in Algeria, Nigeria, and South Africa forms the basis of this discussion, with a supporting regression analysis of the relationship between the FDI from China and the world, as well as the gross domestic product (GDP) of these three countries and their exports to China and the rest of the world. The results of this analysis show that Chinese FDI has had a positive effect on oil and mineral exports from the three targeted African countries, with a relatively uniform effect on exports to the world and varied effects on exports to China among the three nations. Additionally, the study suggests that Chinese FDI has been more effective than FDI from the rest of the world at increasing extraction exports to China and the world from Algeria, Nigeria, and South Africa.

TABLE OF CONTENTS

Acknowledgements.....	iii
Section 1. INTRODUCTION.....	1
Section 2. METHODOLOGY.....	5
Section 3. CHINA'S INVESTMENT.....	9
Section 4. AFRICA-CHINA TRADE.....	15
Section 5. AFRICA-WORLD TRADE.....	20
Section 6. CONCLUSION.....	25
Bibliography.....	27

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1. INTRODUCTION

China's rapid rise to economic and political prominence is somewhat of an anomaly in the developing world. Though the Chinese government remains communistic in its heavy-handed demographic and social policies, it has, over the past few decades, allowed for the invisible hand of market pressures to penetrate both the physical and ideological wall that has long prevented its full integration within the world economy. Where several other rising economies (Taiwan, South Korea, and Brazil) have moved away from state-led strategies of domestic industrialization and export-oriented growth, China has been more cautious in relinquishing control over its commercial sector to the ideals of capitalism, favoring instead government-directed investment in its most promising sectors and those of its trading partners. Despite the continuing criticisms from the international community for interfering heavily in its manufacturing industries, while artificially devaluing its currency, it's difficult to argue with China's consistently astounding rate of economic progress, achieving a growth rate of between eight and fourteen percent annually since the turn of the century (World Bank, 2010).

In order for the Chinese economy to sustain this astronomical state of growth, it has had to build its industrial capacity at a steady and equally impressive rate, relying on the extensive import of raw materials (specifically, petroleum and base metals) from regions of South America and Africa, in order to build domestic infrastructure and achieve greater economies of scale. A recent surge of investment in African mineral extraction projects, in particular, has brought China under fire on allegations that these economic pursuits are exploitative in nature and fail to benefit the African states whose resources are removed. In response to these criticisms, and in hopes of strengthening China's image as a global power, President Hu Jintao named 2006 the "Year of Africa," signaling a dramatic increase in foreign direct investment

(FDI), as well as aid funding to the countries identified by the Chinese government as possessing the most abundant and vital resources to the eastern giant's continued expansion. Since then, the world has witnessed China's increasing involvement in several of Africa's resource-rich nations, in an effort to form mutually beneficial economic and political partnerships.

The academic discourse on China's newfound interest in Africa stands divided on the issue of whether both parties are truly benefiting. Those on the positive end of the spectrum point to the capacity of China's investment to finance the accumulation of capital and improvement of technology (including education and training), increasing the productive potential of extraction industries within Africa. Since extraction plays a critical role in many of these economies, significant advancement in this sector has the potential to raise production, increase employment, improve the quality of labor, and, ultimately, enhance living standards in faltering Sub-Saharan Africa. On the other hand, opponents of China's Africa policy cite exploitation and a lack of meaningful, lasting contributions to African productivity as a means to dismiss Chinese investment as purely self-benefiting arrangement. The research into this area is quite extensive and has revealed a number of enlightening, and often conflicting insights into the complex nature of the China-Africa bond.

Chinese involvement in several African economies has resulted in positive gains for the destination countries in a number of forms. The work of Professor Edward Friedman (2008) of The University of Wisconsin revealed that China has aided African countries in reducing debt, providing new markets for African goods, training employees in fields as diverse as manufacturing and medicine, assisting businesses with information and technology development, and ultimately fostering an atmosphere of cooperation between Chinese and African corporations. American University Professor Deborah Brautigam's (2010) extensive research

also offers a compelling argument in favor of China's "innovative" investment-aid strategy in Africa. Despite tensions between Chinese managers and African laborers, and the less-than-satisfactory record of China's former aid projects throughout the continent, Brautigam cites China's recent investments as having brought much-needed growth to the manufacturing, extraction, and technology-intensive sectors of many African economies. She also stresses the impact of China's controversial aid program in Africa as quite significant in improving infrastructure, health care, and social programs.

A comprehensive 2010 report released by the African Development Bank Group, entitled "Chinese Trade and Investment Activities in Africa," found that "China-Africa trade growth...represents close to 10 percent of the continent's exports and imports." It also indicated a growth in trade diversity between China and Africa, suggesting the enhanced integration of an increasing number of African industries in the Chinese economy, and vice versa. Additionally, the report quantified China's commitment to building Africa's infrastructure, citing \$3.3 billion worth of investment in expanding Africa's hydroelectric power capacity, as well as \$4 billion worth of road and railway improvements, in 2007 alone – Nigeria being the largest recipient of such projects. (Osei, 2010)

Conversely, there are an equal number of studies claiming that China's presence in Africa is a purely one-sided arrangement, resulting in the exploitation of weak African economies for the benefit of state-influenced Chinese corporations. A European Journal of Development Research article (2009), submitted by a team of professors from the University of Ibadan in Nigeria, explained that, while many African countries are experiencing growth in trade as a result of the China-Africa bond, many consumer industries within Africa are finding it difficult to compete with domestic producers in the Chinese market, downplaying the gains from trade.

Furthermore, a study conducted by Juliet Elu and Gregory Price (2010) of the Morehouse College Economics Department established that “there is no relationship between productivity-enhancing foreign direct investment and trade with China,” and that “increasing trade openness with China has no effect on the growth rate of total factor productivity [in Africa]” (Elu, 2010).

The joint efforts of Kinfu Adisu of Grand Valley State University and Thomas Sharkey of The University of Toledo College of Business Administration produced a report in 2010, which also supports the notion that China’s economic pursuits in Africa have had little to do with the advancement of African nations. They argue that China’s provision of investment and capital for infrastructure improvement has precluded many of the respective African governments from pursuing growth-oriented policy. Echoing the notion that competition is simply too intense for African producers to perform well in Chinese markets, the report cites the closure of several Nigerian textile factories in the wake of an influx of cheap Chinese textiles. Finally, conflict between Chinese labor practices and African labor laws has generated a sense of unrest in communities whose inhabitants are employed by Chinese corporations. (Adisu, 2010).

With these conflicting perspectives in mind, this paper will proceed, generally, on the positive impact of China’s involvement in Africa; however some discussion will take place over the strained trade relationships that have resulted from this partnership. The primary focus of this thesis is to examine the effects that Chinese investment has had on the balance of payments (specifically, in petroleum and mineral exports) of Algeria, Nigeria, and South Africa, three of China’s largest targets of FDI in these sectors are examined. By analyzing export volumes from these countries to China, as well as the rest of the world, alongside the amount of investment received from China and the rest of the world, it will be possible to determine the nature and extent of China’s impact on their extraction sector.

