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China's Foreign Aid and Economic Growth

What is the effect of China's foreign aid on economic growth in developing countries?

Qingyi Ye – 418164

Erasmus University

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Student

Qingyi Ye

Student number: 418164

University

Erasmus University Rotterdam

Faculty of Social Sciences

Supervisors

Supervisor: Prof. Dijkstra

Second supervisor: Dr. Onderco

Date

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Abstract

Many scholars have studied the impact of foreign aid on economic growth, yet there is still no consensus on if foreign aid spurs economic growth or hinders the economic growth of developing countries. The vast majority of existing studies concentrate on foreign aid from the west to developing countries, while the amount of researches on foreign aid from emerging economies to other developing countries is relatively limited. On a basis of assumption that foreign aid from China differs from aid provided by the west, and may have a different impact on economic growth in recipients, this research aims to contribute to the literature by testing this assumption concerning China's foreign aid to developing countries. The result shows that China's foreign aid is positively correlated with economic growth in recipient developing countries.

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Content

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List of Abbreviations

AEL	The aid effectiveness literature
CDP	the Committee for Development
CPIA	Country Policy and Institutional Assessment index
DAC	Development Assistance Committee
GDP	Gross Domestic Product
GMM	the generalized method of moments
GNP	Gross National Product
ICOR	the incremental capital output ratio
IMF	International Money Fund
ODA	official development assistance; official development aid
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary least squares
SOE	stated-owned enterprise
SSA	Sub-Saharan African
UNDP	United Nation Development Program
VIF	variance inflation factor

Chapter 1 Introduction

The purpose of the first chapter is to provide the general introduction of this thesis, which is helpful to fully understand the objective and significance of this research. Firstly, I will introduce the problem definition (1.1), followed by the research objective (1.2). The chapter also presents the central question (1.3) and research approach (1.4). Finally it presents theoretical relevance (1.5) and policy relevance (1.6), ending with a reading guide (1.7).

1.1 Problem Definition

"What's wrong with the foreign aid programs of China, Venezuela, and Saudi Arabia? They are enormously generous. And they are toxic."
Moisés Naím (2007)

One of enduring and significant questions in development study fields is whether foreign aid promotes economic growth and alleviates poverty in aid recipient countries. However, the answer to this question still remains controversial among academic and political circles. Within academic circles, there are two main strands of literature which hold opposite views on this issue. Precisely, the first group (for instance, suggests that foreign aid inflows play a crucial role in promoting economic growth of developing countries by increase domestic resource, fills saving gaps, trade gaps, skill gaps, improve human capitals etc., while the another group claim that foreign encourages corruption, undermine recipients' capability, increase aid dependency of recipients, reduce domestic saving etc. which has a negative effect on economic growth of recipients. (Irandoust, & Ericsson, 2005). Moreover, another group of studies found that foreign aid has a negative impact on the development of recipients due to some certain factors, such as policy environment and the quantity of foreign aid. One influential study by Burnside and Dollar (2000) suggests that foreign aid foster economic growth of recipients if they follow good policy. However, little empirical evidence exists in support of positive aid-growth relationship even in countries which follow "good policy". In other words, the impact of traditional assistance on economic growth has been weaker than donor and recipient countries have hoped and expected. (Alemayehu, 2011; Rajan & Subramanian, 2005).

Meanwhile, China rises as an emerging foreign aid provider, operating outside of the

dominant assistance system with a distinctive approach. Moreover, China has expanded its scale of foreign assistance according to the Second White Paper of China's Foreign aid (China's Information Office of State Council, 2014), which indicated China as a rising power extends its influence globally. Besides, this increased presence also changed the dynamic of development foreign aid provision and development finance landscape (Philippa, 2012). More precisely, China's foreign assistance has changed the established notions of what foreign aid donor is, what foreign aid consists of and how it should be invested (Weston, Campbell & Koleski, 2011). Firstly, traditionally 'developed' countries gave aid and 'developing' countries received aid. Although China's rise who still positions itself as 'developing' country, it also provides development assistance to underprivileged countries. Secondly, traditionally foreign aid programmes take forms in development grants, poverty-reduction programmes, humanitarian assistance and food aids etc. and scarcely involve direct economic linkage. However, China's foreign aid mainly operates in infrastructure-focused projects, implemented by Chinese state-owned enterprises (SOEs), with direct economic linkages in recipient countries. (Lum, 2009; China's Information Office of the State Council, 2014). Thirdly, traditionally the west's aid follows country assistance strategies which typically condition its loans on initiatives like democracy promotion and corruption reduction. However, China foreign aid programmes with no strings attached operate outside the dominant aid regime, based on the principles of non-intervention, equality and mutual benefit (Bräutigam, 2011a; Condon, 2012).

The emergence of China's foreign assistance stimulated widespread interest and concern, which makes it has long been an issue of scrutiny and controversy (Shimomura & Ōhashi, 2013, p. 24; Bergen, 2011). In its essence, China's foreign aid is assistance from one country to less developed countries, while in its forms, it has its own characteristics. However, negative criticisms are levelled at numerous aspects, ranging from purposes to the effects of China's foreign aid on recipients' development. It is believed that China's aid programmes focused primarily on smoothing the way for Chinese companies to gain access to extractive resources (Bräutigam, 2011a). Even some critics equated China's heavy aid and investment in Africa to a new "neo-colonialism", which is considered to be a new colonial means to

exercise control in recipient countries. (Men & Barton, 2011, p. 209; Eno, Azaza, Eno, & Makokha, 2014). Besides, it is suggested that China's foreign aid reach its effectiveness at expense of governance, human rights and the environment. Concerning the effect China's foreign aid brings to recipients, it is suggested that China's foreign aid undermines western donors' efforts to develop good governance and fails to generate economic growth in recipient countries (Samy, 2010). More precisely, in western view, China's non-interference policy and respect for sovereignty neglect the recipient countries' government capacity, and therefore create opportunities for corruption which is one of negative externalities that arise from investment spending (Yasutami & Hideo, 2013; Woods, 2008; Condon, 2012). Besides, Chinese approach's concentration on infrastructure building has been criticized for its failure to create direct employment for local labor (Wang, Ozanne & Hao, 2014).

Though China's foreign aid receive plenty of negative criticism, its positive effect on poverty reduction has been admitted by many scholars, such as Moyo (2009, p. 103), Kobayashi (2008), Kaufmann and Kraay (2002), Sorensen (2010, pp. 147-154) and Wang et al. (2014) etc. Overall, Moyo argues that China's foreign aid with its own characteristics provides new opportunities for recipient countries, since it shares with Chinese successful development experience—emphasis on infrastructure building and its approach is much more streamlined and speedy in reaching goals (2009, pp. 109-110). Besides, Mai and Wilhelm suggested that Africa has made immense progress in the area of politics, trade and economy, public health, culture, technology and education because of the help from China. (Mai & Wilhelm, 2012). Precisely, the focus on infrastructure building in recipients removes crucial barrier (i.e. poor infrastructure), which provides a better environment for industry development. In addition, non-conditionality and project-focused features of China's foreign aid minimize the involvement of recipients' government to some extent, which can reduce opportunities of government corruption. (Wang et al., 2014).

Therefore, the influence of China's foreign aid on recipient countries is still controversial within academic, public and policy-making circles. However, there is a need to note that the current appraisals of China's foreign aid have been made through the lens of mainstream views of traditional donors (Yasutami & Hideo, 2013, p. 24). In order to accurately and

thoroughly assess the China's foreign aid policy, viewpoints from various angels should be taken into consideration. Meanwhile, it is suggested China's foreign aid policy is wildly misunderstood in the international society. Obviously, the limited transparency on China's foreign aid programmes restricted in-depth research on China's foreign aid, and some politicians misinterpret China's foreign aid to advocate "China Threat" theory[1], which leads to the widespread misunderstanding about China's foreign aid programmes. (Bräutigam, 2009; Philippa, 2012; Yasutami & Hideo, 2013, p. 37).

Though China's foreign aid is under criticism and misunderstanding, there is little literature attempting to directly respond to negative criticisms and to investigate the real influence China's foreign aid brings to recipient countries. To put it in another way, currently, little literature attempts to answer the question that whether China's aid actually fails to foster economic growth in recipient countries theoretically and empirically. Even the existence knowledge of mechanism, practices and even the principles and objectives of China's foreign aid remain sketchy (Philippa, 2012). Admittedly, apart from limited information and data releasing by the Chinese government, the difference of language, culture and history also restrict researcher's further study about China's foreign aid.

Considering that there is widespread criticism, misunderstanding and misinterpretation about China's foreign aid, and the existent knowledge of China's foreign aid is insufficient, this study is meaningful to investigate the real story of China's foreign aid policy and answer a series of questions centering this issue. What are distinctive characteristics of China's foreign aid? What is the real impact of China's foreign aid on recipient countries? Does it foster economic growth in recipient countries? This series of questions encourage me to find more about Chinese foreign aid. This is the genesis of my research into Chinese foreign aid policy.

1.2 Research Objective

Theoretically, though many scholars pay their attention to topic centering China's role in

[1] "China Threat" theory suggests that China will rise as a world superpower which would become a significant threat to global structure. Precisely, China's ideological orientation (China sticks to communism), its current rising power in size (territory, population and economy), its clash of civilization with the west (China emphasizes Confucian civilization), make itself a revolutionary power that threatens global structure (especially threatens the United States' status in the future) and ultimately may adversely affect other countries' peaceful development. (Xia, n.d.). Here China's foreign aid was considered as a means that expand its influence globally which threaten development of other countries.

some regions (such as Africa, Southeast Asia, South Pacific region etc.), which regard China's foreign aid, trade and investment as a whole, still few studies deal specifically with China's foreign aid. Moreover, compared with a long-history study about western foreign aid, China's foreign aid study is in a lack of systematic and deep research. And simple lens of western views leads to those current widespread appraisals of China's foreign aid were negative, alarmist and oftentimes blatantly incorrect (Yasutami & Hideo, 2013, p. 24; Philippa, 2012). Practically, while China's foreign aid has become a hot topic, there is an increasing number of studies attempting to fill these blanks on an aspect of China's engagement (including Chinese investment, trade and aid), China's impact in a certain sector or area. Still, few studies deal specifically with the impact of China's foreign aid on economic growth in recipient countries since the limited transparency and inaccessible data about China's foreign aid greatly restrict further studies about China's foreign aid.

Luckily, in recent years, the Chinese government has a tendency to present more information and details concerning its foreign aid, publishing the first and second Chinese Foreign Aid White Paper in 2011 and 2015 respectively, which provide us with a necessary condition to study China's foreign aid further. Besides, AidData establishes Chinese development finance dataset, a data base employing a range of different methodologies and technologies tracing 2312 Chinese aid programmes in recipient countries from 2000 to 2012. ("AidData's Methodology for Tracking Underreported Financial Flows", 2015). It fills these critical information gaps and provides this thesis with strong support for data collection to better understand the true effect of China's foreign aid produces in recipients.

Thanks to the increasingly public information and accessed reliable data about China's foreign aid, given the fact there is a gap in the literature, which relates to the study of overall impact of China's foreign aid on recipients' economic growth, this paper attempts to bridge this gap by focusing on the linkage between China's foreign aid and economic development, based on studying impact of foreign aid on recipients' economic growth. In other words, firstly this thesis aims to fill this gap in the literature, attempting to provide deeper understanding concerning China's foreign aid through various angles instead of the simple lens of traditional donors. Secondly, this thesis seeks to directly respond to current extensive

criticisms from international aid community, studying what is the real effect China's foreign aid on recipients' economic development both in theoretical and empirical aspects.

1.3 Research Question

In order to accomplish the above objectives, this thesis attempt to answer the following central research question:

What is the effect of China's foreign aid on economic growth in developing countries?

The following sub questions are designed to fully answer the above core research question:

Sub Question One: What does the existing literature tell about foreign aid and economic growth, especially about China's foreign aid?

Sub Question Two: What are empirical findings of this research on the impact of China's foreign aid on economic growth in developing countries?

1.4 Research Approach

This research question will be answered from theoretical and empirical aspects, namely the first and second sub-questions.

The first sub-question will be answered in chapter 2 through a review of the existing literature, defining and introducing different assumptions and providing the theoretical framework for this thesis. In order to fully answer this sub-question, firstly the critical identification of foreign aid is presented to establish the common language and lay the foundation for later research. Secondly, the impact of foreign aid on economic growth will be thoroughly discussed, with a special look on China's foreign aid impact. Thirdly, theoretical assumption will be formulated and the control variables (factors influencing economic growth) which will be used in empirical test are going to be presented. As for method in this part, related literature including books, periodicals, published reports, journals to reports by International Organizations, academic research reports, will be reviewed. Here desk research in existing literature will be the main instrument for fully answering the first sub-question and formulating the theoretical expectation which will be tested in empirical part.

The second sub-question is going to be answered in chapter 4 where the main empirical research of this research is provided. After forming the theoretical framework, quantitative analysis will be conducted to test the hypothesis based on the theoretical assumption. Cross sectional regression analysis will be used to examine the impact of China's foreign aid on economic growth of recipients. Data for this independent variable (aid received from China) for this empirical research will be used from AidData. In the absence of Chinese officially reported annual aid flows, AidData provides a dataset of Chinese aid flows from 2000 to 2012, by employing various methodologies and technologies based on press report and information from official government speeches etc. Even though this dataset has limited time series, it is best available source. Data for the dependent variable (economic growth) will be used from World Development Indicators database on GDP annual growth rate. Other variables for this research are derived from World Bank (WB) database and Human development reports from United Nation Development Programme (UNDP). Data description and source can be seen in Appendix A.

1.5 Theoretical Relevance

The past several decades witness the intensive debate centering the impact of foreign aid on the growth of recipient countries. A considerable number of empirical studies are conducted to examine different theoretical formulations (i.e. foreign aid has positive, no or conditional impact on growth) on the basis of hard data. However, the majority of those existing literature gives attention to foreign aid from North to South, while relatively less attention is given to foreign aid from South to South, like China. Moreover, among studies on China's foreign aid, many studies study China's foreign aid, investment and trade as a whole (i.e. China's engagement or China's role), while several studies pay attention to China's foreign aid in a certain area, like Africa, Latin America, South-east Asia etc. Most importantly, few researches examine the impact of China's foreign aid in developing countries based on hard data. More precisely, China's foreign aid has invoked both admiration and criticism, most of the appraisals are based on limited empirical or anecdotal evidence, which contributes to conflicting perceptions of its purpose, means and outcomes (Alden & Chen, 2009). In addition, due to limited authorized information published by the Chinese government on

foreign aid, the existing knowledge of model, characteristics and practice of China's foreign aid is still sketchy.

Therefore, conclusions and analysis of this thesis are crucial academically because it will add certain knowledge to the field and will fill the gap in the literature. Precisely, a) this study will contribute to the debate on the impact of foreign aid from a political analysis perspective (not only from economic perspective based on hard data; b) this study on China's foreign aid helps to capture the overall aid finance system and ultimately assist in researching how to better promote recipients' development; c) this study will be of added value to literature on China's foreign aid by complementing the existing knowledge in the field of model, characteristics and practice of China's foreign aid based on information released by Chinese official channels and data released by AidData.

1.6 Policy Relevance

China as an emerging aid donor, providing foreign aid from South to South, operating outside dominant aid provider system, stimulates widespread attention and its impact is still a controversial issue in policy circles. No matter what kind of impact (positive or negative) it brings to recipients, it deeply affects recipients' development and international development finance as well. It is widely accepted that China is playing an enormous role in Africa's infrastructure (Africa is the main aid recipient continent of China's foreign aid), which can be seen as a proactive driving force of African economic growth (Foster, 2009). However, it is often supposed that China's foreign aid undermines western donors' efforts to develop good governance and stimulate economic growth, through promoting non-conditionality aid overlooking recipients' capacity and provide bilateral aid increasing recipients' debt burden. (Samy, 2010; Wang et al., 2014).

Besides, it is suggested that limited transparency on China's foreign aid, deliberate misinterpretation by some politicians to advocate "China Threat" theory, and appraisal of China's aid only through a single western lens, lead to numerous misunderstandings of China's aid approach (Philippa, 2012). Those misunderstandings not only create an obstruction for operating China's aid programmes in recipient countries, but also make

China's foreign aid receive considerable criticism in international development finance circles. To be more precise, those widespread misunderstandings have an adverse impact on the relationship between China and recipient countries, which further negatively affect performance of China's aid programmes. In addition, extensive criticism indeed blackens China's foreign aid's name, and hence reduce opportunities for cooperation between China's aid and other donors (especially traditional donors), which may affect the improvement of aid effectiveness and ultimately affect the development of developing countries.

Therefore, studying the impact of China's foreign aid from various lenses theoretically can provide the real story of China's foreign aid in recipients, and examining the impact of China's foreign aid on recipients empirically can partly erase misunderstanding. Precisely, a) this study can provide policy-makers of donors (both China and other donor countries) with a research result based on hard data, which can provoke themselves to rethink the aid model and adjust their aid policy to improve aid effectiveness; b) this study will be helpful to gain mutual understanding between China and other donors (especially traditional donors), which lay a basic foundation for potential cooperation with each other in the future; c) this study can promote local people to develop a clear understanding of China's foreign aid policy, and therefore improve effectiveness and performance of China's aid programmes in recipient countries.

1.7 Reading Guide

This thesis contains 6 chapters. Chapter 1 provides the problem identification, research objective, research question, research method, research relevance and reading guide, in order to lay the basic foundation for later analysis. Chapter 2 presents the findings of the existing theoretical and empirical literature regarding the impact of foreign aid on recipients' economic growth, and especially China's foreign aid's impact on recipients' economic growth. Based on this literature review, theoretical expectations will be formulated and presented at the end of this chapter. Chapter 3 introduces the research design and its operationalization. In Chapter 4, descriptive statistics and explanation analysis are presented, which includes assumptions of regression analysis, the result of multivariate regression models and their

interpretation. Chapter 5 summarizes the findings of this research, drawing the conclusions to answer the central research question. In addition, limitations of this thesis will be discussed and policy and research implications on this subject will be presented.

Chapter 2 Literature Review

In this chapter, the main literature on the topic will be presented and reviewed and the first sub-question is going to be answered, namely：

What does the existing literature tell about foreign aid and economic growth, especially about China's foreign aid?

To answer this sub-question thoroughly it is important to review the literature regarding this relation from a wider perspective. Firstly, a brief overview of foreign aid's definition (2.1) is provided, which establish the common language that serves as a foundation for the later analysis. After that, the relations between foreign aid and economic growth (2.2) will be generally discussed from theoretical aspect. On a basis of this general discussion, following part is going to narrow down on specific topic regarding China's foreign aid and economic growth (2.3). Then the empirical studies (2.4) concerning the impact of foreign aid on economic growth will be presented. Lastly, a concise summary of the literature review (2.5) will be presented, and on basis of that, theoretical hypothesis will be formulated, which will be tested in the following empirical study of this thesis.

2.1 Defining Foreign Aid

Foreign aid is a multifaceted term which will imply different meanings in different contexts. For instance, foreign aid sometimes implies a public transfer among countries while refers to a tool of foreign policy on other occasions. Besides, the various forms of foreign aid (e.g. bilateral aid, multilateral aid, non-governmental aid, technical aid etc.) also make it involve levels of meanings. Therefore, it is necessary to fully define the term – foreign aid which lays the foundation for later analysis.

In its narrow sense, foreign aid refers to "official development assistance (ODA)" that defined by the DAC of OECD as "concessional funding given to developing countries and to multilateral institutions, and provided by official agencies, including state and local governments, or by their executive agencies". At the same time, this funding should meet two criteria: a) it is administered with the promotion of the economic development and welfare of

developing countries as its main objective, and b) it is concessional in character and contains a grant element of at least 25 percent[2] (Sun, 2014; Bräutigam, 2009, p. 14).

