

## 중국 일대일로 정책이 탄자니아 무역패턴에 미치는 영향

오스카 말레라

계명대학교 일반대학원 무역학과 박사과정

이태희

계명대학교 경제통상학부 국제통상학전공 부교수

## The Impacts of China's Belt and Road Initiative (BRI) on the Trade Patterns of Tanzania

Oscar M. Malela<sup>a</sup>, Tae-Hee Lee<sup>b</sup>

<sup>a</sup>Department of International Trade, Keimyung University, South Korea

<sup>b</sup>School of Economics and Commerce, Keimyung University, South Korea

Received 26 November 2020, Revised 04 June 2021, Accepted 28 June 2021

### Abstract

The Belt and Road Initiative (BRI) is designed to intensify bilateral trade between China and the BRI countries through the improvement of transportation connections. However, little research has empirically investigated the impacts of this policies on the trade patterns. This paper attempts to evaluate the impacts of BRI on the trade patterns of Tanzania. Our study extends the original gravity model of bilateral trade by adding GDP per capita, population and proximity as the explanatory variables. According to our research, we observed that the BRI significantly impacted the Tanzania's trade patterns, as it led to the increase of bilateral trade flow between Tanzania and China more importantly between Tanzania and its adjacent countries. It indicates that the Belt and Road Initiative (BRI) has boosted Tanzania's trade exclusively, hence the Tanzania's export sector earns greater trading potential with the adjacent countries.

**Keywords:** Belt and Road Initiative (BRI), Gravity model, Panel data, Trade patterns

**JEL Classifications:** F13, F18

<sup>a</sup> First Author, E-mail: [oscamalela@stu.kmu.ac.kr](mailto:oscamalela@stu.kmu.ac.kr)

<sup>b</sup> Corresponding Author, E-mail: [thlee@kmu.ac.kr](mailto:thlee@kmu.ac.kr)

© 2021 The Korea Trade Research Institute. All rights reserved.

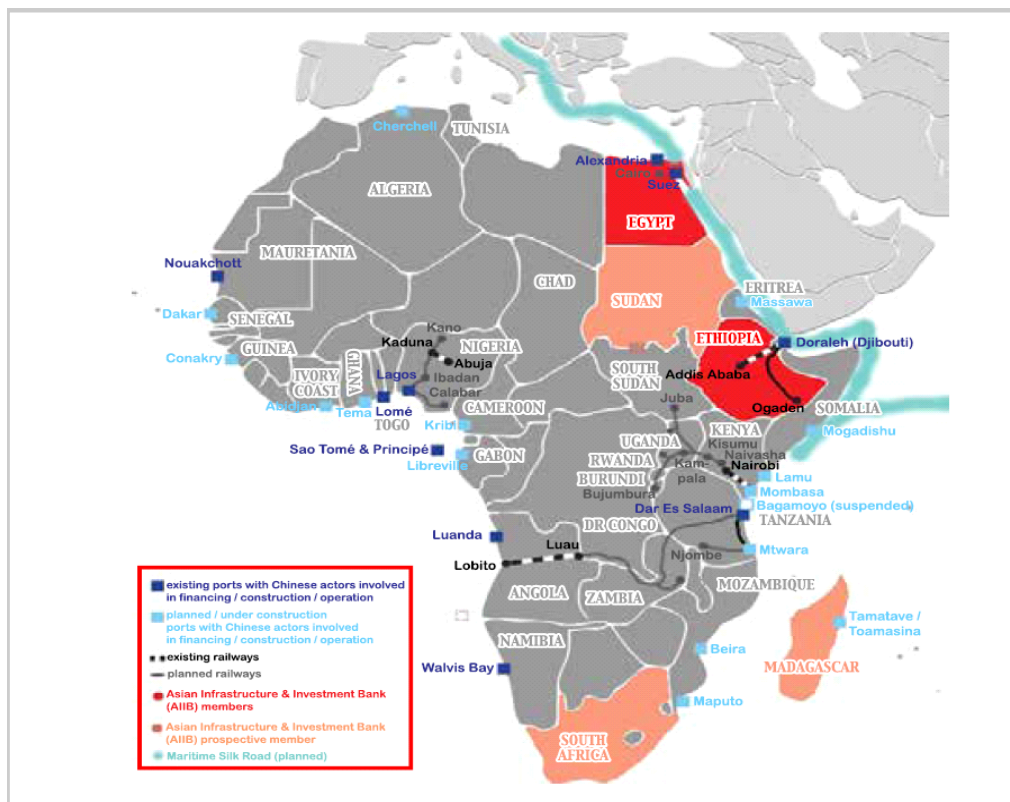
## I. Introduction

China's Belt and Road Initiative (hereafter BRI), also well-known as the New Silk Road, is the greatest ambitious economic development and commercial project ever introduced. This study employs a gravity model of trade to investigate the impacts of the China's Belt and Road Initiative (BRI) on the trade patterns of Tanzania. We compare the trade patterns of the two periods, the first period intends to capture the trade patterns before the BRI by investigating the determinants of bilateral trade flow for the years 1995-2012. The second period covers the years after the announcement of the BRI in 2013 up to 2018. The second period seeks to capture any changes of trade patterns by looking at the changes on the determinants of bilateral trade flows relative to the previous period and if these changes are associated with the BRI.

This model is estimated for a data set of 132 countries and employs random-effects model analysis across the potential trading partners of Tanzania, such as China, India, Saudi Arabia, Netherlands, South Africa, Argentina, Kenya, Rwanda, Malawi, the United States of America, Zambia, the United Kingdom, Japan, South Korea, Canada, Russia, Indonesia, Malaysia, Turkey, Iran, the United Arab Emirates, etc. We use a modified gravity model of total trade that is extended by including proximity, GDP per capita and population of exporting and importing countries as explanatory variables of bilateral trade flows.

The Belt and Road Initiative was introduced in 2013 by President Xi Jinping, it aims to rebuild the former Silk Road by creating a network of railways, roads, pipelines and public power grids that link China to the rest of the world (Yiwei, 2015).

The initiative has provided over US\$200 billion as loans for construction of infrastructure projects (Chatzky and McBride, 2019). Many borrowers of the belt's money are low-income nations in Asia and Africa. The BRI significantly expands China's economic and political influence in these nations. The original Silk Road existed as the results of the expansion toward the west of China's Han Dynasty (206BC-220AD). This created trade networks along the way of what are today the Central Asian countries of Tajikistan, Afghanistan, Kyrgyzstan, Kazakhstan, Uzbekistan, and Turkmenistan as well as Pakistan and India. Central Asia was then the epicenter of globalization, connected eastern and western markets. Valued products from China were silk, spices, jade, and other goods moved to the west and as part of commerce China acquired gold, ivory, glass products and other precious metals. The original Silk Road had significant impacts on, trade, cooperation, maintaining peace, mutual learning and many benefits that were necessary for stimulating developments and opulence in all early civilizations of its time. The main goal of the new silk is to improve trade and connections between China and Europe, Asia, Middle East and Africa. The initiative envisages on forming a vast network of highways, railways, energy pipelines, and modernized border crossings, from westward through the mountainous former Soviet republics, to India, Pakistan, up to the rest of Southeast Asia. The BRI also plans for the 21st Century Maritime Silk Road to accommodate the growing maritime trade traffic. Through BRI China finances port development along the Indian Ocean, starting from Southeast Asia all the way to East Africa and areas of Europe. A New York headquartered investment banking giant, Morgan Stanley has predicted that China's expenses over the

**Fig. 1. The TAZARA Railway in Tanzania**

Sources: Breuer, J.(2017).

life of the BRI could reach \$1.2–1.3 trillion by 2027, although estimates on total investments vary (Stanley, 2018).

The study is organized as follows. In section 1, we provide a brief review of the motivation and rationale behind China's BRI, history of Chinese involvement in Tanzania, and the current situation of the BRI in Tanzania. In section 2, we provide a research background and a brief review on the current economic situation in Tanzania. Section 3, discusses the theoretical background of trade patterns and the gravity model. While section 4 and 5 presents empirical data results and conclusion. Lastly, in section 6 we show the caveats and the potential of future researches.

