The impact of different types of foreign capital inflows on economic growth of Least Developed Countries: Which external resource matter?

By

HONG, Minji

THESIS

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ABSTRACT

The impact of different types of foreign capital inflows on economic growth of Least Developed Countries: Which external resource matter?

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Minji Hong

Least developed countries, a group of poorest countries in the world, are trapped under economic underdevelopment, unable to escape the deplorable state by themselves. A stimulating external force in the form of foreign capital inflows are, therefore, important source of capital for least developed countries. Among different types of foreign capital inflows, which external resource contributes most to economic growth for least developed countries is a key research question for this paper. I use panel data of 43 least developed countries from the period 2003 to 2014 to estimate the impact of different types of Official development assistance and Private capital on GDP per capita growth of least developed nations. Using random effect model, FDI proved to have significant positive effect on the economy, while all types ODAs showed no meaningful result. This paper implies that least developed countries should target toward attracting private FDI rather than government to government transfer of ODAs, as high corruption rate of governance and poor legal system are not the perfect environment for ODAs to unfold the worth.

Dedicated to the greatest woman on earth, Taesoon Choi

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Above all, I express my heartfelt gratitude to the Lord who endowed me with sufficient strength and wisdom to put unremitting effort in this paper.

This paper would not have begun, in the very first place, without guidance and instruction from Professor Kye Woo Lee, who enlightened me with novel insight until I put my last full stop.

I also thank Professor Seung Joo Lee for his kind encouragement and suggestions every time I made a visit.

My heart goes out to the least developed countries in the world, trapped under unspeakable tragedy, hoping and praying that universal effort to lift up the bottom billion would neither stop nor be in vain.

This paper is a small effort to bring the least developed countries exclusively to the center of attention, and implicate the appropriate policy measures derived from rigorous analysis.

Lastly, my sincere gratitude goes to the KDI School of Public Policy and Management that gave me the opportunity to immerse myself in a profound study in the field of Development.

I had the best one and a half year at the KDI School to be remembered for the rest of my life.

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I. INTRODUCTION

The Purpose and Importance of this research

The paper aims to empirically identify and analyze the most significant external financial source on economic growth of least developed countries (LDCs). Several studies examined the impact of foreign capital on economic growth of developing countries, yet to the best of my knowledge there is no, if anything few, published empirical studies that focused on the "least" developed countries exclusively.

In 2011, member states of the United Nations adopted the Istanbul Declaration and Programme of Action (IPoA) under the purpose of halving the number of least developed countries (LDCs). External source of financing is an important means in achieving the goal, but Official Development Assistance (ODA) shows a declining trend and private capital inflows remain infinitely limited. Therefore, given the limited source of external financing, determining the most significant source for economic growth of LDCs can encourage selective measures to attract the most significant external capital. This shall also prevent squandering the limited domestic resources in making indiscreet effort of attracting insignificant or less significant external capital. Furthermore, the fundamental goals of United Nations Millennium Development Goals, however, are largely engaged with least developed countries, where extreme poverty, child mortality are considerably common, if not most common, in the world. LDCs are certainly in deficient of

domestic resources for capital accumulation for growth, and thus, wise use of external financing remains an important task.

The paper shall tackle the following research questions.

1. What is the most significant external capital inflow on economic growth of least developed countries?
2. How is the economic growth of least developed countries different according to regional variations?

In verification of empirical test on the research question above, I use Panel regression model on 43 least developed countries from the year 2003 to 2014. In particular, I examine the effect of Grants, Loans, Technical Assistance, Foreign Direct Investment (FDI), and Remittances on economic growth of 43 least developed countries.

The capital inflows are largely divided into ODA (Official Development Assistance) consisting of Grants, Loans, and Technical Assistance, and Private capital comprising of FDI (Foreign Direct Investment), and remittances. In addition, I use regional dummy variables; Asia, Africa, and Caribbean, and Pacific to examine whether economic growth differs by geographical locations. Data is collected from the World Bank Development Indicators.

Taking into account high rate of corruption for all types of Official Development Assistance to unfold the worth, I presume that private capital inflows targeted to companies and individuals

will be associated with high economic growth in least developed countries.

Detecting the significant external capital inflow for economic growth of LDCs is, thus, the heart of this paper.

I will scope on the reviews of previous literature as a background knowledge supply in the following chapter. Chapter 3 provides detailed description of my research methodology and data used in the study, in order to unveil and empirically analyze the results in Chapter 4. Finally, in the concluding chapter, Chapter 5, I shall summarize the key findings and forge policy implications for future research in Chapter 6.

II. LITERATURE REVIEW

My purpose in discussing the literature is to come up with a single model that can analyze the impact of multiple external capital inflows on the economy of least developed countries. The idea is motivated by theoretical foundation that surge in capital inflows lead to higher economic growth. The relationship between capital flows and growth can be explained by a simple endogenous-growth model, also known as the AK model, denoted as a linear model where output is a linear function of capital.

$$Y = AK$$

A surge in capital inflow means a larger pool of savings available for investment than under the state devoid of capital inflows. But which form of capital inflow is linked to largest increment in economic growth of least developed countries is the question to be empirically answered throughout the rest of the paper.