In its board sense, foreign aid can be defined in diverse ways. Lancaster (2007, p. 9) provides with an identification "a voluntary transfer of public resources, from a government to another independent government, to an NGO, or to an international organization with at least a 25 percent grant element, one goal of which is to better the human condition in the country receiving the aid" (Lancaster, 2007, p. 9). This definition follows the same logic with the definition from OECD, but expands the group of recipient agencies and narrows the range of objectives. To be more precise, the recipient agencies are not restricted in a group of developing countries while the goals are narrowed to better the human condition instead of promoting development (Lancaster, 2007, p. 11). Todaro and Smith (2015, p. 747) define foreign aid as "the international transfer of public funds in the form of loans or grants either directly from one government to another (bilateral assistance) or indirectly through the vehicle of a multilateral assistance agency." Meanwhile, it should meet two criteria: a) its purpose should be non-commercial b) both the interest rate and repayment period should be softer than commercial terms.[3] (Todaro, & Smith, 2015, p. 747). Compared with the definition provided above, Todaro and Smith offer a broader definition which only combines the non-commercial objectives and concessional characteristics.

As we can see from above definitions, the identification of foreign aid should contain three crucial elements: a) foreign aid is the international transfer from one government to another or to an agency; b) its objective is at least non-commercial, usually promoting development or foster a specific aspect of development; c) its instruments have concessional characteristics, while the specific standard of concessional terms varies from one to another. Those crucial elements establish a common language for discussing foreign aid and provide the starting point for this thesis. Apart from being helpful to fully understand foreign aid, it facilitates to thoroughly comprehend the definition of China's foreign aid, and clearly distinguish China's foreign aid from China's economic engagement in the following part (Chapter 2.3.1).

[2]http://www.oecd.org/dac/stats/officialdevelopmentassistancedefinitionandcoverage.htm

[3]Here commercial terms refers to terms for the extension of credit that are more favorable to borrower than those available through standard financial markets (Todaro, & Smith, 2015)

2.2 Foreign aid and economic growth

Several decades witness an intense debate concerning the relationship between foreign aid and economic growth, and however there is still no clear consensus. Some researchers suggest that foreign aid supports and promotes economic growth, while others hold the opposite view, arguing that aid exert adverse impact on recipients' economic development. Additionally, other studies present that aid might tend to spur growth under a certain condition, and therefore the condition becomes a widely-discussed topic in academic circles.

2.2.1 Foreign aid has a positive impact on economic growth

It is widely recognized that growth is restricted by a shortage of capital, savings and foreign exchange, skill gaps and infrastructural weakness (Riddell, 2008, p. 200). The below is centering on how foreign aid breaks through the above limitation and ultimately achieve economic growth.

Firstly, foreign aid would be helpful to capital formation and hence facilitates economic growth in recipient countries. The theory behind this argument is the two-gap model, which is "a model of foreign aid comparing savings and foreign-exchange gaps to determine which is the binding constraint on economic growth" (Todaro, & Smith, 2015, p. 751). This theory builds upon Harrod-Domar model which suggests the incremental capital output ratio (ICOR) is a crucial factor to contribute to economic growth[4] (Browne, 2007, pp. 55-56). Precisely, two gap model considers the development of a developing country would be constrained by its shortage of domestic savings or foreign exchange, which is so called two gaps—saving gaps and foreign-exchange gaps (trade gaps). In other words, the shortage of domestic saving would result in limited ability to take up investment opportunities, while lacking foreign exchange would lead to a restricted capability of importing needed goods or capitals. Besides, it suggests that most developing countries do not have sufficient domestic savings and foreign exchange. As foreign aid can be used to supplement domestic savings and foreign exchange, which simulates trade expansion, increases investment and expands imported goods, it plays a crucial part in economic growth. (Todaro, & Smith, 2015, p. 751; Kabete,

[4]ICOR measures the amount of capital investment led directly to growth.

2008). Additionally, in the 1990s, Bacha (1990) argues that there is a third type of gap—fiscal gap, which refers to a gap between government revenues and expenditure. Recipient governments do not have sufficient tax revenues, and therefore they cannot import necessary goods or invest enough in fields of infrastructure, health or education. Foreign aid as an exogenous resource can contribute to growth in recipient countries through supplementing this fiscal gap (Bacha, 1990; van Randen, 2012).

Secondly, foreign aid in forms of technical assistance could have a beneficial influence on economic growth by bridging skills gap and improving human resources. As mentioned above that aid facilitate economic growth by supporting investment, it was acknowledged that the ability to absorb capital is restricted by low skill levels. Therefore, technical assistance consists of direct technology transfer and spreading knowledge, which contributes to an increase of skill levels, an improvement of human resources (labor force) and therefore promotes economic growth (Radelet, 2006).

Thirdly, foreign aid in forms of health and education aid programmes might contribute to economic growth by improving human capital. Education and health programmes are helpful to an accumulation of human capital in recipients. To be more precise, with better health status, workers are able to work harder and longer, which obviously raises work productivity and ultimately promote economic growth (Spence, & Lewis, 2009, p. 7). In addition, with a better educational background, workers could more easily absorb emerging technologies from modern economy. Sufficient well-educated labor force would enhance absorption of leading technologies, which would lead to rapid economic growth. (Barro, 2001; Kabete, 2008).

According to traditional neoclassical growth theory, there are three factors leading to output growth, which are increases in capital, improvements in technology and increases in labor quantity and quality (Todaro, & Smith, 2015, pp. 132). Based on above discussion, foreign aid definitely facilitates economic growth by filling three gaps which leads to a capital increase, promoting technology diffusion which improving technology and improving human capital which increases labor quantity and quality.

2.2.2 Foreign aid has no impact on economic growth

In this sub-part, various reasons that foreign aid has no impact and even negative impact on economic growth will be discussed from three main channels.

Firstly, foreign aid could have an adverse effect on economic growth by assisting incompetent government to maintain state control. Precisely, foreign aid would increase government consumption in various aspects, which has nothing to do with economic growth in recipients. Such government consumption might consist of the increased income of government officials and extravagant government buildings which lead to correspondingly decreased expenditure on public welfare and productivity, increased military expenditure in a war-torn area which may create increased instability etc (Radelet, 2006). Besides, according to a game-theoretic rent-seeking model from Svensson (2000), foreign aid could encourage corruption and rent-seeking activities, and thereby play a detrimental effect on economic growth. (Shin, 2014).In addition, foreign aid discourages the government from introducing economic reform and optimizing economic policies. To be obvious, incompetent governments tend to follow their poor public policy and hinder their country's economic growth, aiming to receive a considerable amount of foreign aid (Shin, 2014).

Secondly, limited absorptive capacity constrains recipients to effectively utilize foreign aid, so aid would not generate economic growth and even worse could lead to economic recession. Absorptive capacity here refers to limited ability to absorb foreign aid flows and put them into effective and efficient use, which contains a country's weak institutions, shortage of skilled labor force etc. This limited capacity may result in economic troubles such as a loss of competitiveness (also called the Dutch disease), which refers to a situation that aid inflows would induce an increase of exchange rate and therefore lead to a decrease of relative competitiveness of recipients' export sector. This loss of competitiveness would result in less incentive for investment in the private sector and hence reduce productivity and damage economy. (Guillaumont, & Jeanneney, 2006; Browne, 2007, p. 56). Not only that, without well-managed institutions, recipients' economy tends to achieve high dependence on foreign aid, which will further undermine recipients' capability. Even worse, recipients' economy would be affected adversely when foreign aid is withdrawn. (Riddell, 2008, p. 227; Radelet,

2006; Rajan and Subramanian, 2005, p. 5).

Thirdly, foreign aid would reduce domestic saving, both private saving through a decrease in interest rates, and government saving through a reduction of revenue (Radelet, 2006). To be more precise, foreign aid may reduce incentives of recipients' government to introduce economic reform and develop good economic policies to increase revenue. Moreover, according to gap-filling theory, aid inflows fill the fiscal gap, which refers to a gap between government revenues and expenditure. However, foreign aid takes forms of loan which would crates pressure on future government revenue, would correspondently reduce government saving and limit government expenditure on education, health and infrastructure sector (Kabete, 2008; Browne, 2007, p. 56).

2.2.3 Foreign aid has a conditional impact on economic growth

In terms of the relationship between foreign aid and economic growth, apart from the above two arguments, there is another view popular in last two decades that foreign aid accelerates economic growth under some certain circumstances (conditions). To put it in another way, it is suggested that the impact of foreign aid on economic growth depends on some conditions. Then aid-conditionality has become another sharp focus in the aid effectiveness literature (AEL), and it mainly centers on these three aspects, recipient country characteristics, aid characteristics and donor practices.

In terms of recipient country characteristics, there are two influential models here. First, the Good policy model, which means that foreign aid works positively if recipients follow good policies and affect adversely if recipients purse bad policies, first proposed by Burnside and Dollar and later developed by many researchers，such as WB(1998), Svensson (1999), Collier and Dollar (2001). (Doucouliagos & Paldam, 2009). Precisely, WB (1998) in "Assessing aid" presented that "financial aid works in a good policy environment"; Svensson (1999) found that the effect of aid depends on "the degree of political and civil liberties" in recipients. Collier and Dollar (2001) reexamined aid-growth relationship and found that aid accelerates the process of poverty reduction with good policies, and the impact of aid on poverty is conditional on "the quality of policies". (World Bank, 1998, p. 2; Svensson, 1999; Collier &

Dollar, 2001).

Second, the institutions model which means foreign aid has a conditional impact on economic growth and the condition can be democracy (Svensson, 1999; Kosack, 2003), exogenous environmental factors (Guillaumont & Chauvet, 2001), export prices shocks (Collier & Dehn, 2001), the climate-related circumstances (Dalgaard, Hansen & Tarp, 2004) and the quality of state institutions (Burnside & Dollar, 2004).

With regard to aid characteristics, the amount of aid and the type, aid could be conditional factors that affect aid effectiveness. The first one is called Medicine Model, which refers to that aid helps recipients within a certain level of aid while hurts recipients exceeding that level, just like most medicines. According to this model, aid should be properly distributed to recipients, taking the economic situation of recipients into consideration. (Jensen & Paldam, 2006). Second, types of aid may have a different impact on economic growth of recipients. (Radelet, 2006). For instance, emergency and humanitarian aid in large likelihood has a negative effect on growth of recipients; long-impact aid (like aid donated to environment, education, health and democracy fields) cannot show a positive impact on growth in relative short-time period; short-impact aid (such as aid in forms of investment to productive sectors) has a positive impact on growth of recipients (Clemens, Radelet & Bhavnani, 2004; Meulblok, 2009).

Concerning donor practices, it is suggested that donor practices exert an impact on aid effectiveness in recipients (Radelet, 2006). First, multilateral aid (aid donated from international financial institutions like IMF, WB and OECD to developing countries) and bilateral aid (aid donated form one country to another country) are different on donor motivation, characters and conditionalities of aid are exerting different influence on aid effectiveness. (Ram, 2003). It is suggested that multilateral aid would exert stronger influence to aid effectiveness than bilateral aid, since multilateral aid does not need to fulfill national economic and strategic interests of the donor, and normally makes conditions of “structural adjustment” for aid which would be beneficial for recipients (Ram, 2003). Second, it is suggested that ‘untied’ aid (aid to developing countries which can be used to purchase goods and services everywhere) would have stronger impact on aid effectiveness than tied aid(aid to

developing countries on the condition that it can only be used to purchase goods and services from the provider of the aid (Ram, 2003; Meulblok, 2009).

2.3 China's foreign aid and economic growth

As is known to all, China's foreign aid operates outside the international aid community with its own distinctive characteristics. In order to precisely examine the impact of China's foreign aid on recipients' economic growth, the discussion of China's foreign aid definition and characteristics are provided first. Then the impact of China's foreign aid on economic growth of recipient countries will be presented.

2.3.1 The definition of China's foreign aid

On the basis of above identifications of foreign aid, this part is going to discuss the identification of China's foreign aid. Given the fact China's foreign aid differs in several distinct aspects, there is no consensus on what counts as China's foreign aid. To be more precise, on the one hand, unlike OECD-DAC members, the Chinese government operates foreign aid outside the dominant aid system, and does not release official detailed project-level data and information regarding its foreign aid programmes, therefore it makes itself uneasily fit into OECD's definition of ODA (Bergen, 2011). On the other hand, there are many Chinese actors (e.g. the Ministry of Finance, China's export-import bank, SOEs etc,) that perform their different sometimes overlapping function in operating foreign aid in recipient countries, which makes it hard to identify what is China's foreign aid (i.e. what is a certain group of voluntary transfer under the aim of better the development from China to recipient countries). In other words, the multiple agencies operating in China's foreign aid results in difficulty in distinguishing China's foreign aid from Chinese economic engagement in recipient countries, like China's trade and investment.

According to the Second White Paper of China's Foreign aid (China's Information Office of State Council, 2014), objectives of China's foreign aid are "helping improve people's livelihood" and "promoting economic and social development", which meet one criterion of foreign aid's definition concluded in the previous part (Chapter 2.1.1), namely the objective is at least non-commercial. While the main types (here can be seen as instruments) of China's

foreign aid are grants, interest-free loans and concessional loans, which meets the criterion of concessional terms. In addition, China's foreign aid is no doubt a voluntary transfer from China to other recipient countries or international organizations, which satisfies the other criterion of foreign aid's identification. Hence, even though China's foreign aid does not fit clearly into OECD-DAC categorization, it meets all three criteria of foreign aid's board identification.

2.3.2 The characteristics of China's foreign aid

Non-interference and Non-conditionality

> *"When providing foreign assistance, China adheres to the principles of not imposing any political conditions, not interfering in the internal affairs of the recipient countries and fully respecting their right to independently choose their own paths and models of development."(China's Information Office of the State Council, 2014)*

Non-interference in internal affairs of another country is a key pillar of China's foreign policy, and thereby it is also a basic principle that China's foreign aid policy follows. (Brant, 2012).China never uses its foreign aid to interfere in recipient countries' internal affairs or seek political privileges for itself (China's Information Office of the State Council, 2011). And non-conditionality, also known as "no strings attached", "unconditionality" and "no condition imposed", means that no political conditions are attached when China establishes aid relationship with recipients, which is the salient characteristic of China's foreign aid. It conveys three basic ideas: firstly, unlike western aid programmes, China does not require the adoption of good economic policy, the exercise of good governance or a promotion of democracy, human rights and gender parity as precondition for aid, or set objectives for recipients as a condition for the later assistance (if recipients cannot achieve objectives, the later foreign assistance would be reduced or terminated). (Wang & Ozanne, 2000; Ling, 2010). Secondly, China believes that the economic or political reform can only be successfully fulfilled within the country itself, and each country will find their own suitable development path for their specific national conditions. Given China's own painful historical experience of western interference (i.e. Tibet and Taiwan issues), China strongly insists its

non-interference principle (Sorensen, 2010, p. 147; Ling, 2010). Finally, non-conditionality refers to the fact that no political conditions will be set for receiving China's foreign aid, which does not mean no "conditions" at all. There will be a kind of contract between China and recipient countries when providing concessional aid, which consists of various specific measures are proposed to implement aid programmes. Besides, when receiving China's foreign aid, recipient countries should support "one China policy" (recognizing that there is only one China in the world that is represented by the People's Republic of China and Taiwan is part of it). It is China's most crucial sovereignty issue and one of Chinese internal affairs as well, which cannot be seen as a normal conditionality which would be followed and implemented in recipients (Ling, 2010; Sorensen, 2010, p. 149).

Infrastructure-focused and Project-focused

> *"In providing foreign aid, China does its best to help recipient countries to foster local personnel and technical forces, build infrastructure, and develop and use domestic resources, so as to lay a foundation for future development and embarkation on the road of self-reliance and independent development."(China's Information Office of the State Council, 2011).*

China has long focused on infrastructure construction in providing recipients with foreign aid, and the majority of its foreign aid takes the form of projects (Ling, 2010). The focus on infrastructure is decided by three factors, recipients' need, China's own development experience and the potential for mutual benefits. Regarding recipients' demand, a considerable amount of developing countries are in urgent need of better facilities across their whole countries, as underdeveloped infrastructure is their major barrier to encourage development and alleviate poverty. It is widely known that infrastructure is the foundation for national economic development, since it represents the potential bearing on attraction of foreign investment and it stands for the level of national development. More precisely, an insufficient and unstable power supply and the poor transportation condition seriously restrict underdeveloped countries' development (Sorensen, 2010, pp. 152-153). In terms of China's own development experience, the idea of self-reliance and the rapid expansion of infrastructure were immensely helpful to accelerating Chinese economic growth. Therefore, China's foreign aid, with the aims of helping recipient countries to improve their capacity for

independent development, puts its emphasis on infrastructure construction (i.e. building roads, bridges, railways etc.) (Wang, Zhu & Zhang, 2013). With regard to the potential for mutual benefits for both China and recipient countries, these can be seen from the following example. As China is one of biggest trade partner of Africa, its effort on building infrastructure in African recipient countries provide both China and Africa better investment environment, which would be beneficial for both donor and recipients. In terms of utilization of foreign aid, China's foreign aid is not provided through direct funds transfers, but through turn key projects (where all components are provided from Chinese government), technological collaboration (projects where parts of the materials are provided), and human resource training projects (Sorensen, 2010, p. 155; Davies, 2007, p. 55).

Mutual respect and Mutual benefit

> *"Adhering to equality, mutual benefit and common development. China maintains that foreign aid is mutual help between developing countries, focuses on practical effects, accommodates recipient countries' interests, and strives to promote friendly bilateral relations and mutual benefit through economic and technical cooperation with other developing countries."(China's Information Office of the State Council, 2011).*

China respects recipient countries' right to independently select their own path and model of development, and provides aid on the basis of negotiations with recipients with aim of mutual benefits. (Ling, 2010; China's Information Office of the State Council, 2011). Huang Ying, government think-tank scholar from the China Institute of Contemporary International Relations, argues that "Chinese aid is, in essence, cooperation and mutual support between developing countries" (Huang, 2007). Since the "poor helps the poor model" does not belong to OECD/DAC club, China provides bilateral aid outside the dominant aid providing system, through conversation and cooperation between China and recipient countries (Sorensen, 2010, p. 151). More precisely, China's foreign aid is provided based on mutual respect, equality and shared interest; China regards its foreign aid as two-way exchange and two-sided cooperation rather than one-way assistance; China is more responsive to recipients' demand compared with western donors (Sorensen, 2010, p. 147; Huang, 2007).

2.3.3 The impact of China's foreign aid on economic growth

The debate on the impact of China's foreign aid on economic growth of recipients has not achieved a consensus. In essence, China's foreign aid is one kind of foreign aid with its own characteristics. Therefore it can facilitate economic growth and may inhibit economic growth through channels mentioned above (Chapter 2.1). Moreover, the impact of its own characteristics on economic growth ignites heated discussion within academic circles.

Positive impact

First, China's foreign aid has contributed to increasing the total amount of foreign aid flows from donors to recipient countries, which supplement domestic savings, fills foreign-exchange gaps, and hence facilitate capital formation and simulate trade expansion, which would lead to economic growth (Watanabe, 2015). Second, China's foreign aid in forms of technical cooperation and human resource development cooperation, not only fills skill gaps but also improves human resources, which is helpful to accelerate economic growth of recipients. Precisely, in terms of technical cooperation, many Chinese experts (in various fields like industrial production, farming, energy, economic management etc.) are sent to recipient countries to train local people in order to facilitate the achievement of China's foreign aid complete projects, while with regard to human resource development, its main form is training programs for experts and works in recipient countries. Both can be seen as direct technology transfer and spreading knowledge, which would enhance self-development capacity of recipient countries (China's Information Office of the State Council, 2011; Watanabe, 2015). Third, China's sending medical teams to recipient countries, expanding aid expenditure in education exchange and medical service, indeed helps to improves human capital which will have positive effect on economic growth (Sorensen, 2010, p. 154; Watanabe, 2015). Fourth, China's foreign aid attaches emphasis on infrastructure construction, which removes the crucial barriers—underdeveloped infrastructure for developing countries. It establishes the foundation for further development in developing countries by providing better facilities to reduce transportation costs and transaction costs and therefore attract foreign investment and enable domestic trade. Fifth, non-conditionality and project-focused features of China's foreign aid minimize the involvement of recipients' government to some

extent, which can reduce opportunities for rent-seeking and corruption. To be more precise, when foreign aid is provided in forms of projects without political condition, government does not act as a middleman and there are no direct funds transfers to government, which avoids corruption (Wang et al., 2014). Sixth, China's foreign aid does not impose political condition when establishing aid relationship with recipients, which would deal with the "aid dilemma" to some extent. The "aid dilemma" refers to the fact that western donor countries set good governance as a precondition to provision of foreign aid to combat corruption while the corruption is endogenously determined by underdevelopment (Wang et al., 2014). More precisely, poor economic state and poor governance are two sides of one problem—underdevelopment, and underdevelopment is found correlated with poor governance and corruption (Kaufmann and Kraay 2002). Therefore, poor governance cannot be regarded as the cause of low aid effectiveness, donating aid to developing countries so as to stimulate economic growth should be a crucial task.