## II. Literature Review

### 1. China's Belt and Road Initiative

#### 1) Motivation and Rationale behind China's BRI Initiatives

BRI is a huge project with innumerable purposes and expected implications, since the announcement of the initiative, there have been a mounting number of study papers and articles on BRI and what is written is insightful to understand the global perceptions of China's initiative (Sternberg et al, 2017). According to China, the objective

for the BRI is development through connectivity, the emphasis on connectivity is about facilitating trade and investment. The BRI objectives articulated plainly in Chapter 51 and in some sections of the 13th Five-Year Plan(see the 13th five-year plan for economic and social development of the people's republic of china 2016-2020).

- To improve physical infrastructures: “We will advance the development of multi-modal transportation that integrates expressways, railways, waterways, and airways, build international logistics thoroughfares, and strengthen infrastructure development along major routes and at major ports of entry. We will work to develop Xinjiang as the core region for the Silk Road Economic Belt and Fujian as the core region for the 21st Century Maritime Silk Road.”

- To implement free trade zones: “We will speed up efforts to implement the free trade area strategy, gradually establishing a network of high-standard free trade areas. We will actively engage in negotiations with countries and regions along the routes of the Belt and Road Initiative on the building of free trade areas.”

- Gaining access to natural resources: “We will strengthen international co-operation on energy and resources and production chains, and increase local processing and conversion.”

- Strengthen multilateral co-operation: “We will improve the bilateral and multilateral co-operation mechanisms of the Belt and Road Initiative focusing on policy communication, infrastructure connectivity, trade facilitation, capital flow, and people-to-people exchanges.”

- To increase financial co-operation: “We will strengthen co-operation with international organizations including international financial organizations and institutions, work actively

to promote the development of the Asian Infrastructure Investment Bank and the New Development Bank, put the Silk Road Fund to effective use, and attract international capital for the creation of a financial co-operation platform that is open, pluralistic, and mutually beneficial.”

- To strengthen cultural exchanges: “We will conduct extensive international co-operation in the areas of education, science, technology, culture, sports, tourism, environmental protection, health care, and traditional Chinese medicine.”

It's been argued that Beijing's vision and its plans for the BRI gives a significant advantage for China than possible partner countries. For quite a while now, some nations in Europe, the United States and other countries have addressed and made allegations against the Belt and Road Initiative. The main concerns are about accepted procedures or global standards. Some people claim that the Belt and Road Initiative doesn't conform to globally acknowledged guidelines, including transparency, environmental, social security and debt sustainability. China with its BRI is accused of disregarding the legitimate rights and welfare of workers in the BRI host country, moreover it increases the debt burden of the host country. Also, it has been alleged that the Belt and Road is primarily a project involving Chinese state-owned enterprises and that the information and operations of the project are hidden, additionally the projects favor Chinese personnel, but is hardly open to local and international communities. For example, Many Chinese companies working overseas on large infrastructure projects are being criticized for tending to bring their own Chinese labor force to work on the projects,

A good example is from Kyrgyzstan, according to Sultan Sarigaev, a Kyrgyz official at the Foreign Investment Department of the Transport and Communication Ministry, was quoted saying, "joint Kyrgyz-Chinese projects usually reserve 70 percent of the available jobs to Chinese citizens and offer the remaining 30 percent for local hiring". This would justify the narrative that China seeks out to lessen the problem of unskilled unemployment in China. Yet, the Chinese government stresses that BRI is not an instrument of geopolitics and growing power, instead it all about development and mutual development. Based on Chinese standpoint, it could mean that BRI does not plot a trap to bring smaller nations under its influence instead seeks to promote mutual social economic benefits. It also suggests that the success of BRI will further bring growth and development and win-win collaboration between China and participant countries. However, the critical perception considers BRI to be a Chinese means to challenge and grow China globally, the emphasis being that the initiative is mainly based on China's national interest. Bearing in mind the Chinese standpoint with liberal assumptions is that the inspirations behind the initiative are; China wants to link China's western provinces to the neighboring nations for its economic purposes. Secondly, the maritime infrastructures are for commercial use and not aimed for military expansion. Lastly, with the monetary support from multilateral institutions reforms will be made, thus China will earn influence in the international order.

## 2) History of Chinese Involvement in Tanzania

In the late 1950s and 1960s, when numerous countries in sub-Saharan Africa

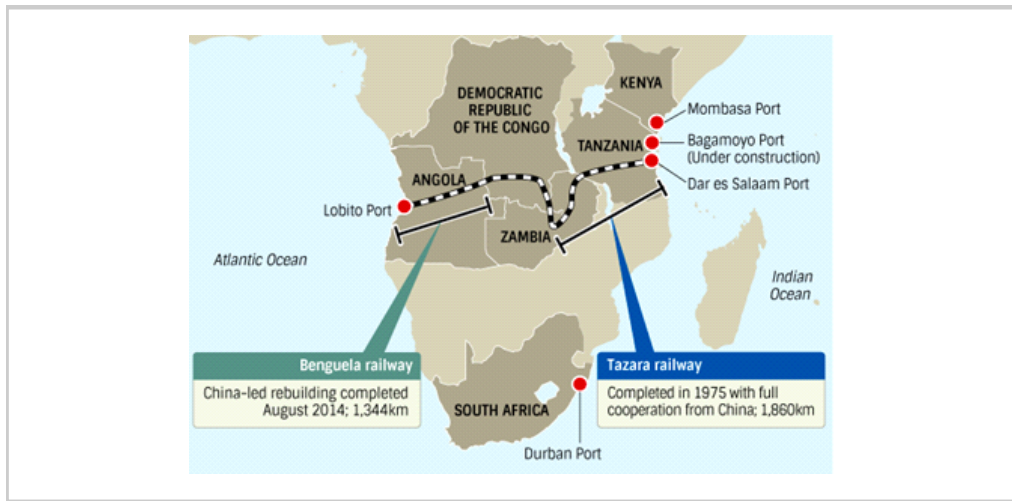
gained independence, the western world was gripped by the communist Soviet Union and the Cold War. At times like these, the newly independent African countries tried to improve relations with new partners in order to escape their former colonial masters. During this time, China and Tanzania began to develop relationships. In the name of solidarity with the larger colonialists, China sympathetically supported the cause of Tanzania's national freedom. On April 26, 1964, the United Republic of Tanganyika and Zanzibar merged into one nation - Tanzania. From that moment on, household help for infrastructure development flowed from China to the newly independent country. China has started to support various projects in Tanzania. These projects included dual power transmitters, a government farm and a fully integrated textile factory outside Dar es Salaam. After that, other projects began to be implemented and other new actors were added. Julius Nair, the first post-colonial Tanzanian president, and Kenneth Kunda, the Zambian president, wanted to build a rail link to connect the Zambian copper belt to the port of Dar es Salaam, giving them access to the Indian Ocean. After the colonial revolution, China was present in various parts of the African continent and supported new and emerging socialist governments (Cabestan & Chaponnière, 2016). While the government of socialist Tanzania sought the support of Western lending institutions, such as the United Nations, for the new railway project, China gladly provided the funding and manpower to complete the project. It was an important project in which China and Tanzania worked together to such an incredible extent. After the completion of the Tsarist railway project, the Chinese presence in Tanzania only increased: Tanzania met its borders with eight other geographical

countries: Kenya, Uganda, Rwanda, Burundi, the Democratic Republic of the Congo, Zambia, Mautsi and Mozambique. Five of these eight countries are completely landlocked. Access to the Tanzanian sea and its coastal industrial city of Dar es Salaam is of great importance not only for Tanzania's economic development, but also for some of the surrounding countries (Flores, 2017). For this reason, Tanzania in particular is an excellent investment for many financial institutions and global businesses. Tanzania's strategic location means that many alternative groups will benefit from an economically stable transport network there. The distribution of investors in these construction projects shows that other participants want to learn from these new roads: 18 of the 52 ongoing construction projects in Tanzania are being funded by the Tanzanian government, 15 through multilateral assistance, 5 are being funded through 5. Bilateral aid, Grants, 8-Planet Bank and 6-Millennium Challenge Corporation Chinese companies account for 72% of construction contracts, 9% of the construction companies are from the geographical region of the community, 11% are from Europe and therefore the remaining 8% are from African countries, South Korea and Japan. Aside from foreign direct investment flowing from China to Tanzania in terms of monetary aid, it's also important to notice that Chinese companies account for 72% of the awarded construction contracts (Hopcraft). These contracts typically rise out of agreements between Chinese contracting firms, that are typically state-owned, and therefore the Tanzania National Roads Agency (TANROADS), an Executive Agency under the Ministry of Works, Transport and Communications. In these cases where Chinese companies are awarded construction contracts, it's the Tanzanian government

hiring Chinese firms to return into the country and help build roadways and other pieces of infrastructure. One in all the numerous samples of this sort of contracting occurred in December of 2013, when the TANROADS Chief military officer signed contracts worth over US\$150 million to acquire Tanzanian roadways constructed by three Chinese firms. Considering the foreign direct investment from China to Tanzania in terms of financial assistance, it is also important to note that Chinese companies account for 72% of the awarded construction contracts. These agreements are usually caused by agreements between Chinese contracting companies, which are usually owned by the state and thus the Tanzania National Highway Agency (TANROADS), an executive agency under the Ministry of Labor, Transport and Communications. In these cases where construction contracts are awarded to Chinese companies, the Tanzanian government hires Chinese companies to help them return to the country and build roads and other pieces of infrastructure. One of the many examples of such an agreement occurred in December 2013, when the TANROADS military chief signed an agreement worth more than \$ 150 million to acquire Tanzanian roads built by three Chinese companies.

