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A Quantitative Analysis of the Belt and Road Initiative

Syed Murtaza Rizvi



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 Syed Murtaza Rizvi^{1*}
¹Nixor College



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Abstract

Purpose: The article aims to examine the effects of the Belt and Road Project (BRI) of China and its recent developments.

Methodology: It does this by analyzing the effects Chinese investments have had on their largest beneficiaries. The article considers several factors such as transport, energy, and debt profiles of the countries after receiving aid under BRI.

Findings: Through our analysis, we have found that the project is by far the most secure investment developing countries might have especially considering the diminishing aid of the USA and European countries. It is largely beneficial for both China and the beneficiaries encouraging economic growth. We have made our conclusions based on data reported through various research articles both domestic and international. These include but are not limited

to papers from the SAIS-CARI website, the American Enterprise Institute (AEI), the World Bank, and the Boston University Energy Database.

Recommendations: We recommend that in the future studies should be further conducted on the progress of BRI projects that have been started or planned in the future as well as the effects previous long-term investments are currently having on beneficiaries. Some research should also be conducted comparing the effectiveness of loans from the US and European countries when compared with Chinese counterparts.

Keywords: *Transport, Debt profile, Connectivity, Green Energy, Sustainability, Recent Developments*

1.0 INTRODUCTION

The Belt and Road Initiative (BRI) also known as the One Belt One Road Project (OBOR) is perhaps the largest transcontinental project in the 21st century. First announced in 2013 by President Jin Ping during his visit to Kazakhstan it has developed into a multi-trillion dollar mega infrastructure project, having profound effects in Africa, Asia, Europe and quite recently South America. Naturally it has been the subject of debate among critics since its inception some calling it a 'debt trap' while others pointing out the negative effects it is likely to have on the environment in developing countries. The article aims to quantify and discuss briefly the effects the BRI has had particularly during recent years. It hopes to achieve this aim by carrying out a number of case studies of the most significant beneficiaries of China during recent years.

To effectively gauge the impact the BRI has had three main sectors are of great significance namely metals, energy and transport, since they account for the largest share of China's investment overseas (see fig.1). However, since recent trends show a diminishing interest of China in the metals sector we will focus more on energy and transport. Other factors which have been considered are debt distress levels in BRI countries as well as environmental effects which the investments have had on them. Finally we must also discuss the effects the BRI has had on connectivity both within the countries and externally, and suggestions regarding the future impacts China is likely to have through these investments.

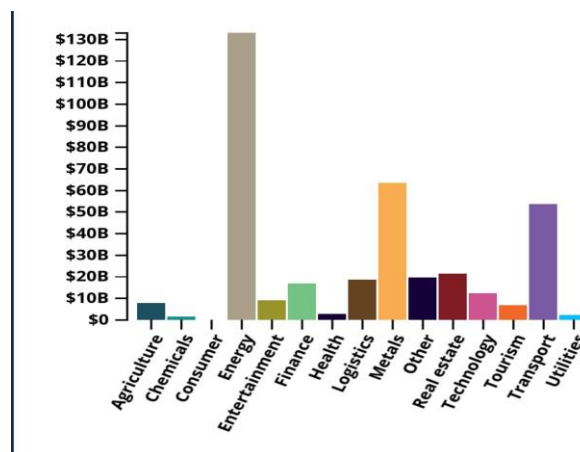


Figure 1: Source: aei.org

2.0 METHODOLOGY

Through our research on this topic, we hoped to highlight the importance of the BRI to developing countries and the significant impact it has had on them over the recent years. We also aimed to identify trends in Chinese investments that could be predictive of future infrastructure and energy-related projects. We have also tried to compare loans and aid from Europe and the US to Chinese ones to help predict the scale of their impact. Simultaneously, we have also looked at the loan profiles of Chinese beneficiaries to better understand the impact past investments have had and how recent ones are likely to impact them. Additionally, we have also looked at the progress of previous projects to better understand how plans currently under consideration or process are likely to be executed and impact the economies of host countries.

For our study, we have primarily relied on data from the World Bank, AEI.org (China Global Investment Tracker), the SAIS-CARI website, and the reports on BRI investments by the Green

Finance and Development Centre. The data collected regarding projects and their progress has been verified and added detail to using domestic and international articles. For the specific methodology behind every data set, we recommend consulting the articles that have been referenced.

To correctly gauge the current involvement of Chinese Investments we have mostly resorted to data from the past 5 years. This has helped us to correctly predict future Chinese endeavors and analyze the current situation in Chinese Beneficiaries.