Negative impact

First, the non-conditionality of China's foreign aid policy is suggested to neglect the poor government capacity and delay the necessary economic policy reform in recipient countries. To be more precise, China's non-conditionality policy does not assist recipient's government to combat rent-seeking activities or curb corruption, and create opportunities for incompetent governments to conduct rent-seeking activities. (Samy, 2010; Woods, 2008). However, this views lacks sufficient evidence to support that China's foreign aid has a negative impact on recipients' political development. Second, Chinese approach's concentration on infrastructure building has been criticized for not only its failure to create direct employment for local labor, but also for its possible aims to help Chinese companies to gain access to extractive resources in recipients countries. More precisely, It is suggested that Chinese aid approach is in exchange for natural resources. (Bräutigam, 2011; Wang et al., 2014; Sorensen, 2010, p. 154). However, the figures from WB report show that only 7 per cent of China's aid investment in African infrastructure is connected to obtain natural resources, which is much less than many of western multinational counterparts aid (Sorensen, 2010, p. 154). This fact can partly respond to the criticism that China's foreign aid is in exchange of natural resource. Third,

most of China's foreign aid is provided bilaterally, which could be employed to fulfill donor's economic interest and hence inhibit aid effectiveness. However, there are three main reasons why China provides foreign aid bilaterally: historical habit and abundant experience; south-to-south aid does not belong to OECD/DAC group; the bilateral way is more efficient than multilateral aid (Sorensen, 2010, p. 151). Fourth, China's concessional loans are all tied, which is perceived to undermine aid effectiveness in recipient.[5] Fifth, Chinese non-transparency aid approach operating outside OECD/DAC system, is considered to be a behaviour that increases debt burden of recipients (Wang et al., 2014).

Conclusion

China's foreign aid is able to have a positive impact on economic growth of recipients through same channels as traditional aid does, but also its emphasis on infrastructure construction established the foundation further development of recipient countries whereas its own characteristics deal with the "aid dilemma" and corruption to some extent. On the other side, China's foreign aid is assumed to have an adverse impact on political development by neglecting recipients' poor government capability, to help Chinese companies to gain access to extractive resources, to fulfil its own economic interests, to undermine aid effectiveness and to increases the debt burden of recipients. However, the lack of evidence on negative impact from China's aid on recipient's political development, the public report by WB and the clear presentation of why China choosing the bilateral way to donate aid can partly correct misunderstandings. In sum, China's foreign aid can have a positive impact on economic growth of developing countries.

2.4 Empirical Studies

In this sub-chapter, a review of empirical studies centering on the impact of foreign aid on economic growth is presented, which lays the foundation for establishing model and conducting empirical study later.

2.4.1 The positive impact of foreign aid on economic growth

Gyimah-Brempong (1992) used cross-national time-series aid data to investigate the effects

[5]China's concessional loans require more than 50 percentages of goods and service from China. (Watanabe, 2015).

of aid on economic growth in Sub-Saharan Africa (SSA) and found aid has a small but positive and significant effect on economic growth. When using aggregate aid, it was found that aid has a significant impact on growth. When decomposing aid into loans, grants and food aid, it is found that both loans and grants have positive impact whereas food aid has no impact. In addition, for control variables investment, export growth and private flow were found to have positive impact on growth while war was negatively associated with economic growth for both tests, The only difference is that per capita GNP (Gross national product) were found significantly positive when using aggregate aid data and were found to be statistically insignificantly associate with growth when data of loans, grants and food aid were used. (Gyimah-Brempong, 1992).

Fayissa and El-Kaissy (1999) by using average cross-sectional data for 77 countries over 1971-1990 period and controlling for gross domestic savings, human capital, labor force, trade (export) and political and civil liberty, found that foreign aid has a statistically positive impact on economic growth in developing countries. Moreover, they also found that domestic savings, labor forces, export values and human capital have a statistically significant positive impact on economic growth in developing countries. In addition, average gross domestic savings is used to measure domestic savings; percentage of pupils enrolled in vocational or teacher-training secondary school is used to measure investment in human capital; average annual rate of growth of labor force is used to measure labor forces; averaged of annual rate of growth of real export values is used to measure trade (exports); an index of political and civil stability from Gastil's index of political and civil freedom is used to measure political and civil liberty. (Fayissa & El-Kaissy, 1999).

Hansen and Tarp (2001) by examining aid-investment and aid-growth relationship based on 131 cross-country data over 30 years, found that aid contributes positively in increasing investment. Moreover, overall, the relationship between foreign aid and growth is positive. In addition, Hansen and Tarp (2001) found there is no significant positive relationship between the quality of policy and growth. The control variables are gross domestic investment, foreign direct investment (FDI), human capital, inflation, the logarithm of initial GDP per capita and lagged growth rate. In addition, by using the generalized method of moments (GMM), FDI is

significantly negative related to economic growth; human capital is significantly positive related to economic growth; inflation is significantly negatively related to economic growth. (Hansen & Tarp, 2001).

Similarly, Dalgaard and Hansen (2001) examined aid-growth relationship by conducting cross-country regressions based on a sample of 56 developing countries and 40 lower income countries respectively, and found the consistent result with the research by Hansen and Tarp (2001) that foreign aid promotes growth unconditional on policy environment. In other words, foreign aid is found to be statistically significantly positively associated with growth with or without the interaction variable (aid × policy) and the interaction variable is statistically insignificant related with growth. Besides, assassinations (one of factors used to measure political stability) and aid squared are found to be significant negative associated with growth, while institutional quality and policy index are found to be significantly positively with growth. (Dalgaard & Hansen, 2001).

Arvin (2002) by using panel data covering the period of 1975 to 1997 for the Solomon Islands found that overall aid has a positive significant impact on growth. Precisely, when he controls for labor force, investment, FDI and exports, he found that investment, FDI and exports are significantly positively associated with growth while aid (i.e. ODA) is negatively significantly related with growth; when he controls for labor force, savings, and exports, he found that aid (i.e. ODA) and other variables are all positive significant related with growth; when divided aid into multilateral aid and bilateral aid, controlling for labor force, investment and exports, he found that multilateral aid is negatively significant, investment is positive significant and other variables are statistically insignificant associated with growth; when decomposed aid into grant aid and loan aid, controlling for labor force, savings and exports, he found that except for loan aid (no significant impact on growth) other variables are positive significant related with growth. (Arvin, 2002, pp. 153-163).

Gomanee, Girma and Morrissey (2005) emphasize the role of aid on supplementing domestic saving, encouraging investment and expanding government spending (fiscal behavior), based on gap-filling theory (which is discussed in previous section). More precisely, they considered that aid does not have a direct influence on growth, and investment plays a

transition mechanism associating aid and growth. Empirically, they investigated how foreign aid affects economic growth by using pooled panel data for 25 SSA countries over the period from 1970 to 1997. They found that foreign aid has had a positive and significant effect on growth, largely through aid-financed investment. Besides, it is found that inflation and government consumption spending has a negative impact on growth while aid, investment, education and initial GDP has positive influence on growth. There is need to explain that divergence in the sample of SSA with higher initial level of development tended to have higher subsequent growth rate. This is why the variable initial GDP here shows a positive relation with growth. (Gomanee et al., 2005).

Moreira (2005) examined aid-growth relationship by using panel data for 48 developing countries covering the period 1970 to 1998, and found that foreign aid (i.e. ODA) has a positive impact on economic growth. By controlling for several variables, Moreira found that domestic savings, private flows and other official flows (OOF) are significantly positively related to economic growth, while population growth is significantly negatively associated with economic growth. In addition, introduction of other additional growth factors like openness, government spending, financial depth, tax ratio, export growth and literacy growth, the relationship between foreign aid and economic growth is stable. Besides, among these additional growth factors, export growth and literacy are found to be significantly related to growth. (Moreira, 2005).

2.4.2 The no significant impact of foreign aid on economic growth

Mosley (1980) examined the aid-growth relationship, and found no statistical significant result on aid-growth relationship when using data for 83 developing countries, by introducing 5-year time lag and controlling for savings, foreign private investment and other financial inflows. However, he found a significant positive impact of aid on growth when he restricted the sample to the poorest 30 countries. (Mosley, 1980).

Islam (1992) examined this issue for the case of Bangladesh (one of poorest countries in the world) using ordinary least squares (OLS) regressions and time series data covering the period 1972–1988. By controlling for domestic saving and population growth, he found that

the relation between the aggregate aid and growth is insignificant. Moreover, when decomposing aid into food, commodity aid and project aid, it is found food aid has significant positive impact on economic growth; when decomposing aid into loans and grants, it is found that loans has significant positive effect on economic growth. In addition, domestic saving is found to exert significant positive effect on growth, not foreign aid. (Islam , 1992).

Based on a sample of 96 countries covering the time period of 1971 to 1990, by using panel data regressions, Boone (1996) found that aid does not have any positive impact in any factor that raises economic growth—public and private investment, human development (infant mortality, life expectancy and primary schooling). (Boone, 1996).

Vasquez (1998) studied the impact of bilateral aid and multilateral aid on growth based on a sample of 73 countries from 1971 to 1995. Basically, his findings are consistent with Mosley (1980) and Boone (1996). Moreover, he found that neither aid per capita nor aid as a ratio of GDP is positively related to economic growth. In addition, he found that aid as a percentage of GDP is slightly negatively related to economic growth. (Vasquez, 1998).

Feeny (2005) by using time-series data for the period of 1965 to 1999 investigated the impact of foreign aid on economic growth in Papua New Guinea, and found that aid does not has statistically significant impact on economic growth. When examining aggregate aid, it was found aid has an insignificant positive impact on growth, whereas trade is positive and crisis is negatively associated with growth. When decomposing aid into grants and loans, the relation is still insignificant. When decomposing aid into project aid and budget aid, project aid shows a significantly positive impact while budget aid has insignificant influence. In this paper, there is another interesting finding that World Bank structural adjustment has positive impact on economic growth.

Islam (2005) examined aid-growth relationship by using cross-section regressions in 65 countries covering the period of 1986 to 1997, and he found that on average aid has no significant impact on growth. Besides, both political instability and the interaction term of aid-political instability is negative significant related with growth while the interaction term of aid-political instability-policy is insignificantly associated with growth. This implies

political instability has a significant negative impact on growth, and political instability reduces aid effectiveness even in the presence of good policies. (Islam, 2005).

Dimanche (2010) investigated the effect of foreign aid on economic growth by conducting cross-sectional regression analysis in 79 developing countries covering the time period for the year 2000. Controlling for Ln GDP, trade, inflation, government consumption, school (human capital), investment and population growth, aid is employed as aid and aid squared introduced in the model, it is found that aid is significantly negatively related to economic growth whereas aid squared is significantly positively related to economic growth. This result interpreted by Dimanche is that foreign aid has an insignificant impact on growth. Besides, investment is found to be significantly positive related with growth whereas Initial GDP and inflation are found to have a significantly negative relation with growth. (Dimanche, 2010).

There is one study (Easterly, Levine & Roodman, 2003) which also find an insignificant relation between aid and economic growth will be discussed in Chapter 2.4.3, since they examine aid-growth relation base on the study of Burnside and Dollar (2000).

2.4.3 The conditional impact of foreign aid on economic growth

In 1995, Isham, Kaufmann and Pritchett (1995) firstly suggested that civil liberties can be seen as interaction which connects foreign aid and economic growth. Empirically, they explored the relation between the governance and economic performance. More precisely, they used the returns on investment projects of WB programmes to measure economic growth while they chose a) the degree of civil liberties and b) the political regime type and degree of political liberties to measure governance. The empirical result shows that civil liberties is significantly positively related to economic growth while the political regime type and degree of political liberties are statistically insignificantly associated with it. To put it more clearly, the result indicates that WB programmes had better performance in countries with higher civil liberties and had worse performance in countries with lower civil liberties. (Isham Jr., Kaufmann, & Pritchett, 1995).

After that, Burnside and Dollar made a series of researches (1997a, 1997b, 2000) on conditional impact of aid on economic growth. They (1997a) by using panel growth

regressions for 56 developing countries covering six 4-year periods (1970-1993) found that the policies (i.e. fiscal surplus, inflation and trade openness) have a considerable impact on growth and then they constructed an index of policy comprised of fiscal surplus, inflation and trade openness. In order to examine interactive impact, interaction variable $\frac{aid}{GDP} \times policy$ and quadratic term$(\frac{aid}{GDP})^2 \times policy$ are introduced to the growth regression, they found that though aid is still insignificant related to growth, $\frac{aid}{GDP} \times policy$ is significantly positive and $(\frac{aid}{GDP})^2 \times policy$ is significantly negative related with growth, which indicates that the impact of aid on growth is associated with not only the level of aid but also the level of policy. Using OLS and two-stage least-squares (2SLS) methods, controlling for factors such as initial level of development, ethnic fractionalization, assassinations, institution quality etc, they found a robust evidence that aid spurs growth in a sound policy environment and has no positive impact in a poor policy environment. Besides, assassination is found to be significantly negative associated with economic growth while ethnic fractionalization × assassinations, institutional quality and policy index are found to be significantly positive related with growth. (Burnside & Dollar, 1997a, 2000).

Following the Burnside-Dollar study, Easterly et al. (2003) adding data from 1970-93 to 1970-97, and then found there is no robust relationship between aid and growth when introducing policy interaction term. Besides, log initial GDP per capita is significantly negatively associated with growth whereas institution quality and policy is found to be significantly positive related to growth. (Easterly et al., 2003).

Guillaumont and Chauvet (2001) analyzed the impact of aid on economic growth covering two periods of years covering 1970 to 1981 and 1982 to 1993 in 66 countries. This study aimed to reexamine the result provided by Burnside and Dollar in 2000, namely to test if aid has conditional impact on growth and the condition is policy. By introducing environment indicator, policy index, aid × environment indicator and aid × policy index, set of environment variable and policy variables, it is found that human capital (education), financial depth, environment factor and policy index are significantly positively related with growth whereas log of initial GDP per capita, rate of population growth, political instability

and two interaction terms are significantly negatively associated with growth. This result indicates that growth is positively influenced by a good environment, good macroeconomic policy and a high level of aid. However, the better the macro policy the lower aid effectiveness, which is exactly the contrary to Burnside-Dollar study. (Guillaumont & Chauvet, 2001).

Islam (2003) by using the five yearly averaged pooled data for 32 countries covering the period from 1869 to 1992 examined whether foreign aid affects economic growth differently under different political regimes. Employing aid as $\frac{aid}{GDP}$ and $(\frac{aid}{GDP})^2$, controlling for labor force growth, population, schooling (human capital), the initial level of GDP, exports and imports, introducing an interaction term of $\frac{aid}{GDP} \times \frac{T_P}{GDP}$ ($\frac{T_P}{GDP}$ is equal to the share of transfer payments in GDP" which is used a proxy for income redistribution), testing for all set sample, it is found that $\frac{aid}{GDP}$ is significantly negatively related to growth whereas $(\frac{aid}{GDP})^2$ is insignificantly positive related to growth. In addition, for other independent variables, schooling, initial level of GDP, exports and imports are observed as having a significant relation with growth whereas the interaction term is found to be significantly negatively associated with growth. When testing for 27 countries which are labeled as tinpots[6], it is found that aid and the quadratic term of aid is insignificant related with growth, and schooling, imports and the initial level of GDP has a significantly positive relation with GDP while the interaction term shows a significantly negative relation. When testing for 5 countries which are labeled as totalitarians, it is found that $\frac{aid}{GDP}$, labor force, exports and imports are significantly positive related to growth whereas $(\frac{\text{aid}}{\text{GDP}})^2$, the initial level of development and interaction term are significantly negative related to growth. Through conducting these regressions, the assumption—the impact of foreign aid affects economic growth varies marked across political regime type has been confirmed. (Islam, 2003).

Clemens et al. (2004) categorizes aid into three groups—humanitarian aid, short-impact aid that might impact growth over a four year period and long impact aid that aid might only

[6] In study of Islam (2003), the sum of Gastil indices of political right and civil liberties is used to label countries (denoted FR). When 2<= FR <=4, labeled democracy; when 5<= FR <=12, labeled tinpot; when FR =13 or 14, labeled totalitarian.

effect growth over a long period of years. They examined the relationship between the so-called growth-oriented aid (excluding humanitarian aid) and growth across 67 countries covering the time period from 1974 to 2001. Controlling for a lot of other factors that might influence growth such as inflation, civil war, log of initial GDP per capita etc., introducing aid squared, it is found that the coefficient on short impact aid is positive and statistically significantly whereas long impact aid is insignificantly related with growth. (Clemens et al., 2004)

The Figure 2.1 presents the brief summary of empirical studies reviewed in this sub-section, which lays the foundation for the later empirical analysis in this study.

Author and Year	The effect of Aid	Conditions	Control Variables
Mosley, 1980	*No significant impact*	*No*	*Savings (+)*
Islam, 1992	*Aggregate aid: no impact (food aid: positive; loans: positive)*	*No*	*Domestic savings (+)*
Gyimah-Brempong, 1992	*Aggregate aid: positive (food aid: no impact, loan: positive; grants: positive)*	*No*	*Investment (+)* *Exports growth (+)* *War (-)* *Per capita GNP (+)* *Private flow (+)*
Fayissa & El-Kaissy, 1999	*Positive*	*No*	*Domestic savings (+)* *Human capital (+)* *Labor force (+)* *Trade (only exports) (+)*
Burnside & Dollar, 2000	*Conditional impact*	*Policy*	*Ethnic fractionalization * assassinations (+)* *Institutional quality (+)* *Policy (+)* *Assassinations (-)*
Hansen & Tarp, 2001	*Positive*	*No*	*Human capital (+)* *FDI (-)* *Inflation (-)*

Dalgaard & Hansen, 2001	*Positive*	*No*	*Assassinations (+)* *Aid squared (+)* *Institutional quality (-)* *Policy index (-)*
Guillaoumont & Chauvet, 2001	*Conditional impact*	*Environment*	*The initial level of development (-)* *Human capital (+)* *Population growth (-)* *Financial depth (+)* *Political instability (-)*
Arvin, 2002	*ODA: significantly negative*	*No*	*Investment (+)* *FDI (+)* *Exports (+)*
	ODA: significantly positive	*No*	*Labor force (+)* *Savings (+)* *Exports (+)*
	Multilateral aid: significantly negative *Bilateral aid: no significant impact*	*No*	*Investment (+)*
	Grant aid: positive *Loan aid: no significant impact*	*No*	*Labor force (+)* *Savings (+)* *Exports (+)*
Islam, 2003	*Conditional impact*	*Political regime types*	*Schooling (+)* *Initial level of GDP (+)*

			Exports (+) *Aid/GDP * Tp/GDP(the proxy for income distribution (-)*
Easterly et al., 2003	*No significant impact*	*No*	*Policy(+)* *Institutional quality (+)* *Initial GDP per capita (-)*
Clemens et al., 2004	*Conditional impact*	*Type of aid*	*Institutional quality (+)* *Inflation (-)* *Openness (+)* *Tropics (+)* *Civil War (-)*
Islam, 2005	*No significant impact*	*Policy*	*Political instability (-)*
Feeny (2005)	*Aggregate aid: no significant impact* *Grants: no significant impact; Loans: no significant impact* *Project aid: positive impact; budget aid: no significant impact*	*No*	*Trade (+)* *Crisis (-)* *World bank structural adjustment (+)*
Gomanee et al., 2005	*Positive*	*No*	*Initial GDP (+)* *Human capital (+)* *Democracy (+)* *Inflation (-)* *Grant squared (+)* *ODA excluding food aid squared (-)*

Moreira, 2005	*Positive*	*No*	*Domestic savings (+)* *Private flows (+)* *OOF (+)* *Population growth (-)*
Dimanche, 2010	*No significant impact*	*No*	*Investment (+)* *The initial level of development (-)* *Inflation (-)* *Aid squared (+)*

Table 2.1 Summary of empirical studies

2.5 Control Variables

As can be concluded form the previous sub-section, economic growth can be associated with many factors. Therefore it is crucial to select proper control variables, in order to control the influence of other factors and to conduct a precise examination of the relationship between China's foreign aid (main independent variable) and economic growth (dependent variable). In this sub-section, based on existing literature, most commonly used control variables will be presented.