2. METHODOLOGY

In order to obtain a broad understanding of China's impact in Africa, economic data from 1995 through 2009 was gathered on Algeria, Nigeria, and South Africa. Data on China's FDI stock in these countries was collected from the United Nations Commercial Trade Statistics Database. World FDI stock totals were pulled from the World Bank World Development Indicators & Global Development Finance Database, as were the GDP totals. The following industries were pooled to comprise Africa's extraction sector: petroleum, aluminum, copper, gold, iron, lead, nickel, silver, tin, and zinc. Export totals for these industries were taken from the United Nations Conference on Trade and Development (UNCTAD) Statistics Database. A summary of the statistical characteristics of the variables utilized in these regression models can be found below.

Variable	Mean (Std. Dev.)	Units	Variable	Mean (Std. Dev.)	Units
$ex^{A,CHN}$	179.35 (321.22)	Millions of Annual US\$	gdp^A	81.38 (41.77)	Billions of Current US\$
$ex^{N,CHN}$	155.49 (162.02)	Millions of Annual US\$	gdp^N	85.06 (59.93)	Billions of Current US\$
$ex^{SA,CHN}$	911.00 (1,172.64)	Millions of Annual US\$	gdp^{SA}	187.55 (65.97)	Billions of Current US\$
$ex^{A,WRD}$	18.43 (13.65)	Billions of Annual US\$	D^A	0.33 (0.48)	N/A
$ex^{N,WRD}$	28.96 (20.32)	Billions of Annual US\$	D^N	0.33 (0.48)	N/A
$ex^{SA,WRD}$	10.13 (6.08)	Billions of Annual US\$	D^{SA}	0.33 (0.48)	N/A
$fdi^{A,CHN}$	141 (235)	Millions of Current US\$	$D^A * \ln(fdi^{CHN})$	0.78 (1.93)	N/A
$fdi^{N,CHN}$	192 (338)	Millions of Current US\$	$D^N * \ln(fdi^{CHN})$	0.84 (2.04)	N/A
$fdi^{SA,CHN}$	429 (941)	Millions of Current US\$	$D^{SA} * \ln(fdi^{CHN})$	0.89 (2.19)	N/A
$fdi^{A,WRD}$	6.78 (4.81)	Billions of Current US\$	Data represents time period between 1995 and 2009		
$fdi^{N,WRD}$	28.67 (10.35)	Billions of Current US\$			
$fdi^{SA,WRD}$	52.73 (34.39)	Billions of Current US\$			

With this information, it was possible to perform a regression analysis to determine the nature of the contribution that Chinese FDI has made to Africa's growing mineral trade. Two models were utilized in this analysis; the first of which regressed Africa's mineral exports to China on Chinese FDI, world FDI, and GDP across the three nations of interest; and the second regressed Africa's mineral exports to the world on the same regressors. In order to determine whether the effects of Chinese FDI stock on exports to China and the world differ across the three African countries of interest, restricted versions of these regression models were also analyzed.

$$(1) \quad \text{Ln}(\text{ex}^{\text{CHN}})_i = \beta_1 D^{\text{A}}_i + \beta_2 D^{\text{N}}_i + \beta_3 D^{\text{SA}}_i + \beta_4 D^{\text{A}} * \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_5 D^{\text{N}} * \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_6 D^{\text{SA}} * \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_7 \text{Ln}(\text{fdi}^{\text{WRD}})_i + \beta_8 \text{Ln}(\text{gdp})_i + e_i$$

$$(2) \quad \text{Ln}(\text{ex}^{\text{WRD}})_i = \beta_1 D^{\text{A}}_i + \beta_2 D^{\text{N}}_i + \beta_3 D^{\text{SA}}_i + \beta_4 D^{\text{A}} * \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_5 D^{\text{N}} * \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_6 D^{\text{SA}} * \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_7 \text{Ln}(\text{fdi}^{\text{WRD}})_i + \beta_8 \text{Ln}(\text{gdp})_i + e_i$$

$$(3) \quad \text{Ln}(\text{ex}^{\text{CHN}})_i = \beta_1 D^{\text{A}}_i + \beta_2 D^{\text{N}}_i + \beta_3 D^{\text{SA}}_i + \beta_4 \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_5 \text{Ln}(\text{fdi}^{\text{WRD}})_i + \beta_6 \text{Ln}(\text{gdp})_i + e_i$$

$$(4) \quad \text{Ln}(\text{ex}^{\text{WRD}})_i = \beta_1 D^{\text{A}}_i + \beta_2 D^{\text{N}}_i + \beta_3 D^{\text{SA}}_i + \beta_4 \text{Ln}(\text{fdi}^{\text{CHN}})_i + \beta_5 \text{Ln}(\text{fdi}^{\text{WRD}})_i + \beta_6 \text{Ln}(\text{gdp})_i + e_i$$

The individual observations for both regressands ($\text{Ln}(\text{ex}^{\text{CHN}})_i$, $\text{Ln}(\text{ex}^{\text{WRD}})_i$) represent the logarithm of the sum of exports in the industries of interest, in a given country and year. The first three regressors (D^{A}_i , D^{N}_i , D^{SA}_i) function as dummy variables to identify the country represented by the individual data points. When multiplying the logarithmic variable for China's FDI stock ($\text{Ln}(\text{fdi}^{\text{CHN}})_i$) by the respective dummy variables, we allow for variation in the amount of FDI stock to vary across the three countries of interest. The observations for the world FDI regressor ($\text{Ln}(\text{fdi}^{\text{WRD}})_i$) represent the logarithm of world FDI stock (less Chinese FDI stock), in a given country and year. The observations for the final regressor ($\text{Ln}(\text{gdp})_i$) represent the logarithm of total GDP, in a given country and year. The value of one has been added to each logarithmic variable (prior to taking the logarithm), in order to account for missing data points. A comparison of the results of these four regression models can be found below.

African Exports to China on Chinese FDI, World FDI, and GDP

Unrestricted			Restricted		
Variable	Coefficient	Std. Error	Variable	Coefficient	Std. Error
D ^A	-51.51	77.89	D ^A	-91.62	59.54
D ^N	-47.83	76.77	D ^N	-91.70	59.89
D ^{SI}	-46.84	80.77	D ^{SI}	-93.04	62.18
D ^A * Ln(fdi ^{CHN})	2.81*	1.38	Ln(fdi ^{CHN})	2.75*	1.16
D ^N * Ln(fdi ^{CHN})	1.90	1.69			
D ^{SA} * Ln(fdi ^{CHN})	1.67	1.33			
Ln(fdi ^{WRD})	1.74	1.46	Ln(fdi ^{WRD})	2.82*	1.35
Ln(gdp)	1.60	3.26	Ln(gdp)	2.94	2.34