Section 1: Transport

Kunming-Singapore Railway

A large portion of Chinese investments in East Asia, particularly in 2020-2021, were for the Kunming-Singapore Railway which is a network of high-speed railway network through Thailand, Malaysia Singapore and Laos. It could improve Laos' connectivity transforming it from a land locked country to a land linked one. In fact, transit trade through Laos could reach 3.9 million tons by 2030 compared to 1.6 billion in 2016. (1)A great advantage of the railway network is its speed, enabling a large quantity of perishable items to be transferred from China to Laos which previously was only possible in smaller quantities and through more expensive means. To understand exactly how significant the difference is in the speed of transport one can look at the fact that the train has shortened the train trip between Vientiane and Boten to three hours from two days, while reducing the journey from Mohan to Kunming to 5-6 hours. (2) In all the agricultural sector has benefitted greatly from the project In 2021, Laos's exports to China as its largest trading partner were led by bananas, worth \$225 million, followed by rubber, cassava, sugar cane, and water melons. With a new bilateral agreement, Laos is planning to export 50,000 tons of orange-like fruits, worth \$50 million, to China in 2022.(3)

Although, China has been criticized for not employing local labor into its workforce while working overseas this project shows a sharp contrast. The project has created over 110,000 jobs in Laos. About 6000 engineers and workers have also been employed for putting up the power transmission system. Training for Lao train drivers and engineers has already started in China allowing Lao professionals to manage the project in the long term.(4)

The railway has promoted trade between South East Asia and China as well, By the end of 2021 over 150,000 tons of cargo had been transported from China to Kunming bound for South East Asia. Overall, the transport network has reached to 9 provinces and 15 major cities within China connecting them directly to Laos and indirectly to countries such as Thailand and Singapore.(5)

Mombasa-Nairobi Railway

The Mombasa-Nairobi railway is a 700-km long standard gauge railway which goes from the port of Mombasa and through Nairobi. It is part of a larger network that will link Kenya with East African countries. In November 2022 three loan contracts were signed between China and Kenya regarding its construction. The project has had vast impacts in the region, one of which is the increase in cargo capacity which increased from 4.8 to 22 million tons.(6) Moreover, it was able to reduce freight travel time and price from 0.2\$ per ton/km to 0.08 \$per ton/km. (7)The railway has also led to a transfer of skills and the creation of jobs. According to liaison officers, in Voi salaries of thousands of newly recruited workers have induced the creation of new businesses and bank branches. The railway has had a number of indirect effects on Kenya as the demand of daily goods have increased due to patronage of workers to local businesses. These

may be expected to stimulate the economy and later develop into economic clusters.

Other Rail Related Projects in Africa

The Addis Ababa light railway in Ethiopia was the first of its kind in Sub-Saharan Africa when it was built in 2015 under the BRI. With a capacity of 60000 people per hour, it increased average transport speed from 10km/h by road to 22km/h. More than 1100 jobs were created and it reduced the burden of foreign oil imports on Ethiopia. Perhaps its greatest effect was the reduction of CO2 emissions which it reduced by 55000 tons per year. (8)

The project recently however has suffered major setbacks mainly due to lack of spare parts which has left a large number of trains inoperable. China once again aided Ethiopia in 2023 by agreeing to provide 1.22-billion-birr worth of spare parts and repairs (9) which may allow the railway network to once again function at full capacity. This is a great example of Chinese aid not only to build new infrastructure but rather to maintain existing ones encouraging development.

China has also recently invested about 1.32 billion dollars in Tanzania for the construction of a railway from the Lake Victoria port of Mwaza to the port of Dar-es-Salam. The project will greatly benefit the Tanzanian economy. (10)

Central Asian Transport Links

Central Asian republics have faced a number of problems since the independence. One of these has been the lack of transport links, due to rugged terrain, internal conflicts due to deteriorating economic conditions and lack of access to the sea. One of China's most recent projects has been the construction a railway line in Tajikistan and Kyrgyzstan. The total length of the line will be 523 kilometers -- 213 kilometers in China, 260 kilometers in Kyrgyzstan and 50 kilometers in Uzbekistan. (11) The railway is likely to benefit both countries by providing direct access to the sea while at the same time providing a secondary route to Europe for China ending its dependency on Russia.

For Kyrgyzstan it will be the long-needed improvement in its overburdened and outdated transport system which under the climbing pressure of increasing freight transport (roughly 10% per year). The project is likely to increase infrastructure availability and communication in the country which may allow it to extract its mineral deposits which are still untapped due to lack of infrastructure in those areas. These factors combined with transit fees are likely to improve the economy and increase social stability in the region. Perhaps its greatest advantage is the reduction in travel distance between China and Europe as well as the Middle East (almost 900 km (12)). This will bring about a net improvement in trade flow between the regions and lead to greater opportunities. In the region China has also focused on building new roads and highways as well as repairing existing ones. These have had large scale impacts. An example of this is the increase of 29.8% in freight transport (13) in Kyrgyzstan which has been primarily caused by an improvement in road transportation.

Aviation

China has worked on a number of projects regarding aviation. One such project is the renovation of the Nasiriyah International Airport in Southwest Iraq. This was a part of the oil for construction deal in 2019. Designed with a capacity for 750000(14) it is likely to become an aviation hub in southwest Iraq. Several other projects have also been initiated in Africa such as in Ekiti, Nigeria and others in Tanzania and Ethiopia. These however have not created much of

an impact and hence are as important to discuss.

In all it can quite easily be concluded from the evidence presented that Chinese investments in transport have been of great significance. They have brought about drastic changes to transport systems particularly in developing economies. There is also a trend towards utilization of local labor and skills and transfer of Chinese skills and technology. Both of these may encourage sustainable development in the beneficiaries.

A noteworthy feature of Chinese investments has been the fact that they have played a key role in the reduction of economic inequality by increasing the spatial distribution of economic activity. One reason for this is the faster completion of Chinese infrastructure projects resulting in faster economic distribution. Secondly, China is willing to invest in regions where transport networks are poor encouraging formation of economic zones away from major hubs where economic activity may be focused due to lack of capital or as a result of colonization.