Human Capital

According to Table 2.1, the most frequently used control variable is human capital, of which relation with economic growth is significantly positive. Human capital refers to "productive investment in people, such as skills, values and heath, resulting from expenditures on education, vocational training programs and medical care." (Todaro & Smith, 2015, p. 44). Normally proxies for human capital are education variable (like education index) and health variable (like life expectancy index). And these are assumed to positively and strongly correlated with economic growth. More precisely, given a certain level of GDP, a higher initial stock of human capital indicates a higher ratio of human to physical capital, of which high value represents the contribution to economic growth (Barro, 2001). That means countries with higher human capital are expected to attain higher economic growth (Tridico, 2011, pp. 203-204). Theoretically as discussed in chapter 2.2, with abundant well-educated healthy human resources would enhance absorption of leading technologies and therefore spur economic growth. Empirically, the result of the positive correlation between human capital variable (education) and economic growth obtained by many studies show the crucial place of human capital in the field of economic growth study. (for instance, Fayissa & El-Kaissy, 1999, Islam, 2003, Guillaoumont & Chauvet, 2001, Hansen & Tarp, 2001, Gomanee et al., 2005). This thesis will also select human capital as a control variable.

Investment

The second independent control variable, very often included in empirical studies of aid effectiveness as a control variable is investment (see Gyimah-Brempong, 1992). Here investment refers to domestic investment, which literally means investment in host country rather than aboard. Precisely, it consists of "outlays on additions to the fixed assets of the economy plus net exchanges in the level of the inventories".[7] The place of domestic

[7] The composition of domestic investment sees at the definition from Gross capital formation (formerly gross domestic

investment in facilitating economic growth has been emphasized by many researchers (e.g. Choe, 2003; Firebaugh, 1992 and Hooi & Wah, 2010). In theory, investment underpins growth by promoting technologies diffusion and facilitating capital formation. More precisely, investment encourages domestic industries, promotes an introduction of appropriate technologies, expands aggregate demand and enlarges a nation's stock of productive assets, which is conductive to economic growth (Firebaugh, 1992). Before moving to empirical part, there is a need to briefly explain the relationship between domestic saving and investment. According to gap-filling theory, as discussed in chapter 2.2, insufficient domestic savings would restrict investment and imports of necessary goods, which ultimately restricts economic growth. Hence empirically, studies select either domestic savings or investment as a control variable to conduct aid-growth regression analysis. For this research, investment variable will be selected since compared with domestic savings, investment is considered to have more direct impact on growth compared with domestic savings.

The Initial level of development

The third independent control variable, quite commonly used in macroeconomic analysis, is the initial level of development, which is used to capture convergence effect. Normally this correlation between itself and growth is negative, which means the lower the initial level of development, the higher the growth rate can be expected. Surprisingly, it is found that there are two positive coefficients of the initial level of development existing in Table 2.1, which are studies by Gomnee et al. (2005) and Islam (2003). Both studies select a small sample of developing countries which share a characteristic in common that low growth rate, hence for that kind of countries especially, countries which have higher initial development level tend to achieve subsequent higher economic growth.

Institutional quality

The fourth control variable is institutional quality, which is also quite often used in empirical studies of aid effectiveness. According to North (1981, pp. 201-201), institutions are " a set of rules, compliance procedures, and moral and ethical behavioral norms designed to constrain the behavior of individuals in the interests of maximizing the wealth or utility of principles." It is believed that development of this set of rules, procedures and behavioral norms (i.e. improving institutional quality) is crucial to economic growth. Precisely, a set of input of institutions is helpful to achieve high output returns on economic growth by optimizing the

investment) provided by World Bank.

environment to attract investment, promoting the development of human capital, efficiently sorting and matching of human capital and other input resources etc. (Easterly, 2005, pp. 1032). Therefore, the high institutional quality, the higher economic growth is expected. Empirically, institutional quality is included as a control variable in many studies of aid effectiveness, and found to be significantly positively related with growth (see Burnside & Dollar, 2000; Clemens et al., 2004; Hansen & Tarp, 2001; Easterly et al., 2003). For this thesis, institutional quality is also selected as a control variable.

Trade

The fifth control variable is trade, which is also a quite common control variable in empirical studies of aid effectiveness. It is generally believed that trade can have a positive impact on economic growth through promoting the efficient allocation of resources, facilitating knowledge diffusion, fostering technology absorption, stimulate competition in and abroad (Busse & Koeniger, 2012). Empirically, as shown in Table 2.1, exports or imports or both or sum (refers to a sum of exports and exports) are found to be significant positive associated with economic growth. Normally the higher the value of the trade is, the better economic performance can be expected. This variable can also be seen as the degree of trade openness, of which the higher value is, the more openness occurs, which also leads to an economic growth based on the assumption that open countries are more likely to grasp opportunities to gain development (here refers to boost imports and increase exports). For this thesis, trade, as a sum of exports and imports relative to GDP will be selected as a control variable.

2.6 Conclusion

This chapter answered the first sub-question of this thesis, namely, *What does the existing literature tell about foreign aid and economic growth, especially about China's foreign aid?*.

First, for general impact of foreign aid on economic growth, though there is no consensus in academic circles, a conclusion that basically foreign aid would facilitate economic growth can be drawn from the above review of existing literature. In the theoretical part, there are three groups which suggest aid has positive, no and conditional impact on growth respectively. Though theoretically aid may exert no impact or even negative impact on economic growth by assisting incompetent government to maintain state control, being misused by recipient government and reducing domestic savings (a decrease in interest rate and a reduction in government savings), its positive influence on economic growth cannot be denied or ignored. Besides, the negative impact is mostly associated with possible existing

circumstances in recipient countries, which can be controlled and eliminated by adjusting ways of donating foreign aid. In terms of positive impact, foreign aid would facilitate economic growth by filling saving gap, trade gap and fiscal gap, promoting technology diffusion and improving human capital, which plays conductive role in three channels—increase in capital, improvement in technology and increase in labor quality and quantity, which are considered to lead to economic growth according to neoclassic growth theory (see chapter 2.2). In addition, in terms of conditional impact, the most influential model—Good policy model lacks supporting empirical evidence, while other arguments about condition are diverse. Empirically, although conditional and negative relation between aid and economic growth can be found in empirical studies, a considerable number of studies found evidence to prove that aid has positive influence on economic growth. Second, for China's foreign aid and economic growth, a brief conclusion has already been made in Chapter 2.3, which is that since China's foreign aid is able to exert a positive impact on economic growth of recipients through same channels as traditional aid does and its own characteristics can deal with the "aid dilemma" and corruption to some extent, a positive impact would be expected.

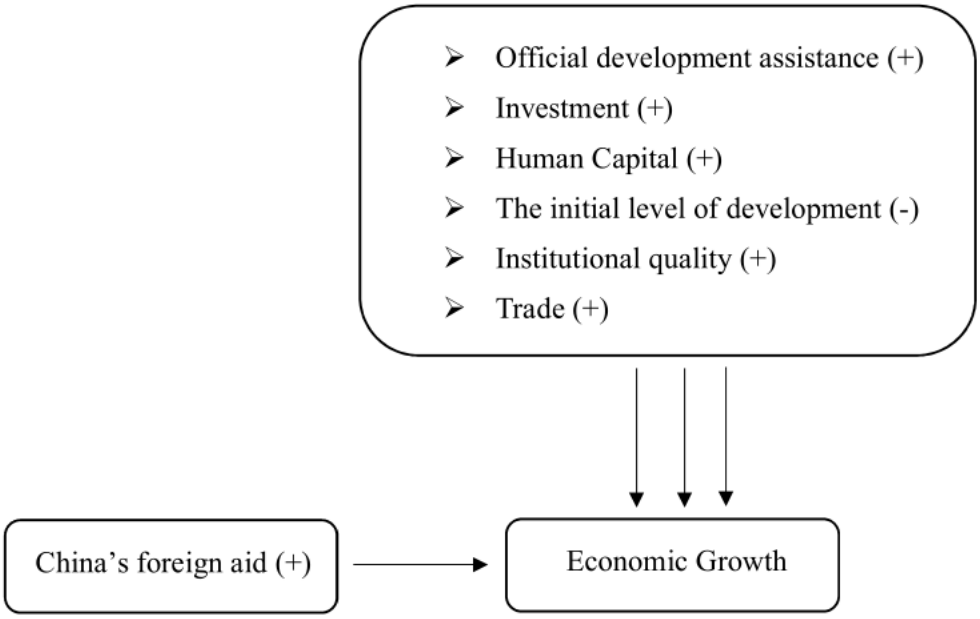
So based on general literature on foreign aid and economic growth and typical studies on China's foreign aid, the hypothesis of this thesis is established as below:

H1: China's foreign aid to other developing countries has positive impact on economic growth of developing countries.

This hypothesis is based on two main pillars. First, it relies on the notion that aid may be a major factor contributing to economic growth in developing countries. Second, China's foreign aid with distinctive characteristics deals with possible negative impact aid may bring to recipient countries (the "aid dilemma" and corruption) to some extent.

Based on the review of existing literature and especially the discussion of control variables, Figure 2.1 presents the model of this research as the main dependent variable China's foreign aid, the other independent variables (control variables discussed above), dependent variable (economic growth) and the predicted relations are shown. Except for control variables discussed in the previous sub-section, the control variable official development assistance (ODA) is also included, which commonly measures the received aid from the west. It is added to distinguish the impact of other foreign aid from China's foreign aid on economic

growth in developing countries.



+ indicates positive relation
– indicates negative relation

Figure 2.1 Model

Chapter 3 Research Design

The design of this empirical study will be presented in this chapter. The first sub-part will discuss thoroughly the research design and the statistical procedure of this study, including the method of this study (3.1.1), namely cross-sectional non-experimental large-N design, population and sample (3.1.2), bivariate correlation coefficients (3.1.3), multivariate regression analysis (3.1.4). The second sub-part deals with the operationalization of the independent variable (3.2.1), the dependent variable (3.2.2), control variables (3.2.3), prediction regression equation (3.2.4) and reliability and validity for this research (3.2.5).

3.1 Research design

3.1.1 Cross-sectional non-experimental Large-N design

As mentioned in Chapter 1, the research design of this empirical study is cross-sectional non-experimental large-N design.

Experimental design is required to "control exposure to an experimental variable, the assignment of subjects to different groups, and the observation or measurement of responses and behaviours", while the quasi-experimental design is required "to include treatment and control groups to which individuals are not assigned randomly" (Johnson, Reynolds, & Mycoff, 2016, pp. 171-210). However, experiments and quasi-experimental design are not commonly used in political science, since implementing an experiment or quasi-experiment proves to be unworkable (Kellstedt & Whitten, 2013, p. 82). For this thesis, the unit of analysis is countries and countries cannot be manipulated or controlled. To be more precise, researchers cannot control exposure to different values of independent variables. Therefore the non-experimental design which allows researchers to observe causal sequence and covariations will be applied in this research. Although this approach "makes it difficult to measure the causal effects that can be attributed to the presence or introduction of independent variables", it is the only design that makes it possible to study a realistic question (the relationship between foreign aid and economic growth in a group of countries (Johnson et al., 2016, pp. 171-210).

Large-N study that includes a large number of cases in the sample is more suitable to investigate generality or general trends, while small-N study studying single case or doing comparative study is more proper to study in-depth one or few cases. Precisely, large-N study seeks to investigate generality and average strength of causal effects, being unable to explain

any single case in depth, while small-N study seeks to investigate a precise causal story for one or few cases at expense of generality. In short, large-N study prefers breadth to depth and small-N study focuses on depth at expense of breadth (Gschwend & Schimmelfennig, 2007, pp. 10-11). For this thesis, it is important to investigate a considerable number of countries in order to achieve a generalized result which can represent the entire population to answer the central question: *What is the effect of China's foreign aid on economic growth in developing countries?* From another aspect, the context of the impact of foreign aid on economic growth is different across countries, so studying study of single or few cases (countries) cannot reflect and represent the whole population.

Cross-sectional research design "focuses on variation across spatial units at almost single time unite", while time-series research design "focuses on variation within a single unit over multiple time units" (Kellstedt & Whitten, 2013, p. 85-87). Instead of time-series design, this thesis selects cross-sectional design as a choice for three following reasons. Firstly, compared with time-series design, cross-sectional research design is more suitable to achieve research objective. As mentioned before, the objective of this thesis is to examine the impact of China's foreign aid in developing countries, so the research should concentrate on variations across spatial units (countries) instead of a single unit (one country). Moreover, cross-sectional design has virtues of generalized results, which is more suitable to explain causal effects for research question of this thesis. Secondly, the limited data availability makes it insufficient to apply time-series research design. Clearly, a time-series research design requires many observations at many points in one time, while AidData database has only been expanded in recent years and hence data is insufficient to conduct a time-series research. More precisely, AidData only provides data for Chinese aid programmes in recipient countries from 2000 to 2012, and the relatively complete data are only accessible approximately for five recent years, namely from 2008 to 2012. Lastly, although cross-sectional research approach makes it difficult to measure the causal effects that can be attributed to the presentence of independent variables, it "allows observation of phenomena in more natural, realistic setting, increases the size and representativeness of the populations studied and allows the testing of hypotheses that do not lend themselves easily to experimental treatment", which means it improves external validity (Johnson et al., 2016, p. 204). There are two points to be clearly explained here. First, considering foreign aid flow is not likely to lead to economic growth in the same year, time of one-year lag will be used in this thesis. Second, considering the limited accessibility of data for China's foreign aid from

AidData, this research decides to use average values of three years (2010 to 2012) to measure the main independent variable. To be more precise, China is not likely to provide all developing countries with foreign aid every year, so it is impossible to access data on China's foreign aid for all developing countries in a certain year from AidData.

3.1.2 Population and Sample

The entire population is 144 developing countries, as classified by the WB. For this study, in order to increase external validity, the sample size should be expanded to the best. As to increase sample size to the best, countries for which not values for the dependent variable and independent variables are excluded. Hence, there is enough data available to work with 80 countries from all parts of the world. The sample covers all regions that developing countries are located in, namely East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia and Sub-Saharan Africa (See Appendix B.). It is important that all regions are covered adequately, since this makes it possible to avoid regional basis that would threaten the external validity and it ultimately makes it plausible to obtain more generalizable results for this study.

3.1.3 Bivariate correlation coefficients

To examine whether China's foreign aid spurs economic growth of developing countries, there are certain steps to be taken and statistical procedures to be carried out. The first statistical procedure is to calculate the bivariate correlation coefficient between the dependent variable and the main independent variable. Hence this paper should firstly examine whether there is a correlation between economic growth and China's foreign aid. Pearson's correlation coefficient, which indicates the intensity and direction of relationship, is used to calculate the bivariate correlation. More precisely, it ranges from 0 (no relation) to 1 (a prefect relation), which only indicates the relation, does not demonstrate the significance of the relationship between main independent and dependent variable when other variables are included. (This will be discussed in Chapter 4.2.1, see Table 4.6.)

3.1.4 Multivariate regression analysis

Multivariate regression analysis will be employed as a tool to analyze the empirical part of this thesis and SPSS software will be used to conduct this regression. Generally, regression analysis is "*a toolbox of methods for describing how, how strongly, and under what conditions an independent and dependent variable are associated*", and also a common statistical technique used to estimate relationship between two or more variables in social

science (Johnson et al., 2016, p. 478). Univariate regression analyzes the relationship between dependent variable (Y) and an independent variable (X), while multivariate regression is analyze the relationship between dependent variable (Y) and more than one independent variables (Xs) (Uyanik & Güler, 2013). Therefore, multivariate regression analysis will be used in this case. More precisely, several control variables (independent variables) will be included to analyze the relationship between the main independent variable China's foreign aid and dependent variable economic growth. Needless to say, the linear multivariate regression equation as following will also be used in this thesis.

$$Y = \beta 0 + \beta 1 * X1 + \beta 2 * X2 + \cdots + \beta n * Xn$$

Y is dependent variable, β0 is a *regression constant*, each β is a *partial regression coefficient* and each X represent one of independent variables, namely control variables and main independent variable (Johnson et al., pp. 529).

To carry out a multivariate regression analysis, several assumptions need to be satisfied. First, the model should include all necessary independent variables that systematically affect dependent variable Y and excludes all unnecessary independent variables that only strengthen errors of prediction. Second, there is a linear relationship between dependent variable and independent variables. Third, all included variables are accurately measured. Fourth, all included independent variables are not highly correlated with each other (no multicollinearity). Fifth, the variation of errors should be same across the independent variables. At last, variables should be normally distributed (Johnson et al., 2016, pp. 480). These assumptions of multivariate regression analysis will be presented and further explained in Chapter 4.2.1.

3.2 Operationalization

3.2.1 Dependent variable

The dependent variable (outcome variable) of this study is economic growth. In the relevant literature, economic growth is usually taken as GDP annual growth rate (for instance, Guillaumont & Chauvet, 2001, Gomanee et al., 2005 and Dimanche, 2010) or the rate of GDP per capita growth (for instance, Fayissa and El-Kaissy,1999). GDP is defined as the total market value of all final goods and services produced within the country in a one calendar year, which is commonly used to represent the economic growth of a country. Therefore, GDP annual growth rate will be used to measure economic growth in this study. Plus in front of the rate implies positive economic growth while minus indicates a negative growth rate. In

addition, the time lag is commonly used on economic growth variable, since the aid impacts may not be captured in the same year. For instance, 4-year lag is used in Islam (2003) and 5-year is used in Lensink & White (2001). In this study, a one-year time lag will be used, and hence the average value of GDP growth for the year 2011, 2012 and 2013 is selected. The data on GDP growth are taken from World Bank Development Indicators database.

3.2.2 Independent variable

The main independent variable of this research is China's foreign aid. Since the Chinese government does not publish data on China's foreign aid, reliable data on aid is scare, ultimately resulting in the bare number of empirical studies on China's foreign aid based on hard data. For this research, data are obtained from AidData, which is mentioned before (Chapter 1.4). Moreover, the relative value of China's foreign aid to GDP of recipient countries averaged for three years (2010, 2011 and 2012) will be used to measure the independent variable. To be more precise, an average of three years for China's foreign aid will be calculated relative to GDP of the host country covering over the exactly the same three years. The relative value is selected because it is commonly used in the majority of existing empirical studies (see Guillaumont & Chauvet, 2001, Gomanee et al., 2005 etc.). Except for aid to GDP ratio, sometimes aid to GNP ratio is taken to measure aid variable (see Lensink and White, 2001). Due to the scarcity and the fluctuation of data for China's foreign aid, this study uses the average value (The average value is also used to measure aid in study conducted by Islam, 2003). Even in AidData, the data on China's foreign aid is only accessible from 2000 to 2012. Since this research will conduct the cross-sectional non-experimental large-N study, it is important to include more samples to ensure the external validity which indicates generalization of the whole population (clearly discussed in Chapter 3.2.5). The average values for three years provide the opportunities to include more countries for which data is missing in a certain year. Besides, the distribution of aid is dependent on many factors, which leads to the fact that aid data tends to fluctuate from year to year. Concerning the fluctuation, it is easily understood that it is impossible for China to distribute aid to all developing countries every year. In order to ensure the stability and correct the measurement errors of annual data, the average value for three years is selected.

