Zeppelin Universität

ZEPPELIN-Lehrstuhl für Internationale Wirtschaftstheorie & -politik

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Bachelor Thesis

Development Aid and Export-Performance: Chinese and Western Engagement in Africa

In what way does the Foreign Development Aid of OECD countries and China affect the Sub-Saharan Africa imports and exports?

An analysis of influencing factors using the extended Gravity Model

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Matriculation Number:	13101177
Field of Studies:	Sociology, Politics & Economics, 8th semester
Semester:	Fall 2016
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Date of Submission:	November 30th 2016

Abstract

In this thesis, the gravity model is applied on the foreign engagement in Sub-Saharan Africa. This model is normally used to explain the influence of the distance between two trading countries and each of their GDP on the exports and imports between these two. Therefore, firstly only the standard determinants of the basic model are used to calculate the impacts on trade between the OECD countries and China with Africa. Second, the development aid from the OECD countries and China to Africa are added as independent variable to the analysis in order to measure to which extent they influence trade. The results show that the OECD's aid has impact on the trade between its member states and Sub-Saharan Africa. Whereas, Chinese aid has no significant influence on their trade with Sub-Saharan Africa. Synthesizing the literature research to foreign engagement in Africa with the empirical results of the gravity model analysis, the meaning of development aid is discussed and it is tried to distinguish between the efficiency of the aid flows generated by two different partners.

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V. List of Abbreviations

AAA	Accra Agenda for Action
AIMS	Aid Information Management Systems
AsDB Special Funds	Asian Development Bank Special Funds
BCE	Before the Christian Era
BEC	Broad Economies Categories
CEPII	Centre d'Etudes Prospectives et d'Informations
CRS	OECD Creditor Reporting System
DA	Development Aid
DAC	Development Assistance Committee
EITI	Extractive Industries Transparency Initiative
Eximbank	Export Import Bank of China
FDA	Foreign Development Aid
FOCAC	Forum on China-Africa Cooperation
GDP	Gross Domestic Product
GNP	Gross National Product
HIPC	Heavily Indebted Poor Countries
Ibid.	ibidem
IDA	International Development Assistance
Max	Maximum
MDG	Millennium Development Goal
MDRI	Initiative and the Multilateral Debit Relief Initiative

Min	Minimum
MOFCOM	Ministry of Commerce of the People's Republic of China
N	Number of Observations
NAFTA	North American Free Trade Agreement
NEPAD	New Partnership for Africa's Development
ODA	Official Development Aid
OECD	Organization for Economic Co-operation and Development
OECD CRS	OECD Creditor Reporting System
OOF	Other Official Flows
SEZs	Special Economic Zones
St. Dev.	Standard Deviation
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
USA	United States of America
USD	US Dollar
WFP	World Food Programme

1. Introduction

By second half of the 20th century, international trade has been growing rapidly. Until the late 1990s this was mostly driven by the growing trade between existing bilateral trading partners and lesser by the emergence of new partnerships (Rubinstein, Helpman & Melitz, 2008). From then on, the expansion of global trade has spurred new global partnerships and created global economic players. Evaluating these new and "classical" connections will be a focus point in this thesis. Special attention will be given to China as an emerging new world economic player. Delivering astonishing growth rates of 6.7 per cent in the second quarter of 2016, China nowadays is the world's second largest economy following the United States of America (USA) (faz.net, 2016). China followed the trend of economic globalization shown by the Global North with means of opening to the outside world and actively promoting trade cooperation with other nations. Strengthening China's ties with other countries has placed them among the world's largest trade countries (Information Office of the State Council, 2016). Building up the partnerships with other developing countries was an integrate part of their global strategies. Furthermore, in addition to the historical trading partners that go back to the old silk road between China and Eurasia as well as the Arab world, China has proactively engaged in trading with African countries promoting mutual beneficial advantages exchanging resources and improving economic structures (ibid.).

Also the Western involvement in Africa has a long history and increased steadily since the late 1990s, especially when considering the ongoing efforts of political and economic reforms. There are promising signs of improved economic performance in Africa and a willingness to encourage the partnership and learn from past mistakes (UNCTAD, 2006). As an example, this is shown by the launch of the New Partnership for Africa's Development (NEPAD) (ibid.). By supporting Africa with topics on debt relief, public health and education, support and aid is the major pillar in the economic relationship (ibid.). In addition, China has started as new donor and development partner by giving aid and financial resources organized by the Chinese Department of Foreign Aid in the Ministry of Commerce

(MOFCOM), cooperating with the Chinese Ministry of Foreign Affairs (Bräutigam, 2010).

1.1 Target of the Thesis

Since the focus of foreign aid is to build up mutually beneficial trading partnerships and expansion of international trade, the correlation between foreign development aid and the global trade is evident (Bräutigam, 2010). This paper investigates whether development aid spurs trade between developing as well as lower developing countries and industrialized nations. As an example, a sample of Sub-Saharan African countries and the Organization for Economic Co-operation and Development (OECD) members as well as China is being evaluated by means of the gravity model has been chosen as methodology. In what manner international trade can be explained defined by which determinates is shown by the gravity model. It has been adapted further and used to evaluate trade flow effects of institutions, exchange-rate mechanisms, ethnic ties, linguistic identity and international border since its initiation in the 1960s (Anderson & van Wincoop, 2003). This novel approach in the thesis takes the additional new explanatory variable of the foreign development aid into account. To this date, no research has yet been found combining the gravity model with foreign assistance. One major objective of foreign aid is to jump start the economies of developing countries and consequently boost industry and trade, nationally as well as internationally (Bräutigam, 2010).

By examining their trade behavior special attention is given to the necessity of including a wide range of assistance and supporting organization or related institutions that participates in various global development processes. Citing Grimm et al. (2011) it is of importance to include all parties who play an increasing international role to further global efforts on greater aid transparency in order to gain more insight into information of aid flows and comparability. Selected in order to cover all the main characters and underlying drivers of trade relationship and its components, the aforementioned sample has been chosen. As increasing gravity literature is aiming to explain the impact of barriers and borders, a further focus of this thesis is to demonstrate that foreign aid development also opens borders and lowers trade barriers (Anderson & van Wincoop, 2003).

The objective is to adapt the gravity model with the sample and define variables that influence imports and exports. Further, it is aimed to provide insight into the sample's development aid showing if and how comparisons can be given. Being aware of the fact that a total transparency and absolute coverage of all the undertaken action on the global scale is unachievable, a vast amount of data and literature aims to widen as well as deepen the understanding as much as possible. In addition to this, the research question "In what way does the Foreign Development Aid of OECD countries and China affect the Sub-Saharan Africa imports and exports?" strives to be answered.

1.2 Overview

The thesis is structured as follows. In the subsequent chapter the challenges to the African economy are displayed (2.). Afterwards, an insight into the vast literature on foreign engagement in Africa (3.) by both, China (3.1) and the OECD countries (3.2), is given. Therein, a short historical epitome until nowadays of the development of the Chinese and the OECD members' relationship with Sub-Saharan Africa is presented. Afterwards, the transparency of aid information is defined and important points in reporting such data are explained (4.1) to subsequently describing the data (4.2). Following to this, the gravity model theory and its further elaboration will be presented in detail (5.). In the subsequent part, the aforementioned hypothesis will be tested in different calculations within the gravity model by adding the foreign development aid (5.2.2) and other control explanatory variables (5.2.3). In (6.), the empirical results of the gravity model analysis (6.1) and the robustness analysis (6.2) are described. The next paragraph is dedicated to discuss the results (7.). Subsequently, important conclusions are presented (8.). In the end, some limitations to the work are shown and an outlook to possible ensuing research is given (9.).

2. Challenges to African Economy

Since the mid-1990s there has been an acceleration of economic growth in Sub-Saharan Africa producing rising incomes and faster human development. Especially the oil-exporting and resource-intensive economies tend to grow fast but also the large- and middle-income economies as well as coastal and low-income nations are growing recently (Go & Page, 2008). Additionally, "[s]ince 1960, Africa has received $580 billion in aid" (UNCTAD, 2006: 14). From 1974 to 1992 the aid increased by twelve per cent from 16 to 28 points. In the later 1990s there has been a sharp downturn that recovered only by 2002. This recovery even surpassed the earlier peak (UNCTAD, 2006). But the problem is the still limping long-term success development and finding the recipe for building the right institutions and policies in order to diversify exports, raise savings and work around economic bad times (Go & Page, 2008). Nigeria and South-Africa are the two largest economies in Sub-Saharan Africa. Largest oil-exporting countries are Angola and Nigeria with a total of over 70 per cent of all exports from Africa (ibid.). 19 of the 47 countries are in the coastal region and account for about 53 per cent of the regional Gross Domestic Product (GDP) as well as 32 per cent of total population. Opposed to this, the landlocked countries only account for 17 per cent of the GDP. The growth rates describe almost similar developments of 4.4 per cent in the coastal and 4.2 per cent in the landlocked region. One of the major issues is the fact that 15 low-income countries, classified as low income and non-oil exporting, are home to 45 per cent of the total population but only 25 per cent of the total income are found in these countries. Also another issue is the 14 fragile states that hold 18 per cent of the population but only 10 per cent of total income (ibid.). In the past, richer countries experienced more growth accelerations whereas poorer countries had more growth collapses. Due to whether there is a conflict or not, growth acceleration falls behind and countries with major conflicts are trapped in a low-level equilibrium. Where countries with high savings and investment have higher probability of growth acceleration the terms of trade are surprisingly of lower quality during growth acceleration (ibid.).

Despite Africa's development and increasing growth rates, enhanced also by development aid flows from industrial states, the heterogeneity of donors and

their strategies still make it difficult to assess the overall impact of the given support, also driven by the fact that the average number of donors per country increased from 12 to 30 in the last 50 years (Go & Page, 2008; UNCTAD, 2006). Go and Page recognize the management of the risk of aid fluctuations as one of the major policy challenges in the macroeconomic framework of scaling up the foreign aid (2008). The emergence of new donors could also challenge the priorities within the agenda-setting of the industrialized nations and erode the purpose of their engagement (Bräutigam, 2010). Additionally, flexibility is disturbed by special and vertical funds such as earmarking of external flows or off-budget spending. Defining and following a clear line in terms of policy formulation and implementation of expenditure plans is no longer easily feasible (Go & Page, 2008). How manifold the Global Development Finance is defined is well presented in figure 2.1 where the single fragmentation is neatly arranged.

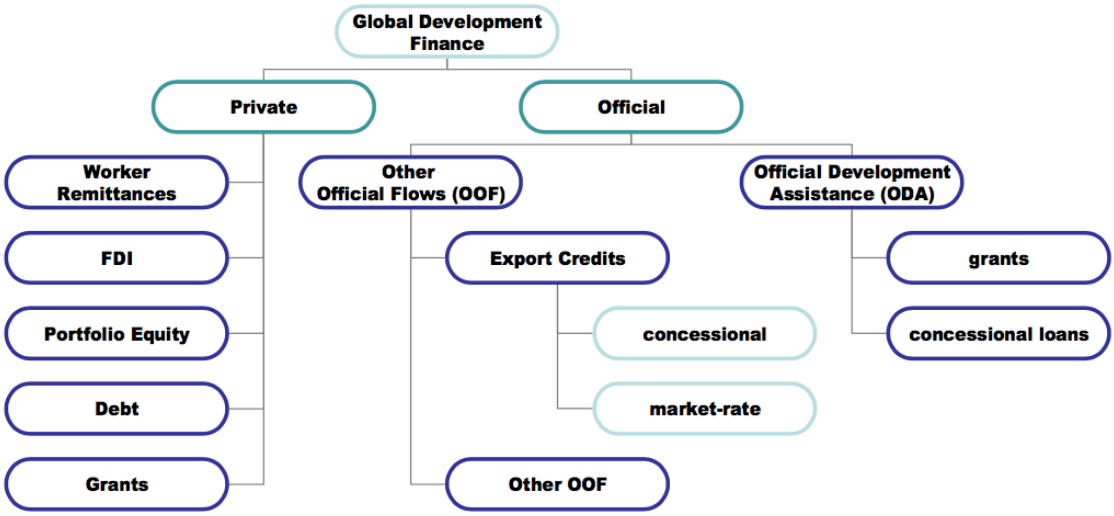

Fig. 2.1: Global Development Finance (Bräutigam, 2010).

So the definition of development aid, used within the scope of this paper, is the standardized definition of aid as an "Official Development Assistance" (ODA)[1].

[1]The definition, provided by the OECD is as follows:

i. provided by official agencies, including state and local governments, or by their executive agencies; and

ii. each transaction of which:

Bribing the global development is hence seen as official financing given at concessional rates to developing countries to promote normal welfare and economic development in the receiving country (Bräutigam, 2010; OECD, 2016). Using the definition of Deborah Bräutigam (2010: 5), the international aid

> "can be defined as the system of institutions, rules, norms, and practices that govern the transfer of concessional resources for development. It comprises four major areas: (1) Institutions and actors; (2) Volumes and composition; (4) Instruments and modalities, and (4) Rules and standards".

The money that comes from governments but does not meet the ODA criteria is thus called "Other Official Flows" (OOF) and herein used as all transaction which is not defined as ODA (Bräutigam, 2010).

However, it has to be mentioned that the definitions of the development aid of China and the OECD diverges in some parts. So for instance other than China does the Development Assistance Committee (DAC) count debt relief as official aid. As seen in the table 2.1 (Grimm et al., 2011) below, Chinese do include military aid and loans for foreign-aided joint ventures as well as cooperative projects in their external assistance. Furthermore, the payments for scholarships count to the OECD aid but not to the Chinese. Moreover, does the DAC not count the support of private investment as ODA (Bräutigam, 2010; Grimm et al., 2011).

