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Understanding Sino-Zambia Trade Relations: Determinants and Policy Implications

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Abstract

In the context of increasing Sino-Zambia trade and investment relations and the controversy surrounding China's engagements in Africa, this paper tried to examine the determinants of Zambia's trade with China. To achieve this, the traditional augmented Gravity Model of International Trade was used for the analysis over a period of 15 years (2000-2014). The results indicate that Sino-Zambia bilateral trade is significantly determined by Zambia's GDP, such that when other factors are held constant, a unit increase in GDP will lead to Zambia's exports to China rise by 27%. Further, Sino-Zambia trade is determined by Zambia's population and the stock of investment as well as

China's GDP per capita and the stock of investment. The paper recommends urgent investments in infrastructure development, especially transport and communications and power generation as well as the formulation of consistent and appropriate policies aimed at reducing trade barriers. Further, a detailed study on how to promote Zambia's agricultural trade with China is recommended.

Key Words: *Sino-Zambia, China-Africa Relations, Gravity Model, International Trade.*

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1.0 Introduction

1.1 Background

According to Pigato & Tang (2015), economic growth in Sub-Saharan Africa (SSA) has averaged roughly 5 percent per year over the past decade, improving living standards and bolstering human development indicators across the continent. Stronger public institutions, a supportive, private sector–focused policy environment, responsible macroeconomic management, and a sustained commitment to structural reforms have greatly expanded opportunities for countries in SSA to participate in global markets. In recent years, many countries in the region have benefited from an increasingly favorable external environment, high commodity prices, and an especially strong demand for natural resources by emerging economies, particularly China (ibid).

The past decade has seen a dramatic rise of trade between China and Africa. Overall trade with Africa rose from $10.6 billion in 2000 to $75.5 billion in 2008, helping to propel Africa's growth rate to 5.8 percent in 2008, and its best performance since 1974. In 2009, China promised at Forum on China-Africa Cooperation (FOCAC) to increase Africa's two-way trade to $100 billion by 2010, to become Africa's single largest trading partner (Chileshe, 2010). As Chileshe (2010) reports, such impressive trade statistics should be to Africa's advantage. Unfortunately, like other developed countries, China is very much in the business of extraction, which leads to trade in mostly raw commodities from Africa to China and finished goods from China to Africa and is not unlike past experiences with the West.

As the volume of China-Africa trade continues to grow, According to The Information Office of the State Council of China (2013), its proportion to China's and Africa's respective total foreign trade volume has also increased. From 2000 to 2012, the proportion of China-Africa trade volume as a part of China's total foreign trade volume increased from 2.23 percent to 5.13 percent: the proportion consisting of China's imports from Africa up from 2.47 percent to 6.23 percent, and that of China's exports to Africa from 2.02 percent to 4.16 percent. From 2000 to 2012, the proportion of China-Africa trade volume as a part of Africa's total foreign trade volume increased from 3.82 percent to 16.13 percent: the proportion contributed by Africa's exports to China increased up from 3.76 percent to 18.07 percent, and that by Africa's imports from China from 3.88 percent to 14.11 percent.

As Romei (2015) noted, China is Africa's main export market and also its largest source of imports. After 15 years of closer trade ties, China accounts for about 20 percent of imports in Sub-Saharan Africa and about 15 percent of its exports. But in the past year, the share of exports to China has started to decline while the growth of Chinese imports has been increasing.

Zambia's bilateral relation with China dates back to the pre-independence period when present-day Zambia was a protectorate of Great Britain. However, economic relations between the two nations were limited until more recently. In the past four decades-and especially in the past two-China's growing economy has caused it to take a greater interest in Zambia's economy. Zambia was first to establish diplomatic relations with China in Southern Africa just

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after independence (Leslie, 2014) with the establishment of the Zambia-China Economic and Trade Cooperation Zone (ZCCZ) in 2007, the first overseas Economic and Trade Cooperation Zone established by the Chinese Government in Africa-it is also the first Multifacility Economic Zone of Zambia.

Reports show that, for example Chileshe (2010), since 2005, China has applied zero-tariff treatment for trade with African countries, and, as at the end of June 2009, about $890 million African products enjoyed preferential treatment. A key platform of the FOCAC IV ministerial meeting in 2009 was to encourage imports of finished African goods into the Chinese market. The total annual growth of Sino-Africa trade has averaged more than 40 percent, and stood at $106.8 billion in 2008 versus $30 billion just four years earlier in 2004. By 2006, the number of zero-tariff Zambian exports into China had grown, from 192 in 2005, to over 452. This is occurring in the context of a decline in demand for Africa's basic exports to the West. For instance, Africa's share in the EU foreign trade has fallen 3.2 percent to about 1.3 percent between 1989 and 2009.

Zambia's trade balance with China has also been increasing in the recent past. The 2008 Sino-Zambia trade accounted for 19.7percent of Zambia's total foreign trade (exports to China-13.8 percent, imports 6.9 percent), making China become the second largest trade partner of Zambia. Sino-Zambia bilateral trade balance reached US $1.3 billion in 2013, of which, Zambia's imports from China accounted for US $956, 655 thousand while Zambian exports to China taking the other balance with US $2.3 billion. This was particularly impressive for the rich copper Zambia, having been recording some imbalances in trade with China. Zambia's trade balance with China grew only by 0.6 percent from 2012, standing at US $927, 683 thousand to a value of US $933, 551 thousand in 2014. Of this, Zambia's export value in 2012 stood at US $1, 799, 145 billion and dropping to US $1,790, 964 billion in 2014 from a US $2.3 billion record in 2013 (ITC [1], UN COMTRADE, 2016[2]).