SSE: 4972.0331, SSR: 314.380837,
SST: 5286.41394, R²: 0.9405, df: 45

*: Significant at a 95% confidence level

SSE: 4894.75317, SSR: 391.660774,
SST: 5286.41394, R²: 0.9259, df: 45

*: Significant at a 95% confidence level

African Exports to World on Chinese FDI, World FDI, and GDP

Unrestricted			Restricted		
Variable	Coefficient	Std. Error	Variable	Coefficient	Std. Error
D ^A	-4.14	6.01	D ^A	-2.16	4.21
D ^N	-3.81	5.92	D ^N	-2.07	4.24
D ^{SA}	-5.68	6.23	D ^{SI}	-3.80	4.40
D ^A * Ln(fdi ^{CHN})	0.27*	0.11	Ln(fdi ^{CHN})	0.31*	0.08
D ^N * Ln(fdi ^{CHN})	0.22	0.13			
D ^{SA} * Ln(fdi ^{CHN})	0.24*	0.10			
Ln(fdi ^{WRD})	0.19**	0.11	Ln(fdi ^{WRD})	0.26*	0.10
Ln(gdp)	0.75*	0.25	Ln(gdp)	0.65*	0.17

SSE: 12230.5199, SSR: 1.87177006,
SST: 12232.3916, R²: 0.9998, df: 45

*: Significant at a 95% confidence level

** : Significant at a 90% confidence level

SSE: 12230.432, SSR: 1.95958556,
SST: 12232.3916, R²: 0.9998, df: 45

*: Significant at a 95% confidence level

Two additional regression models were also analyzed, which excluded China's FDI stock, in order to examine the effect of world FDI stock on African exports to China and the rest of the world without China's FDI contributions. The results of these models are as follows.

$$(5) \quad \ln(\text{ex}^{\text{CHN}})_i = \beta_1 D^A_i + \beta_2 D^N_i + \beta_3 D^{\text{SA}}_i + \beta_6 \ln(\text{fdi}^{\text{WRD}})_i + \beta_7 \ln(\text{gdp})_i + e_i$$

$$(6) \quad \ln(\text{ex}^{\text{WRD}})_i = \beta_1 D^A_i + \beta_2 D^N_i + \beta_3 D^{\text{SA}}_i + \beta_6 \ln(\text{fdi}^{\text{WRD}})_i + \beta_7 \ln(\text{gdp})_i + e_i$$

African Exports to China on World FDI and GDP

Variable	Coefficient	Std. Error
D ^A	-102.64	62.70
D ^N	-97.76	63.20
D ^{SI}	-99.23	65.63
Ln(fdi ^{WRD})	-0.17	0.51
Ln(gdp)	4.38*	2.39

SSE: 4838.20355, **SSR:**448.210394, **SST:** 5286.41394, **R²:** 0.9152, **df:** 45

*: Significant at a 90% confidence level

African Exports to the World on World FDI and GDP

Variable	Coefficient	Std. Error
D ^A	-3.42	4.86
D ^N	-2.76	4.90
D ^{SI}	-4.51	5.09
Ln(fdi ^{WRD})	-0.08*	0.04
Ln(gdp)	0.82**	0.19

SSE: 12229.695, **SSR:**2.69658227, **SST:** 12232.3916, **R²:** 0.9998, **df:** 45

*: Significant at a 95% confidence level

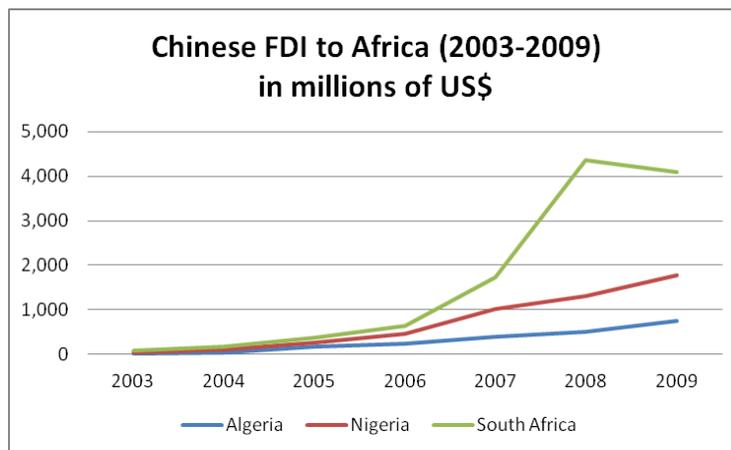
*: Significant at a 90% confidence level

With these results in hand, it is possible to examine the effect that China's recent surge of African investment has had on mineral trade from Algeria, Nigeria, and South Africa to the rest of the world. Though this sample does not include all of China's investment destination countries within Africa, it examines three diverse economies at different stages of development engaging in distinct trade relations with China and the world. As such, the results of this study will help to provide a basic understanding of China's presence in Africa and the impact it has had on African mineral trade. What follows is a discussion of these results, along with additional data collected on the economic indicators from the sample countries.

3. CHINA'S INVESTMENT

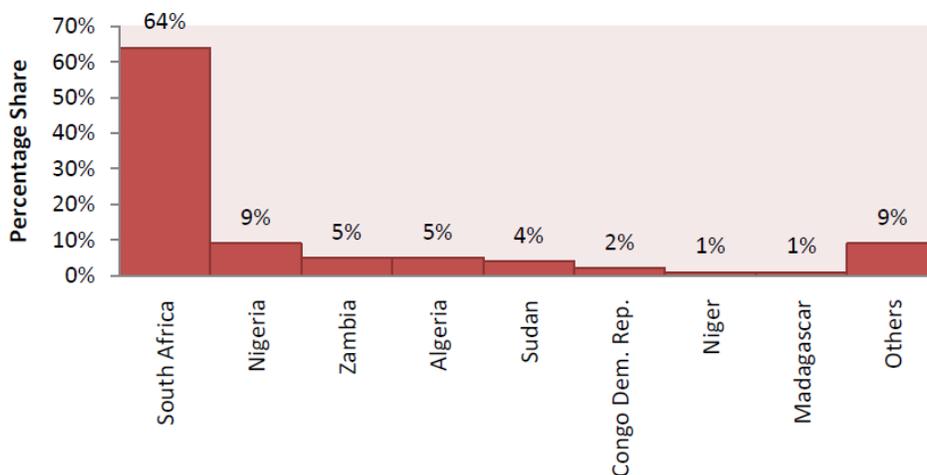
While the “Year of Africa” was not proclaimed by Chinese President Hu Jintao until 2006, the eyes of the dragon had been fixed upon the African continent long beforehand. A study conducted by Leonard Cheng of the Hong Kong University of Science and Technology, in conjunction with Zihui Ma of Renmin University in China (2007) indicates that records of Chinese FDI to Africa date back as far as the early 1980's, when investment flows focused more on labor-intensive light-manufacturing industries, such as textiles and clothing. At that time, Africa received only about two percent of China's total outward FDI. The main goal of Chinese investment between the '80s and early '90s was the accumulation of capital and technology. As Chinese firms achieved greater levels of productive capacity and competitiveness during this time, a greater amount of raw materials was required as an input to production and as means to expand capital and infrastructure. It's no wonder then that many of the oil- and mineral-rich countries in Africa became major destinations of Chinese FDI beginning in the '90s, and reaching 24.1% of total Chinese FDI outflows between 1997 and 2001. (Cheng, 2007)

The data collected throughout this study indicates that this trend has generally continued over the past decade. According to the UN Commodity Trade Statistics Database (2011), total Chinese FDI to the three sample countries (Algeria, Nigeria, and South Africa) rose from around \$82.5 million in 2003 to \$4.1 billion in 2009. Average annual growth in Chinese FDI to Algeria, Nigeria, and South Africa was 180.34%, 90.61%, and 133.38%, respectively. However, growth in FDI was hardly uniform during this period of time. As demonstrated by the following graph, Chinese FDI to Algeria and Nigeria rose rather steadily between 2003 and 2009, while FDI to South Africa followed a similar path until 2006, when it jumped significantly following the “Year of Africa” proclamation and subsequently fell between 2008 and 2009.



