AID EFFECTIVENESS ON ECONOMIC GROWTH IN DISAGGREGATION BY TYPE OF AID: PROGRAMME AID, PROJECT AID, AND TECHNICAL ASSISTANCE

By

RYU, Kyungnam

THESIS

Submitted to
KDI School of Public Policy and Management
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Committee in charge:

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ABSTRACT

AID EFFECTIVENESS ON ECONOMIC GROWTH IN DISAGGREGATION BY TYPE OF AID: PROGRAMME AID, PROJECT AID, AND TECHNICAL ASSISTANCE

By

Kyungnam Ryu

The purpose of this study is to investigate the effectiveness of foreign aid on economic growth of developing countries by type of aid with OECD DAC (Development Assistance Committee) data. As methodology, it applies econometric approaches to analyze panel data of cross-country samples spanning for twelve years. One important contribution of this study to the continuing aid-growth discussion is to disaggregate aid into sub-categories and demonstrate more specific empirical findings on the effectiveness of each aid type on a macro performance indicator of some of the DAC recipient countries. Among various aid types, particular attention is paid to Programme aid, Project aid, and Technical assistance. Aid and other country specific data are collected from the OECD CRS (Creditor Reporting System) and World Bank DataBank to test the hypothesis that Programme aid is the most effective on economic growth in developing economies than the other two types of aid are. The statistical analysis by using more than 60 countries from 2002 to 2013 shows positive effects of General budget support belonging to Programme aid and negative effects of Project aid, but

neither of them is statistically significant. Technical assistance by experts has positive and statistically significant effects on per capita GDP growth while Technical assistance for fellowship has negative and statistically significant effects on economic development. It can be interpreted that one percent increase in technical assistance for experts leads to about one percent increase in per capita GDP growth in aid recipient countries on average. Although the econometric tests indicate the superiority of the Random Effects estimation method with the data, each effect of the Programme aid, Project aid, and Technical assistance on the economic growth was not different among estimation methods, boosting the robustness of my estimation results.

Key words: Aid-growth, disaggregation, OECD DAC CRS, Programme aid, PBA (Programme-based approaches), aid effectiveness, Technical assistance

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1. Introduction

1.1 Purpose of Study

The purpose of this thesis is to investigate aid effectiveness on economic growth of developing countries through disaggregating aid by its type: Programme aid, Project aid, and Technical assistance. Every aid should be effective. Otherwise, its aim, the promotion of economic development and welfare in developing countries, would become difficult to achieve. Another reason for necessity of effective aid is that it is supposed to be accountable to funding sources, mainly tax payers. Aid money might be one of the important resources to ensure more inclusive and sustainable world and aid would not be secured ending up with loosing its validity among other urgent and appealing domestic issues without proving its effectiveness.

Foreign aid can include broad and various concepts, being likely to cause miscommunication among development researchers and practitioners. In this thesis, most of the definitions for aid comply with the ones stated in the OECD Development Assistance Committee (DAC) policy documents as long as not mentioned otherwise. Historically, Programme aid (Programme-based approaches, PBAs) might be, compared to Project-type aid, quite recent modalities[1]. The Paris Declaration on Aid Effectiveness with five principles of Ownership, Harmonisation, Alignment, Managing for Results, and Mutual Accountability had designated the extent to which Programme aid is used as the indicator 9[2] to measure the

[1] While one can trace the inception of official foreign aids to the times after the Second World War, Programme aid concept is mostly said to have been established around 2005.

[2] The Paris Declaration on Aid Effectiveness (2005, p.6) says that 'Donors commit to implement, where feasible, common arrangements at country level for planning, funding (e.g. joint financial arrangements), disbursement, monitoring, evaluating and reporting to government on donor activities and aid flows. Increased use of programme-based aid modalities can contribute to this effort (Indicator 9).'

progress for Harmonisation part. The global target of the indicator 9 was to achieve 66% by 2010, however it was not met as being below 50% of aid provided in the context of programme-based approaches in 2010[3].

Programme aid (PBAs) mainly intends to support single national development plans or strategies to boost various socio-economic fields. It can be committed to increasing aid effectiveness by harmonizing aid practices among donors and implementing common procedures. One of the positive outcomes from Programme aid might be that nation's institutions such as government transparency and efficiency would benefit from implementing the whole management procedures, for instance, establishing development priorities with visible mid-term targets and managing budget within their own system. One can also expect capacity building opportunities for recipient government officers responsible for national planning and strategies.

Project aid seems to be regarded as more traditional assistance with specific project objectives, duration, and demographic and locational target. In practice, it tends to allow donors to more influence over the entire aid process and, probably, outcomes as a result. Technical assistance deals with more direct building and reinforcing the nation's capacity and expertise by sending more advanced country's experts or inviting and training the recipient country's professionals to donor countries.

1.2 Statement of the Problem

While international community has been dedicated to achieve the Millennium Development Goals (MDGs) since 2000, we are still witnessing diverse development challenges jeopardizing lives of countless individuals in the world. The year 2015 is considered to be

[3] OECD (2012), Aid Effectiveness 2011: Progress in Implementing the Paris Declaration, Better Aid, OECD Publishing.

such a remarkable time to discuss development accomplishments so far and remaining challenges still in need to be addressed continuously for the post-2015. According to the Millennium Development Goals Report 2015 by the United Nations, there are still huge disparities in achieving gender equality and fragile states are still in great danger to be left behind despite progress in other sectors including poverty reduction, achieving primary education, and so on. For example, it is acknowledged that the extreme poverty rate has decreased in most of the developing countries, but Sub-Saharan Africa has seen only 28% of decrease. While the adjusted net enrollment rate in primary education in developing regions has increased from 83% in 2000 to 91% in 2015 projection, the gender parity index for gross enrollment ratios in tertiary education in Sub-Saharan Africa and Southern Asia remains around 0.6 and 0.8 respectively. Per reducing under-five mortality rate, children in Sub-Saharan Africa and Oceania await for more decisive interventions. The situation for maternal mortality appears to get worse compared to the child case despite of much progress. All these difficult circumstances make effective aid more crucial when it comes to achieving remaining development goals and counting the poorest and the most vulnerable people.