### 3) The BRI in Tanzania

Since the BRI announcement in 2013, a growing number of Chinese investors have been attracted to Tanzania for a variety of reasons, some are driven by the growing competitive environment in China and the need to redistribute overcapacity abroad, while others are attracted to the market and development capabilities or through the various incentives offered by the government,

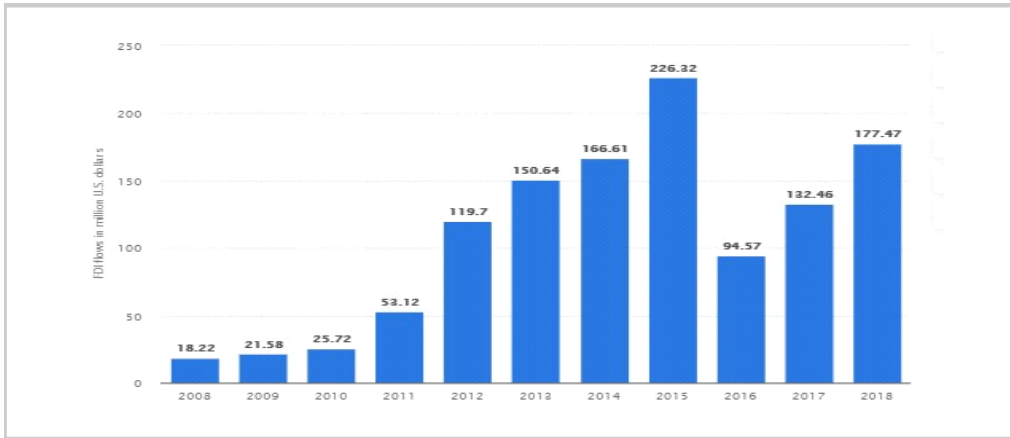
**Fig. 2. The TAZARA Railway in Tanzania**

Sources: Peter Ball(2015)

Evidence of the construction of the Zambia-Tanzania Railway has at one time benefited Tanzania's economic relations with China. The political, and economic climate in both countries has changed dramatically in recent years, with Tanzania being the largest recipient of China and China's most favorable ideology.

Tanzania has an estimated population of 59 million as of 2020. The country has achieved relatively stable and high growth over the past decade (average 6-7% per year). Tanzania and China have had relatively strong economic and political ties for many years. When China hosted the Belt and Road Forum for International Cooperation in 2017, Tanzania also was invited because of its special traditional friendship with historical friendship with China. In 2015, the Chinese government selected Tanzania as a pilot country for capacity cooperation between China and Africa. China is currently Tanzania's largest trading partner and project contractor and a

major source of foreign direct investment. A large number of Chinese public and private companies with great economic, technological and administrative capacity are participating in the industrialization of Tanzania. The results of Sino-Tanzanian cooperation can be seen in various areas of economic development and in all aspects of the lives of the Tanzanian people. It is the result of the Tanzania-Zambia Railway, built by the Chinese in the 1970s, which has historically been important for cooperation between China and Tanzania, connecting landlocked countries like Zambia with the Maritime Silk Road. It also provides an opportunity for the promotion of Africa's internal trade. Trade between African countries is currently around 12%, the lowest compared to 60% in Europe and 30% in ASEAN and North Africa<sup>18</sup>. The multiplier effect of the BRI will undoubtedly contribute to the development of the African continent. The BRI strategy will attract more attention Africa, and most importantly, more government funding to strengthen policy

**Fig. 3.** Annual flow of foreign direct investments from China to Tanzania between 2008 and 2018

Source: Statista(2021)

implementation. The participation of Tanzania and other African countries in the BRI initiative can provide an important opportunity for China and Africa to work together to better develop China-Africa cooperation. The effects of increasing Chinese investment vary across African countries. In Tanzania, most investments can be considered timely and significantly support many sectors, especially agriculture and manufacturing. As well as in many other countries, the investment has paved the way for African infant industries to access technology and information. For example, the Nigerian company Leakey Free Zone Development Company (LFZDC) can be a good example that some Nigerian partners took advantage of China's presence in Africa (Mthembu-Salter, 2009). LFZDC attracts new Chinese investors to Lagos but also allows parts of the value chain to relocate to Nigeria. Infact, manufactured goods that were once imported from China, such as Chinese trucks, are now being assembled in Lagos. Chinese investments can therefore be seen channeled towards strategic and mutual beneficial in

technology and knowledge transfers.

#### 4) Other Factors Contributing to China-Tanzania Trade Relations

Although the importance of Sino-Tanzanian diplomatic ties is reflected in official rhetoric, it is primarily driven by market factors that dominate Chinese investments, especially in Tanzania's agriculture and manufacturing sectors. Some Chinese investors came to Tanzania to work in the import and export business as early as the 1990s, but most came after 2013. Almost all manufacturing investments target local or regional markets. Local production has the advantage of reducing production costs, which gives the manufacturer a price advantage when competing with traders who import the finished products. Also, labor costs for local production in Tanzania is lower than those in China or Southeast Asia, which is another driving factor for the Chinese investors. Although Chinese investments in Tanzania have come later than other foreign investments, they have already created a strong link with



the local economy. It has facilitated knowledge transfer by developing local supply networks, providing training opportunities in collaboration with government organizations and vocational training, and participating in technical and financial cooperation with local organizations.

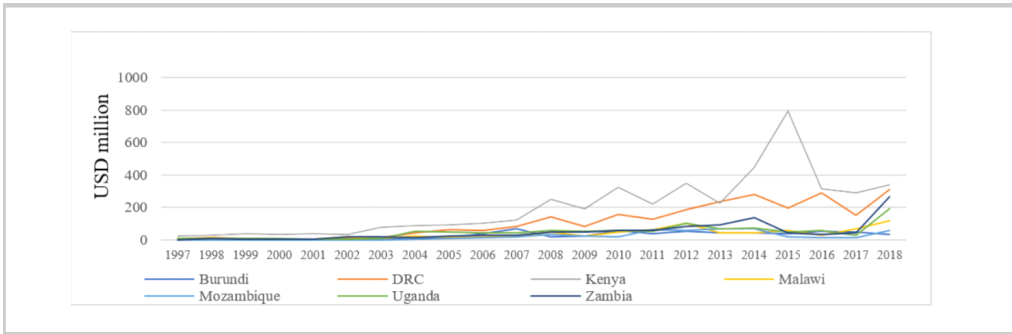
## 2. Research Background

### 1) Tanzania's International Trade Pattern

The important objective of this study is to observe if there is any significant change in Tanzania's international trade pattern since the implementation of China's BRI. A comparative analysis is conducted to capture Tanzania's bilateral trade from the year 1995 to 2012 the period prior to BRI, and the years followed after BRI that is 2013 to 2018 the latest year with available data. Tanzania's principal exports are Gold, Tobacco, Copper, coffee, cashew nuts, and cotton. Of these, gold provides more than two-thirds of the country's export earnings. Tanzania exports mostly to Switzerland, India, South Africa, China, Rwanda, Uganda and Democratic Republic of the Congo. Tanzania's primary imports consist of machinery, transport equipment, petroleum and chemical products, the majority of the country's imported goods are received from countries such as India, South Africa, the United Arab Emirates, China, and Switzerland. By looking back, during most of the pre-independence period Britain was Tanzania's single most chief purchaser as well as the leading source for imports for Tanzania. In 1961, Britain accounted for about 35% of the combined total value of imports and about 33% of exports. However, during the cold war by 1971 a 10 years period since the country's

