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Title: Steel Pipe Dreams: A China-Guinea and China-Africa lens on prospects for Simandou's iron ore

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Abstract: A shift in the drivers of China's economy underlies contemporary change in iron ore and steel markets. Medium-term structural change also lies on the horizon with rising Chinese investment in Africa. Home to the world's largest known and highest-grade iron ore deposit, as well as a history of friendly political ties with Beijing, Guinea offers an important study of related China-Africa political economy and of the emerging iron ore and steel-intensive industrial ties being promoted by Beijing in Africa. Toward understanding long-run and indirect international iron ore market drivers this paper describes directions in China's prospective interest in Simandou in a China-Guinea and China-Africa economic and political economy context. China's selection of Guinea and Sierra Leone among priority partners in Africa, and promise to help these countries and Liberia realize a prosperous 'post-Ebola' era suggest potential for structural change in their integration with the world economy. For China this could offer vast iron ore resources to feed its win-win industrialisation agenda with and in Africa. It could also increasingly see selective commodity markets driven increasingly by intra-developing country dynamics - a trend that itself could induce more favourable prospects for the exploitation of Simandou and also Guinea's economic development.

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Steel Pipe Dreams:
A China-Guinea and China-Africa lens of prospects for Simandou's iron ore

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1. Introduction and Background

In 1956 the People's Republic of China (PRC) founding Premier, Zhou Enlai, visited ten countries in Africa. His itinerary included then French-led Guinea, in Africa's far west. Two years later, when France offered its West African colonies a semi-autonomous post-colonial partnership, under President Sekou Toure Guinea alone sought independence. A year later, in 1959, Guinea became the first country in Sub-Saharan Africa (SSA) to establish ties with the PRC. Friendly ties with Beijing have continued since. For example, Guinea unlike many African countries for example has never recognized Taipei (see Brautigam, 2009). Guinea was also a supporter of the 1971 transfer of Taipei's seat in the UN Security Council to Beijing. A 2009 article in *The New York Times* offers a view of the consequences for Guinea's capital Conakry, describing it as being "littered with such tokens of a friendship that first flowered when Guinea was an isolated and struggling socialist state in the late 1950s" (*The New York Times*, 2009, p6). Despite close political ties with the PRC, Guinea has struggled economically relative to Francophone West African countries retaining closer ties to France, including Senegal and Cote d'Ivoire. Some half a century since independence for example, in 2014 Guinea's per capita income was just USD550, compared to a per capita income of USD1,071 in Senegal and USD1,646 in Cote d'Ivoire (World Bank, 2015). Guinea ranked 179th among the 186 countries in the 2014 United Nations Human Development Index, against 163 for Senegal and 171 for Cote d'Ivoire (UNDP, 2015; retrieved 07/08/15). More than half of Guinea's 12-million strong-population live below the poverty line (World Food Program (WFP), 2015).

Officially a Least Developed Country (LDC), Guinea's economic struggle lies in contrast to its abundant natural resources endowment; a paradox known as the resource curse (see Frankel, 2012). For example, Guinea is home to some 40 billion tons of high-grade bauxite (one-third of known global deposits), and is among the largest producers of bauxite in the world (Di Boscio et al, 2014). The country's natural resources include iron ore (estimated 20 billion tons), gold (700,000 tons), diamonds (30 million carats), and base metals including nickel, cobalt, copper, manganese, etc. (USGS, 2014), as well as untapped offshore oil deposits that are currently licensed to international oil companies for exploration. The crown jewel among Guinea's natural resources lies in the country's far-East in the Simandou mountain range (Figure 1). This area is home to some of the world's most diverse forest biodiversity and also to the "El Dorado" of iron ore (*The Economist*,

2014). An estimated 2.4 billion tons of ore graded at over 65.5% lie in the area (KPMG, 2014). Extraction of Simandou's iron ore reserves would transform global iron ore markets and make Guinea the world's third-largest iron ore exporter, joining Australia and Brazil.

Insert Figure 1 about here

Alongside global commodity market dynamics, political volatility since independence and governance issues within Guinea and its neighbors, including Cote d'Ivoire, Liberia, and Sierra Leone are part of the story as to why Simandou's ore has yet to be extracted. Civil war in Liberia and Sierra Leone through the 1990s for example resulted in the Forest Region in Guinea (home to Simandou) becoming home to some 700,000 refugees (WFP, 2015). Another factor was that the steady flow of bauxite exports provided an alternative source of government income (Knierzinger, 2014).

On governance, Reuters recorded a mining industry executive as suggesting that "it's suicidal to invest in Simandou... ..God knows how many times the government might change the mining code etc...It's a very high-risk investment in a country where laws and rules are not stable" (Samb, 2014, p123, accessed August 10, 2015). Guinea is synonymous with 'mysterious' resources-related deals, and lengthy ensuing legal challenges (Balint-Kurti, 2010; Di Boscio et al, 2014). Simandou has been touted as "Simandon't" (*The Economist*, 2014). The World Bank's 'Doing Business Index' ranks Guinea 169th for ease of doing business (World Bank, 2015b, accessed August 31, 2015). As a prospective sign of the turning medium to long-term tide, Guinea's 2010 democratic election is generally considered as the first credible election since independence. After a series of delays, parliamentary elections were held in September 2013 and the first session of the National Parliament took place in January 2013. President Alpha Conde's relatively smooth re-election for a second and final term in October 2015 adds weight to signs of a sustained shift away from the post-independence precedents deriving from the country's two long-standing autocratic leaders: Ahmed Sekou Toure (1958-1984) and Lansana Conteh (1984-2008). A decade-long consolidation of peace in neighboring Sierra Leone and Liberia, and relative stability in Cote D'Ivoire, also reduce relative sub-regional political and security risks attached to the extraction of Simandou's iron ore.

Insert Figure 2 about here

Source: World Bank, *World Development Indicators* (2015)

Despite regional conflict and business environment uncertainty, Guinea's growth rate has, however, been mostly positive and also stable for a quarter of a century (Figure 2). Negative growth of -0.3 percent in 2009 was related to the death of decades-long leader Lansana Conte. The dip in growth in 2014 relates similarly to political transition, but also to the Ebola virus outbreak. For comparison, the recent economic growth of Liberia and Sierra Leone has been highly volatile. In Liberia's case, between 2002 and 2003 growth oscillated from plus to minus 32%, and in 1997 GDP grew by more than 100% against the previous year (World Bank, 2015).

Since 1973 iron ore-rich neighbors Guinea, Liberia, and Sierra Leone are members of a three-country political and economic union called Mano River Union (MRU). In addition the three are founding members of what later, in 1975, became the Economic Community of West African States (ECOWAS), and also the continent-wide African Union (AU). More recently, the three countries were synonymous with the mid-2014 outbreak of the Ebola virus. On a per capita basis the latter mostly affected Liberia and Sierra Leone. Following the death of some 4,800 people in Liberia, 4,000 in Sierra Leone and 2,500 in Guinea (BBC, 2015), by April 2016 the virus' spread was characterized by occasional sporadic individual new cases. Life in the sub-region had more or less returned to normal. An official end to the transmission of the Ebola virus in Guinea however, was not declared by the World Health Organisation (WHO) until June 1, 2016, some two years after the outbreak had begun (WHO, 2016).

The first major country leader to visit MRU countries following the virus outbreak was Wang Yi, Foreign Minister of China. During his visits to Liberia, Sierra Leone and then Guinea he promised each country support from China for a "post-Ebola era" (Tiezzi, 2015). Minister Wang spoke specifically of China matching its comparative advantages to help the three countries overcome two major developmental bottlenecks: poor infrastructure and talent shortage. On the latter, China offers an extensive array of scholarships to African nationals, including short-term and long-term degree-based studies, and programs in both Chinese and in English (see King, 2013; Johnston, forthcoming 2016). On the former, Minister Wang spoke of helping the continent to transform its extensive natural resources into an economic strength. He promised China would collaborate in production capacity toward African nations gradually developing an

independent industrial capacity, a promise China has since followed up on for African countries collectively at a Sino-Africa presidential summit in late 2015 and thereafter. In July 2016 for example, China's Export-Import Bank (China EXIM) and Africa's Export Import Bank (Africa EXIM) signed a cooperation agreement for one billion dollars in the form of a loan from China to Africa EXIM toward the construction of industrial parks and special economic zones in Africa (Nan, 2016, accessed July 27, 2016).

China's commitment to MRU economies reflects both the objectives of its aid program, and also that, unusually for a developing country, it is the world's second largest economy, has a high savings rate, level of savings, and slowing growth at home (see Garnaut, 2012; Garnaut, Song, Cai and Johnston, 2015 and 2016). Unlike Western aid, China's aid program is moreover explicitly framed as a component within a broader economic partnership built around a trinity of aid, trade and investment (Johnston and Rudyak, 2016). This tradition, adopted from Japan (Nissanke and Shimomura 2013), also now fits with China's new model of growth (Johnston and Rudyak, 2016). Under this model, China is emerging as an important source of international foreign direct investment and a net capital exporter (FDI). The resulting gradual convergence of inbound and outbound investment levels reflects the acceleration of growth in China's outbound investment that began around 2000. Since around that time, under the 'Going Out' strategy, an array of incentives and financing has been made available to local Chinese firms investing abroad (Wang, Qi and Zhang, 2015). Rich in per capita natural resources and green-field investment opportunities, and offering the potential demographic dividend of its young population, Africa is a priority that strategy (Johnston, 2015).