There is also a practical issue on aid effectiveness that financing for development has become more critical than ever notably due to ambitious development aims amid international financial crises and unpredictability facing to every economy. On the one hand, the collective efforts need to be pursued to source additional public resources for development, but on the other hand it would be much convincing if aid will be able to achieve its goals with less input. The Addis Ababa Action Agenda[4] of the Third International Conference on Financing for Development endorsed by the General Assembly of the United Nations in July 2015 emphasizes the member country's efforts to come up with stable

[4] Resolution adopted by the UN General Assembly on 27 July 2015, A/RES/69/313

funding methods to obtain additional development resources and provide financial supports for sustainable economic improvement to fight hunger and malnutrition. In the mean time, the Addis Ababa Action Agenda strongly encourages the donor country's substantial commitment to fulfill the UN guideline of achieving 0.7% of the gross national income (GNI) for official development assistance (ODA) and 0.15 to 0.20% of the GNI to least developed countries.

The United Nations Sustainable Development Summit for the adoption of the post-2015 development agenda and the Sustainable Development Goals (SDGs) was held from 25 to 27 September 2015 in New York so that we have now the 17 Sustainable Development Goals and 169 targets to pursue by 2030[5]. Greenhill and Ali (2013) find that financing gap by sector from 2010 to 2030 or sooner, if possible, requires annual and additional spending: 38 billion dollars for education, 37 billion dollars for health, 26.75 billion dollars for water and sanitation, 34 billion for energy access, 400 to 900 billion dollars for renewable energy, and 50.2 billion dollars for food and agriculture. Proving aid effectiveness might be indispensible with more comprehensive development sectors covered by the SDGs and increased resources.

1.3 Significance of the Study

There have not been sufficient studies on disaggregated aid effectiveness on growth while one can observe a series of literature on aggregate aid effectiveness. This research intends to have a more detailed consideration on aid and growth relation questioning if aid has substantially been effective on economic growth in developing countries. In previous aid-

[5] The UN Sustainable Development Goal 1. No poverty; Goal 2. Zero hunger; Goal 3. Good health and well-being; Goal 4. Quality education; Goal 5. Gender equality; Goal 6. Clean water and sanitation; Goal 7. Affordable and clean energy; Goal 8. Decent work and economic growth; Goal 9. Industry, innovation and infrastructure; Goal 10. Reduced inequalities; Goal 11. Sustainable cities and communities; Goal 12. Responsible consumption and production; Goal 13. Climate action; Goal 14. Life below water; Goal 15. Life on land; Goal 16. Peace, justice and strong institutions; Goal 17. Partnerships for the goals.

growth literature, some researchers find no significant effect of aid on economic growth in recipient countries. In contrast, others argue that they find average positive effects of aid on growth and some others conclude that aid seems to be effective only in countries with sound policies and good institutions. These puzzling results have largely encouraged this study to disaggregate aid into three types, which are Programme aid, Project aid, and Technical assistance because much of policy implications inferred by the former studies could be changed when aid is analyzed in disaggregation. And indeed each type of aid appears to indicate different characteristics, so it might not be very valid if one treats diverse types of aid alike.

This study may contribute to aid-effectiveness literature by disaggregating aid by its types. It also explores to investigate if Programme aid (Programme-based approaches, PBAs) is effective on economic growth considering that the Paris Declaration on Aid Effectiveness underlines it as another modality to achieve better aid effectiveness. Regarding data, it collects OECD DAC CRS data by recipient country from 2002 to 2013 and matches five types of aid to each out of three major aid types: Programme aid, Project aid, and Technical assistance. By doing so, this research intends to fill the above-mentioned research gaps in aid-effectiveness and aid-growth literature.

1. 4 Structure of the Thesis

In the following chapter of literature review, various influential researches accumulated so far on aid-effectiveness are examined through sorting each strand by the significant existence of aid effectiveness in their research findings. The third chapter of the study deals with methodology and data including explanation on econometric models and regression estimators. The fourth chapter of analysis results and discussion follows later to show empirical findings and review some relevant points. The last fifth chapter concludes with

summary and limitation of the study and suggested areas for further study. Some detailed information not included in the chapters can be found in appendix.

Chapter 2. Literature Review

Aid effectiveness has been one of the development research topics that have been most frequently visited among many interesting questions. Some researchers conclude that aid is effective only under certain conditions, otherwise showing little or even negative effects on growth. In their World Bank report, one of the most influential aid-effectiveness policy papers, Dollar and Pritchett (1998) argue that they find positive impact of aid restricted only on low-income countries with sound policies. They analyze aid effects on growth rate of per capita GNP[6] as dependent variable averaged by every span of four years from 1970-73 to 1990-93 for 56 developing countries as sample. Their policy implications seem to convince the significance of more aid investment to recipients with good management to achieve the highest level of aid effectiveness possible. In line with the above study done by Dollar and Pritchett (1998), Burnside and Dollar (2000) also find little impact of aid on growth in general, but aid allocated to countries with sound policies shows positive impacts on growth. Burnside and Dollar (2000) apply the OLS estimation and this thesis follows their methodology by adopting the pooled OLS and fixed effects/random effects estimators.

Radelet et al. (2005) review and classify the history of aid-effectiveness discourse into three strands: Aid is not effective and it may hamper economic development; Aid is effective in general but showing diminishing returns; and Aid is conditionally effective and its effectiveness determines by developing country's characteristics and donor practices.

[6] Gross national product

Their analysis results can be summarized as comparatively large positive impacts of early impact aid[7], moderate but positive impacts of late impact aid, and negative effects of humanitarian aid on economic growth. In this thesis, humanitarian aid or emergency interventions are excluded from the independent variables to account for growth in a sense that those aid seem to have little impact on growth and moreover humanitarian aid tends to be approached as a matter of human rights and international cooperation regardless of making economic progress.

In his manuscript focused on the relation of political structures and the impacts of aid, Boone (1995)[8] finds that aid does not improve economic status of aid recipients and his framework attributes it to no relation between poverty and lack of capital and also the policy makers' stable incentives when aid money is present. Rather, he argues that aid flows in his sample have only increased vested interests of certain groups of elite people, which is consistent with the previous pessimism on the benefits of foreign aid. Chatterjee et al. (2012) explain the absence of impact of foreign aid on economic growth by fungibility[9] working to compensate aid impacts in the middle of them. Their results suggest that about 70 percent of aggregate aid is fungible from analysis on a panel data of 67 countries from 1972 to 2000.

This study has initially been inspired by the idea of disaggregating aid as done in the paper of Clemens et al. (2012) and also ongoing disaggregation discourses among the

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[7] According to the classification defined by them, early impact aid stands for any investment have more direct and instant results on growth such as building infrastructure, while late aid impact takes longer time to see actually better growth such as health and education sectors.

[8] Published later in *European Economic Review* in 1996.

