An empirical analysis of international capital flows:

Implications for the BRICS New Development Bank (NDB)

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Abstract

In recent decades, economic globalisation with the emergence of the BRICS (Brazil, Russia, India, China, and South Africa) countries has attracted the world's attention. These countries have recently established a "New Development Bank (NDB)" to help the developing world and increase their own global effectiveness. For the purpose of providing policy suggestions to the NDB, this dissertation assesses the historical effects of foreign direct investment (FDI), foreign aid, and external debts on the economic growth of developing countries. The empirical evidence is derived from the panel data on 96 low to middle income developing countries over the 1991-2011 period. The Solow model is utilised based on multiple linear regression methods.

To provide more detailed policy indications to the NDB, the regression models are conducted aggregately for the whole sample and specifically for the countries with different income levels (low income countries [LIC], lower-middle income countries [LMIC], and upper-middle income countries [UMIC]). When considering the sample as a whole, the results include: (a).weak diminishing returns to scale exist; (b).capital stock, employment and FDI promote economic growth while total official development assistance (TODA) and total external debt (TED) do not; (c).multilateral official development assistance (MODA) reduces economic growth while bilateral official development assistance (BODA) stimulates the economy; (d).World Bank loans (WBL), IMF credit (IMFC) and other external debts (OED) have no significant effects on the economy. When considering different income levels individually, I find: (a). the LIC and UMIC are very likely to have constant returns to scale, while the LMIC tend to have diminishing returns to scale; (b).capital stock and employment are more important for the UMIC while FDI generates more benefits for the LIC and LMIC; (c).TED weakens the LMIC's economy; (d).MODA dampens the economy of the UMIC while BODA stimulates growth in the LMIC and UMIC; (e).WBL weakens the LIC's economy but benefits the LMIC, and IMFC harms the economy of LMIC.

Based on these results, I can say that probably, the establishment of the NDB is important for the LIC and LMIC to set foot on the track of growth. The policy implications are that if the NDB is established, it should: (a).invest and guide FDI flows into the LIC and LMIC, especially to the projects that increase capital stock; (b).learn lessons from as well as cooperate with traditional MODA agencies; (c).take over some functions from the WB and at the same time as cooperating with the WB; (d).cooperate with the International Monetary Fund (IMF) and make sure the funds have appropriate conditions attached and go to the right countries; (e).advise the UMIC to phase out MODA, IMFC and OED (while BODA and WBL tend to be wiser choices), and probably give them guidance on policies.

Although obstacles exist, the NDB is predicted to be a complement to the traditional MODA agencies and international financial institutions. I hope that the NDB with the traditional institutions could improve world economic governance and achieve their common goal to contribute to the growth of developing countries.

Chapter 1. Introduction

1.1 The era of globalisation and the BRICS countries

> Globalisation is restructuring the ways in which we live in a very profound manner. It is led from the west, bears the strong imprint of American political and economic power, and is highly uneven in its consequences. But globalisation is not just the dominance of the west over the rest; it affects the United States as it does other countries (Giddens, 1999, p.4).

In today's world, no country can be isolated from another. Different economies are becoming increasingly interdependent. The economic as well as financial activities such as international trade, foreign investment, foreign lending, and international aid have been widely expanded in recent decades (Carbaugh, 2011). According to the World Bank (WB, 2011), the world is in the midst of change, with emerging economies (China, India, Brazil, Indonesia, Russia, etc.) at the helm of the global economy, and playing increasingly prominent roles in the global business and financial markets. Consequently, along with globalisation, new world orders with multi-polarity (politically and economically) are now forming, and the diffusion of power in the international economy of emerging countries is turning out to be enormous. Figure 1 below illustrates the historical and forecasted shares of gross domestic products (GDP) of developing and developed countries calculated on purchasing power parity (PPP). The relative share of the developing economies increased from 37% to 55% in the first fourteen years of this millennium (2000-2013), and was predicted to increase further to 64% by 2023.

Figure 1. The distribution of global GDP in 2000, 2013, and 2023

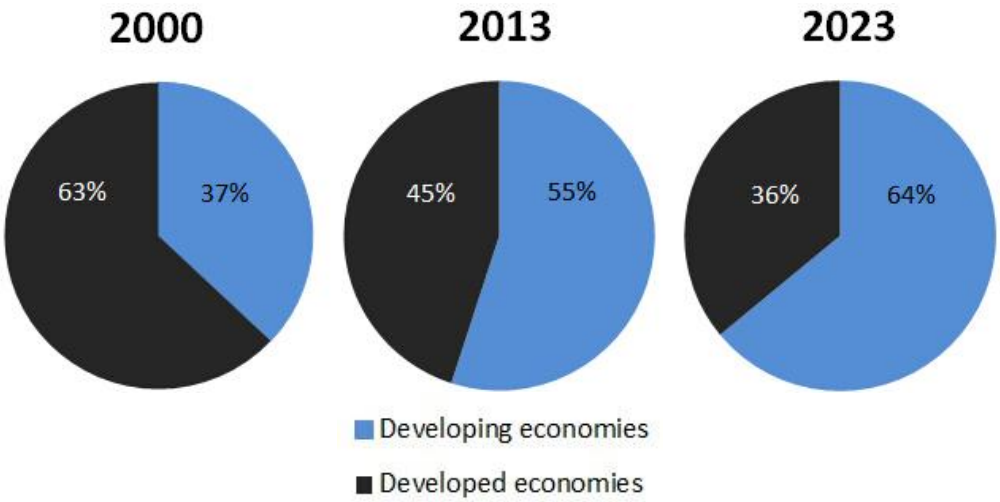


Figure 1. The distribution of global GDP (percent of total; based on PPP exchange rates) in 2000, 2013, and 2023. Copyright 2013a by the IMF. Reprinted with permission.

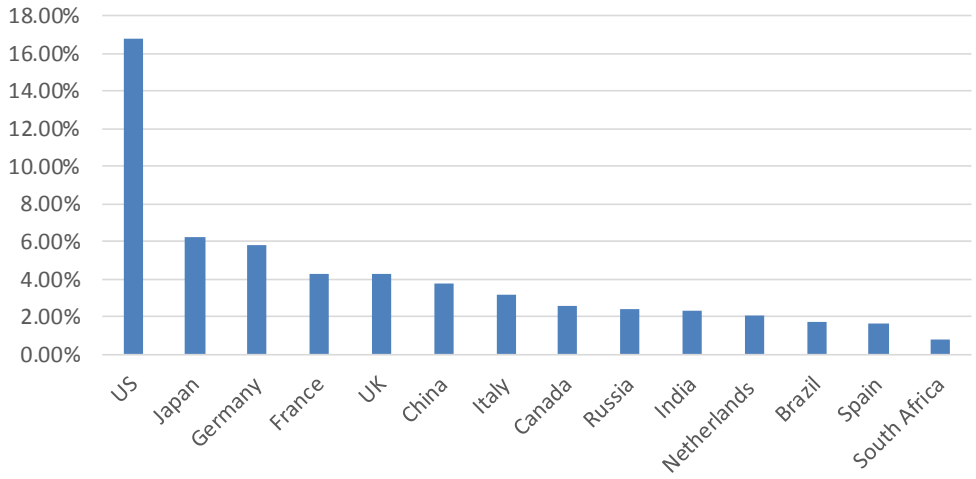
Brazil, Russia, India, China, and South Africa are five emerging countries which have large and increasing effects on their geographical areas and international affairs. The acronym of BRICs (excluding South Africa) was first introduced by O'Neill (2001), the Chairman of Goldman Sachs Asset Management. In the report *Building Better Global Economic BRICs*, he stated that the four large emerging countries' economies (Brazil, Russia, India, China) would experience a boom in the next few decades, because he believed that the purchasing power for China, India, and Russia currencies were underestimated, and the four countries' trade shares and roles would be improved. Of course, such predictions are based on certain conditions, such as same levels of

exchange rates, more consideration of purchasing power parity, and so forth. Even though this was just a prediction, since then the growth of BRICs (excluding South Africa) has attracted a large amount of attention from both the public and economists alike.

1.2 The BRICS New Development Bank (NDB)

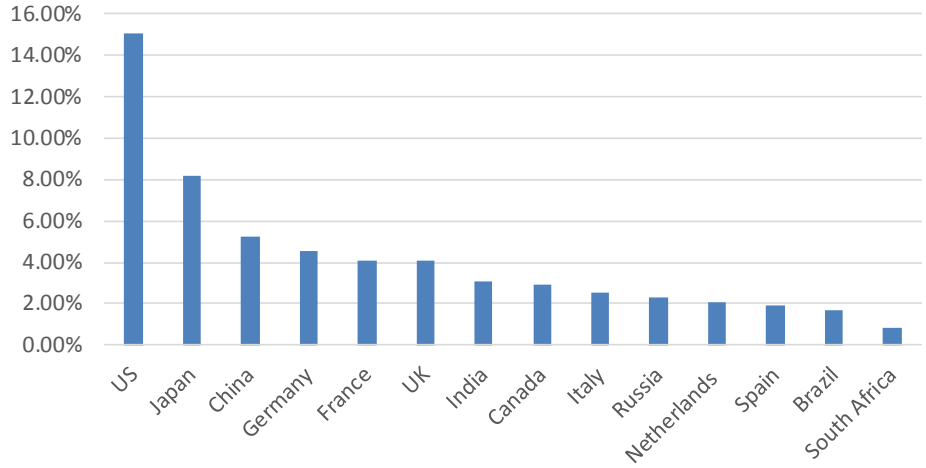
Although the concepts of BRICS were introduced in 2001, its first official meeting was not held until the 1st BRICs (Excluding South Africa) Summit in 2009. The summit invited South Africa as the fifth member country, and focused on improving the global economic situation and reforming financial institutions, and further agreed that the emerging economies must have a louder voice in the global economy as well as within financial institutions (the BRICs [excluding South Africa], 2009). After BRICS 4th Summit in March 2012, the five BRICS countries (Brazil, Russia, India, China, and South Africa) have already started to examine the feasibility and viability of establishing a development bank. In March 2013, the five countries agreed to the development of a new bank, which would not only provide funds to the five countries, but also support projects in other developing countries (the BRICS, 2013). Finally, in their 6th Summit in Brazil, the development bank is founded and names as New Development Bank (NDB), and its head quarter is located in Shanghai, China. The establishment of the NDB would result in the developing world having their own source of finance.

Figure 2. The IMF voting powers in 2014



Note: Adapted from http://www.imf.org/external/np/sec/memdir/members.aspx#R

Figure 3. The WB voting powers in 2014



Note: Adapted from http://siteresources.worldbank.org/BODINT/Resources/278027-1215524804501/IBRDCountryVotingTable.pdf

It has been argued that BRICS agreed to set up a development bank for the following two reasons: firstly, BRICS are frustrated with the IMF and WB's functioning and the slow pace of reformation in those two organisations. As shown in Figure 2 and 3, the voting powers of the IMF and WB are partial to the industrialised countries (This displayed WB voting power is for The International Bank for Reconstruction and Development [IBRD]), one of the main institutions of the WB. In fact, the IMF's voting power is determined by the country's quota, which is based on its relative position in the global economy (and each country's contribution to the IMF) and is calculated by its GDP, openness, economic variability, and international reserves; each country's power is changing over time. The recent adjustment became effective in 2011, which has strengthened the representation of dynamic economies, and the voting rights of many emerging countries have increased (the IMF, 2014b). However, this method of voting power allocation has been a controversial issue, and the reformation seems far from the expectation of the developing world, which will be discussed in Chapter 2. Although it might be "fair enough" to vote based on the contributions as is operating currently, the developing countries strive for "equitable voting power" ("Analysis of World Bank voting reforms", 2010). Secondly, BRICS are strong enough to have an impact on the global economy, and their independent studies and analyses find that the NDB is feasible and viable.

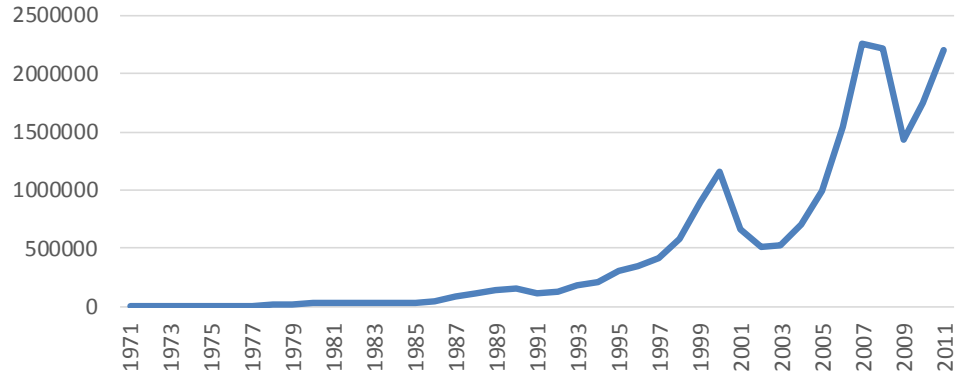
1.3 International financial institutions and capital flows

Since the United Nations Monetary and Financial Conference held in Bretton Woods in 1944, the IMF and WB have become the two main international financial organisations responsible for increasing member countries' standards of living. Their approaches are considered to be complementary. The IMF is primarily a cooperative institution that seeks to maintain an orderly financial system between nations, while the WB is a development institution whose missions are reducing poverty and promoting growth. The IMF focuses on macroeconomic issues (making short to mid-term loans, providing policy advices, giving technical assistances, etc.), and the WB concentrates on long-term economic development and poverty reduction (building schools and

hospitals, protecting environments, economic reformation, etc.) (the IMF, 2014c). By their declared functions, the IMF and WB are two institutions that frame international economic orders, and act as both agents for and resources of foreign aid and external debt[1] (Driscoll, 1996).

One of the key components of economic globalisation involving these institutions are international capital flows. According to Nkoro and Uko (2012), capital inflows are welcomed by the host country, because it is always seen as a catalyst for growth. This dissertation will consider foreign direct investment (FDI), foreign aid (here I consider official development assistance [ODA]), and external debt as they have tighter links with the international financial institutions. The WB (2014b) define FDI as "the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor" (para.1). For ODA, it refers to "government aid designed to promote the economic development and welfare of developing countries. Loans and credits for military purposes are excluded. Aid may be provided bilaterally, from donor to recipient, or channelled through a multilateral development agency such as the United Nations or the World Bank" (The Organisation of Economic Cooperation and Development, 2010, para.3). In respect of external debt, the WB (2014c) defined it as "the debt owed to non-residents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt" (para.1).

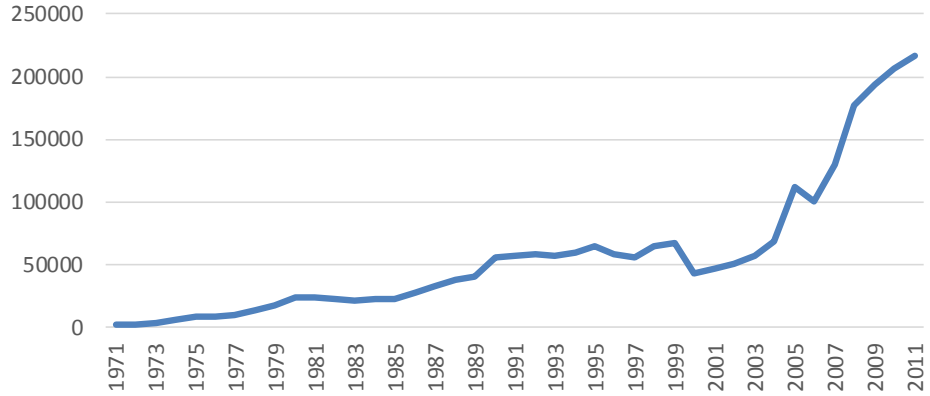
Figure 4. World FDI flows (constant 2005 US$ in millions) (1971-2011)



Note: Foreign aid here refers to official financial flows, which include both official development assistance (ODA) and total other official flows, while the data used in this dissertation will be ODA. Adapted from http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=88 Copyright 2013a by the UN. Reprinted with permission.

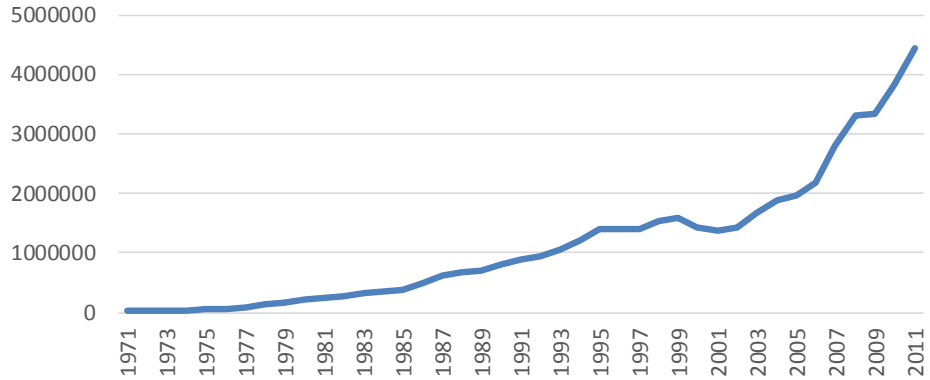
[1] Besides multilateral capital flows, there are bilateral (country to country) capital flows too.

Figure 5. World foreign aid (constant 2005 US$ in millions) (1971-2011)



Note: Adapted from http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=118

Figure 6. World long-term external debts (constant 2005 US$ in millions) (1971-2011)



Note: Adapted from http://unctadstat.unctad.org/TableViewer/tableView.aspx?ReportId=116

Figure 4, 5, and 6 illustrate the trends in world FDI[2], foreign aid, and long-term external debt inflows from 1971 to 2011. FDI and long-term external debts increased dramatically in the last four decades, although FDI seems to fluctuate. In addition, foreign aid is boosted. Therefore, it is obvious that international capital flows have increased dramatically in recent decades. But what is the blessing and curse of such flows? The OECD (2011) stated that increasing international capital flows is able to support long-term income growth through a better allocation of investment. But conversely, capital flows can make economic management difficult, as has been experienced by several emerging countries (Mexico in 1994, Argentina during 1998-2002, Southeast Asia during 1997-1998, etc.). Because shocks and risks (over-heating, credit, asset prices, abrupt reversals in capital flows, etc.) are also transferred faster and more directly, so the business cycle might boom or bust. Nkoro and Uko (2012) also estimated that the development experiences of many countries have not been satisfactory. Because there are both advantages and shortcomings

[2] Although FDI is not the main tool of the IMF and WB, one of the original intentions of the establishment of the NDB is increasing FDI flows, and there is also an organisation under the WB called Multilateral Investment Guarantee Agency (MIGA), which provides guarantees/insurances to promote foreign direct investment (the WB, 2014d).

of international capital flows, the impacts of FDI, foreign aid, and external debts on domestic economic growth have become a debate, which motivates us to conduct this dissertation.

Consequently, in such an international environment of a fast explosion of capital flows, the NDB needs to understand the historical economic effects of global capital flows, especially the flows led by the traditional international financial institutions.

1.4 Infrastructure financing in developing countries and the NDB

With the great amount of international capital flow, the developing countries seems having not met their needs in infrastructure financing. Bhattacharya, Romani and Stern (2012), many emerging markets and all low-income countries require a major step increase in infrastructure investment to alleviate growth constraints, and many projects were lacking of fund due to risks such as policy uncertainty and poor institution. They further figured out that a new development bank for Infrastructure and sustainable development could provide an additional channel through which developing country governments could finance the infrastructures. Johns (2014) also believed that there are very large unmet needs in the developing countries in infrastructure and sustainable development, and these countries actually have the savings and foreign reserves to fund a bank and a reserve pool. To satisfy the needs of the developing world, after the NDB was established, it has announced its plans to focus its lending on infrastructure and sustainable development (Hochstetler, 2014). Based on the claimed functions, the NDB is very likely to directly support the sustainable growth of the developing countries through providing more development assistance and external debt (direct influences). Additionally, as the declarations on the 5th BRICS Summit, developing countries are facing challenges of infrastructure development due to insufficient long-term financing and foreign direct investment (The BRICS, 2013). Thus, it is also very possible that the NDB would stimulate and guide FDI flows within developing countries (indirect influences).

1.5 Motivations of the study

In a time when there are rapid globalisation and multi-polarity, it seems that the emerging economies are becoming the source for the world's development. The amounts of FDI, foreign aid, and external debts have increased as well. If both of the above are in fact true, then the question that begs to be asked is why the global economic order is still very likely to be in the hands of Western countries. People are starting to doubt whether the IMF and WB are delivering the promised results, namely reducing economic gaps and promoting economic growth, because it seems that improper strategies, policies, and working methodologies have been utilised (Donlagic & Kozaric, 2010). As a result, "Increasingly, various forms of South-South Cooperation are emerging as an important trend and in some cases a strategy to limit the influence of northern donors and Bretton Woods Institutions on developing countries" (Alpízar, Clark, Pittman, Rosenhek, & Vidal, 2010, p.14). Now, five representatives of the emerging economies (Brazil,

Russia, India, China, and South Africa) have established a new bank (the NDB) for the purpose of more effectively helping developing countries.

1.6 Research questions and proposed methodology

Given the above, this dissertation aims to provide policy suggestions to the NDB in helping the economic growth in the developing world. This will be determined by both a theoretical literature review as well as an empirical model which will test the effects of FDI, foreign aid and external debts on economic growth. As a result, detailed policy implications can be provided to the NDB.

There are two research questions:

- Whether and to what extent the developing world benefits from FDI, foreign aid (bilateral and multilateral aid) and external debts (from the IMF and the WB) under the current order mainly ruled by Western countries
- What does these situations mean to the establishment and also the future operations of the NDB?

Because the NDB has just been founded and there is no data available yet, I do not have any measurement tool to assess their potential success. Nevertheless, by analysing the empirical outcomes together with reviewing the literature, the policy implications will still be inferred.

1.7 Structure of the dissertation

This dissertation consists of six chapters. Chapter 2 will constitute the literature review, which will include summaries of both the theoretical and empirical studies of the BRICS countries as well as the NDB; critiques of the IMF and WB; the relationships between FDI, foreign aid, and external debts and economic growth. In Chapter 3, the data and methodology will be discussed. The empirical results obtained through running economic models will be interpreted statistically in Chapter 4, which will include the outcomes derived from both overall (all of the sample countries) and specific (categorised by different income levels) datasets. Chapter 5 will provide a detailed discussion on the implications of the outcomes as well as provide policy suggestions to the NDB. Some extensions based on the results and the potential challenges of the NDB's operation will also be discussed. Finally, Chapter 6 will conclude this dissertation, state the limitations of this dissertation, and provide suggestions for future research.