The previous literature on external capital inflows can be largely divided into two broad categories: the determinants of attracting external capital inflows, focused on causes that trigger capital influx, and the macroeconomic impact of foreign capital on domestic economy. This paper follows the latter and forms a complementary idea to the existing literature.

Previous research mostly studied the individual effect of a single external capital, such as the effect of FDI or the effect of ODA on a country's economy. Research on the impact of Foreign Direct Investment on growth conclude that there is no universal relationship between FDI and GDP growth of a country, as its effect depends on the type of investment and policies of the government (Cohen 2007), and the research on the effect of foreign aid on developing countries, covering regional differences, showed mixed results (Ekanayake, 2009).

Other studies that did comparative research on the effect of ODA, FDI, and remittances focused on their effect on the developing countries (Driffield and Jones, 2013; Benmamoun, 2013), namely the emerging market, defined as an economy with low to middle per capita income that have begun to open up their markets, and found that all three sources of foreign capital have positive impact on economic growth of developing countries.

This paper makes a unique contribution in two ways.

First, the study focuses exclusively on least developed countries, and not developing countries at large.

Second, the study disintegrates Official Development Assistance into types to estimate and compare with types of private capital inflows. The types of external capital are largely grouped into Official Development Assistance, comprised of official loans, official grants, and technical assistance; Private capital inflows comprised of Foreign Direct Investment and Remittances.

Past research on economic impact of each capital inflows on recipient countries will be discussed, followed by the hypotheses for empirical testing.

Official Development Assistance (ODA)

Official Development Assistance (ODA) is largely divided into Grants and Loans in regard to repayment classification. Lerrick and Meltzer (2002) claimed that grants are more preferable to loans; while Cordella and Ulku (2004) provided a novel insight that concessional grants imply less repayment obligations but also less resources available for donors to provide the recipients, further insisting that grants prove effective only in highly indebted, poor countries with bad policies. None of the above studies, however, distinguishes technical assistance from grants, failing to note that technical assistance or demonstration projects, unlike pure grants, strengthen policies and institutions of poor countries devoid of such management (World Bank, 1998). In this study, I have tried to complement the omission, considering technical assistance and grants as separate variables with independent disparate impact.

The terms technical assistance and technical cooperation, used interchangeably by World Bank, refer to the provision of donor funded personnel to supply technical skills and train local people. Marcano (2009) substantiated positive and statistically significant impact of technical assistance in the case study of Chile's Neighborhood program and Guatemala's Social Investment Fund where technical assistance made an increment contribution.

On the other side, technical assistance was confronted by widespread criticisms on undermining the capacity of recipient countries (Jaycox, 1993:1) on the grounds that they are merely supply driven, place excessive emphasis on tangible outputs, weak management by the recipients, insufficient emphasis on training local labor (Arndt, 2000).

Unlike pure official grants and loans that are futile in highly corrupted economy, technical

assistance is a form of capacity building in human capital, in which I assume that technical assistance is associated with positive economic growth.

Whether technical assistance statistically proves to be a viable tool for growth of least developed countries, of course, remains a question to be answered.

Private Capital Inflows

Private capital generally consists of Foreign Direct Investment (FDI) and Portfolio Investment. However, under the judgment that Portfolio investment comprises scant proportion of total capital inflows in least developed countries, while remittances are perceived as significant private earnings for many households, I take into account of remittances in place of portfolio investment, for my undivided attention in this study is on least developed countries (LDCs).

Foreign Direct Investment, an investment made by a company based in one country into a company based in another country, usually developing countries, showed mixed results in past literature. Findlay (1978) has asserted that FDI increased the rate of technical progress in host country through a “contagion effect” emanating from advanced technology and management practices used by foreign firms. Further evidence was provided on the effect of FDI on economic growth in Latin America, in which De Gregorio (1992) stated that increase in growth from FDI was three times greater than that of domestic investment. Other scholars challenged the positive effect of FDI, proposing that FDI crowds out domestic investment (Fry, 1993), and has limited, or no impact for economic industrial growth in developing countries (Singh, 1988).

Mercinger (2003) highlighted the adverse effect of FDI, where it can force small emerging local

competitors go out of business, and multinationals paradoxically contributed more to imports than exports. Still others proposed that FDI proved effective only under certain circumstances. Borenszetin et al (1998) investigated the effect of FDI on economic growth of developing countries using panel data for two decades, and concluded that human capital development is crucial for a country to benefit from FDI inflows. And Blomstrom and Kokko (1994) certified that FDI is not effective for lower income developing countries, as they lack technological levels and capacity to be imitators of foreign invested firms.