[9] According to the definition of Devarajan and Swaroop (1998), fungible aid replaces already existing government spending that would have continued to be invested by the recipient country's own budget if aid is not provided and the amount left or freed up is used for other (unknown) items. This might work as a channel to neutralize aid impacts on economic growth.

development researchers and practitioners. When one tracks the study results of Boone (1996), Burnside and Dollar (2000; 2004), and Rajan and Subramanian (2008), they concludes that moderate impacts of aid on investment and growth on average although it varies highly over developing countries and shows diminishing returns to a large amount of aid. While this thesis adopts aid disaggregation strategy of Clemens et al. (2012), the way to classify aid is different to categorize another three types of aid, Programme aid, Project aid, and Technical assistance. For instance, any development project is supposed to be included in their 'early impact aid' if it seems to yield quick impact on economic growth. On the other hand, all the project interventions would belong to the Project aid in this research strictly following the types of aid by the OECD DAC CRS. They are interested in the timing of the impacts of aid, but my research interest lies in Programme aid or PBAs, which has been proposed as another means to ensure aid effectiveness.

The above literature review implies that the actual impacts of aid on economic growth might not have been explored enough to be convincing and these varying findings could have arisen from treating all types of aid alike. Therefore, this study intends to test the below hypothesis,

> *H_0: Programme aid is more effective on economic growth in aid recipient countries than Project aid or Technical Assistance is.*

By extracting the corresponding answer to the hypothesis, it may help to better understand which type of aid is (more if applicable) effective on growth in developing economies to allow us to proceed one step forward from the place where we stand at the moment.

Chapter 3. Methodology and Data

3.1 Methodology

This study takes advantage of econometric approach including descriptive statistics and regression analysis to investigate the effectiveness of each type of aid for developing countries. As mentioned earlier, following regressions use the pooled OLS, fixed effects, and random effects estimators. Many precedent researchers reflect possible time lag influence in their regression specifications and often take four-year averages from their sample spanning for at least twenty to thirty years. However, those techniques seem to be less available or to make little sense in my panel dataset because the publicly open OECD CRS data allows me to have only twelve years from 2002 to 2013 and it turns out to have challenges from missing observations. Clemens at al. (2012) linearly interpolate secondary school enrollment ratio when data is missing, but this thesis decides not to use it because there is quite frequent missing observations in the education variable and I am not confident enough about applicability of the interpolation method even in this case. After regressing dataset, Hausman test and Breusch-Pagan Lagrange multiplier (LM) test help to decide which estimator to use. Lastly, regression models include regional dummy variables to show if there is any difference among entities for cross-country sample. The regression model to be used in the following analysis is as below,

$$Y_{it} = \beta_0 + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \gamma_2 D_2 + \cdots + \gamma_n D_n + u_{it}$$

where Y_{it} is the dependent variable (i=entity and t=time),

$X_{k,it}$ is an independent variable (IV),

β_k is the coefficient for the corresponding IVs,

u_{it} is the error term,

D_n is a regional dummy variable[10], and

γ_n is the coefficient for the corresponding dummy variables.

3.2 Data

This study examines two main sources for data collection, the OECD Development Assistance Committee (DAC) and the World Bank World DataBank. The study disaggregates aid by its type and focuses on three of the different aid types: Programme aid, Project aid, and Technical assistance, the definitions of which are to be specified later. These aid data to be exploited are collected from the OECD DAC Creditor Reporting System (CRS)[11] and other development data to account for each country's economic and social characteristics are gathered from the World Bank World DataBank[12]. Data is collected and updated as of the end of September 2015.

The OECD DAC member countries are supposed to report their aid activities to the Creditor Reporting System (CRS) by aid recipient, sector, flow, channel, amount type, flow type, and type of aid; the recipient category as country and region[13] becomes each entity for the panel data and regional dummy variables; this study deals with total all sectors as a whole (no differentiation among sectors); the CRS flow consists of three components, Official Development Assistance (ODA)[14], Other Official Flows (OOF), and Private Grants and the

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[10] Notice that D_n starts with number 2 since one of the dummy variables should be omitted.

[11] https://stats.oecd.org/Index.aspx?DataSetCode=CRS1

[12] http://databank.worldbank.org/data/home.aspx

[13] Five recipient regions (Europe, Africa, America, Asia, and Oceania) or more specific regional groups available

[14] According to the OECD DAC, official development assistance (ODA) is defined as those flows to countries and territories on the DAC List of ODA Recipients and to multilateral development institutions which are: i. provided by official agencies, including state and local governments, or by their executing agencies; and ii. each transaction of which: a) is administered with the promotion of the economic development and welfare of developing

ODA is the flow of interest in this study; all aid channels including public sector, NGOs & civil society, Public-Private Partnerships (PPP), and multilateral organisations are covered in the study; data is collected in constant prices; as flow type, gross disbursements are adopted, rather than commitments; and lastly various types of aid are as the below table. The more specific definitions of relevant types of aid are described in the annex.

Table 1. Types of Aid, OECD DAC Creditor Reporting System (CRS)

OECD CRS Category		Variable names in the study
Budget support		Programme Aid
	General Budget support	GB (General Budget)
	Sector Budget support	SB (Sector Budget)
Core contributions and pooled programmes and funds		
	Core support to NGOs, other private bodies, PPPs and research institutes	
	Contributions to specific-purpose programmes and funds managed by international organisations (multilateral, INGO)	
	Basket funds/pooled funding	
Project-type interventions		PA (Project Aid)
	Project-type interventions	The same as above
Experts and other technical assistance		TA-E (Technical assistance-Expert)
	Donor country personnel	
	Other technical assistance	
Scholarships and student costs in donor countries		TA-F (Technical assistance-Fellowship)
	Scholarships/training in donor country	
	Imputed student costs	
Debt relief		
	Debt relief	
Administrative costs not included elsewhere		

countries as its main objective; and b) is concessional in character and conveys a grant element of at least 25% (calculated at a discount rate of 10 per cent).

	Administrative costs not included elsewhere	
Other in-donor expenditures		
	Development awareness	
	Refugees in donor countries	
Not applicable		

Programme-based approaches (PBAs) appears to be currently reported as supplementary data to the Creditor Reporting System (CRS) according to the DAC reporting directives, however it is neither publicly available nor seems to have been accumulated enough for data analysis so far. An alternative way that has been adopted in this study is to define Budget support category (General budget support and Sector budget support) as the ones equivalent to the Programme-based approach or Programme aid. Similarly, Project-type interventions can be defined as Project aid and Experts and other technical assistance can be done as TA-E (Technical assistance-Expert), and Scholarships and student costs in donor countries can be done as TA-F (Technical assistance-Fellowship). All aid data is calculated to be percentage of annual GDP for cross-county comparison.