Source: United Nations Commodity Trade Statistics Database

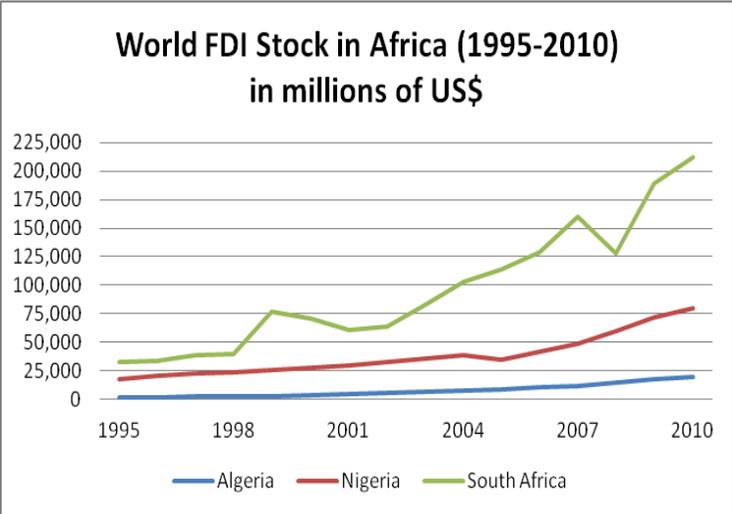
In the 2010 African Development Bank Report, it is reported that of the total Chinese FDI flow to Africa between 2003 and 2008, Algeria, Nigeria, and South Africa were among the top four recipient nations. These three countries alone made up approximately 78% of China’s FDI outflow to Africa during this time period, with South Africa accounting for 64%. The distribution of FDI funds are represented in the diagram below, which appears in the report.



Source: The African Development Bank Group Chief Economist Complex

The world’s FDI stock in Africa has also increased over the past decade-and-a-half, though not as rapidly as China’s recent influx. Algeria experienced an average increase in FDI

stock from the world of roughly 17.96% per year between 1995 and 2010, while Nigeria and South Africa posted average growth rates of 9.52% and 26.01%, respectively (United Nations, 2011). While China’s FDI grew much more rapidly than that from the rest of the world during this time, the stock of FDI from China to the three sample countries averaged only 1.46% of their total FDI stock between 2003 and 2009. The growth trends of world FDI stock in these three countries can be viewed in the graph below.



Source: UN Commodity Trade Statistics Database

The African Development Bank report indicates that “Chinese enterprises investing in strategic sectors such as oil, ores or infrastructure are mostly state-owned and/or subsidized with Chinese grants or by state-owned banks.” Among these sectors, oil is, perhaps, the most coveted for its use across multiple manufacturing industries, as well as in the transportation of raw materials and finished goods. The same report quotes an article in the Financial Times, stating that “China National Offshore Oil Company (CNOOC), a State-owned enterprise and one of the three major energy players in China, is negotiating with Nigeria, to acquire one sixth of the rights to the latter’s oil reserves.” Later, it is noted that “In terms of stocks, the three leading investors in Africa are State-owned oil companies: China Petrochemical Corp., China National Petroleum

Corp. and China National Offshore Oil Corp. Mineral resources are also high on China's investment priority list, as it has become both the world's largest producer and consumer of the industrial metals and their bi-products in recent years. In 2006 alone, over 40% of Chinese FDI into Africa was devoted to the mining sector. (Osei, 2010)

Chinese mining projects have taken several forms in Africa. In many cases, Chinese companies have bought out small extraction corporations with stakes in Africa. In others, Chinese investment has been directed to projects that improve vital infrastructure components at or near ongoing mining operations. In fact, many of China's African destination countries have received assistance from the eastern giant in the form of infrastructure projects, both to enhance their transportation network as well as their extractive and industrial capacities. The China Africa Development Fund (CADF) has been the leading financier of these types of projects, through both direct investment and financial support of Chinese firms. According to a 2009 Oxford Analytica Daily Brief, the CADF invested more than 1 billion dollars in Chinese firms with operations in Africa in 2008 and was expected to double that amount in 2010 (Oxford, 2009). The CADF, like many Chinese investment conglomerates, has a quite diverse African investment portfolio.

Within Africa, the CADF actively seeks investments in: industries that facilitate African development, such as agricultural and manufacturing industries; infrastructure investments, such as power, transportation, telecommunications and water supply; natural resources, such as oil, gas and minerals; and industrial parks set up by Chinese firms in Africa. (Oxford, 2009)

A *European Journal of Development Research* article by Jing Gu (2009) indicated that the breadth of China's private involvement in Africa is quite great. Gu states that "In 2006, the Chinese EXIM Bank estimated that there were about 800 Chinese companies operating in Africa.

According to these data, approximately 85 percent were privately owned. However, evidence from interviews with Chinese Embassies and the Chinese business communities in Africa during 2007 and 2008 indicates that China now has more than 2000 enterprises in Africa” (Gu, 2009). Gu goes on to say that “Chinese enterprises are springing up all over Africa, working across industries...They are not simply operating within the conventional sectors of oil and extractive industries associated with Chinese SOEs activity...By the end of 2006, China’s FDI had already spread across 49 African countries and regions” (Gu, 2009).

Trade relationships between China and Africa have not only strengthened quantitatively, but also diplomatically. A *Transition Studies Review* article by Bertollo, Appolloni, Izquierdo, and several others (2009) discusses the formation and effects of the New Asian-African Strategic Partnership, which formed in 2008. The Economic Community of Western African States (ECOWAS), which includes Nigeria, “signed a comprehensive agreement with the China Council for the Promotion of International Trade (CCPIT) in Beijing on 26th September 2008” (Bertollo, 2009). This agreement established the following provisions between the two organizations:

The Memorandum of Understanding (MOU) provides for the establishment of a development fund, the China-Africa Development Fund Company which will be managed by the China Development Bank and provide capital to be used to intervene in the development of infrastructure, agro-industries, fisheries, industries, trade promotion and other private sector activities in West Africa. The CCPIT is required under the MOU to facilitate linkages between the public and private sector institutions in ECOWAS Member States and their Chinese counterparts in order to promote mutually beneficial economic relations. (Bertollo, 2009)