However, with the decline in the performance of China's GDP amid sluggish global growth, further reducing global demand for raw commodities, of which Zambia heavily relies on for her exports, the performance of Zambia's exports to China remains uncertain. It is also important to note that the current Sino-Zambia trade relation has perpetuated Zambia's dependence on natural resources. According to Romei (2015), the reduced external demand and lower commodity prices caused a 13 percent contraction in Chinese imports in the 12 months to October 2015 over the same period a year earlier. By comparison, the Report (ibid) revealed that the value of imports from Africa over the period fell 32 percent. This contraction is steeper for Angola, South Africa, Republic of Congo, Equatorial Guinea and Zambia. Simply, despite the sluggish African exports to China, Chinese exports to Africa Continue to rise.

With this background, it becomes imperative to understand these trade trends and what really determines them. This is so important for the Sino-Zambia Trade

[1] http://www.trademap.org/Bilateral_TS.aspx

[2] http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx

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Relation. What is the force behind these trends? What policy implications do these imply? How does this Sino-Zambia bilateral trade relation fit within the context of Sino-Africa relation amidst growing concerns over China's engagement with Africa? Does Zambia have any potential for further trade with China? People have sought to understand the pattern and trends of trade between China and Africa and narrowly between Zambia and China; however, one key issue which has been neglected is the determinants of these bilateral trade trends. To our knowledge, this is the first comprehensive empirical study to investigate the Sino-Zambia trade relations, trends, and their determinants, especially within the context of Sino-Africa engagements. In light of growing discussions about China and its impact in Africa, as well as the growing trade and investments, it is very important to understand the dynamics of individual heterogeneous African countries. Many have been taken away by the "Africa Trap[3]" such that most researches focus on macro Sino-African relation issues. It is this very motivation of this paper to seek to understand Sino-Zambia Trade Relations, trends and determinants and the implications these have on policy.

1.2 Objectives

Given the bilateral trade relations Zambia has had with China, the current Sino-African relations under the Forum on China Africa Cooperation and new developments which are likely to influence trade flows between the two countries, such as Chinese One Belt One Road Initiative (OBOR), this paper aimed to achieve the following:

1. To examine Sino-Zambia bilateral trade trends
2. To examine the determinants of Zambia's trade with China
3. To assess the policy implications and recommendations for the Zambian government

2.0 Methodology

2.1 Model Specification

The gravity model of international trade was first developed independently by Tinbergen (1962) and Pöyhönen (1963). In its basic form, the gravity equation predicts that the amount of trade between two countries is proportional to their economic mass, measured by GDP and population, and inversely proportional to the distance between them. Later works, such as Linnemann (1966) included population as an additional measure of country size, employing the now commonly referred to as the augmented gravity model. Since then, the model has been widely used in international trade and now including migration, and foreign policy.

The basic gravity model of trade is represented as:

$$X_{ij} = KY^{\alpha}{}_{i}Y^{\beta}{}_{j} / D^{\theta}{}_{ij} \quad (1)$$

From equation (1) above, X denotes the value of exports between countries i and j , Y is the value of nominal GDP, ij D is the physical distance between the economic

[3] A term coined in this paper to mean the "tendency by many to view Africa as one country, when actually, not"

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centers of countries *i* and *j* , *K* is the gravitational constant, while α , β and θ are parameters, and *a priori* signs of α and β are positive while θ is negative.

Equation (1) can be converted into log-linear form as:

$$lnX_{ij} = K + \alpha\, lnY_i + \beta\, lnY_j - \theta\, D_{ij} + \delta Z + u_{ij} \quad (2)$$

From equation (2), δ Z denotes other factors that may positively or negatively affect export flows, while *uij* is the stochastic term. Equation (2) can be interpreted such that exports are positively affected by the economic mass (measured in GDP and population) of the trading partners and inversely related to the distance between them. As Karamuriro and Karukuza (2015, page 48) indicated, citing (Clarete, Edmonds & Wallack, 2002), more variables, such as population, indicators of cultural affinity, and sharing of boarders are usually added to empirical gravity models to elaborate on the economic mass and distance variables.

We can therefore derive the augmented gravity equation from equation (2). It can be expressed as given below:

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} e^{ym}\, \varepsilon^{u}_{ij} \quad (3)$$

From the equation above (3), *Xij* is the value of exports between pairs of countries; Y_i (Y_j) represents the value of nominal GDP of the exporter (importer), N_i (N_j) is the population of the exporter (importer), D_{ij} is the physical distance between the economic centers of the two countries, A_{ij} represents other factors that could aid or impede exports between countries, e^{ym} is a vector of dummy variables that test for specific effects, and e^{uij} is the error term (Karamuriro and Karukuza, 2015).

For the purposes of understanding the determinants of Zambia's trade with China, this paper adopted the augmented and linearized basic model of Jan Tinbergen (1962) and also used by Karamuriro and Karukuza (2015) which they derived from the basic gravity equation in international trade. Karamuriro and Karukuza (2015) used the following formulation:

$$X_{ijt} = \beta_0 Y_{it}^{\beta 1} Y^{\beta 2}_{it} GDPPC_{it}^{\beta 3} GDPPC_{jt}^{\beta 4} GDPPCDIF_{ijt}^{\beta 5} REAL_{ijt}^{B6} D_{ij}^{\beta 7} \beta_8 Language_{ij}\ \beta 9 Border_{ij}\ \beta 10 COMESA\ \beta_{11} EAC\ \varepsilon^{uijt} \quad (4)$$

The above can be rewritten in its natural logarithm as below:

$$\text{In } Xijt = \ln \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln GDPPC_{it}\ \beta_4 \ln GDPPC_{jt} + \beta_5 \ln GDPPCDIF_{ijt} + \beta_6 \ln REAL_{ijt} + \beta_7 \ln D_{ij} + \beta_8 Language_{ij} + \beta_9 \ln Border_{ij} + \beta_{10} COMESA + \beta_{11} EAC + U_{ij} \quad (5)$$