Into this new international, sub-regional and bilateral economic context is a May 2014 deal to extract Simandou's iron ore reserves. The four-way agreement, between mining giants Rio Tinto (46.6%), the Aluminium Corporation of China Ltd (Chinalco) (46.5%), the Guinea Government (7.5%), and the International Finance Corporation (IFC, a division of the World Bank, (4.6%), targets the southern section of Simandou's deposits (Rio Tinto, 2015). Full production of this section of Simandou's iron ore deposits would produce up to 95 million tonnes of ore annually for four decades (Di Boscio et al, 2014). A long-standing challenge in reaching a deal has been whether to ship the ore via Liberia's more proximate established rail and port facilities (Figure 1). Guinea's government has however, preferred purpose-build domestic infrastructure that would unlock broader growth opportunities for its economy and people. Under this deal, extraction is conditional upon success of what is the largest green-field integrated mine, rail and port investment under

development globally (ibid). The total investment is comprised of a 650km of heavy-haul railway, 35 bridges, 24km of tunnels, alongside a new port for iron ore loading; the sum required to build which is some three times current Guinean national GDP (Samb, 2014). Realisation of this large-scale new infrastructure as part of the project is projected to more than double Guinean GDP, and to create many thousands of jobs (Di Boscio et al, 2014). Given this importance, and the delicate balance of interests and costs, participation of the Guinean Government could eventually reach 35%, comprised of a 15% carried interest and a 20% contributing stake (ibid).

Insert Figure 3 about here

Source: Guinea Poverty Reduction Strategy Paper (PRSP, 2014)

The corridor associated with the project's upfront \$15 billion infrastructure requirement forms a core pillar of Guinea's Poverty Reduction Strategy Paper (PRSP). The PRSP is a key policy tool for promoting economic growth in Guinea (ibid), and has explicit reference to the importance of Simandou: "...the Simandou chain contains one of the most important iron ore deposits in the world. But the project is more than a mine. It is the most important mining, railroad and port project in the world. Infrastructure linking the port to the mine encourages the development of agriculture, aquaculture and services." (PRSP, 2014, p51). Figure 3 illustrates the areas that would benefit by sector.

Unfortunately for Guinea fiscal and development planners, the timing of the improving economic and political conditions in the MRU sub-region and the latest Simandou deal has, however, coincided with the end of the third major commodities boom since the Second World War (Radetzki, 2006; Garnaut, 2015). Led by demand from China over the first decade of the century (Garnaut, 2006; Radetzki, 2006; Penney, Melanie, Stark and Sheales, 2012), the boom caused a rapid rise in minerals prices from 2003 to 2011, with a brief interlude for the Global Financial Crisis (Garnaut, 2006, 2015). The consequences of lower commodities prices include that the International Monetary Fund (IMF) slashed its annual growth forecasts for Guinea, Liberia, and Sierra Leone, from 6% to 0.9%, from 11% to 3.8%, and from 5.4% to -2.5%, respectively (IMF 2015a; IMF 2015b). Compounding the challenge of lower growth and stagnant fiscal revenues is that these arise just as the need for additional social expenditure around the Ebola outbreak increased (IMF, 2015b). This served to widen fiscal deficits and increase borrowing in MRU

countries (UNCTAD, 2015c).

The decline of global demand growth, unfavorable commodity prices, and the potential for currency appreciation has in general increased the risk of debt distress that can result from large-scale projects (AfDB, 2015). In the case of China's lending models in Africa, one such model, known as "Angola terms", uses commodities as collateral. Since the price of many commodities have fallen from earlier highs, the terms of many already issued loans now appear less favorable than when they were agreed (see UNCTAD, 2015b; Macauihub, 2015). This not only raises debt sustainability issues, but has also shifted the balance of power in China's favor in bilateral China-Africa negotiations. For example, in April 2014 when Sierra Leone's Tonkolili iron ore mine and the associated infrastructure company African Port and Railway Services was struggling amid falling iron ore prices and the onset of the Ebola virus, Chinese partner Shandong Iron and Steel Group acquired the remaining 75% share (not all of which was locally-owned). Shandong plans to lift production at the mine to 25 million tonnes per year (Cornish, 2015; Macrobusiness, 2015), and production resumed in May 2015, with Sierra Leone's President Dr. Ernest Bai Koroma assuring its 100% Chinese owners political support for the enterprise.

For current iron ore suppliers, mainly Australian and Brazil, Simandou is also important. If an iron ore project of its scale were to come on stream, this would influence the present iron ore mineral market supply concentration (Penney, Melanie, Stark and Shales, 2012). In the case of Australia's iron ore, Tcha and Wright (1999) identified China's demand to be driven by the previous iron ore trade volume, GDP growth rate, steel production in China, and the relative price of Australia's iron ore. It was earlier predicted that expanded iron ore export capacity of West and Central African iron ore had a medium-term capacity to lower world prices to around USD45/t (Hurst, 2013). Illustrative, however, of the difficulties in predicting market dynamics prices have since troughed, in December 2015, below USD40/t (*The Australian*, 2016, accessed 16.04.16) without progress on extracting Simandou's vast reserves. The layered interests underlying the market were highlighted during a year of booming commodities prices by the President of the Simandou project partner and major iron ore buyer Chinalco, Xiong Weiping, "...China needs Guinea's iron ore to increase global supply and reduce the power of Australian and Brazilian iron-ore miners to dictate prices. China needs the imports to feed its expanding steel industry, now the world's largest" (*The Asian Times*, 2010, accessed 18.03.15). In 2011, the Chairman of China's largest steel company, Baosteel, Xu Lejiang, suggested that

the Simandou project could provide a stable market for the supply of iron ore globally (Lin, 2011). China also is positioned to utilize the dominance of its global steel market powers to impact its domestic resource security (Wilson, 2012).

Into that dynamic and contentious political and industry environment in July 2016 the mining giant announced a U-turn – that it would shelve the Simandou project in light of iron ore market saturation and low prices (Leroux, 2016, accessed July 27, 2016). And this was despite having submitted the necessary feasibility study just two months before, in May 2016. Since unleashing Guinea’s resource wealth through the development of Simandou could dramatically change the fiscal fortunes of Guinea and the Simandou growth corridor in general (Di Boscio et al, 2014), *Africa Intelligence* (2016) reports that the Government of Guinea is considering suing Rio Tinto. Other analysts argue that Rio’s decision will impel China and Guinea to find alternative ways to develop Guinea’s iron ore resources (*Australian Financial Review*, 2016).

Resonant with the analytical approach of Di Boscio et al (2014), this paper explores the lesser-studied political economy and China-Africa economic drivers of and interest in Simandou’s development. The paper outlines recent China-Guinea and China-Africa economic history toward drawing together political and economic trend information that may conspire to produce conditions that are more favourable to innovative financing of the Simandou project. To that end, this overview facilitates understanding of Guinea’s potential economic trajectory, this element of the broader China-Africa story, and of possible near and medium directions in the global iron ore market.

2. China-Guinea Economic Ties

2.1 Trade

China became Africa’s largest trade partner in 2009 following centuries of colonial-centric ties (Figure 4). This change was induced by growth in demand across African countries for China’s low-cost manufactures, and by China’s acquisition of commodities from a comparatively limited list of countries, including Angola, Sudan, Mauritania, and Zambia. China-Guinea trade more specifically follows a similar pattern to China-Africa trade ties. China is a leading source of imports for Guinea, especially in terms of low-cost manufactured goods. China imports commodities from Guinea. However, China ranked only 10th among Guinea’s export partners in 2014, with Korea, India, and Spain being more important markets in that and the preceding year. Less than 15 per cent of Guinea’s total

foreign trade was with China in 2014, though this was up from 3 per cent in 2001 (IMF, 2015c). The recent growth rate of China-Guinea trade is also slower than the rate of growth of Guinea's overall rate of growth of trade (IMF, 2015c).

Insert Figure 4 about here

Source: IMF (2015c), *Direction of Trade Statistics*, author's own calculations

2.2 Aid

Comparative international understanding of China's foreign aid is difficult because China compiles aid data using a different methodology to that used by OECD member states (Brautigam, 2011; Brandt, 2013). It also does not publish bilateral aid statistics. According to official statistics that are available mostly as single data points in the 2014 *China White Paper on Foreign Aid* (China State Council, 2014, accessed 16.04.16), China delivered foreign aid of Rmb89.3 billion (USD13.4 billion) over years 2010-2012, in the form of grants, interest-free loans (8.1% of total foreign aid), and concessional loans (55.7% of total foreign aid). Some half of China's official foreign aid is directed to Africa (Ministry of Commerce (MOFCOM), 2011 & 2013), which in 2014 was equivalent to around USD6.7 billion. In light of these official data limitations, this analysis mainly relies upon the work of AidData to study China's aid to Guinea. AidData independently compiles official Chinese government information as well as data from international agencies and recipient governments under five categories: official finance; unofficial finance; military aid; suspended aid projects, and; projects identified that cannot be otherwise fully verified. Table 1 presents China's official development assistance (ODA) to Guinea that is considered equivalent to aid by the OECD definition. Omitting China's military aid to Guinea, the focus on infrastructure and energy projects, and also human capital projects (health, education, and other bilateral cooperation-related projects), shows the diversity of interests China has in Guinea, and of shared China-Guinea interests.

Table 1: Chinese “Official Finance” Assistance to Guinea

Year	Project	Aid Type	USD'000
2000	Small hospitals	Vague (OF)	
2001	Construction of Radio and Television Guinea Headquarters	Vague (OF)	6,152.1
2004	Rehabilitation of two power plants	Vague (OF)	2,000
	Vehicle donation	ODA-like	
2005	Debt cancellation	ODA-like	45,000
2006	Computer donation to state administration school	ODA-like	58.3
	E-government project	Vague (OF)	9,000
	Financing construction of the presidential palace	Vague (OF)	
	Hydropower Dam	Vague (OF)	2,500
	Medical equipment and office supplies for hospital	ODA-like	38.8
	Rice, chemical fertilizer, seedlings donation	ODA-like	2,136.4
	Souapiti Dam project on the Konkouri River	Vague (OF)	850,000
	Xuanwu medical mission	ODA-like	
2007	Aid package	Vague (OF)	5,200
	Debt relief	ODA-like	4,000
	Medicine donation	ODA-like	
	Stadium construction in Conakry	Vague (OF)	50,000
2008	150-bed hospital	ODA-like	10,000
	50 luxury cars to Guinean government	OOF-like	
	Construction of three schools	Vague (OF)	
	People's palace renovation	Vague (OF)	
	Rice for gold, bauxite delivery, and mining rights	Vague (OF)	
2009	Friendship hospital	Vague (OF)	
2010	Tiantan medical mission	ODA-like	
2011	Bus and street cleaning truck donation	ODA-like	
	Chinese interest-free loan to Guinea	ODA-like	3,095.3
	Cooperation projects	ODA-like	
	Friendship Schools at Coyah	ODA-like	
	Grant of Rmb150mn	ODA-like	23,214.5
	Grant of Rmb80mn	ODA-like	12,381.1
	Guinean gym	Vague (OF)	
	Non-refundable assistance signed	ODA-like	11,327.9
2012	Construction of a new railway in Guinea	Vague (OF)	
	New International Airport at Maferinya	Vague (OF)	

Where OF is official finance, and ODA is Overseas Development Assistance.