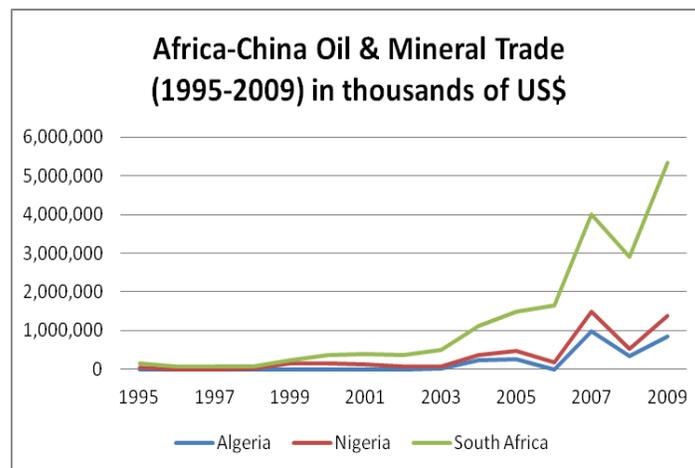
China’s presence in South Africa has also resulted in a strengthening of trade and diplomacy ties between the two countries. Undoubtedly Africa’s most advanced economy, South

Africa has pursued an increased state of global integration in recent years, investing in emerging economies, especially those located within the African continent. According to Bertollo, et al, “South African direct and portfolio investment in other African countries during 1998-2002 was equivalent to five percent of GDP on average in those countries. The share was substantially larger in neighboring countries, ranging from nine to twenty percent of GDP...” (Bertollo, 2009). Recognizing South Africa as a growth hub within Africa, Chinese investors have sought to bolster South Africa’s globalized presence through increased trade, as well as financial linkages. “Chinese banks are starting to enter South Africa’s economy by buying equity stakes, like the Industrial Commercial Bank of China with the South Africa’s Standard Bank for a partnership modality in order to put resources to mining, metals, and oil and gas in emerging economies” (Bertollo, 2009).

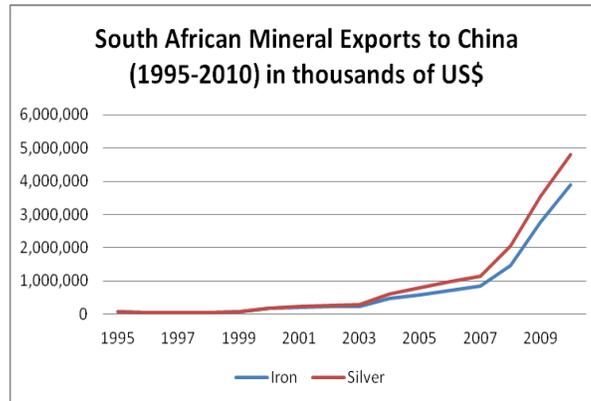
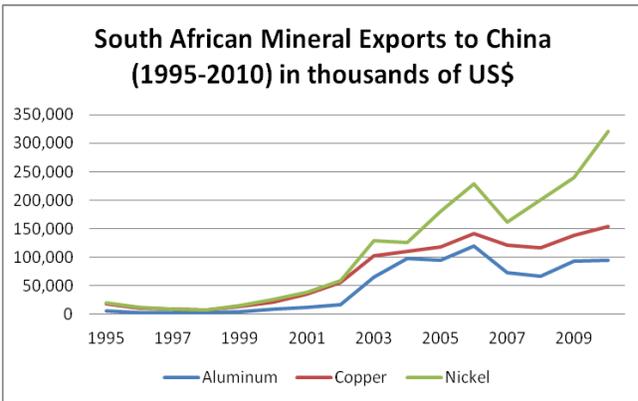
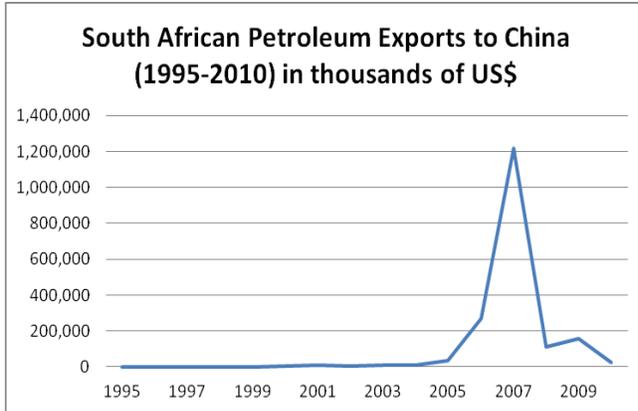
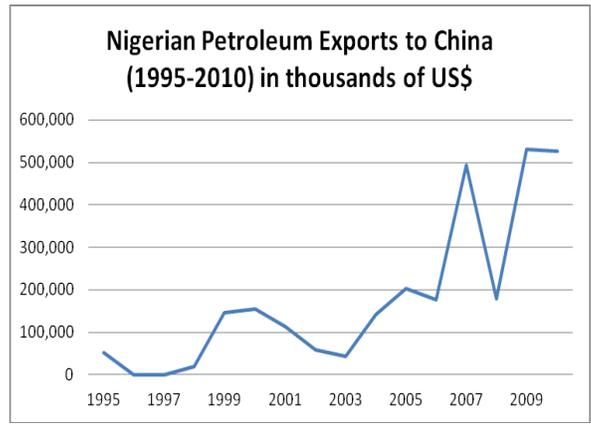
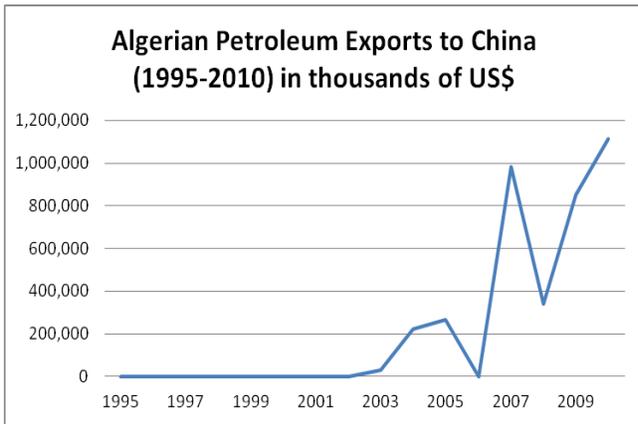
The trend of diversification that has permeated Chinese investments in Africa is due, in many cases, to pressures from the Chinese government. China maintains that its investments are forging a mutually beneficial trade relationship with its African partners and relies on a multi-faceted investment strategy to support these claims. While the world continues to question the motives behind China’s involvement in Africa, the empirical evidence suggests that Africa is benefitting in terms of increasing trade flows to China and the rest of the world.

4. AFRICA-CHINA TRADE

Perhaps, the most beneficial aspect of China's investment in Africa has been the resulting boom in oil and mineral resource trade between Africa and the rest of the world. China, in many cases, has been the largest importer of these commodities over the past decade; a trend which the developed world has identified as evidence of China's alleged attempt to corner the African extraction sector. While it remains unclear whether this is the case, it is evident that the trade relationship between Africa and China has strengthened significantly since China began its financial venture at the start of the 21st century. Nigerian aluminum and copper exports to China increased dramatically over the past five years. Export totals in nearly all of South Africa's base metals have risen rapidly since the turn of the century. And Algeria, along with Nigeria and South Africa, has seen dramatic increases in petroleum exports to China over the past decade. Though some of the graphs below depict observations of zero dollars traded, these data points represent missing data and are not to be regarded as zero-trade years. With that said, African exports to China in these sectors were considerably lower before the mid-1990s than over the past ten to fifteen years.



