

AID TO AGRICULTURE, ECONOMIC GROWTH AND POVERTY REDUCTION

by

OZGUR KAYA

(Under the Direction of Lewell F. Gunter)

ABSTRACT

The link between foreign aid, economic growth and poverty reduction has been a controversial issue with no consensus so far. In this dissertation, I disaggregate the aid variable into several categories, including aid given to the agricultural sector, to investigate the response of both economic growth and a poverty indicator to changes in sector-specific foreign aid. Using the Generalized Method of Moments estimation technique on cross sectional time series country data, I find that aid given to the agricultural sector is positively and significantly related to growth. Using the estimates of aid impact, a country with the average level of aid would have a per capita GDP growth rate that is 0.76 to 2 percentage points higher than a country receiving zero agricultural aid over a four year period. I also find that aid given to the agricultural sector affects poverty both directly and indirectly through increased pro-poor expenditure. A 1 percentage point increase in agricultural aid's share in GDP will result in a 0.17 percentage point decrease in the poverty headcount ratio directly, and a 0.09 percentage point decrease through increases in pro-poor expenditures.

INDEX WORDS: Agricultural Aid, Economic Growth, Poverty Reduction, Pro-Poor Expenditure, Growth Model

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DEDICATION

I dedicate this study to my husband.

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CHAPTER 1

INTRODUCTION

Foreign aid effectiveness has been a frequently visited and hotly debated issue by many scholars. One main reason for this interest can be the need for justification for giving aid. If official development assistance works, it would mean that the officials of the industrialized countries can reassure their constituents of the benefits of giving aid.

Although the roots of aid giving may be traced back to very early times, the official aid giving we know today began to emerge in the 19th and early 20th centuries as western countries started considering their colonies and other undeveloped countries. However, donors' decisions for bilateral or multilateral aid might depend on several different political and strategic factors and the primary goal of financial aid may not always be to fight against poverty and promote economic development.

Nonetheless, aid effectiveness studies mostly used aid's effect on stimulating economic growth and reducing poverty as a yardstick to check whether it works or not. So, does aid work? Apparently, there is still no simple answer to that question and the empirical results are rather ambiguous. Some countries received large amounts of aid followed by rapid economic growth while others have experienced slow or even negative growth. On the other hand, there is plenty of evidence that aid contributed to the improvement of quality of life in aid recipient countries. It helped to extend and improve the quality of services especially in education and health, physical infrastructure, and production, enhance the efficiency and effectiveness of the agricultural sector,

and improve the quality of the key institutions. Aid was also effective in providing emergency relief following natural disasters like the Asian Tsunami in 2004 (Levine et al 2004; Radelet 2006; Riddell 2007). The Green Revolution can also be cited as an example for accomplishment since aid was used as the main instrument to transfer technology and knowledge such as the introduction of new seeds and fertilizers from rich countries to poor countries.

Thus, the relevant question we need to address is not “does aid work?” but rather “how can we make aid work better?” (Riddell 2007) This study aims to answer this question by disaggregating total aid into sectoral aid and look at its effect first on overall economic growth and then on poverty reduction.

1.1. Background

The Millennium Development Goals (MDG)¹ were adopted by 192 United Nations members in 2000 for the purpose of meeting the needs of the World’s poorest and reducing poverty. They include eight goals and 18 targets for development which include curbing poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. Of these eight goals, two are directly related with the purpose of this study. Halving extreme poverty and hunger, which constitutes the first MDG, requires agriculture-led economic growth since three out of four poor people in developing countries live in rural areas and most of them depend on agriculture and related activities for their livelihood (WDR 2008). According to MDG 8, developing countries share responsibility to pursue poverty reduction and good governance and developed countries should support the efforts of developing countries by increasing the amount of aid and improving aid’s effectiveness. Thus this goal requires maintaining a steady increase in development assistance especially to the agricultural sector due to high poverty rates

¹ Please see Table 5.5 for more detail.