Turning to remittances transferred by migrant workers to their country of origin, precedent research exhibit different stances. Giuliano and Ruiz-Arranz (2009) hold an optimistic view, corroborating with empirical analysis that remittances promote growth in countries with underdeveloped financial systems by offering an alternative means to finance investment and ease liquidity constraints. Another finding implicates that remittances have direct impact on reduction of poverty and promotion of financial development (Gupta, Pattillo, Wagh, 2009). Their bottom line statement is that remittances offer opportunity for small savers to gain access to formal financial sector, which otherwise were constrained to formally unbanked households. Chami, Fullenkamp, and Jahjah (2003), taking the opposite stance, developed a unified model to examine the causes and effects of remittances on an economy. They concluded that moral hazard problem that arises between remitters and recipients, under asymmetric information and lack of observability of the recipient's actions, lead to negative impact on economic growth. Their explanation is that dependency on remittances will be transferred to reduction in labor input of recipients. The extent of applicability of this well-grounded argument to least developed countries is an issue to be nailed down.

Considering high political instability of least developed countries, private capital inflows, despite

their plausible negative side, is presumed to be associated with positive economic growth of least developed countries.

Dambisa Moyo, a renowned economist from Zambia, affirmed that ODA is pernicious to least developed countries and only trigger increased corruption and political instability. Instead, Sub-Saharan Africa should rely more on private financial market (Moyo, 2009). Therefore, I assume that Private capital inflows- foreign direct investment and remittances pulled in by laborers will be associated with high economic growth in least developed countries.
This leads to our first hypothesis:

H1: In least developed countries, foreign direct investment would contribute most to the economic growth of least developed countries.

In addition, I assume that economic growth of least developed countries may differ according to geographical regions, owing to different climate, neighboring countries, degree of land-lock. Least developed countries are located in Asia, Africa, Caribbean and the Pacific. I assume that among the least developed countries, those in Asia will display comparatively higher GDP per capita growth, relative to those in Africa and the Caribbean and the Pacific.

This leads to our second hypothesis:

H2: Least developed countries in Asia show higher economic growth, compared to those in Africa and Caribbean and the Pacific.

On this wise, previous literature focused narrowly on the impact of single capital inflow on the economy, in addition to deficient attention on least developed countries per se. Though there has been a comparative study on examining the effect of FDI, ODA, and Remittances that showed significant positive impact on low income countries (Benmamoun, 2013), did not make a distinct analysis between types of ODA and types of Private capital inflows. This study can, thus, provide extensive comparative analysis of different types of ODA and private capital inflows, focusing exclusively on least developed countries.

I will now introduce the variables, data, and model for panel regression analysis in the following chapter.

III. DATA AND METHODOLOGY

In order to examine the impact of distinct external capital inflows constituted of types of ODA (Official Grants without Technical Assistance, Official Loans, Technical Assistance) and types of Private Capital (Foreign Direct Investment, Remittances) on the economic growth of least developed countries, I use the following model.

The model constitutes of a dependent variable, GDP per capita growth, and key independent variables, namely types of ODA and types of private capital inflows, holding other factors that affect economic growth fixed. Other factors include physical capital, human capital, population growth, governance, financial development, trade openness, and lagged dependent variable, followed by regional dummy variables, Asia, Africa, Pacific and Caribbean.

$$Growth\_GDPCap_{it} = \beta 0 + \beta 1 ODAGrant\_GDP_{it} + \beta 2\ ODALoan\_GDP_{it} + \beta 3\ TA\_GDP_{it} + \beta 4\ FDI\_GDP_{it} + \beta 5\ REMIT\_GDP_{it} + \beta 7\ PhysicalCap_{it} + \beta 8 HumanCap_{it} + \beta 9\ Popgrowth_{it} + \beta 10\ Inflation + \beta 11 RuleofLaw_{it} + \beta 12 Financialdev_{it} + \beta 13 TOT_{it} + \beta 14 Growth\_GDPCap_{it-} + \beta 15\ 1\ Asia_{it} + \beta 16 Africa_{it} + \beta 17\ Pacific\ and\ Caribbean_{it} + a_{it} + \varepsilon_{it}$$

The subscript (it) represents combined cross section and time series data, country and time index respectively. ait signifies unobserved time-invariant country-specific effect, while εit is the error term.

I use the panel data of 43 least developed countries covering four different regions: Asia, Africa Caribbean, and Pacific. The data for types of ODA and Private Capital are obtained from World Bank Development Indicators.

This analysis studies the impact for the past decade, ranging from 2003 to 2014 for two reasons. First, private capital inflows in least developed countries only began to show significant increment in the early 2000s. Secondly, in agreement with Hlavac (2007), this period begins more than a decade after the end of the Cold War, and thus can be unaffected by the problems tangled with strategic and political purposes of foreign aid.

This paper empirically examines the effect of these external sources of finance on the economic growth of least developed countries in distinct geographical regions; I complement the model from Benmamoun (2013) by including the omitted variables, critical for economic growth. Omitted variables of economic growth theory are attained from the thorough reference to Bassanini and Scarpetta, (2001). I constructed a more comprehensive empirical model, based on economic growth theory, remedying the shortcomings of model used by Benmamoun (2013) by enlarging the over simplistic model in order to avoid omitted variable bias. I include other critical variables that affect economic growth, such as physical capital accumulation and human capital, critical factors for growth, according to neoclassical growth theory, and financial development, another factor that potentially affects economic growth, especially when it comes to examining impact of foreign financing on domestic economic growth.