Source: UNCTADstat Merchandise Trade by Partner and Product Database



Source: UNCTADstat Merchandise Trade by Partner and Product Database

China's investment in Africa over the past decade has been a major contributor to the rise in oil and mineral exports from Algeria, Nigeria, and South Africa to China during the same time period. The aforementioned regression model (1) analyzing the effects of Chinese FDI, world FDI, and GDP on African extraction exports to China revealed that Chinese FDI to Algeria had a positive relationship with exports in this sector from the three African countries to China of 2.81 million annual US dollars worth of exports per 1 million current US dollars worth of FDI from

China (significant at a confidence level of ninety-five percent). Similarly, the relationship between Chinese FDI to Nigeria and African extraction exports to China was 1.90; while that of Chinese FDI to South Africa and African exports in the same sector to China was 1.67.

Though the effect of Chinese FDI on African extraction exports to China was positive for each of the three African countries, it appears that the extent to which Chinese FDI influenced African exports varied across the three countries. In order to analyze this disparity further, an F-test was run to determine whether the amount of variation was significant. That the coefficients for the effect of Chinese FDI to Algeria, Nigeria, and South Africa on extraction exports from these countries to China were equal was the null hypothesis for the test. The result of the test was an F-statistic of 4.55, with a p-value of 0.0171, which is less than 0.05; therefore, the null hypothesis was rejected at a ninety-five percent confidence level. This means that the variation of the effect of China's investment on extraction exports to China varied significantly across the three countries. To provide a comparison, a second regression model (3) was run, pooling Chinese FDI to each of the three African countries in a single variable. The results of this restricted model indicate that Chinese FDI to Algeria, Nigeria, and South Africa had a positive relationship to extraction exports to China from these three countries of 2.75 million annual US dollars worth of exports per 1 million current US dollars worth of FDI from China (significant at a confidence level of ninety-five percent).

While China's FDI had a significant effect on extraction exports from Africa to China in recent years, it represents only a fraction of the total amount of FDI that was received by the three targeted countries from the rest of the world. In the initial regression model (1) world FDI to Algeria, Nigeria, and South Africa had a positive relationship with extraction exports from these three countries to China of 1.74 million annual US dollars worth of exports per 1 billion

current US dollars of FDI from the world, excluding China. In the restricted model (2), world FDI was positively related with exports to China in the same sector by 2.82 million annual US dollars worth of exports per 1 million current US dollars worth of world FDI (significant at a confidence level of ninety-five percent). Based on these results, world FDI to Africa had a greater impact on African extraction exports to China than Chinese FDI to South Africa in the unrestricted model and Chinese FDI to all three African countries in the restricted model, indicating that Chinese FDI was more effective at increasing extraction exports to China from Algeria and Nigeria, at the very least. This suggests that Chinese investors' methods of selecting and implementing investment projects has been more effective than those of investors from the rest of the world at increasing African exports to China in the extraction sector.

In order to fully comprehend the impact that Chinese investment has had on African extraction exports to China, a third regression model (5) was run, completely eliminating Chinese FDI to Algeria, Nigeria, and South Africa, making world FDI to these countries the main regressor of interest. Without accounting for the effects of Chinese FDI to the three targeted African countries, world FDI appeared to be negatively related to extraction exports from these countries to China by -0.17 million annual US dollars worth of exports per 1 billion current US dollars worth of world FDI. This result indicates the extent to which Chinese FDI has played a role in increasing African extraction exports to China, relative to FDI from the rest of the world.

However, as exports in the African extraction sector have soared, textiles and agricultural goods have seen relative losses in the domestic market and abroad, largely due to China's market penetration in the light manufacturing sector within Africa. This trend is common among countries with export markets predominantly comprised of raw materials. In a report for the

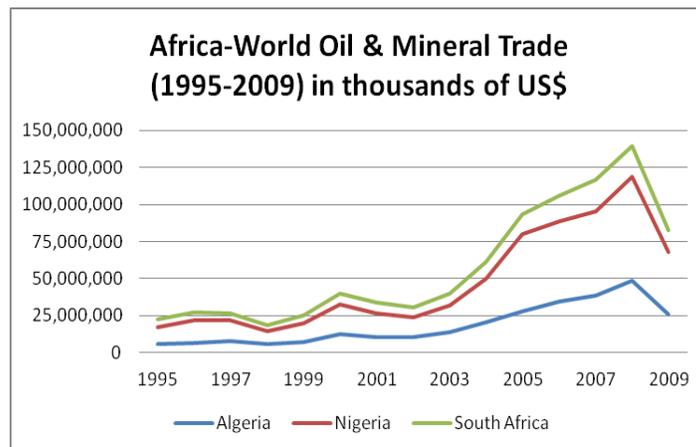
World Bank, Ali Zafar (2007) discusses the implications of this trade distortion, commonly known as the *Dutch disease*.

In the Dutch disease scenario, the natural resources boom will lead to an increase in national income, but will paradoxically lead to deindustrialization (and “deagriculturalization”) and have an adverse effect on the competitiveness of the country’s other exports...After a commodity boom, resource-abundant countries will tend to become more intensive in resource-based exports and less intensive in lower end, labor-intensive manufactures. Moreover, resource-rich countries will tend to finance inefficient economic policies by selling their resources on the market. (Zafar, 2007)