Source: Aid Data (2015)

Table 1 illustrates the identified list of recent aid projects between China and Guinea. By project number these are concentrated in the education and health sectors. Indirectly Table 1 also draws attention to the complex relationship between China's foreign aid and its emerging outbound investment portfolio, in and for example railway infrastructure and airport construction. This relates to the fact that China's aid model evolved from the earlier Soviet and Japanese aid models that sought to promote development and self-reliance around a trinity of aid, trade and investment that openly sought economic gains for both partners (Nissanke and Shimomura 2013; Johnston and Rudyak, 2016). Often China's infrastructure-related aid in turn is comprised of part commercial and part concessional loan to the state and requires the use of Chinese construction companies. Kitano and Harada (2015) unpack the related details.

2.3 Investment

Thanks to China's trinity economic approach to its economic relations with developing countries, separating Chinese aid projects from investment projects is challenging (see Brautigam, 2011). This also relates to the different statistical definitions used by China, and to China's varied development financing institutions. One summary of the contemporary evolution of China's aid and commercial investment captures the challenge: "Other Official Flows (large but less concessional loans and export credit provided by China Export Import Bank); resource for infrastructure packages; equity investment by China-Africa Development (CAD) fund; infrastructure investment by the China Development Bank (CDB) and other commercial banks (which are OOF-like loans and investments with the intention for development, but non-concessional, and suitable for long-term infrastructure investment)." (Lin and Wang, 2014, p8). Since 2003 official Chinese statistics on total bilateral outbound investment, flows and stocks, are published by China's Ministry of Commerce. These, however, tend to understate China's outbound investment (Shen, 2015). Reasons include that non-commodity investments often fall outside official Chinese statistics (Rosen & Hanemann, 2009), and Mainland Chinese FDI passing via Hong Kong and other offshore centers is excluded. In Guinea's case this would exclude the famously 'opaque' investment dealings of the Hong Kong-registered 'Queensway Group', which is otherwise an active investment in the country (Burgis, 2014).¹ Table 2 outlines China's officially reported investment flows and stock into Guinea, and flows into neighboring MRU members Sierra Leone and

¹ A Hong Kong-based business network known to be behind many multi-billion dollar deals with "some of Africa's most oppressive and corrupt regimes" (*The Financial Times*, 2015).

Liberia over recent decades. By 2013 China's official accumulated stock level reached USD338.6mn, up dramatically from just USD25.8mn a decade earlier. However, this was equivalent to just 1.3% of total Chinese FDI stock in Africa; down from 2.9% a decade earlier. In terms of flow of Chinese investment into the three iron-ore rich West African countries that comprise the MRU, Guinea has relatively consistently received the lion's share of China's investment in recent years (Table 2). This is also related to the enduring civil wars in Liberia and Sierra Leone through the 1990s.

Table 2: China's FDI Flow to Guinea and the sub-region, 2004-2013, USD million

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Guinea	14.4	16.3	0.8	13.2	8.3	27.0	9.7	24.6	64.4	100.1
Liberia	0.6	8.7	-7.0	0.0	2.6	1.1	29.9	21.1	12.0	30.3
Sierra Leone	5.9	0.5	3.7	2.9	11.4	0.9	0.0	10.8	7.7	40.0
Mano River Union	20.9	25.5	-2.6	16.1	22.3	29.0	39.6	56.4	84.1	170.5
Guinea share	69.0	64.1	-29.2	82.2	37.3	93.0	24.6	43.5	76.6	58.7
Africa	317.4	391.7	519.9	1,574.3	5,490.6	1,438.9	2,112.0	3,173.1	2,516.7	3,370.6
Guinea share	4.5	4.2	0.1	0.8	0.2	1.9	0.5	0.8	2.6	3.0

Ministry of Commerce (MOFCOM) (2014), 2013 and 2012 Statistical Bulletin of China's Outward Foreign Direct Investment. China Statistical Press.

Despite the reduction in share of total Chinese FDI stock in Africa, Guinea's share of China's investment exceeds its share African GDP, reflecting that the lion's share of recent Chinese investment in Africa has been invested in resource-rich countries (see Johnston, 2015: 390-391). Kolstad and Wiig (2011) found that in the case of 26 African countries investigated, Chinese investment was also biased toward poor governance. More recent research by Chen, Dollar, and Tang (2015) found that China's attraction to resource-rich African countries is no different to those of Western investors; but that China's *share* of investments in countries with poor governance is higher. Guinea ranks 145th of 175 countries in the 2014 Transparency International (TI) corruption perceptions index (TI, 2015), making it a governance 'peer' of Kenya, but placing it ahead of some dozen other African countries.

Globally China's outbound FDI is positively related to international trade, market size, economic growth, openness level, and endowments of natural resources (Zhang and

Daly, 2010). In the case of China-Guinea investment empirical studies are few. In the presence of limited data, Cheung, de Haan, Qian and Yu (2012) use Tobit model regression analysis that accounts for censoring of investment approvals over years 2003-2007. They find that Chinese investment in Guinea responds to a market seeking motive, risk, resources, intensity of trade ties, and the presence of Chinese contracted projects. Their findings resonate with Chen, Dollar and Tang (2015) who find that Chinese FDI is comparatively concentrated in skill-intensive sectors in skill-abundant countries in capital-intensive sectors.

Insert Figure 5 about here

Estimated China share of total Guinea FDI, USD million

Sources: NBS (2011, 2012 and 2013) and MIF (2015b).

Two independent time series estimates are presented in Figure 1: total annual FDI in Guinea and within this China's investment in Guinea. As far as the series are statistically consistent and thus this way comparable, total FDI into Guinea as a percentage of total inbound investment has only recently reached a substantial level. According to the two data series, in 2012 China's investment in Guinea reached 75% of the total. It had not previously exceeded 15% of total in any earlier year for which data is available. No official data is available on the composition of China's outbound foreign investment. Kokouma and Xu (2013) however, outline selected information on the distribution by sector of the activities of Chinese companies in Guinea (reproduced in Table 3). The cross-sector listing of Kokouma and Xu (2013) is congruent with Chen, Dollar and Tang's (2015) finding a majority share of Chinese investment projects fall outside the resources sector. From AidData's 'mixed-model' of aid-investment data for Chinese projects in Guinea (Table 4) it is inferred that the sectors receiving the greatest shares of China's investments in Guinea are mining and construction. The categories include the USD1.35 billion for the Simandou project, and also a USD4 billion agreement to construct related to infrastructure and to develop related iron ore in Kalia².

² Kalia is a town close to the border with Sierra Leone and that falls within the Simandou growth corridor.

Table 3: Distribution by sector, major Chinese companies with a presence in Guinea

Sector	Company
Agriculture, hunting, forestry and fishing	The Soguicoda (ISIC 11), Foret forte (ISIC12)
Mining	China Sonangol
Manufacturing	Guinee Complexe Textile Yahe Shandong (ISIC 32); Produits Artisanaux Huali de Guinee (ISIC 32)
Electricity, gas and water	China International Water & Electric Corp
Construction and public works	China Henan Company (ISIC 50); CGC (ISIC 50) Huanxi Sichuan (ISIC 50); The Jinya Jiangsu of China (ISIC 50)
Transport, warehouse and communications	Huawei Technologies (ISIC 72)
Banks, Insurance, real estate services provided to business	Chinese International Fund (CIF); Eximbank – China
Services to the community, social and personal services	La Pharmagui-Orient en Guinee (ISIC 92)
Wholesale and retail trade and restaurants and Hotel	Company for International Trade; Economic and technical XIAN (ISIC61); Chinese center for investment; Operation and commercial (CCIEC) (ISIC61); Grand Hotel in Conakry (ISIC63); Company International Economic and Technical Cooperation of Hunan Province (CHITEC)

Source: Kokouma and Xu (2013).

Table 4: Unofficial Chinese Aid to Guinea

Year	Title	Objective	USD million
2003	Agricultural experts and hybrid rice	Mixed	
	Nanchang University branch	Development	
2005	Renewable three-year bauxite exploration	Commercial	63
2007	Exploration of aluminum in Boke district,	Commercial	3,000
	Telimele bauxite prospecting	Commercial	
2008	Bauxite and alumina complex	Commercial	
2009	Government audit	Commercial	3.3
2010	Kalia infrastructure and iron ore	Commercial	4,000
	Simandou iron ore project	Commercial	1,350
	StarTimes invests in digital television	Commercial	
2011	240.5 MW Keleta dam	Commercial	526
	Aluminium refinery and smelter at Fria	Commercial	
	Boffa-Telimele region bauxite development	Commercial	5,800
	Motorcycle donation to youth	Development	
2012	Chinese company donates construction	Development	0.6
	Construction of first five-star hotel	Commercial	65

Source: AidData (2015). ‘Mixed’ projects are directed by a combination of commercial and developmental goals

3. China-Guinea: Steel and the broader China-Africa economic context

The drivers of China's investment interest in Guinea and Simandou are global and dynamic. These include improvements in the macroeconomic performance of SSA since 1996 (Arbache and Page, 2007), the 1994 end of apartheid in South Africa allowing SSA's then largest economy to reintegrate with the region (Carmody, 2009), and China itself (Wang, 2007). Half of SSA by country numbers (25 countries specifically) now have an annual per capita income in the middle-income range, defined by the World Bank in international dollars as above \$1,045 and below \$12,735 per capita (Fengler and Devarajan, 2012). Africa's improved economic climate together with burgeoning China-Africa ties may also bring an increase in the demand for minerals in Africa. The consumption of metals, for example via the consumption of steel, typically increases with income from middle through to high income per capita phases, as countries go through a period of industrialization and infrastructure building (Hurst, 2013). Moreover, as growth slows and the population ages in China, investing in basic manufacturing industries and infrastructure in low-wage and demographically young Africa offers a new source of growth (see Johnston, 2015)..