Table 1- Summary of Variables

Dependent Variable	***Measurement***
Growth_GDPCapit	*GDP per capita growth rate*
Independent Variables (ODA)	
ODAGrant_GDPit	*ODA Grants / GDP*
ODALoan_GDPit	*ODA Loans / GDP*
TA_GDPit	*Technical Assistance / GDP*
Independent Variables (Private Capital)	
FDI_GDPit	*Foreign Direct Investment / GDP*
REMIT_GDPit	*Personal Remittances / GDP*
Control Variables	
Physicalcapit	*Investment / GDP*
HumanCapit	*HDI (Human Development Index)*
Fertilityrateit	*Population growth rate*
Govtspendingit	*Government consumption / GDP*
RuleofLawit	*CPIA Governance rule of law*
Financialdevit	*CPIA financial development*
TOTit	*Terms of Trade (Exports / Imports)*
Inflationit	*Consumer Price Index*
Regional Variables	
Asiait	*= 1*
Africait	*= 2*
Caribbean and Pacificit	*= 3*

Source: World Bank, World Development Indicators

The dependent variable, GDP growth per capita, which is the total output of a country divided by number of people, signals growth in the economy. The independent variables ODA grants, ODA loans, Technical Assistance, Foreign Direct Investment, Personal Remittances assess their respective impact on economic growth of least developed countries. In order to subdivide the ODA into Grants, Loans, and Technical Assistance, I use Grants excluding Technical Assistance instead of Total Grants to avoid the problem of multicollinearity. Thus, grants, loans, and technical assistance act as separate variables exhibiting distinct impact on the economy.

FDI inflows, personal remittance inflows constitute private financial inflows into the country, measured in percentage of GDP.

The control variables are intactly derived from economic growth theory, intended to largely control the determinants of economic growth rate and provide an inclusive model, with minimized omitted variable bias.

According to the Solow-Swan model, a simple neoclassical growth model, postulates that the economic growth is the result of capital accumulation and technological progress. Capital accumulation is largely grouped into physical capital and human capital.

Physical Capital accumulation, one of the main determinants of output per capita, measures the investment rate of a country. In alignment with Bassanini and Scarpetta, (2001), we consider the accumulation of physical capital by private sector and public sector, proxied by share of business investment in GDP and share of government investment in GDP, respectively.

Human capital, which represents labor force, is considered to have significant impact on economic growth, pertained to high correlation between skilled labor force and technological

progress. In this empirical study, I use human development index (HDI) as a proxy for measuring human capital. The human development index is a summary measure of average achievement in three key dimensions: a long and healthy life, measured by life expectancy at birth, being knowledgeable, measured by means of schooling and expected years of schooling, and decent standard of living, measured by gross national income per capita (UNDP).

In the macroeconomic context, the variables pertained to economic growth include fertility rate, governance, financial development, the terms of trade, and inflation rate (Barro, 1996; Bassanini and Scarpetta, 2001).

Fertility rate is measured by the population growth of a country. According to the neoclassical growth model, increasing population growth has a negative effect on economic growth, as higher rate of population growth implies sharing of capital among larger number of people. Government consumption, indicated by the ratio of government consumption to GDP, represents the size effect of the government, controlled for its influence on economic growth of a country. A country's governance, derived from Worldwide Governance Indicators, is comprised of six dimensions; Voice and accountability, Political instability and Violence, Government effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. I, particularly, use Rule of law as a proxy for measuring Governance, in considering law enforcement as the core function of the government (Hayek, 1984), significant enough to capture the wholesome effect of a country's governance. The general idea of rule of law is to gauge the attractiveness of a country's investment climate by considering the atmosphere of law enforcement, contract enforcement, and security of property rights.

Financial development of a country critically contributes to economic growth by mobilizing and

channeling savings into investments (Bassanini and Scarpetta, 2001). The financial security attained from well-developed financial system of a country renders increased investment and capital accumulation.

Terms of trade, measured as the ratio of export to import prices has often been stressed as a significant influence on economic growth. The simple GDP equation is stated as follows:

$$GDP = C + I + G + (X-M)$$

C = *Consumption*

I = *Investment*

G = *Government*

(X-M) = *Export – Import*

Terms of trade measures the value of country's exports relative to the value of imports. Negative terms of trade implies that capital is exiting the country, while positive terms of trade signals capital accumulation within the country.

Inflation rate, measured by consumer price index (CPI) is also controlled for its association with economic growth. Lower or stable inflation rates suggest reduced uncertainty in the economy, and thus, well-functioning of price mechanism.

Regional variables- Africa, Asia, Australia and the Pacific, and Caribbean form the UN classification, are dummy variables, tabulated into three groups, taking a value of 1 for Asia, 2

for Africa, 3 for Pacific and Caribbean. Geographical regions are included to examine whether the external capital inflows show different significant result in different regions. Lagged dependent variable, which is the GDP per capita growth in initial year in my model, is considered under assumption that GDP per capita of the given initial year can have consequent impact on the GDP per capita of the following consecutive period.