We therefore, adopted and extended the linearized equation for this present paper as given below so as to include other variables of interest such as FDI and some dummy variables.

$$In\ X_{ijt} = ln\ \beta_0 + \beta_1 lnY_{it} + \beta_2 lnY_{jt} + \beta_3 ln\ GDPPC_{it}\ \beta_4 lnGDPPC_{jt} + \beta_5 lnPOP_{it} + \beta_6 lnPOP_{jt} + \beta_7 lnFDI_{it} + \beta_8 lnFDI_{jt} + \beta_9 lnD_{ij} + \beta_{10} Language_{ij} + \beta_{11} lnBorder_{ij} + \beta_{12} lnColony_{ij} + \beta_{13} RTA_{ij} + \beta_{14} FTAij + U_{ij} \quad (6)$$

From equation (6) above,

X_{ijt} is the total exports from country *i* (Zambia) to country *j* (China or other

partners) at time *t;* Y_{it} is the nominal GDP for country *i* (Zambia) at time *t;* Y_{jt} is the GDP for country *j* (China or other partners) at time *t;* $GDPPC_{it}$ is the GDP per capita of country *i* at time *t*; $GDPPC_{jt}$ is the GDP per capita of country *j* at time *t*; POP_{it} is the total population of country *i* at time *t;* POP_{ij} is the total population of country *j* at time *t;* FDI_{it} is the stock of FDI in country *i* at time *t*, FDI_{jt} is the stock of FDI in country *j* at time *t;* D_{ij} is the geographical distance between the countries *i* and *j* ; $Language_{ij}$ is a proxy of cultural distance to capture whether countries *i* and *j* use the same official language, as a dummy variable, it takes on the value of 1 if yes and zero otherwise; $Border_{ij}$ refers to weather countries *i* and *j* share the same border, as a dummy variable, it takes on the value of 1 if yes and zero otherwise; $Colony_{ij}$ refers to whether countries *i* and *j* share some historical background such as one being a colony of the other or if they were colonized by the same country, as a dummy variable, it takes on the value of 1 if yes and zero otherwise ; RTA_{ij} refers to whether countries *i* and *j* belong to the same regional trade agreement, as a dummy variable, it takes on the value of 1 if yes and zero otherwise and *FTAij* refers to whether countries *i* and *j* have a preferential trade arrangement between them, as a dummy variable, it takes on the value of 1 if yes and zero otherwise.

2.2 Variable Definition

The dependent variable used in the analysis was exports in USA dollars from Zambia to China and other trading partners. The other variables all used, such as GDP, GDP per capita, Population, and FDI for both exporter and importer, as well as distance, common official language, Regional Trade Agreement and Preferential Trade arrangement are all independent variables.

GDP captures the level of economic development and the market size of an economy. It is believed that the larger the size as measured in GDP, the more a country trades with others. It also captures the productive capacity of the exporting country and the purchasing power of the importing country. A higher GDP signifies greater potential supply from the exporting country and increased demand in the importing country (Karamuriro and Karukuza 2015). Therefore, the coefficients of the GDP variables are expected to be positive.

It is thought that the GDP per capita income of a country may affect trade in two different ways. On one hand, a large GDP per capita income may signify a large domestic market, high level of self-sufficiency and less need for trade. While on the other hand, a large GDP per capita income may promote economies of scale in production hence promoting the desire to trade in a greater variety of goods. The estimated coefficient for the GDP per capita income is therefore, ambiguous (Karamuriro and Karukuza, 2015).

Holding other factors constant, a larger population is associated with lower levels of bilateral trade. The relatively smaller population therefore, tends to increase bilateral trade. As such, the expected coefficient for this variable is ambiguous (Coe and Hoffmaister, 1998).

Common official language as a proxy of trade costs emanating from cultural distance between the peoples of the two countries is thought to enhance bilateral trade flows between countries. People who

use the same official language find it easier to do business with each and easily develop trust, a key element in trade negotiations and sustained and effective partnerships. As Linnemann (1966) stresses, linguistic links and other historical and cultural links are particularly important at reducing the cost of unfamiliarity in international trade. Huntington (1996) advanced that trade patterns will be decisively influenced by the patterns of culture. As such, culture plays a significant role in international trade. The estimated coefficients for language and colony variables are expected to have a positive sign.

Contiguous (border) is expected to promote bilateral trade as sharing a boarder with another country immensely reduces transportation costs thereby promoting trade. Countries with a shared border have higher chances of stronger bilateral trade relations. This variable is expected to have a positive influence on trade. This is similar to distance, which is though expected to have a negative influence on trade because the farther countries are from each other, the lesser they trade, at least in theory. This is one short-coming of the gravity model as it does not distinguish those countries with easy access to marine transportation and landlocked ones.

RTA and PTA are other dummy variables which have been used to see the impact of Regional Trade Agreement and Preferential Trade Agreement/arrangement on the trade of member countries. Since the purpose of a Trade Agreement/Preferential Trade Arrangement is promoting trade, therefore, RTA and PTA are expected to have positive signs.

2.3 Sampling and Data

We used annual panel data on Zambia and her top 14 trading partners, including China, whose bilateral relation with Zambia is the main focus of this study. The selection of these countries was purposive; in 2014, they accounted for an aggregate share of about 87 percent of the total Zambian merchandize trade, with China accounting for 29 percent of that share in the same year. The data is for the period 2000 to 2014. We decided to use panel data because it helps to capture the relevant relationships among variables over time, reduces the collinearity among the explanatory variables, improves efficiency of econometric estimates, and controls for unobservable individual heterogeneity and dynamics (Baltagi, 2005).