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a) is administered with the promotion of the economic development and welfare of developing countries as its main objective; and

b) is concessional in character and conveys a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent). (OECD, 2016)

Table 1: Overview of differences in counting aid between China and DAC member states	
Included in Chinese aid figures, but not in DAC member statistics:	Reported by DAC members, but **excluded from Chinese aid figures**:
• Construction of sports facilities • Military assistance • Subsidised loans for joint ventures and cooperative projects	• Costs for foreign students • Debt relief • Costs for first year refugees in the donor country • Administrative costs for aid[1] • Parts of loans that are commercial[2]

[1] Implementing companies, however, can include a limited share of administrative costs (cf. Brautigam 2011).
[2] This practice has apparently changed in 2009, with announcements made at the Sharm el Sheikh meeting of the Forum on China-Africa Cooperation. Since then, the full amounts of concessional loans are included in the announced aid figures. The fiscal budget, however, only includes the subsidies to the loan, not the overall amount, as the capital of concessional loans is collected by EXIM Bank (interview, 28 June 2011).

Table 2.1: Overview of Differences in counting Aid between China and DAC Member States (Grimm et al., 2011)

3. Foreign Engagement in Sub-Saharan Africa

In this chapter, an overview about the Chinese and the Global North's engagement is given. Both, the historical and contemporary development of the relationship between China and the Global North with Sub-Saharan Africa is described. It aims to give a better understanding of the major foreign influencers on the African continent.

3.1 China

3.1.1 Historical Background

To understand the Chinese relation to the African country, an overview of former developments is given to deepen the understanding of important historical connections. 600 BCE horseback riding in the Eurasian steppe was discovered by the nomads and only 200 years later cavalries emerged and a first form of organized trade and communication was established (Liu, 2010). It was the nomads of the Central Asian steppe who brought west and east together (Liu, 2010). Silk which was common in China but precious and rare to the nomads was the first good traded between these two tribes. King Wuling of the state Zhao copied the nomads' tactics and horsemanship and therewith reformed its army (Liu, 2010). It was mainly the ruling elites who demanded for exotic goods from foreign lands in the early international commerce. Marketing their own goods was of minor importance. By securing the trade routes and the emergence of oases, caravan cities and religious facilities along the routes, also information on foreign climate, foods, clothing, and currencies traveled between East Asia and South Asia and the Mediterranean. The Han Empire also contributed to the demand for certain trade goods and this is how the routes, today still known as the Silk Road, became the major arteries of communication and transportation of Eurasia (Liu, 2010). Chinese was the spoken language of cross-cultural communication outside the Great Wall (Liu, 2010).

Later in the 13th century, porcelain and a lot of different other goods were traded and porcelain gained fame in Eurasia and East Africa. Better transported via sea than over land, the sea routes for trading the cobalt blue painted good went from

Quanzhou to Borneo, the Swahili coast of East Africa, Quilon on India's southwestern coast and Siraf in the Persian Gulf. This new way of transportation in the Silk Road's network overshadowed and finally replaced the Eurasian land routes (Liu, 2010).

3.1.2 Recent Economic Endeavors

China started venturing in Africa in the early 1950s. The Chinese were driven by the will to break the diplomatic isolation imposed by Western powers. Building costly railways and stadiums for football and political rallies Mao's anti-imperialist struggle was seeking for support on the African continent (Zhao, 2015). Their investment payed off because the African countries played a decisive role in the UN entry in 1971. Afterwards, in the late 1980s, the "decade of neglect" (ibid.) tore China's foreign policy apart from Africa moving towards Western industrialized countries.

At the beginning of the 21st century China turned back to Africa motivated by economic incentives to secure African natural resources to sustain their own tremendous growth and therewith preventing tensions coming from concerns about the sustainable development and political stability. Hence, China intensified their political as well as commercial relationships with resource-rich nations by developing diplomatic measures. Therefore, they built up the largest number of embassies and consulates (Grimm et al., 2011; Zhao, 2015).

Not only obtaining resources but also selling manufactured goods on unsaturated markets was the other main goal of the Chinese Africa strategy. The China-instigated Forum on China-Africa Cooperation (FOCAC) was established in 2000 giving a multilateral platform to enhance economic ties. In the same year the Forum also established further organs and councils[2], that bolster the trade relationship between China and Africa forcefully (Grimm et al., 2011; Johnston, Morgan, & Wang, 2015). There is a summit, within the scope of the FOCAC, for

[2] This has been the following organs and councils: China-Africa Business Conference, China-Africa Business Council, China-Africa Development Fund, Sino-Africa Business and Investment Forum

high ranking politicians every three years (Grimm et al., 2011). This shows the emerging need to expand the Chinese political influence in Africa (Zhao, 2015). Referring to this engagement the presidents of Senegal and Nigeria agree in common mode by declaring that from their point of view, Europe lags far behind, so China will lead the world and Africa wants to stay close to be part of the leadership (ibid.).

In figure 3.1 (Pigato & Tang, 2015) the increase of imports and exports over time, pictured on the abscissa, can be seen with a one-year exception in 2009 which is to ascribe to the global financial crisis. On the ordinate, the trade value in USD in billions is presented. The orange bar represents the Sub-Saharan African imports to China and increased from a value of nearly zero to almost $70 billion in the recent 20 years. Depicted through the blue bars, a nearly similar development can be watched. Only during the last five years, the Sub-Saharan Africa's exports to China exceed the imports clearly. Shown within the green line, the balance also increases only with a little slump after 2008 but getting already back on track by 2010.

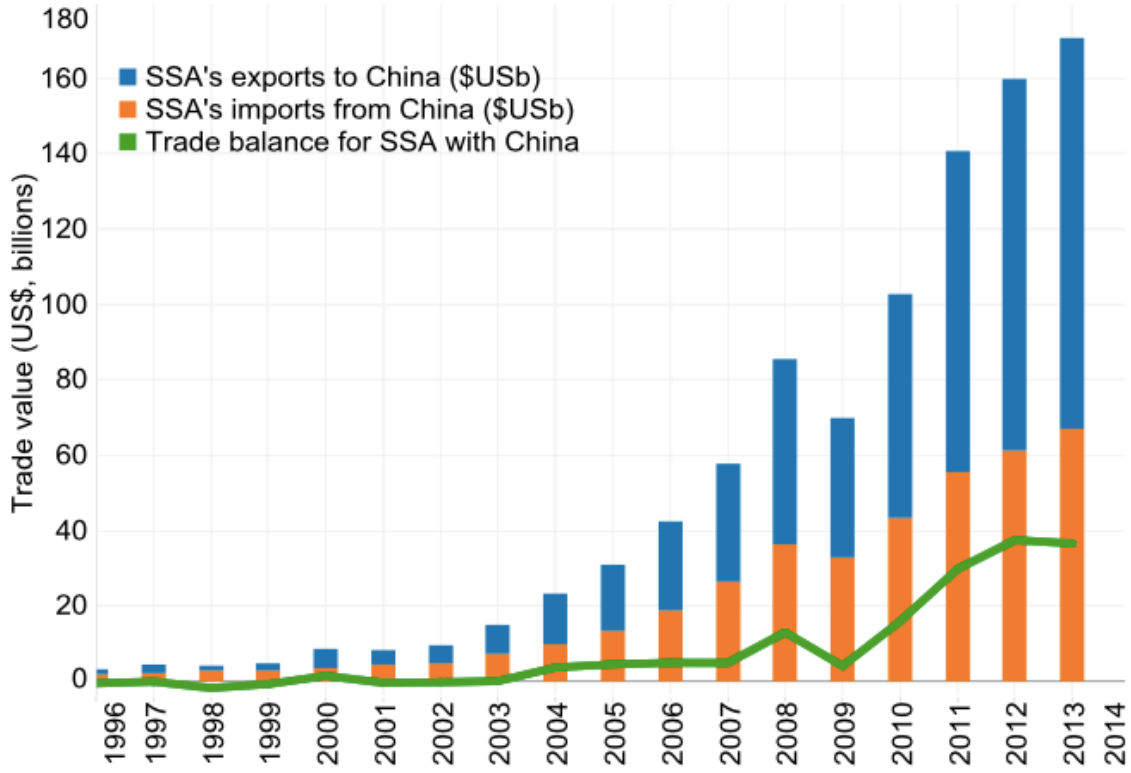

Fig. 3.1: Imports, Exports and Trade Balance between China and Sub-Saharan Africa (SSA) (Pigato & Tang, 2015)

Due to this, also the Chinese share in Sub-Saharan Africa's total trade increased tremendously, presented in figure 3.2 (Pigato & Tang, 2015) by the blue line that describes a strong slope from 3 per cent by 1996 to 24 per cent by 2013. Whereby, the Sub-Saharan African share in China's total trade, illustrated on the ordinate, increased only to a small degree as illustrated by the orange line. It went from 0 per cent by 1996 to 4 per cent by 2013. Comparing these figures, an African dependency on the trade with China can be discerned. Herein, the years are also presented on the abscissa.

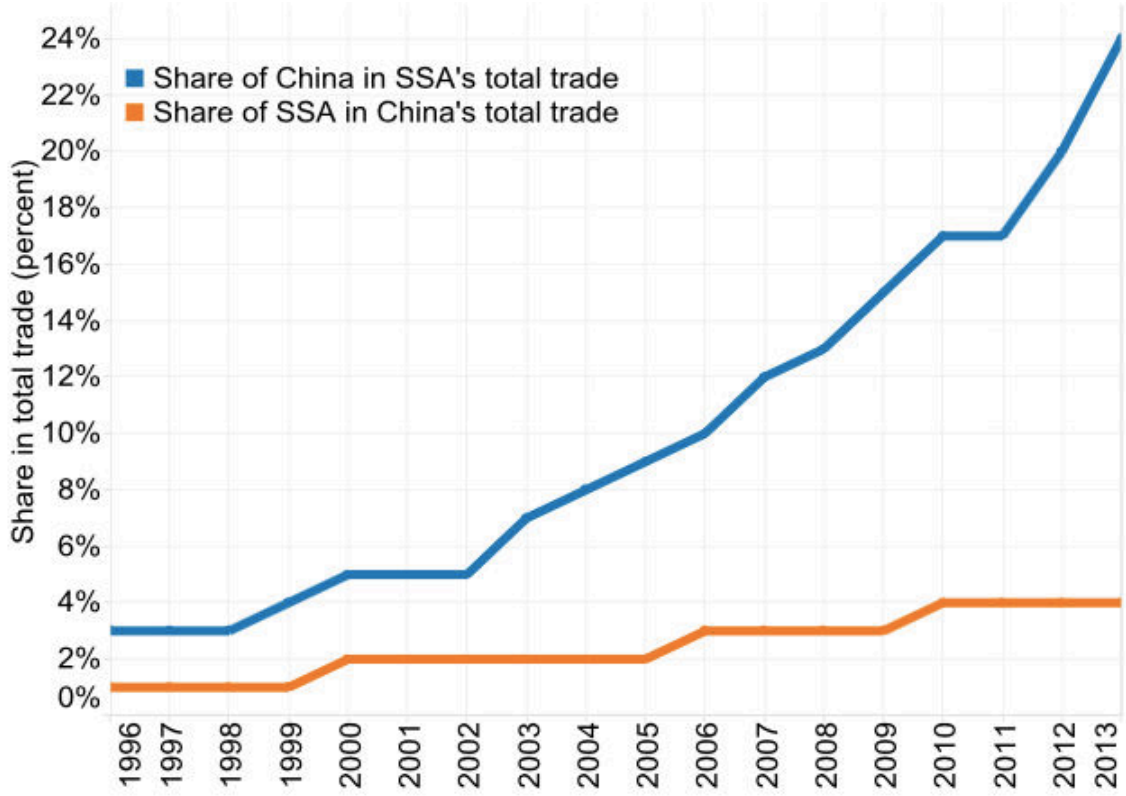

Fig. 3.2: Relative Trade Shares (Pigato & Tang, 2015)

Looking at both graphs, an ongoing increase of these growth figures can be expected and so China is planning a resumption of work on the so-called Silk Road to keep track in consolidating the ways between China and Africa. "One Belt, One Road" (Lo, 2015) shall spur international trade on a long term and also open up domestic and political objectives. The idea is to connect and respectively to reinforce China with the rest of Asia, Europe and also Africa by land and sea and to revitalize old, historical paths and trade connections (ibid.). This reinitialization is also an answer to major international, mostly Western-induced

pacts, where China has been excluded (ibid.). It is estimated by the Chinese that this measure will secure foreign trade relationships and boost the renminbi on an international stage (ibid.).

Besides driving the Silk Road forward, China is recently also investing in many aid projects in Sub-Saharan Africa countries, especially in the Sudan[3], the South Sudan[4], Ethiopia and the Ivory Coast (Dreher et al., 2014). Thereby, China takes an unusual position as simultaneously being recipient and donor of aid at the same time. Indeed, by 2008 they had due to Premier Wen Jiabao already provided $30 billion in official aid to other developing countries. Here, it has to be considered that the Chinese do not report their official aid following certain standards and hence cannot be proven in detail. But when calculating with the Chinese sources, by 2008, China donated $1.4 billion to Africa and hence is one of the major donors of the continent (Bräutigam, 2010).

Dreher et al. speculate that China's aid tends to be more effective and more flexible than Western aid (2014). Despite, China is very much interested in benefitting the governments and promoting the African state elites, while the Western aid concentrates on reducing poverty. So there is a large discrepancy between the recipients' needs (Dreher et al., 2014). This presumption can also be supported by looking at Chinese investment to prestige projects that build up sports stadiums, conference and concert halls, Ministry of Foreign Affairs buildings (Bräutigam, 2010). Hillary Clinton, then US Secretary, accused Chinese firms and the government to conduct "new colonialism" (Zhao, 2015: 1) on the African continent and said they were only interested in extracting natural resources to enrich themselves.

The opinions in Sub-Saharan Africa are torn apart and are as heterogeneous as their nations are. For instance Jacob Zuma, South African President, sees foreign

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[3] There has been an oil boom by 1999. Since then, they can export oil and have a economic growth rate of seven per cent (Gieler, 2016).