3.2.3 Control variables

Human Capital

The first control variable is human capital. As mentioned in Chapter 2.5, normal proxies of

human capital are education variable and health variable. Compared with health variable, education variable is more often used. Concerning education variable, it is commonly measured by schooling enrolment ratios (e.g. Barro, 2001), the average years of schooling (e.g. Guillaomont & Chauvet, 2001), adult literacy rate and education spending. For this study, a measure of education index will be used to measure human capital, which is derived from human development reports from UNDP. It is calculated using mean year of Schooling and expected years of schooling[8], which is used to measure education situation and is a component of human development index. There are two main reasons for choosing this data. One is that most variables in this thesis are measured at ratio level, the value of education index from 0 to 1 is proper to achieve a similar measurement level. The other one is compared with other data of which is also measured by ratio, this data is relatively complete for the year of 2010, 2011 and 2012, as this design requires a relatively large sample to ensure the external validity.

Investment

The second control variable is investment (Gross capital formation % of GDP). The average value of the year 2010, 2011 and 2012 will be selected for measuring this variable. This is also taken from World Bank's World Development Indicators. It is quite commonly used in literature on aid and economic growth (for instance, Arvin, 2002 and Dimanche, 2010). It is supposed that the more investment the higher economic growth is achieved.

The initial level of development

The third variable is the initial level of development (GDP per capita (current US$)), which is most common used variable to measure the initial level of development. (see Guillaoumont & Chauvet, 2001; Islam, 2003; Easterly et al., 2003 and Gomanee et al., 2005). For this study, a time lag of one year will be added, which means the value of this variable for the year 2011 will be used to measure this variable. The data for GDP per capita is derived from World Bank's World Development Indicators.

Institutional Quality

The fourth variable is institutional quality, which is often used to capture various institutional and political factors that may have an impact on economic growth. There are several measurements for institutional quality, like International Country Risk Guide indicator (ICRG), the World Bank Country Policy and Institutional Assessment index (CPIA), World

[8] http://hdr.undp.org/en/content/education-index

Governance Indicator (WGI), the polity IV Project scores, the Economic Freedoms of the World index, civil liberty scores etc. For this thesis, WGI is selected for measuring institutional quality for the following three reasons: a) WGI is commonly used measure in studies of institutional quality and economic growth; b) WGI provides relatively complete data for all sample country; c) WGI provides six indicators to accurately measuring every aspect of intuitional quality. Besides, these six indicators are Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. In order to compute a composite index for overall institutional quality, the value of equally weighted average for these six indicators (named Aggregate World Governance Indicator, which will be used in the following) will be used. In addition, since it is acknowledged that institutional quality does not fluctuate significantly in a short time period, the data for the year 2010 on this variable will be taken to represent the average of three years. The data are also derived from World Bank.

Trade

The fifth variable is trade. Trade consists of imports and exports. It can be seen from empirical studies that imports, exports, the sum of imports and imports or both are often used to measure trade. For this thesis, the relative score of the sum of exports of goods and services and imports of good service to GDP average for three years (2010, 2011 and 2012) will be calculated to measure this variable. The data for imports (Imports of goods and services % of GDP)) and exports (Exports of goods and services % of GDP) are derived from World Bank's World Development Indicators.

Official development assistance

The last control variable is ODA. Commonly, there are three ways to measure ODA, namely, the amount of ODA, ODA per capita, ODA/GNP and ODA/GDP. For this research, in order to ensure the same measurement level with the main independent variable—China's foreign aid, the relative value of net official development assistance to GDP averaged for 3 years (2010, 2011 and 2012) will be calculated to measure ODA. The data (Net official development assistance received (current US$)) is derived from World Bank's World Development Indicators.

3.2.4 Prediction regression equation

$$\text{Economic Growth} = \alpha + \beta 1 \times \text{CFA} + \beta 2 \times \text{ODA} + \beta 3 \times \text{INV} + \beta 4 \times \text{TRA} + \beta 5 \times \text{HC} + \beta 6 \times \text{IQ} + \beta 7 \times \text{IND}$$

CFA is main independent variable and indicates China's foreign aid;

ODA denotes official development assistance;

INV denotes investment;

TRA denotes trade;

HC denotes human capital;

IQ denotes institutional quality;

IND is the initial level of development;

α is constant;

β_x is the estimated coefficient.

3.1.5 Reliability and Validity

In order to obtain an accurate research result, the accuracy of measurements should be guaranteed through ensuring the reliability and validity of them. Reliability refers to "the consistency tests or trials" (Johnson et al., 2016, p. 135). More precisely, a reliable measure should be repeatable or consistent, which means applying the same measurement to the same observation or case at same phenomenon will produce consistent results (Kellstedt & Whitten, 2007, p. 100).With an aim of increasing the reliability of this study, it is crucial to measure what it is supposed to be measured and avoid mistakes and errors in the process of collecting data. Therefore, the information and data origins for dependent and independent variables should be clearly justified and checked. For this thesis, a careful selection of control variables, a full discussion on operationalization of each variable, and a double-check of the reliability of data source ensure this study's reliability. However, as mentioned before, due to the scarcity and the fluctuation of data on the main independent variable, the average values are used which may have a potential negative impact on reliability. Precisely, according to the definition of cross-sectional research design, it requires focusing on variation across spatial unites at almost single time unite (discussed in Chapter 3.1.1), the usage of average values allows focusing on variation across more spatial unites but not exactly at single time unite. Moreover, this usage may improve external validity (discussed in the following paragraph) at expense of potential sacrifice of reliability. Considering 3 years can be defined as almost single unite, the average values will be used.

Validity describes "the degree of correspondence between the measure and the concept it is

thought to measure", which consists of internal validity and external validity (Johnson, et al., 2016, p. 138). Internal validity means that there is a true cause-and-effect relationship existing between an independent variable and a dependent variable, and this cause-and-effect relationship is not influenced by other variables (Johnson et al., 2016, p. 177). According to Miles and Shevlin (2001), causation can be established on the condition that three criteria are fulfilled. First, there has to be a statistical association between the independent variable (aid) and dependent variable (economic growth). Second, the direction of causation needs to be established: does the independent variable (aid) cause dependent variable (economic growth); does dependent variable (economic growth) cause the independent variable (aid); does both caused by a third variable. Third, the independent variable (China's foreign aid) needs to be isolated from factors that may influence dependent variable (economic growth) other than the independent variable (aid) (Miles & Shevlin, 2001, pp. 114-115). For this study, the first criteria is exactly what is needed to be investigated, to identify what is the relation between China's foreign aid and economic growth. Besides, based on existing studies, there is a statistical association between them. For the second and third criterion, non-experimental cross-sectional research implies the lack of control over exposure to the independent variable and is unable to a pure experimental control group to isolate the influence of other factors (Johnson et al., 2016, pp. 205-206). Moreover, since all data for this kind of research are normally collected at one point of time, it is hard to determine whether independent variable cause dependent variable or other way around. Luckily, based on common sense and existing literature, the causal direction between foreign aid and economic growth can be established by using time-lag. Besides, though the inability to form a pure control group, it is plausible to carefully select proper control variables to isolate the impact of the independent variables of interest based on previous studies centering this topic, aiming to cater to the third criterion.

External validity refers to "the extent to which the result of a study can be generalized across population, times and settings" (Johnson et al., 2016, p. 179). For this particular case, cross-sectional large-N research is designed to investigate the impact of foreign aid on economic growth in developing countries. With a sample of large size, it is easy to ensure the representativeness of the entire population (144 developing countries), which is the major virtue of cross-sectional large-N study (Johnson et al., 2016, p. 204). Moreover, 80 countries in this sample cover all different regions across the world, which ensures the absence of a regional bias and ultimately does benefits for drawing a generalizable result for this study.

Chapter 4 Analysis

This chapter deals with the analysis of the study. Since the research design is clearly explained, the operationilazation of variables is presented, the reliability and validity are discussed in the previous chapter, now it is important to conduct statistical procedures to test whether the hypothesis can be accepted or rejected. The first section presents a descriptive analysis (4.1), to organize and summarize the data. The second section provides an explanation analysis (4.2), which contains the assumption for multiple regression analysis (4.2.1), the results of multiple regression models (4.2.2) and the interpretation of multivariate regression model (4.2.3).

4.1 Descriptive analysis

First of all, it is important to explore the sample data of this study. For instance, to explore: what are the maximum and minimum scores, what the means are and how well do these means represent data (which is indicated by the standard deviation). A summary of the descriptive statistics of the ratio variable is presented in Table 4.1. As can be seen in the table, every variable is based on 80 cases (N=80), the part of cases of which data is missing have already been excluded. Please note that Appendix C. contains the complete dataset.

Variable	Measurement	Year	N	Mean	Minimum	Maximum	Std. Deviation
EC(Economic Growth) **Annual growth rate of GDP**	Annual %	Average of 2011/2012/2013	80	4.7	-1.8	13.8	2.9
CFA **China's foreign aid**	% of GDP	Average of 2010/2011/2012	80	0.20	0.00	0.25	0.04
ODA **Official development aid**	% of GDP	Average of 2010/2011/2012	80	0.39	0.00	0.16	0.04
INV(Investment) **Gross Capital Formation**	% of GDP	Average of 2010/2011/2012	80	24.9	6.4	52.0	8.1
HC(Human Capital) **Education Index**	Index	Average of 2010/2011/2012	80	0.57	0.29	0.86	0.14
TRA(Trade) **Sum of imports and exports**	% of GDP	Average of 2010/2011/2012	80	82.33	203.75	203.75	0.35
IQ(Institutional Quality) **Aggregate World Governance Indicator**	Index	2010	80	-0.43	1.21	-0.43	0.60
IND **The initial level of development**	GDP per capita	2011	80	4315	350	14582	3891
Valid N				**80**			

Table 4.1 Descriptive Statistics of Dependent and Independent Variable

As can be observed from Table 4.1, a summary of descriptive statistic of data including number of observations, minimum and maximum values of the variables, the mathematical mean of the observation and the standard deviation is provided. Standard deviation is the most commonly computed and calculated measure of variation which measures the square root of variance and indicate the spread of observations (Johnson et al., 2016, p. 366).

According to Table 4.1, the value of the first dependent variable of this research—economic growth averaged for three years (2011, 2012 and 2013) among 80 countries varies from -1.8 to 13.8, which does not have a big variation of values. It is confirmed by standard deviation which is equal to 2.9 and which is smaller than mean which is equal to 4.7. The main independent variable—China's foreign aid varies from the value of 0.00 to 0.25. Rather small variation implies that there is no huge difference between developing countries which

received foreign aid related to their GDP from China. This small variation of observation is also confirmed by the rather small standard deviation which is equal to 0.04 and which is smaller than the mean which is equal to 0.2.

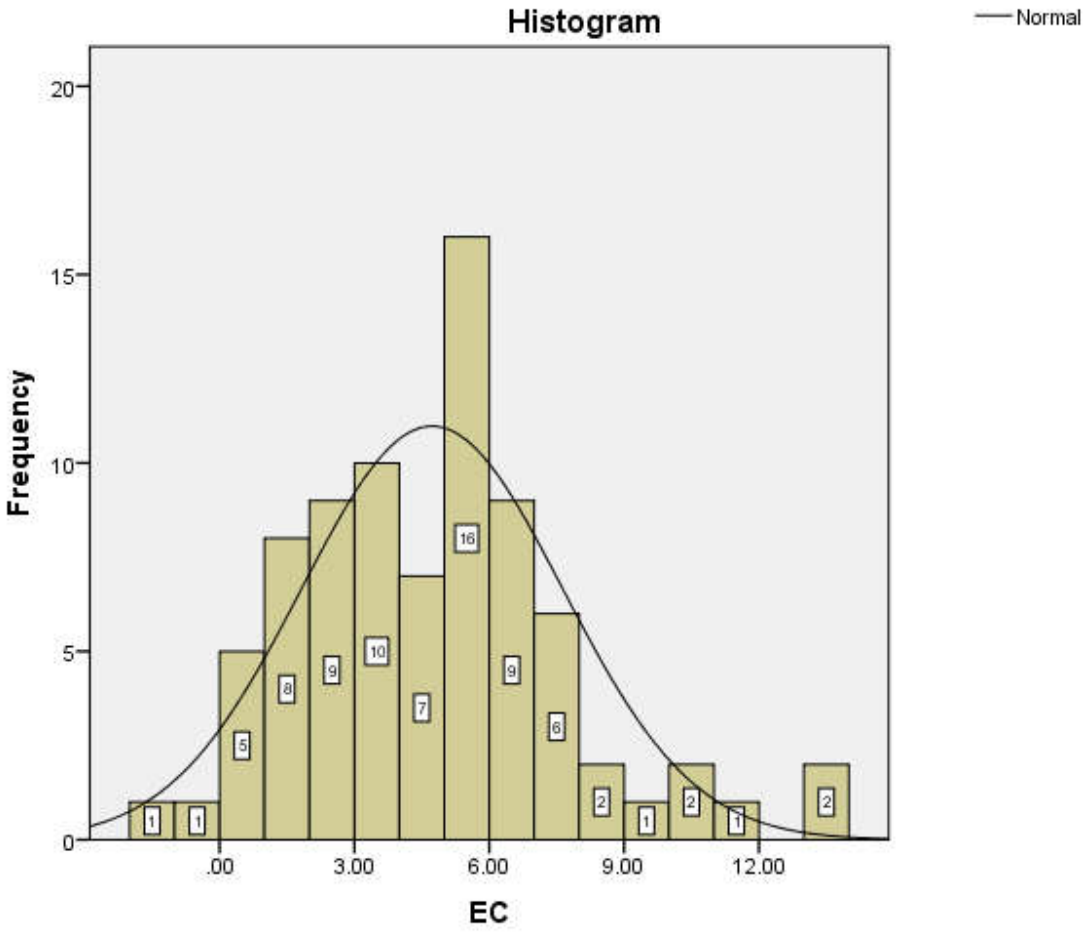


Figure 4.1 Frequency histogram of dependent variable economic growth (EC)

Then main variable (i.e. dependent variable economic growth and independent variable aid) are examined more in depth. Figure 4.1 displays the frequency of economic growth averaged for three years. It is evident in this figure that in most countries (76 countries), the value of economic growth varies from 0 to 12. Besides, there are 2 countries—Dominica and Yemen where the value of economic growth below 0, which indicates that they experience a negative economic growth averaged for these three years. Precisely, the value for Dominica is -0.2, and the value for Yemen is -1.8. In addition, there are 2 countries of which value of economic growth surpasses 12, which are Mongolia where the value is 13.8 and Sierra Leone where the values is 13.6.

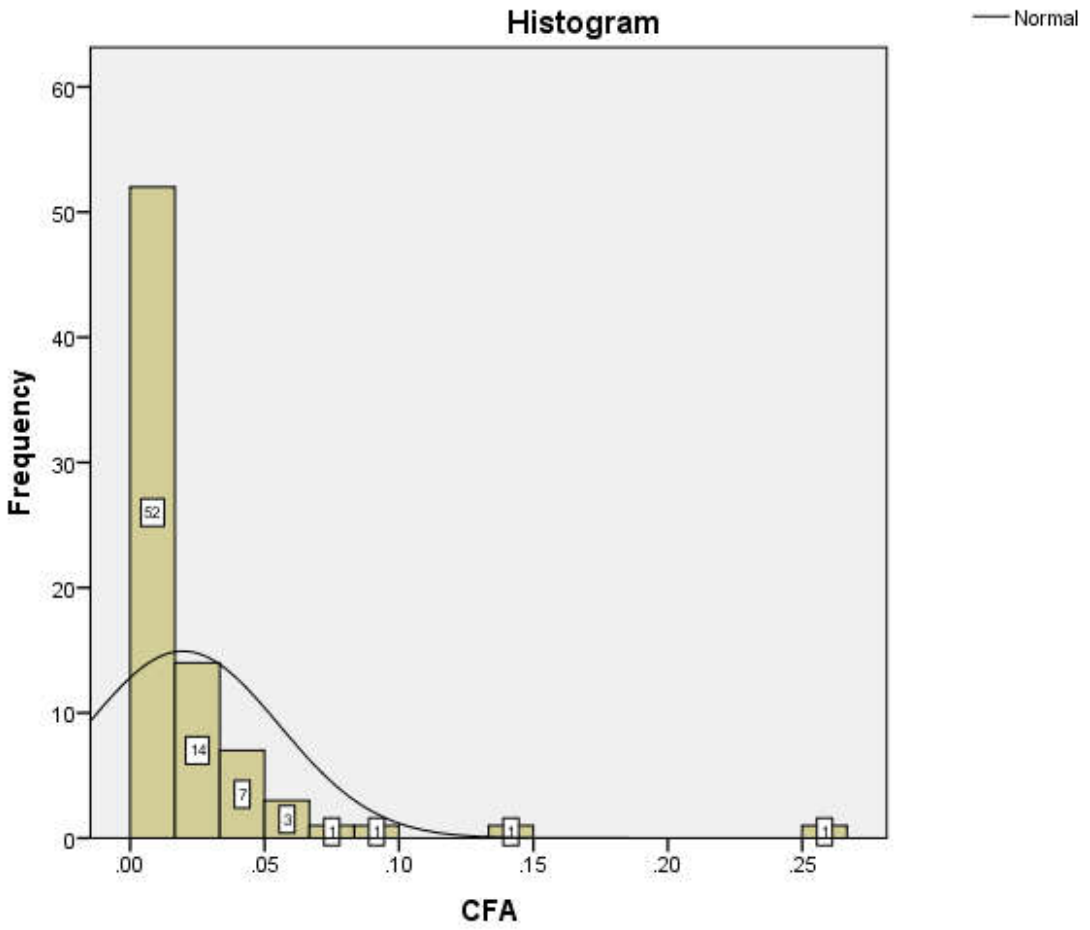


Figure 4.2 Frequency histogram of independent variable China's foreign aid (CFA)

Figure 4.2 displays the value of China's foreign aid related to countries' GDP over three years etc. It is obvious in this figure that in most countries (52 countries) China's foreign aid composes approximately between 0 and approximately 0.016 ($\frac{1}{60}$) of their GDP. Besides, there are 24 countries where China's foreign aid accounts from approximately 0.0166 ($\frac{1}{60}$) to approximately 0.066 ($\frac{1}{15}$) of their GDP. Among the left 4 countries, there are 2 countries which belong to the group where the percentage of Chinese foreign aid related to their GDP varies from approximately 0.066 ($\frac{1}{15}$) to 0.10 ($\frac{1}{10}$). They are Zimbabwe and Cambodia, where the amount of China's foreign aid accounts for 0.08 percentage of their GDP. The largest percentage of China's foreign aid related to their GDP is Lao People's Democratic Republic where China's foreign aid accounts for 0.25 of its GDP, and the second is Guyana where China's foreign aid accounts for 0.14 of its GDP.

4.2 Explanatory analysis

4.2.1 Assumptions for regression analysis

Before proceeding with conducting the regression analysis, it is crucial to ensure that all assumptions for regression analysis are satisfied, since if these assumptions are not met, the result of regression cannot be generalized to the entire population. The first two assumptions will be only discussed briefly because they have already been dealt with in previous chapters.

Assumption 1: Measurement level

The first assumption is that all variables are quantitative (either on the interval or ratio level of measurement). As explained in chapter 3, all variables used in this research are at ratio level, and hence the assumption of quantitative variables (i.e. measurement level) is met.

Assumption 2: Theoretical causal relation

The second assumption is that there is a theoretical causal relation between all independent variables and dependent variable, which has already been discussed in previous chapters, namely chapter 2. Independent variables are factors that existing literature have found that have a certain impact on economic growth. Therefore, there is a causal theoretical relation between the dependent variable and all independent variables, and this assumption is also satisfied.

Assumption 3: Normal distribution

The third assumption is normal distribution, which requires value of variables are normally distributed. According to Johnson et al. (2016), normal distribution refers to "a distribution defined by a mathematical formula and the graph of which has a symmetrical, bell shape" (Johnson et al., 2016, p. 385). It is important to present histograms that show the frequency distribution of all the variables separately, which can be used to roughly test normality by comparing the frequency distribution with the normal distribution curve. Moreover, the statistical test for normality will also be conducted to ensure all the variables for this study are normally distributed. For this case, the Shapiro-Wilk test for normality which is suitable for relatively small samples (up to 200 observations) will be selected. Additionally, when all the residuals are approximately normally distributed, this assumption is met, because residuals are assumed to have the same distribution as their original variables. Residuals refer to "the difference between predicted and observed values" (Johnson et al., 2016, p. 533). For the double check, residuals analysis will also be provided. The histogram based on

standardized residual, normal probability plot of regression standardized residual and the Shapiro-Wilk test on standardized residual will be used to check the normality.