in rural areas which in turn would lead to sustained benefits from agriculture in the long run.
(World Bank 2006)

According to Chen and Ravallion (2008), almost 57% of the world population (over 3 billion people) lives on less than \$2.50 a day, adjusted for purchasing power parity (PPP), and, as of 2005, approximately 1.4 billion people, which constitutes one quarter of the population of the developing world, lived on less than \$1.25 a day. However, approximately 1.9 billion people lived below the \$1.25/day poverty threshold in 1980, so there has been some income improvement among the poorest. This progress, has not been even across regions. The poverty rate in East Asia improved most and fell from almost 80 % to under 20 % over this period while it stayed at around 50 % in Sub-Saharan Africa.

This slow progress in alleviating poverty in most developing countries has refocused attention on the role of agriculture in promoting economic growth and reducing poverty. Research relating economic growth to poverty reduction has found that general economic growth has had less impact on poverty reduction than growth in the agricultural sector, to some extent due to the high level of poverty in rural areas of developing countries. The agricultural sector can be viewed as the “engine of growth” at the early stages of development and a sustainable rapid transition out of poverty requires raising productivity in this sector (Timmer, Lucas and Timmer, Ravallion and Datt, Haggblade and Hazell). The mechanism for a successful structural transformation requires the agricultural sector to provide food, labor, and even savings for urbanization and industrialization by increasing agricultural productivity and wages. Although this process causes a decline in the relative importance of agriculture to the overall economy, the industrial and service sectors grow faster because of this modernized agricultural sector that leads to a migration of rural work force to the other sectors.

Despite this connection among the agricultural sector, economic growth and poverty reduction, the total share of official development assistance allocated to the agricultural sector has fallen during the past three decades. The volume of aid to agriculture decreased by almost two thirds in real terms between 1980 and 2006, with the steepest decline occurring in the late 1980s and the 1990s. Over the same period, total Official Development Assistance (ODA) provided by all donors increased more than 50%. Aid to agriculture represented 17% of total ODA in the early 1980's and by the end of 1990's it fell to 8%. In 2006, agricultural aid represented about 4% of total ODA. According to FAO, a sustained reduction in hunger is only possible with special emphasis on agricultural and rural development (FAO 2007). Thus this decline in the share of aid to agriculture could have serious consequences by limiting agricultural growth especially in regions where improvements are needed most.

1.2. Placing This Dissertation in the Literature

Much of the research on aid effectiveness has focused on the effect of aggregate aid on general economic growth. This study focuses more specifically on the effect of agricultural aid on economic growth and poverty reduction.

A primary emphasis in this study is accounting for heterogeneity in the types of aid given – in terms of both the scope of the aid's intended use and the expected timing of results from a particular aid project. For example, aid given for humanitarian purposes to address an emergency or for political and strategic considerations cannot be expected to affect the productive capacity of a country in the same way as aid targeted directly to enhancing production efficiency. Similarly, the evaluation period for aid should differ by time depending on the kind of aid. For example, aid designed specifically to improve production practices in growing a staple crop

would be expected to have a quicker and more direct impact on rural incomes than aid to improve the educational system of a developing country over several years.

1.3. Objectives

The main objective of this study is to investigate whether foreign aid given to the agricultural sector is effective. More specifically, the primary objectives can be summarized as follows:

- Show the key trends on how the volume of overall and sectoral aid has changed over time for the last forty years
- Present the main theoretical models used in the aid effectiveness literature
- Provide an empirical investigation of whether foreign aid given to the agricultural sector has a significant effect on economic growth by disaggregating the aid variable
- Analyze empirically whether foreign aid given to the agricultural sector reduces poverty

1.4. Organization

The organization of this dissertation is as follows. Chapter 1 presents a background for this study and outlines the specific research objectives. Chapter 2 provides a historical and descriptive framework for Official Development Assistance (ODA) and cites related literature on aid effectiveness. Chapter 3 discusses the growth models used as the theoretical background for aid models in general. Chapter 4 provides an empirical investigation of whether foreign aid given to the agricultural sector has a significant effect on economic growth by disaggregating the aid variable. Last of all, the final chapter presents an empirical investigation of whether foreign aid given to the agricultural sector has a significant effect on the welfare of the poor.