[4] After the separation from the Sudan by 2011, they have 85 per cent of the oil production regions of the Former Sudan's oil production region. Nowadays, the oil business represents 98 per cent of the GDP. Furthermore, China offered credits for the construction of a new pipeline to the Kenyan ports (Gieler, 2016).

engagement critically and warns at the 2012 FOCAC that “Africa’s past economic experiences with Europe dictates a need to be cautious when entering into partnerships with other economies” (Zhao, 2015). Zuma describes the economic ties with China as “unsustainable in the long term” (Zhao, 2015, 6). On the one hand, there is the general population and on the other hand, there is the governing elites and both of their needs should be satisfied equally. It appears to happen that their associated interests do not necessarily align (Dreher et al., 2014). So China’s Vice-Foreign Minister Zhai Jun sees the economic backing of China as an opportunity for Africa which they never had under the Western world order (Zhao, 2015). China builds up infrastructures to create “real development” where Western countries were too shy to do so (ibid.). Some African leaders describe the Chinese-African relationship as neutral, business-oriented and able to generate real economic growth for both countries. They rate China’s interest as pure and broadly welcomed. Based on its comparative advantage, China could find niches and gain solid ground (ibid.). Additionally, China concentrates its aid in areas that have received little attention from the OECD in recent decades. For example, financing the massive improvement of the infrastructure by building bridges, roads and water systems as well as supporting the agricultural sector (Bräutigam, 2010). As a first interim conclusion the engagement of China in Africa can be assessed as a “win-win relationship” (Zhao, 2015).

In order to distance themselves and their actions from the Western definition and practices that are known from former development attempts the Chinese do not like using the word “aid” but “external assistance” (Grimm et al., 2011). Additionally, another reason for this may be that aid figures are still a sensitive issue in China because it is seen as “handouts” which are immoral due to Chinese cultural tradition and philosophy (ibid.). It can be assumed that this is the reason for not mentioning the term development aid on their official government website and corresponding White Papers (Information Office of the State Council, 2016).

3.1.3 New Economic Developments

The new trade theory after Eisenmann (2015) says that increasing returns to scale can be another motive for specialization and trade besides comparative trade. So Paul Krugman states, that returns to scale can cause trade even when comparative advantage is insignificant among countries with the same resources and technology (Eisenman, 2015). Beijing tries to benefit from the increasing returns to scale by setting up Special Economic Zones (SEZs) where they can allure foreign investments and promote Chinese exports by inducing cheap labor and tax breaks. But it has to be mentioned that the SEZs in Shenzhen only were so successful because of the bargaining among the political elites in Beijing. This empowers the argument of Thomas I. Palley, who declares, that the comparative advantage originates in technological development (Zhao, 2015). This shows that the previously presented factor abundance theory alone is not the single explanation for Chinese trade patterns in Africa. On top, also the reduction of trade costs is a decisive factor. This is why in 2009, the Chinese National Development and Reform Commission endorsed the establishment of the Tianjin Shipbuilding Industry Fund that improved the port capacity of different African cities, including the East Africa coast which is the gateway for oil and fuel shipments to China (ibid.).

Mansfield et al. (in: Eisenman, 2015) found out, that a democracy and autocracy engage 15-20 per cent less commerce than a dyad composed of two democracies. So China tends to trade with governments that have illiberal norms which influences Africa negatively because it interrupts peace, prosperity and democracy. This is why China aligns its economic perspective to the African elites interests[5] to face fewer obstacles originating from institutions and commitment to constitutional law (Zhao, 2015). By the Chinese expended economic relations, Africa becomes more illiberal which likewise weakens the local efforts to increase good governance. At the same time, the “Go Global”-strategy by China does hamper the chance of Africa to enter the Chinese market because China is flooding the African market with low quality but affordable consumer products that

[5] In detail defined in the paper of Dreher et al. (2014).

are subsidized in China and shipped to Africa (ibid.). Together with China's need for raw materials those two facts are the dual engine for growth of the Sino-African commerce. Unfortunately, this condemns Africa to underdevelopment referring to the former South African President Thabo Mbeki in 2006 (Eisenman, 2015; Johnston et al., 2015). Also the Nigerian newspaper "This Day" wrote in August 2011 that Africa should rather focus on a long term development instead of satisfying its present greed. The article claims for a team that is capable of strategic thinking to generate a sustainable Chinese policy (Eisenman, 2015).

All in all, it can be said that Africa still depends on the exports of natural resources to China. But at the same time it emerges impatience and frustration. This comes from hindered exports of labor-intensive African goods and Chinese subsidies on African manufactured goods, political support for autocratic regimes and trade barriers (Eisenman, 2015).

3.1.4 Review the Chinese Behavior in Africa

Speaking of the Chinese engagement in Africa, literature tends to rise critique to their behavior which is occasionally regarded as inappropriate (Eisenman, 2015). For example, while the genocide in Darfur in the Sudan, China continued business in the region and even delivered weapons used by the militias against the rebellions. Lindsey Hilsum described the Chinese behavior as "shrewd, selfish, calculating, greedy and primitive because it prioritizes its economic and political interests over ordinary people's human rights in its dealing with African countries." (Hilsum, 2005). Also when it comes to corruption Zhao states that China continues to support the African countries whereas it is excepted by the United States and Europe to behave in a socially responsible way (2015). This may be explained from a Chinese perspective as a result of the non-interference policy which is practiced when giving aid. Because, compared to the OECD, China does not align its aid with political or economic conditions neither will they intervene in international affairs of other countries. However, their money is tied to their own goods and services which will positively influence the Chinese merits of the bilateral trade with Africa (Bräutigam, 2010). Another issue that may be the cause for such a behavior is that China still sees itself as a developing country, despite they number among the so-called "new donors". It puts its own domestic

needs first when giving external assistance to Africa, which may harm the African interests heavily (Bräutigam, 2010; Grimm et al., 2011). Meanwhile such inconsiderate appearance, the undermining of the efforts to promote democracy, transparency, human rights and good governance poses a danger to the sustainable and socially acceptable development in Africa (Zhao, 2015).

Another indicator to short-term oriented development strategy is that China mostly hires its own professionals and pays the local workers low wages and treats them despotically. For example, in Angola by 2009 70-80 per cent were Chinese workers whereas the American energy company Chevron hired 90 per cent Angolan laborers also including engineers and managers. On the contrary, China employed less than 15 per cent Angolans who were working at the bottom of wage scale (Eisenman, 2015).

To prevent such behavior, in 2003, the OECD founded the Extractive Industries Transparency Initiative (EITI)[6] that shall provide transparent reporting of activities, hamper bribe and show transparently the foreign money awarded and spent. The problem is that China is not participating in the EITI because it is convinced a sufficient transparency will arise after the economic development worked (Zhao, 2015). The issue of lacking transparency will be discussed in chapter four.

Several factors are driving the motivation of the China-Africa trade consistently. China's fast growing economy has a clear comparative advantage in labor-intensive and capital-intensive production while Africa has an abundant natural resource endowment (Eisenman, 2015). Moreover, China emphasizes building an infrastructure both at home and in Africa. This also supports the emergence of economies of scale in shipping and light manufacturing sectors (ibid.). In order to enforce the relationship with the elites and moreover with the elites of tomorrow, Beijing is building up universities and funds existing schools "to win the hearts and minds of future African leaders" (Lotter, 2016: 39).

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[6] "The EITI Standard is the international standard for transparency and accountability around countries' oil, gas and mineral resources." (EITI, 2016).

3.2 Global North

3.2.1 Historical Background

Since 50 years, western donors are sending trillions of dollars of development aid to Sub-Saharan Africa but still fail to pull them out of poverty (Lotter, 2016). Nevertheless, the multilateral donors attempt to improve aid flows and hence are assumed to be key to create a strong base of development aid in the world. Since 1970 there has been a significant growth in multilateral donation of ODA that can be seen in figure 3.3 (OECD, 2015). On the abscissa, the years since 1970 until nowadays are displayed and the ordinate shows the ODA in billion USD with 2013 prices and exchange rates. Here, the blue line represents the EU Institutions who surpassed all other organizations and thus spends the most ODA since the mid-1990s. Second most is donated by the International Development Assistance (IDA) but they do not look back to a strong growth of ODA as the EU Institutions do. The Asian Development Bank Special Funds (AsDB Special Funds), the United Nations Development Programme (UNDP) and the World Food Programme (WFP) only give small amounts of ODA lingering around between $0 and $2 billion without remarkable rise.

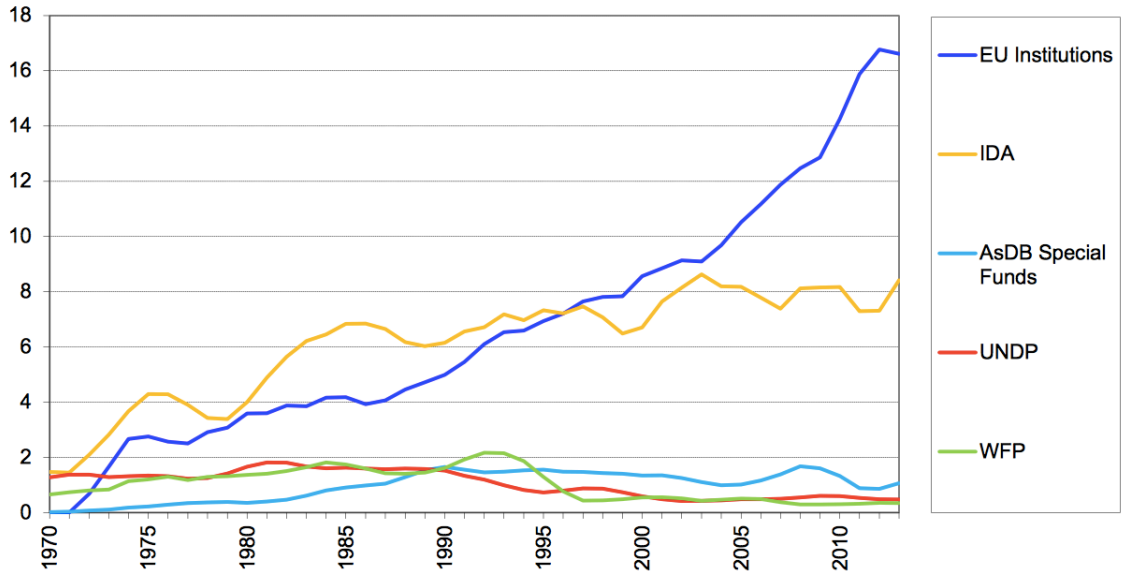

Fig. 3.3: ODA by largest multilateral Donors since 1970 (USD billion, 2013 Prices and Exchange Rates, 3-year Average Net Disbursements) (OECD, 2015)

The simultaneously given bilateral aid to Africa also describes a growing curve despite some slumps during global financial crisis or shocks and important historical events that likewise influenced the world economy and political environment such as the fall of the Berlin Wall around 1990. Figure 3.4 (OECD, 2015) shows an overview of the developments. Where the United States take over the lead with more than $9 billion by 2012 and France, the United Kingdom, Germany and Japan range between $2 billion and $4 billion in the same year. Almost all slopes increase consistently, only France and recently also Japan tend to have decreasing ODA.

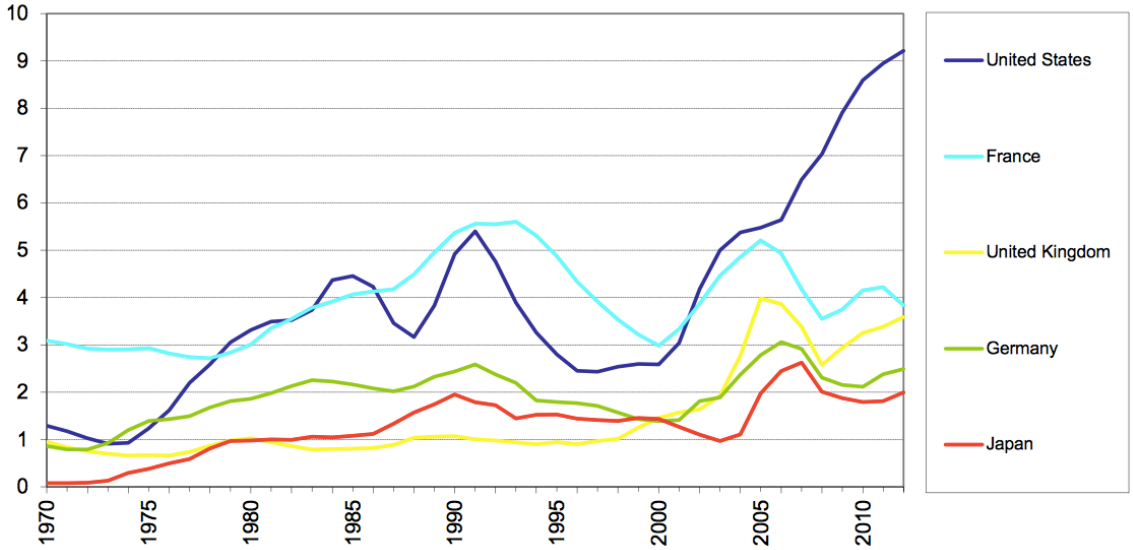

Fig. 3.4: ODA to Africa by largest bilateral Donors since 1970 (USD billion, 2013 Prices and Exchange Rates, 3-year average Net bilateral Disbursements) (OECD, 2015)

However, referring to United Nations Conference on Development and Trade (UNCTAD), the African continent is already far behind in meeting the Millennium Development Goals (MDG). To catch up, they would need an annual sustained growth of eight per cent which is well above the 5.5 per cent that are expected (UNCTAD, 2006). As an answer, the foreign aid framework has changed during the recent years. Besides the MDG, it mainly aims to reduce extreme poverty and infant mortality, improving education and health. There has also been a remarkably shift towards country-owned poverty reduction strategies (ibid.). Similarly, the debt relief of the poor countries by the Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debit Relief Initiative (MDRI) as

well as the promised up scaling of the foreign aid by the industrial nations was authorized (ibid.). Especially speaking about Sub-Saharan Africa, the Group of Eight countries pledged at the 2005 Gleneagles Summit to double the aid for this critical region (Go & Page, 2008).