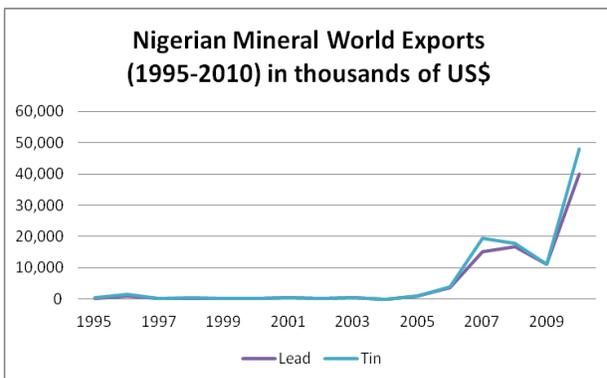
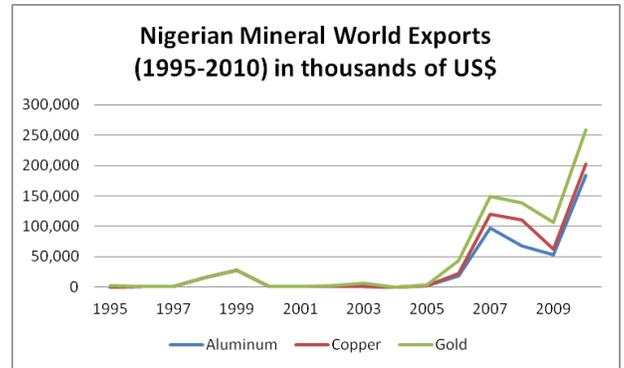
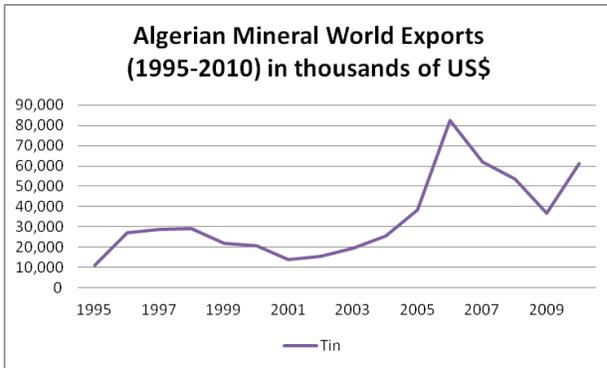
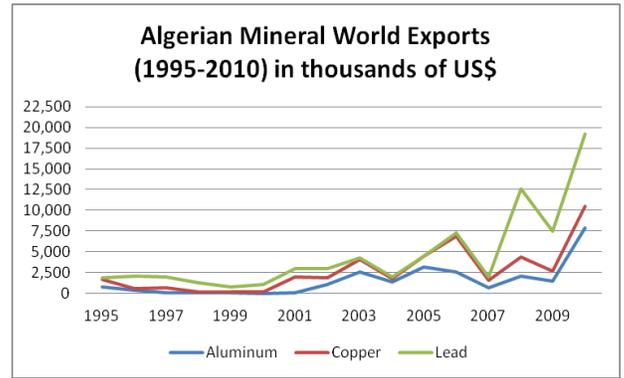
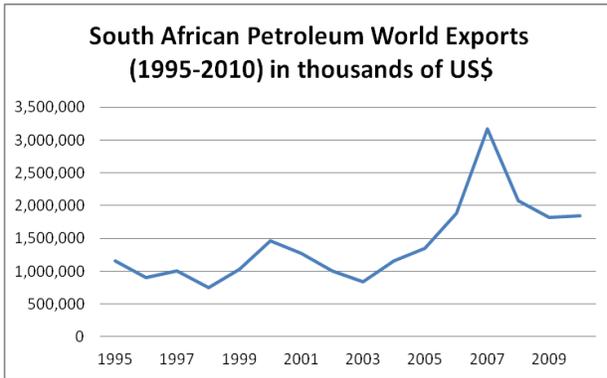
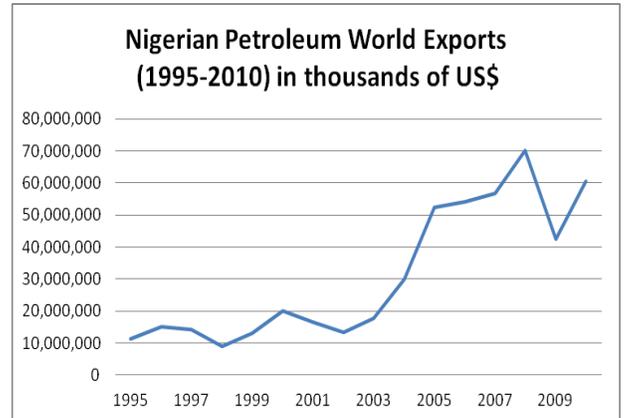
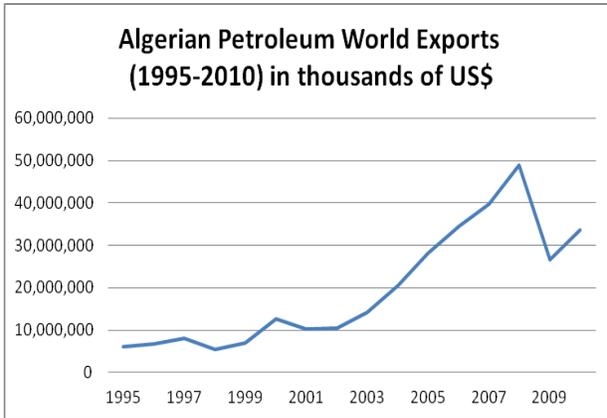
Should this trend continue, it is likely that light manufacturing and agricultural production will slow significantly as oil and mineral exports account for an increasing majority of the gross national income of Africa’s resource-rich economies, while foreign producers fill resulting holes in the domestic market with cheap imports.

5. AFRICA-WORLD TRADE

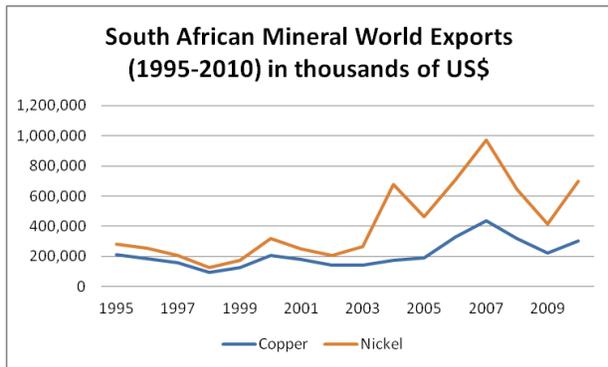
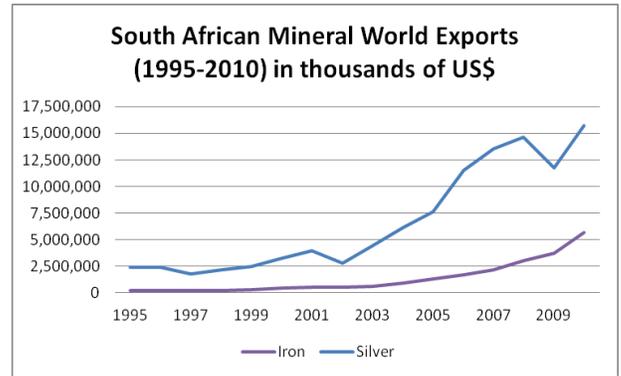
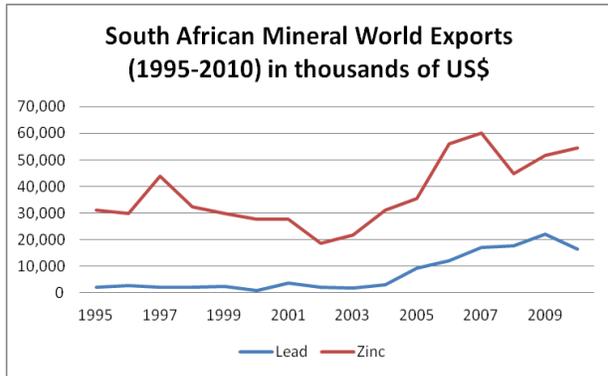
Though exports to China have been the major aspect of the African extraction sector that has benefited from China's recent inflow of investment, exports to the rest of the world in this sector have also experienced positive gains. As Chinese investments fund productivity improvements among African oil and mineral extraction sites, the amount of extraction exports from Africa to the rest of the world has increased dramatically, in some cases by a greater proportion than exports to China. Algeria's industrial metal exports to the rest of the world, including aluminum, copper, lead, and tin, rose significantly between the start of the century and today. Nigeria and South Africa have also experienced increasingly higher volumes of industrial metal exports to the rest of the world, as well as gold. South Africa's precious metal exports, specifically in gold and silver, have grown by leaps and bounds in the past ten to fifteen years. Additionally, all three countries have seen major increases in petroleum exports to the rest of the world since the early 2000s. The export growth that these and the rest of the African recipient countries have experienced since 1995 suggest that China's FDI has been beneficial to far more than its own trade relationships with Africa.