As is observed in Figure 4.1, it is visible that values for economic growth are roughly normally distributed of which shape is almost like a bell. This result is also confirmed by the Shapiro-Wilk test, the value of significance is equal to 0.017, which can be seen in Table 4.2. Therefore, the data for the dependent variable does not need to be transformed.

	Shapiro-Wilk		
EG	Statistic	df	Sig.
	0.962	80	0.017

Table 4.2 Normality Test for EG

According to Figure 4.2, it is evident that values for China's foreign aid are not normally distributed as they do not follow a bell shape which represents a normal distribution. This result is also confirmed by Shapiro-Wilk test, the value of significance is equal to 0.000, which can be seen from Table 4.3. In order to have a normal distribution, raising power to 1/5 will be used (i.e. $CFA^{\frac{1}{5}}$). After calculation, data for the independent variable China's foreign aid become more distributed normally, as can be seen in Figure 4.3 and Table 4.4. The value of significant in the Shapiro-Wilk test is equal to 0.352.

	Shapiro-Wilk		
CFA	Statistic	df	Sig.
	0.545	80	0.000

Table 4.3 Normality Test for CFA

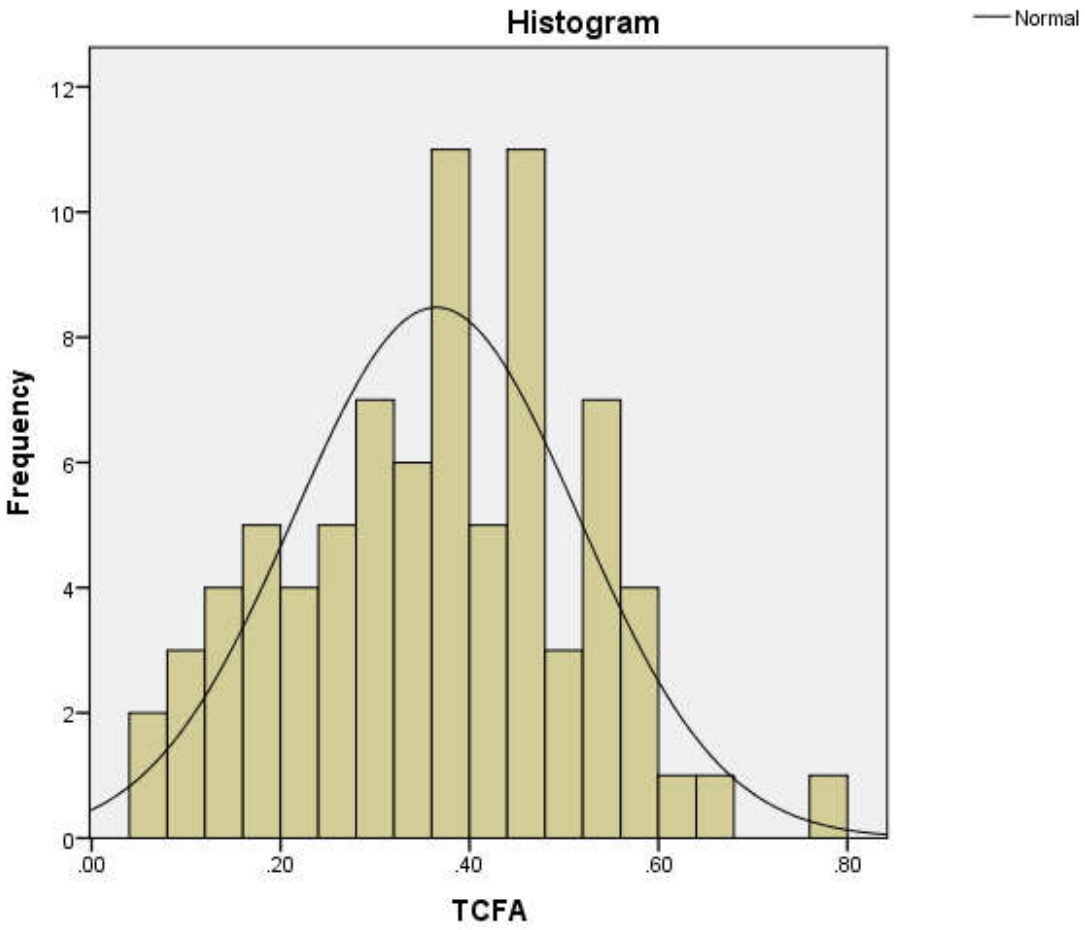


Figure 4.3 Normality Graph CFA

TCFA	Shapiro-Wilk		
	Statistic	df	Sig.
	0.983	80	0.352

Table 4.4 Normality Test for TCFA

For control variables, graphs of histograms and tables of Shapiro-Wilk test are presented in Appendix D. Two variables— Net official development assistance (ODA) and the initial level of development (IND) require transformation among five control variables whereas other three variables—investment (INV), trade (TRA), human capital (HC) and Institutional quality (IG) basically follow normal distribution. For ODA, since there is a negative value on data which is -0.0002 for Thailand, a constant α need to be added to have positive values on this variable for the further transformation (power function). A constant of 0.008 is selected, since it is the smallest number to turn $\min(\text{ODA} + \alpha)$ into positive values. Then the power of 1/4 is used, namely $(\text{ODA} + 0.0008)^{\frac{1}{4}}$, in order to obtain a normal distribution. While for IND, the natural logarithm, namely $\ln \text{GDP per capita}$ will be used to make it distributed more

normally. Graphs of histograms and tables of Shapiro-Wilk test after transformation are also presented in Appendix B.

After transformation, in order to double check the normality on the model which includes all control variables, the residual analysis is provided. On condition that the histogram based on standardized residuals displays a normal curve and the points in normal probability plot suited around the diagonal line, the residuals are normally distributed. In addition, the Shapiro-Wilk test on standardized residual will also be conducted to check the normality.

Figure 4.4 presents the histogram based on the standardized residuals and the predicted standardized residuals. This histogram indicates that there is neither positive nor negative skews, which refers to the values are symmetrically distrusted. Also, there is no high kurtosis, which represents the distribution is neither too flat nor too peaked.

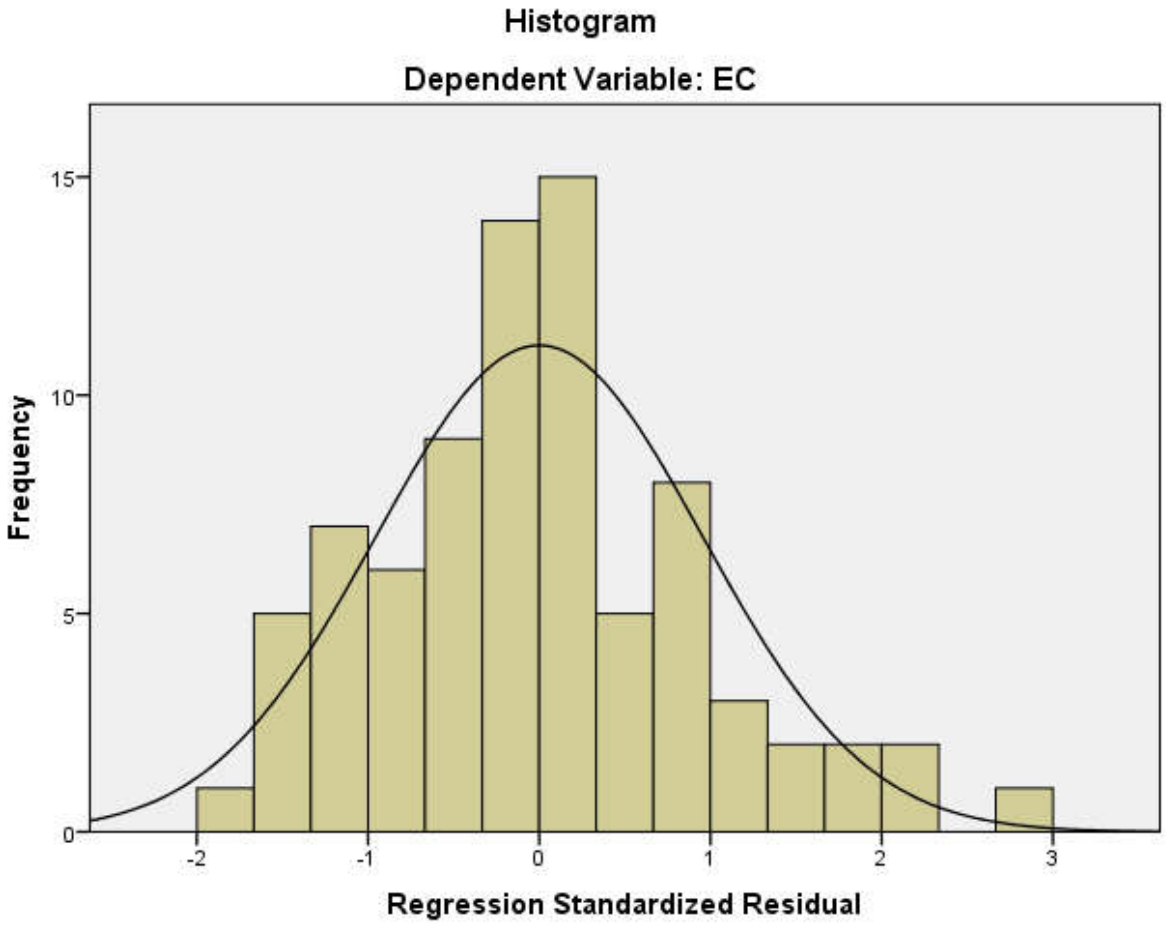


Figure 4.4 Histogram standardized residual

Figure 4.5 displays normal probability plot of the standardized residuals. As can be observed from Figure 4.5, the points are approximately situated on a straight line which indicates the residuals are basically normally distributed.

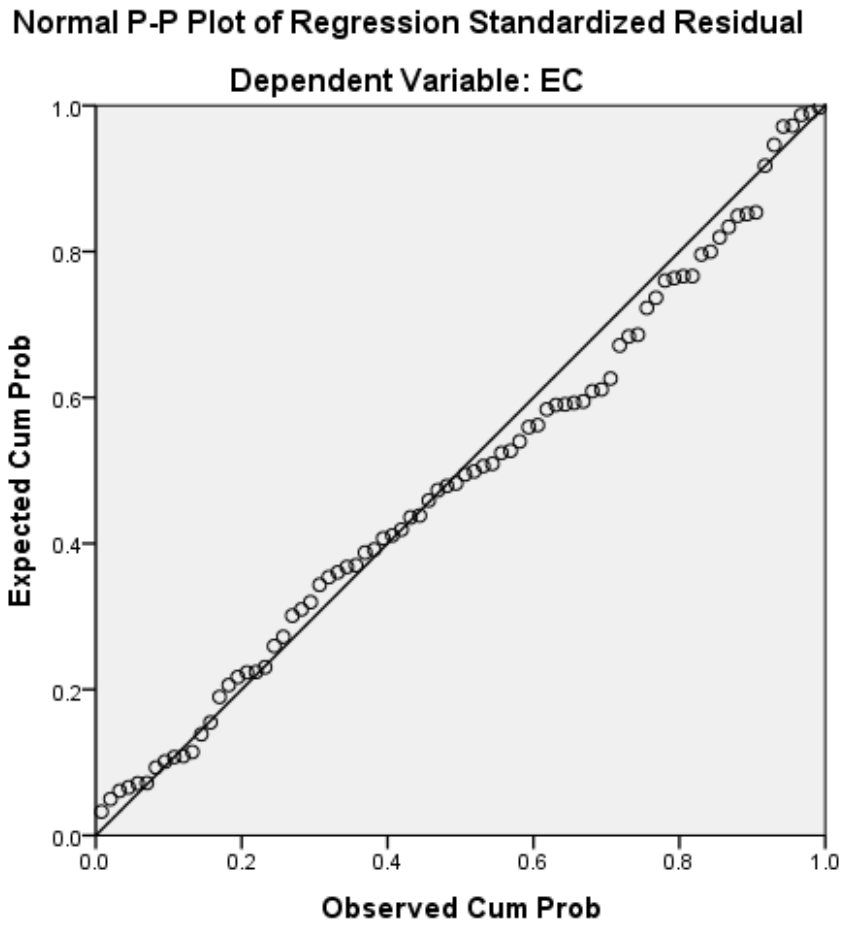


Figure 4.5 Normal P-Plot regression standardized residual

Table 4.5 indicates the result of Shapiro-Wilk tests on standardized residual. The value of significance is equal to 0.107, which confirms that this distribution is roughly normal.

Standardized Residual	Shapiro-Wilk		
	Statistic	df	Sig.
	0.974	80	0.107

Table 4.5 Normality test for standardized residual

Assumption 4: Linearity

The fourth assumption is linearity, which is essential for selecting regression analysis as a tool. The linearity assumption indicates that the expected value of dependent variable Y is a leaner function of the independent variable X (Best & Wolf, 2015, p. 84). More precisely, when a unit change in any parameter values, the same change will occur in the dependent value. It can also be seen from the perspective of residuals. As mentioned before, residuals refer to the difference between predicted values of the model and observed values. Basically the smaller the residuals, the more correct the model. In order to establish a correct model,

linearity requires the expected values of the residuals are equal to zero for every Y value. In other words, the residuals should display a linear relationship. According to Best and Wolf (2015), a graphic method—scatterplot of residuals can be used to evaluate this linearity assumption. (Best & Wolf, 2015, p. 88).When the residuals in the scatterplot do not follow a certain patter (like a parabola) and are located in a balanced way around the reference line, the regression model is linear. Figure 4.6 shows that there is a reasonable amount of linearity, since residuals do not display a clear patter and all of them are situated rather randomly around the reference line.

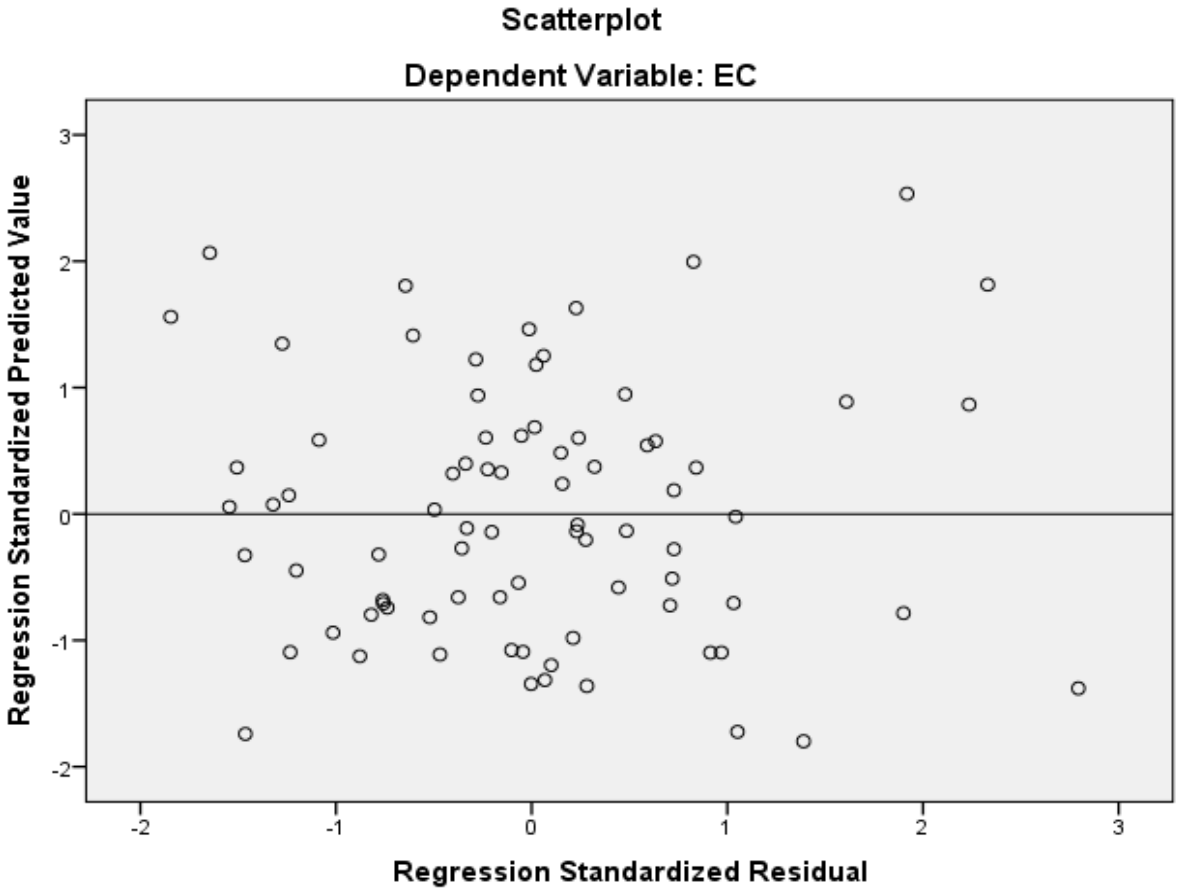


Figure 4.6 Scatterplot standardized residual

Assumption 5: No Multicollinearity

The fifth assumption is no multicollinearity. According to Best and Wolf (2015), multicollinearity represents "a situation where a set of predictor variables show very strong intercorrelations" (Best & Wolf, 2015, p. 106). Therefore the absence of multicollinearity requires there is no independent variable is an exact linear function of other independent variables (Johnson et al., 2016, p. 530). To test the presence of multicollinearity, two measures—the correlation matrix and variance inflation factor (VIF) with tolerance can be

used. The correlation matrix presents the bivariate correlation coefficients for every two independent variables. When this method is applied, there should be no perfect correlation in this correlation matrix. More precisely, the absence of multicollinearity requires all the values of the bivariate correlation coefficient in correlation matrix are smaller than 0.8. According to Table 4.6, the highest correlation exists between official development assistance (ODA) and the initial level of development (TIND), and the absolute value of the coefficient is equal to 0.708. Since it is lower than 0.8 which represents multicollinearity, the test result is no multicollinearity.

In addition, as can be seen in Table 4.6, the correlation coefficient between economic growth and China's foreign aid is equal to 0.360, significant at 0.01 level. First, this indicates the direction of the relation between economic growth and China's foreign aid is positive, which means that countries in which received more foreign aid from China had a positive growth rates. However, this does not represent a causal relation, but shows that higher economic growth rates were obvious in countries which received relative more foreign aid from China. Second, this number indicates the strength of the relationship between these two variables. In this case, the value of the correlation coefficient is equal to 0.360, which represents a medium relationship, namely neither very weak nor fairly strong relationship. Third, the level of significance of the correlation represents the possibility that this correlation coefficient has occurred by chance. Normally, when the results of significant levels is smaller than 0.05, the result will be included in the research, since the value equal to 0.05 means that the possibility that this correlation occurs by chance is very low. In this case, the bivariate correlation between economic growth and China's foreign aid is significant at the 0.01 level. Hence, it is possible to conclude with 99% certainty that this result is not based on chance.

	TCFA	TODA	INV	TRA	HC	IQ	TIND	EC
TCFA								
TODA	0.314**							
INV	-0.024	-0.035						
TRA	0.082	0.103	0.267*					
HC	-0.163	-0.399**	0.227*	0.177				
IQ	-0.329**	-.0.141	0.265*	0.227*	0.411**			
TIND	-0.367**	-0.708**	0.176	0.182	0.563**	0.534**		
EC	0.360**	0.238*	0.342**	0.031	-0.091*	-0.188	-0.315**	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Tabel 4.6 Correlation between variables

The other method to evaluate multicollinearity is calculating VIF and tolerance. Tolerance indicates the level of dependence of a predictor on the other independent variables, of which value ranges from 0 to 1. Smaller tolerance values indicate multicollinearity (a usual threshold is 0.1). VIF is defined as the inverse of the tolerance, of which value range from 1 to $+\infty$. Obviously high values indicate multicollinearity (a usual threshold is 10, which corresponds to the value of 0.1 for tolerance) (Best & Wolf, 2015, p. 106). As can be seen from Table 4.7, the values of VIF are all smaller than 5 with acceptable tolerance level, which implies that none of independent variables suffer from multicollinearity problem.