Chapter 2. Literature review

2.1 The BRICS countries

Since O'Neill's report published in 2001, the growth of BRICs (excluding South Africa) has attracted the attention of both the public and economists alike, because these countries were thought to become the main contributors to the world's future economic growth. There are many studies focusing on the growth of BRICS. Purushothaman and Wilson (2003) found that the BRICs (excluding South Africa) would by 2050 be among the top 6 economies, which would also include Japan and the US. O'Neill, Purushothaman, Stupnytska, and Wilson (2005) showed that the growth of BRICs (excluding South Africa) was faster than forecasted. Since then, instead of seeking reliable policies to promote output growth, many studies focused on predicting or assessing the predictions made by other researchers on the economic growth of BRICS (Armijo, 2007; Cheng, Gutierrez, Mahajan, Shachmurove, & Shahrokhi, 2007; Almeida, 2009; Koch, 2011).

After 2010, a new trend of studies emerged, which focused on the BRICS' growth patterns and domestic policies. Goel (2011) found significant within-group differences: China and Russia (mainly product manufacturer or fuel exporter) showed higher growth, while the economic performance of India as well as Brazil (mainly agricultural exporters) was not outstanding. To ensure the future growth of the BRICS countries, the Center for WTO Studies (2012) advised these five countries to sign trade agreements, promote investment, and build skills and capacities. Cormier (2012) implied that these countries needed to consider democratic freedoms as well as human rights. Similar conclusions were made by Bird et al. (2013); they believed that BRICS needed to encourage "the access to assets, investment in productive activities, social transfers, and political economic context where inclusion is a priority" (p.5). Besides, the study of Schrooten (2011) on Human Development Index suggested BRICS fight against absolute poverty, expand education, and promote health care. Azzarello and Putnam (2012) figured out that the BRICs (excluding South Africa) needed to stabilise their financial markets, appreciate their currencies, and attract more foreign capital. In general, it could be seen that the BRICS countries should launch proper policies and deepen the cooperation within the group.

A second stream of research concentrated on the role BRICS play in the international re-ordering, which would be the guiding ideology of this dissertation. Laidi (2011) demonstrated that BRICS formed a coalition of sovereign state defenders, but these countries were not anti-Western purposely; they just affirmed their independence of judgement in economic and social affairs in the world of globalisation. Niu (2012) also concluded:

> The BRICS group is not aimed as a counterbalance to the established western powers but rather seeks to pursue a more effective or equal interaction with them to build a better world order for humanity…However, the BRICS should find a clear and common approach considering their great potential to influence global issues (p.6).

From the perspectives of Laidi (2011) and Niu (2012), the relationship between BRICS and the Western world tends to be complementary rather than competitive. But BRICS have the potential to change the world. The International Monetary Fund (IMF, 2011) detected the influences of the BRICs (excluding South Africa) on low income countries and implied that although the Organisation for Economic Co-operation and Development (OECD) countries were still the

dominant powers, the BRICs (excluding South Africa) countries were starting to re-shape the low income countries' international economic relations, from the aspects of trade, foreign direct investment (FDI), development assistance, short-run cycles, as well as the growth in the long run. Similar conclusions were made by Mlachila and Takebe (2011). They found that the impacts of the BRICs (excluding South Africa) countries' investments in low income countries were not only greater than the published data, but were also expanding and promoting development significantly. Knoblauch, Knoke, Morazan, and Schafer (2012) stated that BRICS were emerging protagonists in development cooperation and affecting the developing countries through FDI, aid, and so forth. Despite BRICS not being a homogeneous alliance, the impacts of BRICS on low income countries' economies increased. They said: "BRICS are causing changes in the architecture of international development cooperation, not only with regard to trade and financial flows but also as emerging donors" (p.6). Kumar (2013) demonstrated that BRICS should cooperate to reform the international financial and monetary system, and predicted that the landscape of the world economy would be changed along with the fall of US dollar. Botis (2013) also emphasized that even though the emerging countries sometimes were not performing well in terms of controlling inflation and unemployment, they would continue their rapid growth. From a historical perspective, Armijo and Roberts (2013) stated that the BRICS would play significant roles in the global shifts in material capabilities, international influence, voting imbalance, and reformation and evolution.

As a summary, I quote this statement by Leavell, Maniam, and Nelson (2013): "The BRICS are a significant portion of the world economy, and expected to play increasingly important roles in the new global market" (p.137).

This review shows that it is obvious that the BRICS nations need to cooperate for the further step if they want to increase the volume and extend of their voice internationally. In reality, during their 4th Summit, the BRICS (2012) moved a pace further to consolidate their economic power as a group by agreeing to set up a new development bank "for mobilizing resources for infrastructure and sustainable development projects in BRICS and other emerging economies and developing countries, to supplement the existing efforts of multilateral and regional financial institutions for global growth and development" (para.13).

2.2 The studies on the New Development Bank (NDB)

There are two possible reasons that the BRICS countries want to establish a development bank. Firstly, the BRICS countries would prefer to spread the economic clout of the developing countries' to the global economy (Kirton & Larionova, 2012; Pasumarti, 2013). However, according to Smith (2013) and Figure 2 and 3 in Chapter 1, the two largest financial organisations in the world – the IMF and the World Bank (WB), are still dominated by the Western world. Furthermore, many researchers criticised both the IMF and WB for not performing their roles well enough in helping the countries with economic gaps and maintaining their long-term economic growth and development, reducing poverty, or protecting the countries from the financial crisis (Ismi, 2004; Donlagic & Kozaric, 2010; Fragkos, Frangos, & Valvi, 2012). Although researchers believed that

the reforms of the IMF and WB structure were necessary and the voting powers of emerging economies needed to be increased ("Reshaping IMF and World Bank: Meltzer Commission Report", 2000; Buira, 2003; Chaudhry, Kelkar, & Yadav, 2004; Linn, 2009; Leech & Leech, 2009; Gangopadhyay & Kala, 2012), the pace of the reform was slow, and the BRICS countries were frustrated with it (Coleman, 2013). Secondly, the BRICS countries were seen as large in terms of their economies, and they believed that developing countries had insufficient financing, especially FDI. These five countries started to examine the possibility and necessity of setting up a new development bank for resourcing development projects in developing countries in 2012, and found it was feasible and viable (Pasumarti, 2013; the BRICS, 2013).

Subsequently, in their fifth summit held in 2013, the leaders of BRICS have pledged to endow the NDB with an initial (up to) US$50 billion. This bank is designed to meet the financial needs of developing countries within and outside the five BRICS states, together with a foreign exchange reserve pool of US$100 billion and a virtual secretariat. The NDB would present an alternative solutions to the Western-dominated global banking system - the IMF and WB. It would provide a collective foreign reserve and a fund for financing developmental projects in order to address the needs of emerging and poor economies ("New BRICS Bank to rival World Bank, IMF", 2013). Recently, in July 2014, the leaders of these five countries agreed to officially inaugurate the NDB, and the initial aggregate contribution had been double to US$100 billion, with another $100 billion reserve pool.

But, from the moment that the concept of the NDB was introduced and the NDB was formally build, only limited data has been made available. This means that there are no empirical studies to date investigating the impact of the bank. Nevertheless, I can still obtain some working papers that focus on the NDB theoretically. Iqbal and Vargas-Hernández (2013) stated that in order to make the NDB a reality, these five countries needed a clear rationale and a high degree of trust with each other because there would be disturbance from the outside, especially from the developed countries. O'Neill (2013) figured out that practically, over agreed periods, the development bank should set country-by-country targets for improving the performance of governance, education, and modern technology since these three areas were believed to be the organising principles to guide capital allocation. In terms of the intentions, Simha (2013) listed five reasons as well as functions for the rationale operation of the NDB: (a).an idea of whose time had come (the gravity of the world economy is moving from the North to the South); (b).channelling the liquidity of export earnings and foreign reserves (because the BRICS countries have huge export earnings and foreign reserves, even though just a small proportion of this money goes to the NDB, the fund would be viable and helpful for emerging and poor countries' development projects); (c).detoxifying global banking system (the current system lacks transparency and probably lead to problems such as corruption. However, the NDB could try to change the way conducted in international financial institutions through a more transparent system); (d).providing a new growth model to the world (the Western dominated banks concentrate on their own interests and do not understand what in fact the developing countries need, but the NDB is expected to help in the infrastructure challenges faced by developing countries with better understanding of these countries as well as focusing on solving the problems); (e).BRICS' policy

as examples (the rise of the BRICS not only offers hope, but also valuable policy lessons for developing countries [promoting education, urbanisation, manufacturing, etc.]).

With regard to the operation of the NDB, Pasumarti (2013) and Spratt, Watson, and Younis (2013) believed that to make the NDB work effectively, four conditions must be met. Firstly, the NDB should continuously focus on domestic growth and stability. Secondly, the NDB should deepen the engagements in multilateral forums and regional trade forums. Thirdly, the policies of the NDB should be aligned with sustainable development and other global public goods debate. Finally, the NDB should promote transparent and democratic bank governance. De Brito (2013) outlined the characteristics and potential policy directions of the NDB:

> BRICS Bank is yet to be established not only as a set of choices on its conception of development, but also as an institution capable of changing international economic governance…It was possible to see a project of reform of the IMF and the World Bank based on a discontentment with the maintaining of some of their original features that purportedly excluded less developed countries. The BRICS Bank project arises as a possibility of a concretization of this inclusion (p.10-11).

Dube and Singh (2013) summarised that the NDB would be expected to "fund development and infrastructure projects in developing countries; promote sustainable development; facilitate increased trade and trading opportunities; and offer support to the social development sectors" (p.25). Littlejohns (2013) believed that the priority for the BRICS countries was to invest in the health sector (global access to affordable medicines and health commodities) because it was considered to be the wisest investment in improving the quality of human capital. From a global perspective, Saran, Sharan, and Singh (2013) launched a full-scaled analysis based on the five countries' trends of cooperation and the major issues and concerns. Their suggestions to the NDB included but were not limited to: launching equitable voting rights and each country contributing with a cap as a percentage of total contributions (to balance the power), allowing the participation of all developing countries, and accepting convertible assets (such as gold) to be guarantees. Karackattu (2013) advised that in order to improve the efficacy of the NDB, it should establish conditions that include safeguards and covenants that apply throughout the borrowing period and towards repayment as a supplement to policy adjustments. The NDB should act as an economic engine of the other emerging markets and the whole developing world.

What is the mission of the NDB? Karackattu (2013) concluded that in the short term, the BRICS countries should practically set up the bank. The medium-term goal would be financing economic development, increasing the employment level, and promoting urbanisation. Reisen (2013) also showed his support for the NDB by listing some missions: "a new BRICS bank would help close infra-structure gaps, support the process of global in-come convergence in favour of poor countries, finance global public goods, reduce international current-account imbalances, and direct abundant central bank liquidity into productive uses" (p.3).

With this being said, there still remain obstacles to overcome for the establishment and operation of the NDB. Beausang (2012) pointed out that if BRICs (excluding South Africa) did not solve the problems of authoritarian rule and inequality, their global influence as a group would not last long. Iqbal and Vargas-Hernandez (2013) were worried about China being the dominant power of the new bank, just like the US in the IMF and WB. A similar concern was expressed by Spratt et al.

(2013): “the limited scope of business and diplomatic relations between the BRICS beyond China hinders their ability to create a common development agenda” (p.1). Regarding the management of the NDB, Pasumarti (2013) summarised and explained several barriers as well, which included: (a).geopolitics (China, with both India and Russia were geopolitical competitors in Asia); (b).divergent economic interests (the BRICS group was economically incoherent. Russia was already a high income country, while India was still in the low income group); (c).the problems of voting rights and contribution (if the member countries contributed and voted proportionally, China would dominate; if the members contributed and voted equally, there might not be enough funds); (d).insufficient ideological coherence (Brazil and India were both vibrant democracies, whereas Russia, China, and South Africa were de facto or de jure one-party states); (e).the problems of infrastructure development (the investors/donors/lenders might affect the organisation in problematic ways, such as pollution); (f).undermining by the West (developed countries would want the IMF to remain the dominant global crisis-beating institution, so that they could still influence the world economy).

2.3 Criticisms of the IMF and WB

For the purpose of ultimately answering the research questions, it is important to understand the critical voices towards the IMF and the WB.

According to the IMF (2014c), the IMF and the WB are two institutions of the United Nations (UN) system, which were created in Bretton Woods, the US in 1944, with the initial goals of founding a framework of global economic cooperation and development. Although these goals remain as the core of both the IMF and the WB, their work involves reacting according to new economic developments and challenges. The IMF promotes financial cooperation and gives policy advice and technical assistance to countries for the purpose of building and maintaining strong economies. It also provides short and medium-term loans to the countries that cannot meet the demands for international payment. On the other hand, the WB promotes long-term economic growth and poverty reduction by providing financial and technical assistance and policy suggestions to help countries reform particular sectors or launch projects. These two organisations have ongoing high-level coordination, management consultation, and staff collaboration. However, along with the IMF and WB’s operations, there are two main streams of criticism made towards them in recent decades, which include both governance (internal) and functioning (external).

From the internal point view, researchers believe that the governance especially regarding voting power is highly biased towards the Western countries, especially the US. The US has a 16.75% voting share at present in the IMF; since numerous matters require decisions to be taken by a supermajority of 85%, this means that the US is the only member that possesses a veto (Leech & Leech, 2012). The reason for such imbalance is that the current IMF and WB voting rights are calculated based on each country’s relative position in the global economy, as well as their contributions. As a consequence, the developing countries claim that this allocation is unfair and

argue for more rights. For more information, please refer to the IMF (2014b) and "Analysis of World Bank voting reforms" (2010).

Thacker (1999) utilised the logit model on the IMF loans received by developing countries over the 1975-1994 period. He suggested that although multilateral organisations had enhanced roles in developing countries, the structure of the context was still shaped by and profitable to the industrialised nations. If a country's international political space moved towards the US, it would be much easier to receive loans from the IMF; unfortunately, the IMF was a multilateral channel for the US to punish enemies and reward friends because the IMF was extremely sensitive to the political pressures from its most powerful member. Woods (2000) demonstrated that the IMF and WB faced the challenges to be more acceptable in their governance, with more balanced powers and more emerging stakeholders, because such institutions have a universal character and identity. Stiglitz (2003) also speculated that the problem with the IMF was its governance. It did not allow discussions of global economic architecture among all affected parties; he also argued that the world was coerced to let the people who made the crisis cure it. Leech (2002) made more direct policy suggestions:

> Firstly, the American insistence on setting the special majority requirement so high as to retain its own blocking power is not only damaging the effectiveness of decision making within the IMF itself but is also counter-productive in reducing the influence of the United States as a member, in terms of formal voting power. Secondly, votes should be allocated to individual members instrumentally to achieve the required distribution of voting power (p.27).

Chaudhry et al. (2004) generalised about the benefits of reforming the IMF's voting powers, which included both addressing the current imbalance between emerging countries and developed countries, and creating a more "contestable market" for voting power with more effective cooperation. On the other hand, Gianaris (1990) contended that an equitable voting system would not perform as efficiently as a weighted voting system in the IMF and WB, because the developed nations with the majority of capital and power are far more willing to participate. Hence, the contribution of capital might be a key controversial issue in terms of the reform of voting rights. Nevertheless, it is a fact that the voting powers at the IMF and WB are highly concentrated, with 10 countries controlling more than 50% of the voting shares in each organisation. Also, the US is the only country that is able to unilaterally veto major IMF decisions with a voting share of 16.75% (when 85% majority is required) (Weiss, 2013).

By descriptively surveying the indicators (trade, population, gross domestic product [GDP], etc.) with current quotas, Rapkin and Strand (2006) inferred three possible reform proposals for the IMF: (a).increasing the basic votes (the current basic vote is 5.502%, and the voting share is derived from this percentage, but largely depends on a country's relative position in the global economy [GDP, openness, economic variability, and international reserves]); (b).switching to use purchasing power parity (PPP) GDP when calculating the quota; (c) adopting a double majority voting system (passage of a resolution requires the support of a majority of both states and weighted votes). In regard to the WB, a formula that reflects democratic principles and the WB's development mandate needs to be reasoned out to reform the voting rights as well ("Analysis of World Bank voting reforms", 2010).

From an external perspective, researchers argue that the IMF and the WB do not function effectively and efficiently. Firstly, these two organisations force developing countries to accept the Structural Adjustment Programmes (SAPs)[3] together with the assistances, and concerning this, the critical voice has never stopped.

Easterly (2003) found that the SAPs reduced poverty less than what would be expected, and the reasons were probably corruption, strict conditions over the assistances, poor knowledge of the recipients, and so forth. Oberdabernig (2010) questioned the SAPs. He compared the countries which launched this programme with the ones that did not, and found that this programme increased poverty more severely. For the reasons why the SAPs failed, Heidhues and Obare (2011) summarised: "SAPs paid insufficient attention to the social dimension of development and to the institutional weaknesses of developing countries" (p.55).

Secondly, the effectiveness of IMF and WB as stabilisers when reacting to budget deficits and government[4] and financial crises was in doubt. John and Knedlik (2011) found three problems with the Flexible Credit Line (FCL)[5] and International Lender of Last Resort (ILOLR)[6] introduced by the IMF, which were inducing higher financial risks and the problem of moral hazard, high prerequisites for the FCL, and the slow pace of complementary reforms. Dreher and Gassebner (2008) selected 90 developing countries, and reasoned that government crises were more likely to occur as a consequence of the IMF and the WB's intervention during the period of 1970-2002. Muchhala (2011) summarised the misleading effects of the IMF financial crisis loans. He argued that it was wrong to just focus on "macroeconomic stability" and "tightening fiscal and monetary policy" because such policies would harm the poor and unemployed, as did the business cycle. Fragkos et al. (2012) empirically tested the roles of the IMF and WB in the Russian and East Asian crises, and found that these two organisations failed to contribute to stability and growth, and both promoted financial instability. Additionally, Janssen (2010) predicted that the 2010 Greek rescue package to save its economy, which was jointly designed and implemented by the IMF and the European Commission, would lead to an even higher debt burden in the country. He thought that employments together with economic growth would be sacrificed, because nothing except the ownership of the debt (from Greece sovereign debt to European government debt) was changed[7].

[3] According to the World Health Organisation (WHO) (n.d.), Structural Adjustment Programmes (SAPs) are "economic policies for developing countries that have been promoted by the World Bank and International Monetary Fund (IMF) since the early 1980s by the provision of loans conditional on the adoption of such policies. Structural adjustment loans are loans made by the World Bank. They are designed to encourage the structural adjustment of an economy by, for example, removing 'excess' government controls and promoting market competition as part of the neo-liberal agenda followed by the Bank. The Enhanced Structural Adjustment Facility is an IMF financing mechanism to support of macroeconomic policies and SAPs in low-income countries through loans or low interest subsidies" (p.1).

[4] Dreher and Gassebner (2008) defined government crisis as "any rapidly developing situation that threatens to bring the downfall of the present regime, excluding situations of revolt aimed at such overthrow" (p.5-6).

[5] According to the IMF (2013b), The Flexible Credit Line (FCL) is "designed to meet the increased demand for crisis prevention and crisis-mitigation lending for countries with very strong policy frameworks and track records in economic performance" (p.1).

[6] According to the Cambridge Dictionary Online (n.d.), a lender of last resort refers to "a central bank or international organization that lends money to banks or countries in difficult financial periods when they cannot borrow from anywhere else" (para.1). For more information, please refer to Giannini (1999).

[7] Eventually, the prediction came true: according to the data obtained from the WB (2014e) and the WB (2014f), the growth rate of Greece was -4.9% in 2010, -7.1% in 2011, and -6.4% in 2012; while the unemployment rate was 12.5% in 2010, 17.7% in 2011, and 24.2% in 2012. However, I could not identify that what caused the poor economic performance of Greece, because there might be numerous reasons such as the government did not follow the advice of the IMF.

Lastly but very importantly, many studies concluded that the IMF and the WB failed to pursue their initial mission of reducing poverty and promoting growth. Bello (2008) focused on the IMF and the WB's impacts on the agricultural sector. He argued that these institutions changed Mexico and the Philippines (countries with existing strengths in agriculture) from food exporter to importer. The farmers in these countries were made to become "consumers" of costly seeds and chemicals, regardless of the fact that they were social and cultural producers. Furthermore, the Actionaid International Kenya (2009) encapsulated the negative effects of the IMF policies towards education, health, and women's rights, such as brain drain, reduction of education enrolment, less female employment, and so forth. Several issues were listed regarding the problems of IMF policies, for example, governance, transparency, short-term stability and long-term growth, negative effects of SAPs, and ultra-low inflation and deficit targets. Concerning the impacts on economic growth, Easterly (2001) argued that many countries did not make a good use of the loans due to the policy makers being coalitions representing different factions and the aid being improperly allocated from the point view of efficient policy. He also pointed out that it was a paradox that aid was increasing under poor policies, and decreasing as policies improved. Barro and Lee (2005) collected the data of 130 countries from 1975 to 2000. Through utilising regression models, they found that a higher IMF loan-participation rate reduced economic growth; they suggested that countries should not get involved in the IMF programmes if it was unnecessary. Easterly (2005) also estimated that structural adjustment loans (loans with SAPs) failed to promote growth. Based on the Solow neoclassical growth model[8], Butkiewicz and Yanikkaya (2005) compared the lending activities between the IMF and the WB in 100 developing countries; after considering both current and lagged variables, they proved that the WB lending stimulates growth, while the IMF lending had neutral or negative impacts. Similarly, Dreher (2006) conducted a study on the IMF projects, loans, and economic growth. Through regression models with empirical data of 98 countries from 1970 to 2000, he drew the conclusion that the IMF programmes reduced growth rates and there was only weak evidence showing that compliance with the conditions mitigated the negative effects. Furthermore, the IMF loans could not lead to output growth.

Donlagic and Kozaric (2010) completed a comprehensive survey on the criticisms of the IMF and the WB. They summarised clearly that the IMF: (a).did not ensure funds to countries faced with economic problems; (b).had become too broad and preoccupied with adapting politics to global changes (focusing more on financial freedom and stability rather than employment and domestic consumption); (c).did not take actions to fight poverty and wealth disparity; (d).was not capable of conducting control and regulation of monetary policy; (e).reflected the power of industrialised developed countries and multinational corporations; (f).was too loyal to neoclassical economic doctrine (market economy and free trade); (g).had management problems (lack of transparency, responsibility, democracy, etc.); (h).forced the countries to accept strict conditions on the loan usages. In addition, the WB: (a).launched ineffective projects; (b).utilised bureaucracy; (c).forced the countries to accept strict conditions on the loan usages; (d).lacked transparency when making decisions; (e).was not presenting democratic principles; (f).was not responsible to any parliament

[8] This model will be discussed in details in Chapter 3.

or democratic institution; (g).had the problem of corruption, lacked developing countries' participation, and reflected the power of industrially developed countries; (h).distorted the physical and social environment.

To summarise the current situation of the IMF and the WB, Birdsall (2012) claimed:

> The IMF and the World Bank suffered a loss not only of legitimacy (and that for many reasons, not just governance) but also of relevance, as rapid growth and their easy access to private capital reduced dramatically the borrowing of the big emerging markets and other developing countries…By 2008, Turkey was the only major IMF borrower. The World Bank remained active in low-income countries but was becoming more of an aid agency, heavily reliant on contributions from the traditional Western donors for its activities in those countries (p.14).