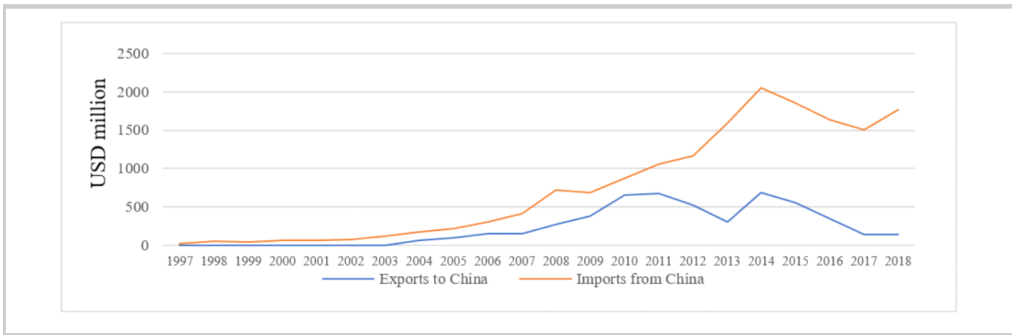
independence, as a consequence of Tanzania's policy of non-alignment in international relations, China substituted Britain as the leading exporter to Tanzania. Tanzania's export-import trade with China was nearly nonexistent in 1961. Certainly, the sino-Tanzania trade relation developed after Peking accepted to support the construction of the Tanzania-Zambia railroad. Ever since China has turned out to be the leading source of imports for Tanzania. Correspondingly, it's worth noting that in 1961, trade with the USSR and the East European countries was almost non-existent, however, in 1971 Tanzania was a leading East African importer and exporter of goods from and to the Communist countries. A number of these countries and Tanzania have also engaged in trade agreements. Such as, in 1963 Tanzania and Russia the then so-called USSR engaged in their first bilateral agreement, under which the USSR committed to import coffee, sisal, cotton, tobacco, hide & skins and Tanzania undertook to buy Russian autos, tractors, trucks, fishing boats, and metal tools. In 1970, East Germany and Tanzania engaged in their first trade agreement yielding most favored nation treatment. In the post-independence Tanzania also observed a considerable growth in trade with the six states that originated the European Economic Community (EEC) who formed the European Free Trade Association. These countries were France, West Germany, Italy and the three Benelux countries: Belgium, the Netherlands and Luxembourg. Lately, Sino-Tanzania trade relations have seen a change in the trade composition between the two countries. This change has also led to a realignment of trade relations with Tanzania's traditional trade partners. Up to the year 2012 Tanzania exports and imports from China were insignificant, relative to her main trading

**Fig. 4. Tanzania's Exports to East Africa 1997–2018**



Source: UN Comtrade(2020)

**Fig. 5. Tanzania –China Bilateral Trade flow 1997–2018**



partners namely, United Kingdom, Germany, India, and South Africa. In recent years exports to China have picked up while those of German, UK, and South Africa gradually declines. The BRI has made the Sino-Tanzania trade relation to grow strongly. These trade relations seem to have both direct and indirect impact on the economy and the trade patterns of Tanzania. Based on this regard we are anticipating to analyze the impact of BRI on Tanzania's trade patterns.

## 2) The Current Economic Situation of Tanzania

Tanzania recorded a high growth rate in 2001. Since then, growth has been over 5%

each year and has grown at around 7% over the last decade. With annual GDP per capita (USD 990 at the end of 2020) still very low, the recovery process is expected to continue over the next decade. Tanzania has a satisfactory record of implementing noted reforms, and technological upgrading is an important engine of economic growth. Although the intensity of investment reached 30% of GDP per year during the last decade, the capital / GDP ratio (460% of GDP) was among the highest on the region. The country also takes advantage of its geographical position as the East Africa region is investing heavily in connectivity as part of China's Belt and Road initiative. The development of the offshore and onshore

natural gas industries is an important strength that accompanies the positive dynamic of regional integration. The rapid development of the energy sector could somehow offset the downward trend in the metal and mining sector, which still generates about a third of exported goods. The slowdown in domestic and foreign demand had hit the Tanzanian economy in 2020 with the outbreak of COVID-19. With a GDP growth rate of +1,9 in 2020, Tanzania is one of the few countries to escape the economic downturn based on the COVID-19. But despite this, Tanzania did not opt for tougher lockdown measures, however, with a sharp slowdown in regional activity and trade, as well as a sharp decline in the tourism sector is hurting the economy. The world bank predicts that economic growth will accelerate in 2021 (+ 4,2%) and gain momentum in 2022 (+ 6,2%) before the previous crisis (World bank, 2021). Although it is expected moderate growth in the agricultural sector in the medium term, service activity (accounting for up to 40% of GDP) will be the main engine of growth. With the resumption of international trade as well as the rapid expansion of the transport, logistics and ICT sectors, growth is expected to accelerate during 2021–2025. On the other hand, the industry will lead the restoration through major infrastructure projects: the expansion of standard gauge railway energy facilities across the border between Tanzania and Rwanda is on the agenda. Finally, as mining relies heavily on commodity prices, the sector should benefit from a revolving cycle in the medium term. Tanzania's capital-intensive growth model places high demands on imports of oil and capital goods that fuel the structural current account deficit. The fall in imports throughout 2020 temporarily reduced the current account deficit to -3,2% of GDP. Parallel to the

increase in imports of capital goods for the construction of infrastructure and the strengthening of economic activity, the deficit is expected to widen again to reach -4,5% of GDP in 2021. Finally, it is expected that the recovery in oil prices continue to aggravate the trade deficit. On the export side, the value of goods supplied by Tanzania is expected to rise as world trade returns to normal in a post-pandemic world. Agricultural products and minerals will drive increased exports, but this will not be enough to offset the growth in imports. On the services side, with the recovery of the tourism sector starting in 2021, trade surpluses should return to their structurally high levels. Additionally, revenue from port services and warehouse trade is expected to remain strong. The exchange rate of Tanzanian Shilling remained fairly stable during the COVID-19 crisis, helping to control import inflation. The central bank of Tanzania has the facility to follow a flexible exchange rate policy. Therefore, its intervention in foreign exchange markets is limited to the extreme events required to support liquid management or to reduce excessive volatility. Flexibility of exchange rate regimes prevents erosion of foreign exchange reserves. International reserves have historically remained at a comfortable level, covering about 5,5 months of imports. In addition, the flow of foreign direct investment and bilateral loans has so far provided adequate coverage of external lending requirements.

### 3. Theoretical background of trade patterns

Pattern of trade denotes the composition and volume of trade in a country and in an effort to understand the pattern of trade in a

globalized world, economists have regularly used the gravity model. Determinants of pattern of trade are chiefly based on supply factors such as factor endowments, government policies and free-trade agreements and the quality of infrastructures. Infrastructure plays a vital role in trade facilitation, low levels of infrastructure quality and quantity can produce trade barriers through the increase of transport expenses (Celbis et al., 2013). The Belt and Road Initiative (BRI) is increasing transport networks which eventually brings potential impacts to international trade. Trade between countries involved in BRI accounts for more than a quarter of world trade, so better connectivity and the lower trade costs that come with them obviously is expected to have a significant global impact. Countries in Eastern Europe and Central Asia stand to benefit greatly, and Africa follows but the benefits will rest on where trade costs fall. There are already some opportunities to transport goods via rail between China and Europe, which may appeal to the wide range of industries with time-sensitive products. The impact of transportation infrastructure on international and regional trade and its economic benefits has been widely documented (Redding & Turner, 2015; Venables & Behar, 2010). Previous literature suggests that improved transport infrastructure speeds up the industrialization process and enables more efficient regional and global production networks (Jacoby and Hodge, 2008). In turn, this translates into greater job creation, which has a positive impact on industries and sectors. Redding and Turner(2015) summarize the benefits of better infrastructure than business operating costs due to resource costs, reduced fleet, warehouse, and cost savings inventory and improved transportation times. Winston and Shirley(2004) find that