The rationale of a more purposeful development was initially advanced by the Bretton Woods Conference and the Marshall Plan, that spurred the creation of the United Nations and subsequently institutionalized the logic of multilateral economic rules (Go & Page, 2008). Even if the objective of the Marshall Plan and the then newly established World Bank was to reconstruct the war-torn Europe, they simultaneously gave rise to the consciousness of using the benefits of the scientific advance and industrial progress to support underdeveloped regions helping them to grow and improve the economic situation (ibid.). By 1950, the Act of International Development was passed in order to develop resources and improve the living conditions in stunted areas (UNCTAD, 2006). Main thinking of this was that growth and development should become self-sustaining over time in order to make aid redundant at a certain point (ibid.). Therewith, the basic purpose of aid should be to allow the receiving country to increase their consumption and investment by using the external assistance, provided by the donors. This macroeconomic strategy of aid absorption and spending is instrumental in supporting growth and reducing poverty. While also special attention needs to be paid avoiding the Dutch Disease when pushing the exports forward (Go & Page, 2008).

By 2000, all member states of the UN Millennium Summit agreed on reducing world poverty by signing the declaration of the MDGs. Afterwards, there have been many follow-up events[7] on defining these goals and keeping on track (UNCTAD, 2006). By 2006, the United Nations proposed to double its aid in aiming to “make poverty history” but security concerns and energy politics are

[7] UN Financing for Development (FFD) Conference in Monterrey, Mexico in March 2002 (UN, 2002), the High Level Forum on Harmonization in Rome in February 2003, the High Level Forum on Aid Effectiveness in Paris (February/ March, 2005), the Group of Eight (G8) Heads of States Meeting in Gleneagles, Scotland in July 2005 and, in September of the same year, the UN World Summit in New York (UNCTAD, 2006).

shaping the policy debates on aid and development. Also the unwillingness of African leaders to forsake short-term rent-seeking behavior for longer-term commitments to productive investments is hindering the development on aid effectiveness from the Global North (ibid.). The aforementioned issues of absorption and spending of aid also point to replacing short-term fiscal policy decisions by medium- and longer-term policy and expenditure frameworks in order to stabilize the spending path (ibid.).

3.2.2 Recent Economic Endeavors

Within the realm of the thesis the Western engagement in Africa is mainly defined as the endeavors of the OECD, which means especially the DAC. Therefore, the strategy declared by 2008 in the Paris Declaration on Aid Effectiveness (Paris Declaration) and the Accra Agenda for Action (AAA) come into focus (OECD, 2016). As it is written on the OECD website, “the [African] continent needs to better harness its other resources to create opportunities for its population and economy, in line with Agenda 2063” (OECD, 2016) to gain opportunities and face challenges of a globalizing world. The DAC gathers the world’s most important donors, defining and overseeing global standards in areas that are key to development. They mostly perform in the scope of multilateral donor institutions that are presented in table 3.1 (OECD, 2015) where the years from 2012 to 2014 are shown and the 3-year average as well as the percentage of all multilaterals given. The EU Institutions are ahead with an average more than $16,000 million, followed by the IDA that approximately donates half the ODA average. On the places three to eight, the numbers range around $3500 and $1000 million. The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and the Global Environment Facility (GEF) come in last with less than $1000 million. The percentage of all multilaterals is respectively distributed.

		2012	2013	2014	**3-year average**	% of all multilaterals
1	EU Institutions	17 173	15 645	16 389	**16 403**	39%
2	IDA	6 840	8 172	10 262	**8 425**	20%
3	Global Fund	3 307	3 946	2 847	**3 367**	8%
4	African Dev.Bank	1 902	2 324	2 042	**2 089**	5%
5	IDB Special Fund	1 413	1 930	1 719	**1 687**	4%
6	GAVI	1 068	1 544	1 415	**1 342**	3%
7	UNICEF	1 140	1 230	1 295	**1 222**	3%
8	AsDB Special Funds	716	1 004	1 477	**1 066**	3%
9	UNRWA	667	539	680	**629**	2%
10	GEF	537	573	605	**572**	1%
	Other multilaterals	4 545	5 278	4 418	**4 747**	11%
	Total multilaterals	**39 309**	**42 185**	**43 151**	**41 548**	**100%**

Table 3.1: Top ten multilateral Donors (USD million, Net Disbursements) (OECD, 2015)

The declaration targets to achieve a more positive outcome. Prerequisites to the developer are a greater local ownership of aid programs, the de-politicization of aid, greater policy space for the receiving countries and less intrusive policy conditions (UNCTAD, 2006). Key to achieving these is a greater multilateralization of aid as well as a greater coherence, transparency and accountability. So the OECD's claim for lower transaction costs, an improvement of the predictability of disbursement and a reduction of demands on recipient institutions (ibid.). The overall strategy of the OCED countries aid is to give growth-oriented and productive investments that balances out growth-enhancing and social development goals to ensure higher economic growth rates in order to reduce aid dependency in the longer-term and likewise ensure that reductions in poverty will not revert (ibid.). Hitherto, the OECD also used its ODA to support exports by improving infrastructure projects by using the own firms and technologies. This is why nowadays concessional exports credits that are tied to aid, are only allowed when the projects are commercially nonviable (Bräutigam, 2010).

3.2.1 Review the OECD Countries' Behavior in Africa

A problem that has been identified watching the recent 50 years of aid flows to Africa is that 50 percent of government budgets of African countries commonly are derived by foreign aid. Don Lotter calls this a "recipe for dependency and bloated governments" (2016: 39) that fails to reach the regions and people who are really in need of the development programs. In addition to that, the government employees are often less educated. With the additional self-feeding corruption, an efficient development work is nearly impossible and does not lead to the achievement of the donors' plans (ibid.). Also the multiplicity of donors with diverging outlooks, programs, accounting systems and priorities has created a chaotic action with a lack of oversight by recipient governments or national institutions. This stretches the bureaucratic abilities of the OECD countries leading to a cut back of aid efficiency (ibid.).

Therefore, the importance of fiscal management, strengthened budget systems and longer-term expenditure framework is directly linked to the target of reducing extreme poverty (Go & Page, 2008). Measuring the effectiveness of aid, growth and poverty motivated the World Bank to apply various microeconomic techniques and tools for evaluating how economic policies on poverty and income distribution are influenced. Since it is crucial surveying the institutional and organizational inside of the financial management, adding microeconomic analyses to the macroeconomic framework will deliver a broader picture and hence an overview of effectiveness of aid in greater detail (ibid.).

Considering the foreign engagement of China and the OECD countries depicted above, the following hypothesis is derived. It will later be tested within a panel data analysis:

When adding OECD countries' and China's foreign development aid as independent variable to the gravity model, it will show a positive impact on the exports and imports between them and Sub-Saharan Africa.

4. Availability of Data

This chapter surveys the data situation of the external assistance and financing resources that flow between China respectively the OECD countries and Sub-Saharan Africa. A more differentiated idea of the necessity of data availability shall be given. Therefore, the first part is dedicated to portray the transparency of aid information to subsequently closer describe the used data.

4.1 Transparency of Aid Information

To gain a clear view over the given aid to Africa, it is necessary to regard assistance beyond the DAC members. Therefore, also the aid information of the BRICS states, in the scope of this paper, this means China in particular, needs to be included to compare the different aid types and patterns (Grimm et al., 2011). Long ago, the DAC agreed to report their financial flows using standardized definitions and categories. Surprisingly, also 18 non-members of the DAC voluntarily report their financial flows transparently whereas China, Russia, India and Brazil still refuse to turn their aid flows transparent (Bräutigam, 2010).

This lack of information gives even more reason reaching beyond the governmental aid and collecting also data about organization's and firm's aid in order to get a feel for how much of ODA and OOF is donated and which implications can be derived to adjust the future strategy. Therefore, UNCTAD reaches for a new consensus of the ODA finding a more effective macroeconomic management of aid and hence designing a development strategy tailored to local needs and conditions (UNCTAD, 2006). It is claimed to have a greater multilateralization of aid to reduce unnecessary competition among donor states and hence reduce the administrative costs (ibid.). The above mentioned volatility in aid flows can be displayed clearly when looking at the ODA as a per cent of gross national income. It varies widely, even for well-performing countries in Sub-Saharan Africa (Go & Page, 2008).

In order to turn this data into workable figures, it needs to be transparent since it is seen by Grimm et al. (2011) as a prerequisite for improving the efficiency and effectiveness of aid. When a developing country receives disproportional aid

flows, this can even weaken the state system of the recipient, so timely, comparable and complete data is needed to avoid destruction and improve effectiveness (Grimm et al., 2011).

Coming to the transparency of aid data, China lags far behind and only patchy and outdated information is published (Bräutigam, 2010; Grimm et al., 2011). The Chinese White Papers, which are published on the governmental website, do not include any consultations with researchers (Information Office of the State Council, 2016). Additionally, there is no clause for a transparency standard in the White Papers. The annual report which is edited by the China Commerce Yearbook and written by the Director General of the Department of Aid to Foreign Countries in the Ministry of Commerce misses statistical data as well (Grimm et al., 2011). In the end, only the “external assistance” comes the closest to development aid figures that is published in the annual budget (ibid.). Also, China never gives actual money through their loans but keeps it inside their country by paying Chinese companies. This helps to avoid large-scale embezzlements but cannot hamper kickbacks totally (Bräutigam, 2010).

Therefore, the donors from the Global North started, due to the lack of reporting, the regular assessment of public expenditure, procurement and financial accountability published by the World Bank. It expects to integrate and harmonize the aid strategy approaches (Go & Page, 2008). Central to the assessment of the Western engagement in Africa are the six objectives defined by Go and Page that are implemented in 68 countries: “policy-based budgeting; predictability and control in budget execution; accounting, recording and reporting expenditure; external scrutiny and audit; comprehensiveness and transparency and budget credibility” (2008: 154f.). This leads to a very transparent overview of the ODA while the information about the exports credits are still kept confidential due to their commercial nature. Though, recently the behavior on these changed to a voluntary form of giving required notifications to other members of the DAC which has been quite effective in policing the exports credits (Bräutigam, 2010).

But, even if China does not report its figures officially, the MOFCOM is an institution that is authorized as administrative department by the State Council to oversee the foreign aid. They are in charge of foreign aid policies, regulations,

overall and annual plans. On top, they are responsible for the examination and approval of foreign aid projects as well as for the management of project execution (Grimm et al., 2011). The MOFCOM is supported by the Executive Bureau of International Economic Cooperation, the China International Center for Economic and Technical Exchange and the Academy of International Business Officials who are managing the implementation of projects (ibid.). Moreover, the Export-Import Bank of China (Eximbank) is responsible for the assessment of projects with concessional loans. In the end, it is the embassies and consulates in the recipient countries, that coordinate and manage the aid projects on site (ibid.). Though, it has to be mentioned that the Eximbank is well aware of the norms for exports credits and stresses on its website that it only acts within the scope of the OECD Arrangement[8] that is applicable since negotiations by 1978 and has been extended and improved within the 1992 Helsinki Package (Bräutigam, 2010). But in the end, there is no detailed data which give clear information about the actions of China. The most precise compilation of projects can be found at the website of AidData.org. Still, neither they add monetary value to projects.

Hence, an important fact is the assumption that African governments themselves know very well how much aid and development finance they get from China (Bräutigam, 2010).

4.2 Data Description

Despite the vague availability of information, following data could be found to calculate the adjusted gravity model that will be explained in detail in the following

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[8] 1) No concessional export credits allowed for wealthier countries above a certain income level; (such as Botswana, Gabon, or Brazil)

2) No concessional export credits for “commercially viable” projects anywhere. These must be at specific Commercial Interest Rates of Reference (CIRR)

3) When allowed, concessional export credits must be given at least 35 percent as a grant, calculated using the relevant commercial interest rate in the exporting country (CIRR) as comparison. Sometimes referred to as “tied aid”, this definition of “aid” is different from the definition of “official development assistance” used for the DAC.

chapter. To pool as much data as required, a consultation of several resources was necessary. The original static analysis is stretched to longitudinal analysis to overview the development of the trade. Consequently, the second characteristic[9] of Tinbergen (1962) that will be explained in more detail later, is ignored when using the model herein. Other elaborative developments of the models already have the same (Boxell, 2015). The time frame for the panel data is defined by the years from 2000 until 2006[10]. Still, the data was not completely available, especially when it comes to data from least developed countries, for example Somalia. Neither the Chinese state is providing much information about the data required for the analyses. Nevertheless, a large amount of observations could be generated and processed within the research.

The trade information about exports and imports between the Sub-Saharan African and the OECD countries as well as the exports and imports between Sub-Saharan African countries and China was retrieved from the UN Comtrade Database. The trade values are provided in US dollar and measured at the end of the respective year. As type of product goods have been chosen as trading element in an annual frequency. The trade data was classified by the fifth revision of the Broad Economies Categories (BEC) that has been included as international statistical classification in 2016 (United Nations, 2016). Data needed to perform the typical gravity model analysis with variables such as distance, GDP and common features of the countries that will be used as control variables are provided by the 'Centre d'Etudes Prospectives et d'Informations Internationales' (CEPII) based on the research of Thierry Mayer. It is a French center for research and expertise on the world economy, founded by 1978 (CEPII, 2016). The added variable for development aid was not readily accessible. Owing to AidData, which is a development research and innovation lab as well as a database for development finance, this data could be accomplished. AidData.org has founded only by 2009 by the College of William & Mary. They are seen as a global leader in the provision of comprehensive information about foreign assistance projects

[9] "only a static analysis is made" (Tinbergen, 1962: 263)

[10] As far as the figures were already published and accessible.

around the globe. So the data could be retrieved from their database using as well the research by Axel Dreher, Andreas Fuchs and several other scientists. The geocoded data on AidData stems from a variety of country aid information management systems (AIMS), donor IATI feeds and open data initiatives like the World Bank's Mapping for Results. The project/transaction level data is used by the OECD Creditor Reporting System (CRS) (Aid Data, 2016).