However, some studies found that the IMF benefited the economy. By utilising General Evaluation Estimator (GEE)[9], Dicks-Mireaux, Mecagni, and Schadler (2000) concluded that the IMF programmes affected output growth positively. Through conducting regression analysis on the data of 130 countries over the period 1975-2003, Ramos (2008) figured out that the involvement of the IMF appeared to reduce the probability of future currency crises.

Even though there are numerous criticisms as well as some supporters of the functioning of the IMF and the WB, it is quite difficult to find an answer to the question of whether they have positive or negative impacts, as I cannot observe the outcomes that would have occurred in the absence of their interventions to in a particular country.

Since this dissertation will mainly focus on the effects of FDI, foreign aid, and external debts under the current order dominated by the Western countries, and further provide policy implications for the NDB, I will not make efforts to judge the governance and specific policies of the IMF and the WB. What one needs to be aware of here is that the developing countries might need another international financial institution that "functions better" in promoting economic growth. Next, I look further into the studies on international capital flows and economic growth.

2.4 FDI and economic growth

Despite the fact that many countries have eased the restrictions on FDI after the 1980s (the WB, 1997), it is still in doubt whether or not the inflow of FDI stimulates economic growth[10].

A great number of researchers found positive results, and I will analyse the impacts of FDI in the developing countries located in various regions. In terms of Africa, Ndambendia & Njoupouognigni (2010) found that if focusing on 36 Sub-Saharan African countries, FDI would promote growth. A larger sample group of 43 African countries were tested by Juma (2012), and he found that FDI had positive and significant impacts on growth in the long run. There are also many researchers attempted to analyse the relationship between FDI and economic growth by using co-integration and/or Granger Causality test. "The concept of co-integration can be defined as a systematic co-movement among two or more economic variables over the long run" (Yoo, 2005). According to

[9] For more information, please refer to Goldstein and Montiel (1986).
[10] Since there are few recent researches conducted towards the effectiveness of the Multilateral Investment Guarantee Agency (MIGA), an institution of the WB whose role is to promote FDI, I will not discuss it in this dissertation.

Engle and Granger (1987), if X and Y are both non-stationary, we would expect that the linear combination of them would be a random walk. However, the particular combination of these two variables Z =X-bY might be stationary. Thus, if this characteristic is true, then we are able to demonstrate that X and Y are co-integrated. This long-run equilibrium might presence among non-stationary variables. For more information, please refer to Engle and Granger (1987). In terms of Granger Causality, "Y is said to 'Granger-cause' X is and only if X is better predicted by using the past values of Y than by not doing so with the past values of X being used in either case" (Mandal & Roy, 2012, p.425). According to Engle and Granger (1987), the definition of Granger Causality should be based on the assumption that X and Y are stationary time series. For more information, please refer to Granger (1969) and Engle and Granger (1987). In respect to East Asian countries, by launching co-integration and Granger Causality tests on the data of China from 1985 to 2003, Du and Zhao (2007) concluded that co-integration existed, and FDI spurred growth in the long run. Similar results were drawn by Mandal and Roy's (2012) study on 10 Asian countries[11] and Ray's (2012) study on India. Hsiao and Won (2008) employed a Granger Causality test as well, and focused on the panel data of seven East Asian fast growing economies[12] from 1981 to 2005. They concluded that as a whole, FDI led to economic growth in these economies. Mutascu and Tiwari (2011) collected the data of 23 Asian countries from 1986 to 2008 and ran panel data regressions. They found that both FDI and export have a positive relationship with output growth, while FDI's role is less important than export. For Mid-East and West Asia, Al-Iriani and Al-Shamsi (n.d.) detected the relationship between FDI and the growth of the Gulf Cooperation Council[13] (GCC) countries. A strong bi-directional link was derived. Arsoy's (2012) study on Turkey estimated the same results by taking total factor productivity (TFP) into consideration. In regard to Latin America, Bengoa and Sanchez-Robels (2003) selected 18 countries, and a positive long-run co-movement was found. Besides focusing on individual countries or regions, there were as well other researchers who launched analyses based on the data collected inter-continentally. Hansen and Rand (2006) analysed 31 developing countries in Africa, Asia, and Latin America. By utilising a co-integration test, they found that FDI spurred growth. Dabla-Norris, Honda, Lahreche, and Verdier (2010) pointed out that for mid and low income countries, growth was increasingly associated with higher FDI inflow. Borensztein, De Gregorio, and Lee (1998) found that 46 out of 69 developing countries were benefiting from FDI. Li and Liu (2005) found that from 1985 onward, FDI started to influence growth. When interacting with FDI, both human capital and technology progress play crucial roles in developing countries. Kasibhatla, Khojasteh, and Stewart (2008) chose US, UK, Mexico, China, and India as representatives, and found the existence of long-term equilibrium, and FDI inflow had a bilateral relationship with economic growth in all these countries except India. Kyrkilis and Moudatsou (2011) estimated that in the European Union (EU) and Association of Southeast Asian Nations (ASEAN), Finland and Indonesia were the only two countries where inward FDI causes growth, but in the long run all EU and ASEAN countries were benefiting from FDI. Craigwell, Freckleton,

[11] These include China, Hong Kong, India, Indonesia, Japan, Malaysia, Philippines, Singapore, and South Korea.
[12] These include South Korea, Taiwan, Singapore, Malaysia, Philippines, Thailand, and China.
[13] These include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

and Wright (2012) focused on 42 developing countries and 28 developed countries for the period 1998-2008. Through regression analysis, they inferred that FDI stimulated growth.

On the other hand, many researchers found negative or insignificant conclusions. For Africa, Adewumi (2006) selected 11 countries and found that if consider the continent as a whole, there would be neither long-run nor short-run relationships between FDI and economic growth. Tekin (2012) believed FDI boosted growth in only 2 (Benin and Togo) out of 18 least developed countries. Onu (2012) focused on the Nigerian economy. Through multiple regression analysis, he concluded that there was neither significant nor large impacts from FDI to growth. Gursoy, Kalyoncu, and Sekreter (2013) inferred that among Mid-Asian countries, FDI stimulated economic growth only in Azerbaijan and Turkmenistan. Jimborean and Kelber (2011) conducted a research on Mid-East European countries, and concluded that concerning financial markets and technological progress, the impact of FDI on growth would be insignificant. An insignificant relationship was also found by Elkanji, Tararbay, and Yaacoub (2013), when investigating 6 Arab region countries. In terms of Latin America, for Barbados, Granger Causalities could not be derived from FDI to growth; for Argentina, long-term relationships between these two variables did not exist either (Campbell, 2012; Naguib, 2012). Herzer, Klasen, and Nowak-Lehmann (2008) also questioned the main-stream results and theory that FDI spurred growth. Carkovic and Levine (2002) collected and examined the data of 72 developing and developed countries. They indicated that FDI did not spur economic growth by itself, but through channels, such as improving the quality of human capital.

What's more, some other researchers tried to find which countries benefited most from FDI. Li and Ljungwall (2007) found that in China, although its financial market is not developed yet, the steady evolution enhanced the link between FDI and the economy and consequently spurred growth. Cem (2012) indicated that mid income developing countries took more advantages than developed countries and least developed countries, and emphasised the role of freedom.

Some findings can be discovered from the literature. If considering the countries geographically, the developing countries in East Asia tend to benefit in economic growth from FDI. Conversely, the land-locked countries (Mid Asia & East Europe) are unlikely to take advantages from FDI. Furthermore, mixed results were found in the developing countries from the other regions, and it is very possible that each country has different circumstances. In addition, more developed financial markets, a higher degree of economic freedom, better infrastructure, and higher quality of labour force would be credible factors for countries to take advantage of output growth from FDI.

2.5 Foreign aid and economic growth

Although economic growth is not the only goal of foreign aid, growth is the most commonly used summary measure of economic welfare that is directly targeted by official development aid (ODA), and which is used in most of the studies (Vasquez, 1998). The argument about whether foreign aid promotes the recipient's economic growth has continued for decades. Friedman (1958) first

argued that foreign aid would encourage socialism and discourage democracy. He suggested aid should be abolished because it was bad for institutions that were supposed to be the basis of development. On the other hand, Chenery and Strout (1966) believed that foreign aid was an important source for developing countries to grow. In fact, empirical studies also infer various results.

Burnside and Dollar (2000) conducted research on the relationship between foreign aid and growth, by using panel data on 56 developing countries with six four-year periods (1970-93). They discovered that aid had positive impacts on growth in developing countries with fiscal surplus, low inflation rate, and openness to trade. Dalgaard, Hansen, and Tarp (2004) launched the Generalised Method of Moments (GMM) (For more information, please refer to Hansen [1982]) on the same data as Burnside and Dollar (2000), and found that aid was effective in spurring growth but the magnitude depended on the economic climate. Ndambendia and Njoupouognigni's (2010) study on Sub-Saharan Africa found that the impact of foreign aid on growth was positive but very low, and they suggested that the governors focus more on internal factors. Kargbo (2012) launched a study on Sierra Leone based on the method of Auto-regressive Distributional Lag (ARDL) (For more information, please refer to Pesaran and Shin [1999]). He found that from 1970 to 2007, foreign aid promoted growth, but the magnitude was decreasing, which might be due to various sectors' development trends and damaged institutions. Besides this, many studies showed that foreign aid stimulated growth significantly and sizably (without endogenous conditions). Durbarry, Gemmell, and Greenaway's (1998) research found foreign aid promotes growth, based on data from 68 developing countries from 1970 to 1993. Mallick and Moore (2005) suggested that the WB's aid to the sampled 30 developing countries boosted the economies, but the magnitudes were variable. Karras (2006) selected a sample of 71 aid-receiving countries, and positive, permanent, and sizable results were found by running a dynamic time-series model using lagged and differenced variables. Minoiu and Reddy (2006) collected the data of 107 developing countries, and their results showed that development aid positively and significantly promoted growth in the long-run. Fasanya and Onakoya (2012) implemented a research on Nigeria based on the data over the period of 1970-2010. Through a co-integration test, they demonstrated that aid flows had significant and positive impacts on economic growth. Similar results were deduced from Abidemi, Abidemi, and Olawale's (2011) study on Nigeria, Sakyi's (2011) study on Ghana, and Asteriou's (2009), and Chowdhury and Das's (2011) studies on South Asian countries.

In respect of the negative demonstrations, Dhakal, Upadhyaya and Upadhyaya (1996) tested the Granger Causalities between foreign aid and economic growth of four South Asian countries (India, Nepal, Pakistan and Thailand) and four African countries (Botswana, Kenya, Malawi and Tanzania) with the data from 1970 to 1990. They failed to find relationships between foreign aid and economic growth in all of these countries. Easterly (2003) believed that the notion of "aid buys growth" was on shaky ground because of the existences of poor policies and institutions, and advised that aid should focus on people who were poor and needy for some of the time, rather than a society-wide transformation. Carden (2009) also supported Easterly's (2003) conclusion that foreign aid cannot spur growth, and further voted to encourage better institutions that would clean up corruption and promote entrepreneurship. From another perspective, Ranis

(2012) believed that donors were too passive and that aid was not used properly by the recipients to promote growth. In addition, Easterly, Levine, and Roodman (2004) extended the study of Burnside and Dollar (2000) by increasing the sample size and variables. Based on the same method of panel data regression, they found that the conclusion made by Burnside and Dollar (2000) that "domestic policy was important" turned out to be less persuasive. Bhandari, Dhakal, Pradhan, and Upadhyaya (2007) utilised a co-integration test on the aid-growth nexus of six East European nations (Czech Republic, Estonia, Hungary, Latvia, Lithuania and Poland), with data from 1993 to 2002. Through a panel data co-integration test, they found that foreign aid had no significant impacts on real GDP, while FDI was one factor that promoted growth. Mallik (2008) examined the relationships between foreign aid and growth in six of the poorest countries in Africa (Central African Republic, Malawi, Mali, Niger, Sierra Leone, and Togo) since 1965. He concluded that foreign aid negatively influenced the economy in all countries except Togo. For Pakistan and Egypt, it was also discovered that foreign assistance dampened the economy (Ahmed & Wahab, 2011; Ali, 2013).

In addition, mixed results were found in some studies. Ruhashyankiko (2005) used the data of 77 countries, and tested whether growth depended on aid; he found that aid might have a positive impact on growth, but was very unlikely to be sustainable. Chatrna and Ekanayake (2010) focused on 83 developing countries, and utilised regressions based on different time periods, regions, and income levels. The results showed that except for the period 2000-2007, foreign aid always had inverse impacts on growth. Regionally, only Africa benefited from foreign aid. If income levels were considered, aid promoted economic growth in lower-middle income, upper-middle income, and high income countries, but weakened the economy in low income countries.

Instead of considering external aid as a whole, it can be classified into bilateral and multilateral aid. Some studies analysed these two kinds of aid separately. Vasquez (1998) said: "the various bilateral and multilateral agencies have emphasised different approaches to lending, even though a common principle objective has been the promotion of growth" (p.276). For example, the WB only lends to governments, whereas the US Agency for International Development can provide credit to private groups.

In terms of economic growth, Boone and Faguet (1998) utilised descriptive analysis of multilateral aid; they suggested that: (a).multilateral donors should target the increase of investment rather than the consumption of the receptors; (b).local governments needed to concentrate more on improving the Human Development Index (an overall level of social welfare); (c).multilateral donors should provide short-term aid, which might be very effective in the reforming period. Meanwhile, Gounder (2001) showed empirically that Fiji's growth during the period 1968-1996 was not significantly spurred by multilateral aid, but by bilateral aid. Ram (2003) selected the data of 56 developing countries from 1970 to 1993, and using regression models, showed that there were significant negative relationships between multilateral aid and growth while bilateral aid played a positive role. In addition, Rajan and Subramanian (2008) collected the data of 83 developing countries from 1960 to 2000 and launched the GMM. They demonstrated that there were no robust positive relationships between aid and growth, for all the sub-categories of aid including bilateral and multilateral aid. However, Javid and Qayyum's (2011) study on Pakistan

(1960-2008) used ARDL, and they concluded that under sound macroeconomic policies, both bilateral and multilateral aid spurred economic growth.

In addition, there are several studies that examined other influences, such as the general standard of living and politics. Feeny, McGillivray, and White (2004) focused on poverty reduction on an organisational level; they found that multilateral assistance was concentrated more on poverty. Through a theoretical analysis of the aid flow to Sub-Saharan Africa, Abuzeid (2009) believed that the multilateral agencies should not discriminate against corruption in particular countries, and the aid from the IMF and the WB was problematic in effectiveness.

Furthermore, some other studies focused on the future trends of multilateral and bilateral aid. The North-South Institute (2011) concluded that: (a).the emerging powers and globalisation accreted potential risks; (b).South-South cooperation turned out to be more important; (c).economic orders were changing; (d).transparency, effectiveness, and risk management were important; (e).for traditional donors, if they wanted to maintain competitiveness, then they needed to further consider the aid's conjunction with other instruments (trade, skills, etc.). Similar conclusions were made by Besada and Kindornay (2011), who believed that:

> New actors are (re)emerging, such as the BRICs and the private sector, presenting new challenges and opportunities for multilateral development cooperation…The international community should agree on a transparent and universally applied standardized multilateral evaluation and assessment framework to help reduce duplication and increase the effectiveness of the multilateral development cooperation system (p.22-23).

From the literature above, I cannot conclude whether or not foreign aid promotes economic growth. But when separating foreign aid into bilateral aid and multilateral aid, it is more likely that bilateral aid performs better than multilateral aid in effectiveness. In addition, there is a trend that aid donated by developing countries (South-South assistances) is increasing. Since the current international organisations (the United Nations [UN], the IMF, the WB, the OECD, etc.) and the NDB are all multilateral aid agencies, the policy indications in Chapter 5 will mainly focus on multilateral aid.

2.6 External debt and economic growth

The Debt Laffer Curve as a theory was first introduced by Sachs (1989), and Krugman (1989) perfected the logic behind it. According to the theory, external debt could have a positive impact on investment and growth (upward sloping), but if a country borrowed too much, when surpassing a certain endogenous threshold of level of debt, then this might result in efficiency losses (downward sloping). Sun, Xuan, and Yan (2012) detected the relationship between debt transformation rates. They concluded that if the rate was too low, an asset bubble might be generated, which would cause crises, while if it was too high, the equilibrium capital level would drop and depress the economy. Debt promoted growth when the rate was in an optimal range.

In the real world, it is unclear whether or not external debts benefit the economy, as stated by Karagol (2004):

> Empirical results indicate that it is difficult to say whether external debt has a negative or positive effect on economic growth. It is also improper to make any type of generalizations of the potential relationship between economic growth and external debt (p.69).

With regard to the positive conclusions, Amoako-Adu and Amoateng (1996) launched a Granger Causality test, and drew a positive relationship between external debt and growth in 35 less developed countries. Kasidi and Said (2013) focused on the Tanzanian economy (1990-2010), and found that although positive results were shown by regression models, long-term relationships did not exist between debt and growth. Ahmad, Azman-Saini, and Daud (2013) launched the ARDL model. They concluded that from 1991 to 2009, the accumulation of external debt was associated with an increase in Malaysia's economic growth, but there is an optimal level; above that level, the impacts might be negative (Debt Laffer Curve). Through a co-integration test, Pervin and Shah (2012) demonstrated that in the long run, public debt had positive impacts on the economy of Bangladesh. Additionally, for transition countries[14], Emsen, Kabadayi, Karakoy, and Uzun (2012) found that since the transition started in 1991, external debt had a positive relationship with growth.

On the other hand, there are also many negative results being deduced. Shabbir (2013) focused on 24 developing countries, and concluded that external debt adversely affected economic growth. Similar results were obtained by Deshpande (1997), and Daud and Podivinsky (2011), when testing a group of developing countries globally. Pattillo, Poirson, and Ricci (2002) detected the role of external debt in 93 developing countries, and realised that there was a non-linear relationship between external debt and economic growth. They assessed that high debt reduced growth by lowering both factor accumulation (physical capital and labour) and total factor productivity growth (technological progress). There was also evidence that lower external debt was associated with higher growth rate in developing countries (Schclarek, 2004). The studies of Fosu (1999) on Sub-Saharan African countries and Ramon-Ballester and Schclarek (2005) on Latin-American countries also found that the relationships were negative. For individual countries, Mehrizi and Safdari (2011) estimated that a negative long-term relationship between external debt and economic growth existed in Iran from 1974 to 2007. Similar results were inferred by Karagol (2002) (for Turkey) and M'Amanja and Morrissey (2006) (for Kenya). Based on the methodology of regression, Boboye and Ojo (2012) reasoned out that external debt harmed output growth in Nigeria. Awan, Navaz, and Qureshi (2012) utilised co-integration and Granger Causality tests on the data of Pakistan, and found a long-term equilibrium relationship between external debt and GDP, but an external shock negatively impacted GDP in the long run. Aziz and Murad's (2011) study of Pakistan based on the method of regression obtained a negative relationship as well.

Similar to the effects of FDI and foreign aid, after considering the methodologies and countries employed in the studies, it is unclear that whether or not external debt promote economic growth.

[14] According to the WB (2004), countries with transition economies (transition countries, transition economies) refers to "countries moving from centrally planned to market-oriented economies. These countries (include China, Mongolia, Vietnam, former republics of the Soviet Union, and the countries of Central and Eastern Europe) contain about one-third of the world's population" (para.13).

2.7 Foreign aid, external debt, and growth

From the literature review above on foreign aid and external debt, I conclude that it is unclear whether or not foreign aid and external debt are helping developing nations' economic growth. There were some other studies focusing on the effects of both foreign aid and external debt on economic growth. Kamanyire (1999) concluded that the positive relationship between foreign aid and economic growth were cancelled out by external debt. Similar results were elicited by Nkoro and Uko (2012) from their study on Nigeria, and their conclusion was that foreign aid helped growth, but debt harmed it. Haider and Qayyum (n.d.) also demonstrated that good governance and foreign aid spurred growth in low income countries, but external debt dampened the economy.

Even though all these three studies show that if both foreign aid and external debt are introduced as explanatory variables, the impacts of foreign aid tend to be positive while the impacts of external debt are more likely to be negative, I cannot demonstrate that my results will be consistent with these studies, because two of them focused on individual countries (Kamanyire, 1999; Nkoro & Uko, 2012), and the rest concerned the poorest countries only (Haider & Qayyum, n.d.).

2.8 From literature to empirical study

Through reviewing this literature, I can draw the following conclusions: (a).the BRICS countries have strong economic backgrounds, and they are the emerging and leading powers of world economic development; (b).there are numerous criticisms of the IMF and the WB on their governance and functioning; (c).currently, it is in doubt whether or not FDI, foreign aid, and external debt stimulate developing countries' growth; (d).there are few empirical studies linking external finance and growth, and inferring the policy implications for the NDB. Empirically, within the context of the establishment of the NDB and the criticisms of the IMF and the WB, there are several gaps needing to be filled: (a).few researchers used FDI, foreign aid, and external debt all together as regressors when studying economic growth, despite the fact that these three indicators are the main components of international capital flows; (b).there are not enough empirical studies on the effectiveness of both the IMF credit and WB loans in promoting economic growth; (c).the availability of the latest data on international capital flows since the end of the Cold War allows us to conduct up-to-date research from a global point of view on the economic growth of developing countries; (d).it is compulsory to provide policy suggestions to the NDB for its establishment and operation. Thus, the following research questions are generalised: (a).whether and to what extent the developing world benefits from FDI, foreign aid (bilateral and multilateral aid) and external debt (from the IMF and the WB) under the current order mainly ruled by Western countries; (b).what does the current situation mean to the establishment as well as the future operations of NDB (policy implications)? Through answering these two questions, this dissertation will contribute to the literature by showing the roles of FDI, foreign aid, and external debt in spurring the economic growth of the developing countries comprehensively, and further propose policy suggestions for the future operation of the NDB.

For the sake of answering these questions, a solid empirical model needs to be estimated and interpreted to show the present situations (answer the first question), so that I can combine the reviewed literature with the findings, to analyse the findings and provide policy implications for the NDB to promote output growth in developing countries (answer the second question).

After collecting the data on low to middle income developing countries, I will build a set of panel data. Based on these, there are two potential pathways to answer these research questions: (a).utilising the methodologies and expanding the models used by Bhandari et al. (2007) and Hsiao and Won (2008), which were a panel data co-integration test and a Granger Causality test. These allow us to test both long-term equilibrium and short-term Granger Causality and solve the problem of simultaneous equation (reversed causality from economic growth to the dependent variables), but there is a restriction that the data need to be a stationary panel (Engle & Granger, 1987); (b).launching the methodologies and adjusting the variables used by Mutascu and Tiwari (2011), which conducted panel data regression analysis. Based on this method, I should improve the model and mitigate simultaneous causality, because Mutascu and Tiwari (2011) did not pay sufficient attentions to the possibility of the reverse causality, which was a common problem of regression models. One of the ways to minimise contemporaneous causality is to regress lagged variables, which is used by Butkiewicz and Yanikkaya (2005) when dealing with the impacts from IMF credit and WB loans to the recipients' economic growth.