investments in road infrastructure make a profit by reducing the company's inventory. Datta (2012) shows that the Advanced Golden Quadrangle (GQ) scheme (India's flagship highway project) allows Indian companies to store inventory for a short period of 6 to 12 days. The reduction in input stocks varies inversely with the distance between the city where the business is located and the nearest city on the highway. In the long run, companies can benefit from making replacement inputs and restructuring manufacturing processes, thereby improving service and reducing costs. For example, Gunasekaran and Lai (2016) found that good transport infrastructure improves producers' access to distant markets and allows them to draw inputs from a larger area, thereby promoting local production. Gibbons et al. (2012) investigate the impact of the new road structure on UK businesses and find that a 1 per cent improvement in accessibility leads to an increase in the number of industries and around 0.3-0.4 per cent employment. These effects are new to existing companies. The endogeneity problem (where roads are likely to be built in places where demand and productivity increase), has been researched by recognizing the impact of changes in accessibility due to differences between small geographical areas near new road structures. Martincus & Blyde (2013) investigate how the 2010 earthquake damaged Chilean roads and reduced exports to manufacturing companies that had to rebuild their shipments. Given their study, the lack of a study could negatively impact companies' exports, thereby limiting their ability to profit from potential economies and gain from trade in general. Gani et al. (2016) also examines the impact of the GQ project on manufacturing companies in India. Manufacturing activity rose to 8 3.8 billion from 8 1.8 billion over

the previous period, and a 43 percent increase in inspections was due to GQ updates. The study found that improved transport infrastructure has encouraged new entrants to settle into improved GQ networks, resulting in increased overall output, employment, wages and overall factor productivity. While newcomers benefited from the upgrades, overall, the newcomers benefited more.

### 1) The Gravity Model

Gravity model is a model used to estimate the bilateral trade flows between two countries. The model was derived from physics which is based on Newton's universal law of gravitation, which measures the gravitational pull of two objects based on their mass and distance. The gravity model for international trade works in the similar way, the model suggests that relative economic size attracts countries to trade with each other whereas extensive distances deteriorate the attractiveness. At first, the gravity model was perceived as an empirical one, without any precise grounding in trade theory, but then the widespread embracing of the gravity model to elucidate patterns of trade has been seen by economists as a noteworthy progress on earlier theoretical models. These consist of the Ricardian model, that explain trade patterns in terms of differences in the distribution of technology, and the Heckscher-Ohlin model that count on differences in factor endowments between countries as the base for trade. In these pre-gravity models the magnitude of an economy was not well-thought-out to be significant. However, the model is now credited to be a pillar of trade theory, particularly in terms of estimating the impact of changes in trade policy on trade costs,

The model is flexible in that 'distance' between countries can include a range of related variables, including cultural and political differences among trading countries. Due to its solid economic foundation, an extensive number of studies have been conducted to frame gravity-type augmented equations that combine other variables that might either deter or facilitate bilateral trade flows. In 2014 Mahona and Kim Tae-Gi (2014) used the gravity model to analyze the determinants of trade patterns of Tanzania Trade for the years 1981 to 2009, they found that economic size of the partners' country (GDP), partner's per capita income, Tanzania's per capita income, and exchange rates significantly determines Tanzania's bilateral trade flows. But Tanzania's economic size appeared as distance, obstructing the trade flows. Nevertheless, with all this theoretical relevance and the success of its empirical performance, no study has yet been undertaken to explain the impact of BRI on Tanzania's trade patterns using this model. Bearing in mind the importance of international trade in Tanzania's economic development, it would be an important task to identify the current determinant factors of bilateral trade flows as it would assist in the understanding of Tanzania's trade patterns before and after the introduction of the BRI. In this regard, this study will be the first attempt at analyzing Tanzania's bilateral trade patterns then the work will be easy to capture the pattern change in relation to the impacts of the BRI.

### 2) Research Model

The Gravity Model of trade specifies that the trade flows between two countries depend positively on the product of their GDPs and negatively on the distances

between them as expressed in equation 1.

$$F_{ij} = a \times \frac{GDP_i \times GDP_j}{D_{ij}} \quad (\text{equation } 1)$$

where  $F_{ij}$  is the proxy for value of trade between country i and country j, while  $a$  is a constant term,  $GDP_i$  represents country i's income,  $GDP_j$  is the country j's income and  $D_{ij}$  is the proxy for the distance between two countries (Krugman and Obstfeld, 2006). The gravity equation that this paper seeks to estimate follows closely the standard gravity model by taking the following form:

$$\begin{aligned} \ln F_{ijt} = & \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_{jt} + \beta_3 \ln GDPPC_i \\ & + \beta_4 \ln GDPPC_{jt} + \beta_5 \ln Pop_i + \beta_6 \ln Pop_{jt} + \beta_7 \ln D_{ij} \\ & + \beta_8 Proximity_{ij} + \epsilon_{ijt} \end{aligned} \quad (\text{equation } 2)$$

where  $\ln F_{ijt}$  represent log of bilateral trade flow (exports + imports) between countries i and j at time t,  $\ln GDP_i$  and  $\ln GDP_{jt}$  represents the log of Gross domestic product (GDP) at time t of countries i and j respectively.  $\ln GDPPC_i$  and  $\ln GDPPC_{jt}$  represents the log of per capita GDPs of country i and j at time t respectively.  $\ln Pop_{it}$  and  $\ln Pop_{jt}$  represents the log of the population of country i and country j respectively.  $\ln D_{ij}$  is the log of distance between countries i and j. While  $Proximity_{ij}$  is a categorical variable equal to one if countries share a common land border and zero if otherwise. Lastly,  $\epsilon_{ijt}$  is the error term. The product of GDPs serves as a proxy for the two countries' economic size, in terms of both production capacity and size of market. A

larger country, with a greater production capacity, is more likely to realize economies of scale and increase exports based on its comparative advantage. It also holds large domestic markets which are able to absorb more imports. Hence, an increase in the product of the two countries' GDPs is expected to increase bilateral trade volumes. In this regard, it's expected the estimated coefficient of  $\beta_1$  and  $\beta_2$  to be greater than 0. Per capita GDP serves as a proxy for the income level or purchasing power of exporting and importing countries. However, Bergstrand (1989) theoretically derived the gravity equation and predicted that the exports of goods in bilateral trade depend not only on income but also on per capita income. As a result, in this paper we included per capita GDP. Regarding the coefficient to the variable  $\beta_3$  and  $\beta_4$ , we do not have any a prior information on its sign. The distance variable is a trade resistance factor that represents trade barriers such as transport costs, delivery time, cultural unfamiliarity and market access barriers. The distance coefficient, measures the effect of relative distances of countries: a decrease in the distance coefficient indicates that trade with geographically distant countries increases relative to trade with geographically closer countries, whereas an increase indicates that trade with closer countries increases faster than that with distant countries. We anticipate the coefficient  $\beta_7 < 0$ , but by comparing the coefficients of the period before BRI and the period after we are interested to see any changes in its magnitude. The coefficients on  $\ln Pop_{it}$  and  $\ln Pop_{jt}$ , which represent the population in the importing and exporting countries at time t, could likely to take either a negative or positive sign. Inmaculada Martínez-Zarzoso

and Nowak-Lehmann (2004) demonstrated that population size may have a negative effect on exports if countries export less as they become or a positive effect if they export more as they become larger as they are able to realize economies of scale. Population size will have alike impacts on imports. The coefficient of  $Proximity_{ij}$  is anticipated to impact positively the bilateral trade flows, emphasizing that countries situated adjacent to each other are likely to have a long history of bilateral trade. Closer countries are likely to better understand each other's tastes and customs. In addition to all the theoretical expectations on the coefficient results, our main goal is to capture the impacts of the BRI on the trade pattern of Tanzania. Thus, we intend to compare the coefficients obtained from regression results of the period before BRI and the period after the introduction of BRI. It will be more interesting to observe the changes of signs of the coefficients, changes in the significance levels and magnitudes in increase or decrease in values of coefficients. Below are 2 more regression equations to be used in our estimations.

$$\begin{aligned} \ln Exp_{ijt} = & \alpha + \beta_1 \ln GDP + \beta_2 \ln GDP_{jt} \\ & + \beta_3 \ln GDPPC \\ & + \beta_4 \ln GDPPC_{jt} + \beta_5 \ln Pop \quad (\text{equation} \\ & + \beta_6 \ln Pop_{jt} + \beta_7 \ln D_{ij} \quad 3) \\ & + \beta_8 Proximity_{ij} + \epsilon_{ijt} \end{aligned}$$

$$\begin{aligned} \ln Imp_{ijt} = & \alpha + \beta_1 \ln GDP + \beta_2 \ln GDP_{jt} \\ & + \beta_3 \ln GDPPC \\ & + \beta_4 \ln GDPPC_{jt} + \beta_5 \ln Pop \quad (\text{equation} \\ & + \beta_6 \ln Pop_{jt} + \beta_7 \ln D_{ij} \quad 4) \\ & + \beta_8 Proximity_{ij} + \epsilon_{ijt} \end{aligned}$$

The equation 2, measures the determinants for total bilateral trade between country i (exporter) and country j (importer) during

time t, where  $\ln F_{ijt}$  is calculated as a log of the sum of exports from country i to country j and imports from country j to country i at a time t. Additionally exports and imports are measured in current US dollars.  $\ln D_{ij}$  is the log of distance between capital cities of country i and country j that is measured in kilometers. The equation 3,  $Exp_{ijt}$  estimates the determinants for total exports of country i (exporter) and country j (importer) during time t. Whereas the equation 4,  $Imp_{ijt}$  estimates the determinants for total imports country i (importer) and country j (exporter) during time t.