In order to test the severity of multicollinearity among the explanatory variables, I examined variance inflation factor, which showed mean VIF figure of 1.69, confirming that predictor variables are not linearly related.

I use Panel random effect, which enables to include time invariant variables, under the assumption that variables do not vary significantly among the homogenous group of least developed countries. Hausman test was performed prior to implementing random effect model. A finding of $p>0.05$ signifies that random effect is free from bias, and is preferred over fixed effect model (Clark and Linzer, 2012). Following the result, LM test was conducted to confirm the use of random effect model rather than OLS regression. If the figure displays significant rejection of null hypothesis indicating no variation between entities in favor of the alternative hypothesis of variation between entities ($p<0.05$), OLS regression should be opted instead of random effect model. As to my case, failure to reject the null hypothesis verifies the appropriate use of random effect model.

Next, in suspicion of plausible existence of heterogeneous residual values among different least developed countries, Breusch-Pagan test was conducted to test the heteroskedasticty.

Heteroskedasticity was proved to be present in my model, and consequentially I used the term

robustness in response to the presence of heteroskedasticity. To ensure robustness of the model, several minor changes were made in the model by reducing the number of variables, including the lagged dependent variable and dummy regional variables. Despite the changes made in the model, and consequentially changes in the value of coefficients, the significance of result remained the same, assuring the model's robustness.

The result of the robustness check shall be discussed in the Results Section.

IV. RESULTS

I ran two panel regressions using random effect model to examine the impact of different types of ODA and private capital on 43 least developed countries.

The empirical results discussed so far are summarized in the following table:

Table 2- PANEL REGRESSION RESULTS (DEPENDENT VARIABLE: GDP PERCAPITA GROWTH)

	(1)	(2)
	GDP per capita growth	GDP per capita growth
ODAGrants_GDP	-0.153*	-0.0936
	(-2.19)	(-1.02)
ODALoans_GDP	0.249*	0.281
	(2.00)	(1.61)
Technical Assitance_GDP	0.0434	0.497
	(0.18)	(1.32)
FDI_GDP	0.0782**	0.0789**
	(3.22)	(3.18)
Remittances_GDP	-0.112*	-0.0975*
	(-2.55)	(-2.24)
Physical capital	-0.00716	-0.0150
	(-0.24)	(-0.45)
Human capital	-2.128	-0.758
	(-0.69)	(-0.22)
Population growth	-1.314**	-0.955
	(-2.83)	(-1.47)
Inflation rate	-0.0337	-0.0215
	(-0.66)	(-0.46)
Governance	-0.0384	0.207
	(-0.08)	(0.37)
Financial Development	0.113	0.182
	(0.19)	(0.33)
Trade Openness	-0.539	-0.432
	(-0.73)	(-0.58)
Lagged_GDP per capita growth	0.357***	0.309*
	(3.31)	(2.48)
regional_dummy1		2.429
		(1.78)
regional_dummy2		1.375
		(1.36)
regional_dummy3		0
		(.)
_cons	7.126*	3.167
	(2.25)	(0.87)
N	235	235

T statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The result of the first hypothesis that foreign direct investment will have significant positive impact on economic growth of least developed countries was proved to be true. In fact, foreign direct investment was the only variable that showed significant positive effect. On the contrary, ODA show mixed results. ODA grants have negative impact on economic growth of least developed countries, though significant at 5 percent level. ODA loans, on the other hand, demonstrate s negative impact on economic growth of least developed countries, significant at 5 percent level.

The degree of significance of ODA loans and ODA grants are neither large nor consistent, compared to that of FDI. The significance of ODA loans and ODA grants disappear when additional variables are included or excluded in the model, indicating that the effect of ODA loans and ODA grants are highly contingent on recipient countries' conditions. This also may relate to the notion that the degree of significance of ODA loans and ODA grants lie in 5 percent significance level, while the FDI is significant at 1 percent level.

The model delineated in the Methodology section demonstrates varying coefficient signs across disparate types of ODA, in which ODA loans show positive sign while ODA grants show negative. This finding is consistent with Koeda (2004) that unveiled the superiority of concessional loans to grants, as the perverse effect of concessional loans is minor.

An interesting finding by Lahiri and Younas (2013) on measuring the comparative effectiveness of ODA grants and ODA loans proved an inverted U-shaped relationship between ODA grants and economic growth, and a U-shaped relationship between ODA loans and economic growth of developing countries. Large amount of ODA grants is not a preferable solution for growth of developing nations, and so is small amount of ODA loans.

The reasoning behind the result can be attributed to the high level of government corruption present in most, if not all, in least developed countries, and financial endowment dedicated to highly corrupted governor may be associated with high level of aid fungibility, that is foreign aid actually not reaching the poor nor be constructively employed for country's growth (Easterly, 2006). The negative impact of ODA grants is further bolstered by Moyo (2009)'s assertion that foreign aid to poor countries in Sub-Saharan Africa are fatal and are no more than stimulators of government corruption.