By combining the three sources, it has to be said that some information in specific countries was not available throughout the years which nevertheless delivers a more than sufficient amount of data for the planned analysis that will be described and interpreted in the next section.

5. Methodology, Model Specification and Determinants

Coming back to the hypothesis[11] and the research question[12], in this chapter, the gravity model shall help to explain the trade from China and the OECD countries with Sub-Saharan Africa. Firstly, starting with a more general approach of the gravity model, it is secondly narrowed down to describe the augmented gravity model which is applied in the analysis of the thesis.

The basic idea of the gravity model bases on Newton's law of gravity and states that two masses attract each other (Salvatore, 2011; Siebert, 2000). Its first applications in the economic realm are reported from the 1940s (Schulze & König, 2008). As countries grow in size, which here means growth in GDP, they tend to have greater self-sufficiency (Prais & Linnemann, 1967). Different to other trade theories, the gravity model tries to explain the volume of trade (Appleyard & Field Jr., 2014). Hence, there is a strong empirical relationship between the size of a country's economy measured in GDP and the volume of both its imports and exports which is measured by its monetary value in US Dollar (Appleyard & Field Jr., 2014; Krugman, Obstfeld, & Melitz, 2015).

5.1 Jan Tinbergen's Gravity Model Approach

Therefore, the equation induced by Jan Tinbergen in 1962 is employed to describe this relationship:

$$E_{ij} = \alpha_0 \, Y_i^{\alpha_1} \, Y_j^{\alpha_2} \, D_{ij}^{\alpha_3} \tag{5.1}$$

It is written in its simplest form. Where E_{ij} are the exports of country i to j, Y_i is the Gross National Product (GNP) of country i and Y_j is the GNP of country j (Tinbergen, 1962). D_{ij} is the variable for the distance between country i and country j where distance can also be seen as a proxy for transportation costs

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[11] When adding OECD countries' and China's foreign development aid as independent variable to the gravity model, it will show a positive impact on the exports and imports between them and Sub-Saharan Africa.

12 In what way does the Foreign Development Aid of OECD countries and China affect the Sub-Saharan Africa imports and exports?

(Appleyard & Field Jr., 2014). Prais and Linnemann describe the distance also as natural resistances to trade (1967). The exponents $\alpha 1$, $\alpha 2$ and $\alpha 3$ serve as parameters and tell that the independent variables (Y_i, Y_j and D_{ij}) and the dependent variable (E_{ij}) are not necessarily proportional to each other (Tinbergen, 1962). First calculations made upon this theory is based on 1985 exports from 18, mainly developed, countries.

Based on these calculations, it is assumed that a higher GNP increases the trade between a country pair. Whereas the greater the distance of the pair, the smaller the trade between them. With respect to each explanatory variable the equation implies that exports have a constant elasticity. A one per cent increase in the GNP of country *i* will result in an increase of $\alpha 1$ per cent increase in the exports of the demanding country *j*. Starting his theory, Tinbergen (1962) assumed that there was no substantial divergence from the normal standard pattern and volume of trade. Further, it is assumed that individual deviation from the standard patterns are little so the trade flow is not largely influenced by them. It is thus supposed that apart from purely economic impacts, it is likely that also semi-economic and political factors play an important role in determining the volume of international trade flow because when it comes to trading countries with a low distance between them, this does not give a sufficient answer to who is trading with whom in a close perimeter (Tinbergen, 1962).

Tinbergen's aim is to find out which obstacles and barriers exist that restrict the flow of international trade. He imposes two characteristics to his model which say that "no separate demand and supply functions for exports are introduced" and "only a static analysis is made" (Tinbergen, 1962: 263). As said above, the second characteristic will not be considered within this paper.

5.2 Modern Use of the Gravity Model

The model has found approval in economic theory during the recent centuries. Especially Paul R. Krugman, Maurice Obstfeld and Marc J. Melitz (2015) recently included this model into their research about international trade and economics. Likewise, Rubinstein, Helpman and Melitz (2008) see Tinbergen's widely used specification as suitable to most data of international trade flows. Since the

induction of the model, it has been augmented by different estimation techniques and new theoretical approaches. So in the following their modern use of the Tinbergen model is described.

5.2.1 Basic Variables

In the recent works, the equation has been adapted to modern conditions. The GNP has been replaced by the GDP. Krugman et al. (2015) changed the equation to a more general one:

$$T_{ij} = A\ Y_i^a\ Y_j^b\ /\ D_{ij}^c \tag{5.2}$$

T_{ij} replaces $E_{ij,}$ A is the constant term and stands for the value of trade (exports and imports) between i and j. The variables Y_i^a and Y_j^b are by now the GPD of countries i and j, where D_{ij}^c stays for the distance between them. The parameters a, b and c give information of how the increase in the independent variables lead to an increase in trade volume. This is called the basic gravity model of world trade employed by Krugman et al. in 2015.

First, impediments to trade are distance, barriers and borders. After the research of Melitz and Toubal (2014) countries with a common border are expected to trade more. Hence, it is still assumed distance has a negative effect on the trade between two countries as in the original model. For example does the United States trade much more with its neighbors Canada and Mexico than it trades with Spain although the economy of Canada and Spain have roughly the same size (Krugman et al., 2015). Estimated gravity models show that a one per cent increase in distance implies a 0.7 to one per cent fall of the trade between two countries (ibid.).

Second, the GDP is correlated positively with trade volume. It is supposed that countries with economies of scale, a distinct industrial sector, a well built out infrastructure and rich natural resources tend to have more intrastate trade and hence an increasing GDP which also spurs the international trade. Whereas countries with a small economy are more likely to have small international trade volume (Krugman et al., 2015).

Within the thesis, first a core model will be calculated in order to only estimate the basic variable of the gravity model.

5.2.2 Development Aid as Control Variable

Now a further additional control variable, that is believed to influence the trade among countries is attached to the model. This variable gives information about how much development aid did flow from the donor OECD and China to the recipient Sub-Saharan Africa. The aforementioned manifold of donating to least developed countries are key to these considerations and underpin the importance of working them into the gravity model.

In a second round, the development aid of China and afterwards, the development aid of the OECD countries will be employed to the model. For the following changes of the model, these variables will be held constant.

5.2.3 Further Control Variables

Throughout the time since trade grew globally, political battles over free trade and protectionism brought about a change of the global trade structure (Krugman et al., 2015). The gravity model has been extended and modified throughout the last years. Also trade agreements among states have a remarkable impact on their bilateral trade. With the North American Free Trade Agreement (NAFTA) for instance the shipped goods and services between Mexico, Canada and the United States can take place without paying tariffs or facing trade barriers and turns is thus very likely. Effective trade agreements are hence leading to significantly more trade (ibid.). Likewise similar demand patterns lead to attraction between two nations (Appleyard & Field Jr., 2014).

Besides the trade agreements also additional variables such as common (trade, hence official) language or population size, exchange rate or business cycle were employed when working on the model (Nuroğlu, 2010; White, 2007; White & Tadesse, 2008). Moreover, Frankel und Rose (1998) found out, that trade is positively correlated with the same official language is shared (Fidrmuc & Fidrmuc, 2016).

It also has been augmented by the independent dummy variable for common borders of the trading countries, for landlocked countries or for island states (Fidrmuc & Fidrmuc, 2016; Nuroğlu, 2010; Zhao, 2015). Here, the main findings for the same border are that neighboring countries tend more to trade as displayed above with the US and Canada and Mexico (Chen & Li, 2014).

Furthermore, Helpman (2008) found out, that the gravity theory holds best, when the countries are similar and have considerable intra-industry trade with each other. Contrarily, countries with a predominance of traditional trade and different factor endowments the theory did not work the same way (Appleyard & Field Jr., 2014).

The selection of control variables made to be added to the here estimated model, will be presented later in the paper.

5.3 Model Specification

In order to obtain a better understanding of the global trade and the participation and interaction of Sub-Saharan African countries, the gravity model is used. The model is with donor and recipient countries fixed effects as well as years fixed effects.

To get a linear function, the logarithm of the originally nonlinear function is taken (Schulze & König, 2008). The classical linear regression model that has been explained in detail in earlier passages is induced and computed with the sample explained above and displayed later in this chapter, whereas here a distinction between exports and imports will be made:

$$\log(Im_{ijt}) = \beta_1 \log(GDP_{it}) + \beta_2 \log(GDP_{jt}) + \beta_3 \log(D_{ij}) + e_{ijt}. \quad (5.3)$$

$$\log(Ex_{ijt}) = \beta_1 \log(GDP_{it}) + \beta_2 \log(GDP_{jt}) + \beta_3 \log(D_{ij}) + e_{ijt}. \quad (5.4)$$

5.4 Determinants of Import and Export

Here, Im_{ijt} are the imports and Ex_{ijt} are the exports traded from donor country i and recipient country j in a certain time period of t, which is set as one year. GDP_{it} corresponds to the GDP of country i in one year and the same holds for Y_{jt} for country j. Furthermore, the variable D_{ij} indicates the distance measured between

the trade partners' capitals. e_{ijt} is the error term which contains the unobserved factors of *i* and *j* to a certain time *t*, that affect the dependent variable.

In this thesis, the gravity model is extended by the variable for foreign development aid, for which more models are run. There has also been performed one analysis with adding the development aid from the OECD countries, marked as DAO_{jt}. The same was performed for the development aid of China which is described as DAC_{jt}. The variables GDP_{it}, GDP_{jt} and D_{ij} are held fix and their parameters β have a *ceteris paribus* interpretation.

In order to obtain a better understanding of the influences to imports and exports from Sub-Saharan Africa and which effects impact their change in growth, as already aforementioned, a linear panel data model with data from 2000 until 2006 is used. Panel data suggests states and countries are heterogeneous, so this fits perfectly to describe the surveyed broad range of very different countries (Baltagi, 2013). The panel of seven years has been chosen to survey a change in trade between the country pairs over time.

5.5 Panel Data Analysis

In the following the methods and its implications will be explained. To estimate the unobserved component, defined as e_{ijt}, where *t* changes over time, the basic unobserved effects model for this can be written as

$$y_{it} = x_{it}\beta + c_i + u_{it}, \quad t = 1, 2, \ldots, T. \tag{5.5}$$

Here, the error term contains $c_i + u_{it}$ where c_i is also called the unobserved component or unobserved heterogeneity. Respectively, u_{it} contains the idiosyncratic errors because there is a change in *i* as well as in *t*. The question whether c_i has to be treated as random or fixed effect arises. Since various individuals and time periods are regarded in this analysis, a two way fixed effects model will be employed. Thus the parameter is estimated for each cross section observation *i* over time where a common observation of individual and time effects are described (Schulze & König, 2008; Wooldridge, 2002).

5.5.1 Fixed Effects Model

In terms of eliminating individual heterogeneity of the estimation equation a fixed effects model, which is also more robust than random effects analysis, is imposed. It is assumed that the individual heterogeneity is a fix constant for every individual. The basic equation would be equal to the unobserved effects model from above. Using panel data allows c_i to be arbitrarily correlated with x_{it}. A strict exogeneity of the explanatory variables conditional on u_{it} is further assumed:

$$E(u_{it} \mid x_i, c_i) = 0, \quad t = 1, 2, \ldots T. \tag{5.5a}$$

Where $E(c_i \mid x_i)$ is allowed to be any function of x_i (Wooldridge, 2002).

As general specification time period and country dummies are created. Time dummies for each year are called $d2_t, \ldots, dT_t$, for instance the year 2000 is denoted as $d2000_t$. Further, the country dummies of all time-constant observables are pooled in a vector z_i. Presume y_{it} is hence determined by

$$y_{it} = \theta_1 + \theta_2 d2_t + \ldots + \theta_T dT_t + z_i\gamma_1 + d2_t z_i\gamma_2 + \ldots + dT_t z_i\gamma_T + c_i + u_{it} \tag{5.6}$$

$$E(u_{it} \mid z_i, c_i) = 0, \quad t = 1, 2, \ldots, T \tag{5.6a}$$

Where the intercept θ_1 is for the base time period t = 2000 and γ_1 measures the effects of z_i on y_{it} in the period t = 1. In other words, it can be tested whether the effects of time-constant variables did change over time. The equation is estimated with a OLS regression.[13]

5.5.2 Implementation to the Gravity Model

To apply the fixed effects model to the gravity theory, the data set needs to get adapted to meet the preconditions. Therefore, year and country dummies are applied and added to the regression equation.

With these specifications a sample was constructed. The panel data used shows some deficits and hence is unbalanced as there is data missing in some years for some countries. For example, Somalia or the Democratic Republic of the

[13] A more detailed explanation can be found in the Appendix.

Congo do not deliver data on their GDP or the distance to trading partners. These restrictions leave 9,040 observations for the imports and 9,525 observations for the exports when computing the models. Particularly, the availability of aid data puts limits on the sample size. Since a lot of Sub-Saharan African countries do not receive a well-organized or sound reported external assistance, the value has been set to zero, when there was no data available because it is assumed that no appreciable amount of aid has been rendered. However, the sample size is sufficient to run a panel data analysis. By adjusting the data set as described, a fixed effects analysis can be processed.