### 3) Research Data

The study has incorporated an augmented gravity model and regressed three dependent variables; bilateral trade flows, exports, and imports on a set of 8 explanatory variables. These variables denoted relative market size and GDP per capita which represent wealth, population, and distance and geographical proximity. These variables are the best among in measuring bilateral trade and have been endorsed by various studies. It is because it directly indicates the characteristics of demand and supply in the country (Kepaptsoglou et al., 2009). The GDP per capita indicated the relative wealth and market size of the source and host countries in natural logarithm form (Abdon et al., 2010). It is suggested that richer economies are major sources and recipients of foreign investment. The data was obtained from the World Bank database and it is expected to have a positive effect on bilateral trade flows. Distance is measured as the natural logarithmic form to capture the circle of distance (in kilometers) from capital cities of Tanzania its trading partners. The data

**Table 1.** Random effect regression results analyzing Tanzania's trading patterns: 1995–2012

Division	RE Coeff. (Model 1)	RE Coeff. (Model 2)	RE Coeff. (Model 3)
Variables	Total Trade flow	Exports	Imports
Exporter GDP	-0.855(0.657)**	-2.226***(0.832)	1.370(0.932)
Importer GDP	0.176(0.115)	0.221(0.139)	0.153(0.151)
Exporter Per Capita	-0.494(0.379)	-1.456***(0.480)	-0.313(0.537)
Importer Per Capita	0.898***(0.138)	0.574***(0.168)	1.222***(0.183)
Exporter Population	-0.00329(1.300)	-1.457(1.648)	-2.914(1.847)
Importer Population	0.898***(0.131)	0.816***(0.159)	1.049***(0.173)
Distance	-1.849***(0.251)	-1.919***(0.303)	-1.884***(0.328)
Proximity	1.522**(0.696)	2.021**(0.838)	0.681(0.906)
Constant	-0.225(9.616)	-20.33*(12.13)	-5.978(13.55)
R-square	0.6342	0.5059	0.5700
Observations	2,371	2,367	2,366
Number of id	132	132	132

Notes: 1. Standard errors in parentheses

2. \*p<0.1, \*\*p<0.05, \*\*\*p<0.001.

were obtained from Centre d' Etudes Prospective et d' Information's Internationals (CEPII) and is expected to have a negative impact on bilateral trade. The variable of the population in natural logarithm form indicated that larger economies are mainly sources and recipients of foreign investment, and it is positively related to bilateral trade. The data was obtained from the World Bank WDI database. Consideration is done to total bilateral trade, exports and imports of Tanzania from different countries in the world for the years 1995 to 2018. The sample period covers a total of 23 years separated into two periods, the first period captures the bilateral trade flow from the year Tanzania joined WTO in 1995 up to 2012 right before the introduction of the BRI and the second period covers the period after the introduction of the BRI, years from 2013 to 2018. The total number of countries included in the data set are 132, some countries we

had to exclude due to missing data. The model is estimated using bilateral trade flows across these countries and the results are shown in Table 1 & 2.

#### 4. Empirical results

In this section, we present an estimate of equation 2, 3, and 4 using random fixed effects methodology. Most of the independent variables are found to be significant, demonstrating that the gravity model is suitable and effective in explaining Tanzania's bilateral trade flows.

##### 1) GDP

According to the gravity theory, the country's GDP positively affects its bilateral trade. Our regression results, both table 1 and 2 shows a positive sign for the importer country GDP. While the coefficient for



**Table 2.** Random effect regression results analyzing Tanzania's trading patterns: 2013–2018

Division	RE Coeff. (Model 1)	RE Coeff. (Model 2)	RE Coeff. (Model 3)
Variables	Total Trade flow	Exports	Imports
Exporter GDP	-0.209(1.010)	-1.035(1.375)*	1.607(1.315)
Importer GDP	0.455***(0.0961)	0.404***(0.123)	0.448***(0.124)
Exporter Per Capita	-0.259(1.599)	0.323**(2.184)	-5.315***(2.083)
Importer Per Capita	0.817***(0.139)	0.696***(0.177)	1.175***(0.180)
Exporter Population	-3.663*(4.067)	-7.743**(5.536)	-7.564**(5.298)
Importer Population	0.529***(0.0984)	0.617***(0.129)	0.716***(0.128)
Distance	-2.126***(0.276)	-2.694***(0.342)	-1.954***(0.355)
Proximity	1.964***(0.756)	2.200**(0.933)	1.350*(0.971)
Constant	25.03***(8.273)	22.04**(11.20)	35.14***(10.76)
R-square	0.6032	0.5158	0.5625
Observations	789	783	789
Number of id	132	132	132

Notes: 1. Standard errors in parentheses

2. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$ .

exporter (Tanzania) GDP has a negative sign for trade exports. Mahona and Kim Tae-Gi (2014) used a gravity model to analyze the determinants of trade Patterns and Comparative Advantage of Tanzania Trade for years 1981-2009. They concluded that the economic size of the partners' country (GDP<sub>j</sub>), is positive and significant. While, Tanzania's economic size (GDP<sub>i</sub>) has a significant negative effect, such that a 10 percent increase in GDP would lead to 48.12 percent cut on total export. Our results approve their conclusion, but it shows a different trend since in our regression for the years 1995 to 2012 shows that a 10 percent increase in Tanzania's GDP (Exporter GDP) leads to 22 percent decrease in total exports while in the second period of 2013-2018 the decrease in exports is only 10 percent. This can be interpreted that the BRI investments in the country has attracted many other investors in manufacturing and other areas of

investment which led to the improvement in technology and increased production which is leads to the capacity to serve the internal market and overseas.

## 2) GDP per capita

When comparing the signs and sizes of the coefficients, it was discovered that the period before the BRI exports coefficient has a negative sign such that a 10 percent increase in Tanzania's GDP per capita resulted in a 14.6% decrease in exports. On the other hand, the second period reveals the pattern change as a 10% increase in Tanzania's GDP per capita positively impacts exports which leads to 3.2% increase in the country's exports. Hassan(2009) and Mehanna and Hassan (2003), also found positive income per capita coefficients backing up the idea that higher income per capita results in more trade. According to Mehanna and Hassan

(2003) it is common to find a positive influence of GDP per capita on bilateral trade flows in the intra-industry trade models while the comparative advantage theory predicts a negative relation since it is based on dissimilar factor endowments. Following this interpretation, we can then argue that the period before BRI, Tanzania traded more products with factor endowments but the pattern changed after the introduction of the BRI. In his 1979 article, Krugman formalized the idea that economies of scale together with imperfect competition can give rise to trade even in the absence of comparative advantage, due to (i) people's desire for variety, which allows firms to specialize in the production of similar but slightly differentiated products (also refereed as product differentiation), and (ii) increasing returns to scale due to economies of scale; both of which lead to intra-industry trade. Such a trade pattern is refereed to as intra-industry trade (trade in similar but slightly differentiated products), as opposed to the inter-industry trade pattern of classical trade models (trade in dissimilar products) (Helpman and Krugman 1985). China through BRI is heavily investing not only in Tanzania but also in almost all its neighboring countries, these investments help to expand the market in terms of GDP per capita, on the one hand significantly lower trade costs and allowing firms to take advantage of consumers' desire for variety and economies of scale to expand production and so exports. As a result, more firms have entered in Tanzanian market and compete in producing similar but slightly differentiated products and export them hence led to the pattern change.