CHAPTER 2

BACKGROUND

2.1. Historical and Descriptive Framework

2.1.1. Definition of Aid and a Brief History

Foreign aid can be simply defined as economic assistance provided to a country by another country or organization. The current definition of Official Development Assistance (ODA) includes grants or loans provided by official agencies to developing countries and to multilateral institutions for flows to developing countries. According to the Organisation for Economic Co-operation and Development (OECD), ODA is defined as:

“Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries (“bilateral ODA”) and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions (OECD, *Glossary of Statistical Terms*.)”

In other words, ODA needs to meet the following criteria:

- (a) the type of flows include grants, loans or technical cooperation;
- (b) it should be provided by official agencies, including state and local governments, or by their executive agencies;

- (c) it is administered with the promotion of the economic development and welfare of developing countries as its main objective;
- (d) it is concessional in character and contains a grant element of at least 25 per cent; and
- (e) the recipients must be on the Development Assistance Committee (DAC) list;
(www.oecd.org/dac/stats/daclist).

The underlying principles of aid and aid giving of the modern era as we understand it today were established during the 1940s. There are some significant events that are highly relevant to the evolution of development aid in the 1940s. First of all, development aid was proposed to be an institutional international activity where aid funds should be used to raise the living standards in the developing countries. Thus the United Nations was established in 1943 and it was soon receiving funds from more than 40 countries to use to improve the living standards of people in the recipient countries (Riddell 2007). In 1944, The United Nations Monetary and Financial Conference was held at Bretton Woods, New Hampshire, USA, in an assembly of 44 nations. This meeting later would lead to the establishment of the International Bank for Reconstruction and Development (World Bank) and the International Monetary Fund (IMF). These organizations started operating in 1946. In 1948, U.S. Secretary of State George Marshall proposed a European Recovery Program of aid to Western Europe. This program sought to provide funds for rebuilding European countries which were largely destroyed in the Second World War. The Marshall plan is considered a great success which has not been matched by later aid programs for other parts of the world.

During the 1940s and 1950s, most aid (using aggregate DAC data at current prices), came from the United States (58%), France (22%), and the United Kingdom (8%) (IDA 2007). Aid was especially used as a tool to stop the spread of communism during this period. However, by

the mid-fifties, there was a growing discontent, especially in the US, which gave birth to the term “aid burden”. Some argued that since the benefits from the prevention of communism accrued to all members of the free world, there should be an equal share of burden among those countries (Hjertholm and White 2000). Thus, in the early 1960s, a major concern was how to share the “aid burden” among donors, and most developed countries started foreign aid programs with high hopes that it would work as well as the Marshall Aid did for the reconstruction of Europe after World War II.

In the 1960s, bilateral aid programs started to be established. Most donors (Canada, Germany, Japan, Sweden, Switzerland, Belgium, Denmark, Norway and the Netherlands) established separate and independent aid agencies or ministries and the biggest bilateral aid program, USAID, was founded in 1961 by President J.F. Kennedy (IDA 2007). Until the late 1960s, official aid levels increased and so did the growth rate of the developing countries including the ones in Sub-Saharan Africa. Aid seemed to be working (Riddell 2007).

Donor focus was mostly on productive sectors and infrastructure such as support to the Green Revolution. Most bilateral aid was given as technical assistance and/or budget support whereas multilateral aid mostly supported projects (Hjertholm and White 2000). It was also during this period where recipient countries called for separate official aid from other flows with a specific target for official development aid (Riddell 2007). However, the 1970s saw major reductions in aid where aggregate official aid’s share in donor countries’ GNI had fallen to 0.3% of GNI compared to 0.5% at the beginning of the 1960s. The first oil price shock and falling commodity prices during the next two decades were cited as possible reasons for this reduction (Hjertholm and White 2000). The political situation in some large donor countries might be another reason for the drop in aid. For example, the Vietnam War and the associated cost for it

for the United States, which was one of the largest donors, was an obstacle on the expansion of aid programs.