Table 5.1 shows the summary statistics for all variables employed in the models. The listed columns show the observations (N), the mean, the standard deviation (St. Dev.), the minimum (Min) and maximum value (Max). Where Im_{ijt}/Ex_{ijt}, GDP_{it}, GDP_{jt}, DA_{ij}, DAC_{jt} and DAO_{jt} is denoted as total amount in USD, D_{ij} in kilometers and pop_d_{it} and pop_r_{jt} in total amount of citizens. The rest of the variables are defined as dummy variables.

Statistic	N	Mean	St. Dev.	Min	Max
Im_{ijt}/Ex_{ijt}	22,828	14.2	3.3	0.0	24.2
GDP_{it}	18,931	12.7	1.6	8.6	16.4
GDP_{jt}	18,632	8.2	1.4	5.3	12.4
D_{ij}	18,998	8.8	0.4	7.6	9.8
DA_{ij}	124,470	12.6	4.4	0.0	22.8
DAC_{jt}	124,470	0.1	1.1	0.0	22.8
DAO_{jt}	124,470	12.5	4.5	0.0	14.6
$comlang\_off_{ijt}$	18,998	0.2	0.4	0	1
$comlang\_ethno_{ijt}$	18,998	0.2	0.4	0	1
$conflict_{ijt}$	124,470	0.001	0.03	0	1
$comcol_{ijt}$	18,998	0.01	0.1	0	1
$col45_{ijt}$	18,998	0.03	0.2	0	1
$gatt\_d_{it}$	18,998	1.0	0.1	0	1
$gatt\_r_{jt}$	18,998	0.8	0.4	0	1
pop_d_{it}	18,998	75.2	222.5	0.3	1,311.8
pop_r_{jt}	18,998	15.9	24.2	0.4	144.7

Table 5.1: Summary Statistics (own calculations)

In order to guarantee robustness of the model and concerning Tinbergen's approach of regarding also semi-economic and political factors, several control variables are employed to the model after having calculated it with the basic variables. Within the scope of this thesis inspired by the above presented variety of supplements, a choice of control variables mainly offered by CEPII has been made and looks as follows:

First, cultural related dummy variables are employed. Whereby $comlang\_off_{ijt}$ asks for the common official and $comlang\_ethno_{ijt}$ is the language spoken by at least 9 per cent of the population in both countries.

Second, another dummy is employed which shows whether there is a conflict or not. This variable is called $conflict_{ijt}$.

Thirdly, the colonial relationship between the two trading partners is investigated. Here, $comcol_{ijt}$ gives information about if there has been a common colonizer post 1945. While $col45_{ijt}$ are the pairs in colonial relationship post 1945. Whereas it is assumed that no common colonizer exists between the trading pairs.

Fourthly, the variables $gatt\_d_{it}$ and $gatt\_r_{jt}$ accrue where the first says whether the donor is in the GATT or WTO and the second, whether the recipient is a member of the GATT or WTO, this application has also been performed by Helpman, Melitz and Rubinstein (2008).

The last model contains as well the variables pop_d_{it} and pop_r_{jt} for the number of citizens in the donor and the recipient country. This variable is originally also rated as a “size”-variable and tends to show the same impact as the GDP (Gorter & Tinbergen, 1963; Tinbergen, 1962).

For all variables, except of $conflict_{ijt}$, having a value of one it is assumed, that there is a positive increase in the dependent variable. When it is zero, the effect is respectively negative. For $conflict_{ijt}$ a negative increase for a value of one is expected.

To determine the parameters, OLS regressions are run and then described and interpreted later on.

5.6 Further Developments and Critique of the Gravity Model

The model’s approach has been critically debated among economists. It has found recognition due to the empirically soundness among economic models and its ability to explain the variation in international trade (Boxell, 2015).

In the model the principle determinants are the distance between two countries and the size of their respective economy. In detail, this means measuring the shipping distance and the GDP and therewith investigating the quantity of trade between two countries. Robustness can be increased by including social and political explanatory variables such as population size, common borders or language. As Mansfield et al. put it the gravity framework is successful in

explaining the flow of the cross-national trade (Eisenman, 2015). Hence, it offers a convenient model.

6. Empirical Results

In this chapter the results of the earlier induced augmented gravity model analysis are presented and the relevant figures are closer described. Secondly, a robustness analysis and its results are illustrated.

6.1 Gravity Model Analysis

The aforesaid model has been performed in slightly different constellation of explanatory variables. In order to test the heteroskedasticity it is assumed that the errors u_i are independent. Therefore, the test of MacKinnon and White from 1985 is run to get the robust standard errors (Zeileis, n.d.). Hence, the standard errors presented in the following tables are robust.

The next two tables present the calculations for the core models. One model for the imports in table 6.1 and one for the exports in table 6.2.

Model	I (Gravity Model (GM))	II (GM + aid)	III (GM + DAC + DAO)	IV (III + contr. vars)	V (III + sig. contr. vars)
Dep. Var.:	Im_{ijt}	Im_{ijt}	Im_{ijt}	Im_{ijt}	Im_{ijt}
GDP_{it}	**0.772*****	**0.737*****	**0.735*****	**0.805*****	**0.767*****
	(0.275)	(0.275)	(0.275)	(0.277)	(0.275)
GDP_{jt}	**1.038*****	**1.132*****	**1.131*****	**0.811*****	**0.811*****
	(0.136)	(0.139)	(0.139)	(0.180)	(0.180)
D_{ij}	**-1.568*****	**-1.488*****	**-1.486*****	**-1.281*****	**-1.285*****
	(0.172)	(0.173)	(0.173)	(0.175)	(0.175)
DA_{jt}		**0.028*****			
		(0.006)			
DAC_{jt}			0.033	0.022	0.021
			(0.023)	(0.023)	(0.023)
DAO_{jt}			**0.028*****	**0.024*****	**0.024*****
			(0.006)	(0.006)	(0.006)
$comlang\_off_{ijt}$				**0.453*****	**0.464*****
				(0.148)	(0.093)
$comlang\_ethno_{ijt}$				0.004	
				(0.145)	
$conflict_{ijt}$				**0.618*****	**0.619*****
				(0.188)	(0.188)
$comcol_{ijt}$				0.192	
				(0.351)	
$col45_{ijt}$				**1.252*****	**1.246*****
				(0.131)	(0.131)
$gatt\_d_{it}$				-0.682	
				(0.649)	
$gatt\_r_{jt}$				**3.291*****	**3.285*****
				(0.315)	(0.315)
pop_d_{it}				**0.045*****	**0.037*****
				(0.013)	(0.011)
pop_r_{jt}				**0.052*****	**0.052*****
				(0.015)	(0.015)
Constant	**11.680****	**10.268****	**10.230****	**-50.492*****	4.074
	(4.635)	(4.644)	(4.653)	(17.174)	(4.699)
Observations	9,040	9,040	9,040	9,040	
Adjusted R^2	0.638	0.639	0.638	0.639	

Note: Significance of the coefficients is denoted by *p<0.1 (at 10%); **p<0.05 (at 5%); ***p<0.01 (at 1%). Country and time fixed effects were employed, but are not reported here. Standard errors (heteroskedasticity robust) in parentheses.

Table 6.1: Core model imports (own calculations)

Model	Ia (Gravity Model (GM))	IIa (GM + aid)	IIIa (GM + DAC + DAO)	IVa (IIIa + contr. vars)	Va (IIIa + sig. contr. vars)
Dep. Var.:	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}
GDP_{it}	**0.505*****	**0.489*****	**0.493*****	**0.504*****	**0.492*****
	(0.181)	(0.182)	(0.182)	(0.180)	(0.180)
GDP_{jt}	**0.603*****	**0.637*****	**0.639*****	**0.372*****	**0.372*****
	(0.085)	(0.086)	(0.086)	(0.104)	(0.104)
D_{ij}	**-1.740*****	**-1.707*****	**-1.711*****	**-1.495*****	**-1.497*****
	(0.105)	(0.105)	(0.105)	(0.104)	(0.103)
DA_{jt}		**0.011*****			
		(0.003)			
DAC_{jt}			-0.002	-0.009	-0.009
			(0.008)	(0.008)	(0.008)
DAO_{jt}			**0.012*****	**0.007****	**0.007****
			(0.003)	(0.003)	(0.003)
$comlang\_off_{ijt}$				**0.559*****	**0.557*****
				(0.085)	(0.054)
$comlang\_ethno_{ijt}$				-0.030	
				(0.083)	
$conflict_{ijt}$				**0.966*****	**0.967*****
				(0.169)	(0.168)
$comcol_{ijt}$				0.297	
				(0.245)	
$col45_{ijt}$				**1.398*****	**1.379*****
				(0.095)	(0.094)
$gatt\_d_{it}$				-0.260	
				(0.235)	
$gatt\_r_{jt}$				**0.710*****	**0.702*****
				(0.181)	(0.181)
pop_d_{it}				**0.023*****	**0.020*****
				(0.005)	(0.004)
pop_r_{jt}				**0.047*****	**0.047*****
				(0.008)	(0.008)
Constant	**21.843*****	**21.358*****	**21.453*****	-8.518	**17.434*****
	(2.991)	(2.998)	(2.999)	(6.422)	(2.933)
Observations	9,525	9,525	9,525	9,525	
Adjusted R^2	0.765	0.765	0.765	0.765	

Note: Significance of the coefficients is denoted by *p<0.1 (at 10%); **p<0.05 (at 5%); ***p<0.01 (at 1%). Country and time fixed effects were employed, but are not reported here. Standard errors (heteroskedasticity robust) in parentheses.

Table 6.2: Core model exports (own calculations)

Within these tables, in model (I) and (Ia) the original gravity model has been calculated with the earlier introduced sample. As expected, all the variables are highly significant at a one per cent level for imports and exports. The coefficients are positive for the $GDP_{jt/it}$ variables as well as negative for the distance variable D_{ij}. Hence, a one per cent increase in GDP_{it} will lead to an increase of the imports of 0.77 per cent and respectively to an increase of exports of 0.50 per cent.

Whereas a one per cent increase in GDP_{jt} will lead to an increase of the imports of 1.04 per cent and respectively to an increase of exports of 0.60 per cent. When distance increases by one per cent, imports and exports will decrease by 1.57 per cent and 1.74 per cent respectively.

When adding the summed up development aid (DA_{jt}) by the OCED countries and China to the core model, figures only change to a low degree. For the second model of the imports, all three variables slightly increase and likewise stay highly significant on a one per cent level as the added variable is. Since the development aid increases to one per cent, the imports will increase by 0.28 per cent. For the second model of the exports, the GDP of the donor decreases as well as the distance does, but only the GDP of the recipient increases. Development aid here is also highly significant and a one per cent increase in DA_{jt} leads to a 0.11 per cent increase of exports.

In model three (III/IIIa), the development aid by China and the OECD countries are added separately. In addition, the figures only change minor. Both imports and exports do not show a significant result for the Chinese development aid DAC_{jt}, but do so for the OECD's development aid DAO_{jt}. Hence, the latter is highly significant at a one per cent level and has a value of 0.28 per cent. In contrast to model four (IV/IVa), when adding all control variables, estimates do change for imports as well as for exports. Further does the significance of the DAO_{jt} decrease to the five per cent level and only has a value of 0.007 per cent left. In the fifth model (V/Va), only significant control variables are regarded. Here, only slight differences in imports and exports in the estimates can be recorded which underpins omitting the unimportant variables.

The R^2 are very high between 63.8 per cent and 76.5 per cent which is typical for a gravity model estimation. In addition to this, there is no multicollinearity given[14].

[14] It can be seen in the Appendix.

6.2 Robustness Analysis

In the second round, adding the control variables to the core model with different combinations of the variables. After implementing every single variable, a model (XI/XIa) for all control variables with the basic variables hold constant, is performed. Subsequently, another model (XII/XIIa) is run with the basic variables hold constant and only those control variables that are significant in the core model. In the tables 6.3 and 6.4 the results are presented again for the imports and respectively for the exports. Also here, robust standard errors are displayed.

For the control variables, most of the tested variables are highly significant with few exceptions. Consequently, only the salient results will be presented.

The model VI joined by $conflict_{ijt}$ surprisingly has a positive coefficient that is highly significant for imports and exports with a value of 0,86 per cent and even 1.25 per cent. For the next model VII, only the variable $col45_{ijt}$ has been highly significant. This shows that only a colonial relationship and not the same colonizer impacts to imports and exports as already expected. Further, in model VII for imports only the membership of the recipient is highly significant and also has a very high coefficient. So, if the recipient country is a member of the GATT or the WTO, the imports increase by 2.38 per cent. In the terms of exports, the effect is the other way around, so they will increase by 0.33 per cent when the donor country is in the GATT/WTO where it has to be said that this result is only significant at a ten per cent level.

For the model which includes the population size, all estimates are highly significant and have a positive coefficient. So, as population rises, also the imports and exports will increase. As Tinbergen (1962) first formulated the independent variable as a “size variable” a positive relationship has been expected.

In the third round, the models XI/XIa and XII/XIIa has been estimated. In model XI, $comlang\_ethno_{ijt}$ gets insignificant compared to the earlier estimation. For the exports’ model XIa, the value of the coefficient even is negative. Which is further very unforeseen is the fact that $conflict_{ijt}$ has a positive coefficient in all four cases and is also highly significant.

In model XI, all variables that have been highly significant watched isolated also stay the same when merging them within one model. There are only two exceptions for $comcol_{ijt}$ and $gatt\_d_{it}$. They turn insignificant, when adding them to the model with all other variables. Hence, they are omitted in the following model XII and XIIa. The new estimates do not change to a large degree. This proofs that the omitted variables are not seen as important variables.

For all estimates, a very high R^2 between 62.3 per cent and 77.3 per cent has been calculated.