Indicators to show the country's economic and social traits are from the World Bank World DataBank; GDP per capita growth (annual %), Personal remittances, received (% of GDP), Gross fixed capital formation (% of GDP), Primary (school) Enrollment rate (% gross), Trade (EX+IM/GDP, %), and Government Effectiveness (Percentile Rank, one of the six dimensions for Worldwide Governance Indicators) standing for Policies/Institutions. Per human capital, labor force with primary or secondary education seems to be a more appropriate variable to directly encourage economic growth. However, primary enrollment rate is hired as a proxy for human capital because many of the developing countries lack of those data in the sample. Across countries, school enrollment rate tends to be stable over

times allowing the assumption that it constantly relates to labor force with education despite of the time lags between school enrollment and actual economic contribution of the people. The list of data, description, unit, and source is shown in a table below.

Table 2. The list of variable description, unit, and source

GDP per capita growth	Description	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by midyear population.
	Unit	Annual %
	Source	World Bank World Development Indicators[15]
General Budget support	Description	Unearmarked contributions to the government budget including funding to support the implementation of macroeconomic reforms
	Unit	Million U.S. dollar (Constant prices, 2013 base)
	Source	OECD DAC Creditor Reporting System (CRS)
Sector Budget support	Description	Financial contributions to a recipient government's budget, focused on sector-specific concerns
	Unit	The same as the above unit
	Source	The same as the above source
Project-type interventions	Description	Contributions for project, which is a set of inputs, activities and outputs, agreed with the partner country, to reach specific objectives/outcomes within a defined time frame, with a defined budget and a defined geographical area
	Unit	The same as the above unit
	Source	The same as the above source
Experts and other technical assistance	Description	The provision, outside projects, of knowhow in the form of personnel, training and research
	Unit	The same as the above unit
	Source	The same as the above source
Scholarships and student costs in donor countries	Description	Contributions for Scholarships/training in donor country and Imputed student costs
	Unit	The same as the above unit
	Source	The same as the above source

[15] Source: World Bank national accounts data and OECD National Accounts data files.

Personal remittances, received	Description	Personal transfers and compensation of employees
	Unit	% of GDP
	Source	World Bank World Development Indicators[16]
Gross fixed capital formation	Description	Gross fixed capital formation (formerly gross domestic fixed investment)
	Unit	% of GDP
	Source	World Bank World Development Indicators[17]
School enrollment, primary	Description	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown[18].
	Unit	% gross
	Source	The same as the above source[19]
Trade (EX+IM/GDP, %)	Description	The sum of exports and imports of goods and services measured as a share of gross domestic product.
	Unit	% of GDP
	Source	The same as the above source[20]
WGI Government Effectiveness	Description	It captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
	Unit	Percentile Rank (It indicates the country's rank among all countries covered by the aggregate indicator, with 0 corresponding to lowest rank, and 100 to highest rank)
	Source	Worldwide Governance Indicators (WGI)[21]

[16] Source: World Bank staff estimates based on IMF balance of payments data, and World Bank and OECD GDP estimates.

[17] Source: World Bank national accounts data and OECD National Accounts data files.

[18] Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music.

[19] Source: United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.

[20] Source: World Bank national accounts data, and OECD National Accounts data files.

[21] The WGI are produced by Daniel Kaufmann (Natural Resource Governance Institute and Brookings Institution) and Aart Kraay (World Bank Development Research Group).

Lastly, the OECD DAC recipient countries without any data on the five aid categories[22] were excluded and also the countries lacking of data on per capita GDP growth from 2002 to 2013, which is the dependent variable were excluded. (For instance, Afghanistan in 2002, Cook Islands as a whole, Nauru as a whole, Niue as a whole, North Korea as a whole, Myanmar in 2002 to 2012, Somalia as a whole, Syrian Arab Republic from 2002 to 2004 and from 2008 to 2013, Tokelau as a whole, Wallis and Futuna as a whole and etc.)

Chapter 4. Empirical Findings

4.1 Analysis Results and Discussion

The pooled panel data contains 143 aid recipient country samples[23] in Africa, America, Asia, Europe, and Oceania for the period of 12 years from 2002 to 2013 with 1,491 observations. On the other hand, only more than 60 country entities are eligible for econometric analysis due to the missing data issue in the observations.

Per the Table 3 summary statistics below, the average per capita GDP growth is approximately 3 percent for 143 countries from 2002 to 2013. In general, aid data varies much across observations, which is the reason to take logarithm to make it more in standard distribution. In regression, logarithm variables are used instead of natural ones. The average capital share toward the GDP is around 23 percent, which is slightly lower than world average ratio, one third. The primary school enrollment rate on average is above 100 percent, reflecting the characteristics of the variable possible to be over 100 since the gross indicator

[22] Programme aid (General budget support and Sector budget support), Project aid (Project-type interventions), Technical assistance (Experts and other technical assistance and Scholarships and student costs in donor countries)

[23] The list of the country samples and period is available in the appendix B.

does not exclude early-age or late-age enrollment. The mean for the trade is around 83 percent showing comparatively high variation among observations. The average government effectiveness is ranked around 35 percentile, demonstrating the low level of policies and institutions in aid recipient countries.

Table 3. Descriptive Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
id	1,491	70.02	40.65	1	143
year	1,491	2008	3.266	2002	2013
pcgdpg	1,491	2.989	5.681	-62.21	104.7
gb	691	73.34	173.7	0.000696	3,000
sb	616	79.55	128.6	-16.12	1,150
pa	1,488	324.9	595.5	0.00532	4,853
tae	687	29.27	39.04	0.000594	300.7
taf	1,104	20.35	49.86	0.0145	649.3
rem	1,300	6.249	8.015	0	59.31
capital	1,321	23.16	9.462	1.357	81.65
school	1,167	103.5	15.99	36.25	164.9
trade	1,413	83.46	35.46	21.67	225.0
govern	1,487	35.71	21.19	0	91.75
lgbgdp	691	-19.87	2.729	-35.47	-14.70
lsbgdp	607	-19.83	2.579	-36.07	-14.31
lpagdp	1,488	-18.68	2.093	-31.99	-14.42
ltaegdp	687	-20.87	1.919	-28.24	-16.11
ltafgdp	1,104	-21.60	1.807	-26.16	-16.71

Note: The ‘id’ stands for the identification variable for each country; the ‘pcgdpg’ is per capita GDP growth; the ‘gb’, ‘sb’, ‘pa’, ‘tae’, and ‘taf’ are the variable names for General budget support, Sector budget support, Project-type interventions, Experts and other technical assistance, and Scholarships and student costs in donor countries; the ‘rem’ stands for personal remittances; the ‘capital’ is Gross fixed capital formation; the ‘school’ is Gross school enrollment ratio for the primary education; the ‘trade’ is ratio of the sum of import and export of a nation to its GDP; the ‘govern’ is the WGI government effectiveness in percentile rank; the ‘lgbgdp’, ‘lsbgdp’, ‘lpagdp’, ‘ltaegdp’, and ‘ltafgdp’ stand for logarithm of each variable.