The 1970s and 1980s saw expansion of multilateral aid programs and agencies. Until the early 1970s, poverty reduction was not a specific target for aid allocation. This was partly due to the fact that there were not many studies on poverty levels either for individual countries or around the world until that time. During the 1970s, officials of the World Bank and the International Labor Office (ILO) focused on poverty and argued that to alleviate poverty, it was not sufficient just to try to increase the growth rates and stimulate institutional changes within a country. It was also important to address poverty by directly targeting the poor. However, this newly discovered poverty issue was overshadowed by macro level issues such as stagflation which forced governments to implement deep public expenditure cuts, and this in turn also decreased the aid level during the 1980s. Furthermore, interventionist governments both in industrialized and developing world were being perceived as the major source for inefficiency and an obstacle to development during that period. This in turn led to a decrease in aid which would influence the recipient government's role. Accordingly, aid allocation decisions were also conditioned on rewarding those governments who followed neoliberal policies. As a result, total ODA fell dramatically the following years (Riddell 2007). The financial crises of the 1980s also moved the attention beyond capital accumulation and basic human needs of developing countries to their policies, starting the lending for "structural adjustment" (IDA 2007).

The 1990s saw the end of the Cold War and aid budgets declined as a result of the end of the Cold War. During that period, donor's concerns about governance in the aid recipient countries became a determinant on the aid allocation decision. Donors started awarding or withdrawing aid on the basis of governance issues whereas they supported any Western friendly

regimes during Cold War. The political aid based on Cold War scenarios came to a halt. Some countries lost their strategic importance and aid to those countries fell accordingly (Hjertholm and White 2000).

There were two major changes throughout the 1990s. The first one was that the Eastern Europe and the Former Soviet Unions became aid recipients rather than donors. The other change was the renewed emphasis on poverty. The main goal for aid during that period was sustainable development with a greater attention paid to environmental concerns and institutions of developing countries. While it was previously accepted that economic growth would ultimately benefit the poor over time, economic growth by itself was not sufficient to address the poverty levels. Accordingly, the goal of aid was modified to include sustainable development, poverty reduction, integration in the world economy and the building of viable economies and societies. (Aid Architecture: An Overview of the Main Trends in ODA Flows, IDA Report, 2008). Fighting against poverty once again became the main agenda with the disappearance of the communist threat (Hjertholm and White 2000).

In September 2000, the Millennium Development Goals were adopted by 192 United Nations members for the purpose of meeting the needs of the World's poorest and reducing poverty. This summit was crucial for the future of aid. Millennium Development Goals (MDG) include eight goals and 18 targets for development which include curbing poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. According to these goals, developing countries share responsibility to pursue poverty reduction and good governance and developed countries should support the efforts of developing countries by increasing the amount of aid and improving aid's effectiveness. Nowadays, MDGs became the central benchmark to evaluate foreign aid's effect.

2.1.2. Types of Foreign Aid

Foreign aid flows can be classified as loans and grants, project and program aid, bilateral and multilateral aid or tied and untied aid. It can be in the form of debt relief, commodity aid or technical assistance. These classifications are not rigid and the flows may include components from each of the different types.

i. Loans vs. Grants

Loans are defined as transfers for which repayment is required while grants are transfers made in cash, goods or services for which no repayment is required. Starting from early 1960s, loans were used more frequently than grants since it was assumed that they would be used more efficiently because they were expected to be repaid. However this caused massive debt accumulation and recipient countries started to struggle to repay. Today almost 90 percent of bilateral ODA is in the form of grants as a result of an overall consensus reached within DAC in the late 1970s (IDA 2007).