Specifically, falling demand for steel in China and the related need to reform the domestic steel industry (see Liu and Song, 2016), together with shifting economic prospects in Africa may serve to incrementally diversify the locus of demand for steel away from East Asia and toward Africa. Poor infrastructure in Africa remains an important 'bottle-neck' to domestic and intra-regional economic development (Lin and Wang, 2014: 13), reducing growth in output by as much as 40% (AfDB, 2015). One estimate from the Africa Infrastructure Country Diagnostic suggests a need for infrastructure investment in the order of USD93bn annually on the continent. An estimate of the funding gap for that infrastructure is some USD31bn (IMF, 2015c). Speeches by Chinese leaders visiting Africa suggest that China is politically committed to using its savings and infrastructure comparative advantages to helping to meet that need. For example, at the 2015 heads of state meeting of the 54-member African Union (AU), China signed the 'African Union-China deal', billed as "the most substantive project the AU has ever signed with a partner" (International Center for Trade and Sustainable Development (ICTSD), 2015, p123). This promises to connect the continent by road, rail, and air transportation. At present China's

largest single outbound investment contract at the time of signing in 2014 was a \$12 billion railway construction project in Nigeria. According to the American Enterprise Institute's (AEI) outbound Chinese investment research, China's infrastructure investments in Guinea include a 2014 USD850 million investment in the shipping sector led by state-owned shipping giant Sinomach. The majority-Chinese funded Kaleta hydropower scheme was also constructed by a Chinese state-owned enterprise, International Water & Electric Corp. The project increases Guinea's hydroelectric generating capacity from 2012 levels to 128 MW to 368 MW and offers Guinea's capital Conakry a stable electricity supply for the first time in many decades (Poindexter, 2015). Currently just 3% of Guinea's rural population and three-quarters of the country's urban population enjoy access to electricity (World Bank, 2015). Were Guinea to ever be home to its own steel making industry, substantial investment, local or foreign would be needed for Guinea to generate sufficient electricity capacity.

Confronted by the prospect of rising infrastructure-related demand for steel in Africa itself, falling demand for steel at home and incentives and increasing financing options for outbound investment, outside of Guinea, however, Chinese investors are among international investors entering steel-related downstream industries in Africa. A non-exhaustive list includes that in August 2014 Shandong Iron and Steel Group (Shangang) signed an agreement to construct a USD140 million steel pipe plant in Morocco (Hysteelpipe, 2014). The plant is to be situated in the Tangier Exportation Freezone and have an estimated capacity of 250,000 tonnes of pipe annually. In 2011 Mauritania granted an iron-mining license to a joint-venture enterprise including China Minmetals Corp and a state-owned partner. In late 2014, Hebei Iron & Steel, China's largest steelmaker, announced plans to relocate five million tonnes of production (roughly 11% of its annual output) to South Africa. In 2014 also, China's Sichuan Hongda Group was awarded a 25-year mining license to exploit what is believed to be 219mn tonnes of iron ore deposits in the Liganga area of Ludewa district, Niombe region, Tanzania (Ihucha, 2016). In March 2015, state-owned giant steel-maker Sinosteel signed a memorandum of understanding with the government of Kenya to build a 'Steel City' outside Nairobi towards meeting Kenya's rising domestic and regional steel demand (Muhoro, 2015). In resembled the April 2015 acquisition by Shangang of Sierra Leone's Tonkolili iron ore mine and the associated infrastructure company African Port and Railway Services.

Presently, however, Africa as a continent has little domestic steel-making industrial capacity (Figure 7). The largest steel producing country in Africa is South Africa. Yet, in April 2016 South Africa's steel industry is reported to be on the brink of collapse in struggling to compete with Chinese steel imports, against which it had resorted to imposing new duties (Mail and Guardian, 2016, accessed 21.04.16). The country's ferrochrome industry has similarly struggled in the presence of competition from China (Reuters, 2014, accessed 28.07.16) The largest share of Africa's steel is produced by steel giant ArcelorMittal in South Africa (albeit national steel production capacity remains the same in 2015 as it was in 1998). However, this output is insignificant in relation to the scale of the glut in global supply – 6 million tons annually against 300-400 million tons of excess supply on global markets (van Rensburg, 2015). Besides South Africa, Libya and Morocco are listed among Africa's steel producers with capacity above half a million metric tonnes. Countries with production listed above zero, were Tunisia, Nigeria, Congo (DRC), Uganda, Ghana, Kenya and Mauritania.

Insert Figure 7 about here

Steel Production: World, China, and Africa

Source: World Steel Association (2015)

Central to the story also is that China is not the leading overall international investor in Africa, and not alone in expressing interest in investing in steel capacity on the continent. For example, in Ethiopia major investors include Turkey, India, China, Saudi Arabia, and Sudan. A local company owned by a Saudi billionaire and Italy's Danieli & Cofferati Meccaniche SpA in 2014 signed a deal to develop a USD600 million steel plant, which will be Ethiopia's largest (Davison, 2014). How such plans evolve around the broader dynamic of a Chinese-dominated global steel industry that is currently drowning in excess capacity (see Liu and Song, 2016) is unfolding.

4. Conclusion

In 1959 Guinea became the first country in SSA to recognize Beijing over Taipei. Almost six decades later, Beijing's foreign minister was the first major official visitor to Guinea following the disastrous outbreak of Ebola. During that visit Minister Wang Yi spoke of the tradition of mutual support between China and Guinea, a synopsis of which was outlined herein. A year before that visit by Minister Wang to Guinea, in May 2014, a four-way mining deal was struck that would see Guinea's Simandou region's vast and high-grade iron ore reserves begin to be extracted, and entering global markets toward the end of the decade. The deal is a complex arrangement between the government of one of the world's poorest countries (Guinea), a Washington-based international organisation (IFC), a Chinese state-owned enterprise (Chinalco), and an Anglo-Australian-Chinese publicly listed mining giant (Rio Tinto). It was, however, shelved by its leading partner, Rio Tinto in mid-2016, with the Government of Guinea reported to be threatening to sue as a result. The dynamics of the global iron ore market, and their competing and co-dependent interests continue to determine not just the future of Simandou's iron ore, but in this case also the livelihoods of some eight million primarily impoverished Guineans.

Simandou's near prospects, may, in the medium-term, however, come to form part of the China-Guinea and China-Africa industrial development story. For China, finding an innovative way to unlock Simandou's iron ore is in line with the 'win-win' concept that is embedded at the heart of the country's aid policy. China is committed to helping Guinea to build a 'post-Ebola' era characterized by greater prosperity. China has also, in 2016, nominated Guinea, and neighbouring Sierra Leone, as among its 'priority' partners in Africa. In general in Africa, China has also expressed plans to invest in steel-intensive infrastructure, and is also investing in steel milling capacity. The later may include in an area of Liberia that is very proximate to Guinea's Simandou region. In parallel China has promised African countries, collectively via the African Union, and bilaterally, that it will increasingly invest in ways that industrialise the continent while supporting China's own ongoing economic transition. The Simandou project, were it to be developed, offers China improved access to high-grade iron ore that would directly diversify the material foundations for China's own growth – inbound and outbound - and offers an array of subsidiary contracts for Chinese companies. The prospect that some of Simandou's resources may be used in future steel production in Africa itself would compound the

consequential foundation shifts for Africa's integration into the global economy, alongside those of the global iron ore market and China's and African ore exporting country's ability to influence it.

As the shelving of the project suggests, the potential for this type of envisioned 'post-Ebola' era is complicated by the arrival of a commodities crash. On the one hand and on the surface this makes extracting mineral commodities unviable commercially. On the other hand, this also produces more cost-effective industrialization inputs for industrial growth in Africa and improves the terms of trade in frontier African industrializing economies such as Ethiopia and Rwanda - the potential of 'Boom to Cusp' in Africa (Johnston, 2015). For selective Chinese investors cheap steel may be an opportunity to establish the foundations of a 'cheap steal' for related national outbound infrastructure investment ambitions, especially in support of Africa's own development ambitions. In a market where lower commodity prices have also undermined an earlier model of using commodities as collateral for infrastructure loans, such possibilities are increasingly conditional on innovative financing models, which China is pushing forward with.

Prominent among China's innovative development financing initiatives is the Beijing-based Asian Infrastructure Investment Bank. The Shanghai-based emerging market members-only New Development Bank, and Silk Road Fund are additional examples. There are furthermore multiple regional-targeted "Industrial Cooperation Funds", and the existing Chinese policy banks, China Development Bank and China EXIM Bank. In July 2016 China EXIM also joined hands with Cairo-based Africa EXIM in a billion-dollar agreement to develop industrial zones in Africa. This type of increasing industrial-focused investment from China and other countries in Africa, is backed up by stable governance and good policy-making in Africa, and could in turn ultimately re-distribute demand for iron ore and steel. A history of close political ties between China and Guinea as elaborated herein may in turn underwrite innovative support for feeder inputs for that change – including in the form of Simandou's high-grade iron ore.

Better understanding those prospects and the related inter-dependencies is best supported by more qualitative and quantitative studies of China's and other major investments in Africa. Quantitative studies however, would need to identify ways to circumvent the data limitations elaborated herein. A parallel set of research that illuminates lessons from mining and resources-led development case studies that can be usefully

applied to the Guinea and Simandou context would also be useful. Finally, lessons from China's own development success, and the challenges faced over time by its steel sector could also serve to support the sustainable economic development potential of Africa and of China-Africa cooperation.

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Title: China-Africa Steel Pipe Dreams: A China-Guinea and China-Africa lens on prospects for Simandou’s iron ore

Highlights:

- Guinea is home to world-class resources, with unique ties with China
- China promised to help build a ‘post-Ebola’ future for the 3 affected countries
- China’s African investments are more affordable with declining iron ore prices
- Growth in African national income is likely to increase demand for steel
- Prospects for Simandou are dependent on ‘South-South’ economic and political ties

Figure 1
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Title: China-Africa Steel Pipe Dreams: A China-Guinea and China-Africa lens on prospects for Simandou's iron ore

Dear EXIS editors and reviewers

This submission was requested as part of a special issue "Making Growth Inclusive", which arose from the 2015 Africa-Australia Research Forum, held by Murdoch University in Perth Western Australia, as part of the Africa Down Under Conference.