Source: UNCTADstat Merchandise Trade by Partner and Product Database



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Though the effects of China’s recent investment in Africa has not had as profound an impact on extraction exports to the world as to China, further analysis reveals some interesting characteristics regarding the relationship between Chinese FDI and African oil and mineral exports to the rest of the world. The initial regression model (2), analyzing the effects of Chinese FDI, world FDI, and GDP on African extraction exports to the world, reported that Chinese FDI to Algeria had a positive relationship with exports in this sector from the three African countries to China of 0.27 billion annual US dollars worth of exports per 1 million current US dollars worth of FDI from China (significant at a confidence level of ninety-five percent). The relationship between Chinese FDI to Nigeria and extraction exports to China from the three countries was 0.22; and that of Chinese FDI to South Africa and exports to China in the same sector was 0.24 (significant at a confidence level of ninety-five percent).

In this case, the effect of Chinese FDI on African extraction exports to China was very close for all three countries. In order to determine whether the positive relationship was statistically the same for Algeria, Nigeria, and South Africa, another F-test was conducted. Again, the null hypothesis expressed the equality of the three coefficients of China's FDI to Algeria, Nigeria, and South Africa on extraction exports to the world. The result of this test was an F-statistic of 0.87, with a p-value of 0.4282, which is greater than 0.05; thus, the null hypothesis could not be rejected at a ninety-five percent confidence level. This means that the variation of the effect of China's investment on extraction exports to the world did not vary significantly across the three African countries. Since the three coefficients can be treated as though they were equal, a second regression model (4) was run, again pooling Chinese FDI to each of the three African countries in a single variable. The results of this restricted model indicate that Chinese FDI to Algeria, Nigeria, and South Africa had a positive relationship to extraction exports from these three countries to the world of 0.31 billion annual US dollars worth of exports per 1 million current US dollars worth of FDI from China (significant at a confidence level of ninety-five percent).

As with the analysis of exports to China, world FDI to Algeria, Nigeria, and South Africa must also be considered as a contributing factor to growth in extraction exports from these countries to the rest of the world. In the first regression (2), world FDI to the three countries had a positive relationship with extraction exports to the world of 0.19 billion annual US dollars worth of exports per 1 million current US dollars worth of world FDI (significant at a confidence level of ninety percent). In the restricted model (4), world FDI was also positively related with exports to the world in the extraction sector by 0.26 billion annual US dollars worth of exports per 1 billion current US dollars worth of world FDI (significant at a confidence level of ninety-

five percent). Based on these findings, world FDI to Africa did not have as significant an impact on African extraction exports to the world as Chinese FDI in either model, suggesting that Chinese FDI had a more profound impact on increasing extraction exports to the world from all three African countries. Once again, it appears that Chinese investments have been more effective than those from the rest of the world in increasing African extraction trade with the rest of the world.

In order to grasp the extent of China's impact on African exports in this sector to the rest of the world, a final regression model (6) was run, which removed Chinese FDI to Algeria, Nigeria, and South Africa, altogether. Disregarding the effects of Chinese FDI to the three African countries, world FDI again seemed to be negatively related to extraction exports from these countries to the rest of the world by -0.08 billion annual US dollars worth of exports per 1 billion current US dollars worth of world FDI (significant at a confidence level of ninety-five percent). Once again, this demonstrates the importance that Chinese FDI has had in trade growth within this sector between Africa and the rest of the world.

Despite allegations from the developed world, declaring China's investments in Africa self-serving and exploitative, it is clear that Africa's trading partners around the world have experienced an increase in extraction imports, as a result of Chinese FDI. The extent to which market distortions, such as the *Dutch disease* and the crowding-out effect, negatively impact trade relationships between the African extraction economies and the rest of the world has yet to be seen. It is evident, however, that China's presence in Africa has resulted in increased oil and mineral exports from Africa to the rest of the world – a trend that has benefited far more than the Chinese government and its affiliated investors.

6. CONCLUSION

It is evident that China's involvement in Africa's resource-rich economies has resulted in an export boom for the extraction sector throughout Africa. The investments of numerous state-led and private organizations within China have improved the physical capital involved in the extraction process, as well as the critical infrastructure components at and around extraction sites, enhancing the productive capacity of African mining and drilling operations. China's growing demand for oil and base metals has simultaneously provided the African extraction industry with new market opportunities, strengthening the trade relations between China and Africa. Chinese FDI has also had a positive effective on oil and mineral exports from Africa to the rest of the world, even surpassing the extent to which world FDI affected exports in the extraction sector. Despite the export gains that several resource-rich African nations have experienced as a result of China's recent investments, the question remains as to whether these countries have truly benefited from the *dragon's gift*, all residual effects considered.

As aforementioned, the *Dutch disease* appears to be afflicting the African nations that have been targeted by China for their oil and mineral resources. While the extraction sector has experienced significant growth as a result of China's investments, other sectors of the economy have had to bear the burden of competing with cheap Chinese goods domestically and abroad. A crowding out effect is likely to occur among these economies, as oil and mineral extraction operations comprise a greater share of GDP each year, forcing agricultural production and light manufacturing out of the economy. The fact that many of these African economies are so heavily dependent on their extraction exports as a source of revenue leaves their economic security vulnerable to external demand shocks experienced by their trading partners.

Furthermore, the recent global economic downturn has resulted in declining demand for base metals throughout much of the developed world, especially the Euro bloc. As industrial and infrastructure capacity building take a back seat to debt reduction in many of the world's major economies, the amount of extraction exports demanded from the African continent will likely fall. China, however, has remained relatively unaffected by ongoing recession. Its economy showed signs of slowing growth in the first quarter of this year, but investments have continued to flow both in and out China. The long term effects of slowed growth around the world on African extraction exports will likely be minimal, as China's desire to maintain its rapid economic growth continues to fuel its need for oil and base metals.

Contrary to the claims of the United States and much of the developed world that China's dealings in Africa are self-serving and fail to benefit the targeted African economies, there has clearly been a positive effect on extraction exports from Africa to the rest of the world as a result of China's increased FDI. Proving more effective than world FDI at increasing African exports, China's investments have done more for advancing the economies of Africa in a little over a decade than U.S. aid programs have done for nearly half a century. China's investment in African extraction operations has proven effective in terms of expanding the industry in countries where economic growth has been absent for several decades. If African governments are able to channel revenues from growing extraction operations to the development of Africa's secondary industries, such as its light manufacturing and services sectors, some of the least developed economies in the world may see significant increases in employment and productivity. Ultimately, the effectiveness of China's investments on improving the overall productivity and economic strength of Africa's numerous disadvantaged economies depends on the policy decisions of those in power in each of the targeted African states.

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