### 3) Population

Our results show that Exporter (Tanzania's) population has a large and negative effect in exports showing a positive absorption effect. Theoretically, the coefficients on population in the importing and exporting countries at time  $t$ , may be expected to take either a negative or positive sign. As Martínez-Zarzoso and Nowak-Lehmann(2002) show, population size may have a negative effect on exports if countries export less as they become larger since they tend to rely more on internal trade or a positive effect if they export more as they become larger as they are able to achieve economies of scale. Population size will have a similar effect on imports. Our regression of the exporter's population variable shows a significant negative impact on export and imports in both periods. However, the second period has a higher significant negative impact compared to the pre BRI period. It was observed that in the second period a 10 percent increase in Tanzania's population leads to the decrease of exports and imports by 77.4%, 75.6% respectively. Hosnijeh (2008) got a negative population coefficient for the exporter country, he then interpreted the negative exporter population coefficient in a way that if the population in a country is higher, people have a less tendency to export because they need more of the products for the home market.

### 4) Distance

Another crucial element of the gravity model is the distance between countries, which is on the denominator of the gravity equation (Equation 1). It is presumed that distance should have a negative sign since the higher distance reduces bilateral trade by

increasing transportation expenses and generating some additional complications to trade. Leamer (2007) claimed, "There is very little that economists fully understand about global trade but there is one thing that we do know – commerce declines dramatically with the distance". As theoretically predicted, our results also show that distance has the expected significant negative sign in both periods of study. However, the coefficient value of distance in table 2(period 2) is higher than the coefficient value of the period 1(Table 1). The reason behind this increase could be that in the second period due to the infrastructure improvements and investments brought by the BRI, Tanzania has turned to trade more bilateral trade with the neighboring countries as the transportation cost decreases. In theory, infrastructure assets have both direct and indirect effects on industrialization. First, infrastructure development improves overall economic efficiency and improves integration of national and regional markets. Second, infrastructure assets increase the attractiveness of countries as recipients of foreign direct investment. Third, infrastructure development improves social outcomes such as healthcare and education, which in turn increases industrial productivity (UNECA, 2017). These observations are supported by numerous studies such as that of Hulten et al. (2006) and Fedderke and Bogetic (2009). These studies show that industrial production is increasing through the provision of better infrastructure services and leading to higher productivity and efficiency through economies of scale and better access to technology. The graph shows that Tanzania's exports to East Africa (neighbor countries) has significantly improved from the years 2013 to 2018, which supports the argument that the BRI has an

impact on this change of the pattern.

## 5) Proximity

Proximity is a categorical variable that takes a value of one (1) if countries share a common land border and zero (0) if otherwise. Adjacency tends to cut the transportation costs, time delays, and the cost of assembling information about the partners' legal, and administrative dealings. It is anticipated to positively affect bilateral trade flows, reflecting that countries located adjacent to each other are expected to have a long history of bilateral trade. It offers a better understanding of each other's tastes and customs. Empirically, our regression results show a positive coefficient on both periods. However, the coefficient value for exports rose from 2.02 to 2.20, while the coefficient value for imports rose from 0.681 to 1.35. This suggests that the BRI has caused the increase of bilateral trade between Tanzania and its adjacent countries. The empirical work on proximity effects was influenced by the seminal work of McCallum (1995), who demonstrated that Canadian provinces trade more with each other than with US states. This finding was also confirmed, by Helliwell and McCallum (1995). Likewise, Wei (1996) discovered that OECD countries purchase almost 2.5 times more from themselves than from alike external countries. It is worthy to note that most studies find out that bilateral trade increases for adjacent countries as it was shown by de Soyres et al., (2019), they conducted a study to find out the impact of transport infrastructure projects of the Belt and Road Initiative on shipment times and other trade expenses. Their findings show that the Belt and Road Initiative significantly reduces shipment times and other related

trade costs which leads to an increase of bilateral trade. The Belt and Road Initiative has shown a great potential to Tanzania by substantially improving trade, foreign investment, and living conditions for citizens. But Tanzania should adopt substantial policy transformations that increase transparency, expand trade, improve debt sustainability, and mitigate environmental, social, and corruption risks.

In terms of FDI inflows, the transition from traditional partners to emerging economies reflects the change in trading partners. The share of foreign direct investment in Tanzania from the EU and the United States has declined gradually, while the share of foreign direct investment from China has increased significantly over the recent years especially after the year 2013. In fact, China and India ranked 4th and 7th in African economies in 2015 (Bereznoy, 2018). Tanzania has seen a significant increase in FDI inflows from China. Previously, China's investment was concentrated in resource rich countries like Algeria, Nigeria and South Africa, but after the global financial crisis, the Tanzania and other African countries have also become a priority for Chinese investors. According to the Ministry of Commerce of the People's Republic of China, China's FDI inflows to East Africa increased from \$ 100 million in 2007 to about \$ 1.2 billion in 2015, more than 40 percent of total FDI. In 2015, it was around 6 percent in 2007.

## 5. Conclusion

This study confirms that the BRI have a very significant positive impact on Tanzania's not only on trade patterns but also on other areas. We observed that the BRI significantly impacted Tanzania's trade, as it led to the upsurge of bilateral trade between Tanzania

and China more importantly between Tanzania and its adjacent countries. Our results align with the study findings from the OECD Directorate for Financial and Enterprise Affairs, which explored the shares of Chinese exports going to BRI-participating economies, OECD countries and the group of all other economies found that in year 2000, exports to the OECD as a share of Chinese exports were around 61% while, for the BRI-participating economies, it was 19%. However, the following years, the trend in the share of BRI-participating economies has been constantly upwards, reaching 34% in 2016, whereas that for the OECD declined steadily to about 49%. In 2019, China's trade with countries participating in BRI has posted "robust growth", totaling \$1.34 trillion, as Beijing pursues to expand its export base away from the well-paid US and EU markets. The graph above shows that trade between China and Tanzania has grown rapidly in the BRI period, particularly China's exports. The trade between Tanzania and its adjacent countries also increased significantly in the BRI period, as it was captured by our gravity model regression results. Infrastructure improvement such as that associated with the BRI in East Africa helps improve the region's railway lines, roads, ports and cross-border infrastructures in Kenya, Rwanda, Burundi, Congo, Mozambique, Malawi and Zambia which led to the growth of trade in the region. However, in the policy standpoint, Tanzania should be more cautious as China's strategy is to invest mainly through loans and not equity. In the energy and transport sectors, the vast majority of Chinese investment in the BRI countries has not implied direct investment. Usually, state-owned construction companies develop the initiative through loans provided by state-owned banks such as the China

Development Bank, Multilateral financial institutions provide just 1 percent of the total investment in BRI projects. It is certain that Tanzania should implement good policies in order to benefit more from China's BRI, among the challenges to be mitigated includes trade imbalance. The trade imbalances have been worsening (Tanzania is the net importer) as the trade volume between the two countries increases. In 2020 Tanzania's total imports accounted for 29% of the total imports while exports to China accounted for 7% (Hermes, 2020). It is certain that Chinese imports create its basic premise of huge and constantly growing Sino-Tanzania trade unevenness. Unbalanced growth in trade over the past decade has resulted in large trade deficits between the Tanzania and China. In 2016, the trade imbalance was approximately \$ 9.2 billion, which is about 57 percent of the Tanzania total trade deficit. We therefore, emphasize the importance of policymakers addressing a number of emerging issues in order to mitigate the negative impacts of the BRI. For Tanzania to maintain remarkable benefits, this study recommends that Tanzania should focus more on (i) Actively implement reforms to improve the business environment, especially in the area of appropriate financial support for the private sector. (ii) Make the best use of FDI in manufacturing to facilitate rapid technological improvements and job opportunities. (iii) Continue to invest in infrastructure but in economical viable manner. (iv) Mobilizing domestic resources and managing external debt wisely. And (v) a strategic review of existing trade agreements. Tanzania lags behind its regional partners in real reform. According to the World Bank's Business Report 2020, Tanzania ranked 141 of 190 economies, behind Rwanda, Kenya and Uganda, and sub-Saharan

Africa, Zambia, Malawi and Mozambique. According to the government's "Writing for Regulatory Reform to Improve the Business Environment", more appropriate and practical business environments need to be improved, especially in terms of business regulations.