I will examine the stationarities of the panel data first, and if it is a stationary panel, co-integration and Granger Causality tests used by Bhandari et al. (2007) and Hsiao and Won (2008) will be utilised. If the data are not stationary, I need to utilise panel data regressions as did Mustascu and Tiwari (2011), and minimise the simultaneous causality through employing lagged data as did Butkiewicz and Yanikkaya (2005). Furthermore, theoretically, the studies of Bhandari et al. (2007), Mutascu and Tiwari (2011), and Butkiewicz and Yanikkaya (2005) are all based on the Solow model. Therefore, I will try to employ the Solow model as the primary framework of this dissertation. The data and methodology will be discussed in Chapter 3.

Chapter 3. Data and methodology

3.1 Theoretical framework

To answer the research questions, an economic growth model needs to be established as a foundation. In neoclassical economics, there are two basic economic growth models, the factor accumulation model (exogenous) introduced by Solow (1956), and the endogenous growth model pioneered by Romer (1986) and Lucas (1988). By assuming diminishing returns to capital and exogenous accumulation of capital, population and technological progress, the Solow model predicts that long-term economic growth and steady-state growth are exogenously determined by technological progress. Algebraically, the Solow model can be calculated as $Y = Af(K, L)$, where Y=output level, A=technological progress (total factor productivity), K=physical capital stock, L=labour force. While as suggested by Romer (1986), and Lucas (1988), technological progress has spillover effects, which will endogenously influence the effectiveness labour the factors of production, this exogenous model might not tell the whole story precisely. Mankiw, Romer, and Weil (1992) concluded that the augmented Solow model (that includes the accumulation of human capital) holds and expected that the Solow model would provide the best framework for understanding how the factors influence a country's level of economic well-being. Moreover, according to Karras (2008), the Solow model is one of the most widely used models in economics, and it is employed in a substantial amount of empirical research as the foundation for this analysis. Dawson (n.d.) outlined some advantages of the Solow model, which include: (a).simplifying complicated problems of economic growth; (b).providing better understanding of different types and sources of growth (capital accumulation, labour, technological progress); (c).allowing the estimation of the various parts of the growth "process" (other variables can be introduced as "technological progress"). Furthermore, many studies on the determinants of economic growth utilise the Solow model by introducing the variables that they want to examine, for instance, the "benchmark" studies (Butkiewicz & Yannikkaya, 2005; Bhandari et al., 2007; Mutascu and Tiwari, 2011), and a great number of other researchers add the aspects of globalisation (international trade, foreign direct investment [FDI], foreign aid, external debt, etc.) as independent variables to examine their effects on output growth (Dewan & Hussein, 2001; Gounder, 2010; Kumar, Pacheco, & Rossouw, 2010; Fansanya & Onakoya, 2012).

Consequently, in this dissertation, I will as well conduct empirical tests based on the Solow model by considering the proxies of international capital flows as technological progress A: $Y = Af(K, L)$ and $A = f(X)$, where X= (FDI[15], total official development assistance [TODA][16] [as a proxy for

[15] Readers might argue that FDI is a part of capital stock, so it needs to be deducted from capital stock. But according to the WB (n.d.), "foreign direct investment (FDI) relates to financing—that is, the purchase of shares in foreign companies where the buyer has a lasting interest (10 percent or more of voting stock). FDI can be used to finance fixed capital formation; however, it can also be used to cover a deficit in the company or paying off a loan. Thus, you cannot say FDI is always included in gross fixed capital formation (GFCF)" (para.1). I understand that the overlapping data would cause multi-collinearity problems, but cannot fix them perfectly because of data limitation.

[16] Similar to the relationship between FDI and gross fixed capital formation (GFCF), according to the WB (2014g), besides the disbursements of loans made on concessional terms (net repayments of principal) and grants by official agencies, official development assistance (ODA) as well consists of loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Again, I understand that the overlapping data would cause multi-collinearity problems, but I cannot fix them perfectly because of data limitation.

foreign aid], total external debt [TED]). The Cobb-Doulas production function: $Y = AK^{\alpha}L^{\beta}$ will be estimated, which allows a direct estimate of the associated returns to scale in the economy.

Besides, to test the robustness of the results, I will deconstruct TODA and TED; in order to detect the roles of international organisations in promoting economic growth in the current circumstances, and to further establish how the BIRCS New Development Bank (NDB) could improve the current situations. TODA is broken up into multilateral official development assistance (MODA) and bilateral official development assistance (BODA); TED is categorised into International Bank for Reconstruction and Development (IBRD) loans and International Development Association (IDA) credit by the WB (WBL), the IMF credit used (IMFC), and other external debts (OED). This dissertation will contribute to the literature by looking deep into the sub-categories of foreign aid and external debt, which would show the impacts of each component of these two variables. Therefore, I will be able to estimate the effectiveness of current multilateral aid and loans from the IMF and WB and formulate more precise and reliable policy implications for the.

3.2 Sources and definitions of data

The data sources are the World Development Index (WDI) (by the WB) and the United Nations Conference on Trade and Development (UNCTAD) (by the United Nations [UN]). The sample period ranges from 1991 to 2011, and the sample includes 96 low to middle income developing countries. The country list is in Appendix 1. For the purpose of consistency and minimising the biases caused by domestic factors (financial markets, population base, etc.), all of the countries in the sample are foreign aid and external debt recipients; the unit of the variables (except employment to population ratio) is thousands of constant US$ in 2005, and all data are transformed into per capita levels.

Here are the definitions of data:

- RY=Real gross domestic product (GDP) per capita as the proxy of output level
- RK=Real gross fixed capital (GFC) stock per capita - derived from perpetual inventory method (PIM) as the proxy for capital stock. To obtain the data for each country, I need to estimate the initial capital stock; for most of the countries, the initial year is 1980. Due to limited data availability, some countries' data are missing for some years. For the details of the PIM method – steady state approach, please refer to Appendix 2.
- EPR=Employment to population ratio – derived from total employment to aggregate population[17] as the proxy for labour
- FDI=Real net FDI inflow per capita as the proxy for foreign direct investment

[17] Here I followed the definition of the International Labour Office (ILO, 2009), and consider ages 15 and older as the working-age population. Two steps are processed to calculate the EPR. Firstly, find out the total figure for employment of the country; due to the limitations of data, what I obtained was the total figure for employment for the 15+ years old population, while child labour is omitted. Secondly, divide the total employment by the aggregate population of the country; in order to make it consistent with the other independent variables (at "per capita" level). For the details, please refer to Appendix 3.

- MODA=Real per capita multilateral official development assistance as the proxy for multilateral aid
- BODA=Real per capita bilateral official development assistance as the proxy for bilateral aid
- TODA=Real total per capital official development assistance per capita (the sum of MODA and BODA)
- WBL= Real per capita World Bank (WB) loans, which is the sum of International Bank for Reconstruction and Development (IBRD) loans and International Development Association (IDA) credits, as the proxy for the WB loans[18]
- IMFC=Real use of the International Monetary Fund (IMF) credit per capita as the proxy for the IMF loans
- OED=Real per capita total other external debts (other than the WB and IMF) per capita
- TED=Real per capita total external debt (the sum of WBL, IMFC, and OED)

When regressing the variables, in order to investigate the percentage change, RY, RK and EPR are transformed into natural logarithms, which can be written as ln(RY), ln(RK) and ln(EPR) mathematically. Due to most of the variables of international capital flows (FDI, MODA, BODA, TODA, WBL, IMFC, & ODEBT) have negative or zero values, I need to keep the original data rather than transform them into natural logarithm forms.

3.3 Methodology

For the sake of detecting the long-term equilibrium and Granger Causalities among these variables, co-integration and Granger Causality tests were planned to be utilised initially. According to Engle and Granger (1987) and Mahadeva and Robinson (2004), if the variables are integrated in first difference or *I(1)*, I will be able to conduct a co-integration and also a Granger Causality test. However, based on the unit root test method developed by Im, Pesaran, and Shin (IPS, 2003) (a method that can be launched on unbalanced panel data), I find ln(RK), MODA, BODA, TODA, OED, and TED are stationary in level or *I(0)* (with at least 95% confidence level), whereas it is more convincing to say that ln(RY), ln(EPR), FDI, WBL, and IMFC are stationary in first difference or *I(1)*. The results of the IPS unit root test are displayed in Appendix 4. As the results show that the variables have various levels of stationarity, I am unable to continue the econometric model into the next step of testing the existence of co-integration and Granger Causality as carried out by Bhandari et al. (2007) and Hsiao and Won (2008). Thus, to continue this dissertation, I need to follow the study of Mutascu and Tiwari (2011) to conduct panel data regressions.

[18] According to the WB (2014d), there are five institutions within the WB, the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA), and the International Centre for Settlement of Investment Disputes (ICSID), whereas the IBRD and IDA are the two institutions that provide loans to developing countries' governments.

Mutascu and Tiwari (2011) intended to investigate the relationship between FDI, export and economic growth, the basic model that they employed was:

$$Y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + \beta_3 fdi_{it} + +\beta_4 x_{it} + \varepsilon_{it}$$

where y=GDP per capita, k=gross capital formation, l=total amount of labour force, fdi=foreign direct investment inflow, x=volume of export, and ε=error term.

Based on this model, the ordinary least squares (OLS), fixed effects (FE) and random (RE) effects models are utilised. This dissertation will use these basic regression frameworks too. But I adjusted the model used by Mutascu and Tiwari's (2011) model by (a).using more precise measurements for capital and labour force – employed gross fixed capital (GFC) stock and the real number of people who are employed as proxies of capital stock and labour. According to the Organisation for Economic Co-operation and Development (OECD, 2001), GFC "is measured by the total value of a producer's acquisitions, less disposals, of fixed assets during the accounting period plus certain additions to the value of non-produced assets realised by the productive activity of institutional units" (para.1), whereas the gross capital formation used by Mutascu and Tiwari (2011) also includes "the inventories, stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and work in progress" (the WB, 2014h, para.1). Thus, GFC stock has a better link with productivity. For the proxy of labour force, of course, the figure for total employment is a more precise and reliable measurement of the number of people who participated in economic activities; (b).transforming all the variables into real and per capita levels on 2005 constant US dollar (for total employment, I divided it by population). This change would overcome the problem of inflation and fluctuation of exchange rates (for the sake of consistency); (c).transforming the positive variables (RY, RK, and EPR) into natural logarithms, to measure the percentage change rather than absolute values; (d).finding the possible way(s) to mitigate the problem of simultaneous equations, which would be more likely to represent the correct direction of causality.

To illustrate the model algebraically, I will firstly plug the variables into the model used by Mutascu and Tiwari (2011). TODA and TED together with ln(RK) and ln(EPR) are used as independent variables:

$$ln(RY_{it}) = \alpha_0 + \alpha_1 l\, n(RK_{it}) + \alpha_2 ln(EPR_{it}) + \alpha_3 FDI_{it} + \alpha_4 TODA_{it} + \alpha_5 TED_{it} + u_{it}$$

where α_0 is the intercept term and u_{it} is the error (disturbance) term.

Afterwards, as mentioned earlier in this section, for the sake of robustness and to show the impacts of multilateral assistance from multilateral agencies and loans from international financial institutions (especially the IMF and WB), I need to further break down TODA and TED into their components: MODA, TODA, WBL, IMFC, and OED:

$$ln(RY_{it}) = \alpha_0 + \alpha_1 l\, n(RK_{it}) + \alpha_2 ln(EPR_{it}) + \alpha_3 FDI_{it} + \alpha_4 MODA_{it} + \alpha_5 BODA_{it} + \alpha_6 WBL_{it} + \alpha_7 IMFC_{it} + \alpha_8 OED_{it} + u_{it}$$

Because current employment and capital stock levels are the substantial determinants of output, the coefficients of ln(RK) and ln(EPR) will make sense and will be reliable in influencing RY

regardless of the direction of causality. However, it is possible that contemporaneous relationships exist between RY and FDI, TODA, TED, MODA, BODA, WBL, IMFC, and OED. For example, if a country has a flourishing economy, there will be more FDI inflow because the investors believe that investments in the country will be profitable. On the other hand, the probability for the country to receive a large amount of foreign aid or external debt will be much lower. This relationships could result in simultaneous equation bias and will lead the causality to run from left to right in the regression models. This results in the independent variables being correlated with the disturbance term, which violates one of the assumptions of the classic linear regression model.

To mitigate this problem, the possibilities for reverse causality need to be reduced as much as possible. Using lagged independent variable is a possible solution (Butkiewicz & Yanikkaya, 2005). Johnson and Vogt (2011) define lagged independent variable as "an independent variable lagged by one or more time periods, and the new lagged independent variable is used to help predict the values on the dependent variable" (p.199). According to Branas-Garza, Bucheli, and Garcia-Munoz (2011), the introduction of lagged variables is crucial to understand the dynamic change, and it is also a new way to understand underlying economic behaviours. In this case. For instance, TODA and TED in the previous year(s) are very unlikely to be instantaneous with this year's economy, compare with the current TODA and TED. As a result, the regression results would be more appropriate, reliable, and accurate to show the relationships between the independent variables and the dependent variable. Consequently, I will use lagged terms for international capital flows rather than current terms. Because there are only 21 years' data in the panel due to limited availability, which restricts the lag length that can be used, to investigate short to long-term effects, the lagged terms (lag 1 and lag 1&2) of the variables of international capital flows are going to be used.

Therefore, the models using TODA and TED can be specified as:

Lag 1: $ln(RY_{it}) = \alpha_0 + \alpha_1 ln(RK_{it}) + \alpha_2 ln(EPR_{it}) + \alpha_3 FDI_{it-1} + \alpha_4 TODA_{it-1} + \alpha_5 TED_{it-1} + u_{it}$

Lag 1&2: $ln(RY_{it}) = \alpha_0 + \alpha_1 ln(RK_{it}) + \alpha_2 ln(EPR_{it}) + \alpha_3 FDI_{it-1} + \alpha_4 FDI_{it-2} + \alpha_5 TODA_{it-1} + \alpha_6 TODA_{it-2} + \alpha_7 TED_{it-1} + \alpha_8 TED_{it-2} + u_{it}$

After deconstructing TODA and TED into MODA, BODA, WBL, IMFC, and OED, the models become:

Lag 1: $ln(RY_{it}) = \alpha_0 + \alpha_1 ln(RK_{it}) + \alpha_2 ln(EPR_{it}) + \alpha_3 FDI_{it-1} + \alpha_4 MODA_{it-1} + \alpha_5 BODA_{it-1} + \alpha_6 WBL_{it-1} + \alpha_7 IMFC_{it-1} + \alpha_8 OED_{it-1} + u_{it}$

Lag 1&2: $ln(RY_{it}) = \alpha_0 + \alpha_1 ln(RK_{it}) + \alpha_2 ln(EPR_{it}) + \alpha_3 FDI_{it-1} + \alpha_4 FDI_{it-2} + \alpha_5 MODA_{it-1} + \alpha_6 MODA_{it-2} + \alpha_7 BODA_{it-1} + \alpha_8 BODA_{it-2} + \alpha_9 WBL_{it-1} + \alpha_{10} WBL_{it-2} + \alpha_{11} IMFC_{it-1} + \alpha_{12} IMFC_{it-2} + \alpha_{13} OED_{it-1} + \alpha_{14} OED_{it-2} + u_{it}$

Next, similar to Mutascu and Tiwari (2011), I will also utilise three regression methods, namely the OLS model, the FE model (also called least squares dummy variable model [LSDV] model), and the RE model (also called RE generalised least square [GLS] model). In the OLS regressions, the parameter is identical for all the countries and the disturbance term is assumed as a zero

conditional mean, or uncorrelated with the independent variables. In the FE models, the parameter (that turns out to be α_{0i}) is unique for each country and the error term is assumed to be correlated with independent variables, which can be divided by the FE (with a different constant for each country) and the traditional error terms with a zero conditional mean. For the RE models, the parameter is assumed to be constant for every country, which is a part of the parameter of the FE model, and the error term is allowed to distribute differently among countries.

The best model will be selected through the F-test (OLS vs. FE), the Lagrange Multiplier (LM) test (OLS vs. RE), and the Hausman test (FE vs. RE).

Firstly, to compare the OLS regression model with the FE model, according to Asteriou and Hall (2007), an F-test needs to be conducted on the coefficients of country dummies, with the hypotheses as following:

- Null: The coefficients of all country dummies are equal to each other
- Alternative: The coefficient of at least one country dummy is different from the others

If the null hypothesis is rejected, I can conclude that the FE model is better than the OLS model.

Secondly, the Lagrange Multiplier (LM) test introduced by Breusch and Pagan (1979) will be utilised to compare the OLS model and the RE model. The hypotheses are:

- Null: there is no significant evidence of heteroskedasticity[19] in the OLS model
- Alternative: there is significant evidence of heteroskedasticity in the OLS model

If the null hypothesis is rejected, I can conclude that there is significant evidence of heteroskedasticity and the RE model is proper, compared with the OLS model.

Thirdly, to choose a better model between the FE and the RE models, the Hausman (1978) test will be launched. The hypotheses are:

- Null: the RE model is consistent and efficient
- Alternative: the FE model is inconsistent

If the null hypothesis is rejected, I can conclude that the RE model is inconsistent, and the FE estimators are more suitable to be used.

In addition to running the regressions of these 96 developing countries as a whole, I will as well categorise them into low income countries (LIC), lower-middle income countries (LMIC), and upper-middle income countries (UMIC)[20], based on the catalogue of income levels obtained from the WB, for the sake of achieving more detailed results and providing horizontal comparisons of these countries.

Theoretically, the expected signs of the coefficients of ln(RK) and ln(EPR) are positive, whereas the roles of the other variables will be interpreted based on the best regression models. To see the mid to long-term effects, the aggregate effects for each lagged indicator will be discovered

[19] According to White (1980), heteroskedasticity occurs when the variance of the error terms differ across observations.
[20] Since there are no high income developing countries (Bahrain, Oman, Qatar, Russia, etc.) in the observations (they are not foreign aid and/or external loan recipients), I do not consider this income group. Russia has been classified by the WB in 2013, and it has never been a development assistance receiver since 1991. The country list is in Appendix 1.

through the F-test. Additionally, unless stated specifically, the 5% significance level (or the 95% confidence level) will be used in this dissertation.

After discovering whether and to what extent the developing world is benefited/harmed by FDI, foreign aid (bilateral and multilateral) and external debt (from the IMF and WB) under the current order mainly ruled by the Western countries (Chapter 4), I will discern what the current situation means to the future operations of the NDB (policy suggestions) (Chapter 5).

Chapter 4. Interpretations of empirical results

4.1 Data description

Table 1. Data description

All the 96 countries					
Panel & time	Observation	Mean	Std Dev	Min	Max
Country	96	-	-	1	96
Year	21	-	-	1991	2011
Economic variables (the unit of the variables except EPR is thousands of US$, at constant price and exchange rate of 2005)					
RY	2005	1.7700	1.8036	0.0809	8.4123
RK	1954	391.1808	464.2805	0.1641	2687.397
EPR	2016	0.3701	0.0731	0.1782	0.5834
FDI	1955	0.0650	0.1167	-0.7027	0.9545
MODA	1984	0.0190	0.0266	-0.0204	0.3224
BODA	1987	0.0302	0.0416	-0.0469	0.4770
TODA	1984	0.0492	0.0605	-0.0381	0.6120
WBL	1996	0.0931	0.0881	0	0.6930
IMFC	1995	0.0343	0.0611	0	0.5692
OED	1982	0.7865	0.9905	0	8.0101
TED	1982	0.9139	1.0528	0.0013	8.3654

Income levels	Low income countries (LIC)	Lower-middle income countries (LMIC)	Upper-middle income countries (UMIC)	Total
Number of countries	30	33	33	96

Table 1 displays the descriptive statistics of the data collected. I collected the data on 96 countries from 1991 to 2011, but because some data are unavailable (for some countries/years), it is an unbalanced panel dataset[21]. Real gross domestic product (GDP) per capita (RY) varied from $80.9 to $8412.3 with an average of $1,770.0. The minimum RY was experienced by Liberia in 1995 ($80.9) while the highest was experienced by Mexico in 2007 ($8,412.3). In regard to real per capita gross fixed capital stock (RK), Gabon[22] had the highest value of $2,687,397 in 2011, whereas Liberia had the lowest figure of $164.1 in 1999, and the mean was $391,180.8[23].

The highest employment to population ratio (EPR) was seen in Rwanda in 1991 with a ratio of 0.5834, the lowest EPR occurred in Mauritania in 1991 where the value was approximately 0.1782, and the average EPR of these selected countries during this period was around 0.3701. Real per capita net foreign direct investment inflow (FDI) had a mean of $65.0 and ranged from -$702.7

[21] For some variables, since some data is missing and I have unbalanced data, the observation is less than 2016. If it is a balanced panel, the observations of all the variables should be 96x21=2016. Since lag 1 and both lag 1and 2 will be used to regress, the number of effective observations for time variables is 19 or 20 in this dissertation.

[22] Yes, Gabon is an upper-middle income country. Gabon has a per capita income four times that of most sub-Saharan African countries, but the problem of income inequality is serious (The Central Intelligence Agency [CIA], 2014).

[23] The capital stock level seems too high, but according to the empirical results, it is reasonable. Bernstein (2005) figured out that the discount rate of capital has dropped dramatically in recent years, which will lead to a high value of capita stock results, and in fact, "the measurement of capital is one of the nastiest jobs that economists have set to statisticians" (Hicks, 1981, p.204). Thus, what I could do here is to strictly follow the most widely used estimation of capital stock – the perpetual inventory method (PIM), which is shown in Appendix 2.

(Gabon in 1996) to +$954.5 (Turkmenistan in 2009), where the negative sign in -$702.7 indicated that there was a net outflow. The means of real per capita multilateral official development assistance (MODA), real per capita bilateral official development assistance (BODA), and real per capita total official development assistance (TODA) were approximately $19.0, $30.2 and $49.2. Panama experienced the lowest level of MODA and TODA -$20.4 in 1992 and -$38.1 in 2007, and Gabon had the smallest BODA of -$46.9 in 2003; the negative signs showed that net outflows occurred. The highest values of MODA, BODA, and TODA were all experienced by Guyana. In 1991, it received $322.4 as MODA; in 1997, it received $477.0 as BODA; the peak of TODA was also in 1997 with the amount of $612.0. The average real per capita World Bank loans (WBL), real per capita International Monetary Fund credit (IMFC), real per capita other external debts (other than WBL and IMFC) (OED) and real per capita total external debts (TED) for these countries were $93.1, $34.3, $786.5, and $913.9. Jamaica had the highest WBL of $693 in 1992; while Turkey used the highest IMFC $569.2 in 2002. Gabon had the highest OED as well as TED of $8,010.1 and $8,365.4 in 1998.