Thirdly, the Chinese often invest in the social and productive sector near their transport investment where of local businesses as it allows them to be better linked with each other as well as consumers. For greater insight regarding this topic and for relevant data the reader is encouraged to refer to <https://www.aiddata.org/publications/connective-finance-chinese-infrastructure-projects>.

Section 2: Energy

Ghana

Ghana is one of the major beneficiaries of China in Africa in terms of energy. One of the most significant Chinese project there has been the construction of the Bui Dam and although this is an older project that those we have discussed or will continue to do so (inaugurated in December 2013 and handed over to Ghanaian authorities in November 2016), it is important to discuss it due to its significance. Built on the Black Volta river it is the second largest hydroelectric power plant in the country with a capacity of 400MW.(15) An important feature of the project is that it has variety of uses. Other than helping Ghana overcome its energy crisis it plays an important role in the agriculture sector through irrigation. There is also great potential for the development of fisheries near it.

An important feature of the project lies in how it was financed. Loan repayment for the buyers' credit loan (BCL) involved an agreement to 30000 metric tons of cacao beans at market price until the dam was constructed. This in the following year led to an increase in Ghana's exports to China in the form of cacao beans stimulating the economy as well as increasing agricultural output. Moreover, the price of electricity was negotiated to fall between 0.035\$ and 0.055\$ kW/hr which was far lower than the average electricity tariff in Africa at 0.13\$ kW/hr.(aiddata)

In December 2022 China invested 100 million dollars for the continuation of the construction of Ghana's Tema LNG import terminal which upon its completion will be able to receive, re-gasify, store and deliver roughly 1.7 million tons of LNG a year. This would be made up roughly 30% of Ghana's general capacity. (reuters.com)

Other African Countries

The East African Crude Oil Pipeline (EACOP) is another example of a major energy related project being carried out by China in Africa. It will be one of the largest underground pipelines in the world. It will be thermally insulated and electrically heated to allow the smooth flow of

oil. It will have a length of 1443 km from and will pass through Tanzania starting from Uganda. It is likely to benefit Uganda significantly allowing them to 'reach their potential'. It will strengthen political ties between the countries and create jobs (over 100000 according to senior government officials) (16). The project with over 4 billion in investment is the largest foreign investment in Uganda and Tanzania (17). The Hwange power plant in Zimbabwe is another project being built under Chinese aid. It will supply 300MW of electricity upon its construction which will be especially beneficial due to a reduction in their hydropower capacity. Although these projects have several benefits, they have been criticized over environmental concerns these will be dealt with later under the topic of sustainability.

The Middle East

During recent years there has been a great increase in Chinese investments in the Middle East. This is particularly true for Iraq where oil related activities account for 42% of the GDP and has great potential in the future especially in countries such as India. The oil industry has had a major impact from Chinese investments *CNPC now holds substantial stakes in the al- Ahdab, Rumaila, Halfaya, and West Qurna oilfields. In fact, [more than half of Iraq's oil production](#) comes from fields where CNPC and other Chinese companies are operators or non-operating partners. In late 2022, the Iraqi Oil Exploration Company signed a contract*

with CNOOC to [move ahead with a project](#), agreed in 2019, to explore an offshore oil block in Basra. PetroChina — the listed arm of CNPC — is [seeking to take over as the sole lead operator](#) of Iraq's supergiant West Qurna 1 oilfield. Smaller, publicly traded Chinese oil and gas companies, such as [Geo-Jade Petroleum and United Energy Group \(UEG\)](#), are also in the mix. Geo-Jade [recently signed contracts](#) to develop the Huwaiza and Naft Khana oilfields located along the country's border with Iran, while [UEG sealed a deal](#) to develop the Sindbadfield near Basra. (Middle East Institute).

Another country where China has played the role of a benefactor in the oil industry has been Kuwait. China has remained an important partner for crude oil importing more than 25 million tons of crude oil from Kuwait, in 2020 an increase of 18% from the previous year. (From <https://www.al-monitor.com/originals/2021/04/kuwait-and-china-see-diversifying-economy-belt-and-road-initiative>) .An important project in Kuwait is the Al-Zour oil refinery which is likely to increase Kuwait oil refining capacity by 615000 bpd (<https://kipic.com.kw/al-zour-refinery/>) making it one of largest in the middle east. Upon its completion it will ensure a supply of clean fuel to power stations and provide up to 1000 jobs for Kuwaiti national. An important feature of this refinery is that its environmental impacts are minimal. This has been made possible by a number of factors such as recycling and using waste water, smoke free flares and systems for maintaining air quality and controlling emissions.