This submission explores the rising Chinese investment in Africa, and in particular Guinea. Home to the world's largest known and highest-grade iron ore deposit, as well as a history of friendly political ties with Beijing, Guinea offers an important study of both China-Africa political economy, and also the emerging and related industrial ties being promoted by Beijing in Africa.

Described are directions in China's investments in Guinea in a China-Guinea and China-Africa economic context to realize a more prosperous 'post-Ebola' era. The paper discusses the shift in selected commodity markets being proportionately more driven by intra-developing country economic dynamics in the future; a trend that may itself shift prospects for Simandou.

Sincerely,

The author.

Detailed Response to the Reviewers

The author is grateful for the support of the Reviewers. On the file received by the author, several highlights were drawn, including the following:

1) Grammatical checks

- The author has best attempted to address these points in the respective places in the document.

2) Clarification as to the status of the Ebola virus in Guinea

- The author found the latest available World Health Organisation update, and added this information to the paper.

3) To clarify the argument and points within the paper in light of the recent decision by Rio Tinto to shelve the project

- The author has addressed this throughout the paper. In fact the shelving of the project to some extent better feeds into the main thesis of the paper.

4) The author also took advantage of the chance to tighten the paper's language and to minimally additional information to the paper.

Title: China-Africa Steel Pipe Dreams: A China-Guinea and China-Africa lens on prospects for Simandou's iron ore

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China-Africa Steel Pipe Dreams:
A China-Guinea and China-Africa view of prospects for Simandou's iron ore

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1. Introduction

In 1956 the People's Republic of China (PRC) founding Premier, Zhou Enlai, visited ten countries in Africa. His itinerary included then French-led Guinea, in Africa's far west. Two years later, when France offered its West African colonies a semi-autonomous post-colonial partnership, under President Sekou Toure Guinea alone sought independence. A year later, in 1959, Guinea became the first country in Sub-Saharan Africa (SSA) to establish ties with the PRC. Friendly ties with Beijing have continued since. For example, Guinea unlike many African countries for example has never recognized Taipei (see Brautigam, 2009). Guinea was also a supporter of the 1971 transfer of Taipei's seat in the UN Security Council to Beijing. A 2009 article in *The New York Times* offers a view of the consequences for Guinea's capital Conakry, describing it as being "littered with such tokens of a friendship that first flowered when Guinea was an isolated and struggling socialist state in the late 1950s" (*The New York Times*, 2009, p6). Despite close political ties with the PRC, Guinea has struggled economically relative to Francophone West African countries retaining closer ties to France, including Senegal and Cote d'Ivoire. Some half a century since independence for example, in 2014 Guinea's per capita income was just USD550, compared to a per capita income of USD1,071 in Senegal and USD1,646 in Cote d'Ivoire (World Bank, 2015). Guinea ranked 179th among the 186 countries in the 2014 United Nations Human Development Index, against 163 for Senegal and 171 for Cote d'Ivoire (UNDP, 2015; retrieved 07/08/15). More than half of Guinea's 12-million strong-population live below the poverty line (World Food Program (WFP), 2015).

Officially a Least Developed Country (LDC), Guinea's economic struggle lies in contrast to its abundant natural resources endowment; a paradox known as the resource curse (see Frankel, 2012). For example, Guinea is home to some 40 billion tons of high-grade bauxite (one-third of known global deposits), and is among the largest producers of bauxite in the world (Di Boscio et al, 2014). The country's natural resources include iron ore (estimated 20 billion tons), gold (700,000 tons), diamonds (30 million carats), and base metals including nickel, cobalt, copper, manganese, etc. (USGS, 2014), as well as untapped offshore oil deposits that are currently licensed to international oil companies for exploration. The crown jewel among Guinea's natural resources lies in the country's far-East in the Simandou mountain range (Figure 1). This area is home to some of the world's most diverse forest biodiversity and also to the "El Dorado" of iron ore (*The Economist*,

2014). An estimated 2.4 billion tons of ore graded at over 65.5% lie in the area (KPMG, 2014). Extraction of Simandou's iron ore reserves would transform global iron ore markets and make Guinea the world's third-largest iron ore exporter, joining Australia and Brazil.

Insert Figure 1 about here

Alongside global commodity market dynamics, political volatility since independence and governance issues within Guinea and its neighbors, including Cote d'Ivoire, Liberia, and Sierra Leone are part of the story as to why Simandou's ore has yet to be extracted. Civil war in Liberia and Sierra Leone through the 1990s for example resulted in the Forest Region in Guinea (home to Simandou) becoming home to some 700,000 refugees (WFP, 2015). Another factor was that the steady flow of bauxite exports provided an alternative source of government income (Knierzinger, 2014).

On governance, Reuters recorded a mining industry executive as suggesting that "it's suicidal to invest in Simandou... ..God knows how many times the government might change the mining code etc...It's a very high-risk investment in a country where laws and rules are not stable" (Samb, 2014, p123, accessed August 10, 2015). Guinea is synonymous with 'mysterious' resources-related deals, and lengthy ensuing legal challenges (Balint-Kurti, 2010; Di Boscio et al, 2014). Simandou has been touted as "Simandon't" (*The Economist*, 2014). The World Bank's 'Doing Business Index' ranks Guinea 169th for ease of doing business (World Bank, 2015b, accessed August 31, 2015). As a prospective sign of the turning medium to long-term tide, Guinea's 2010 democratic election is generally considered as the first credible election since independence. After a series of delays, parliamentary elections were held in September 2013 and the first session of the National Parliament took place in January 2013. President Alpha Conde's relatively smooth re-election for a second and final term in October 2015 adds weight to signs of a sustained shift away from the post-independence precedents deriving from the country's two long-standing autocratic leaders: Ahmed Sekou Toure (1958-1984) and Lansana Conteh (1984-2008). A decade-long consolidation of peace in neighboring Sierra Leone and Liberia, and relative stability in Cote D'Ivoire, also reduce relative sub-regional political and security risks attached to the extraction of Simandou's iron ore.

Insert Figure 2 about here

Source: World Bank, *World Development Indicators* (2015)

Despite regional conflict and business environment uncertainty, Guinea's growth rate has, however, been mostly positive and also stable for a quarter of a century (Figure 2). Negative growth of -0.3 percent in 2009 was related to the death of decades-long leader Lansana Conte. The dip in growth in 2014 relates similarly to political transition, but also to the Ebola virus outbreak. For comparison, the recent economic growth of Liberia and Sierra Leone has been highly volatile. In Liberia's case, between 2002 and 2003 growth oscillated from plus to minus 32%, and in 1997 GDP grew by more than 100% against the previous year (World Bank, 2015).

Since 1973 iron ore-rich neighbors Guinea, Liberia, and Sierra Leone are members of a three-country political and economic union called Mano River Union (MRU). In addition the three are founding members of what later, in 1975, became the Economic Community of West African States (ECOWAS), and also the continent-wide African Union (AU). More recently, the three countries were synonymous with the mid-2014 outbreak of the Ebola virus. On a per capita basis the latter mostly affected Liberia and Sierra Leone. Following the death of some 4,800 people in Liberia, 4,000 in Sierra Leone and 2,500 in Guinea (BBC, 2015), by April 2016 the virus' spread was characterized by occasional sporadic individual new cases. Life in the sub-region had more or less returned to normal. An official end to the transmission of the Ebola virus in Guinea however, was not declared by the World Health Organisation (WHO) until June 1, 2016, some two years after the outbreak had begun (WHO, 2016).

The first major country leader to visit MRU countries following the virus outbreak was Wang Yi, Foreign Minister of China. During his visits to Liberia, Sierra Leone and then Guinea he promised each country support from China for a "post-Ebola era" (Tiezzi, 2015). Minister Wang spoke specifically of China matching its comparative advantages to help the three countries overcome two major developmental bottlenecks: poor infrastructure and talent shortage. On the latter, China offers an extensive array of scholarships to African nationals, including short-term and long-term degree-based studies, and programs in both Chinese and in English (see King, 2013; Johnston, forthcoming 2016). On the former, Minister Wang spoke of helping the continent to transform its extensive natural resources into an economic strength. He promised China would collaborate in production capacity toward African nations gradually developing an

independent industrial capacity, a promise China has since followed up on for African countries collectively at a Sino-Africa presidential summit in late 2015 and thereafter. In July 2016 for example, China's Export-Import Bank (China EXIM) and Africa's Export Import Bank (Africa EXIM) signed a cooperation agreement for one billion dollars in the form of a loan from China to Africa EXIM toward the construction of industrial parks and special economic zones in Africa (Nan, 2016, accessed July 27, 2016).

China's commitment to MRU economies reflects both the objectives of its aid program, and also that, unusually for a developing country, it is the world's second largest economy, has a high savings rate, level of savings, and slowing growth at home (see Garnaut, 2012; Garnaut, Song, Cai and Johnston, 2015 and 2016). Unlike Western aid, China's aid program is moreover explicitly framed as a component within a broader economic partnership built around a trinity of aid, trade and investment (Johnston and Rudyak, 2016). This tradition, adopted from Japan (Nissanke and Shimomura 2013), also now fits with China's new model of growth (Johnston and Rudyak, 2016). Under this model, China is emerging as an important source of international foreign direct investment and a net capital exporter (FDI). The resulting gradual convergence of inbound and outbound investment levels reflects the acceleration of growth in China's outbound investment that began around 2000. Since around that time, under the 'Going Out' strategy, an array of incentives and financing has been made available to local Chinese firms investing abroad (Wang, Qi and Zhang, 2015). Rich in per capita natural resources and green-field investment opportunities, and offering the potential demographic dividend of its young population, Africa is a priority that strategy (Johnston, 2015).