(Dependent Variable: EC)	**Collinearity Tolerance**	**Statistic VIF**
TCFA	0.788	1.269
TODA	0.376	2.663
INV	0.870	1.150
TRA	0.804	1.244
HC	0.546	1.831
IQ	0.552	1.813
TIND	0.225	4.448

Table 4.7 Collinearity Statistics

Assumption 6: Homoscedasticity

The last assumption for conducting regression analysis is homoscedasticity, which also called constant value assumption. This assumption requires the variance of the residual should be constant for all independent variables. To evaluate homoscedasticity, the scatterplot which compares the standardized residual with the predicted residuals, namely Figure 4.6 will be used to check whether the variances of the residuals are homogeneous. If values are situated in an unbalanced way and the variances are very unequal, there is homoscedasticity. As can be seen in Figure 4.6, the residuals are situated randomly enough and are keeping going further from the zero-line, which indicates the existence of homoscedasticity.

To conclude, since all assumptions for multiple regression analysis are met, the regression analysis can be conducted, and the results of the sample can be generalized to the entire population.

4.2.2 Multivariate regression model

To answer the second sub research question, the multivariate regression model will be used. For this case, the method of gradually adding independent variables will be used to select the best model, which means to select the best model by gradually adding independent variable each by each to the regression model. The order of including control variables is based on correlation coefficients between them and the dependent variable (economic growth) as can be seen in Table 4.6, starting with a variable which has high correlation with the dependent variable. Below Table 4.8 present a summary of all models.

Dependent Variable: EG						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
(constant)	-1.006	5.504**	7.111*	5.649	6.191	5.859
	(1.170)	(2.581)	(3.978)	(4.932)	(4.992)	(5.115)
China's foreign aid	7.107***	5.083**	5.164**	4.927**	4.752**	4.853**
	(1.902)	(1.961)	(1.977)	(2.041)	(2.058)	(2.092)
Investment	0.126***	0.144***	0.146***	0.149***	0.146***	0.149***
	(0.035)	(0.035)	(0.035)	(0.036)	(0.036)	(0.037)
The initial level of development		-0.787***	-0.925**	-0.788*	-0.982*	-0.935*
		(0.281)	(0.384)	(0.471)	(0.532)	(0.552)
Official development assistance			-1.553	-0.897	-1.064	-0.749
			(2.916)	(3.204)	(3.219)	(3.368)
Institutional quality				-3.16	-0.344	-0.388
				(0.625)	(0.628)	(0.632)
Human capital					2.096	2.094
					(2.655)	(2.672)
Trade						-0.003
						(0.009)
N	80	80	80	80	80	80
Adjusted R square	0.233	0.296	0.289	0.282	0.278	0.269
F	13.014	12.061	9.031	7.205	6.077	5.163
Sig.	0.000	0.000	0.000	0.000	0.000	0.000
Std. Error of the Estimate	2.54561	2.43955	2.45113	2.46337	2.46967	2.48474

*. Coefficient is significant at 0.01 level
**. Coefficient is significant at 0.05 level
***. Coefficient is significant at 0.1 level

Table 4.8 Composition of Models

The first model includes the dependent variable (economic growth), the main independent

variable (China's foreign aid) and a control variable (investment). For subsequent models, one by one other independent variable are added. Hence, Model 2 includes China's foreign aid, investment, the initial level of development; Model 3 adds official development assistance; Model 4 adds institutional quality; Model 5 adds human capital; Model 6 includes all independent variables.

R-squared (typically written as R^2), also called the coefficient of determination, varying from 0 to 1, representing the proportion of variance explained by the regression model, which is a popular indictor of model's goodness-of-fit (Kellstedt & Whitten, 2013, p. 180). In other words, R-squared indicates the total amount of variance of the dependent variable that can be explained by independent variables. The adjusted R-squared is adjusted version of R-squared which correct the main problem of R-squared that its value can only be increased when adding new independent variables to the given equation even though the adding variables is not associated with the dependent variable. Adjusted R-squared can decrease when adding independent variables which are irrelevant with the dependent variable (Best & Wolf, 2015, p. 62). Therefore, the adjusted R-squared is more suitable for this study due to the method discussed in the previous paragraph. As can be seen from Table 4.8, the value of adjusted R-squared differs from one model to another, which indicates that model's goodness-of-fit differs one to another. Of all adjusted R-squared values, Model 2 with three independent variables namely China's foreign aid (main variable), investment and the initial level of development has the highest value, which is equal to 0.296. This means that Model 2 has highest explanatory power compared with other four models. Also, it indicates that 29.6% of the variance of economic growth is explained by these five independent variables for the entire population.

F value is the ratio of the regression mean and residual mean squared, which decides whether the model has any predictive capability. Commonly, F value and the significance value of R-squared (written as Sig, in Table 4.8) that represents how significant the whole model are checked together to test whether the null hypothesis is rejected. More precisely, when F value is large with acceptable significance level, the null hypothesis is rejected. According to Table 4.8, Model 2 has second highest F values is shown which is equal to 12.061, which a perfect significance level (0.000). This indicates the null hypothesis that the model is in explaining the variance of values of the dependent variable is rejected. More precisely, this implies that it is possible to justify the model as a complete entity is significant in explaining 29.6% of the variation of economic growth. Furthermore, the lowest standard error of the estimate also

occurs in Model 2, which also increases its level of goodness-of-fit. In addition, as shown in Table 4.8, the significant values for all models are 0.000, which indicates that all models have some predictive capability and all models are significant.

Based on the above analysis, Model 2 is the best model which is selected for this research. Due to relatively small sample size, a model with four variables is an appropriate option. In addition, for Model 2, the scatterplot of standardized residual and the table of Shapiro-Wilk test for standardized residual, are presented in Appendix E., which are used to reconfirm the linearity, normality of residuals and homoscedasticity assumptions.

4.2.3 Interpretation of the multivariate regression model

This sub-section presents an interpretation of this multivariate regression model. The theoretical relations between economic growth and independent variables are confirmed by review of existing literature. In this sub-section, the question to what extent is the statistical evidence consistent with these theoretical relations will be answered. The effect of the main independent variable—China's foreign aid on economic growth will be discussed first, then followed by the impact of each control variable on economic growth.

China's foreign aid and Economic growth

As shown in Table 4.6 (Correlation between variables), the correlation coefficient between China's foreign aid and economic growth is significant. This means that the theoretical expectation that the higher amount of China's foreign aid, the higher economic growth is expected is true. It is important to test whether this result holds when the impacts of other independent variables are taken into consideration. As can be seen in Table 4.8, the unstandardized coefficient of China's foreign aid is equal to 5.083, which is significant at 0.05 level in Model 2. This indicates the significant positive relation between China's foreign aid and economic growth (the probability of this significant relation has occurred by chance is less than 5%). In addition, this significant positive relation can be seen in each model according to Table 4.8. Based on this result, the hypothesis that foreign aid from China to other developing countries has a positive impact on economic growth of developing countries is not rejected. In other words, developing countries which received more foreign aid from China would achieve higher economic growth.

Furthermore, the result also can be interpreted as China's foreign aid was one of the causes of their economic development in observed countries in the specific time period. Based on this interpretation, it is predicted that China's foreign aid boosts economic growth in developing

countries. Besides, general theories of the impact of aid on economic growth and specifically on theoretical argumentation on the subject of China's foreign aid including its typical characteristics with its impact on economic growth also lays the foundation for this prediction. In the empirical part, the review of existing literature concerning aid's impact on economic growth also provides the firm basis for this prediction. However, since there is little empirical literature to support or reject this theoretical assumption in the Chinese case, the result of this thesis have added value since it proves that for the observed sample, China's foreign aid is significant factor exerting a positive impact on economic growth, which responds to the criticism from international society on China's foreign aid, and supports that although China's foreign aid has distinctive characteristics different from traditional aid, it is helpful to boast economic growth in recipient countries in practice.

Control variables and Economic growth

On investment, the unstandardized coefficients of it are all positive and all significant at 0.01 level. In Model 2, the coefficient is 0.144. This indicates: a) investment is significantly positively associated with economic growth, and the probability of this significant relation has occurred by chance is lower than 1%; b) as long as other independent variables held constant, when investment increase with 1 unit as a share of GDP, economic growth will correspondingly increase with 0.144 unit. Besides, the result is consistent with the expectation that more investment higher economic growth is achieved. In other words, investment has a positive impact on economic growth in developing countries. Therefore, recipient's government should put a heavy emphasis on economic growth.

In terms of the initial level of development, the significant positive coefficients can be found in all models, as can be seen in Table 4.8. In model 2, its coefficient is -0.787, significant at 0.01 level. This indicates the initial level of development is significantly negatively associated with economic growth, and the probability of this significant relation has occurred by chance is lower than 1%. This negative relation between the initial level of development and economic growth is consistent with expectation identified by previous studies. The lower initial level of development the higher subsequent economic growth is expected.

With regard to ODA, its negative coefficients can be found in all models, but insignificant. The negative relation is not consistent with expectation based on previous studies. With regard to this insignificant relation, the data for this control variable is net ODA, which may partly explain this result. If a country has to repay earlier loans in a certain year, the data of

net ODA for that year can become negative, which ultimately may unable to reflect its conductive impact on economic growth statistically. Besides, since the result is not significant and the prossibility that it has occurred by chance is too high, ODA can therefore not be identified as a factor that will exert a negative influence on economic growth.

In terms of institutional quality, according to Table 4.8, its negative coefficient can be found in all models, but insignificant. This is not consistent with theoretical expectation based on previous studies. This probably implies the higher institutional quality the lower subsequent economic growth is expected. The possible explanation to this insignificant negative coefficient is that it requires time to witness the conductive influence of improvement in institutional quality on economic growth. However, since the result is not significant, the possibility of this relation occurred by chance is too high. Hence, institutional quality cannot be defined as a factor may have negative impact on economic growth.

Concerning human capital, as can be observed in Table 4.8, the unstandardized coefficients of human capital are all positive, but not significant. This is in accordance with expectation based on previous studies, which is that countries with higher human capital are expected to obtain higher economic growth. However, this unexpected insignificant relation can partly be explained by the lag-effect of human capital on economic growth. That is, improvements in human capital cannot be expected to obtain economic growth in a short period of time (like one year here), especially in poor countries which have limited demand for high-quality human capital.

Last, trade is expected to contribute to economic growth. As shown in Table 7.9, the regression coefficient is -0.003, but not significant, which is not consistent with expectation based on previous studies. This would imply that the more trade is developed lower economic growth would be. However, since the result is not significant and the probability that it has occurred by chance is too high, trade can therefore not be identified as a factor that will exert a certain influence on economic growth.

Chapter 5 Conclusion

The last chapter aims to provide a conclusion of this study. At first, the answers to central research question will be discussed with possible explanations (5.1). In order to fully answer the main research question, two sub-questions will be answered precisely by summarizing the above theoretical analysis based on existing literature and the above interpretation of results for multivariate regression analysis. After that, the limitations of this research (5.2) will be provided, followed with policy (5.3) and research implications (5.4).

5.1 Central Research Question

The central question of this research is:

What is the effect of China's foreign aid on economic growth in developing countries?

The first sub-question was defined as:

1. *What does the existing literature tell about foreign aid and economic growth, especially about China's foreign aid?*

This sub-question was analyzed and answered in Chapter 2 by reviewing the existing theories and literature. Most of the existing research on aid and economic growth focused on investigating the impact of aid from developed countries to the developing world and emphasized the contribution of foreign aid to economic growth. It is believed that aid facilitates growth by filling saving gap, trade gap and fiscal gap, promoting technology diffusion and improving human capital, which correspondingly leads to an increase in capital, an improvement in technology and an increase in labor quality and quantity that are defined as three channels to achieve output growth according to neoclassical growth theory. Also there are a certain number of studies discuss the no significant and even negative impact of aid on economic growth by assisting incompetent government to maintain state control, being misused by recipient government and reducing domestic savings (a decrease in interest rate and a reduction in government savings). Besides, recently many researchers focus on investigating conditional impact of aid on economic growth. The most influential model in this field is Good policy model, which proved to have lack of empirical evidence. For China's foreign aid and economic growth, it can exert a positive impact on economic growth of recipients through same channels as traditional aid does and its own distinctive characteristics can deal with the issue of "aid dilemma" and corruption to some extent. Based on aid may have positive impact on economic growth and China's foreign aid with distinctive

characteristics it may not only exert impact on growth through same channel as traditional aid does, but also deal with possible negative impact aid may bring to recipient countries (the "aid dilemma" and corruption) to some extent, the assumption is formulated that China's foreign aid to other developing countries has positive impact on economic growth of developing countries.

The second sub-question was defined as:

2. *What are empirical findings of this research on the impact of China's foreign aid on economic growth in developing countries?*

This second sub-question was answered in the previous chapter. Multivariate regression analysis was conducted in order to answer this sub-question. To examine whether China's foreign aid has positive impact empirically, multiple regression is conducted, controlling for other significant variables. The selection of control variables was based on previous literature. More precisely, choosing variables of which relation with economic growth are found to be significant in previous studies. The variable human capital, investment, the initial level of development, institutional quality and trade are selected as control variables. Besides, ODA which distinguishes the impact of foreign aid from other countries is also included as a control variable. After presenting different combinations of variables, the best model which explains 29.6% variation of economic growth is selected. In the model, the positive and significant coefficient of China's foreign aid confirms the expectation that China's foreign aid has a positive impact on economic growth of developing countries. Therefore, the answer for the second sub-question is that relation between China's foreign aid and economic growth is positive and statistically significant. In addition, the result of multivariate regression indicates that investment and the initial level of development can also be the cause of economic growth. A positive sign of coefficient for investment and a negative sign of coefficient for the initial level of development are in correspondence with the theoretical expectations based on previous chapter.

In conclusion, through theoretical and empirical examination, the effect of China's foreign aid on economic growth in developing countries is significantly positive.

5.2 Limitations of this research

The limitations of this research will be discussed below. The first limitation is related with cross-sectional research design. This study analyzes data from China's foreign aid for certain years (2010, 2011 and 2012) and measures its impact in years 2011, 2012 and 2013. This

makes it hard for the result to generalize for the whole population. More precisely, the result that China's foreign aid has a positive impact on economic growth in these years does not imply that the significant relation will take place when examined in other years. Moreover, the average value of three years are used in this study, Besides, for cross-sectional data, the development of this relation between China's foreign aid and economic growth during a longer time period cannot be examined. In addition, for this thesis, due to the scarcity of reliable data, average values are used to ensure external validity which may have a potential negative impact on reliability.

The second limitation is that the mechanism through which China's foreign aid contributes to economic growth was not analyzed empirically. More precisely, though the significant positive impact was found through multivariate regression analysis, the findings of this research cannot explain through which channels China's foreign aid has a positive impact. The theoretical argumentation concerning channels by which China's foreign aid exert influence on economic growth cannot be examined empirically in this research.

However, due to the extreme shortage of reliable data on China's foreign aid, this research already has some added value.

5.3 Policy implications

This study shows that China's foreign aid has positive impact on economic growth based on theoretical and empirical examination.

First, the study result provides empirical evidence that China's foreign aid has positive impact on economic growth of developing countries, which responds to wide negative criticism in international aid society to some extent. Besides, this result contributes to the establishment of mutual understanding between China and traditional donors (south and north donors), which lays a foundation for having an in-depth dialogue on how to improve aid effectiveness and even having mutual cooperation on promoting aid programmes.

Second, this study may increase the confidence of recipient countries in aid to some extent. Also, this result may encourage local people to develop a clear understanding of aid policy and therefore may improve the performance of aid programmes. For instance, if local people can develop a clear comprehension of aid policy and then actively participate in infrastructure aid programmes, these programmes' performance will be substantially raised, since they are largely decided by the involvement of local human capital.

Last, the research result that investment boosts economic growth in developing countries encourages policy-makers to develop the policy to promote domestic investment and ultimately spur economic growth.

5.4 Research implications

First, in terms of empirical research method, in order to obtain more scientific evidence on the relation between China's foreign aid and economic growth, incorporating data for different time-periods and applying a different method that can test mechanism of China's foreign aid influencing economic growth are needed. More precisely, incorporating data for different time-periods will be helpful to find more evidence which will be more generalizable for the whole population. Besides, examining the relation between China's foreign aid and economic growth in one country by using time-series data will provide detailed information on this relation, if reliable data for long period of time can be found.

Second, with regard to research focus, compared with the considerable number of researches on traditional aid, research on aid from South to South is relatively scarce. Hence more attention should be given to this area, which can provide more experience (success or failure) which can be learnt from each other in order to optimize aid model. Besides, concerning China's foreign aid, emphasis on its impact on political development and human development etc. is also needed since it is also criticized to negatively affect political progress in recipient countries. Furthermore, given the fact that China's foreign aid consists of grants, interest-free loans and concessional loans, the effect of these three components on economic growth can be an interesting and meaningful topic to investigate.

Last, more research should be done into how to optimize aid model in order to promote economic growth in recipient countries. This is meaningful for improving living standards of people especially in poor areas and to make this world a better place for everyone.

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Appendix A. Description of Variables

Variable Name	*Variable Code*	*Description*	*Level of Measurement*	*Database*	*Website*
Economic Growth	*EC*	*GDP growth (annual %)*	*Ratio*	*World Bank*	*http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?page=*
China's foreign aid	*CFA*	*Aid received from China (Current US$) as a percentage of GDP*	*Ratio*	*AidData*	*http://china.aiddata.org/aggregates/export*
Official development assistance	*ODA*	*Net official development assistance received (current US$) as a percentage of GDP*	*Ratio*	*World Bank*	*http://data.worldbank.org/indicator/DT.ODA.ODAT.CD*
Investment	*INV*	*Gross capital formation (% of GDP)*	*Ratio*	*World Bank*	*http://data.worldbank.org/indicator/NE.GDI.TOTL.ZS*
Trade	*TRA*	*Sum of imports and exports as a percentage of GDP* *Exports of goods and services (% of GDP)* *Imports of goods and services (% of GDP)*	*Ratio*	*World Bank*	*http://data.worldbank.org/indicator/NE.EXP.GNFS.ZS* *http://data.worldbank.org/indicator/NE.IMP.GNFS.ZS*
Human Capital	*HC*	*Education index*	*Index*	*UNDP*	*http://hdr.undp.org/en/content/education-index*
The initial level of development	*IND*	*The natural logarithm of GDP per capita* *GDP per capita (current US$)*	*Ratio*	*World Bank*	*http://data.worldbank.org/indicator/NY.GDP.PCAP.CD*
Institutional quality	*IQ*	*The equally weighted average of six World Governance Indicators*	*Index*	*World Bank*	http://databank.worldbank.org/data/reports.aspx?Report_Name=WGI-Table&Id=ceea4d8b

Appendix B. Full Country Sample

East Asia and Pacific:

Cambodia	Indonesia	Lao PDR
Malaysia	Mongolia	Thailand
Vanuatu	Vietnam	

Europe and Central Asia:

Albania	Armenia	Azerbaijan
Belarus	Georgia	Kazakhstan
Kyrgyz Republic	Macedonia FYR	Moldova
Montenegro	Serbia	Tajikistan
Turkey	Ukraine	

Latin America and the Caribbean:

Antigua and Barbuda	Argentina	Bolivia
Brazil	Chile	Dominica
Ecuador	Grenada	Guyana
Jamaica	Mexico	Nicaragua
Peru	Suriname	Uruguay
Venezuela, RB		

Middle East and North Africa:

Algeria	Egypt, Arab Rep.	Iraq
Jordan	Lebanon	Morocco
Yemen, Rep.		