Technical Assistance, on the other hand, proves to have no significant impact on economic growth of least developed countries.

The findings regarding ODA, unlike FDI, however are not absolutely robust, and instead depend on recipient country's regions, economic growth, and governance, as indicated in Table 2 and Table 3 showing different outcome.

Among the foreign private capital inflows, foreign direct investment showed expected positive effect on economic growth of least developed countries at 1 percent significance level. The result can be interpreted as when foreign direct investment increases by 1 percent, economic growth of least developed countries increases by approximately 8 percentage point. This shows foreign direct investment has substantial positive impact on least developed countries' economic growth, and the probability that I may be wrong is less than 0.01, signaling high credibility. One of many previous research on the impact of foreign direct investment on economic growth of developing countries based in Africa was estimated to be positive in most countries, but no statistically significant (Adewumi, 2006). Statistically insignificant finding by Adewumi (2006) can be explained by using different time period, in which the author used time series data from 1970 to

2003, where the proportion of foreign direct investment inflows out of GDP was almost virtually nonexistent, and only started to increase fairly in early 2000s (World Bank). I intentionally chose to test the foreign direct investment impact on economic growth in the latest decade, ranging from 2003 to 2014, in order to take into account of meaningful increase of foreign direct investment after 2000s, and to assure similar proportion of foreign direct investment inflows across countries high to low income countries. According to the World Bank Development Indicators, all countries, regardless of income levels, show 3 to 4 percent of net inflows of FDI of GDP, enabling to avoid possible criticism that foreign direct investment targeted to least developed countries is substantially limited, simply insufficient to accurately measure its effectiveness. Data from the World Bank, however, tells us that the percentage of FDI inflows of GDP of least developed countries does not differ much from that of middle income or high income countries.

My empirical finding of positive impact of foreign direct investment is consistent with widely cited former research, which provided evidence of positive causal link between FDI and growth in developing countries via transfer of knowledge and adoption of new technology (Hansen and Rand, 2006).

Thus, the positive and significant coefficient of FDI implies that there is positive effect of FDI on growth of least developed countries, confirming the validity of my first hypothesis:

Result to H1: In least developed countries, foreign direct investment would contribute most to the economic growth of least developed countries.

On the contrary, personal remittances showed significant negative impact on economic growth of least developed countries, at 1 percent significance level. That is, with 1 percent increase in

personal remittances, economic growth of least developed countries decreases approximately by 11 percentage point. At the initial screen, the negative effect of personal remittances on growth of least developed countries appear surprising, especially when we concede that remittances constitute an important source of foreign capital, potential to trigger household wellbeing, which can lead to increased consumption, ultimately resulting in increase in economic growth. However, the negative coefficient of personal remittances becomes more convincing when we refer to the following explanations.

Personal remittances, unlike other private capital inflows, tend to rise particularly in times of economic hardship, as migrants try to send greater proportion of their income to their families when the economy is in recession and the growth is at minimal (Ratha, 2007). This phenomenon delineates negative relationship between personal remittances and economic growth. A more determining explanation is that remittances prove effective under sound financial systems and policy environment (Ratha and Mohapatra, 2007). According to IMF (2005), a country with good institutions can effectively use remittances as a means of investment in physical and human capital. Least developed countries, however, are associated with bad institutions, underdeveloped financial systems, and a high rate of corruption, and eventually confronts difficulty in transferring remittances to investment in physical and human capital, hindering capital accumulation for economic growth.

Large amount of remittances can be particularly harmful in least developed countries, where the economies are small and remittances are high (Gupta et al, 2007). Gupta et al suggests that large inflows of remittances in small economies can be vulnerable to Dutch disease, an appreciation of real exchange rate and loss in export competitiveness, incurring negative impact on economy. Thus, remittances are not the best foreign capital inflows on growth, at least for the least

developed countries with small economies and poor institutions, leading to another conclusion derived from empirical result:

In least developed countries, personal remittances have significant negative impact on economic growth.

To ensure, robustness of the above panel regression result in Table 4, some changes were intentionally made in the model by including some variable and excluding other variables. Initially, additional variables were included in the existing model, taking into account of contingency of Foreign Direct Investment on the governance of the recipient countries (Cohen, 2007) to check whether the significance of the results do not change with regards to change made in variables. Next, some existing variables were omitted from the model, excluding physical capital accumulation, human capital, and financial development not specified in Benmamoun (2013)'s model.

As the following results show, the coefficients do vary but the statistical significance of key variables remain robust.