The principal data source for exports values is *COMTRADE* [4] which provides detailed raw trade data by partner and product. The source figures were adjusted and/or complemented by data from the International Trade Center [5], when considered necessary. The export data presents merchandise trade by trading partner and product based on three-digit levels SITC Revision 3 commodity classification, expressed in thousands of dollars. In addition, data are also summarized by geographical region, economic and trade grouping, for both reporting country and its trading partners, and by product grouping.

Data on nominal GDP; based on GDP in national currency and exchange rate projections-expressed in billions of US

[4] http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?IF_ActivePath=P,15912&sCS_ChosenLang=en

[5] http://www.trademap.org/Bilateral_TS.aspx

Dollars, distance-measured in square kilometers, colonial link, common language, and contiguous/boarder were obtained from the CEPII [6] Databank. The CEPII provides comprehensive data specially developed and designed for the gravity model, covering the basic variables required to run the gravity equation. Data on GDP per capita were obtained from the World Bank's World Development Indicators[7]. We obtained data on total national population from the International Futures website[8]. Data on FDI was obtained from the Global Economy[9].

3.0 Results

3.1 Regression Results

Equation (6) was first run using the Ordinary Least Squares (OLS) method to examine the determinants of Sino-Zambia bilateral trade flows. With this method, due to the problem of multicollinearity among the variables used, dummy variables were omitted. Further, the same equation (6) was run using the Random-effects Poisson Regression method with an addition of four more variables (population for both Zambia and China and FDI stock for both China and Zambia). Table 3.1 below presents the regression results with Random-effects Poisson Regression results presented under column (1) and the Ordinary Least Squares under column (2).

Table 3.1 Regression Results for the determinants of Zambia-China Bilateral Trade

	Random-effects Poisson Regression	**OLS Regression**
	(1)	(2)
VARIABLES	Export_*ij*	Export_*ij*
gdp_*i*	0.272***	6.57e+07***
	(0.00182)	(1.11e+07)
gdppc_*i*	-0.00146***	-6.55e+07***
	(2.29e-05)	(1.08e+07)
gdp_*j*	-0.00221***	-2.35e+07***
	(4.32e-06)	(3946628)
gdppc_*j*	0.000114***	7249654***
	(4.24e-06)	(1567928)
pop_*i*	10.43***	
	(0.0259)	
pop_*j*	-0.130***	
	(0.000743)	
Fdi_i	0.285***	

[6] http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8

[7] http://databank.worldbank.org/data/reports.aspx?Code=NY.GDP.PCAP.CD&id=af3ce82b&report_name=Popular_indicators&populartype=series&ispopular=y

[8] http://www.ifs.du.edu/ifs/frm_CountryProfile.aspx?Country=ZM

[9] http://www.theglobaleconomy.com/rankings/fdi_dollars/

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	(-0.00186)	
Fdi_j	0.00384***	
	(-2.29E-05)	
Constant	76.48***	4.35e+08***
	(0.713)	(7.41e+07)
Observations	15	15
R-squared		0.9856
Adj R-squared		0.9748

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: country (*i)* is Zambia and country (*j)* is China.

From table 3.1, column (1) above, we can observe that what determines Zambia's trade with China are: Zambia's GDP, such that when other factors are held constant, a unit increase in GDP will lead to Zambia's exports to China rise by 27%. This is consistent with the gravity equation theory. The coefficient for this variable is positive and statistically significant at 99.9 percent significance level. This result suggests that Zambia's GDP is a key determinant of the country's capacity to export to China. A higher GDP means a higher production capacity which translates into exports. As such, activities which contribute to GDP are encouraged for Zambia to be able to export more to China. This finding is consistent with many other studies applying the gravity equation, for example Adekunle and Waanjiru (2013); Elmorsy (2015); Didier and Hoarau (2013). These studies all found the GDP for exporter countries to be positive and significant.

Zambia's population is also found to be positive and significant at 99.9 percent level of significance. Intuitively, this signals the importance of labor force in economic activities leading to increased GDP.

Zambia's FDI stock was also positive and statistically significant at 99.9 percent level of confidence. For FDI stock, our findings are consistent with other Sino-African studies which also indicated that FDI, especially Chinese FDI promoted African exports to China, for example Adekunle (2013) and Drummond and Liu (2013).

Further, the coefficient for China's GDP Per Capita was found to be statistically insignificant but positively correlated with Zambia's trade with China. This signifies that increased income in China leads to increased demand for imports from Zambia. Surprisingly, FDI stock in China was found to have a positive but insignificant influence on Zambia's trade with China. Investments in China are closely related to the growth of imports from Zambia, especially that Zambia mainly exports primary commodities demanded by China. This is consistent with Hailu (2010)'s findings that FDI was positive and statistically significant in influencing African exports to China such that a 1 percent increase in FDI in the previous year brings about 0.043 percent increases in export of the next period. Also, for example, Drummond and Liu (2013) found out that a 1 percentage point increase (decline) in China's domestic investment growth is associated with an average 0.6

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percentage point increase (decline) in SSA countries' export growth and that this impact is larger for resource-rich countries such as Zambia. This implies that China's economic growth has an indirect impact on SSA's trade trough price effects.