In regard to income groups, there were 30 low income countries (LIC), 33 lower-middle income countries (LMIC), and 33 upper-middle income countries (UMIC) in the sample. The detailed country lists of each income level is displayed in Appendix 1, and the descriptive statistics of the data for each income group is shown in Appendix 5.

4.2 Empirical results and interpretations for the whole sample

Table 2. Regression results for all the 96 countries
(Independent variables: ln[RK], ln[EPR], FDI, TODA, & TED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.6994** (0.0232)	**0.2915** (0.0346)**	0.3571** (0.0545)	0.7011** (0.0249)	**0.2867** (0.0384)**	0.3614** (0.0605)
ln(EPR)	-0.0718 (0.0398)	**0.5586** (0.1108)**	0.2012 (0.1674)	-0.0784 (0.0406)	**0.5994** (0.1175)**	0.1897 (0.1657)
FDI_{t-1}	0. 6045** (0.1030)	**0. 2675** (0.0597)**	0.3138* (0.1244)	0.3010** (0.1174)	**0.1385* (0.0592)**	0.1728 (0.0931)
FDI_{t-2}				0.4094** (0.1345)	**0.2016** (0.0601)**	0.2290** (0.0852)
$TODA_{t-1}$	-1.3470** (0.2181)	**-0. 2157 (0.1122)**	-0.2884 (0.2105)	-1.0600** (0.2501)	**-0.0846 (0.1171)**	-0.1683 (0.2163)
$TODA_{t-2}$				-0.0515* (0.2627)	**-0.1124 (0.1050)**	-0.1670 (0.1119)
TED_{t-1}	0. 1052** (0.0170)	**0.0042 (0.0069)**	0.0203 (0.0173)	0.1782** (0.0395)	**0.0123 (0.0148)**	0.0272 (0.0210)
TED_{t-2}				-0.0710* (0.0343)	**-0.0106 (0.0139)**	0.0058 (0.0114)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.8949	**0.9856**	0.8832	0.9005	**0.9865**	0.8897
Sample size	96	**96**	96	96	**96**	96
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman Test, p=0.0000			Hausman Test, p=0.0000		
The robust standard errors are displayed in the parentheses below the coefficients. **Bold** means the model selected; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.2915+0.5586=+0.8501	p = 0.0747
Column (5) 0.2867+0.5994=+0.8861	p = 0.1958

F-test results for the sum of the coefficients of the lagged terms of FDI, TODA, and TED being equal to zero, based on Column (5) (testing mid to long-term effects)		
FDI +0.3401	TODA -0.1970	TED +0.0017
p=0.0000**	p=0.1527	p=0.8144

Maximum and minimum country dummies in Column (2) and (5)					
Column (2)	Max	Min	Column (5)	Max	Min
Coefficient	0.9220	-1.8240	Coefficient	0.9355	-1.8523
Country	Gabon	Ethiopia	Country	Gabon	Ethiopia

The regression coefficients of the impacts on ln(RY) from ln(RK), ln(EPR), FDI, TODA, and TED for the 96 developing countries are displayed in Table 2. Different models with one lag and both one and two lags are utilised. In terms of one lag, the outcome of the ordinary least squares (OLS) model is displayed in Column (1), the result of the fixed effects (FE) model is in Column (2), and the result of the random effects (RE) model is in Column (3). Then I add another lag for FDI, TODA, and TED, and re-run the regression models. The outcomes are shown in Column (4), (5), and (6) for these three models. The results of model selection tests, namely F-test, Lagrangian Multiplier (LM) test and Hausman test are listed as well. After that, the results showing whether these countries face constant returns to scale and whether these variables have mid to long-term effects (the aggregate impacts of lagged 1&2) are calculated through F-tests. Lastly, the maximum and minimum country dummies are shown at the bottom. This table structure will also be used in Table 3-8, except that the country dummies will not be shown in Table 4-8.

In Table 2, for the regression models with one lag (Column [1], [2], and [3]), from the p-value of the assumption that the country effects are equal (0.0000), I am able to draw the conclusion that the FE model is better than the OLS. Besides, the coefficient of total employment per capita in the OLS model is negative (-0.0718), which contradicts the priori expectation of the Solow model. Since the p-value of the Breusch-Pagen (1979) Lagrange Multiplier (LM) test is 0.0000, the RE model is also more appropriate than the OLS. In addition, the Hausman test also infers a 0.0000 p-value, so I can reject the null hypothesis that the RE and FE model are the same at a 1% level. Therefore, the regression result of the FE model in Column (2) is the most appropriate specification. According to Column (2), the coefficient of determination (R-square) is 0.9856, which means that 98.56% of the variation in the dependent variable (RY) is captured by the variation in the regressors. I can see that RK and EPR have significant and positive impacts on RY. The coefficient of ln(RK) is 0.2915, which means that with the other variables constant, a 100% increase in RK is expected to cause a 29.15% increase in RY. The coefficient of ln(EPR) is 0.5586, and it means that with the other variables remaining unchanged, a 100% increase in EPR is expected to push RY up by 55.86%. The F-test result indicates that I can reject constant returns to scale at a 10% significance level (but not at a 5% level); these 96 countries in general tend to have a diminishing returns to scale (0.2915+0.5586= 0.8501<1). Besides RK and EPR, FDI_{t-1} is the only variable that could stimulate RY. The coefficient of FDI_{t-1} is 0.2675, which indicates that controlling the other variables, a $1,000 increase in FDI_{t-1} will on average lead to a 26.75% increase in RY. The percentage 26.75% seems high, but the condition is that FDI_{t-1} increases by $1000, while the mean of FDI in the sample is about $65. My result shows that if FDI_{t-1} grows from zero to $65 (the mean), RY will increase by 1.74%, which is reasonable.

Regarding the regression models with both lag one and two (Column [4], [5], and [6]), the model selection process is similar. Based on the F-test, LM test, and Hausman test (all p-values are 0.0000), it is obvious that the FE model in Column (5) is the most appropriate to interpret the relationships. In Column (5), the coefficient of determination (R-square) is 0.9865, which means that 98.65% of the variation in the dependent variable (RY) is captured by the variation in the independent variables. I can see that RK, EPR, FDI_{t-1} and FDI_{t-2} have significant and positive impacts on RY. The coefficients of ln(RK) and ln(EPR) are 0.2867 and 0.5994, and I can draw

the conclusion that with the other variables constant, a 100% increase in RK will push RY up by 28.67%; for EPR, the percentage is 59.94%. The F-test result shows that I should not reject the null hypothesis of constant returns to scale at a 10% significance level (but at 20%, I can accept the null hypothesis that these countries have constant returns to scale). The coefficient of FDI_{t-1} is 0.1385, and the coefficient of FDI_{t-2} is 0.2016; the summation of these two coefficient turns out to be 0.3401 (27% larger than 0.2675, when allowing lag 1 only). These changes suggest that it is important to introduce the second lagged terms. Similarly, I could conclude that it is necessary to add one more lag for TODA. For TED, the coefficients of the two lagged periods have opposite signs, which also demonstrates that the second lag is important. Hence, in order to investigate the mid to long-term effects, I need to utilise F-tests on the significance of the sum of the estimated coefficients on these variables. The results show that in the preferred specification of the FE model with two lagged periods, there is no statistical evidence showing positive effects from TODA and TED on economic growth. In addition to RK and EPR, FDI is again the only explanatory variable that stimulates (+0.3401) economy significantly in this model (at a 1% significance level). In the mid to long term, a 1,000 increase in FDI will on average lead to a 34.01% increase in RY, when controlling the other variables. The percentage 34.01% seems high, but the condition is that FDI increases by $1000, while the mean of FDI in the sample is about $65. My result shows that if FDI grows from zero to $65 (the mean), RY will increase by 2.21%, which is reasonable. The results as well show that in addition to RK and EPR, FDI is the only regressor that stimulates the economy significantly in both short and long run. What's more, TODA has a negative effects on RY if I tentatively increase the significance level to 15.27%.

Table 3. Regression results for all the 96 countries

(Independent variables: ln[RK], ln[EPR], FDI, MODA, BODA, WBL, IMFC, & OED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.6943**	**0.2906****	0.3574**	0.6970**	**0.2840****	0.3604**
	(0.0230)	**(0.0345)**	(0.0540)	(0.0247)	**(0.0382)**	(0.0601)
ln(EPR)	-0.0927*	**0.5598****	0.1870	-0.1003*	**0.5959****	0.1664
	(0.0393)	**(0.1108)**	(0.1686)	(0.0404)	**(0.1163)**	(0.1646)
FDI_{t-1}	0.6244**	**0.2717****	0.3174**	0.3197**	**0.1505****	0.1865*
	(0.1041)	**(0.0579)**	(0.1187)	(0.1142)	**(0.0545)**	(0.0833)
FDI_{t-2}				0.4304**	**0.2107****	0.2363**
				(0.1337)	**(0.0580)**	(0.0866)
$MODA_{t-1}$	-2.9177**	**-1.0754****	-1.1718*	-1.8368**	**-0.4932**	-0.6441
	(0.4661)	**(0.2841)**	(0.4648)	(0.6766)	**(0.3257)**	(0.4956)
$MODA_{t-2}$				-1.5609*	**-0.8754****	-0.9229**
				(0.6170)	**(0.2587)**	(0.2549)
$BODA_{t-1}$	-0.1589	**0.1248**	0.0785	-0.3363	**0.1694**	0.1231
	(0.3051)	**(0.1016)**	(0.1797)	(0.2673)	**(0.1112)**	(0.1727)
$BODA_{t-2}$				0.1972	**0.1776**	0.1351
				(0.3411)	**(0.1049)**	(0.1423)
WBL_{t-1}	-0.2840*	**-0.0019**	-0.0507	0.0408	**-0.1772**	-0.1641
	(0.1328)	**(0.0636)**	(0.1492)	(0.2928)	**(0.1034)**	(0.1320)
WBL_{t-2}				-0.3256	**0.1612**	0.0932
				(0.2858)	**(0.1072)**	(0.1412)
$IMFC_{t-1}$	0.6553**	**-0.0626**	-0.0948	0.0496	**-0.2913**	-0.3130
	(0.1938)	**(0.0843)**	(0.1497)	(0.3153)	**(0.1534)**	(0.1821)
$IMFC_{t-2}$				0.8020**	**0.3271***	0.3143
				(0.2568)	**(0.1588)**	(0.1890)
OED_{t-1}	0.0968**	**0.0072**	0.0287	0.1928**	**0.0358***	0.0519**
	(0.0169)	**(0.0077)**	(0.0183)	(0.0471)	**(0.0175)**	(0.0180)
OED_{t-2}				-0.1029*	**-0.0358***	-0.026*
				(0.0411)	**(0.0173)**	(0.0127)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.8970	**0.9857**	0.8850	0.9028	**0.9868**	0.8918
Sample size	96	**96**	96	96	**96**	96
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman Test, p=0.0000			Hausman Test, p=0.0000		

The robust standard errors are displayed in the parentheses below the coefficients.
Bold means the model selected; ** means significant at a 1% level; * means significant at a 5% level.

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.2906+0.5598=+0.8504	p=0.0755
Column (5) 0.2840+0.5959=+0.8799	p=0.1680

F-test results for the sum of the coefficients of the lagged terms of FDI, MODA, BODA, WBL, IMFC, and OED being equal to zero, based on Column (5) (testing mid to long-term effects)					
FDI	MODA	BODA	WBL	IMFC	OED
+0.3612	-1.3686	+0.347	-0.016	+0.0358	0.0000
p=0.0000**	p=0.0000**	p=0.0172*	p=0.82	p=0.6643	p=0.9969

Maximum and minimum country dummies in Column (2) and (5)					
Column (2)	Max	Min	Column (5)	Max	Min
Coefficient	0.8757	-1.8546	Coefficient	0.8940	-1.8902
Country	Gabon	Ethiopia	Country	Gabon	Ethiopia

To investigate the effects of TODA and TED on economic growth in developing countries more precisely and robustly, I divide TODA into MODA and BODA, and TED into WBL, IMFC, and ODEBT. The identical regression procedures are utilised. Again, for the sake of selecting the optimal models for lag one and both lag one and two, the F-test, LM test, and Hausman test are conducted. The regression results with the deconstructed variables are shown in Table 3. Through the model selection tests, the FE models are found to be optimal in both regressions (Column [2] and [5]).

The FE regression result of one lag is displayed in column (2). The R-square shows that 98.57% of the variation in RY is determined by the regressors. A 100% increase in RK will on average result in a 29.06% increase in RY, holding the other variables constant, and for EPR, the percentage is 55.98%. The F-test result tells us that at a 10% significance level, these countries tend to have decreasing returns to scale (0.2906+0.5598=0.8504<1). Apart from RK and EPR, the only variable that spurs RY significantly is FDI_{t-1}. With other variables constant, a $1,000 increase in FDI_{t-1} is expected to push RY up by 27.17%. My result shows that if FDI_{t-1} grows from zero to $65 (the mean), RY will increase by 1.77%. Conversely, $MODA_{t-1}$ negatively influences RY enormously. A $1,000 increase in $MODA_{t-1}$ is expected to decrease RY by 107.54%, controlling the other variables. The percentage 107.54% seems too high, but the condition is that $MODA_{t-1}$ increases by $1000, while the mean of MODA in the sample is about $19. This means that if $MODA_{t-1}$ grows from zero to $19 (the mean), RY will decrease by 2.04%, which is reasonable.

Column (5) illustrates the regression coefficients based on the FE model, with both lag one and two. The R-square indicates that 98.68% of the change in RY is captured by the independent variables. The coefficients of ln(RK) and ln(EPR) reveal that with the other regressors constant, a 100% increase in RK is expected to cause a 28.40% increase in RY; a 100% increase in EPR will on average increase RY by 59.59%, controlling the other variables. The F-test result infers that constant returns to scale hold at a 10% significance level (but not at 20%). Besides RK and EPR, FDI_{t-1}, FDI_{t-2}, $IMFC_{t-2}$ and OED_{t-1} as well stimulate economy. On the other hand, $MODA_{t-2}$ and OED_{t-2} pull RY down significantly. The coefficient of FDI_{t-1} becomes 0.1505, and the coefficient of FDI_{t-2} is 0.2107; their sum is 0.3612, which is 33% larger than 0.2717 (when regress with 1 lagged period only). Similar conclusions can be drawn when comparing the other coefficients in Column (2) and (5). Thus, to detect the mid to long-term effects, it is necessary for us to see the significance of the sum of the estimated coefficients for each explanatory variable, and the aggregate effects on these deconstructed variables with two lagged periods are examined and illustrated. According to the results of the F-test, the effects of FDI (+0.3612) and BODA (+0.347) are positive, whereas MODA (-1.3686) has a negative influence on RY. This means that holding the other variables constant, a $1,000 increase in the FDI and BODA will on average cause 36.12% and 34.7% increases in RY in the mid to long term. My result shows that if FDI grows from zero to $65 (the mean), RY will increase by 2.35%. Similarly, for BODA, if BODA grows from zero to $30 (the mean), RY will increase by 1.04%. However, a $1,000 increase in MODA is expected to pull RY down by 136.86%, with the other variables constant. The percentage 136.86% seems too high, but the condition is that MODA increases by $1,000, while

the mean of MODA in the sample is about $19. My result shows that if MODA grows from zero to $19 (the mean), RY will increase by 2.60%, which is reasonable. Moreover, the effects of WBL, IMFC, and OED are not statistically significant from zero (in this case, it seems that the first year's effects of these variables are offset by the second year's effects).

Since the models that are appropriate to be used here are all FE models, each country has its own dummy variable. The constant term is the coefficient for Albania (alphabetically ranked as the first country, whose country dummy is omitted). As shown at the bottom of Table 2 and 3, identically, the highest value of the dummy coefficients is Gabon, whereas the lowest dummy coefficient is Ethiopia. With regard to the "permanent difference" of each country, RY varies approximately 2.75 (derived from the absolute value of the difference of Gabon and Ethiopia's country coefficients).

Based on the above findings, I can demonstrate that if these 96 developing countries are observed as a whole, (a).diminishing returns to scale hold, but the statistical evidence is weak (two of the models are significant at a 10% level, and the other two are at the 20% level); (b).FDI promotes output growth; (c).TODA and TED have no significant impacts on the economy; (d).BODA benefits but MODA dampens the economy; (e).WBL, IMFC, and OED have no significant impacts on the economy.

4.3 Empirical results and interpretations for different income groups

Since these 96 countries have different income levels and were at various stages of development, for the purpose of providing more robust and practical policy implications to the BRICS New Development Bank (NDB) as well as preventing biases in the research procedures, it is necessary to investigate the effects of FDI, foreign aid, and external debts on the economies with various income levels (LIC, LMIC, and UMIC). As stated in the data description, there are 30 LIC, 33 LMIC, and 33 UMIC in the sample (based on the categorisation by the World Bank [WB]). Next, identical regression processes are re-utilised with the concentrations on these income groups.

Table 4. Regression results for the 30 LIC
(Independent variables: ln[RK], ln[EPR], FDI, TODA, & TED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.4519** (0.0411)	**0.2483**** **(0.0568)**	0.2725** (0.0827)	0.4848** (0.0404)	**0.2601**** **(0.0608)**	0.2853**
ln(EPR)	-0.1626* (0.6401)	**0.1598** **(0.2393)**	-0.0173 (0.3992)	-0.1291* (0.0621)	**0.2435** **(0.2335)**	0.0580
FDI_{t-1}	3.9715** (1.0767)	**1.3369** **(0.8824)**	1.3771 (1.0365)	1.7580 (1.0683)	**0.4485** **(0.8130)**	0.4463
FDI_{t-2}				4.1259** (1.3180)	**2.1071*** **(0.8252)**	2.1862**
$TODA_{t-1}$	-1.0244** (0.3284)	**-0.1124** **(0.3236)**	-0.1847 (0.4930)	-0.6516 (0.4483)	**-0.1647** **(0.3808)**	-0.2114
$TODA_{t-2}$				-0.4274 (0.5094)	**0.1005** **(0.4347)**	0.0543
TED_{t-1}	0.2202** (0.6798)	**0.0093** **(0.0535)**	0.0347 (0.0817)	0.5347** (0.1402)	**0.2298*** **(0.1012)**	0.2474
TED_{t-2}				-0.3229** (0.1249)	**-0.2558*** **(0.1006)**	-0.2450*
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.5806	**0.8941**	0.5579	0.6259	**0.9081**	0.5908
Sample size	30	**30**	30	30	**30**	30
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman Test, p=0.0000			Hausman Test, p=0.0004		
The robust standard errors are displayed in the parentheses below the coefficients. **Bold** means the model selected; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on column (2) and (5) (testing constant returns to scale)	
Column (2) 0.2483+0.1598=+0.4081	p = 0.0040**
Column (5) 0.2601+0.2435=+0.5036	p = 0.0122*

F-test results for the sum of the coefficients of the lagged terms of FDI, TODA, and TED being equal to zero, based on Column (5) (testing mid to long-term effects)		
FDI +2.5556	TODA -0.0642	TED -0.0260
p=0.0163*	p=0.8505	p=0.6162

Table 5. Regression results for the 30 LIC
(Independent variables: ln[RK], ln[EPR], FDI, MODA, BODA, WBL, IMFC, & OED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.4892**	**0.2508****	0.2775**	0.5271**	**0.2616****	0.2857**
	(0.0442)	**(0.0580)**	(0.0833)	(0.0445)	**(0.0597)**	(0.0849)
ln(EPR)	-0.1231	**0.1681**	-0.0181	-0.0681	**0.2132**	0.0559
	(0.0665)	**(0.2381)**	(0.3941)	(0.0661)	**(0.2276)**	(0.4078)
FDI_{t-1}	2.9884**	**1.4178**	1.4124	1.1914	**0.5015**	0.4624
	(1.0368)	**(0.8911)**	(1.0180)	(0.9756)	**(0.7859)**	(0.9980)
FDI_{t-2}				3.1127**	**1.9686***	1.9954**
				(1.1663)	**(0.7931)**	(0.5823)
$MODA_{t-1}$	-0.3478	**-0.4086**	-0.3939	-0.2808	**-0.1859**	-0.1733
	(0.9550)	**(0.7376)**	(0.7172)	(1.1026)	**(0.8184)**	(0.8902)
$MODA_{t-2}$				0.4018	**-0.0293**	0.0317
				(1.1527)	**(0.6632)**	(0.6760)
$BODA_{t-1}$	-1.3686	**0.0526**	-0.0804	-0.7772	**0.0913**	0.0025
	(0.7445)	**(0.4793)**	(0.6808)	(0.7580)	**(0.4697)**	(0.6630)
$BODA_{t-2}$				-0.6066	**0.2633**	0.1895
				(0.8492)	**(0.5058)**	(0.3191)
WBL_{t-1}	-0.0967	**-0.4623***	-0.3987	-0.8108	**-0.9830****	-0.9818
	(0.2824)	**(0.1852)**	(0.3555)	(0.5347)	**(0.3331)**	(0.5175)
WBL_{t-2}				0.9249	**0.6260**	0.7172
				(0.6026)	**(0.3653)**	(0.6079)
$IMFC_{t-1}$	2.5963**	**0.1683**	0.2483	2.6206*	**0.6763**	0.7615
	(0.9199)	**(0.7762)**	(0.5945)	(1.2225)	**(0.9011)**	(0.8895)
$IMFC_{t-2}$				1.0745	**0.5620**	0.4720
				(1.0783)	**(0.8956)**	(0.7070)
OED_{t-1}	0.1566	**0.1266**	0.1377*	1.1321**	**0.6340****	0.6653*
	(0.0987)	**(0.0903)**	(0.1273)	(0.3086)	**(0.1880)**	(0.2977)
OED_{t-2}				-1.0927**	**-0.6230****	-0.6531
				(0.3208)	**(0.2138)**	(0.3417)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.5967	**0.8954**	0.5712	0.6514	**0.9109**	0.6237
Sample size	30	**30**	30	30	**30**	30
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman Test, p=0.0002			Hausman Test, fails to meet assumptions (use FE)		

The robust standard errors are displayed in the parentheses below the coefficients.
Bold means the model selected; ** means significant at a 1% level; * means significant at a 5% level.