Into this new international, sub-regional and bilateral economic context is a May 2014 deal to extract Simandou's iron ore reserves. The four-way agreement, between mining giants Rio Tinto (46.6%), the Aluminium Corporation of China Ltd (Chinalco) (46.5%), the Guinea Government (7.5%), and the International Finance Corporation (IFC, a division of the World Bank, (4.6%), targets the southern section of Simandou's deposits (Rio Tinto, 2015). Full production of this section of Simandou's iron ore deposits would produce up to 95 million tonnes of ore annually for four decades (Di Boscio et al, 2014). A long-standing challenge in reaching a deal has been whether to ship the ore via Liberia's more proximate established rail and port facilities (Figure 1). Guinea's government has however, preferred purpose-build domestic infrastructure that would unlock broader growth opportunities for its economy and people. Under this deal, extraction is conditional upon success of what is the largest green-field integrated mine, rail and port investment under

development globally (ibid). The total investment is comprised of a 650km of heavy-haul railway, 35 bridges, 24km of tunnels, alongside a new port for iron ore loading; the sum required to build which is some three times current Guinean national GDP (Samb, 2014). Realisation of this large-scale new infrastructure as part of the project is projected to more than double Guinean GDP, and to create many thousands of jobs (Di Boscio et al, 2014). Given this importance, and the delicate balance of interests and costs, participation of the Guinean Government could eventually reach 35%, comprised of a 15% carried interest and a 20% contributing stake (ibid).

Insert Figure 3 about here

Source: Guinea Poverty Reduction Strategy Paper (PRSP, 2014)

The corridor associated with the project's upfront \$15 billion infrastructure requirement forms a core pillar of Guinea's Poverty Reduction Strategy Paper (PRSP). The PRSP is a key policy tool for promoting economic growth in Guinea (ibid), and has explicit reference to the importance of Simandou: "...the Simandou chain contains one of the most important iron ore deposits in the world. But the project is more than a mine. It is the most important mining, railroad and port project in the world. Infrastructure linking the port to the mine encourages the development of agriculture, aquaculture and services." (PRSP, 2014, p51). Figure 3 illustrates the areas that would benefit by sector.

Unfortunately for Guinea fiscal and development planners, the timing of the improving economic and political conditions in the MRU sub-region and the latest Simandou deal has, however, coincided with the end of the third major commodities boom since the Second World War (Radetzki, 2006; Garnaut, 2015). Led by demand from China over the first decade of the century (Garnaut, 2006; Radetzki, 2006; Penney, Melanie, Stark and Sheales, 2012), the boom caused a rapid rise in minerals prices from 2003 to 2011, with a brief interlude for the Global Financial Crisis (Garnaut, 2006, 2015). The consequences of lower commodities prices include that the International Monetary Fund (IMF) slashed its annual growth forecasts for Guinea, Liberia, and Sierra Leone, from 6% to 0.9%, from 11% to 3.8%, and from 5.4% to -2.5%, respectively (IMF 2015a; IMF 2015b). Compounding the challenge of lower growth and stagnant fiscal revenues is that these arise just as the need for additional social expenditure around the Ebola outbreak increased (IMF, 2015b). This served to widen fiscal deficits and increase borrowing in MRU

countries (UNCTAD, 2015c).

The decline of global demand growth, unfavorable commodity prices, and the potential for currency appreciation has in general increased the risk of debt distress that can result from large-scale projects (AfDB, 2015). In the case of China's lending models in Africa, one such model, known as "Angola terms", uses commodities as collateral. Since the price of many commodities have fallen from earlier highs, the terms of many already issued loans now appear less favorable than when they were agreed (see UNCTAD, 2015b; Macauihub, 2015). This not only raises debt sustainability issues, but has also shifted the balance of power in China's favor in bilateral China-Africa negotiations. For example, in April 2014 when Sierra Leone's Tonkolili iron ore mine and the associated infrastructure company African Port and Railway Services was struggling amid falling iron ore prices and the onset of the Ebola virus, Chinese partner Shandong Iron and Steel Group acquired the remaining 75% share (not all of which was locally-owned). Shandong plans to lift production at the mine to 25 million tonnes per year (Cornish, 2015; Macrobusiness, 2015), and production resumed in May 2015, with Sierra Leone's President Dr. Ernest Bai Koroma assuring its 100% Chinese owners political support for the enterprise.

For current iron ore suppliers, mainly Australian and Brazil, Simandou is also important. If an iron ore project of its scale were to come on stream, this would influence the present iron ore mineral market supply concentration (Penney, Melanie, Stark and Shales, 2012). In the case of Australia's iron ore, Tcha and Wright (1999) identified China's demand to be driven by the previous iron ore trade volume, GDP growth rate, steel production in China, and the relative price of Australia's iron ore. It was earlier predicted that expanded iron ore export capacity of West and Central African iron ore had a medium-term capacity to lower world prices to around USD45/t (Hurst, 2013). Illustrative, however, of the difficulties in predicting market dynamics prices have since troughed, in December 2015, below USD40/t (*The Australian*, 2016, accessed 16.04.16) without progress on extracting Simandou's vast reserves. The layered interests underlying the market were highlighted during a year of booming commodities prices by the President of the Simandou project partner and major iron ore buyer Chinalco, Xiong Weiping, "...China needs Guinea's iron ore to increase global supply and reduce the power of Australian and Brazilian iron-ore miners to dictate prices. China needs the imports to feed its expanding steel industry, now the world's largest" (*The Asian Times*, 2010, accessed 18.03.15). In 2011, the Chairman of China's largest steel company, Baosteel, Xu Lejiang, suggested that

the Simandou project could provide a stable market for the supply of iron ore globally (Lin, 2011). China also is positioned to utilize the dominance of its global steel market powers to impact its domestic resource security (Wilson, 2012).

Into that dynamic and contentious political and industry environment in July 2016 the mining giant announced a U-turn – that it would shelve the Simandou project in light of iron ore market saturation and low prices (Leroux, 2016, accessed July 27, 2016). And this was despite having submitted the necessary feasibility study just two months before, in May 2016. Since unleashing Guinea’s resource wealth through the development of Simandou could dramatically change the fiscal fortunes of Guinea and the Simandou growth corridor in general (Di Boscio et al, 2014), *Africa Intelligence* (2016) reports that the Government of Guinea is considering suing Rio Tinto. Other analysts argue that Rio’s decision will impel China and Guinea to find alternative ways to develop Guinea’s iron ore resources (*Australian Financial Review*, 2016).

Resonant with the analytical approach of Di Boscio et al (2014), this paper explores the lesser-studied political economy and China-Africa economic drivers of and interest in Simandou’s development. The paper outlines recent China-Guinea and China-Africa economic history toward drawing together political and economic trend information that may conspire to produce conditions that are more favourable to innovative financing of the Simandou project. To that end, this overview facilitates understanding of Guinea’s potential economic trajectory, this element of the broader China-Africa story, and of possible near and medium directions in the global iron ore market.

2. China-Guinea Economic Ties

1.1 Trade

China became Africa’s largest trade partner in 2009 following centuries of colonial-centric ties (Figure 4). This change was induced by growth in demand across African countries for China’s low-cost manufactures, and by China’s acquisition of commodities from a comparatively limited list of countries, including Angola, Sudan, Mauritania, and Zambia. China-Guinea trade more specifically follows a similar pattern to China-Africa trade ties. China is a leading source of imports for Guinea, especially in terms of low-cost manufactured goods. China imports commodities from Guinea. However, China ranked only 10th among Guinea’s export partners in 2014, with Korea, India, and Spain being more important markets in that and the preceding year. Less than 15 per cent of Guinea’s total

foreign trade was with China in 2014, though this was up from 3 per cent in 2001 (IMF, 2015c). The recent growth rate of China-Guinea trade is also slower than the rate of growth of Guinea's overall rate of growth of trade (IMF, 2015c).

Insert Figure 4 about here

Source: IMF (2015c), *Direction of Trade Statistics*, author's own calculations

1.2 Aid

Comparative international understanding of China's foreign aid is difficult because China compiles aid data using a different methodology to that used by OECD member states (Brautigam, 2011; Brandt, 2013). It also does not publish bilateral aid statistics. According to official statistics that are available mostly as single data points in the 2014 *China White Paper on Foreign Aid* (China State Council, 2014, accessed 16.04.16), China delivered foreign aid of Rmb89.3 billion (USD13.4 billion) over years 2010-2012, in the form of grants, interest-free loans (8.1% of total foreign aid), and concessional loans (55.7% of total foreign aid). Some half of China's official foreign aid is directed to Africa (Ministry of Commerce (MOFCOM), 2011 & 2013), which in 2014 was equivalent to around USD6.7 billion. In light of these official data limitations, this analysis mainly relies upon the work of AidData to study China's aid to Guinea. AidData independently compiles official Chinese government information as well as data from international agencies and recipient governments under five categories: official finance; unofficial finance; military aid; suspended aid projects, and; projects identified that cannot be otherwise fully verified. Table 1 presents China's official development assistance (ODA) to Guinea that is considered equivalent to aid by the OECD definition. Omitting China's military aid to Guinea, the focus on infrastructure and energy projects, and also human capital projects (health, education, and other bilateral cooperation-related projects), shows the diversity of interests China has in Guinea, and of shared China-Guinea interests.

Table 1: Chinese “Official Finance” Assistance to Guinea

Year	Project	Aid Type	USD'000
2000	Small hospitals	Vague (OF)	
2001	Construction of Radio and Television Guinea Headquarters	Vague (OF)	6,152.1
2004	Rehabilitation of two power plants	Vague (OF)	2,000
	Vehicle donation	ODA-like	
2005	Debt cancellation	ODA-like	45,000
2006	Computer donation to state administration school	ODA-like	58.3
	E-government project	Vague (OF)	9,000
	Financing construction of the presidential palace	Vague (OF)	
	Hydropower Dam	Vague (OF)	2,500
	Medical equipment and office supplies for hospital	ODA-like	38.8
	Rice, chemical fertilizer, seedlings donation	ODA-like	2,136.4
	Souapiti Dam project on the Konkouri River	Vague (OF)	850,000
	Xuanwu medical mission	ODA-like	
2007	Aid package	Vague (OF)	5,200
	Debt relief	ODA-like	4,000
	Medicine donation	ODA-like	
	Stadium construction in Conakry	Vague (OF)	50,000
2008	150-bed hospital	ODA-like	10,000
	50 luxury cars to Guinean government	OOF-like	
	Construction of three schools	Vague (OF)	
	People's palace renovation	Vague (OF)	
	Rice for gold, bauxite delivery, and mining rights	Vague (OF)	
2009	Friendship hospital	Vague (OF)	
2010	Tiantan medical mission	ODA-like	
2011	Bus and street cleaning truck donation	ODA-like	
	Chinese interest-free loan to Guinea	ODA-like	3,095.3
	Cooperation projects	ODA-like	
	Friendship Schools at Coyah	ODA-like	
	Grant of Rmb150mn	ODA-like	23,214.5
	Grant of Rmb80mn	ODA-like	12,381.1
	Guinean gym	Vague (OF)	
	Non-refundable assistance signed	ODA-like	11,327.9
2012	Construction of a new railway in Guinea	Vague (OF)	
	New International Airport at Maferinya	Vague (OF)	

Where OF is official finance, and ODA is Overseas Development Assistance.