Table 3- ROBUSTNESS CHECK: PANEL REGRESSION RESULTS AFTER INCLUSION AND EXCLUSION OF VARIABLES (DEPENDENT VARIABLE: GDP PERCAPITA GROWTH)

	(1)	(2)
	GDP per capita growth	GDP per capita growth
ODA Grants_GDP	0.262	- 0.107
	(0.14)	(-1.15)
ODALoans_GDP	-3.301	0.0367
	(-1.73)	(0.21)
Technical Assistance_GDP	29.57	-0.0785
	(1.55)	(-0.51)
FDI_GDP	0.625**	0.0608**
	(2.58)	(3.15)
Remittances_GDP	-0.101	-0.0957*
	(-0.47)	(-2.37)
Physical capital	-0.000512	
	(-0.02)	
Human Capital	-2.404	
	(-0.72)	
Population growth	-1.313**	-1.131**
	(-2.61)	(-3.11)
Inflation rate	-0.0287	-0.0134
	(-0.56)	(-0.32)
Governance	0.765	-0.215
	(1.10)	(-0.59)
Financial Development	0.327	
	(0.52)	
Trade Openness	-0.177	-0.630
	(-0.22)	(-0.90)
Lagged_GDP per capita growth	0.283*	0.331***
	(2.36)	(3.32)
Governance*Grants_GDP	-13.53	
	(-0.21)	
Governance*Loans_GDP	122.1	
	(1.94)	
Governance*Technical Assistance_GDP	-989.1	
	(-1.55)	
Governance*FDI_GDP	-0.214*	
	(-2.29)	
Goverannce*Remittances_GDP	-0.00832	
	(-0.13)	
_cons	4.356	6.173**
	(1.28)	(3.10)
N	235	285

T statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 4- Summary of Variables

Dependent Variable	***Measurement***
Growth_GDPCapit	*GDP per capita growth rate*
Independent Variables (ODA)	
ODAGrant_GDPit	*ODA Grants / GDP*
ODALoan_GDPit	*ODA Loans / GDP*
TA_GDPit	*Technical Assistance / GDP*
Independent Variables (Private Capital)	
FDI_GDPit	*Foreign Direct Investment / GDP*
REMIT_GDPit	*Personal Remittances / GDP*
Control Variables	
Physicalcapit	*Investment / GDP*
HumanCapit	*HDI (Human Development Index)*
Populationgrowthit	*Population growth rate*
Governanceit	*CPIA Governance rule of law*
Financialdevit	*CPIA financial development*
Tradeopennessit	*Terms of Trade (Exports / Imports)*
Inflationit	*Consumer Price Index*
governanceGrants	*CPIA Governance rule of law * Grants*
governanceLoans	*CPIA Governance rule of law * Loans*
governanceTA	*CPIA Governance rule of law * TA*
governanceFDI	*CPIA Governance rule of law * FDI*
governanceRemittance	*CPIA Governance rule of law * Remittance*
Regional Variables	
Asiait	*= 1*
Africait	*= 2*
Caribbean and Pacificit	*= 3*

Source: World Bank, World Development Indicators

The second panel regression model includes regional dummy variables, where 1 denotes Asia, 2 for Africa, and 3 for Caribbean and the Pacific. Regional dummy variables are considered, assuming that economic growth differs across different geographical regions. The empirical finding, however, demonstrates that least developed countries do not show significant differences in economic growth.

The result, though unexpected, can be attributed to the notion that least developed countries share similar economic condition, and therefore regional differences do not significantly contribute to different economic growth.

This finding of different economic growth associated with different geographical regions rejects my second hypothesis:

Result to H2: Least developed countries in Asia, Africa, and Pacific and the Caribbean do not show significant differences in economic growth.

The physical capital, measured by gross capital formation, property right, and financial development are not statistically significant in the empirical analysis, but have the expected coefficient signs. In the first equation, population growth has significant negative impact on economic growth of least developed countries, at 1 percent significance level. A 1 percent increase in population growth in least developed countries can result in 160 percent decrease in economic growth, negatively affecting the economy to a considerable extent. According to the theory of Solow growth model, population growth holds an inverse relationship with economic growth, as the limited pie of economy has to be shared with increased population. Significant

and considerable negative impact of population growth tends to become more severe in least developed countries, where the size of the economic pie is excessively minimal. Terms of Trade, denoted as Trade Openness is not statistically significant, but has expected positive sign.

V. CONCLUSION

In this panel regression analysis, I studied the impact of different types of ODA and Private capital inflows on economic growth of least developed countries. Previous literature focused too little on least developed countries, overshadowed by rapid economic growth of emerging economies that deserve much scholarly attention. This research is meaningful because it solely focuses on least developed countries, largely in deficient of capital and capital accumulating capacity. This implies that foreign capital, however limited, constitute an important source of capital especially for least developed countries. But one has to concede that not all types of foreign capital are contributive to economic growth, and in fact, some types of capital inflows can rather harm the economy in a poor institutional setting as featured by many least developed countries.

Therefore, this research is contributive to policy implication to least developed countries regarding discrete selection of a particular foreign capital that contributes most to economic growth, thus minimizing potential cost of attracting ineffective foreign capital and target the optimal foreign capital conducive to economic growth.

The empirical finding indicates that foreign direct investment has significant positive impact on economic growth of least developed countries.