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.2508+0.1681=+0.4189	p = 0.0043**
Column (5) 0.2616+0.2132=+0.4748	p = 0.0068**

F-test results for the sum of the coefficients of the lagged terms of FDI, MODA, BODA, WBL, IMFC, and OED being equal to zero, based on Column (5) (testing mid to long-term effects)					
FDI	MODA	BODA	WBL	IMFC	OED
+2.4701	-0.2152	+0.2546	-0.357	+1.2383	+0.011
p=0.0000**	p=0.7647	p=0.4300	p=0.0898	p=0.0642	p=0.8725

The regression results for the LIC are displayed in Table 4 and 5, where Table 4 shows the results with RK, EPR, FDI, TODA and TED as independent variables when considering one and both one and two lagged periods, and Table 5 concerns the deconstructed independent variables. In Table 4, according to the model selection tests, the FE models are the best. Besides, the coefficients of ln(EPR) in OLS models are negative, which contradicts prior expectation. As Column (2) shows, if the regression has one lag, 89.41% of the variation in RY is captured by the independent variables. In this model, the only variable that positively and significantly influences RY per capita is RK. Controlling the other regressors, a 100% increase in RY will lead to a 24.83% increase in RY on average. The reason that EPR does not influence RY significantly might be that there are measurement errors[24] in the EPR of LIC, which bias the coefficient towards zero and as a consequence the effect of EPR on RY is underestimated. Even though the sum of the coefficients of ln(RK) and ln(EPR) is smaller than 1 (0.2483+0.1598=0.4081<1), the F-test result fails to reject the null hypothesis of constant returns to scale. If another lagged period is added into the model, as shown in Column (5), 90.81% of the variation in RY is explained by the independent variables. The coefficient of ln(RK) is 0.2601, which means that with the other variables constant, a 100% increase in RK is expected to increase RY by 26.01%. The F-test result also shows that constant returns to scale hold. In addition to RK, FDI_{t-2} and TED_{t-1} also have significant influences on RY, whereas TED_{t-2} is negative and significant. In order to see the mid to long-term effects of each, I launch the F-test on the sum of the estimated coefficients of each variable with both lag one and two. The results indicate that besides RK, only FDI has significant and positive influences on RY in the mid to long run (+2.5556). Controlling the other variables, it is expected that a $1,000 increase in FDI will lead RY to increase by as much as 255.56% in the mid to long term. The percentage 255.56% seems too high, but the condition is that FDI increases by $1,000, while according to Appendix 5, the mean of FDI for LIC in the sample is about $10. The result shows that if FDI grows from zero to $10 (the mean), RY will increase by 2.55%, which is reasonable. This magnitude is much larger than the result for all these 96 developing countries (+0.3401), which means that FDI really matters for the economic growth of the LIC. Besides, I can also see that the negative impact of TED_{t-2} is balanced by the positive effect of TED_{t-1}.

Table 5 illustrates the regression models with the deconstructed variables. According to Antonakis (2013), the FE models should be used when the data fails to meet the assumptions of the Hausman test, because it means that the RE estimators are inconsistent. Thus, for both regressions with one and two lagged periods, the FE models in Column (2) and (5) are appropriate. Besides, since the expected sign of ln(EPR) is positive, I can demonstrate that the regression results of OLS (lag 1 and lag 1&2) and the RE model (lag 1) are inconsistent with the prior expectation. In the FE model with one lag, as shown in Column (2), 89.54% of the change in RY is captured by the independent variables. The only variable that positively and significantly influences RY is RK. A 100% increase in RK will on average lead to a 25.08% increase in RY, with the other variables remaining unchanged. The F-test result indicates that constant returns to

[24] For example, I did not count the child labour in the EPR due to the data being unavailable, but there might be numerous child workers in LIC.

scale hold at. On the other hand, WBL_{t-1} pulls RY down, which means that with the other regressors unchanged, a $1,000 increase in WBL_{t-1} is expected to cause a 46.23% decrease in RY. My result shows that if WBL grows from zero to $86 (the mean), RY will decrease by 3.96%. When considering two lagged periods, as Column (5) shows, the R-square indicates that 91.09% of the variation in RY is captured by the variation of explanatory variables. The coefficient of ln(RK) remains positive and significant. With the other regressors constant, a 100% increase in RK is expected to generate a 26.16% increase in RY. Besides, diminishing returns to scale are not tenable in this model as well. FDI_{t-2} and OED_{t-1} are significant stimulators of RY, while WBL_{t-1} and OED_{t-2} dampens RY. Again, it is necessary to test the significance of the sum of the estimated coefficients for each variable to obtain the mid to long-term effects. These findings show that although it seems that a number of variables could influence RY significantly, in the mid to long run, at a 5% significance level, FDI is the only variable of international capital flows that influences RY, and the effect is large and positive (+2.4701). Controlling the other variables, it is expected that a $1,000 increase in FDI will lead to a 247.01% increase in RY. The percentage 247.01% seems too high, but the condition is that FDI increases by $1,000, while according to Appendix 5, the mean of FDI for LIC in the sample is about $10. My result shows that if FDI grows from zero to $10 (the mean), RY will increase by 2.47%, which is reasonable. Tentatively, at a 10% significance level, WBL has negative (-0.357) while IMFC has positive (+1.2383) effects on RY. In the mid to long term, with the other variables unchanged, a $1,000 increase in WBL is expected to cause a 35.7% drop in RY. This result shows that if WBL grows from zero to $86 (the mean), RY will decrease by 3.07%. A 1,000 increase in IMFC will on average increase RY by 123.83%, with the other variables constant. The percentage 123.83% seems too high, but the condition is that IMFC increases by $1,000, while according to Appendix 5, the mean of IMFC for LIC in the sample is about $19. This means that FDI grows from zero to $19 (the mean), RY will increase by 2.35%. These findings show that unlike the whole group of 96 countries, in the mid to long run, RY for the poorest countries is dampened by WBL but promoted by IMFC in a large magnitude. However, MODA, BODA, and OED have no significant influences on RY (the impacts of OED_{t-2} is balanced by OED_{t-1}).

Table 6. Regression results for the 33 LMIC
(Independent variables: ln[RK], ln[EPR], FDI, TODA, & TED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.4279** (0.0396)	**0.2731** (0.0462)**	0.2811** (0.0607)	0.4338** (0.0436)	**0.2661** (0.0506)**	0.2825** (0.0617)
ln(EPR)	0.1766** (0.1766)	**0.4049* (0.1751)**	0.3324 (0.2963)	0.1791** (0.0468)	**0.4705* (0.1858)**	0.3224 (0.2400)
FDI_{t-1}	0.4799* (0.2418)	**0.5546** (0.1476)**	0. 5714* (0.2822)	0.3105 (0.3037)	**0.3671** (01378)**	0.3969* (0.1948)
FDI_{t-2}				0.3011 (0.3166)	**0.3361* (0.1360)**	0.3460* (0.1401)
$TODA_{t-1}$	-0.9375** (0.2213)	**0.0489 (0.0839)**	0.0396 (0.0958)	-0.4779* (0.2235)	**0.0891 (0.0828)**	0.0796 (0.0936)
$TODA_{t-2}$				-0.6722** (0.2314)	**-0.0337 (0.0992)**	-0.0582 (0.0884)
TED_{t-1}	0.0881** (0.0192)	**-0.0215* (0.0093)**	-0.0185 (0.0180)	0.1257* (0.0565)	**-0.0147 (0.0150)**	0.0092 (0.0192)
TED_{t-2}				-0.0238 (0.0496)	**-0.0065 (0.0148)**	0.0057 (0.0157)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.6223	**0.9473**	0.5644	0.6362	**0.9511**	0.5796
Sample size	33	**33**	33	33	**33**	33
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman Test, p=0.0060			Hausman Test fails to meet assumptions (use FE)		

The robust standard errors are displayed in the parentheses below the coefficients.
Bold means the model selected; ** means significant at a 1% level; * means significant at a 5% level.

F-test results for the sum of the coefficients of ln(RK)and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.2731+0.4049=+0.6780	p=0.0237*
Column (5) 0.2661+0.4705=+0.7366	P=0.0789

F-test results for the sum of the coefficients of the lagged terms of FDI, TODA, and TED being equal to zero, based on Column (5) (testing mid to long-term effects)		
FDI	TODA	TED
+0.7032	+0.0554	-0.0212
p=0.0000**	p=0.6670	p=0.0267*

Table 7. Regression results for the 33 LMIC
(Independent variables: ln[RK], ln[EPR], FDI, MODA, BODA, WBL, IMFC, & OED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.4244**	**0.2687****	0.2775**	0.4277**	**0.2583****	0.2747**
	(0.0401)	**(0.0466)**	(0.0613)	(0.0445)	**(0.0507)**	(0.0617)
ln(EPR)	0.1489**	**0.4781****	0.3911	0.1377**	**0.5485****	0.3837
	(0.0459)	**(0.1862)**	(0.3085)	(0.0459)	**(0.1948)**	(0.2520)
FDI_{t-1}	0. 4836	**0.5844****	0. 6013*	0.2895	**0.4094****	0.4362*
	(0.2503)	**(0.1352)**	(0.2658)	(0.2998)	**(0.1128)**	(0.1855)
FDI_{t-2}				0.3200	**0.3632****	0.3728**
				(0.3121)	**(0.1149)**	(0.1332)
$MODA_{t-1}$	-1.8451**	**-0.1296**	-0.1245	-1.0691	**0.0961**	0.0838
	(0.5183)	**(0.2354)**	(0.3691)	(0.5710)	**(0.2424)**	(0.3394)
$MODA_{t-2}$				-1.2910*	**-0.3315**	-0.3471
				(0.5315)	**(0.2865)**	(0.3518)
$BODA_{t-1}$	-0.0952	**0.1559**	0.1499	0.2186	**0.2078***	0.2184*
	(0.2829)	**(0.0885)**	(0.1025)	(0.2523)	**(0.0941)**	(0.0881)
$BODA_{t-2}$				-0.2435	**0.0521**	0.0364
				(0.2894)	**(0.1100)**	(0.1262)
WBL_{t-1}	-0.3132	**0.0757**	0.0469	-0.5974	**-0.1003**	-0.1558
	(0.1637)	**(0.0940)**	(0.1994)	(0.3612)	**(0.1376)**	(0.1549)
WBL_{t-2}				0.2528	**0.1745**	0.1765
				(0.3549)	**(0.1433)**	(0.2081)
$IMFC_{t-1}$	0.4047	**-0.5212***	-0.4697	0.4999	**-0.6685**	-0.5614
	(0.2970)	**(0.2100)**	(0.2736)	(0.7847)	**(0.4185)**	(0.2951)
$IMFC_{t-2}$				0.1103	**0.1257**	0.1159
				(0.7062)	**(0.3852)**	(0.2925)
OED_{t-1}	0.1037**	**0.0079**	0.0046	0.1707*	**0.0187**	0.0254
	(0.0238)	**(0.0087)**	(0.0151)	(0.0792)	**(0.0186)**	(0.0238)
OED_{t-2}				-0.0578	**-0.0223**	-0.0224
				(0.0680)	**(0.0167)**	(0.0186)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.6321	**0.9482**	0.5552	0.6467	**0.9526**	0.5715
Sample size	33	**33**	33	33	**33**	33
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman test, p=0.0000			Hausman test fails to meet assumptions (use FE)		
The robust standard errors are displayed in the parentheses below the coefficients. **Bold** means the model selected; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.2687+0.4781=+0.7468	p=0.0941
Column (5) 0.2583+0.5485=+0.8068	p=0.2201

F-test results for the sum of the coefficients of the lagged terms of FDI, MODA, BODA, WBL, IMFC, and OED being equal to zero, based on Column (5) (testing mid to long-term effects)					
FDI	MODA	BODA	WBL	IMFC	OED
+0.7726	-0.2354	+0.2599	+0.0742	-0.5428	+0.1444
p=0.0000**	p=0.5403	p=0.0787	p=0.4538	p=0.0097**	p=0.7053

Table 6 and 7 present the regression results for the 33 LMIC. Similar to Table 4 and 5, in Table 6, TODA and TED are used, and in Table 7, these two variables are disassembled. Lag one and both lag one and two are considered in the regressions. In Table 6 and 7, the model selection tests indicate that the FE models are suitable for use (Column [2] and [5]). To interpret the results of Table 6, for Column (2), the R-square shows that there is 94.73% of the variation in RY captured by the independent variables, and RK, EPR, FDI_{t-1} and TED_{t-1} influence RY significantly. In regard to RK, a 100% increase in RK will on average lead to a 27.31% increase in RY, controlling the other variables; for EPR, the percentage turns out to be 40.49%. The F-test result on returns to scale shows that diminishing returns hold (0.2731+0.4049=0.6780<1). Besides RK and EPR, FDI_{t-1} spurs growth as well. A $1,000 increase in FDI_{t-1} is expected to result in a 55.46% increase in RY, with the other variables constant. This means that if FDIt-1 grows from zero to $42 (the mean), RY will increase by 2.33%. On the other hand, with the other variables constant, if TED_{t-1} grows by $1,000, RY will on average drop by 2.15%. When considering two lagged periods, as Column (5) shows, the R-square is 0.9511, which means that 95.11% of the variation in RY is captured by the explanatory variables. RK and EPR promote economic growth. A 100% increase in RK is expected to generate a 26.61% increase in RY, when the other variables remain constant; a 100% increase in EPR will on average push RY up by 47.05%, with the other regressors unchanged. The F-test shows that there are diminishing returns to scale at a 10% significance level (0.2661+0.4705=0.7366<1). Besides, FDI_{t-1} and FDI_{t-2} also have positive and significant effects on RY, and the magnitude is similar (0.3671 and 0.3361). Next, the mid to long-term effects of each variable (lag 1 & 2) are tested. The results show that if focusing on the mid to long run, FDI has a positive influence on RY (+0.7032), whereas the impact of TED is negative (-0.0212). A $1,000 increase in FDI is expected to push RY up by 70.32% in the mid to long term, with the other variables constant. The percentage 70.32% seems high, but the condition is that FDI increases by $1,000, while according to Appendix 5, the mean of FDI for LMIC in the sample is about $42. This result shows that if FDI grows from zero to $42 (the mean), RY will increase by 2.95%. However, a $1,000 increase in TED will on average cause a 2.12% decrease in RY in the mid to long run, when controlling the other variables.

In Table 7, the FE models are the most appropriate too. For the models with both one lagged period and two lagged periods, I will again focus on Column (2) and (5). As specified in Column (2), 94.82% of the variation in RY is captured by the variation in the independent variables. RK and EPR have significant impacts on RY. A 100% increase in RK is expected to lead to a 26.87% increase in RY, with the other variables constant; for EPR, the rate is 47.81%. The test on returns to scale estimates that decreasing returns to scale are tenable at a 10% significance level (0.2687+0.4781=0.7468<1). In addition, FDI_{t-1} also has a positive and significant influence on RY. A $1,000 increase in FDI_{t-1} will on average lead to a 58.44% increase in RY, when controlling the other variables. This result means that if FDI_{t-1} grows from zero to $42 (the mean), RY will increase by 2.45%. On the other hand, the coefficient of $IMFC_{t-1}$ is negative and significant. With the other variables constant, a $1,000 increase in $IMFC_{t-1}$ is expected to cause a 52.12% drop in RY, and the result shows that if $IMFC_{t-1}$ grows from zero to $38 (the mean), RY will decrease by 1.98%. If both lag one and two are taken into consideration, as Column (5) reports, 95.26% of the variation

in RY is explained by the variation of the regressors. RK, EPR, FDI_{t-1}, FDI_{t-2} and $BODA_{t-1}$ stimulate RY positively and significantly. For RK and EPR, a 100% increase in RK is expected to generate a 25.83% increase in RY, holding the other regressors constant; for EPR, the percentage becomes 54.85%. The returns to scale are estimated to be constant at a 10% significance level. The F-tests on the significance of the sum of the estimated coefficients of the lagged deconstructed variables indicate that FDI promotes RY (+0.7726), whereas IMFC pulls RY down (-0.5428), and BODA promotes RY at a 10% significance level as well (+0.2599). With the other variables remaining constant, a $1,000 increase in FDI is expected to cause a 77.26% increase in RY in the mid to long term. The percentage 77.26% seems high, but the condition is that FDI increases by $1,000, while according to Appendix 5, the mean of FDI for LMIC in the sample is about $42. My result shows that if FDI grows from zero to $42 (the mean), RY will increase by 3.24%. With the other variables unchanged, a $1,000 increase in IMFC will on average decrease RY by 54.28%. My result shows that if IMFC grows from zero to $38 (the mean), RY will decrease by 2.06%. Besides, I understand that it seems abnormal to obtain a p-value of 0.0097, because the coefficient of $IMFC_{t-1}$ is negative and insignificant, while the coefficient of $IMFC_{t-2}$ is positive and insignificant. However, the results have been re-tested and this outcome is really what the data told us. A $1,000 increase in BODA will on average cause a 25.99% increase in RY, which means that if BODA grows from zero to $34 (the mean), RY will increase by 0.88%, with the other variables constant,

Table 8. Regression results for the 33 UMIC
(Independent variables: ln[RK], ln[EPR], FDI, TODA, & TED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.5731**	**0.3748****	0.4114**	0.5680**	**0.3575****	0.4026**
	(0.0592)	**(0.0945)**	(0.1368)	(0.0642)	**(0.1009)**	(0.1445)
ln(EPR)	-0.0313	**0.6548****	0.4151	-0.0683	**0.7127****	0.4009
	(0.0572)	**(0.2398)**	(0.2841)	(0.0683)	**(0.2463)**	(0.2765)
FDI_{t-1}	0.2139**	**0.1087**	0.1220	0.0942	**0.0567**	0.0673
	(0.0537)	**(0.0688)**	(0.1369)	(0.0756)	**(0.0623)**	(0.1070)
FDI_{t-2}				0.1708*	**0.0910**	0.1017
				(0.0807)	**(0.0684)**	(0.0840)
$TODA_{t-1}$	-0.7110**	**-0.2770**	-0.2718	-0.6677*	**-0.1573**	-0.1428
	(0.2699)	**(0.1787)**	(0.2976)	(0.3248)	**(0.1850)**	(0.2801)
$TODA_{t-2}$				-0.2716	**-0.1061**	-0.1237
				(0.3163)	**(0.1667)**	(0.2036)
TED_{t-1}	0.0586**	**0.0066**	0.0120	0.0831**	**0.0092**	0.0125
	(0.0134)	**(0.0088)**	(0.0208)	(0.0286)	**(0.0188)**	(0.0206)
TED_{t-2}				-0.0252	**0.0061**	0.0013
				(0.0271)	**(0.0182)**	(0.0126)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.7453	**0.9239**	0.6523	0.7410	**0.9216**	0.6448
Sample size	33	**33**	33	33	**33**	33
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman Test, p=0.0000			Hausman Test fails to meet assumptions (use FE)		
The robust standard errors are displayed in the parentheses below the coefficients. **Bold** means the model selected; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.3748+0.6548=+1.0296	p=0.8452
Column (5) 0.3575+0.7127=+1.0702	p=0.6476

F-test results for the sum of the coefficients of the lagged terms of FDI, TODA, and TED being equal to zero, based on Column (5) (testing mid to long-term effects)		
FDI	TODA	TED
+0.1447	-0.2634	+0.0138
p=0.3340	p=0.5191	p=0.6024

Table 9. Regression results for the 33 UMIC
(Independent variables: ln[RK], ln[EPR], FDI, MODA, BODA, WBL, IMFC, & OED)

Regression with ln(RY) as dependent variable						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) OLS	**(2) FE**	(3) RE	(4) OLS	**(5) FE**	(6) RE
ln(RK)	0.5799**	**0.3823****	0.4187**	0.5745**	**0.3658****	0.4055**
	(0.0604)	**(0.0990)**	(0.1393)	(0.0648)	**(0.1040)**	(0.1460)
ln(EPR)	0.0076	**0.6812****	0.4403	-0.0328	**0.7095****	0.4314
	(0.0587)	**(0.2354)**	(0.2722)	(0.0620)	**(0.2348)**	(0.2670)
FDI_{t-1}	0.2373**	**0.1328***	0.1451	0.1054	**0.0734**	0.0836
	(0.0529)	**(0.0664)**	(0.1277)	(0.0724)	**(0.0591)**	(0.0945)
FDI_{t-2}				0.1919*	**0.1117**	0.1211
				(0.0763)	**(0.0646)**	(0.0864)
$MODA_{t-1}$	-2.5677**	**-1.7621****	-1.7728**	-1.0381	**-1.1787***	-1.0347
	(0.4767)	**(0.3966)**	(0.6328)	(0.9751)	**(0.5976)**	(0.8486)
$MODA_{t-2}$				-1.7921*	**-1.2443****	-1.3414**
				(0.8882)	**(0.4502)**	(0.4413)
$BODA_{t-1}$	-0.2352	**0.2182**	0.2183	-0.5272	**0.0802**	0.0723
	(0.3286)	**(0.1412)**	(0.2019)	(0.3787)	**(0.1609)**	(0.1905)
$BODA_{t-2}$				0.1713	**0.4041***	0.4005*
				(0.3249)	**(0.1672)**	(0.1782)
WBL_{t-1}	0.7232**	**0.4535***	0.4662	-0.3247	**0.0937**	0.0883
	(0.1820)	**(0.1942)**	(0.3357)	(0.6059)	**(0.3810)**	(0.5000)
WBL_{t-2}				0.9705	**0.2179**	0.2502
				(0.5305)	**(0.3614)**	(0.4868)
$IMFC_{t-1}$	-0.1115	**-0.0785**	-0.1281	-0.2644	**-0.3952***	-0.4369*
	(0.1360)	**(0.1161)**	(0.2141)	(0.2462)	**(0.1661)**	(0.1891)
$IMFC_{t-2}$				0.2285	**0.4449****	0.4282
				(0.2307)	**(0.1614)**	(0.2259)
OED_{t-1}	0.0478**	**0.0043**	0.0032	0.1069**	**0.0276**	0.0325
	(0.0141)	**(0.0101)**	(0.0221)	(0.0288)	**(0.0219)**	(0.0179)
OED_{t-2}				-0.0625*	**-0.0411**	-0.0366*
				(0.0279)	**(0.0229)**	(0.0169)
Country effects	No	**Yes**	No	No	**Yes**	No
R-square	0.7564	**0.9279**	0.6638	0.7535	**0.9273**	0.6444
Sample size	33	**33**	33	33	**33**	33
Model selection	Country effects are equal, p=0.0000			Country effects are equal, p=0.0000		
	LM test for random effects, p=0.0000			LM test for random effects, p=0.0000		
	Hausman test, p=0.0000			Hausman test, p=0.0315		
The robust standard errors are displayed in the parentheses below the coefficients. **Bold** means the model selected; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1, based on Column (2) and (5) (testing constant returns to scale)	
Column (2) 0.3823+0.6812=+1.0635	p=0.6604
Column (5) 0.3658+0.7095=+1.0753	p=0.5943

F-test results for the sum of the coefficients of the lagged terms of FDI, MODA, BODA, WBL, IMFC, and OED being equal to zero, based on Column (5) (testing mid to long-term effects)					
FDI	MODA	BODA	WBL	IMFC	OED
+0.1851	-2.4230	+0.4843	+0.3116	+0.0497	-0.0041
p=0.0332*	p=0.0003**	p=0.0144*	p=0.1536	p=0.6710	p=0.2128

In regard to the UMIC, the regression outcomes are presented in Table 8 and 9. Similar to the tables before, Table 8 displays the results that consider TODA and TED as independent variables, with lag one and both lag one and two. The outcomes of the deconstructed variables are shown in Table 9. In both Table 8 and 9, the model selection tests have demonstrated that FE models are the most appropriate to explain the relationships (Column [2] and [5]). As the coefficients are shown in Column (2), the R-square is 0.9239, and it means that 92.39% of the variation in RY is captured by the regressors. If merely one lag is taken into consideration, there is no variables influencing RY significantly except RK and EPR. A 100% increase in RK is going to lead to a 37.48% increase in RY, with the other variables constant; for EPR, the rate becomes 65.48%. In addition, I cannot reject the hypothesis that the UMIC have constant returns to scale. If adding the second lag into the model, as Column (5) shows, 92.16% of the variation in RY is explained by the variations in the independent variables[25]. The significances of the variables are similar and only RK and EPR have significant impacts on RY. A 100% increase in RK will on average lead to a 35.75% increase in RY, holding the other regressors constant; for EPR, the percentage turns out to be 71.27%. In this model, constant returns to scale hold. From the regression results, I can draw the conclusion that it is necessary to utilise an F-test on the mid to long-term effects of these lagged variables. However, the result demonstrates that even considering their aggregate impacts of previous two years, none of FDI, TODA, or TED could affect RY significantly.