Mega Green Projects

China has positioned itself at the front of the race for decarbonization and has promised to go completely carbon-free by 2060. To achieve this goal within the country and overseas China has invested in a number of large scale green energy projects mainly solar and wind. In fact, in 2022 Chinese investments in green energy accounted for 546 billion dollars in 2022(18) nearly half of the global total of 1.1 trillion dollars.(19)

One example of these investments is the Ibri solar field in Oman." The Ibri Solar PV Project covers an area of 1,154 hectares, which is equivalent to about 1,600 standard football fields. It is

currently the solar power plant with the largest installed capacity in Oman. Construction was completed in January 2022, with the plant having an installed capacity of 607 MW and an annual power generation of 1,598 GWh, which can meet the annual electricity consumption of 50,000 local households and is expected to reduce carbon emissions by 340,000 metric tons per year."(20)

In Argentina China has invested in the Kirchner- Cepernic hydropower plant. Upon its completion the project's annual power generation will reach 4.95 billion MW increasing the country's power generation capacity by 6.5%. It will cover the daily electricity consumption of 1.5 million Argentine households, cut almost US\$1.1 billion in oil and gas import expenses each year, and allow for the export of electricity to Brazil and Paraguay. (21) Many other projects have been proposed in Africa as well such as the floating solar farm in Zimbabwe, lake Kariba. This is likely to have a capacity of 1000 MW allowing the country to counter its acute power shortage. (22) In Asia the Karot hydroelectric plant in Pakistan is being built under Chinese supervision. With a capacity of 720 MW it is likely to add 3.2 billion kilowatt hours of clean energy reducing carbon dioxide emissions by 3.5 million tons per year. (23)

Section: 3

Sustainability

Having discussed the investments China has done to reduce carbon emissions and damages to the environment it is important to talk about sustainability of Chinese projects as a whole. This contains two parts sustainability with respect to the environment and sustainability with respect to management and availability of capital for infrastructure projects as well as the effects on they have debt profile of a country.

Environmental Sustainability

As has been already mentioned China has worked greatly to reduce its impact on the environment by reducing carbon emissions and implementation of a number of policies. Now we turn to the changes in Chinese infrastructure and policies have occurred to make their projects more sustainable. An important step which Chinese authorities have taken has been the reduction of coal related energy projects which are responsible for the greatest amount of CO₂ emissions compared with other energy sources. Before their announcement to go green a large portion of power projects were coal based. Over 33% of energy capacity of Chinese power plants as coal based as can be seen from fig.2.

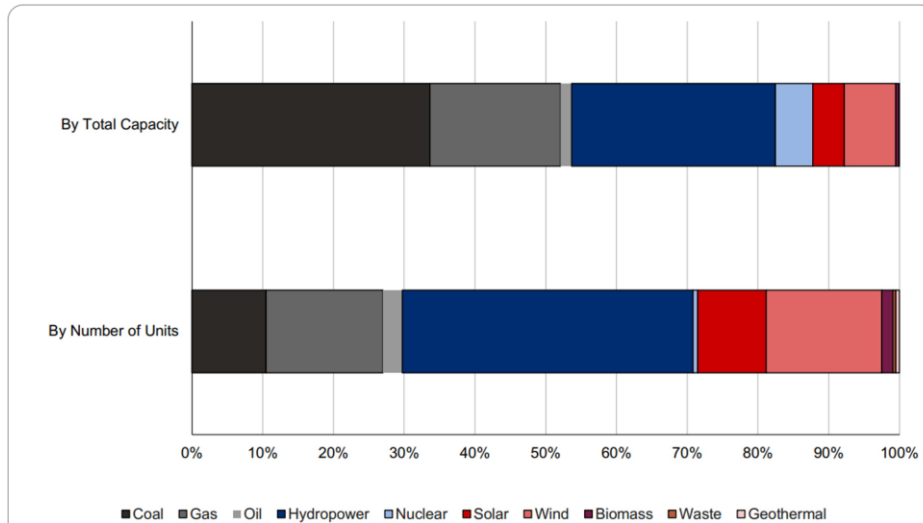


Figure 2: Environmental Sustainability

Source: China’s Global Power Database: 2022 Update, Boston University Global Development Policy Center.

After 2020 there has been a significant reduction in these types of projects. The reduction is so profound that in 2021 there were no coal related energy projects in which the Chinese were engaged. And in the following year as well coal related infrastructure is at a minimum. See fig.3

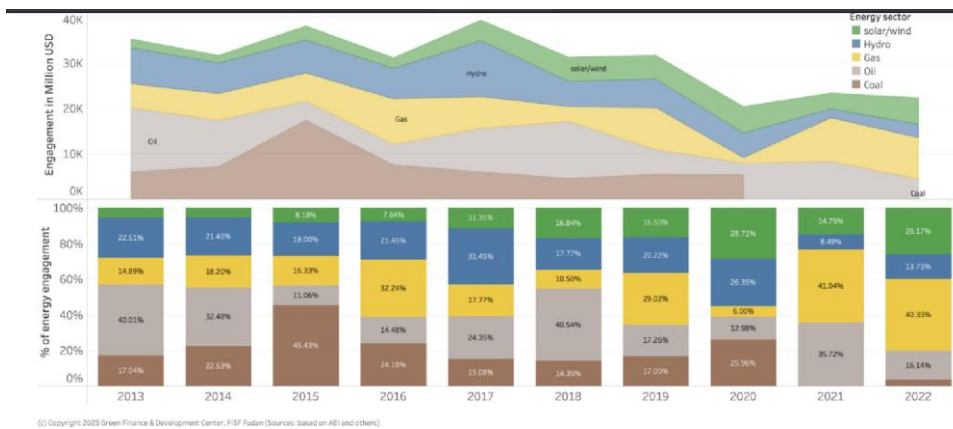


Figure 3: China Belt and Road Initiative (BRI) Investment Report2022”, Green Finance & Development Center, FISF Fudan University, Shanghai)

Source : (Nedopil, Christoph (January 2023)

A major factor which has led to this reduction is the adoption of green financing by Chinese banks." Currently, Chinese banks’ BRI-related green finance practices are mainly threefold, i.e., lending green credits, issuing green financial bonds, and underwriting onshore green bonds.