However, contrary to the economic theory, China's GDP was found to be negative though insignificant; implying that for every increase in Chinese GDP, Zambian exports to China would decrease by 0.00221 units. This could be a depiction of the reality of Zambian exports given their nature in terms of product composition. Zambian exports are highly concentrated, consisting of mainly mineral products, especially copper and cobalt. One key finding of Foad (2011)'study was that access to markets and securing raw materials determined China's trade with African Countries. This then signifies that, contrary to the prediction of the gravity model, China's GDP does not matter as China is interested in securing the raw materials for her local production demands. Our findings are consistent with other studies which have also found out that China's GDP portrays a negative influence on China's trade with African Countries. For example, Adekunle (2013): for the study of bilateral trade between China and Sub-Saharan African countries, the GDPs, FDI, GDP per capita and the exchange rate of Sub-Saharan countries had a positive and significant influence on their trade with China. However, when grouped into oil-rich and non-oil-rich countries, China's GDP was found to be negatively correlated with the non-oil-rich Sub-Saharan countries but positively related to the oil-rich African countries. This was also similar to Mukiibi (2006)'s where the GDP and GDP per capita for Uganda's trade partners were insignificant and negative, respectively. Similarly, in a study of BRICs trade with African Countries, Didier and Hoarau (2013), when estimated individually, the GDPs of African exporters were significantly positive. However, concerning the GDPs of importing countries, only the GDPs of Brazil and India conformed to the theory, meaning that the GDP for China was negative. In theory, this is unusual but it reflects the realities of African trade with China. Additionally, China's population was found to be negative and statistically insignificant in influencing the bilateral trade between Zambia and China.

Column (2) on table 3.1 above presents OLS regression results on the determinants of bilateral trade between Zambia and China. The results are consistent with the Random-effects Poisson Regression results presented on column (1) the same table above (3.1) in terms of estimation signs for the coefficients albeit varying magnitudes in influencing the bilateral trade between the two countries. For example, the regression results show that the effect of Zambia's GDP per capita income was negative and statistically significant at the 99.9 percent level under the GLS regression method with a coefficient of 6.5 percent while the Random-effects Poisson regression method had a coefficient of Zambia's GDPPC of -0.00146 units at 99.9 percent significance level. This implies that an increase in Zambia's GDP per capita income raises the absorption capacity of the domestic market, resulting into lower exports. This result is consistent with the findings of Karamuriro and Karukuza (2015). In a study of the determinants of Uganda's export performance, these authors found that a higher GDP per capita of Uganda reduced the export performance of Uganda's exports.

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3.1 Zambia's Trade Potential with China

Having investigated what determines Sino-Zambia bilateral trade and Zambia's trade with the other partners, it is also imperative to determine whether there is any potential for continued trade between the two countries. From the estimates of the determinants of trade between Zambia and China, based on the estimates for the gravity model, the trade potential was computed. The method of calculation is given below:

$$\text{Trade Potential} = \frac{\{\frac{Actual}{Predicted\ Exports}\} - 1}{\{\frac{Actual}{Predicted\ Exports}\} + 1} \quad (8)$$

$\binom{-}{+}$ *Used to standardize the exports*

Note: 1. (0, 1) = higher than predicted; reached potential

2. (-1, 0) = trade potential exists

Figure 3.1 below shows the general trend in Zambia's trade potential with China. We can see on the graph below that the potential for trade was declining beginning 2001 with a potential of -0.95 vanishing to -0.07 by 2013 before improving to -0.17 in 2014.

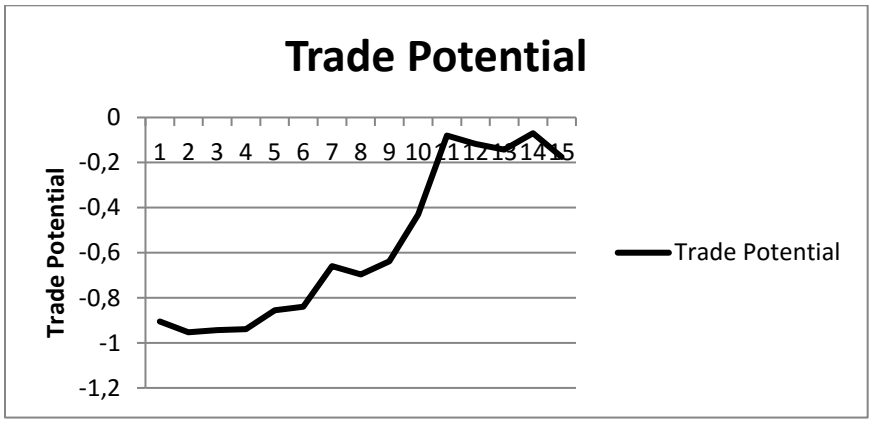

Figure 3.1 Zambia's Trade Potential with China (2000-2014)

Source: Author's own calculations, 2016

Table 3.2 below shows Zambia's trade potentials with top 7 sampled partners relative to China's. In comparative terms, Switzerland has the highest average trade potential with Zambia, with a potential of -1, followed by the Congo DR with -0.99. China, among the 7 sampled countries, is the number 4 most potential country Zambia could trade with, on average. This signifies

unrealized opportunities for deepened trade between the two countries. Zimbabwe, despite sharing a border with Zambia, sharing the same colonial history and using the same official language, in addition to belonging to two Regional Trade Agreements, has the least potential for trade. This is contrary to the predictions of the gravity model. There are two immediate inferences from this; the first one is that the potential is being depleted or that the countries are trading beyond the potential, in other words, they are over trading. The other one is that the two countries are similarly endowed with natural resources, they all do not have adequate capacity to further process them, as such, and they have to trade with other countries where their similar raw commodities are demanded like China, Switzerland and the Singapore, just as an example.

Table 3.2 Relative Average Trade Potentials (2000-2014)

No.	Country	Trade Potential
1	Switzerland	-1
2	Congo DR	-0.99
3	United Arab Emirates	-0.96
4	**China**	**-0.93**
5	South Africa	-0.92
6	Singapore	-0.80
7	Zimbabwe	-0.77

Source: Author's own Calculations, 2016.

One interesting finding is that Zambia still has potential for continued trade with all the top 7 trading partners. This should be an incentive for the Zambian government to further promote trade especially with China, given the trade preferences Zambia receives under the Forum on China-Africa Cooperation and the good bilateral relations the two enjoy. This calls for consented efforts in addressing barriers to trade even as measures towards diversification are scaled up.