	V	VI	VII	VIII	IX	X	XI
Model	Language	Conflict	Colony	GATT	Population		
Dep. Var.:	Im_{ijt}	Im_{ijt}	Im_{ijt}	Im_{ijt}	Im_{ijt}	Im_{ijt}	Im_{ijt}
GDP_{it}	**0.754*****	**0.737*****	**0.745*****	**0.708****	**0.749*****	**0.803*****	**0.765*****
	(0.275)	(0.275)	(0.275)	(0.276)	(0.275)	(0.276)	(0.274)
GDP_{jt}	**1.152*****	**1.138*****	**1.109*****	**1.129*****	**0.809*****	**0.809*****	**0.809*****
	(0.139)	(0.139)	(0.139)	(0.139)	(0.180)	(0.180)	(0.180)
D_{ij}	**-1.357*****	**-1.504*****	**-1.443*****	**-1.493*****	**-1.393*****	**-1.284*****	**-1.288*****
	(0.171)	(0.173)	(0.172)	(0.173)	(0.176)	(0.175)	(0.174)
AidDummy	**0.317*****	**0.388*****	**0.345*****	**0.390*****	**0.417*****	**0.331*****	**0.328*****
	(0.080)	(0.080)	(0.080)	(0.080)	(0.081)	(0.080)	(0.080)
$comlang\_off_{ijt}$	**0.682*****					**0.454*****	**0.465*****
	(0.140)					(0.148)	(0.093)
$comlang\_ethno_{ijt}$	0.073					0.004	
	(0.144)					(0.145)	
$conflict_{ijt}$		**0.864*****				**0.618*****	**0.620*****
		(0.185)				(0.188)	(0.188)
$comcol_{ijt}$			0.446			0.189	
			(0.338)			(0.351)	
$col45_{ijt}$			**1.637*****			**1.252*****	**1.246*****
			(0.113)			(0.131)	(0.131)
$gatt\_d_{it}$				0.624		-0.676	
				(0.542)		(0.653)	
$gatt\_r_{jt}$				**2.379*****		**3.289*****	**3.283*****
				(0.204)		(0.315)	(0.315)
pop_d_{it}					**0.052*****	**0.045*****	**0.037*****
					(0.015)	(0.012)	(0.010)
pop_r_{jt}					**0.037*****	**0.052*****	**0.052*****
					(0.010)	(0.015)	(0.015)
Constant	**8.441***	**10.512****	**9.534****	**7.919***	**9.626****	3.728	4.141
	(4.591)	(4.609)	(4.595)	(4.646)	(4.732)	(4.700)	(4.701)
Observations	9,040	18,565	9,040	9,040	9,040	9,040	9,040
Adjusted R^2	0.642	0.623	0.643	0.639	0.640	0.645	0.645

Table 6.3: Control Model Imports (own calculations)

	Va	VIa	VIIa	VIIIa	IXa	Xa	XIa
Model	Language	Conflict	Colony	GATT	Population		
Dep. Var.:	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}	Ex_{ijt}
GDP_{it}	**0.487*****	**0.487*****	**0.489*****	**0.471*****	**0.475*****	**0.498*****	**0.485*****
	(0.182)	(0.182)	(0.181)	(0.183)	(0.181)	(0.180)	(0.180)
GDP_{jt}	**0.662*****	**0.648*****	**0.615*****	**0.638*****	**0.372*****	**0.372*****	**0.373*****
	(0.085)	(0.086)	(0.085)	(0.086)	(0.106)	(0.104)	(0.104)
D_{ij}	**-1.539*****	**-1.724*****	**-1.651*****	**-1.707*****	**-1.622*****	**-1.490*****	**-1.488*****
	(0.104)	(0.105)	(0.102)	(0.105)	(0.107)	(0.104)	(0.103)
AidDummy	0.071	**0.151*****	**0.108****	**0.156*****	**0.181*****	**0.082***	**0.079***
	(0.046)	(0.047)	(0.046)	(0.047)	(0.047)	(0.046)	(0.046)
$comlang\_off_{ijt}$	**0.797*****					**0.561*****	**0.559*****
	(0.083)					(0.085)	(0.054)
$comlang\_ethno_{ijt}$	0.054					-0.029	
	(0.083)					(0.083)	
$conflict_{ijt}$		**1.250*****				**0.968*****	**0.969*****
		(0.255)				(0.170)	(0.169)
$comcol_{ijt}$			**0.683*****			0.295	
			(0.236)			(0.246)	
$col45_{ijt}$			**1.854*****			**1.398*****	**1.380*****
			(0.097)			(0.095)	(0.094)
$gatt\_d_{it}$				**0.327***		-0.271	
				(0.196)		(0.236)	
$gatt\_r_{jt}$				-0.085		**0.709*****	**0.702*****
				(0.123)		(0.181)	(0.181)
pop_d_{it}					**0.046*****	**0.021*****	**0.018*****
					(0.008)	(0.005)	(0.004)
pop_r_{jt}					**0.018*****	**0.046*****	**0.046*****
					(0.004)	(0.008)	(0.008)
Constant	**17.875*****	**20.192*****	**19.185*****	**20.150*****	**20.479*****	**17.444*****	**18.137*****
	(2.963)	(2.982)	(2.948)	(2.984)	(2.987)	(2.937)	(2.948)
Observations	9,525	9,525	9,525	9,525	9,525	9,525	9,525
Adjusted R^2	0.771	0.766	0.773	0.765	0.766	0.776	0.776

Note: Significance of the coefficients is denoted by *p<0.1 (at 10%); **p<0.05 (at 5%); ***p<0.01 (at 1%). Country and time fixed effects were employed, but are not reported here.

Table 6.4: Control Model Exports (own calculations)

7. Discussion

In this section, the literature based chapters two to four are discussed in connection the data gathered and the empirical results. As a summary, the overall findings are presented.

Evaluating the challenges for African economies, the following basic problems emerge. One chief problem is the drastic wealth gap between African coastal and landlocked regions causing differing growth rates and development statuses (Go & Page, 2008; UNCTAD, 2006). The endeavor by China and the OECD countries to support all Sub-Saharan Africa s to produce similar wealth is hindered by the heterogeneity of donors (Bräutigam, 2010). As a result, issues accrue due to aid fluctuations and non-transparent financing with complicated policy formulation, agenda-setting and creation of expenditure plans (Bräutigam, 2010; Go & Page, 2008). Consequently, donors fail to create institutions and policies in order to reach their goals such as diversifying exports and increasing savings (Go & Page, 2008)

Focusing on Chinese engagement in Africa, more interdependent issues arise. The main problem is the apparent short-sighted development endeavors tending to only benefit the Chinese businesses. By ignoring illiberal norms, corruption or political issues to the extent of wars in some Sub-Saharan African countries where China is proactively engaged, resulting in undermining the overall efforts to promote democracy, transparency, human right and adequate governance (Zhao, 2015).In addition to mostly hiring own Chinese professionals, China floods the African market with low quality products that harm the local businesses and hamper the development of themselves (Eisenman, 2015; Johnston et al., 2015). Therefore, it is questionable whether it is advantageous for China as a recipient of aid also functioning as a donor.

However, some African leaders are fond of the neutral and business oriented manner that produces economic growth. As a result, African nations seek the connection with China in hopes to follow the Chinese way of development. By the same token, this behavior could become threatening for the independency of the

Sub-Saharan African countries as they get more dependent on the Chinese willingness to invest.

Should the Chinese attempt to bolster the relationship by political and commercial ways, it can be argued that they will exploit some regions. Exporting natural resources for exchange of China-made low affordable low quality products, will not stabilize the African economy in the long term. However, China tries to support the creation of economies of scale in shipping and light manufacturing by improving infrastructure providing knowhow (Eisenman, 2015). Additionally, China supports improvement of education through direct investments in universities. By preferentially backing the elites, the discrepancy of wealth further develops and limits the improvement of less developing regions (Lotter, 2016).

To sum it up, Chinese engagement in Sub-Saharan Africa is supporting prosperity of the economy to a great degree, but in some respect disregards other parts that need to be strengthened as well. An overall rise of Sub-Saharan African wealth reaching common standards seems to be hard to achieve.

In comparison to the Chinese engagement, the OECD seems to pursue another approach of foreign aid. The obvious problem when examining the foreign aid from the Global North is that it still fails to effectively combat poverty. Having formulated the MDGs it is apparent that Africa still lags far behind. To avoid failures in the future, the OECD members have changed their framework of how to provide aid. In addition to debt relief and country-owned poverty reduction strategies doubling of aid should ease budgets and boost self-sustaining organization over time. Supported by scientific and industrial progress, piloted by the OECD donor states, a more effective aid promises to be created over time. Another challenge that needs to be tackled, is the unwillingness of African leaders to forego short-term prosperity in order to generate long term sustaining economic and social development. As a solution, the OECD countries are trying to implement medium- and longer-term policies and various microeconomic techniques as well as to establish an expenditure framework that will spur sustainability of growth and health in the Sub-Saharan African countries.

In contrast to the Chinese endeavors, there still exists a dependency on the donors' willingness to support.

It came as a surprise not finding any significant results when it comes to Chinese development aid regarding the vast appearance of engagement in the creation of ministries, resumption of the Silk Road and support of prestige projects in the earlier presented literature part. Moreover, China improves the infrastructure professionally and creates flourishing businesses. A deeper look into the makeup of China's aid data, used in this model, has been carried out. In retrospect, it has to be pointed out that even if the data substantiating the Chinese development aid could be found and downloaded, the accuracy and completeness cannot be guaranteed, although the data has been processed to suit the empirical investigation. A possible explanation may lay in the fact that China is not reporting its development aid adequately and much information is lost. As China does not follow standardized categories of reporting their development financing or even omit to report them, some OOF may perish and are not considered in the herein applied aid data from the Chinese government.

When assuming that the Chinese overall aim is to create a worthy global trade partner by supporting Sub-Saharan Africa, a closer look at their methods of achieving this aim must be taken. Obviously, a long-term self-organization is targeted to create mutual benefits of the trading parties. China places economic success first and expect a reduction of poverty as a result. The proliferation of human rights and improvement of health and educational sectors are seen as an additional aftereffect. By representing and defending such a stance, utility maximization based on Adam Smith striving after mutual advantage between two business partners is recognized in this pattern (Pies, 2004). It is anticipated that China first increases business relationships and connections and banks on balancing of the social and humanitarian issues later. But it still is not clear if China really is interested in giving aid to improve the wealth of the African nations next to the industry and economy. As a logical conclusion, by only supporting the economic sector, other sectors will suffer as they are not developed and successful self-organization will not be reached. Consequently, other areas need to be considered and supported. As a fact, China already widens its support but still single-handed. It is believed that some synergetic effects are left unused. This results in the difficulty of organizing external financing limited by the multiplicity of donors in the least developed regions.

Following common paths and sharing information is necessary in order to generate progress. It is shown that the control variables in the model are mostly highly significant. It can be generally stated that when common features exist between trading partners, exports and imports are positively influenced and mutual benefits are derived. Next to common language, which is not only a by-product of colonialism but also to a degree of education, being a member of an international organization increases the exporting and importing markedly.

8. Conclusion

The research question raised at the beginning stated: “In what way does the Foreign Development Aid of OECD countries and China affect the Sub-Saharan Africa imports and exports?”. In order to answer it, a short overview of the most important results is presented below.

The gravity model’s approach delivers significant results, when employing this technique to better understand the trade behavior between the chosen samples. Based on this findings, it further is demonstrated that in addition to GDP and distance, the OECD’s development aid has positive and significant influence on the imports and exports between the OECD countries and Sub-Saharan Africa. In contrast, the basic gravity model shows positive and significant impact on the imports and exports between China and Sub-Saharan Africa, while the Chinese development aid does not show any influence.

Regarding the literature base and the revealed issue of lacking transparency of development aid flows, it is necessary to stay attentive when assessing the Chinese data. Considering the results of the literature research, it can be assumed that external assistance which is not officially labeled as Chinese development aid, influences the trade between Sub-Saharan Africa and China. Assuming Chinese OOF have been paid to Sub-Saharan Africa nations caused this data not be included in the level of development aid that has been used within this thesis.

Even though it has to be stated that both China and the OECD increase their effort to achieve their development goals, they still have a long way to go in figuring out an adequate strategy to successfully achieve the MDGs that results in economic growth and wealth. The effort of the well-established donors from the Global North to organize meetings and conferences in order to exchange knowledge and information become more important. Not only exchange of information but also the alignment of common strategies, aims and instruments used are key to an effective approach. For a successful long-term economic relationship with Africa, it is essential to concentrate on increasing socio-economic, political and social connections, not only economic driven agendas. Since politics is cannot be separated from economy, negotiations dealing with

trade agreements and policies are becoming more important. The Chinese strategy of non-interference will be challenged with time. In order to prolong and stabilize the trade with Africa, using synergistic effects between multilateral aid organization seems inevitable and China should pay attention to this fact.

The task of Western organizations and players is to proactively incentivize the Chinese donors to work cooperatively with the other nations, even though China regards the Western aid as very ineffective in terms of poverty reduction. China needs to improve their reporting which currently harms the donors who report regularly and entirely. As data is crucial for the understanding of important interdependences when it comes to international trade, the work and endeavors of AidData.org is only the beginning of a movement to a more predictable and clear aid flows evaluation and insight. In addition to collecting and reviewing global aid finance it is necessary to get an understanding of who is donating what by using what means. When not discussing strategies being followed openly, valuable synergistic effects can remain hidden and changes may be blocked.

At the end, the own motivation and responsibility of the Sub-Saharan African governments and actors must be considered. As Bräutigam quotes, “No country in the world can develop itself through foreign aid ... Developing your economy is your job; you have to do it yoursel[f]” (2010: 35), the necessity to trust the capability of the Africans becomes a vital part. Obviously, it is their job to build up their own countries and keep the long-term development on track.

In summary, the OECD’s development aid spurs the imports and exports between its member states and Sub-Saharan Africa. In comparison, the Chinese developments aid does not affect the imports and exports between China and Sub-Saharan Africa. In addition, it needs to be stated that further activities in improving economic growth and wealth, besides the official development aid, serve to increase trade even if those are not taken into account within the variables for the development aid.