1. Lending Green Credits

The PBOC defines ‘green credit’ as loans provided for energy conservation and environmental protection, production of clean energy, environmental protection, eco-friendly infrastructure upgrades, and green services. Given the considerable size of BRI infrastructure loans, syndicated loans are often provided by several banks in order to share risk and to satisfy

regulations concerning credit exposure to a single borrower. A green loan may be granted to a host country's government or state-owned enterprises (SOEs) that carry out the project, or to joint investors, which occasionally include Chinese enterprises. China's two policy banks, the Exim Bank and the CDB, have together financed numerous green BRI projects. While they do not provide official BRI loan statistics, a database created by the Global Development Policy Center at Boston University reports that, as of March of 2022, the Exim Bank had provided USD 27.3 billion to 69 hydropower projects in BRI countries. Similar efforts in granting green BRI loans are being taken by China's largest commercial banks.

2. Issuing Green Financial Bonds

A 'green bond' is a debt financing instrument that enables the issuer to raise capital in the form of conventional bonds; the proceeds raised are then used to fund 'green' projects. A 'green financial bond' in the Chinese regulatory context refers to a green bond issued by domestic banks to institutional investors. All of the proceeds from green financial bonds must be devoted to financing green projects, ordinarily through granting green loans to eligible green infrastructure projects. Depending on the way they are offered (i.e., onshore or offshore), green financial bonds may be listed on the China Interbank Bond Market (CIBM) or on other offshore exchanges. Green bonds can assist in 'greening' the BRI, and can supply benefits to both issuers and investors. First, as green infrastructure financing requires a great deal of investment and Chinese banks can hardly finance all projects on their own, issuing bonds is an effective way for banks to mobilize private capital for green BRI projects. Second, for institutional investors a green bond represents an ESG investment option that incorporates climate transition factors into investment decisions. As an investment portfolio option, green financial bonds issued by Chinese banks represent a low risk in that the Chinese banks are stringently supervised, with high credit ratings and little risk of default. Accordingly, their financial bonds' yield is typically significantly lower than bonds issued by non-financial corporations. For instance, the coupon rate of the Exim Bank's 'Bond Connect' green RMB financial bond (issued on 24 December 2021) was set at 2.48%. Comparatively, 105 corporate bonds listed on the Shanghai Stock Exchange in the same week (20–24 December 2021) offered an average coupon rate of 5.23%. Thus, a third benefit is that banks offering green financial bonds are able to raise relatively cheap funds for green BRI projects. Green bonds

therefore serve as an important source of capital for green credit lending. This will ultimately contribute to the green development of the BRI. Globally, the first-ever green bond was issued by the European Investment Bank in 2007. While China is a latecomer to this field, with its first green financial bond issued in 2016, it has been actively mobilizing green bond issuance, as evidenced by the many BRI-related green financial bonds. Chinese policy banks have issued green bonds for BRI projects both onshore and offshore and to both domestic and foreign institutional investors. For example, in December 2017, the Exim Bank issued RMB 2 billion onshore 'Bond Connect' green financial bonds for financing clean energy projects in BRI countries. The Hong Kong branch of CDB has recently successfully issued USD 500 million in offshore green bonds on the RegS market in order to finance green projects involving renewable energy, clean transport, and pollution prevention. Commercial banks have issued green financial bonds to finance BRI projects as well, mostly through issuance of offshore bonds by their overseas branches. For example, in October 2017, the Luxembourg branch of ICBC successfully listed its first 'belt and road' climate bond on the Luxembourg Stock Exchange, and the USD 2.15 billion raised thereby was used to support green projects domestically as well as

in key BRI countries . Other reported offshore green bonds include the Singapore branch of ICBC's 'Green Belt and Road inter-bank regular cooperation (BRBR) Bond', the Hong Kong Branch of CCB's green bonds listed on NASDAQ Dubai, and the Macau and Paris branches of BOC's 'blue bonds' for financing marine projects . Banks can benefit from issuing offshore green bonds both by accessing a broader pool of non-resident investors as well as by reaping the benefits of positive public image associated with their commitment to green finance, which can strengthen the reputation of leading financial institution through engagement in combating climate change.

3. Underwriting Onshore Green Bonds

The third role taken up by Chinese banks to facilitate a greener BRI is the underwriting of onshore green bonds issued by resident and non-resident issuers. As underwriters, banks serve as the most important intermediary in green bond issuance. In the event that an offering is too large for an underwriter to take on, the 'lead underwriter' may form an underwriter syndicate with other underwriters in order to spread the risks of selling bonds, which is quite common with green infrastructure bond offerings. A lead underwriter's duties include, inter alia, assisting the issuer in disclosing information for bond investors to make informed decisions.