4.0 Conclusion and Recommendations

4.1 Conclusion

In trying to understand the determinants of Zambia's trade with China, and whether Zambia still has trade potential with China relative to other partners, the traditional gravity model of International was used for the analysis covering 15 countries over a period 2000-2014 on panel data.

Our empirical results indicate that Zambia's GDP, population and the stock of investment positively and significantly determine Zambia's trade with China. Further, China's GDP per capita and FDI also have a positive influence on Sino-Zambia bilateral trade. The results also indicated that there still exist potential for further trade between China and Zambia.

4.2 Policy Implications

This present study found out that Zambia has huge trade potential with China

yet; trade is not as it is supposed to be. This has policy implications, requiring the redesigning of trade and investment policies to ensure that trade barriers are significantly reduced if the two countries were to benefit from enhanced trade between them. For example, Brulhart, et al, (2015) found that Zambian agricultural exporters face regulatory costs through regulatory measures as phytosanitary, non-GMO and fumigation certificates among others. Brulhart, Dihel and Kukenove (2015) and Arvis et al, (2015) further found out that the costs of exporting agricultural and manufacturing products from Zambia to key markets such as China, Japan, USA, and Germany are consistently higher than those for neighbors such as Malawi, Mozambique and Tanzania among others, yet trade with these very countries, as our stylized facts indicate, is very minimal. This therefore requires that Zambia addresses these issues by designing consistent and appropriate policies to be able to further benefit from the high trade potential with China.

4.3 Recommendations

4.3.1 Policy Direction

i. There is need for the Government of Zambia to design consistent and appropriate policies to reduce trade barriers. The elimination of barriers can improve Zambia's bilateral trade and foreign direct investment; however, such measures should be able to take into account nascent industries in the context of global competition so as not to hamper on Zambia's export diversification efforts.

ii. There is urgent need to investment in infrastructure development, especially transport and communications and power generation as this would increase economic activities leading to increased GDP and the subsequent export performance.

iii. There is need to strategically restructure/ strengthen local institutions and create an enabling environment for foreign direct investment, especially in the agricultural, infrastructure, manufacturing and tourism sectors. This is cardinal for the diversification and development of a resilient exports sector. This is core even as China now places emphasis on the "Go Global Strategy". Zambia can strategically position herself and attract the attention of Chinese investors.

4.3.2 Future Research Direction

Given the limitations of this study, which only looked at the trends and determinants of Sino-Zambia trade on aggregated panel data, we recommend that further detailed research (es) be instituted on the following broad areas:

i. Economic impact of Zambia's trade with China on the Zambian economy
ii. Zambia's agricultural trade with China
iii. A detailed sectoral study on how Sino-Zambia trade can be enhanced.

5.0 REFERENCES

(2016, 03 10). Retrieved from http://www.chinadaily.com.cn/china/2007-01/26/content_793504.htm

(2016, 03 10). Retrieved from http://www.chinadaily.com.cn/china/2007-01/26/content_793504.htm

AD, & African Development Bank Statistics Department. (2016). Yamoussoukro: ADB.

Adekunle, B. & Wanjiru, G.C. (2011). Illusion or Reality: Understanding the Trade Flow Between China and Sub-Saharn Africa. *CSAE 25TH Anniversary Conference.*

Alden, C. (2005). China in Africa: Survival. *Global Politics and Strategy 47:3*, 147-164.

Alden, C. (2005). Chinain Africa, Survival. *Global Politics and Strategy*, 147-164.

Alden, C. (2008). *China in Africa.*

Alleyne, A. & Lorde, T. (2014). A Gravity Model Approach to Analyzing the Trade. *Applied Econometrics and International Development Vol. 14-2*, 145-160.

Alleyne, Antonial & Troy L. (2014). A Gravity Model Approach to Analyzing the Trade Performance of CARICOM Member States. *Applied Econometrics and International Development*.

Anderson, E. (1979). A Theoretical Foundation for the Gravity Equation . *American Economic Review 69*, 106-116.

Anderson, J. E. & Van Wincoop, E. (2001). *Gravity with Gravitas: A Solution to the Border Puzzle.* Cambridge: National Bureau of Economics.

Anderson, J. E. & Van Wincoop, E. (2001). *Gravity with Gravitas: A Solution to the Border Puzzle.* Cambridge: National Bureau of Economics.

Anderson, J.E van Wincoop. (2003). Gravity with Gravitas: A Solution to the Border Puzzle. *American Economic Review 93*, 171-192.

Andrews-Speed, P., & Andrews-Speed, P, Liao, X., & Dannreuther. (2002). *The Strategic Implications of China's Energyy Needs: Adelphi Ppaper 346.* Oxford: Oxford University Press FOR IISS.

Arellano, M. (2005). Econometric Analysis of Panel Data. Third Edition Wiley, Baum, C.F,. Schaffer, M.E and Stillman, S. (2003) Instrumental Variables and GMM:estimation and Testing. *The Stata Journal-Boston College Department of Economics 3.*, 1-31.

Assefa, M. (2014). COMESA's Trade with China: Patterns and Prospects. *International Journal of African Development* , v1.n.2.

Balgati, B. (2005). Econometric Analysis of Panel Data.3rd Edition Wiley, Baum, C.F, Schaffer, M.E and Stillman, S.(2003) Instrumental Variables and GMM: Estimation and Testing. *The*

Stata Journal 3 Working Paper Version, Boston College Deprtment, 1-31.

Bergrand, J. (1990). The Hechscher-Ohlin-Samuelson Model, the Linder Hyposis and the Determinants of Trade: Intra-Industrry Trade. *Economic Journal 100*, 1216-1229.