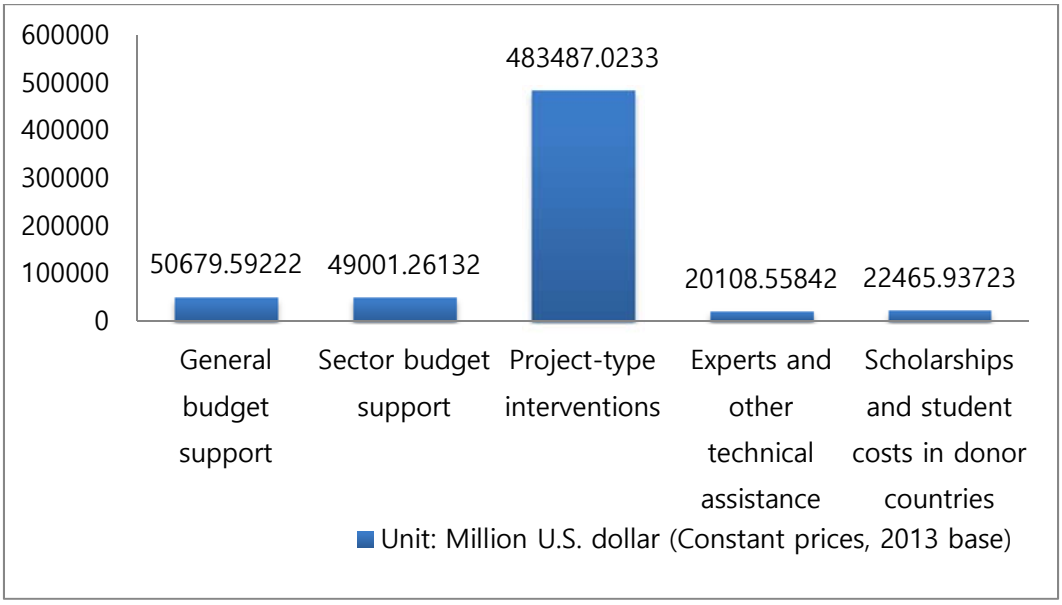
Table 4. The lowest and highest five observations, per capita GDP growth

country	region	subr	pcgdpg	year
Libya	Africa	Nsahara	-62.214351	2011
Central African Republic	Africa	Ssahara	-37.284926	2013
South Sudan	Africa	Ssahara	-48.392772	2012
Zimbabwe	Africa	Ssahara	-17.53265	2003
Zimbabwe	Africa	Ssahara	-18.874825	2008

country	region	subr	pcgdpg	year
Libya	Africa	Nsahara	104.65761	2012
Chad	Africa	Ssahara	28.716825	2004
Nigeria	Africa	Ssahara	30.342238	2004
Azerbaijan	Asia	Scasia	25.114439	2005
Azerbaijan	Asia	Scasia	33.030487	2006

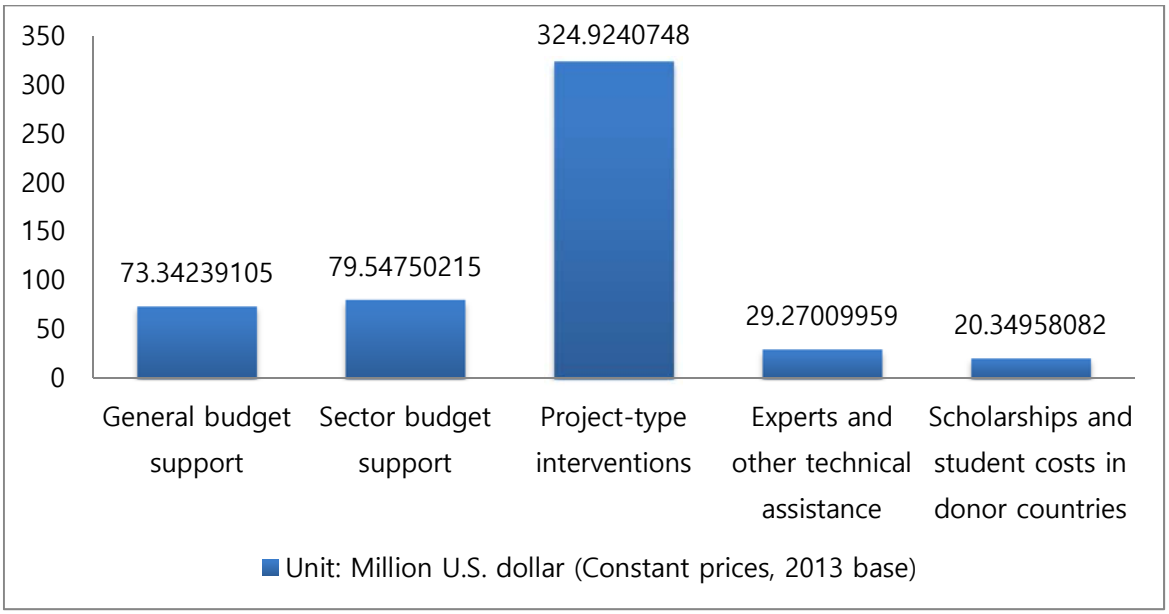
Among the samples, all the five country observations of the lowest per capita GDP growth are located in Africa, mostly in South of Sahara. However, the highest per capita GDP growth is shown by Libya in 2012, one of the African countries in North of Sahara.

Figure 1. The OECD DAC aid total sum[24] by type, 2002 to 2013



[24] Note: some countries have missing data.

Figure 2. The OECD DAC average aid amount per observation by type, 2002 to 2013



Per the OECD DAC CRS aid statistics, it turns out that project-type interventions per observation is higher about four times than budget support per observation is. On the one hand, technical assistance per observation is less than ten percent of the project-type interventions per observation.