Both of the two policy banks as well as the 'big four' commercial banks have obtained mainland China's underwriting licenses, and have been actively engaged in the underwriting of onshore green bonds on the inter-bank market. Depending on where the bond issuer resides, their underwriting business includes two main conditions: • Underwriting a Chinese issuer's onshore green bonds. This is the most common case, in which Chinese banks underwrite domestic enterprises' green bonds. Typically, the proceeds from the sale of these bonds are invested in domestic green projects . An example is the Exim Bank's serving as lead underwriter for the State Grid Corp's RMB 5 billion green mid-term note (a carbon-neutral bond) in 2021, the proceeds of which will be used to construct hydro-power plants on the Yalong and Yangtze Rivers . • Underwriting a non-Chinese issuer's onshore renminbi-denominated green bonds ('green panda bonds'). The first mid-term green panda bond for BRI projects was issued in 2017 by China Merchants Port (based in Hong Kong) underwritten by ICBC, and raised RMB 2.5 billion for the construction and operation of ports in BRI countries.

As the mainland bond market progressively opens up, foreign institutional investors can now purchase Chinese onshore green bonds via a variety of flexible access methods . Banks are therefore in a better position to sell the green bonds they have underwritten, which in turn will assist companies seeking to finance BRI green projects, thus contributing to the BRI's sustainability."(Zhang, M.; Zhang, C.; Li, F.; Liu, Z. Green Finance as an Institutional Mechanism to Direct the Belt and Road Initiative towards Sustainability: The Case of China. Sustainability 2022, 14, 6164. [https:// doi.org/10.3390/su1410616](https://doi.org/10.3390/su1410616)).

A major policy of China in foreign countries has been to abide by their local laws regarding air quality and the environment. This was introduced in 2017 with the file name Administrative regulations: Regulations on the Administration of Foreign Contracted Projects (Revised) (Order No.676 of the State Council of the People's Republic of China). These lay the basic framework of Chinese infrastructure until the introduction of the sustainable development goals (SDGs) and green investment principles (GIP) recently. As a result, there is a general trend wherein the BRI seems to be greener in countries where laws regarding the environment are stricter. Data regarding the difference in Chinese environmental policy according to difference in local policies

is available at" How green is the “Belt and Road Initiative”? – Evidence from Chinese OFDI in the energy sector Haiyue Liu, Yile Wang, Jie Jiang, Peng Wu * Business School, Sichuan University, China". From this it is easy to deduce that even if Chinese infrastructure was not very green in some countries it was due to the fact that local laws were not in place and if these countries had developed the same infrastructure by their own resources the environmental impact would have been the same if not worse.

Moreover, it is to be noted that often these countries are economically unstable and for them priority can often be given to development rather than environment (given that many of them are in Africa which is responsible for the lowest amount of CO2 emissions when compared to other continents). Most BRI countries now have their own green development agendas and hence destruction to the environment can be controlled even if it existed previously. See fig.4



BRI member countries (excluding China) with/without green development agendas.

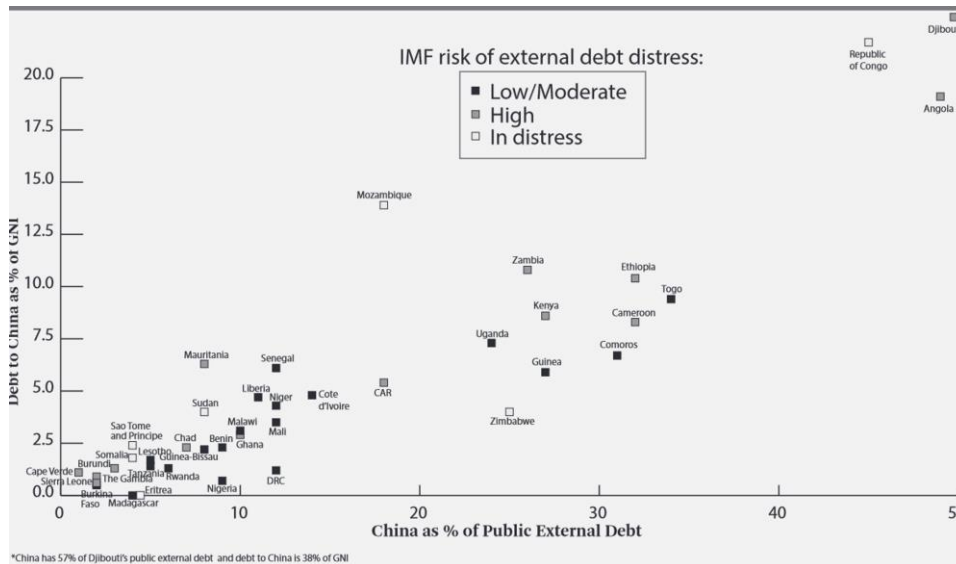
Figure 4 Source: Pioneering a Green Belt and Road Initiative (BRI) alignment between China and other members: mapping BRI's sustainability plan Ali Cheshmehzangi a,b,, Linjun Xie and May Tan-Mullinsc*

Sustainability with Regards to Debt

One of the major concerns regarding the BRI is that it is a debt trap for poorer countries. Usually, this argument revolves around African nations hence it would be wise to take them as case studies when discussing China's debt diplomacy and debt distress in beneficiaries.