Bergstrand, J. (1989). The Generalized Gravity Equation in International Trade: Monopolistic Competition and the Factor-Proportions theory in International Trade. *Review of Economics and Statistics 71*, 143-153.

Bergstrand, J. H. (1990). The Heckscher-Ohlin-Samuelson Model, The Linder Hypothesis and the Determinants of Bilateral Intra-Industry Trade. *Economic Journal 100*, 1216-1229.

Brautigam, D. (2009). *The Dragon's Gift: The Real Story of China in Africa.* Oxford: Oxford University Press.

Brulhart, M, et al . (2015). *More than Copper: Towerd the Diversification and Stabilization of Zambian Exports.* WB.

Central Statistical Office. (2014). *Zambia in Figures.* Lusaka: CSO.

Charoensukmongkol, P., Sexton, S. (2011). The effect of corruption on exports and. *LLatin American Business Review 12(2)*, 83-98.

Chen, W., Dollar, D. & Tang, H. (2015). *China's Direct Investment in Africa: Reality versus Myth .* Brookings.

Chen, W., Dollar, D. & Tang, H. (2015). *Why is China Investing in Africa? Evidence from the Firm Level.* Brookings.

Chileshe, C. (2010). *Chinese Debt, Aid and Trade: Opportunity or Threat for Zambia.* South African Institute of International Affairs.

Chinese Government. (2006). *China's Africa Policy.* Beijing.

Clarete, R., Edmonds, C. and Wallack, J. S. (2002). Asian Regionalism and its Effects on Trade in the 1980s and 1990. *Journal of Asian Economics, 14*, 91-129.

Coe, David T, and Alexander W Hoffmaister. (1998). *North-South Trade: Is Africa Unusual? Working Papers of the International Monetary Fund WP/98/94.* IMF.

Coporate M.G, Sova, A. & Sova, R. (2015). Trade Flows and Trade Specialization: The Case of China. *China Economic Review*, 261-273.

Deardorf, A. (1998). *Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?: The Regionalization of the World Economy.* Frankel. J, ed University of Chigago Press.

Deardorf, A. V. (1995). *Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?* NBER wORKING pAPER nO. 5377.

Didier, L. & Hoarau. (203). *Determinats of Bilateral Trade Between BRICS and*

Sub-Saharan Africa: What the Gravity Model Tells Us?

Drumond, P. &., & Drumond, P., & Liu, X. (2013). *Africa's Rising Exports to China: How Large are Spillovers Through Trade?* IMF.

Egger, P. (2000). A note on the Proper Econometric Specialization of the grvity Equation. *Economics Letters 66 (1)*, 25-31.

Egger, P. (2002). An Econometric View on the Estimation of Gravity Models and the Calculation of Trade Potential. *World Economy 25 (2)*, 297-312.

Elmorsy, Samah, S.A. . (n.d.). Determinants of Trade Intensity of Egypt and COMESA Countries. *Journal of the Global South*.

Elsenman, J. & rOGIN, j. . (2001). China Must Play by the Rule in Oil-Rich Sudan:. *Alexender's Gas and Oil Connections Vol.8 no.6 21 August*, 1.

Faneem, O. (2013). Modeling and Estimation of Gravity Equation in the presence of Zero Trade: A validation of Hypthothess,using Africa's Trade Data. *European Association of Agricultural Economics: Paper Presentation*.

Faustino, H., Proença, I. (2011). *Effects of immigration on intra-industry trade: a Logit.* Technical University of Lisbon.

Foad, H. (2011). *China's Trade with Africa and the Middle East: A Tale of Markets, Politics and Resources.*

Fuente,A., Murr, A. & Rascón, E. (2015). *Mapping Subnational Poverty in Zambia.* WB.

Green, W. (2003). *Econometric Analysis 5TH EDITION.* NJ: Upper Saddle RivER.

Hailu, Z. (2010). Impact of Foreign Direct Investment on Trade of African Countries. *International Journal of Economics and Finance Vol.2, No: 3*.

Hallak, J. C. (2006). *A Product-Quality View of the Linder Hypothesis.* Ann Arbor, Michigan: International Policy Center.

Hanauer, L., & Hanauer, L. and Morris, L. (2014). *Chinese Engagement in Africa: Drivers, Reactions and Implications for US Policy.*

Hare, P. (2007). China Zambia: The All-Weather Friendship Hits Strong Weather. *The Jamestown Foundation Brief, Vol (5), 8 March 9-9*.

Hausman, J. (1978). Specification Tests in Econometrics. *Econometica 46 (6)*, 1251-1272.

Helpman, E.& Krugamn, P.R. (1985). *Market Structure and International Trade.* Cambridge, MA: MIT Press.

Helpman, E., Melitz, M. and Rubinstein, Y. (2008). Estimating trade flows: trading partners and trading

volumes. *Quarterly Journal of Economics (73)*, 441–486.

Hong, C. (2005). *The political Economy of Tariff Protectio in China: Evidence from WTO Accessin. Dissertation Paper.* Davis: University of California.

Human Rights Watch . (2011). *' You' ll Be Fired if you Refuse': Labor Abuses in Zambia's Chinese State-Owned Copper Mines.*

Human Rights Watch. (2011). Retrieved from https://www.hrw.org/sites/default/files/reports/zambia1111ForWebUpload.pdf

Information Office of the State Council. (2013, August). Retrieved from http://english.gov.cn/archive/white_paper/2014/08/23/content_281474982986536.htm

International Centre For Trade and Sustainable Dev. (2013). Bridges Africa-Trade and Sustainable Development News and Analysis. *Bridges Network*.