Source: Aid Data (2005)

Table 1 illustrates the identified list of recent aid projects between China and Guinea. By project number these are concentrated in the education and health sectors. Indirectly Table 1 also draws attention to the complex relationship between China's foreign aid and its emerging outbound investment portfolio, in and for example railway infrastructure and airport construction. This relates to the fact that China's aid model evolved from the earlier Soviet and Japanese aid models that sought to promote development and self-reliance around a trinity of aid, trade and investment that openly sought economic gains for both partners (Nissanke and Shimomura 2013; Johnston and Rudyak, 2016). Often China's infrastructure-related aid in turn is comprised of part commercial and part concessional loan to the state and requires the use of Chinese construction companies. Kitano and Harada (2015) unpack the related details.

2.3 Investment

Thanks to China's trinity economic approach to its economic relations with developing countries, separating Chinese aid projects from investment projects is challenging (see Brautigam, 2011). This also relates to the different statistical definitions used by China, and to China's varied development financing institutions. One summary of the contemporary evolution of China's aid and commercial investment captures the challenge: "Other Official Flows (large but less concessional loans and export credit provided by China Export Import Bank); resource for infrastructure packages; equity investment by China-Africa Development (CAD) fund; infrastructure investment by the China Development Bank (CDB) and other commercial banks (which are OOF-like loans and investments with the intention for development, but non-concessional, and suitable for long-term infrastructure investment)." (Lin and Wang, 2014, p8). Since 2003 official Chinese statistics on total bilateral outbound investment, flows and stocks, are published by China's Ministry of Commerce. These, however, tend to understate China's outbound investment (Shen, 2015). Reasons include that non-commodity investments often fall outside official Chinese statistics (Rosen & Hanemann, 2009), and Mainland Chinese FDI passing via Hong Kong and other offshore centers is excluded. In Guinea's case this would exclude the famously 'opaque' investment dealings of the Hong Kong-registered 'Queensway Group', which is otherwise an active investment in the country (Burgis, 2014).¹ Table 2 outlines China's officially reported investment flows and stock into Guinea, and flows into neighboring MRU members Sierra Leone and

¹ A Hong Kong-based business network known to be behind many multi-billion dollar deals with "some of Africa's most oppressive and corrupt regimes" (*The Financial Times*, 2015).

Liberia over recent decades. By 2013 China's official accumulated stock level reached USD338.6mn, up dramatically from just USD25.8mn a decade earlier. However, this was equivalent to just 1.3% of total Chinese FDI stock in Africa; down from 2.9% a decade earlier. In terms of flow of Chinese investment into the three iron-ore rich West African countries that comprise the MRU, Guinea has relatively consistently received the lion's share of China's investment in recent years (Table 2). This is also relates to the enduring civil wars in Liberia and Sierra Leone through the 1990s.

Table 2: China's FDI Flow to Guinea and the sub-region, 2004-2013, USD million

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Guinea	14.4	16.3	0.8	13.2	8.3	27.0	9.7	24.6	64.4	100.1
Liberia	0.6	8.7	-7.0	0.0	2.6	1.1	29.9	21.1	12.0	30.3
Sierra Leone	5.9	0.5	3.7	2.9	11.4	0.9	0.0	10.8	7.7	40.0
Mano River Union	20.9	25.5	-2.6	16.1	22.3	29.0	39.6	56.4	84.1	170.5
Guinea share	69.0	64.1	-29.2	82.2	37.3	93.0	24.6	43.5	76.6	58.7
Africa	317.4	391.7	519.9	1,574.3	5,490.6	1,438.9	2,112.0	3,173.1	2,516.7	3,370.6
Guinea share	4.5	4.2	0.1	0.8	0.2	1.9	0.5	0.8	2.6	3.0

Ministry of Commerce (MOFCOM) (2014), 2013 and 2012 Statistical Bulletin of China's Outward Foreign Direct Investment. China Statistical Press.

Despite the reduction in share of total Chinese FDI stock in Africa, Guinea's share of China's investment exceeds its share African GDP, reflecting that the lion's share of recent Chinese investment in Africa has been invested in resource-rich countries (see Johnston, 2015: 390-391). Kolstad and Wiig (2011) found that in the case of 26 African countries investigated, Chinese investment was also biased toward poor governance. More recent research by Chen, Dollar, and Tang (2015) found that China's attraction to resource-rich African countries is no different to those of Western investors; but that China's *share* of investments in countries with poor governance is higher. Guinea ranks 145th of 175 countries in the 2014 Transparency International (TI) corruption perceptions index (TI, 2015), making it a governance 'peer' of Kenya, but placing it ahead of some dozen other African countries.

Globally China's outbound FDI is positively related to international trade, market size, economic growth, openness level, and endowments of natural resources (Zhang and

Daly, 2010). In the case of China-Guinea investment empirical studies are few. In the presence of limited data, Cheung, de Haan, Qian and Yu (2012) use Tobit model regression analysis that accounts for censoring of investment approvals over years 2003-2007. They find that Chinese investment in Guinea responds to a market seeking motive, risk, resources, intensity of trade ties, and the presence of Chinese contracted projects. Their findings resonate with Chen, Dollar and Tang (2015) who find that Chinese FDI is comparatively concentrated in skill-intensive sectors in skill-abundant countries in capital-intensive sectors.

Insert Figure 5 about here

Estimated China share of total Guinea FDI, USD million

Sources: NBS (2011, 2012 and 2013) and MIF (2015b).

Two independent time series estimates are presented in Figure 1: total annual FDI in Guinea and within this China's investment in Guinea. As far as the series are statistically consistent and thus this way comparable, total FDI into Guinea as a percentage of total inbound investment has only recently reached a substantial level. According to the two data series, in 2012 China's investment in Guinea reached 75% of the total. It had not previously exceeded 15% of total in any earlier year for which data is available. No official data is available on the composition of China's outbound foreign investment. Kokouma and Xu (2013) however, outline selected information on the distribution by sector of the activities of Chinese companies in Guinea (reproduced in Table 3). The cross-sector listing of Kokouma and Xu (2013) is congruent with Chen, Dollar and Tang's (2015) finding a majority share of Chinese investment projects fall outside the resources sector. From AidData's 'mixed-model' of aid-investment data for Chinese projects in Guinea (Table 4) it is inferred that the sectors receiving the greatest shares of China's investments in Guinea are mining and construction. The categories include the USD1.35 billion for the Simandou project, and also a USD4 billion agreement to construct related to infrastructure and to develop related iron ore in Kalia².

² Kalia is a town close to the border with Sierra Leone and that falls within the Simandou growth corridor.

Table 3: Distribution by sector, major Chinese companies with a presence in Guinea

Sector	Company
Agriculture, hunting, forestry and fishing	The Soguicoda (ISIC 11), Foret forte (ISIC12)
Mining	China Sonangol
Manufacturing	Guinee Complexe Textile Yahe Shandong (ISIC 32); Produits Artisanaux Huali de Guinee (ISIC 32)
Electricity, gas and water	China International Water & Electric Corp
Construction and public works	China Henan Company (ISIC 50); CGC (ISIC 50) Huanxi Sichuan (ISIC 50); The Jinya Jiangsu of China (ISIC 50)
Transport, warehouse and communications	Huawei Technologies (ISIC 72)
Banks, Insurance, real estate services provided to business	Chinese International Fund (CIF); Eximbank – China
Services to the community, social and personal services	La Pharmagui-Orient en Guinee (ISIC 92)
Wholesale and retail trade and restaurants and Hotel	Company for International Trade; Economic and technical XIAN (ISIC61); Chinese center for investment; Operation and commercial (CCIEC) (ISIC61); Grand Hotel in Conakry (ISIC63); Company International Economic and Technical Cooperation of Hunan Province (CHITEC)

Source: Kokouma and Xu (2013).

Table 4: Unofficial Chinese Aid to Guinea

Year	Title	Objective	USD million
2003	Agricultural experts and hybrid rice	Mixed	
	Nanchang University branch	Development	
2005	Renewable three-year bauxite exploration	Commercial	63
2007	Exploration of aluminum in Boke district,	Commercial	3,000
	Telimele bauxite prospecting	Commercial	
2008	Bauxite and alumina complex	Commercial	
2009	Government audit	Commercial	3.3
2010	Kalia infrastructure and iron ore	Commercial	4,000
	Simandou iron ore project	Commercial	1,350
	StarTimes invests in digital television	Commercial	
2011	240.5 MW Keleta dam	Commercial	526
	Aluminium refinery and smelter at Fria	Commercial	
	Boffa-Telimele region bauxite development	Commercial	5,800
	Motorcycle donation to youth	Development	
2012	Chinese company donates construction	Development	0.6
	Construction of first five-star hotel	Commercial	65

Source: AidData (2015). ‘Mixed’ projects are directed by a combination of commercial and developmental goals

3. China-Guinea: Steel and the broader China-Africa economic context

The drivers of China's investment interest in Guinea and Simandou are global and dynamic. These include improvements in the macroeconomic performance of SSA since 1996 (Arbache and Page, 2007), the 1994 end of apartheid in South Africa allowing SSA's then largest economy to reintegrate with the region (Carmody, 2009), and China itself (Wang, 2007). Half of SSA by country numbers (25 countries specifically) now have an annual per capita income in the middle-income range, defined by the World Bank in international dollars as above \$1,045 and below \$12,735 per capita (Fengler and Devarajan, 2012). Africa's improved economic climate together with burgeoning China-Africa ties may also bring an increase in the demand for minerals in Africa. The consumption of metals, for example via the consumption of steel, typically increases with income from middle through to high income per capita phases, as countries go through a period of industrialization and infrastructure building (Hurst, 2013). Moreover, as growth slows and the population ages in China, investing in basic manufacturing industries and infrastructure in low-wage and demographically young Africa offers a new source of growth (see Johnston, 2015)..