According to the World Bank's debt service suspension initiative (DSSI) "for 40 low-income African countries debt to China adds up to 64 billion and accounts for 22 percent of the PPG debt stock in 2018, and an estimated 29 percent of debt service due in 2020. The outstanding debt to the World Bank is very close to this figure. Low-income African countries owe the World Bank US\$ 62 billion, but due to generous subsidies the World Bank is able to offer its clients, debt service is lower.

Fig.5 shows Chinese outstanding debt as a percentage of gross national income (GNI), and as a percentage of all external debt (with vertical axis log scale). Countries with different debt distress are also marked.



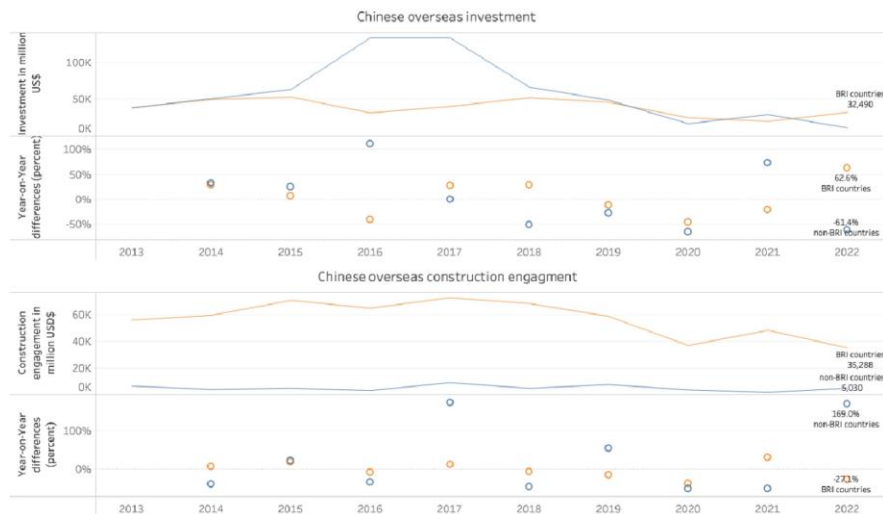
Source: Sais-Cari Briefing Paper 3/2020

From the data above it can easily be deduced that China accounts for a very low percentage of PPG debt in countries where debt distress exists or there is a high risk of it.

As a case study we will now consider Kenya. The country, like others in the region, has been a victim of poor governance. The problem has had devastating effects on the economy and has led to the borrowing of 6.3 billion dollars. 5.3 billion dollars in particular were for the construction of the Mombasa Nairobi SGR(24), hence the project has been hailed as an example of a debt trap by critics. This however can be easily resolved considering the fact that the borrower was not the Kenya Railway Cooperation rather it was the Kenya National Treasury, which issued the primary loan agreements. The two had an agreement later regarding the loans. This is important as it proves that Chinese authorities cannot take control of the railway upon default as the borrower i.e. Kenya National Treasury does not have control and rights to the railway. (25) Moreover in February 2021 China decided to postpone the debt repayments holiday for six months' worth 245 million USD, due to the Kenyan economic fallout caused by the Covid-19 pandemic wherein China could have easily relinquished economic assets of the country if it the intentions to do so. (26)

Similarly, we take Malaysia into account to provide another example of soft Chinese loan policies. In particular we shall discuss the East Coast Rail Link. The construction of the project was stopped due to lack of funds in 2018 and the project was to be aborted until the terms of the Chinese loans were renegotiated reducing the cost of the project by 1/3. It was decided to be a joint venture between Chinese and Malaysian companies with the ownership going to the Malaysian side. Once again it was evident that China was willing to renegotiate loans instead of occupying economic assets.

It can also be deduced that countries in general often enjoy great economic benefits due to the BRI. One sign of this is the fact that BRI countries on average experience greater economic growth per annum compared to non-BRI ones. Refer to fig.6



Source: Nedopil, Christoph (January 2023): “China Belt and Road Initiative (BRI) Investment Report2022

Digital Corridor and Connectivity

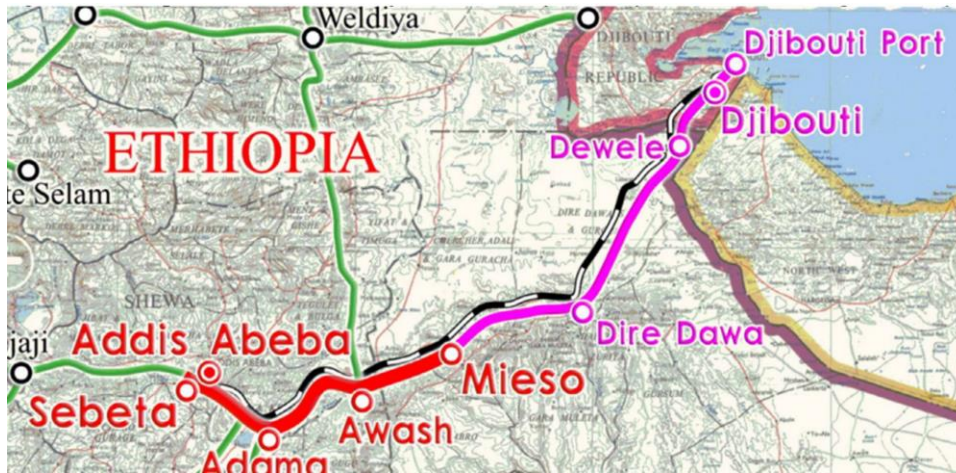
Along the BRI countries China has also pushed for a digital belt and road in an attempt to increase sustainability in BRI countries. *Smart buildings, smart electricity grids, and smart transport logistics would, if successful, help to reduce greenhouse gas emissions and water needs in BRI-participating economies.* (China’s Belt and Road Initiative in the global