International Futures. (2016, 04). *Country Profile-Zambia*. Retrieved from http://www.ifs.du.edu/ifs/frm_CountryProfile.aspx?Country=ZM

International Trade Center. (2016, 04 17). *Trade Map*. Retrieved from http://www.trademap.org/Bilateral_TS.aspx

J.E, A. (1979). A Theoretical Foundation For the Gravity Equation. *American Economic Review 69 (1)*, 106-116.

J.H., B. (1985). The Gravity Equation in International Trade: Some Macroeconomic Foundations and Empirical Evidence. *American Economic Review 69*, 474-481.

Jaffe, & Jaffe and Lewis Steven. (2002). Beijing's Oil Diplomacy. *Survival Volume no. 44 no.1, Spring*, 115-34.

Junbo, J. & Frasheri, D. (2014). Neo-Colonialism or De-Colonialism? China's Economic Engagement in Africa and the Implicxations for World Order. *African Journal of Political Science and International Relations*.

Junbo, J., & Frasheri. (2014). Neo-Colonialism or Decolonialism? China's Economic Engagement in Africa and the Implications for World Order. *Africa Journal of Political Science and International Relations*, 185-201.

Kane, T., & Kane, T. & Serewicz, L. (2001). China's Hunger: The Consequences of Risinf Demand for Food and Energy. *Prameters vol.31, Autunm*, 63-75.

Karamuriro, T. & Karakuza, W.N. (2015). Determinants of Uganda's Export Performance: A gravity Model Analysis. *International Journal of Business and Economics Research 4 (2)*, 45-54.

Kareem, F. O. (2013). *Modeling and Estimation of Gravity Equation in the Presence of Zero Trade: A Validation of Hypotheses Using Africa's Trade*

Data. Heinrich DukerWeg 12: University of Goettingen.

Learner, E. (1974). *The Commodity Composition of International Trade in Manufactures: An Empirical Analysis.* Oxford: Oxford Economic Papers 26.

Leitao, N. C. & Tripathi. (2013). *Portugese Trade and European Union: The Gravity Model.* Munich: MPRA.

Leslie, A. (2014). *Chinese Investments in Zambia: The Role of Governemnt in Protecting Workers.* Center for African Studies.

Linnemann, H. (1966). *An Econometric Study of International Trade Flows.* Amsterdam.

Linnemann, H. (1966). *Modeling International Trade Flows: An Economic Approach .* Armsterdam.

Maswana, J.-C. (2015). Colonial Patterns in the Growing Africa and China Interactions: Dependency and Trade Intensity Perspectives. *The Journal of Pan African Studies, Volume 8, No. October*.

Mohmand, Y. T. et al. (2015). Export Potentials of Pakistan: Evidence From the Gravity Model of Trade. *European Journal of Economic Studies*.

Mukiibi, P. (2016). *Determinants of Intra-Regional Trade Flows: A case of Uganda's Bilateral Trade With Her East African Community State Partners.* Kampala: Lawyer Issue.

P., H. (2007). cHINA AND Zambia: The All-Weather Friendhsip Hits Strong Weather. *The Jamestown Foundation Brief v11 (5) 8March* , 7-9.

Pigato, M, & Tang, W. (2015, March). *World Bank.* Retrieved from World Bank: http://www.worldbank.org/content/dam/Worldbank/Event/Africa/Investing%20in%20Africa%20Forum/2015/investing-in-africa-forum-china-and-africa-expanding-economic-ties-in-an-evolving-global-context.pdf

Pigato, M. & Tang, W. (2015). *China and Africa: Expanding Economic Ties in an Evolving Global Context.* World Bank.

Poyhonen, P. (1963). A Tentative Model for the Volume of Trade between Countries. *Welltwirtschaftliches Archive 90*, 93-100.

Roache, S. (2012). *China's Impact on World Commodity Markets: IMF Working Paper No. 12/115.* Washington: IMF.

Romei, V. (2015). *China and Africa: Trade Relationship Evolvels.* Finanacial Times.

Salameli, M. (1995-1996). China, Oil and the Risk of Regional Conflict. *Survival, Volume 37 no.4 Winter*, 133-46.

Samy, Y., Dehejia, V.H. (2011). Trade and labor standards in the European Union: A. *The International Trade Journal 25 (5)*, 581-618.

Sanusi, L. (2013). *Africa Must get Real about Chinese Ties:.* Retrieved from

Financial Times: http://www.ft.com/intl/cms/s/0/562692b0-898c-11e2-ad3f-00144feabdc0.html%23axzz2icnCpBl0

Serrano, R., Pinilla, V. (2012). The long-run decline in the share of agricultural and food. *Applied*, 4199-4210.

Subramanian, Arvind, and Natalia, T. Tamirisa. (2001: 30). *Africa's Trade Revisted: Working.* IMF.

Taylor, I. (2006). *Unpacking China's Resource Diplomacy in Africa.* University of St Andrews, School of International Relations .

The FDI Report. (2015). *Global Greenfield Investments Trends.* fDi Intelligence.

Tian, X. (2016). *Anew Era for China-Africa Relations.* The Thinker.

Tinbergen, J. (1962). *An Analysis of World Trade Flows.* New York: The Twentieth Century Fund.

UNCTAD. (2016). *COMTRADE*. Retrieved from http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx

World Bank. (2014, 4). Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/19300/888630NWP0REPL020Box385245000PUBLIC0.pdf?sequence=1&isAllowed=y

World Trade Organization. (2013). *World Trade Report.* Geneva: WTO.

Wu, D. (2014). *Every DAY lIFE OF cHINESE mIGRANTS IN zAMBIA: Emotion, Sociality and Moral Interaction.*

Zafar, A. (2007). *The Gravity Relationship Between China and Sub-Saharan Africa: Macroeconomics, Trade, Investment and Aid Links.* Oxford: Oxford University Press.