Table 5. Correlation between variables

	pcgdpg	lgbgdp	lsbgdp	lpagdp	ltaegdp	ltafgdp	rem
pcgdpg	1.0000						
lgbgdp	0.0072	1.0000					
lsbgdp	-0.0190	0.3956*	1.0000				
lpagdp	-0.0956*	0.4535*	0.5047*	1.0000			
ltaegdp	0.0200	0.3176*	0.6104*	0.8531*	1.0000		
ltafgdp	-0.0592*	0.2839*	0.4231*	0.6332*	0.6366*	1.0000	
rem	-0.0557*	0.1092*	0.0839*	0.2486*	0.3021*	0.2378*	1.0000
capital	0.1765*	-0.0042	-0.0624	0.0348	0.0010	0.1017*	0.0010
school	0.0532	-0.1786*	-0.1218*	-0.0318	0.0709	0.0025	0.0385
trade	0.0674*	0.0260	0.0357	0.0354	0.1242*	0.0901*	0.1966*
govern	0.0521*	-0.0838*	-0.1719*	-0.2871*	-0.2756*	-0.2823*	-0.1202*

Note: Star mark means ‘statistically significant at 5 percent’

	capital	school	trade	govern
capital	1.0000			
school	0.0589	1.0000		
trade	0.2656*	0.0841*	1.0000	
govern	0.2152*	0.1342*	0.1060*	1.0000

Note: Star mark means 'statistically significant at 5 percent'

Table 6. Pooled OLS, Fixed, and Random effects regression

Dependent variable: per capita GDP growth	(1) Pooled OLS	(2) Fixed	(3) Random
Log (General budget /GDP)	0.299**	0.0987	0.165
	(0.124)	(0.110)	(0.107)
Log (Sector budget/GDP)	-0.00111	0.129	-0.0290
	(0.225)	(0.432)	(0.298)
Log (Project aid/GDP)	-0.863	-2.051	-0.958
	(0.682)	(1.257)	(0.710)
Log (TA-Experts/GDP)	1.067***	1.306**	1.168***
	(0.390)	(0.519)	(0.393)
Log (TA-Fellowship/GDP)	-0.842***	-1.046	-0.827***
	(0.216)	(0.706)	(0.277)
Remittances (% of GDP)	-0.0727	0.283	-0.0643
	(0.0451)	(0.201)	(0.0669)
Capital (% of GDP)	0.0635**	0.0237	0.0549
	(0.0315)	(0.0742)	(0.0356)
Primary school enrollment ratio	0.00641	-0.0852	-0.00103
	(0.0224)	(0.0589)	(0.0277)
Trade (% of GDP)	0.0129	0.0195	0.0124
	(0.0110)	(0.0555)	(0.0157)
Government effectiveness	-0.0199	0.0220	-0.0322
	(0.0210)	(0.0710)	(0.0257)
D2. Far East & South Asia	3.209***		3.258**
	(0.938)		(1.351)
D3. Middle East	0.0684		-0.255
	(2.050)		(1.057)
D4. South America	2.089**		1.175
	(0.930)		(1.253)
D5. South of Sahara	0.373		0.636
	(0.905)		(1.149)
Constant	-5.573	-19.72	-6.753
	(8.269)	(20.41)	(10.09)
Observations	156	156	156
R-squared	0.197	0.120	
Number of id		62	62

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The table 6 is the regression results for the sample of 62 aid recipient countries and 156 observations. The general budget support shows positive and significant coefficient in the pooled OLS estimation, however this does not prolong when measured in the fixed and random effects models. The coefficients for the sector budget support are neither consistent nor statistically significant across three estimators. The impacts of project aid appear to be negative on per capita GDP growth, but it is not statistically significant. All the coefficients for technical assistance by experts are positive and statistically significant at 0.05 or 0.01 percent. It means that one percent increase in technical assistance by experts increases slightly more than one percent in per capita GDP growth on average. On the other hand, the coefficient for technical assistance for fellowship is negative and significant in the pooled OLS and random effects estimator. The positive impact of capital in the pooled OLS estimation looses its significance in two other models. On average, Far East and South Asia shows approximately three percent higher increase in per capita GDP growth among sample.

Table 7. Hausman test and Breusch-Pagan Lagrange multiplier (LM) test

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lgbgdp	.0987368	.0952914	.0034454	.1154252
lsbgdp	.128945	-.0090322	.1379771	.223354
lpagdp	-2.050745	-.8615931	-1.189152	1.298165
ltaegdp	1.30649	1.028794	.2776958	.3528952
ltafgdp	-1.045994	-.7987978	-.2471964	.8633832
rem	.2832357	-.0378821	.3211177	.1718184
capital	.0236852	.0760049	-.0523196	.0703644
school	-.0852042	.0031109	-.0883151	.0910382
trade	.0194922	.0102474	.0092448	.0547525
govern	.0220152	-.0408994	.0629146	.0805646

```
                b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

            chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                     =        7.34
           Prob>chi2 =      0.6929
```

```
Breusch and Pagan Lagrangian multiplier test for random effects

        lgbgdp[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                  lgbgdp |    9.781974       3.127615
                       e |    2.566251       1.601952
                       u |    2.840519       1.685384

        Test:   Var(u) = 0
                                 chibar2(01) =    18.83
                              Prob > chibar2 =   0.0000
```

To decide which estimator to use, Hausman test and Breusch-Pagan Lagrange multiplier (LM) test are done and the results are like table 7. The hypothesis of the Hausman test is not rejected, so I decide to run random effects model. For the Breusch-Pagan Lagrange multiplier (LM) test, its hypothesis is rejected, so random effects model is superior to the pooled OLS estimator. The Hausman test is important here because a statistical analysis warns that the fixed effects model could be problematic. However, from the above two tests I am safe with running random effects model.

In the table 8 below, the positive but not significant coefficients for general budget support and negative but not significant coefficients for sector budget support remain across estimations. The positive coefficient for technical assistance for experts looses its significance in the model (4), but the rest of the models show positive and significant impacts on economic growth. The negative and significant coefficients for technical assistance for fellowship do not change across different specifications. The overall R-squares appear to be quite low except the model (5) with regional dummy variables, but the other regression models do not seem to show severe problems.