9. Limitations and Outlook

The major challenge while working on this bachelor's thesis was finding suitable data to perform the gravity model. Therefore, the data set needed to be composed of different sources. One issue was the lacking availability of recent data. Consequently, the latest data chosen for the panel was from 2006. Due to this, the newest developments could not be closer investigated. Further limitation concerns the broader established work on the model. Having created a large data set, also other constellations of the independent variables could have been performed. This would have exceeded the frame of this thesis but is hence a possible starting point for further work on the model with the here created data set. For instance, a broader range of control variables, for example refering to the Silk Road, could present further insights and knowledge of the constitution of the trade between Sub-Saharan Africa and China and the OECD countries. Therewith, additional factors that influence the imports and exports might be revealed. Following approaches are suggested to further work on the model:

First, the donor and recipient countries can be clustered defining different categories. For example, countries whose economy concentrates on the same sector or has the similar development status can be regarded isolated.

Second, observation of single countries that play a special role in donating, for example the United States who always give a lot of ODA, compared to other donors in the DAC.

Third, a better data availability could be reached by sending an official request to the Chinese government to obtain more detailed aid data. Despite, this request might not be acceded. However, AidData.org is working on a more exact resumption of the world's aid data, it may be freely available within few years. Consequently, the research could be pursued more precisely.

Further, a possible extension of the work on the data set is the Difference-in-Difference Analysis[15]. This can show the difference in the development of poor countries supported differently throughout the time.

A last question raised concerns the significantly negative impact of distance to the dependent variable of imports and exports. It emerges different opinions on the degree of its influence. The strong negative relationship gets trimmed by distance minimizing factors such as modern transportation and communication. Krugman et al. asked whether the world was made smaller through the rapid development and immediately approves this question as true (Krugman et al., 2015). The world enforcedly had to shrink in order to accomplish the extensive cross-shipping implied by the vertical disintegration of production which cuts the assembly line in multiple parts taking place in different countries (Krugman et al., 2015). It might be assumed, that China, as a proficient in building infrastructure and trade vessels, intentionally exceeds its trading distances by intending business with “unnatural” partners. This may also be an additional motivating factor for the resumption of the historical Silk Road. As a result, the “natural” trading partners of China who are closest to it, are forced to search for partners that are farer away. This may intend that China aims to have a global comparative advantage because they have matured, improved ways and instruments to facilitating international trade. Considering this hypothesis as correct, the definition of distance and therewith the basic theory of the gravity model needs to be reviewed.

[15] I can be seen in detail in the Appendix (x)

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II. Appendix

Appendix 1: List of OECD countries used in the sample (corresponding ISO3 country codes)

Australia	AUS
Austria	AUT
Belgium	BEL
Canada	CAN
Chile	CHL
Czech Republic	CZE
Denmark	DNK
Estonia	EST
Finland	FIN
France	FRA
Germany	DEU
Greece	GRC
Hungary	HUN
Iceland	ISL
Ireland	IRL
Israel	ISR
Italy	ITA
Japan	JPN
South Korea	KOR
Latvia	LVA
Luxembourg	LUX
Mexico	MEX
The Netherlands	NLD
New Zealand	NZL
Norway	NOR
Poland	POL
Portugal	PRT
Slovakia	SVK
Slovenia	SVN
Spain	ESP
Sweden	SWE
Switzerland	CHE
Turkey	TUR
United Kingdom	GBR
United States	USA

Appendix 2: List of Sub-Saharan Africa countries used in the sample (corresponding ISO3 country codes)

Angola	AGO
Benin	BEN
Botswana	BWA
Burkina Faso	BFA
Burundi	BDI
Cabo Verde	CPV
Cameroon	CMR
Ctrl African Rep.	CAF
Chad	TCD
Comoros	COM
Congo	COG
Côte d'Ivoire	CIV

Dem. Rep. of the Congo	COD
Djibouti	DJI
Equatorial Guinea	GNQ
Eritrea	ERI
Ethiopia	ETH
Gabon	GAB
Gambia	GMB
Ghana	GHA
Guinea	GIN
Guinea-Bissau	GNB
Kenya	KEN
Lesotho	LSO
Liberia	LBR
Malawi	MWI
Mali	MLI
Mauritania	MRT
Mauritius	MUS
Mozambique	MOZ
Namibia	NAM
Niger	NER
Nigeria	NGA
Rwanda	RWA
Senegal	SEN
Sierra Leone	SLE
Somalia	SOM
South Africa	ZAF
South Sudan	SSD
Sudan	SDN
Swaziland	SWZ
Tanzania	TZA
Togo	TGO
Uganda	UGA
Zambia	ZMB
Zimbabwe	ZWE

Appendix 3: Further explanation of the Fixed Effects Model

In order to get a consistent estimation, the 'within estimator' needs to be employed. The fixed effects transformation, also called within transformation, eliminates the individual specific heterogeneity by subtracting the individual specific average of each observation over the time period

$$y_{it} - \bar{y}_i = (x_{it} - \bar{x}_i)\beta + u_{it} - \bar{u}_i$$

This time demeaning of the original equation has removed the individual specific effect c_i.

Therefore, a key pooled OLS assumption needs to hold in this equation:

$$E(\ddot{x}'_{it}\,\ddot{u}_{it})^{16} = 0, \quad t = 1, 2, \ldots, T$$

Under assumption (4.11a) u_{it} is uncorrelated with x_{is}, for all s, $t = 1, 2, \ldots, T$. Respectively, u_{it} and $\bar{u}_i$ are uncorrelated with x_{it} and $\bar{x}_i$ for $t = 1, 2, \ldots, T$. Further it can be observed that under this assumption $E(\ddot{u}_{it} \mid x_i) = E(u_{it} \mid x_i) - E(\bar{u}_i \mid x_i) = 0$ which also implies $E(\ddot{u}_{it} \mid \ddot{x}_{i1}, \ldots, \ddot{x}_{iT}) = 0$ because each $\ddot{x}_{it}$ is a function of $\bar{x}_i = (x_{i1}, \ldots, x_{iT})$. This shows by implication that $\ddot{x}_{it}$ satisfies the conditional expectation form of the earlier imposed form of strict exogeneity assumption. It can thus be concluded that the fixed effects estimator of β which will be derived is unbiased under the assumptio.

Further, it can be shown that the within estimator is asymptotic normally distributed. Assuming homoscedasticity and negating auto correlation of the residuals, the asymptotic variance of the estimator can be calculated with the equation

$$\hat{\beta}_{FE} = \hat{\sigma}_u^{\,2} \left(\sum_{i=1}^{N} \ddot{X}_i' \ddot{X}_i\right)^{-1} = \hat{\sigma}_u^{\,2} \left(\sum_{i=1}^{N} \sum_{t=1}^{T} \ddot{x}'_{it} \ddot{x}_{it}\right)^{-1}.$$

Here, special attention needs to be payed to the fact that σ_u^2 is the variance of u_{it}. The errors in the transformed equation are $\ddot{u}_{it}$. So the fixed effects residuals which are the OLS residuals from the pooled regression, are defined as

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[16] $\ddot{y}_{it} = y_{it} - \bar{y}_i$, $\ddot{x}_{it} = x_{it} - \bar{x}_i$ and $\ddot{u}_{it} = u_{it} - \bar{u}_i$

$$\hat{u}_{it} = \ddot{y}_{it} - \ddot{x}_{it}\hat{\beta}_{FE}, \quad t = 1, 2,\ldots, T; i = 1, 2,\ldots, N$$

After this, a consistent estimator of the error term variance needs to be employed.

$$\hat{\sigma}_u^{\,2} = \frac{1}{[N(T-1)-K]} \cdot \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\epsilon}_{it}^2$$

Consequently, an adequate model is created to perform the gravity model.

Appendix 4: Correlations

	log_trade_value	log_gdp_r	log_gdp_d	log_dist	log_aid_usd2	comlang_off	comlang_ethno	comcol	col45	conflict	gatt_d	gatt_r	pop_r	pop_d
log_trade_value	1	0.4091	0.5221	0.0095	0.2024	0.1207	0.1466	-0.0039	0.1798	0.0385	-0.0342	0.0956	0.2857	0.2088
log_gdp_r	0.4091	1	-0.0436	0.0893	0.0329	0.0087	0.0050	0.0203	-0.0240	0.0119	0.0133	0.2048	0.6387	-0.0121
log_gdp_d	0.5221	-0.0436	1	0.2710	0.3147	0.1239	0.1531	-0.0554	0.1523	0.0517	-0.0556	-0.0306	-0.0426	0.3663
log_dist	0.0095	0.0893	0.2710	1	-0.0196	0.1219	0.1466	-0.0898	-0.0968	-0.0010	-0.0715	0.0753	-0.0355	0.2711
log_aid_usd2	0.2024	0.0329	0.3147	-0.0196	1	0.2000	0.1236	-0.0764	0.1475	-0.0028	-0.0213	0.0646	0.05643	0.1207
comlang_off	0.1207	0.0087	0.1239	0.1219	0.2000	1	0.7796	0.2046	0.3475	-0.0010	0.0297	0.0185	0.0059	-0.0589
comlang_ethno	0.1466	0.0050	0.1531	0.1466	0.1236	0.7796	1	0.1783	0.3009	0.0025	0.0277	0.0706	-0.0093	-0.0517
comcol	-0.0039	0.0203	-0.0554	-0.0898	-0.0764	0.2046	0.1783	1	-0.0163	-0.006	0.0061	0.0261	0.0325	-0.0287
col45	0.1798	-0.0240	0.1523	-0.0968	0.1475	0.3475	0.3009	-0.0163	1	0.0540	0.0113	-0.0009	-0.0202	-0.0182
conflict	0.0385	0.0119	0.0518	-0.0097	-0.0028	-0.0010	0.0025	-0.006	0.0541	1	0.0043	0.0011	-0.0057	-0.0060
gatt_d	-0.0342	0.0133	-0.0556	-0.0715	-0.0213	0.0297	0.0277	0.006	0.0113	0.0043	1	0.0046	0.0022	-0.3470
gatt_r	0.0956	0.2048	-0.0306	0.0753	0.0646	0.0185	0.0706	0.0262	-0.0010	0.0011	0.0046	1	-0.0197	-0.0090
pop_r	0.2857	0.6387	-0.0426	-0.0355	0.0564	0.0059	-0.009	0.0325	-0.0202	-0.0057	0.0022	-0.0197	1	-0.0089
pop_d	0.2088	-0.0121	0.3663	0.2711	0.1207	-0.0589	-0.0517	-0.0287	-0.0182	-0.0060	-0.3470	-0.0089	-0.0089	1

Appendix 5: Difference-in-Difference Analysis

It is furthermore assumed that the added independent variable of development aid only started growing by the year 2000, so two different points in time as well as the static growing can be estimated. A dummy variable is created to describe whether there is any development aid which will be in the year 2000 and is signed with as zero, or if there is some development aid paid which are all the years except 2000.

Afterwards, in order to prepare the difference in difference analysis (DID), year dummies are employed for accounting aggregate changes over time. The method of the DID has been chosen due to the fact that pooled cross sections are investigated over time. This gives rise to independent, not identically distributed observations (Wooldridge, 2002). Then, the two groups that are surveyed are China with an African state (B) and an OECD country with an African state (A). The latter is chosen to be the control group and the first is the experimental group or also called treatment group. A can be seen as the control group since the OECD countries tend to be rather classical donors so the change of their development aid does not increase or decrease significantly. So the Chinese development aid is also regarded as a change in value so the both figures can be compared to each other.

In an ordinary DID analysis two time periods are chosen, so as China is seen as a new donor, the year 2000 is seen as “not treated”, the following years until 2014 the value of development aid increased and is hence seen is “treated”. Therefore, a dummy variable for the factor time is employed: year 2000 = “0” and > year 2000 = “1” and is called *d2*.

The same is done for the difference between the treatment group and the control group and is named *dB.* If China is involved in the trade *dB* attains “1”, if not “0”. To test whether the payments of development aid has an influence on imports or exports, the following equation is used:

$$Y_{exports} = \beta_0 + \delta_0\, d2 + \beta_1\, dB + \delta_1\, d2\, dB + u$$

Where δ_1, which multiplies the interaction term *d2 dB,* is the coefficient of interest. The interpretation of it is the so-called difference-in-difference estimator and its equation looks like:

$$\delta_1 = (\bar{y}_{B,2} - \bar{y}_{B,1}) - (\bar{y}_{A,2} - \bar{y}_{A,1})$$

The value for δ_1, that is calculated for the case when looking at the value exports $Y_{exports}$ is 685.826.766 which means that an one unit increase of δ_1 results in an increase of $ 685.826.766 in exports. This value is significant at a 0,1 per cent level and has a very low p-value of 2e-16 (0,0000000000000002). But the adjusted R-squared only has a value of 0.05498.

The same is done regarding the imports:

$$Y_{imports} = \beta_0 + \delta_0\, d2 + \beta_1\, dB + \delta_2\, d2\, dB + u$$

Here, the value of δ_2 is 902.386.222 which says a one unit increase of δ_2 means an increase of $ 902.386.222 in imports. Also this value is significant at a 0,1 per cent level and has the p-value of 2.2e-16 (0,00000000000000022). The R-squared is also very low with 0.02189.

The most important limitation which is implicit is the fact of a permanently growing global economy. So the trade as well as the GDP of the countries are growing consistently. Hence, an auto correlation between the dependent variable trade and the independent time-changing variables of the GDP will occur. By having in mind this simultaneous growth has been eliminated by using the fixed effects method. Still, it need to be pointed out.

III. Statement

I hereby certify that the thesis entitled “Development Aid and Export-Performance: Chinese and Western Engagement in Africa” is an original piece of research that has been written by me. In addition, I also certify that all sources and literature used are indicated in this thesis.

Friedrichshafen, November 29th 2016

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Theresa Wiedmann