Concurrent to falling demand for steel in China and the ensuing need to reform the domestic steel industry (see Liu and Song, 2016), shifting economic circumstances in Africa may directly also serve to relatively and incrementally diversify the locus of demand for steel away from East Asia and toward Africa. Poor infrastructure in Africa remains an important 'bottle-neck' to domestic and intra-regional economic development (Lin and Wang, 2014: 13), reducing growth in output by as much as 40% (AfDB, 2015). One estimate from the Africa Infrastructure Country Diagnostic suggests a need for infrastructure investment in the order of USD93bn annually on the continent. An estimate of the funding gap for that infrastructure is some USD31bn (IMF, 2015c). Speeches by Chinese leaders visiting Africa suggest that China is politically committed to using its savings and infrastructure comparative advantages to helping to meet that need. For example, at the 2015 heads of state meeting of the 54-member African Union (AU), China signed the 'African Union-China deal', billed as "the most substantive project the AU has ever signed with a partner" (International Center for Trade and Sustainable Development (ICTSD), 2015, p123). This promises to connect the continent by road, rail, and air

transportation. At present China's largest single outbound investment contract at the time of signing in 2014 was a \$12 billion railway construction project in Nigeria. According to the American Enterprise Institute's (AEI) outbound Chinese investment research, China's infrastructure investments in Guinea include a 2014 USD850 million investment in the shipping sector led by state-owned shipping giant Sinomach. The majority-Chinese funded Kaleta hydropower scheme was also constructed by a Chinese state-owned enterprise, International Water & Electric Corp. The project increases Guinea's hydroelectric generating capacity from 2012 levels to 128 MW to 368 MW and offers Guinea's capital Conakry a stable electricity supply for the first time in many decades (Poindexter, 2015). Currently just 3% of Guinea's rural population and three-quarters of the country's urban population enjoy access to electricity (World Bank, 2015). Were Guinea to ever be home to its own steel making industry, substantial investment, local or foreign would be needed for Guinea to generate sufficient electricity capacity.

Confronted by the prospect of rising infrastructure-related demand for steel in Africa itself, falling demand for steel at home and incentives and increasing financing options for outbound investment, outside of Guinea, however, Chinese investors are among international investors entering steel-related downstream industries in Africa. A non-exhaustive list includes that in August 2014 Shandong Iron and Steel Group (Shangang) signed an agreement to construct a USD140 million steel pipe plant in Morocco (Hysteelpipe, 2014). The plant is to be situated in the Tangier Exportation Freezone and have an estimated capacity of 250,000 tonnes of pipe annually. In 2011 Mauritania granted an iron-mining license to a joint-venture enterprise including China Minmetals Corp and a state-owned partner. In late 2014, Hebei Iron & Steel, China's largest steelmaker, announced plans to relocate five million tonnes of production (roughly 11% of its annual output) to South Africa. In 2014 also, China's Sichuan Hongda Group was awarded a 25-year mining license to exploit what is believed to be 219mn tonnes of iron ore deposits in the Liganga area of Ludewa district, Niombe region, Tanzania (Ihucha, 2016). In March 2015 state-owned giant steel-maker Sinosteel signed a memorandum of understanding with the government of Kenya to build a 'Steel City' outside Nairobi towards meeting Kenya's rising domestic and regional steel demand (Muhoro, 2015). Similarly of the April 2015 acquisition by Shangang of Sierra Leone's Tonkolili iron ore mine and the associated infrastructure company African Port and Railway Services.

Presently, however, Africa as a continent has little domestic steel-making industrial capacity (Figure 7). The largest steel producing country in Africa is South Africa. Yet, in April 2016 South Africa's steel industry is reported to be on the brink of collapse in struggling to compete with Chinese steel imports, against which it had resorted to imposing new duties (Mail and Guardian, 2016, accessed 21.04.16). The country's ferrochrome industry has similarly struggled in the presence of competition from China (Reuters, 2014, accessed 28.07.16) The largest share of Africa's steel is produced by steel giant ArcelorMittal in South Africa (albeit national steel production capacity remains the same in 2015 as it was in 1998). However, this output is insignificant in relation to the scale of the glut in global supply – 6 million tons annually against 300-400 million tons of excess supply on global markets (van Rensburg, 2015). Besides South Africa, Libya and Morocco are listed among Africa's steel producers with capacity above half a million metric tonnes. Countries with production listed above zero, were Tunisia, Nigeria, Congo (DRC), Uganda, Ghana, Kenya and Mauritania.

Insert Figure 7 about here

Steel Production: World, China, and Africa

Source: World Steel Association (2015)

Importantly to the story also is that China is not the leading overall international investor in Africa, and not alone in expressing interest in investing in steel capacity on the continent. For example in Ethiopia major investors include Turkey, India, China, Saudi Arabia, and Sudan. A local company owned by a Saudi billionaire and Italy's Danieli & Cofferati Meccaniche SpA in 2014 signed a deal to develop a USD600 million steel plant, which will be Ethiopia's largest (Davison, 2014). How such plans evolve around the broader dynamic of a Chinese-dominated global steel industry that is currently drowning in excess capacity (see Liu and Song, 2016) is unfolding.

4. Conclusion

In 1959 Guinea became the first country in SSA to recognize Beijing over Taipei. Almost six decades later, Beijing's foreign minister was the first major official visitor to Guinea following the disastrous outbreak of Ebola. During that visit Minister Wang Yi spoke of the tradition of mutual support between China and Guinea, a synopsis of which was outlined herein. A year before that visit by Minister Wang to Guinea, in May 2014, a four-way mining deal was struck that would see Guinea's Simandou region's vast and high-grade iron ore reserves begin to be extracted, and entering global markets toward the end of the decade. The deal is a complex arrangement between the government of one of the world's poorest countries (Guinea), a Washington-based international organisation (IFC), a Chinese state-owned enterprise (Chinalco), and an Anglo-Australian-Chinese publicly listed mining giant (Rio Tinto). It was, however, shelved by its leading partner, Rio Tinto in mid-2016, with the Government of Guinea reported to be threatening to sue as a result. The dynamics of the global iron ore market, and their competing and co-dependent interests continue to determine not just the future of Simandou's iron ore, but in this case also the livelihoods of some eight million primarily impoverished Guineans.

Simandou's near prospects, however, may in the medium-term however, come to form part of the China-Guinea and China-Africa industrial development story. For China, finding an innovative way to unlock Simandou's iron ore is in line with the 'win-win' concept that is embedded at the heart of the country's aid policy. China has explicitly promised Guinea it will help to build a 'post-Ebola' era characterized by greater prosperity. China has also, in 2016, nominated Guinea, and neighbouring Sierra Leone, as among its 'priority' partners in Africa. In general in Africa, China has also expressed plans to invest in steel-intensive infrastructure, and is also investing in steel milling capacity. The later may include in an area of Liberia that is very proximate to Guinea's Simandou region. In parallel China has promised African countries, collectively via the African Union, and bilaterally, that it will increasingly invest in ways that industrialise the continent while supporting China's own ongoing economic transition. The Simandou project, were it to be developed, offers China improved access to high-grade iron ore that would directly diversify the material foundations for China's own growth – inbound and outbound - and offers an array of subsidiary contracts for Chinese companies. The prospect that some of Simandou's resources may be used in future steel production in Africa itself would

compound the consequential foundation shifts of the global iron ore market and China's and African ore exporting country's ability to influence it,

As the shelving of the project suggests, the potential for this type of envisioned 'post-Ebola' era is undermined by the arrival of a China-led commodities crash. On the one hand and on the surface this makes extracting mineral commodities unviable commercially. On the other hand, this also produces more cost-effective industrialization inputs for industrial growth in Africa and improves the terms of trade in frontier African industrializing economies such as Ethiopia and Rwanda - producing the potential of 'Boom to Cusp' in Africa (Johnston, 2015). For selective Chinese investors cheap steel may be an opportunity to establish the foundations of a cheap steel for related national outbound infrastructure investment ambitions, especially in support of China's promise to Africa of win-win development. In a market where lower commodity prices have also undermined an earlier model of using commodities as collateral for infrastructure loans, such possibilities are increasingly conditional on innovative financing models, which China is pushing forward with.

Prominent among China's innovative development financing initiatives is the Beijing-based Asian Infrastructure Investment Bank. The Shanghai-based emerging market members-only New Development Bank, and Silk Road Fund are additional examples. There are furthermore multiple regional-targeted "Industrial Cooperation Funds", and the existing Chinese policy banks, China Development Bank and China EXIM Bank. In July 2016 China EXIM also joined hands with Cairo-based Africa EXIM in a billion-dollar agreement to develop industrial zones in Africa. This type of increasing industrial-focused investment from China and other countries in Africa, is backed up by stable governance and good policy-making in Africa, and could in turn ultimately re-distribute demand for iron ore and steel. A history of close political ties between China and Guinea as elaborated herein may in turn underwrite innovative support for feeder inputs for that change – including in the form of Simandou's high-grade iron ore.

Better understanding those prospects and the related inter-dependencies is best supported by more qualitative and quantitative studies of China's investments in Africa. Quantitative studies however, would need to identify ways to circumvent the data limitations elaborated herein. A parallel set of research that illuminates lessons from mining and resources-led development case studies that can be usefully applied to the

Guinea and Simandou context would also be useful. Finally, lessons from China's own development success, and the challenges faced over time by its steel sector could also serve to support the sustainable economic development potential of Africa and of China-Africa cooperation.

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