In Table 9, as presented in Column (2), if one lagged period is considered, 92.79% of the variation in RY is captured by the variation in the regressors. RK and EPR can stimulate economic growth. A 100% increase in RK will on average lead to a 38.23% increase in RY, with the other variables constant; holding the other regressors constant, a 100% increase in EPR is expected to generate a 68.12% increase in RY. Based on the F-test, these countries are very likely to have constant returns to scale. Additionally, FDI_{t-1} and WBL_{t-1} also spur RY. Holding the other variables constant, a \$1,000 increase in FDI_{t-1} is expected to bring a 13.28% increase in RY; for WBL_{t-1}, the percentage is 45.35%. This means that if $BODA_{t-1}$ grows from zero to \$31 (the mean), RY will increase by 1.41%. Conversely, $MODA_{t-1}$ has negative impacts on RY. A \$1,000 increase in $MODA_{t-1}$ will on average cause a 176.21% drop in RY. The percentage 176.21% seems too high, but the condition is that MODAt-1 increases by \$1,000, while according to Appendix 5, the mean of MODA for UMIC in the sample is about \$15. The result shows that if MODAt-1 grows from zero to \$15 (the mean), RY will decrease by 2.64%. After adding the second lag into the regression models (Column [5]), 92.93% of the variation in RY can be captured by the explanatory variables. If RK increases by 100%, it is expected that RY will increase by 36.58%, controlling the other regressors; for EPR, the percentage is 70.95%. The F-test on the returns to scale also infers constant returns to scale. Apart from RK and EPR, the variables that could also promote RY are $BODA_{t-2}$ and $IMFC_{t-2}$. By contrast, $MODA_{t-1}$, $MODA_{t-2}$, and $IMFC_{t-1}$ influence RY negatively and significantly. The significance tests on the sum of the estimated coefficients of the lagged variables are launched afterwards. The outcomes indicate that for the UMIC, FDI has positive influences on RY (+0.1851) in mid to long term, but the magnitude is smaller than the influences

[25] Although three more variables (2 lagged periods) are added, the R-square drops because the total amount of observations in the regression model decrease from 20 years to 19 years. The R-squares in Column (2) and (5) of Table 9 as well drop due to this.

on the RY of LIC and LMIC. BODA promotes RY significantly (at a 5% level) for the first time (+0.4843), whereas MODA makes RY fall (-2.4230). In the mid to long term, a $1,000 increase in FDI and BODA will on average lead to 18.51% and 48.43% increase in RY, holding the other regressors unchanged. The percentage 48.43% shows that if BODA grows from zero to $31 (the mean), RY will increase by 1.50%. With the other variables constant, a $1,000 increase in MODA is expected to decrease RY by as much as 242.3%. The percentage 242.3% seems too high, but the condition is that MODA increases by $1,000, while according to Appendix 5, the mean of MODA for UMIC in the sample is about $15. My result shows that MODA grows from zero to $15 (the mean), RY will increase by 3.63%, which is reasonable. It seems that the significant positive impacts from BODA and negative impacts from MODA for the whole group obtained in the previous part are mainly from the UMIC. Furthermore, WBL has a positive effects on RY if I tentatively increase the significance level to 15.36%.

4.4 A comparison of the results for different income groups

Table 10. The comparisons of the results for the LIC, LMIC, & UMIC
(Independent variables: ln[RK], ln[EPR], FDI, TODA, & TED)

The comparisons of the coefficients of LIC, LMIC, & UMIC, dependent variable: ln(RY)						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) LIC	(2) LMIC	(3) UMIC	(4) LIC	(5) LMIC	(6) UMIC
ln(RK)	0.2483**	0.2731**	0.3748**	0.2601**	0.2661**	0.3575**
ln(EPR)	0.1598	0.4049*	0.6548**	0.2435	0.4705*	0.7127**
FDI_{t-1}	1.3369	0.5546**	0.1087	0.4485	0.3671**	0.0567
FDI_{t-2}				2.1071*	0.3361*	0.0910
$TODA_{t-1}$	-0.1124	0.0489	-0.2770	-0.1647	0.0891	-0.1573
$TODA_{t-2}$				0.1005	-0.0337	-0.1061
TED_{t-1}	0.0093	-0.0215*	0.0066	0.2298*	-0.0147	0.0092
TED_{t-2}				-0.2558*	0.0065	0.0061
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.8941	0.9473	0.9239	0.9081	0.9511	0.9216
Sample size	30	33	33	30	33	33
The FE models are selected for all of the regressions; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1 (testing constant returns to scale)		
	1 lagged period	1 & 2 lagged periods
LIC	+0.4081	+0.5036
	p=0.0040**	p=0.0122*
LMIC	+0.6780	+0.7366
	p=0.0237*	p=0.0789
UMIC	+1.0296	+1.0702
	p=0.8452	p=0.6476

F-test results for the sum of the coefficients of the lagged terms of FDI, TODA, and TED being equal to zero (testing mid to long-term effects)			
	FDI	TODA	TED
LIC	+2.5556	-0.0642	-0.0260
	p=0.0163*	p=0.8505	p=0.6162
LMIC	+0.7032	+0.0554	-0.0212
	p=0.0000**	p=0.6670	p=0.0267*
UMIC	+0.1447	-0.2634	+0.0138
	p=0.3340	p=0.5191	p=0.6024

Table 11. The comparisons of the results for the LIC, LMIC, & UMIC
(Independent variables: ln[RK], ln[EPR], FDI, MODA, BODA, WBL, IMFC, & OED)

The comparisons of the coefficients of LIC, LMIC, & UMIC, dependent variable: ln(RY)						
	Allowing 1 lagged period			Allowing 2 lagged periods		
Variables	(1) LIC	(2) LMIC	(3) UMIC	(4) LIC	(5) LMIC	(6) UMIC
ln(RK)	0.2508**	0.2687**	0.3823**	0.2616**	0.2583**	0.3658**
ln(EPR)	0.1681	0.4781**	0.6812**	0.2132	0.5485**	0.7095**
FDI_{t-1}	1.4178	0.5844**	0.1328*	0.5015	0.4094**	0.0734
FDI_{t-2}				1.9686*	0.3632**	0.1117
$MODA_{t-1}$	-0.4086	-0.1296	-1.7621**	-0.1859	0.0961	-1.1787*
$MODA_{t-2}$				-0.0293	-0.3315	-1.2443**
$BODA_{t-1}$	0.0526	0.1559	0.2182	0.0913	0.2078*	0.0802
$BODA_{t-2}$				0.2633	0.0521	0.4041*
WBL_{t-1}	-0.4623*	0.0757	0.4535*	-0.9830**	-0.1003	0.0937
WBL_{t-2}				0.6260	0.1745	0.2179
$IMFC_{t-1}$	0.1683	-0.5212*	-0.0785	0.6763	-0.6685	-0.3952*
$IMFC_{t-2}$				0.5620	0.1257	0.4449**
OED_{t-1}	0.1266	0.0079	0.0043	0.6340**	0.0187	0.0276
OED_{t-2}				-0.6230**	-0.0223	-0.0411
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.8954	0.9482	0.9279	0.9109	0.9526	0.9273
Sample size	30	33	33	30	33	33
The FE models are selected for all of the regressions; ** means significant at a 1% level; * means significant at a 5% level.						

F-test results for the sum of the coefficients of ln(RK) and ln(EPR) being equal to 1 (testing constant returns to scale)		
	1 lagged period	1 & 2 lagged periods
LIC	+0.4189	+0.4748
	p=0.0043**	p=0.0068**
LMIC	+0.7468	+0.8068
	p=0.0941	p=0.2201
UMIC	+1.0635	+1.0753
	p=0.6604	P=0.5943

F-test results for the sum of the coefficients of the lagged terms of FDI, MODA, BODA, WBL, IMFC, and OED being equal to zero (testing mid to long-term effects)						
	FDI	MODA	BODA	WBL	IMFC	OED
LIC	+2.4701	-0.2152	+0.2546	-0.3570	+1.2383	+0.0110
	p=0.0000**	p=0.7647	p=0.4300	p=0.0898	p=0.0642	p=0.8725
LMIC	+0.7726	-0.2354	+0.2599	+0.0742	-0.5428	+0.1444
	p=0.0000**	p=0.5403	p=0.0787	p=0.4538	p=0.0097**	p=0.7053
UMIC	+0.1851	-2.4230	+0.4843	+0.3116	+0.0497	-0.0041
	p=0.0332*	p=0.0003**	p=0.0144*	p=0.1536	p=0.6710	p=0.2128

Table 10 and 11 present the regression results for the LIC, LMIC, and UMIC. The FE models are the best to interpret the relationships between the variables for all these income groups. When comparing the results, I am able to obtain some findings.

Firstly, the coefficient of ln(RK) for the UMIC (approximately 0.37) is higher than for the LIC and LMIC (approximately 0.26). Besides, the higher a country's income level, the higher the coefficient of ln(EPR) (approximately 0.19 for LIC, 0.48 for LMIC, and 0.7 for UMIC). These differences might be caused by measurement errors in the independent variables which are able to influence the returns of capital (such as technology) and the efficiency of the labour force (such as education). What's more, according to the F-test results, I cannot reject that the LIC and UMIC have constant returns to scale, while the LMIC are very likely to have diminishing returns to scale (at a 10% significance level, 3 out of 4 F-tests infer diminishing returns to scale).

Secondly, compared with the other variables of international capital flows, FDI stimulates the host countries' economic growth distinctly across all the LIC, LMIC, and UMIC, but the magnitude is larger in the LIC in the medium to long run. For LMIC, FDI is also playing a vital role in pushing RY growth, and is always significant (from short to long term). In regard to the UMIC, after deconstructing TODA and TED, FDI also promotes growth in the mid to long run, but the magnitude is the smallest among all these income groups.

Thirdly, TODA has no measurable effects on all the LIC, LMIC, and UMIC. TED also has no significant impacts on the RY of LIC and UMIC, but it weakens the RY of LMIC. In general, the effects of TODA and TED on RY are unmeasurable, except TED of the LMIC.

Fourthly, MODA always has negative signs (for all the LIC, LMIC, and UMIC). In addition, it pulls the RY of UMIC down significantly and distinctively. The results are unchanged even after considering the lagged terms individually or aggregately (from short to long term). However, BODA always has positive signs. In the mid to long term, BODA stimulates RY for the UMIC; at a 10% significance level, it also stimulates the RY of LMIC.

Next, in regard to WBL, IMFC, and OED, in the short to medium term, WBL has negative influences on the economy of LIC; at a 10% significance level, it dampens the RY of LIC in the mid to long run as well. However, WBL tends to promote growth in the UMIC. For IMFC, it harms the LMIC, but at a 10% level, IMFC can considerably stimulate the RY for the LIC. Furthermore, for all the income levels, OED fails to affect RY significantly.

Lastly, the R-squares of these models range from 0.8941 to 0.9526, which indicates that these explanatory variables have strong explanatory powers on the variations of RY. Because the R-squares of the LMIC are relatively higher than the LIC and UMIC, these independent variables tend to perform better in capturing the RY for the LMIC; although for the LIC and UMIC, these variables also act well.

Chapter 5. Discussion and policy implications

5.1 Returns to scale and the New Development Bank (NDB)

In general, these 96 low to middle income developing countries in the sample are likely to have weak diminishing returns to scale, which means that if the countries are homogeneous (identical in technology, business environment, population growth rate, inflation rate, etc.), in an absolute sense, they would converge in terms of real income per capita (steady-state) (Artelaris, Arvanitidis, & Petrakos, 2008).

Nonetheless, if I divide these countries into low income countries (LIC), lower-middle income countries (LMIC), and upper-middle income countries (UMIC), I can find that the hypothesis that the LIC and UMIC have constant returns to scale cannot be rejected, while for the LMIC the hypothesis can be rejected. The LMIC are very likely to have diminishing returns to scale. These outcomes infer that the demarcation line of returns to scale is between LMIC and UMIC[26].

It can be reasoned that improving the effectiveness and efficiency of factors of production (capital and labour) is essential for the developing world, especially for the LMIC. Incidentally, from the perspectives of helping the two poorest groups of countries, the establishment of the NDB would probably be an initial step for the LIC and LMIC to get on the right track of economic growth.

5.2 The role of foreign direct investment (FDI) and policy implications for the NDB

Based on the empirical findings, it can be concluded that compared with foreign aid and external debt, FDI is the most important variable to stimulate economic growth in these low to middle income countries. The effects are obviously important, especially in the LIC and LMIC. Furthermore, for the UMIC, FDI still tends to have a positive and significant impact in the mid to long term, although with a smaller magnitude.

These findings are consistent with those of Borensztein et al. (1998), Dabla-Norris et al. (2010), and Craigwell et al. (2012), which indicate that low to middle income developing countries should try to absorb more FDI rather than finance through other external sources. However, currently the International Monetary Fund (IMF) and World Bank (WB) are mainly acting as the sources of foreign aid and external debt[27].

The positive impacts of FDI inferred in this dissertation support the declaration made in the BRICS (2013) 5th Summit that the developing countries need more FDI to supplement development. Therefore, the NDB had better act as a foreign investor and also an intermediary agent of FDI. Meanwhile, it needs to focus more on investing in the LIC and LMIC. Practically, the optimal

[26] Four of the five BRICS countries are at least UMIC, except India.
[27] As stated in Footnote 2, one of the WB's institutions, the Multilateral Investment Guarantee Agency (MIGA) promotes FDI into developing countries by offering political risk insurance (guarantees) to investors and lenders. But because there are few recent studies on the effectiveness of the MIGA and it is not functioning as a foreign investor, I will not discuss it in this dissertation.

projects for the NDB to launch in these countries are those that could increase fixed capital stock, because I find that fixed capital is always the promoters of the economy.

In respect of the countries with different income levels, at this stage, the NDB is expected to invest and guide FDI flows preferentially into the LIC and LMIC for the following reasons: (a).FDI is able to improve capital stock level exogenously, and also (probably) spill over into the other endogenous factors[28]; (b).among all the variables of international capital flows, FDI is a distinct and substantial determinant of economic growth for the LIC and LMIC; (c).the other international supports (total official development assistance [TODA], total external debt [TED], and their components) are not that effective in stimulating economic growth for the LIC and LMIC. Meanwhile, the NDB should not ignore the positive influences from FDI to the UMIC as well; despite FDI seeming to be less important for those countries, the effect is still positive if considering a longer period. In summary, to stimulate the developing world's economic growth, the NDB needs to operate as an investor as well as a compass of the flows of FDI towards the developing countries.

5.3 The role of foreign aid and policy implications for the NDB

Theoretically, TODA should have positive impacts on the economy. However, my findings suggest that if considering these 96 developing countries as a whole, the influence is likely to be negative (significant at the 15.3%, which is weak but cannot be ignored). The summary made by Cassen (1994) might be a good explanation of these results: "the relationship between aid and growth is rather weak: it can be either positive or negative, depending on the country groupings and time period chosen" (p.15). When considering the developing countries as a whole, TODA is the only variable that always has negative signs. If deconstructing it into multilateral official development assistance (MODA) and bilateral official development assistance (BODA), I can find that in the mid to long term, BODA has positive effects on the economy of the LMIC and UMIC, whereas MODA dampens the economy of the UMIC. However, neither BODA nor MODA could influence the economy of LIC significantly. Furthermore, no matter what regression models are used, the signs of MODA are always negative while the signs of BODA are always positive.

There are two possible reasons why these negative coefficients of TODA and MODA are inferred: (a).contemporaneous relationships still exist, because the aid providers predict that these recipient countries will suffer from recessions, and thus they give assistance in advance; (b).this assistance really makes no contributions to output growth but weakens the economy. Because there is little evidence showing that the assistance offer by MODA agencies is based on the expectations of economic contractions, I would believe that this assistance failed to be constructive (reason [b] holds).

The mission of development assistance is definitely to promote economic growth, not to worsen it. However, in general, this dissertation fails to establish evidences that TODA and MODA have

[28] I will extend this later in this chapter.

been able to promote growth in developing countries in the last two decades. The findings reveal that on average, foreign aid does not stimulate economic growth in developing countries, which accords with Carden (2009), Ahmed and Wahab (2011), and Ali (2013). Concerning MODA and BODA, I can draw the conclusion that MODA has negative while BODA has positive signs, and these results are consistent with Ram (2003). In current circumstances, developing countries, especially the UMIC, need to re-consider whether or not they need MODA even when the providers, such as the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN), the WB, and the IMF are keen to provide the funds, because their development assistance is very likely to cause the economy to deteriorate. On the other hand, BODA is a wiser choice since it is fairly certain to improve the economic performances. Therefore, while a great deal of effort has been placed on investigating the role of "good policies" of the recipients (the WB, 1998; Dalgaard and Hansen, 2000; Denkabe, 2003; Logile and Odusanya, 2011; Bhavan, 2013), the estimations in this dissertation could be interpreted as suggesting some reforms in the MODA agencies, or a new MODA provider (the NDB) might be feasible, even though it does not mean that the aid provided by the NDB will definitely be effective.

Since the countries from various income groups are influenced in different ways by external debt, it is necessary for the NDB to provide different supports. For the LIC and LMIC, the NDB should: (a).conduct comprehensive studies and surveys on what these countries need; (b).learn from the lessons of the traditional MODA agencies' unconvincing performance; (c).understand these countries' current difficulties; (d).build effective plans based on the recipients' needs and the other developing countries' successful experiences; (e).launch well-planned projects with reasonable (but limited) conditions to the recipient countries, as well as follow the projects up (for example, work together with the recipients). In regard to the UMIC, the NDB should advise them to phase out MODA programmes and try to use BODA instead (or adjust the MODA projects to be more growth concentrated, but this is not shown in my results), because in the current circumstances, the inflow of MODA is very likely draining income from the UMIC. According to Lal (2011), externally, MODA probably creates obstacles to the innovation of the economy and society of the UMIC. Also, as FDI leads to higher income levels, using MODA in a way similar to FDI (such as creating "multinational-owned business") would also be a possible effective measurement to spur the economic growth of the recipients.

Furthermore, the NDB could cooperate with the traditional MODA agencies, because those traditional "Western dominated" agencies need more knowledge of the developing world, and as a new international economic player, the NDB needs to hear the experiences of the traditional agencies. In regard to this, I suggest the NDB should work as a complement of the traditional MODA agencies to help the developing countries.

5.4 The role of external debt and policy implications for the NDB

Compared with FDI and TODA, the effects of TED and its components on growth are more ambiguous. On the whole, as claimed by the empirical results, I can see that TED has no

significant impacts on the economic growth in developing countries. If I re-run the regressions for the country groups with various income levels, the economy of LMIC is worsened by TED. For the LIC and UMIC, TED fails to have significant effects. After breaking up TED into World Bank loans (WBL), IMF credit (IMFC), and other external debts (OED), the regression results are even more complex. In the mid to long term, the economy of LIC is more likely to be harmed by WBL, whereas IMFC tends to promote the economy in LIC. However, for the LMIC, their economies tend to be weakened by IMFC. With regard to the UMIC, neither WBL nor IMFC has significant impacts (the negative effect of the IMFC two years before is balanced by the positive effect of the previous year). In addition, OED cannot significantly influence the economy of all these income groups.

As with MODA, there are two possible reasons that the negative coefficients on WBL and IMFC were calculated: (a).these countries borrow from these organisations in advance, because they are aware that a recession will happen in the following years (contemporaneous relationships or simultaneous problem); (b).these loans really do not perform well, and in certain cases, they have a detrimental effect on the economy. But based on the literature, there is little evidence to show that countries/financial institutions are able to borrow/lend for a future crisis. Thus, I believe that using of WBL and IMFC doing not foster economic growth, and sometimes dampens it (reason [b] holds).

My findings are consistent with Karagol (2004), who has demonstrated there is little significant evidence that TED affects growth. Specifically, these results are also similar to: (a).Dicks-Mireaux et al. (2000) (IMFC contributes to the output growth in LIC); (b).Barro and Lee (2003) and Dreher (2004) (in general, IMFC has no significant impacts on the economic growth of developing countries).

In accordance with the results above, it seems necessary for the organising of the NDB to execute or take over some functions which are not implemented constructively by the WB and IMF. The NDB needs to conduct distinct policies towards different income groups. In respect to the LIC, debt should be injected to simulate growth, but the WBL is prone to precipitate economic recession. Therefore, I suggest that the NDB should take over some of the functions from the WB and also work together with the WB (the NDB can work as a consultant). When looking at the LMIC, likewise, the NDB needs to work at least as a substitute or as a consultant of the WB, in order to make effective loans to foster the economy. Besides, it is essential for the NDB to give advice to the LMIC which are preparing to borrow from the IMF, because according to the estimation, such loans are ineffective in promoting economic growth; in fact they cause it to deteriorate. It might be crucial for the LMIC to suffer a necessary painful period of social and business innovation without seeking assistance from the IMF, in exchange for long-term gain. From another perspective, the NDB could give suggestions to the IMF, to ensure that IMFC goes to the countries that really need help. Lastly, in terms of the UMIC, the NDB should give guidance to them to phase out the use of IMFC and OED, because they do not promote economic growth significantly, while WBL is a wiser choice.

Generally speaking, I advise the NDB to act as not only as a complement as well as a substitute for the WB and IMF, but also as a financial advisor for the developing countries.

5.5 Some extensions

This dissertation has some findings on the impacts from international capital flows to developing countries' economic growth. However, there are some other points that are not shown in the results, but are worth mentioning to the readers and the NDB. Therefore, in this section, some further points (speculations) will be reviewed.

Firstly, with regard to FDI, as stated by Ozawa (1992), Ozturk (2007), Adams (2009), and Naguib (2012), there are various channels for FDI to influence economic growth, which consist of trade openness, domestic investment, the labour force, technological progress, and the business environment. Hence, although this is not shown in my results, I still advise the NDB also to try to generate some spill-over effects. The developing countries would take advantages of FDI inflow and develop through a number of other channels as well, which means that sustainable growth would probably be achieved. For example, the results show that the coefficients of employment are relatively small in the LIC and LMIC, while FDI seems able to transfer knowledge and skills into the countries and help to improve the quality of human capital. Furthermore, the "hardware" of a country, such as its geographical location, climate, and natural resources, also need to be considered by the NDB when making investment decisions. For instance, in terms of the countries located in the continent of Africa, Hoeffler (2002) observes that foreign investors may find it is easier to invest in a neighbouring country if the investment in the first country is successful. Thus, the NDB could try to invest in certain countries, where they can be more successful in directing FDI into growth-enhancing activities.