Table 8. Robustness check with Random effects models

Dependent variable: per capita GDP growth	(1)	(2)	(3)	(4)	(5)
	Random	Random	Random	Random	Random
Log (GB/GDP)	0.0604	0.0504	0.0724	0.00930	0.150
	(0.142)	(0.124)	(0.120)	(0.150)	(0.102)
Log (SB/GDP)	-0.0379	-0.0500	-0.0204		-0.0274
	(0.155)	(0.195)	(0.298)		(0.290)
Log (Project aid/GDP)	-0.309		-0.659	0.438	-0.690
	(0.605)		(0.751)	(0.466)	(0.641)
Log (TA-E/GDP)	0.607*	0.490**	1.067**	0.0716	1.157***
	(0.310)	(0.228)	(0.431)	(0.243)	(0.389)
Log (TA-F/GDP)	-0.600**	-0.685***	-0.828***	-0.461**	-0.859***
	(0.250)	(0.239)	(0.296)	(0.221)	(0.283)
Remittances		-0.00801	-0.0249		-0.0722
		(0.0350)	(0.0581)		(0.0600)
Capital	0.0683**	0.0706**	0.0595	0.0928**	0.0387
	(0.0313)	(0.0358)	(0.0377)	(0.0372)	(0.0399)
Primary school			0.00574		0.00197
			(0.0274)		(0.0261)
Trade					0.00895
					(0.0145)
Far East & South Asia					3.067**
					(1.459)
South America					0.967
					(0.929)
Constant	-4.360	-3.591	-5.565	-0.505	-3.721
	(5.291)	(5.822)	(8.462)	(5.226)	(8.058)
Observations	216	197	156	297	156
Overall R-sq	0.0604	0.0586	0.0756	0.0555	0.1784
Number of id	71	69	62	87	62

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Chapter 5. Conclusion

5.1. Summary of the Study

Despite donor countries' substantial investment to recipient countries for the last decades, most of the developing countries have not fully utilized their economic and social potential.

Moreover, there is a prolonged controversy on the impact of foreign aid on the actual progress in the recipient economy and society. Reflecting this issue, some researches find no effect of aid on economic growth while others find positive impacts only under certain circumstances such as sound policies and good institutions. These contrasting conclusions may arise from treating existing kinds of aid altogether as a whole. To deal with that possible limitation, this study disaggregated aid disbursements collected from the OECD DAC CRS from 2002 to 2013 for the DAC listed recipient countries into five detailed components: Programme aid (General budget support and Sector budget support), Project aid, and Technical assistance for experts and fellowship, respectively. It tested the hypothesis through regression analysis that Programme aid is more effective for the economic development of developing countries than Project aid or Technical assistance is. This hypothesis was rejected with not significant coefficients of Programme aid. Instead, the impacts of technical assistance for experts were positive and statistically significant. It can be interpreted that one percent increase in technical assistance for experts would lead to about one percent increase in per capita GDP growth in aid recipient countries on average. It seems that it would be quite striking that the coefficients for Project aid indicated negative effects on growth because the portion allocated to Project aid has been larger compared to other types, but these negative effects were not statistically significant. Lastly, this thesis found the negative and significant average effects of technical assistance for fellowship on economic growth and those countries in Far East and South Asia showed around three percent higher growth on average during the observation period from 2002 to 2013, which is statistically significant.

One of the possible policy suggestions in consideration of the above analysis results is that it seems to be required to increase the current portions of technical assistance by experts to improve the economic growth of the aid recipient countries. Moreover, provision of knowhow to any kind of interventions in developing countries might play a pivotal role to

allow the policy implementation by both donors and recipients to be more successfully delivered and ultimately contribute to improving welfare of the people in the targeted areas.

5.2. Limitation of the Study and Suggested Areas for Further Study

Reflecting common data challenges facing to any cross-country analysis, this study also suffered from missing or unbalanced panel dataset. While it contains more than 1,400 pooled observations, only around ten percent of them were available for the panel data regression analysis. This lack of data prevented the study from introducing time lag component and other more stable regression estimators. The usual assumption for random effects models is that the individual error components are not correlated with each other and are not autocorrelated across both cross-section and time series units[25]. So, other regression methods such as the Generalised Method of Moments (GMM) or IVs may be able to be applied with care to test the robustness of the result.

The time span of twelve years did not seem to be long enough if compared to other previous studies. However, it appears that this issue would gradually improve as aid data, especially for Programme aid, is collected more and made publicly available as well. Since the effects of Programme and Project aid on growth were not significant in this paper, further research seems to be necessary to see these insignificant results come from the actual insignificance or another omitted variable problems and so on.

The aid disaggregation principal in this research was the type of aid complying with the classification of the OECD DAC CRS. This aid data system also provides different information such as aid data by sector including infrastructure, education, health, etc. It may be worthy to conduct another aid-growth or aid-effectiveness research with disaggregation by

[25] Gujarati: Basic Econometrics, Fourth Edition. P.648. 2004.

sector of aid. Also, as a proxy for economic growth, per capita GDP growth was adopted in this research, but other independent variables to account for social development could be tested although it would become more challenging in terms of data availability and difficulties with analysis. For instance, this thesis tried to collect data for GINI index estimated by the World Bank, but it could not be included as the second dependent variable due to missing data problem.

Regarding the negative and statistically significant coefficients for technical assistance for fellowship, one might need to study if the effects would be eligible to illustrate the existence of the 'brain drain' phenomenon. It might be possible that the qualified groups of people from developing countries remain in the donor country where they were provided with scholarships and tertiary education or training. Their not coming back might partially result in less economic development in their countries while they can contribute through personal remittances or spill-over effects by inventing and developing advanced technologies in leading economies.

APPENDICES

Appendix A. OECD DAC definitions (clarifications) of selected types of aid

1. General Budget support (named as GB, General Budget in this study)

   Unearmarked contributions to the government budget including funding to support the implementation of macroeconomic reforms (structural adjustment programmes, poverty reduction strategies). Budget support is a method of financing a recipient country's budget through a transfer of resources from an external financing agency to the recipient government's national treasury. The funds thus transferred are managed in accordance with the recipient's budgetary procedures. Funds transferred to the national treasury for financing programmes or projects managed according to different budgetary procedures from those of the recipient country, with the intention of earmarking the resources for specific uses, are therefore excluded.

2. Sector Budget support (named as SB, Sector Budget in this study)

   Sector budget support, like general budget support, is a financial contribution to a recipient government's budget. However, in sector budget support, the dialogue between donors and partner governments focuses on sector-specific concerns, rather than on overall policy and budget priorities.

3. Project-type intervention (named as PA, Project Aid in this study)

   A project is a set of inputs, activities and outputs, agreed with the partner country, to reach specific objectives/outcomes within a defined time frame, with a defined budget and a defined geographical area. Projects can vary significantly in terms of objectives, complexity, amounts involved and duration. There are smaller projects that might involve modest financial resources and last only a few months, whereas large projects might involve more significant amounts, entail successive phases and last for many years. A large project with a number of different components is sometimes referred to as a programme, but should nevertheless be recorded here.