trade, investment and finance landscape) (27). The PEACE submarine optical fiber project is one such example. Stretching over 6,299 km from Djibouti to Gwadar Pakistan it is likely to improve bandwidth and data processing speed in Pakistan. Moreover, it will end Pakistan's dependence on a single landing station cable in Karachi, which if damaged could risk the whole country's internet connection. It has also increased the importance of Gwadar port for Pakistan as it is the landing station for the PEACE cable. This also shows Chinese interest in Pakistan as an important hub in its Asian silk route. Through companies such as Alibaba and smaller off shoots such as Daraz in South Asia China has greatly influenced the e-commerce market in the region. The e-commerce market in south east Asia is to cross 110 billion dollars in 2023 (statista.com) . China is also working on the Beidou satellite system which will may replace GPS in the future in countries such as Pakistan. A number of smaller projects have taken place in countries such Nepal reducing dependence on Indian counterparts.

There is an important role played by the BRI in increasing connectivity between regions by the improvement of telecommunication as well as through building and improving transport infrastructure. A direct impact of these is the increase in trade volumes and significant reduction in trade cost.

A significant impact in this field has been experienced by Africa. The continent is quite diverse and with a large land area. This means that a number of countries do not have access to a port and with poor links to other countries transport costs become very high and trade volume decreases. In the telecommunication sector Chinese high-tech companies like Huawei and ZTE are involved in equipment supply and local information network building. In fact companies such as Huawei have built almost 70% of 4G infrastructure in the continent. (28) Cell phone use has also risen sharply, by the end of 2020, there were 495 million mobile subscribers in sub-

Saharan Africa amounting to 46% of the region's population, and that figure is estimated to rise to 615m subscribers by 2025, equivalent to 50% of the region's population(29). In East Africa a system of railway including the Djibouti-Addis railway, Kenya Standard Gauge Railway and Mombasa-Nairobi railway have played a key role in connecting hinterland areas to ports. Fig7 shows how this has been achieved.



Source: Adaptive Governance along Chinese-Financed BRI Railroad Megaprojects in East Africa (Maria Adele Carai)

In Central Asia China is seeking to build a new railway through Uzbekistan to Europe which could reduce travel time by 8 days providing the shortest route between China and Europe (this has already been mentioned previously in the transport section). Internet availability in Central Asia is very poor. All of the Central Asian countries are near the bottom of the global ranking on the average time taken to download a 5GB film or a three-hour full HD (1080p) educational lecture on YouTube. Among Central Asian countries, the Kyrgyz Republic scored highest and yet reached only 146th place globally, 12 minutes ahead of Kazakhstan (30). China has played a key role in improving this condition. It has a cross-border fiber-optic cables to 3 adjacent countries in Central Asia which are Kazakhstan, Kyrgyzstan, and Tajikistan. A number of other smaller projects have also taken place such as the smart city concept in Uzbekistan which is an important step to improving its ICT sector. Similarly, Kyrgyzstan has introduced an e-government allowing paperless data transfers. Through Huawei 8 out of every 10 Kyrgyz national had internet access in 2019(Jardine 2019). Also, through companies such as Ali Baba China has formed local partnerships and has offered incentives such as cash back to encourage e-commerce in the region. However, there is still much room for improvement.

With regards to trade there has also been an improvement made by the BRI. The WTO have calculated that improvements in trade facilitation could reduce BRI countries' trade costs between 12 and 23%. This reduction will likely result in an increase in world trade by at least 4%.(31)

3.0 CONCLUSION AND RECOMMENDATIONS

Conclusion

It can be concluded from the information presented that the BRI is not just a strategy of China to use resources of foreign countries and to enhance its influence, rather it is a multi layered project

which has a number of benefits for both the recipient countries and China itself.

Currently as interest of the USA and Europe slowly fades away (for the USA direct investment overseas fell by almost 12% according to Wall Street) in some of the poorest countries in the world there only hope to attract foreign investments, improve local infrastructure and telecommunication and stimulate their economies may lie with the Chinese BRI project.

It is also evident that Chinese investments are also quite sustainable and do not pose a serious economic or environmental risk if they continue to operate in the way they are doing now. Certain cases where this has become an issue can be explained easily due to poor governance, lack of regulations or simply due to greater benefits which in that particular situation may have been more important.

The BRI has had a significant impact in the reduction of trade prices and logistics which indirectly has had positive impacts on the distribution of economic activity. The energy sector has helped many countries overcome severe energy related problems while reducing CO₂ emissions at the same time.

In the end it must be clarified that we do not think that the BRI is perfect in any way. It has a number of shortcomings which we hope it will overcome in the future. We do however

believe that given its current status it has great benefits and is better for developing countries as compared to alternatives which the West has to offer.

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