Lastly, the difficulties that foreign investors face in Tanzania are quite common in developing countries. They are based on the areas of infrastructure, human resources and governance. Tanzania's transport infrastructure is nowhere near enough. Most often it has been reported that investors complain that it costs less to transport goods from Europe to Dar es Salaam, Tanzania than to Mombasa, Kenya. Although Tanzania has fewer complaints about railways than Kenya, rail infrastructure is also inadequate. With lower frequency and lower reliability than Kenya, electricity is a significant problem in many areas. However, in terms of labor skills, Tanzania is particularly weak compared to its EAC partners, especially Kenya. Investors rank this high on their list, which needs government attention. Skills are limited and training is inadequate. Employing expatriates for companies is almost always more expensive and significantly increases the cost of doing their business in the country. Bureaucracy is another concern of investors. The prospects for Tanzania are undoubtedly promising. Its stability, relative safety, coastline and location are important assets. In addition, it has a huge land mass and one of the most spectacular wildlife species in the world. The question is not whether Tanzania will attract more investment; it is almost certain that it is. The question is how fast this happens. Investors find it a very attractive but rather slow country. This last feature will undoubtedly change as skills and infrastructure improve.

A major limitation of gravity models is that they focus on trade volumes and do not represent the indirect linkages between the various elements in the economies for different sectors at a more disaggregated level. Therefore, this study was limited to simple formulations of gravity model to quantify the impact of BRI to Tanzania's trade patterns and aggregate impacts of this China-Tanzania trade relationship. The modeling would also be improved by refining the representation of different sectors. In addition, the current model can only capture the effects of BRI on Tanzania trade patterns considering the improvements

in transport infrastructure and connectivity and not the dynamic responses from manufacturers, consumers and other economic actors. Ideally, this work should be expanded using a computable general equilibrium model (CGE) to quantify the broader effects of improved transport on trade and economies. The model analysis could then examine a range of investment scenarios and deepen the sensitivity of a wider range of assumptions. It should also be noted that the lack of a unified reporting method and statistical coordination between different authorities affects the credibility of the data in China and Tanzania.

## References

- Abdon, A. M. and Bacate, M. L. Felipe, J. and Kumar, U. (2010), *Product Complexity and Economic Development* (Working Papers No. 616), Levy Economics Institute, Available at <http://dx.doi.org/10.2139/ssrn.1677442>
- Bereznoy A. (2018). "Multinational business in the era of global digital revolution", *Mirovaia ekonomika i mezhdunarodnye otnosheniia* 62(9), 5-17. DOI: 10.20542/0131-2227-2018-62-9-5-17
- Bergstrand, J. (1989). "The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade", *The Review of Economics and Statistics*, 71(1), 143-153. doi:10.2307/1928061.
- Breuer, J. (2017). "Two Belts, One Road?-The role of Africa in China's Belt & Road initiative", *Stiftung Asienhaus*, 1-8.
- Cabestan, J. P., and Chaponnière, J. R. (2016), *Tanzania-China All Weather Friendship From Socialism to Globalization: A Case of Relative Decline*, (Discussion Paper, May 2016), Centre for Chinese Studies, Available at <http://scholar.sun.ac.za/handle/10019.1/100545>
- Celbis, M. G., Nijkamp, P., and Poot, J. (2013). *How big is the impact of infrastructure on trade? Evidence from meta-analysis*, (Working paper 2013-032). United Nations University, Maastricht Economic and social Research and Training Centre on Innovation and Technology, Available at <http://collections.unu.edu/eserv/UNU:25/wp2013-032.pdf>
- Chatzky, A. and McBride, J. (2019). *China's Massive Belt and Road Initiative*. (Webpage) Available from <https://www.cfr.org/backgrounder/chinas-massive-belt-and-road-initiative>

- Datta, S. (2012), "The impact of improved highways on Indian firms". *Journal of Development Economics*, 99(1), 46-57.
- de Soyres, F., Mulabdic, A., Murray, S., Rocha, N., and Ruta, M. (2019). How much will the Belt and Road Initiative reduce trade costs? *International Economics*, 159, 151-164.
- Fedderke, J. W. and Z. Bogetic. (2005) *Infrastructure and Growth in South Africa: Direct and Indirect Productivity Impacts of Nineteen Infrastructure Measure*. Manuscript of the workshop on Infrastructure and Growth of Economic Research Southern Africa; May 29-31, Cape Town, South Africa
- Flores, I. (2017). *Dissecting Chinese Involvement in Road Construction Projects in Tanzania*, (Honors thesis), University of Iowa, 32.
- Fujita, M. (2017). *Chinese Involvement in Tanzania and Its Local Impacts*, (Honors thesis) Bucknell University, 413.
- Ghani, E., Goswami, A. G., & Kerr, W. R. (2016). Highway to success: The impact of the Golden Quadrilateral project for the location and performance of Indian manufacturing. *The Economic Journal*, 126(591), 317-357.
- Gibbons, S., Lyytikäinen, T., Overman, H. G., and Sanchis-Guarner, R. (2012). *New road infrastructure: the effects on firms*, (SERC discussion paper 117). CEPR Centre for Economic Policy Research, Available at [https://cepr.org/active/publications/discussion\\_papers/dp.php?dpno=11239](https://cepr.org/active/publications/discussion_papers/dp.php?dpno=11239)
- Gunasekaran, A., & Lai, K. (2016). Responsive Supply Chain: A Competitive Strategy In a Networked Economy. *Logistics Thought*, 15(58), 165-198.
- Hassan M. Kabir, Benito A. Sanchez and M. Ershad Hussain (2010) "Economic Performance of the OIC countries and the prospect of an Islamic Common Market". *Journal of Economic Cooperation and Development*, 31 (2): 65-121.
- Helliwell, John F. and McCallum, John (1995), "National Borders Still Matter for Trade," *Policy Options*, 16, pp. 44-48.
- Helpman, E. and Krugman, P. R. (1985). *Market structure and foreign trade: Increasing returns, imperfect competition, and the international economy*. MIT press.
- Hermes E., 2020. *Sector risk methodology* (Webpage). Availabel from [https://www.eulerhermes.com/content/dam/onemarketing/ehndbx/eulerhermes\\_com/cee/pdf/sector-risk-methodology-euler-hermes.pdf](https://www.eulerhermes.com/content/dam/onemarketing/ehndbx/eulerhermes_com/cee/pdf/sector-risk-methodology-euler-hermes.pdf).
- Hosnijeh, K. (2008). "The Trade Lilateralization Effect on FDI of OIC Meraler Counties". *Journal of Development and Capital*, 1(1), 133-148.
- Hulten, C. R., Bennathan, E., and Srinivasan, S. (2006). "Infrastructure, externalities, and economic development: A study of the Indian manufacturing industry", *The World Bank Economic Review*, 20(2), 291-308.
- Jacoby, D, and Hodge D., (2008), "Infrastructure investment: the supply chain connection." *CSCMP's Supply Chain Quarterly*, Q4.
- Kepaptsoglou, K., Tsamboulas, D., Karlaftis, M. G., and Marzano, V. (2009). "Free trade agreement effects in the Mediterranean region: An analytic approach based on SURE gravity model". *Transportation Research Record*, 2097(1), 88-96.
- Krugman, P. R., and Obstfeld, M. (2006). *International economics: Theory and policy*. Pearson Education.
- Leamer, E. E. (2007). *Housing is the business cycle*. National Bureau of Economic Research.

- Mahona, B. K., and Kim, T. (2014), *Determinants of Trade Patterns and Comparative Advantage of Tanzania Trade 1981-2009*. (Webpage) Available from <https://www.iiste.org/>
- Martincus, C. V., & Blyde, J. (2013). Shaky roads and trembling exports: Assessing the trade effects of domestic infrastructure using a natural experiment. *Journal of International Economics*, 90(1), 148-161.
- Martínez-Zarzoso, I, and Nowak-Lehmann, F. (2002). Explaining MERCOSUR sectoral exports to the EU: The role of economic and geographical distance, *International Trade 0309025*, University Library of Munich, Germany.
- McCallum, J. (1995). National borders matter: Canada-US regional trade patterns. *The American Economic Review*, 85(3), 615-623.
- Mehanna, R. A., and Hassan, M. K. (2003). "On Openness, Integration, Stability, and Economic Growth" *Bangladesh Institute of Islamic Thought*.