4. Experts and other technical assistance (named as TA-E, Technical assistance-Expert in this study)

   This category covers the provision, outside projects as described in category C (Project-type interventions), of knowhow in the form of personnel, training and research.

5. Scholarships and student costs in donor countries (named as TA-F, Technical assistance-Fellowship in this study)

It consists of two components; Scholarships/training in donor country and Imputed student costs. Scholarships/training in donor country is financial aid awards for individual students and contributions to trainees. The beneficiary students and trainees are nationals of developing countries. Financial aid awards include bilateral grants to students registered for systematic instruction in private or public institutions of higher education to follow full-time studies or training courses in the donor country. A sub-category of imputed student costs is indirect ("imputed") costs of tuition in donor countries.

Appendix B. Cross-country observation pool[26] from 2002 to 2013

	Country & Region	Year from	to
	Europe		
1	Albania	2002	2013
2	Belarus	2005	2013
3	Bosnia and Herzegovina	2002	2013
4	Croatia	2003	2010
5	Former Yugoslav Republic of Macedonia	2002	2013
6	Kosovo	2009	2013
7	Moldova	2002	2013
8	Montenegro	2003	2013
9	Serbia	2002	2013
10	Turkey	2005	2013
11	Ukraine	2005	2013
	Africa (North of Sahara)		
12	Algeria	2004	2013
13	Egypt	2002	2013
14	Libya	2006	2013
15	Morocco	2003	2013
16	Tunisia	2006	2013
	Africa (South of Sahara)		
17	Angola	2002	2013
18	Benin	2002	2013
19	Botswana	2004	2013

[26] Note: Not all of the collected country samples were available for statistic analysis due to prevailing missing observations. But, observations of more than 60 countries at least were used for estimations.

20	Burkina Faso	2002	2013
21	Burundi	2002	2013
22	Cabo Verde	2002	2013
23	Cameroon	2002	2013
24	Central African Republic	2002	2013
25	Chad	2002	2013
26	Comoros	2002	2013
27	Congo	2002	2013
28	Cote dIvoire	2002	2013
29	Democratic Republic of the Congo	2002	2013
30	Djibouti	2002	2013
31	Equatorial Guinea	2005	2013
32	Eritrea	2002	2013
33	Ethiopia	2002	2013
34	Gabon	2004	2013
35	Gambia	2002	2013
36	Ghana	2002	2013
37	Guinea	2002	2013
38	Guinea-Bissau	2002	2013
39	Kenya	2002	2013
40	Lesotho	2002	2013
41	Liberia	2004	2013
42	Madagascar	2002	2013
43	Malawi	2002	2013
44	Mali	2002	2013
45	Mauritania	2002	2013
46	Mauritius	2006	2013
47	Mozambique	2002	2013
48	Namibia	2004	2013
49	Niger	2002	2013
50	Nigeria	2002	2013
51	Rwanda	2002	2013
52	Sao Tome and Principe	2002	2013
53	Senegal	2002	2013
54	Seychelles	2006	2013
55	Sierra Leone	2002	2013
56	South Africa	2003	2013
57	South Sudan	2011	2013
58	Sudan	2004	2013
59	Swaziland	2003	2013
60	Tanzania	2002	2013
61	Togo	2002	2013
62	Uganda	2002	2013
63	Zambia	2002	2013
64	Zimbabwe	2003	2013

	America (North & Central America)		
65	Antigua and Barbuda	2006	2013
66	Barbados	2006	2010
67	Belize	2004	2013
68	Costa Rica	2003	2013
69	Cuba	2003	2013
70	Dominica	2002	2013
71	Dominican Republic	2004	2013
72	El Salvador	2003	2013
73	Grenada	2002	2013
74	Guatemala	2004	2013
75	Haiti	2002	2013
76	Honduras	2002	2013
77	Jamaica	2007	2013
78	Mexico	2006	2013
79	Nicaragua	2002	2013
80	Panama	2003	2013
81	Saint Kitts and Nevis	2006	2013
82	Saint Lucia	2002	2013
83	Saint Vincent and the Grenadines	2002	2013
84	Trinidad and Tobago	2006	2010
	America (South America)		
85	Argentina	2003	2013
86	Bolivia	2002	2013
87	Brazil	2006	2013
88	Chile	2003	2013
89	Colombia	2004	2013
90	Ecuador	2005	2013
91	Guyana	2002	2013
92	Paraguay	2004	2013
93	Peru	2003	2013
94	Suriname	2005	2013
95	Uruguay	2006	2013
96	Venezuela	2006	2013
	Asia (Far East Asia)		
97	Cambodia	2002	2013
98	China (People's Republic of)	2002	2013
99	Indonesia	2002	2013
100	Lao People's Democratic Republic	2002	2013
101	Malaysia	2006	2013
102	Mongolia	2002	2013
103	Philippines	2003	2013
104	Thailand	2003	2013
105	Timor-Leste	2003	2013

106	Viet Nam	2002	2013
	Asia (South & Central Asia)		
107	Afghanistan	2003	2013
108	Armenia	2002	2013
109	Azerbaijan	2002	2013
110	Bangladesh	2002	2013
111	Bhutan	2002	2013
112	Georgia	2002	2013
113	India	2002	2013
114	Kazakhstan	2003	2013
115	Kyrgyzstan	2002	2013
116	Maldives	2002	2013
117	Myanmar	2013 only	
118	Nepal	2002	2013
119	Pakistan	2002	2013
120	Sri Lanka	2002	2013
121	Tajikistan	2002	2013
122	Turkmenistan	2006	2013
123	Uzbekistan	2003	2013
	Asia (Middle East)		
124	Iran	2005	2013
125	Iraq	2006	2013
126	Jordan	2003	2013
127	Lebanon	2005	2013
128	Oman	2006	2010
129	Saudi Arabia	2006	2007
130	Syrian Arab Republic	2005	2007
131	West Bank and Gaza Strip	2005	2013
132	Yemen	2002	2013
	Oceania		
133	Fiji	2006	2013
134	Kiribati	2006	2013
135	Marshall Islands	2006	2013
136	Micronesia	2006	2013
137	Palau	2006	2013
138	Papua New Guinea	2004	2013
139	Samoa	2002	2013
140	Solomon Islands	2002	2013
141	Tonga	2002	2013
142	Tuvalu	2005	2013
143	Vanuatu	2006	2013

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