South Asia:

Bangladesh	India	Nepal
Pakistan	Sri Lanka	

Sub-Saharan Africa:

Angola	Botswana	Cameroon
Congo, Dem. Rep.	Cote d'Ivoire	Ethiopia
Ghana	Guinea	Guinea-Bissau
Kenya	Lesotho	Madagascar
Malawi	Mali	Mauritius
Mozambique	Namibia	Nigeria
Rwanda	Senegal	Seychelles
Sierra Leone	South Africa	Sudan
Tanzania	Togo	Uganda
Zambia	Zimbabwe	

Appendix C. Full Data Set

N	Country	EC	CFA	ODA	IND	INV	WGI	HC	TRA	TCFA	TODA	TIND
1	Albania	1.7	0.00	0.03	4438	30.0	-0.17	0.61	87.19	0.08	0.42	8
2	Algeria	3.0	0.00	0.00	5447	39.5	-0.86	0.64	67.58	0.16	0.21	9
3	Angola	5.3	0.01	0.00	4745	14.1	-1.01	0.46	104.97	0.42	0.24	8
4	Antigua and Barbuda	0.6	0.01	0.01	12818	23.5	0.81	0.68	103.48	0.42	0.33	9
5	Argentina	2.5	0.00	0.00	12727	17.5	-0.29	0.78	33.57	0.28	0.18	9
6	Armenia	5.1	0.00	0.03	3417	28.5	-0.30	0.70	71.07	0.20	0.43	8
7	Azerbaijan	2.7	0.00	0.00	7190	20.0	-0.78	0.70	77.92	0.14	0.26	9
8	Bangladesh	6.3	0.00	0.01	839	27.3	-0.84	0.44	44.44	0.27	0.34	7
9	Belarus	2.8	0.05	0.00	6306	37.7	-0.96	0.82	142.33	0.55	0.23	9
10	Bolivia	5.7	0.02	0.03	2378	18.2	-0.55	0.67	80.98	0.45	0.42	8
11	Botswana	7.3	0.00	0.01	7505	39.1	0.67	0.62	101.64	0.17	0.31	9
12	Brazil	3.0	0.00	0.00	13047	21.7	0.11	0.66	23.66	0.28	0.18	9
13	Cambodia	7.3	0.08	0.06	879	17.7	-0.86	0.50	115.97	0.61	0.50	7
14	Cameroon	4.8	0.03	0.02	1259	19.7	-0.91	0.48	43.54	0.48	0.39	7
15	Chile	5.2	0.00	0.00	14582	24.7	1.21	0.74	69.85	0.08	0.24	10
16	Congo, Dem. Rep.	7.5	0.05	0.05	350	17.4	-1.67	0.36	86.80	0.55	0.46	6
17	Cote d'Ivoire	5.1	0.06	0.00	1232	11.1	-1.20	0.39	92.64	0.57	0.22	7
18	Dominica	-0.2	0.03	0.06	7016	16.7	0.75	0.61	87.86	0.50	0.49	9
19	Ecuador	6.2	0.02	0.00	5223	28.0	-0.80	0.59	62.18	0.45	0.23	9
20	Egypt, Arab Rep.	2.1	0.00	0.00	2817	17.5	-0.54	0.57	44.63	0.26	0.26	8
21	Ethiopia	10.1	0.06	0.16	356	23.1	-0.94	0.86	31.21	0.56	0.63	6
22	Georgia	5.7	0.00	0.05	3725	25.6	-0.06	0.77	91.56	0.19	0.46	8
23	Ghana	10.2	0.04	0.05	1587	28.1	0.10	0.54	84.95	0.53	0.47	7

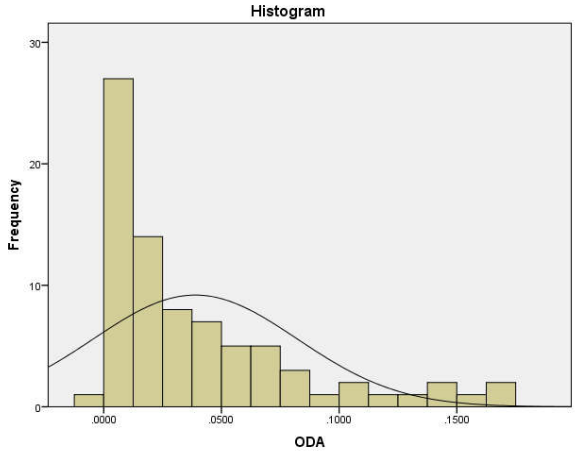
24	Grenada	0.7	0.00	0.02	7411	19.4	0.40	0.72	74.78	0.32	0.39	9
25	Guinea	3.4	0.00	0.06	448	14.5	-1.26	0.29	78.31	0.32	0.51	6
26	Guinea-Bissau	2.8	0.01	0.11	661	6.4	-1.02	0.33	50.89	0.35	0.58	6
27	Guyana	5.2	0.14	0.06	3409	24.7	-0.35	0.58	139.11	0.68	0.49	8
28	India	6.2	0.02	0.00	1461	39.5	-0.28	0.47	53.70	0.43	0.22	7
29	Indonesia	5.9	0.00	0.00	3648	33.6	-0.48	0.60	48.82	0.32	0.20	8
30	Iraq	9.4	0.00	0.01	5829	14.9	-1.42	0.47	73.07	0.30	0.33	9
31	Jamaica	0.5	0.03	0.01	5247	20.5	-0.06	0.67	82.28	0.48	0.28	9
32	Jordan	2.7	0.00	0.04	4266	25.5	-0.08	0.70	119.77	0.21	0.44	8
33	Kazakhstan	6.1	0.02	0.00	11634	24.5	-0.50	0.76	73.66	0.44	0.21	9
34	Kenya	5.5	0.01	0.05	1013	21.3	-0.66	0.51	57.48	0.37	0.48	7
35	Kyrgyz Republic	5.6	0.05	0.08	1124	29.3	-0.88	0.65	136.36	0.54	0.53	7
36	Lao PDR	8.0	0.25	0.05	1298	26.8	-0.98	0.43	79.29	0.76	0.47	7
37	Lebanon	1.7	0.00	0.01	8729	27.0	-0.62	0.63	110.69	0.11	0.34	9
38	Lesotho	4.9	0.01	0.10	1375	27.7	-0.12	0.50	139.16	0.38	0.56	7
39	Macedonia, FYR	1.6	0.06	0.02	5080	26.8	-0.08	0.64	107.76	0.56	0.37	9
40	Madagascar	2.2	0.00	0.05	456	18.6	-0.75	0.46	70.03	0.13	0.46	6
41	Malawi	4.0	0.01	0.15	524	15.8	-0.29	0.44	58.11	0.36	0.62	6
42	Malaysia	5.2	0.00	0.00	10428	24.1	0.34	0.67	153.57	0.29	0.17	9
43	Mali	1.6	0.01	0.09	830	20.3	-0.41	0.30	57.01	0.43	0.55	7
44	Mauritius	3.6	0.00	0.01	1403	25.1	0.77	0.34	117.64	0.24	0.35	7
45	Mexico	3.1	0.00	0.00	9730	22.5	-0.19	0.63	63.71	0.16	0.19	9
46	Moldova	5.2	0.00	0.07	1971	23.8	-0.39	0.65	125.33	0.32	0.52	8
47	Mongolia	13.8	0.02	0.04	3773	52.0	-0.21	0.69	113.31	0.47	0.44	8
48	Montenegro	1.4	0.01	0.02	7319	20.6	0.09	0.77	106.07	0.38	0.40	9
49	Morocco	4.3	0.00	0.01	3067	35.0	-0.27	0.46	81.27	0.24	0.34	8

50	Mozambique	7.2	0.04	0.16	525	30.4	-0.27	0.37	92.30	0.53	0.64	6
51	Namibia	5.3	0.01	0.02	5540	24.4	0.30	0.52	104.99	0.35	0.39	9
52	Nepal	4.1	0.02	0.05	694	36.9	-0.89	0.45	43.82	0.46	0.47	7
53	Nicaragua	5.9	0.01	0.07	1680	28.9	-0.64	0.48	109.12	0.37	0.51	7
54	Nigeria	4.9	0.01	0.00	2496	16.1	-1.17	0.42	46.61	0.39	0.27	8
55	Pakistan	3.6	0.04	0.01	1230	15.0	-1.11	0.37	32.87	0.53	0.35	7
56	Peru	6.1	0.00	0.00	5770	24.2	-0.25	0.66	53.43	0.22	0.21	9
57	Rwanda	7.1	0.01	0.16	607	24.1	-0.26	0.41	43.70	0.38	0.64	6
58	Senegal	3.2	0.00	0.07	4066	25.5	-0.44	0.37	71.09	0.29	0.52	8
59	Serbia	1.0	0.03	0.02	6423	19.9	-0.15	0.70	84.91	0.50	0.40	9
60	Seychelles	6.8	0.02	0.04	12189	36.3	0.17	0.65	203.75	0.46	0.44	9
61	Sierra Leone	13.6	0.04	0.14	498	33.4	-0.68	0.30	74.84	0.54	0.62	6
62	South Africa	2.7	0.00	0.00	8050	19.7	0.25	0.69	59.00	0.32	0.25	9
63	Sri Lanka	7.0	0.02	0.01	3221	34.3	-0.38	0.74	50.95	0.44	0.31	8
64	Sudan	1.0	0.01	0.03	1596	21.3	-1.61	0.31	31.60	0.39	0.40	7
65	Suriname	3.8	0.00	0.02	8449	49.5	-0.15	0.59	105.29	0.32	0.37	9
66	Tajikistan	7.4	0.01	0.06	841	19.3	-1.11	0.64	81.20	0.38	0.50	7
67	Tanzania	6.8	0.02	0.08	740	29.7	-0.36	0.42	53.02	0.45	0.53	7
68	Thailand	3.6	0.00	0.00	5539	26.7	-0.34	0.61	135.14	0.09	0.15	9
69	Togo	4.6	0.01	0.11	572	20.5	-0.89	0.51	100.14	0.37	0.58	6
70	Tunisia	1.7	0.00	0.02	4258	25.0	-0.20	0.62	106.55	0.21	0.37	8
71	Turkey	8.1	0.00	0.00	10539	28.8	-0.04	0.64	50.27	0.19	0.25	9
72	Uganda	5.6	0.01	0.08	598	26.5	-0.58	0.48	50.09	0.38	0.53	6
73	Ukraine	1.9	0.02	0.00	3570	21.7	-0.53	0.79	98.72	0.46	0.27	8
74	Uruguay	4.4	0.00	0.00	14167	21.1	0.82	0.71	53.34	0.18	0.19	10
75	Vanuatu	1.6	0.00	0.13	3275	28.4	0.24	0.60	97.87	0.12	0.60	8

76	Venezuela, RB	3.7	0.02	0.00	10755	23.9	-1.29	0.68	48.73	0.46	0.18	9
77	Vietnam	5.6	0.01	0.03	1543	30.9	-0.57	0.51	157.23	0.35	0.41	7
78	Yemen, Rep.	-1.8	0.00	0.02	1350	8.6	-1.27	0.34	62.94	0.15	0.37	7
79	Zambia	6.1	0.03	0.04	1636	31.8	-0.36	0.58	74.40	0.48	0.46	7
80	Zimbabwe	11.7	0.08	0.07	769	18.3	-1.55	0.50	86.95	0.60	0.51	7

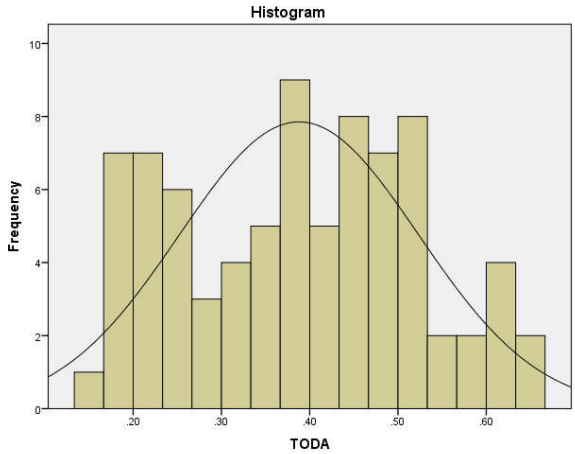
Appendix D. Normality Tests for Control Variables

Net Official development assistance (ODA) before transformation



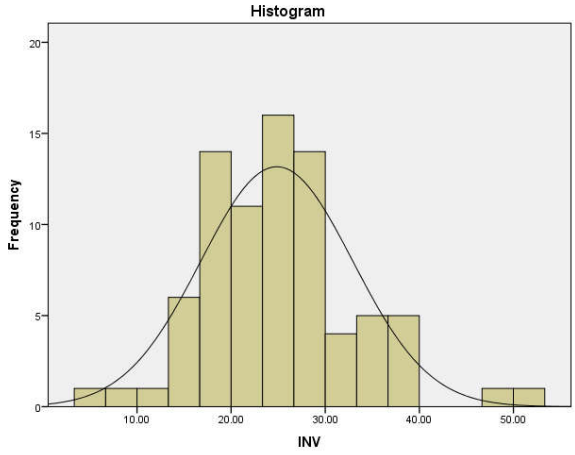
	Shapiro-Wilk		
ODA	Statistic	df	Sig.
	0.820	80	0.000

Net Official development assistance (ODA) after transformation (adding constant of 0.0008) and raise power to 1/4



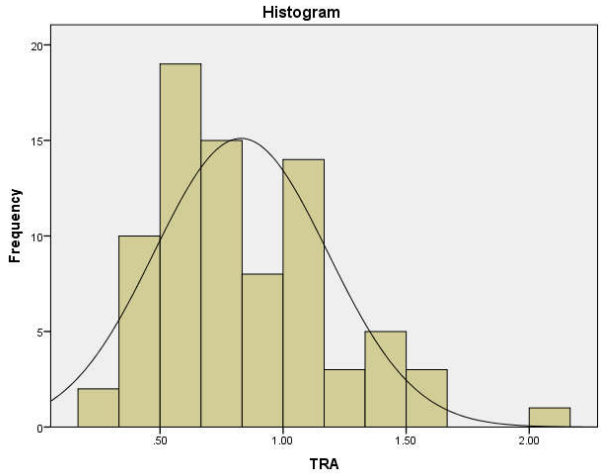
	Shapiro-Wilk		
TODA	Statistic	df	Sig.
	0.960	80	0.014

Investment (INV)



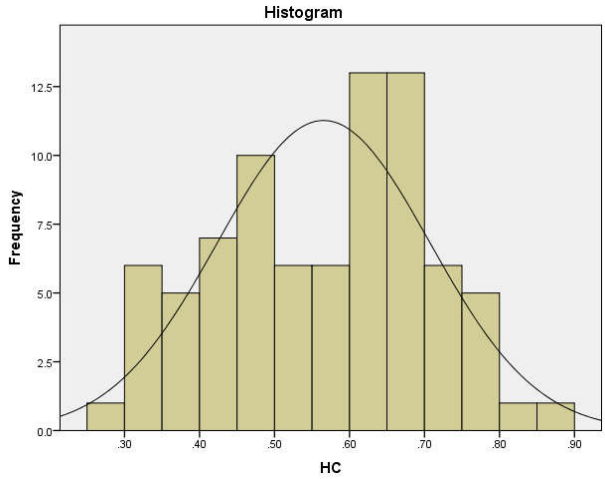
	Shapiro-Wilk		
INV	Statistic	df	Sig.
	0.962	80	0.018

Trade (TRA)



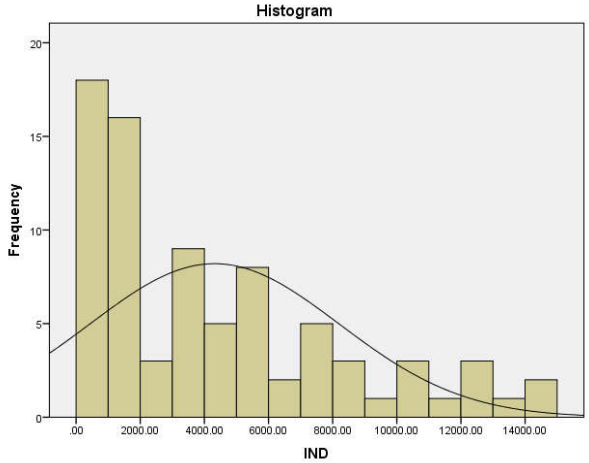
	Shapiro-Wilk		
TRA	Statistic	df	Sig.
	0.948	80	0.003

Human Capital (HC)



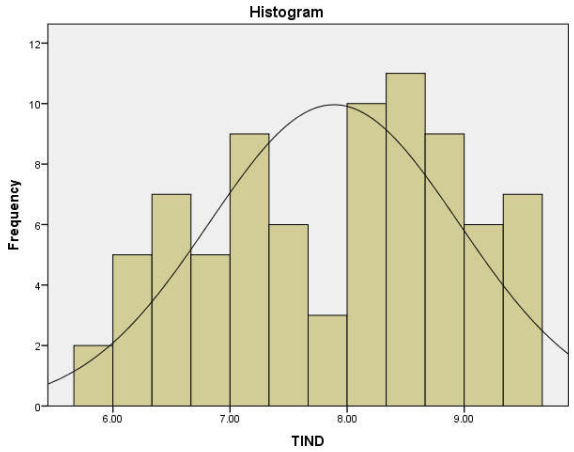
	Shapiro-Wilk		
HC	Statistic	df	Sig.
	0.969	80	0.052

The initial level of development (IND)



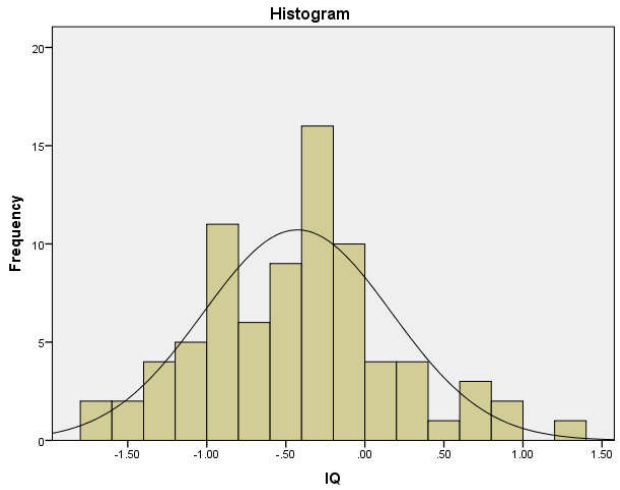
	Shapiro-Wilk		
IND	Statistic	df	Sig.
	0.864	80	0.000

The initial level of development (IND) after transformation (using natural logarithm function, i.e. ln GDP per capita)



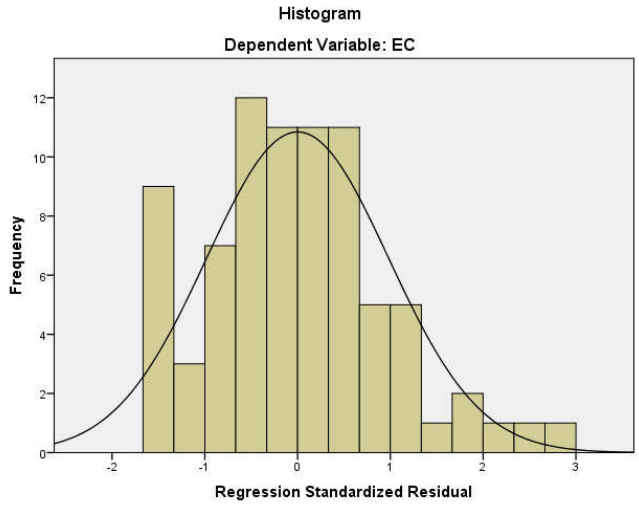
	Shapiro-Wilk		
TIND	Statistic	df	Sig.
	0.950	80	0.003

Institutional quality (IQ)



	Shapiro-Wilk		
IQ	Statistic	df	Sig.
	0.985	80	0.475

Appendix E. Test of Linearity, Normality of residuals and homoscedasticity for Model 2



Standardized Residual	Shapiro-Wilk		
	Statistic	df	Sig.
	0.970	80	0.057