Official Development Assistance including grants, loans and technical assistance, on the other hand, showed mixed results. ODA grants proved to have negative significant impact at 5 percent

significance level, and ODA loans showed positive significant impact at 5 percent significance level. Technical Assistance, on the other hand proved to have no meaningful impact on least developed countries' economic growth. The reasoning behind this conclusion can be attributed to high rate of corruption and ineffective legal system, with an average score of 2 to 2.5 out of 6 in Country Policy and Institutional Assessment (CPIA) property rights and rule-based governance rating. Therefore, free funds targeted to governments in least developed countries poses negative impact on economic growth of least developed countries in the form of ODA grants, and do not significantly contribute to improvement in economic growth of least developed nations in the form of Technical Assistance. ODA loans, unlike ODA grans and Technical Assistance, show positive impact, though meager, as it holds the recipient countries accountable for payback at low interest rate, rather than in the form of free endowment.

Personal remittances had significant negative impact on economic growth of least developed countries, as remittances in poor institutional setting are not effectively transferred to physical and human capital accumulation, as explained in the Results section. Yet, due to the difficulty in detecting accurate data on personal remittances, as they are micro-level data based on individuals and households, the conclusion made for remittances do not feature full assurance of credibility. There, certainly, is a chance that remittances can reach different result when examined with more comprehensive household data set.

Factors affecting economic growth were controlled, including human capital, measured by human development index (HDI), physical capital, measured by gross capital formation, financial development, governance, population growth, and terms of trade. Holding these factors fixed, I aimed to measure the pure, unbiased effectiveness of each foreign capital on economic growth of least developed countries.

All in all, my research provides some important evidence on significance of foreign direct investment in least developed countries, where they are equipped with poor governance and legal system, potential to nullify effectiveness of any government-targeted official development funds. My research empirically supports the proposition made by a renowned Zambian economist, Dambisa Moyo, who emphatically asserted that Sub-Saharan countries should strive to attract foreign direct investment and encourage free enterprise and private sector, rather than relying on ODA, which only fosters corruption and conflict (Moyo, 2009). If Dambisa Moyo made an intuitive, convincing proposal on significance of foreign direct investment especially in least developed countries, my research yields empirical evidence, statistically significant at 1 percent level.

VI. LIMITATION AND IMPLICATIONS

Despite some contributive findings, my research is not without limitations.

The methodology of my research suffers from potential omitted variable bias, as there are some unmeasurable factors that affect economic growth, such as culture, racial characteristics. The potential omitted variable bias can result in biased or inconsistent estimator, as the significant impact of FDI can partially be due to other unmeasurable factors that may affect economic growth, causing an upward bias.

Another limitation of my methodology is the reverse causality issue. The types of foreign capital inflows certainly have an impact, whether positive or negative, on economic growth of least developed countries. However, there could be presence of reverse causality, as economic growth of a country can also affect different types of foreign capital inflows entering the country. For instance, countries with higher economic growth can attract larger share of foreign capital into market. The problem of reverse causality, however, can be alleviated, to some extent, when we acknowledge that that the target group of my research constitutes of 43 least developed countries, which do not significantly differ from each other in terms of economic development. In other words, the least developed countries, as one group, share much of similar economic concerns, and their economic growth do not differ substantially, at least not as much as countries in two different groups of income levels. Different economic growth can have different impact on luring foreign capital inflows, signaling the presence of reverse causality, but the problem of reverse

causality may not be extremely severe, given the not-too-different economic growth of least developed countries.

Thirdly, inability to add foreign private loan as a type of private capital to make some comparative analysis of ODA loans and private loans remains much to be desired. Data on private foreign loan, including foreign microfinance targeted to least developed countries were unavailable to the best of my knowledge.

Despite the limitations of my research, it does provide some important framework and guidelines for least developed countries that they should allocate limited resources to attracting foreign direct investment. Funds and effort need to be dedicated to establishing good legal system and reducing high rate of corruption to create appropriate environment for ODA grants and loans and technical assistance to prove their real worth.

Future research might want to improve the methodology used in the research to minimize omitted variable bias, and if possible, come up with instrument variables for key foreign capital inflows to completely avoid reverse causality.

Related interesting topic may include comparative analysis on impact of ODA loans and private loans on economic growth of least developed countries. Also, prospective researchers might want to examine the impact of foreign capital inflows on poverty reduction of least developed countries or go even further and suggest effective economic activity that contributes most to institutional development of least developed countries.

Overall, the focus of my research lied in least developed countries, or the “bottom billion” as defined by Paul Collier (2007) to pull them up from the trap of extreme poverty and economic underdevelopment.

APPENDIX

List of 43 Least Developed Countries in the study:

Afghanistan	Myanmar
Angola	Nepal
Bangladesh	Niger
Benin	Rwanda
Bhutan	Samoa
Burkina Faso	Sao Tome and Principe
Burundi	Senegal
Cambodia	Sierra Leone
Congo, Dem. Rep.	Solomon Islands
Comoros	Sudan
Djibouti	Timor-Leste
Eritrea	Togo
Ethiopia	Tuvalu
Gambia, The	Uganda
Guinea	Tanzania
Guinea-Bissau	Vanuatu
Haiti	Yemen, Rep.
Kiribati	Zambia
Lao PDR	
Lesotho	
Liberia	
Madagascar	
Malawi	
Mali	
Mozambique	

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