Secondly, there might be some reasons behind the estimations that BODA promotes but MODA dampens economic growth. According to Ram (2003), the substantial differences between BODA and MODA are no more than donor motives, characteristics of and conditions associated with the aid, and the degree of understanding between the donors and the recipients; the strict terms attached to MODA (for example, the Structural Adjustment Programmes [SAPs]) are very likely to harm the recipients. As noted by Cassen (1994), compared with multilateral aid, bilateral programmes have several advantages, including the donor's knowledge of the recipient, the donor's experience and skills, linguistic and personal affinities, and similarities of institutional structures. The NDB is fairly certain to possess some advantages that BODA has but which are voided in the traditional MODA agencies. For instance, the developing world has a better understanding of itself, the countries are at a similar level of social progress (compared to the developed world), and some countries have recent successful growth experience. In addition to these innate advantages, the NDB could also try to draw lessons from the performance of the traditional MODA agencies, such as adjusting/loosening aiding conditions, focusing more on the problem and being result-driven, providing deeper as well as more practical advices for the specific social conditions, conducting good tracking of the projects, and striving to be more

transparent in the operation and equitable in the voting powers. The establishment of the NDB might be a catalyst for the traditional MODA agencies to reform too. Subsequently, through the establishment and operation of the NDB, the developing countries would possibly enjoy "positive and significant coefficients" of TODA and MODA.

Thirdly, regarding external debt, the reason that WBL fails to stimulate output growth might be that the conditions are impracticable, which can range from requiring a government to privatise its state-owned companies or adopt lower trade tariffs, to mandating new budget and procurement procedures, and so forth; excessive requirements in these policy reforms are always deemed to be the source of economic downturns (the Bank Information Center [BIC], 2013). Furthermore, although my results show that IMFC promotes growth in the LIC in the mid to long run, I speculate that it would be unable to generate long-term sustainable growth, because the IMF is an International Lender of Last Resort (ILOLR) and it helps to achieve temporary financial balance and provide short to mid-term credits (Giannini, 1999; Bird, 2010). It has not been proved that such positive impacts of IMFC on the economy of LIC are really effective in maintaining sustainable growth, or that it is simply due to the LIC being "too poor to be poorer" (experiencing extremely awful economic performance). Therefore, I also advise the NDB to try to discover a way which would lead to sustainable growth for the developing countries, because similar to the NDB's role in foreign aid, it also possesses several advantages in assisting the developing countries in the form of external debt. Firstly, because the developing countries have BRICS as powerful growth accelerators with better focusing on themselves and closer cooperation in terms of common objectives and less restrictions, the NDB is more likely to achieve effective results. Secondly, in recent years, a great number of developing countries (especially the BRICS countries) rather than industrialised countries have experienced sustained and rapid development. The NDB would have more knowledge about how to achieve economic growth in the current situation. Indeed, compared with the constructive policies launched by the industrialised countries decades ago, it would be much more effective to implement the developing policies that have succeeded in recent years. Thirdly, in this era of globalisation, if a new international financial institution is introduced, it has to bring in something new to keep operating to survive. Researchers criticise the operations of the long-established WB and IMF as being too bureaucratic, lacking transparency and public participation, and reflecting the power of industrially developed countries, while the NDB has the opportunity to learn from these criticisms and avoid the problems.

Fourthly, if excluding FDI from the analysis, for the 96 countries as a whole, it is very likely that the coefficients of TED, BODA, and IMFC becomes larger (positive) and more significant. After categorising the countries based on different income levels, the role of BODA and IMFC might be more important in promoting the growth of the LIC; TODA, BODA, WBL, and OED are very possibly becoming more important for the LMIC; TED, BODA, WBL, and IMFC tend to stimulate economic growth in UMIC more effectively and significantly. These differences would further demonstrate that MODA has not performed well in the developing countries, and the IMFC and WBL jointly stimulates the growth of the UMIC (both of their coefficients are positive and tend to be significant), rather than LMIC (Only WBL tend to have a positive and significant effect) and LIC

(Only WBL tend to have a positive and significant effect). In terms of policy implications, there will not be any difference except that the NDB and its corporation with the IMF and the WB would become even more crucial.

5.6 The challenges to the NDB and the future global economic governance

From the literature and empirical results, I am able to speculate that the establishment and operation of the NDB will have multiple barriers, both internally and externally.

In terms of internal conflicts, first and foremost, the cooperation of the BRICS countries is very likely to be influenced by geo-politic issues, although the core agenda of the NDB has been the economy (for instance, the policies of Russia and China towards Syria are different). Secondly, several concerns have arisen among the BRICS countries that: (a).China will become the dominant power of the NDB; (b).the NDB will bring a new kind of colonialism into the poor countries, which might be even worse than what the IMF and WB are doing now; (c).the BRICS countries' lack of a central mission that they want to collectively accomplish (Maini, 2013; Pasumarti, 2013).

Externally, there are as well severe pressures: the world is watching. On the one hand, the developed countries will tend to thwart the operation of the NDB, because they, in particular the IMF and WB, would like to remain the dominance power of the international financial institutions, so that they can be the governors of the global economic order. According to Lipscy (2003), when Japan wanted to build an "Asian Monetary Fund" during the 1997-1998 financial crisis, the plan was shelved after encountering strong resistance from the US. Now, as the momentum for the NDB builds, the BRICS states might also be influenced by the developed countries, because very likely, BRICS value their relationships with the Western world above the ties with their fellow countries – although eventually, this might change. On the other hand, more importantly, the people in the recipient countries are all watching, because their living environments will be changed. Besides the effectiveness of development projects in pulling up income, the NDB will place even more emphasis on sustainable growth. Although the NDB could operate successfully in human society, because of the development projects, very likely more indigenous people will be resettled, animals will be disturbed, trees will be harvested, and rivers will be dammed (Chen, 2013). From this perspective, avoiding irreversible natural loss is a big challenge for the NDB.

In addition, even if the NDB has been established, there is almost no position for it to take over the entire role of IMF or WB. The sum of the endowed US$100 billion to the NDB and US$100 billion to the foreign reserve pool is only US$200 billion, whereas the IMF has a quota of US$368 billion with and additional US$1 trillion pledged or committed resources[29], and the WB also has a subscribed capital of US$223.2 billion[30]. The endowed US$100 billion is just one sixth of the sum

[29] The source of data is the IMF (2014d), and the dollar figures are as of June 3rd, 2014.
[30] The source of data is the World Bank Treasury (2013), the dollar figures are as of June 30, 2013.

of the current IMF quota and WB capital (US$591.2 billion). Because of this, the NDB should not be expected to replace the IMF and the WB perfectly.

Admittedly, establishing the NDB might generate a disservice to an already over-multifarious financial system. However, as shown by the empirical evidences, the developing economies are enjoying the inflow of FDI, but acquiring few benefits from the funds that multilateral donors/international financial institutions have provided. Therefore, since it is estimated that the current system works ineffectively, why not introduce the NDB to generate some innovations?

In regard to global economic governance, on the one hand, the NDB should work alongside the recipients, to make sure the fund goes to the appropriate projects and the states that really need help in a more democratic manner. On the other hand, the NDB also needs to work closely with traditional international financial agencies, especially the IMF and WB, even though some of their functions in lending (to the LIC and LMIC) might be transferred to the NDB. Because these traditional organisations have more funds in their pools and richer experiences in operating whereas the NDB has better knowledge of the developing world and promoting economic growth in the current circumstances, these organisations should work in a complementary fashion rather than as competitors. Indeed, they have the same mission of reducing poverty and promoting growth. Furthermore, it would be extremely helpful if the NDB had extra functions as a foreign investor. From this viewpoint, the NDB would perform not only as an alternative, but also as an important and necessary complement to the traditional agencies. All these international financial agencies need to work together to achieve their common goal of helping the developing world.

Chapter 6. Conclusion

The impacts of the international capital flows on the economic growth of the developing world and the policy implications for the BRICS New Development Bank (NDB) have been the core of this dissertation. In these decades of globalisation and multi-polarity, the five BRICS countries (Brazil, Russia, India, China, and South Africa) want more influence. Moreover, they believe that the NDB is appropriate and will be helpful. Because the industrialised countries currently dominate the two largest international financial institutions, the International Monetary Fund (IMF) and the World Bank (WB), and the developing world has insufficient finance, the BRICS countries stand out. Since the NDB has just been established and is few data available, in order to give policy suggestions to the NDB, I have attempted to examine whether and to what extent the developing world benefits from foreign direct investment (FDI), foreign aid (bilateral and multilateral aid) and external debt (from the IMF, WB, and other sources) under the current order mainly ruled by the Western countries, and then further deduce what the current situation means for the future operation of the NDB and the global economy.

I collected the panel data on 96 low to middle income developing countries from 1991 to 2011, and ran multiple linear regressions based on the most widely used growth model - the Solow model. Econometrically, the fixed effects (FE) model is the most appropriate regression model to be used.

When considering these 96 countries as a whole, I find: (a).weak diminishing returns to scale; (b).capital stock, employment, and FDI promote growth; (c).total official development assistance (TODA) and total external debt (TED) do not influence the economy significantly; (d).multilateral official development assistance (MODA) dampens while bilateral official development assistance (BODA) stimulates the economy; (e).World Bank loans (WBL), IMF credit (IMFC), and other external debts (OED) do not influence the economy significantly. After dividing the whole sample into low income countries (LIC), lower-middle income countries (LMIC), and upper-middle income countries (UMIC) and re-running the regressions, I draw these conclusions: (a).constant returns to scale tend to hold in the LIC and UMIC, but the LMIC are more likely to have diminishing returns to scale; (b).capital stock, employment, MODA, and BODA are more influential in the UMIC, while the other variables (especially FDI) are more influential in the LIC and LMIC; (c).FDI stimulates the economic growth in all these income groups (especially the LIC and LMIC); (d).TODA has no significant influences on any income group, while TED weakens the economy of the LMIC; (e).MODA dampens the economy of the UMIC, while BODA benefits the economies of the LMIC and UMIC; (f).WBL harms the LIC's economy but benefits the UMIC, and IMFC harms the economy of LMIC.

These findings have important policy implications for the NDB. Firstly, the establishment of the NDB is probably important for the LIC and LMIC to set foot on the track of growth. Secondly, the NDB should make efforts to invest and guide FDI flows into the LIC and LMIC, especially to the projects which could increase the fixed capital stock. Thirdly, the NDB should learn from the unsuccessful lessons of traditional MODA agencies, conduct researches to obtain better knowledge of the recipients and work together with them, and cooperate with traditional MODA

agencies to reduce poverty and promote growth. Additionally, it is necessary for the NDB to take over some of the functions of the WB (such as conducting researches and communicating with the recipients) and meanwhile cooperate with the WB, due to the empirical evidences showing that the WBL is pulling the LIC's economy down and is also ineffective in the LMIC. Next, the NDB should work closely with the IMF to make sure the funds have appropriate conditions and go to the countries that really need help, since IMFC benefits the LIC but harms the LMIC. Lastly, in terms of the UMIC, the NDB needs to advise this income group to phase out MODA, IMFC, and OED (maybe providing policy guidance on development would be more effective in promoting output growth rather than providing physical funds as debt in the UMIC, but this is not shown in this dissertation), whereas BODA and WBL are wiser choices.

In spite of these suggestions, there still might be several obstacles from both inside and outside the BRICS group. To operate the NDB, these five countries should clarify the modalities, minimise the conflicts caused by geo-political issues, and avoid the controversial operational failures that have happened in the other international financial institutions. Meantime, externally, these five countries should be united and immovable in order to persevere with the NDB politically. Moreover and most importantly, when launching the projects, it is necessary for the NDB to concern about the sustainable growth of the recipient states, and not lead to irreversible natural and human losses.

With regard to future international economic governance, it is important for the NDB (representatives of the developing world) to cooperate with the IMF and WB (representatives of all countries – but very likely biased towards the developed world). Growth is a global issue, and global issues need global solutions. Thus, rather than competing with the traditional international financial agencies, the NDB should work more suitably as a complementary agency. The most desired outcomes are an eradication of absolute poverty[31], a sustainable increasing income level, continuous improvement in the standard of living, and a fairer international economic environment.

This dissertation aims to fill the gap since there are insufficient empirical studies on the role of external finance and growth with the initiation and operation of the NDB. Of course, there are several limitations. First and foremost, the access to data is limited, and this results in the problems of (a).multi-collinearity (for example, FDI is partially included in capital stock); (b).failing to detect the longer-term effects with 3 or more lags (for the data range of only 21 years causes restricted lag selection); (c).errors generated by the estimation of data (physical capital stock is derived by ourselves). Secondly, the spill-over effects of FDI, foreign aid, and external debt are not tested in this dissertation, while endogenous relationships very likely connect these variables with total employment and capital stock. Thirdly, I utilise multiple linear regression models, but the relationships between the variables might be none-linear (I did not test the Debt Laffer Curve). Fourthly, Russian is an important emerging power, but it is excluded in the empirical analysis due to it is not a BODA or MODA receiver. These four shortcomings are probably the cause of biased results. Lastly, I did not run the regression models that excluding FDI, which possibly generate a

[31] The UN (1995) defines absolute poverty as "a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to social services" (para.19).

less important role of the NDB (although the results shows that the NDB is important, in fact it might be more momentous than what reported in this dissertation).

Further study should be directed to discern more detailed and concentrated policy suggestions. For instances, (a).it will be very meaningful for the LIC and LMIC if I can discover the reasons why the returns to scale tend to decrease in LMIC; (b).to detect whether or not the Debt Laffer Curve holds in developing countries would be helpful for them to make borrowing decisions; (c).the mainstream criticism of the WB is in terms of its aid and loans to the public sectors, whereas the WB has five institutions, and three of them deal with the other areas[32]. Hence, to see the effectiveness of the WB as a group, it is necessary to investigate the performances of the other sub-institutions (such as the Multilateral Investment Guarantee Agency [MIGA]). Moreover, another outcome that needs to be noticed is that for the regression results, fixed effects (FE) models (which allow permanent differences among countries) are always the most appropriate. Thus, for the sake of providing detailed policy indications regarding international capital flows to the government of each country, it will be practical to conduct studies on individual countries.

Finally, I hope that every country and financial institution will be able to work well with each other to reach a state of superior economic well-being.

[32] As shown in Footnote 18, there are five institutions within the WB, which are the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA), and the International Centre for Settlement of Investment Disputes (ICSID), where the IBRD and IDA are the two institutions that provide loans to developing countries' governments.

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Appendices

Appendix 1. List of countries

List of low income countries (LIC), lower-middle income countries (LMIC), and upper-middle income countries (UMIC) developing countries in the sample (96 in total):

LIC	LMIC	UMIC
Bangladesh	Armenia	Albania
Benin	Bolivia	Algeria
Burundi	Cameroon	Angola
Burkina Faso	Congo, Rep	Argentina
Cambodia	Cote d'Ivoire	Azerbaijan
Central African Republic	Egypt, Arab Rep.	Belize
Chad	El Salvador	Bosnia and Herzegovina
Comoros	Georgia	Botswana
Congo, Dem. Rep.	Ghana	Brazil
Eritrea	Guatemala	China
Ethiopia	Guyana	Colombia
Gambia, The	Honduras	Costa Rica
Guinea	India	Dominican Republic
Guinea-Bissau	Indonesia	Ecuador
Kenya	Lao PDR	Fiji
Kyrgyz Republic	Lesotho	Gabon
Liberia	Mauritania	Iran, Islamic Rep.
Madagascar	Moldova	Jamaica
Malawi	Mongolia	Jordan
Mali	Morocco	Kazakhstan
Mozambique	Nicaragua	Lebanon
Nepal	Pakistan	Malaysia
Niger	Papua New Guinea	Maldives
Rwanda	Paraguay	Mauritius
Sierra Leone	The Philippines	Mexico
Tajikistan	Senegal	Panama
Tanzania	Sri Lanka	Peru
Togo	Sudan	South Africa
Uganda	Syrian Arab Republic	Thailand
Zimbabwe	Uzbekistan	Tunisia
	Vietnam	Turkey
	Yemen, Rep.	Turkmenistan
	Zambia	Venezuela, RB

Appendix 2. Perpetuity Inventory Method (PIM) - steady state approach.

This approach is introduced by Harberger (1978), which employs neoclassical growth theory and relies on the assumption that the economy under consideration is at its steady state.

As a consequence, output grows at the same rate as the capital stock, i.e.:

$$g_{GDP} = g_k = \frac{K_t - K_{t-1}}{K_{t-1}} = \frac{I_t}{K_{t-1}} - \delta$$

where g = growth rate, K = capital stock, I = capital formation, and δ = depreciation rate.

Solving this equation for the stock of capital in period t-1 leads to:

$$K_{t-1} = \frac{I_t}{g_{GDP} + \delta}$$

In this dissertation, the growth rate of GDP is calculated from the real GDP level from 1980 to 2012, I is real gross fixed capital formation (GFCF); δ is 4%, which follows Li (2003), Jun, Wu, and Zhang (2007), and Kolasa (2008). After obtaining the K of the beginning year (1980 in this dissertation), I can calculate the real capital stock for year t by adding the depreciated real capital stock of year t-1 with the GFCF of year t.

Appendix 3. The calculation of the employment participation rate (EPR)

There are two major steps to calculate EPR.

The first step is to find out the total amount of employment:

$$EMP = EPR_{15+} \times POP_{15+}$$

where EMP=total amount of labour force employed, EPR_{15+}=employment to population (who ages are 15+) ratio, and POP_{15+}=working age population. Age 15+ is generally considered as the working-age (the International Labour Office [ILO], 2009).

The second step is to calculate the total employment to population ratio:

$$EPR = EMP/POP$$

where EPR= employment to population ratio, EMP=total amount of labour force employed, and POP=population.

Although it follows the definition of working age population and uses population as the denominator for the purpose of consistency with the other variables (all on per capita level), one drawback of this method is that the employment of the population whose ages are 14- is ignored, but I could not fix it due to data limitation.

Appendix 4. Im-Pesaran-Shin (IPS) unit root test results

Ho: All panels contain unit roots
Ha: Some panels are stationary

	I(0)				I(1)			
	Demean lag(AIC)		Trend demean lag(AIC)		Demean lag(AIC)		Trend demean lag(AIC)	
	T-bar statistics	p-value	T-bar statistics	p-value	T-bar statistics	p-value	T-bar statistics	p-value
ln(RY)	0.5877	0.7216	-5.2794	0.0000**	-22.1441	0.0000**	-19.1481	0.0000**
ln(RK)	-15.4763	0.0000**	-30.8239	0.0000**	-46.6016	0.0000**	-49.2175	0.0000**
ln(EPR)	2.0091	0.9777	-2.7681	0.0028**	-25.7571	0.0000**	-20.0412	0.0000**
FDI	-1.2237	0.1105	-7.5576	0.0000**	-32.6334	0.0000**	-26.5502	0.0000**
MODA	-12.1815	0.0000**	-13.6208	0.0000**	-49.7150	0.0000**	-45.0525	0.0000**
BODA	-17.1527	0.0000*	-17.3489	0.0000**	-44.3167	0.0000**	-38.7463	0.0000**
TODA	-13.6157	0.0000**	-12.7086	0.0000**	-43.3908	0.0000**	-38.3505	0.0000**
WBL	-0.4848	0.3139	0.6579	0.7447	-24.7893	0.0000**	-22.2699	0.0000**
IMFC	-4.0565	0.0000**	-0.3923	0.3474	-22.6847	0.0000**	-18.4136	0.0000**
OED	-1.8186	0.0345*	-1.9885	0.0234*	-26.5337	0.0000**	-22.2187	0.0000**
TED	-2.6516	0.0040**	-2.7382	0.0031**	-26.6103	0.0000**	-22.8836	0.0000**
** means significant at a 1% level, * means significant at a 5% level.								

Appendix 5. Data description (different income groups)

30 low income countries (LIC)					
Panel & time	Observation	Mean	Std Dev	Min	Max
Country	30	-	-	1	30
Year	21	-	-	1991	2011
Economic variables (the unit of the variables except EPR is thousands of US$, at constant price and exchange rate of 2005)					
RY	627	0.3488	0.1354	0.0809	0.7238
RK	619	60.6008	35.7003	0.1641	156.5553
EPR	630	0.3953	0.0580	0.2471	0.5566
FDI	610	0.0104	0.0218	-0.0717	0.2103
MODA	623	0.0202	0.0175	-0.0069	0.1357
BODA	624	0.0255	0.0254	-0.0224	0.2620
TODA	623	0.0457	0.0395	1.47e-07	0.3612
WBL	625	0.0860	0.0678	0	0.4699
IMFC	624	0.0194	0.0322	0	0.2343
OED	623	0.2070	0.2533	0	1.4184
TED	623	0.3126	0.3209	0.0013	1.9380

33 lower-middle income countries (LMIC)					
Panel & time	Observation	Mean	Std Dev	Min	Max
Country	33	-	-	1	33
Year	21	-	-	1991	2011
Economic variables (the unit of the variables except EPR is thousands of US$, at constant price and exchange rate of 2005)					
RY	689	1.0642	0.5222	0.2655	3.0474
RK	671	235.4498	152.9004	0.4905	773.6257
EPR	693	0.3540	0.0711	0.1782	0.5797
FDI	683	0.0424	0.0696	-0.0335	0.7913
MODA	683	0.0224	0.0334	-0.0023	0.3224
BODA	683	0.0340	0.0404	-0.0320	0.4770
TODA	683	0.0564	0.0632	-0.0012	0.6120
WBL	687	0.1021	0.1008	0	0.6478
IMFC	687	0.0383	0.0667	0	0.5678
OED	687	0.6500	0.7424	0	5.6202
TED	686	0.7915	0.8354	0.0021	6.7804

33 upper-middle income countries (UMIC)					
Panel & time	Observation	Mean	Std Dev	Min	Max
Country	33	-	-	1	33
Year	21	-	-	1991	2011
Economic variables (the unit of the variables except EPR is thousands of US$, at constant price and exchange rate of 2005)					
RY	689	3.7689	1.6868	0.5089	8.4123
RK	664	856.7299	516.2492	0.6015	2687.396
EPR	693	0.3635	0.0811	0.1859	0.5834
FDI	662	0.1387	0.1617	-0.7027	0.9545
MODA	678	0.0146	0.0253	-0.0204	0.2841
BODA	680	0.0306	0.0528	-0.0469	0.4445
TODA	677	0.0449	0.0714	-0.0381	0.5969
WBL	684	0.0906	0.0901	0	0.6930
IMFC	684	0.0440	0.0718	0	0.5692
OED	672	1.4633	1.2182	0.0036	8.0101
TED	672	1.5977	1.2822	0.0036	8.3654