ii. Project vs. Program Aid

Project aid is given for a specific purpose or to support an investment project whereas Program aid is given to fund development expenditures generally. Program aid can be in the form of general budget and sector program support or debt relief. General budget and sector program support as a percentage of total ODA commitments rose from 8% in 2001 to 20% in 2004. During the 2001-2004 period, low-income countries benefited from debt relief (about 90% in 2004) as well. In real terms, debt relief explains almost 70 % of the increase in ODA between 2004 and 2005 – most of which (US\$19 billion) benefited Iraq and Nigeria (IDA 2007).

iii. Bilateral and Multilateral Aid

Bilateral flows are provided directly by a donor country to an aid recipient country whereas multilateral flows are channeled through a multilateral development institution (e.g. World Bank,

UNDP). Today, about 70 % of ODA flows have been provided through bilateral organizations and 30 % through multilateral organizations. Projects implemented by multilateral institutions or NGOs on behalf of donor countries are classified as bilateral ODA (IDA 2007).

iv. Tied vs. Untied Aid

Tied aid is the assistance given for a specific purpose usually with conditions attached and untied aid consists of assistance for which the associated goods and services may be fully and freely obtained from all countries. The conditions for tied aid may demand that some or all of the donated money be spent on goods or services from the donor country. Although tied aid is criticized because it does not allow the recipient to buy from the lowest bidder and the recipient is not able to buy local goods or hire local companies, the European Union used tied aid efficiently for its new members during its expansion process (IDA 2007).

v. Commodity Aid

Commodity aid comprises flows of goods and services with no payment in money or debt instruments in exchange. Food aid is a specific form of commodity aid and it is given to countries in urgent need of food supplies, especially if they have just experienced a natural disaster (OECD glossary of statistical terms).

vi. Technical Assistance/Cooperation

Technical cooperation includes both (a) grants to nationals of aid recipient countries receiving education or training at home or abroad, and (b) payments to consultants, advisers and similar personnel as well as teachers and administrators serving in recipient countries, (including the cost of associated equipment). In this type of aid, educated personnel are employed to assist with a program of development. Technical assistance can be both program and project aid (OECD glossary of statistical terms; IDA 2007).

2.1.3. Major Aid Agencies and Trends in Overall Aid²

If we look at the distribution of aid over the last forty years, we can see the following key trends that show how the volume of overall aid has changed over time.

During the 1960s and 1970s, ODA to developing countries were at a steady level. The Development Assistance Committee (of the Organisation for Economic Cooperation and Development) donors' share in overall ODA was about one third of total ODA during that period. The former Soviet bloc and Arab countries accounted for 10% and 30 % of total ODA, respectively, until the end of Cold War with occasional changes during oil shocks and the first Gulf War. Since the second half of the 1990s, the DAC donors accounted for almost 95% of total ODA to developing countries. Recently, non-DAC and emerging donors are providing more resources to developing countries and by 2010, non-DAC OECD countries alone are expected to double their current ODA levels to over \$2 billion.

Although total aid from donors had an upward trend until the early 90s, it fell sharply after the end of Cold War and in 1997 reached its lowest level since 1983. Since then, ODA flows have trended upwards reaching US \$107 billion (representing 0.30% of developed countries' combined national income) in 2005 but slipped in 2006 and 2007 again. However, recent growth in net ODA reflects that debt relief was the main drive for that increase rather than aid to core development programs along with emergency assistance and administrative costs of donors. As can be seen from Figure 1.1, debt relief has grown steeply since the end of the Cold War and in real terms, it explains almost 70% of the upward trend in total ODA since 2002. Most of this debt relief was for Iraq and Nigeria, especially in 2005, due to large Paris Club debt relief operations.

² The statistics are taken from the OECD website, the International Development Association's (IDA) Report "Aid Architecture: An Overview of the Main Trends in ODA Flows" and "Development Aid at a Glance 2007"

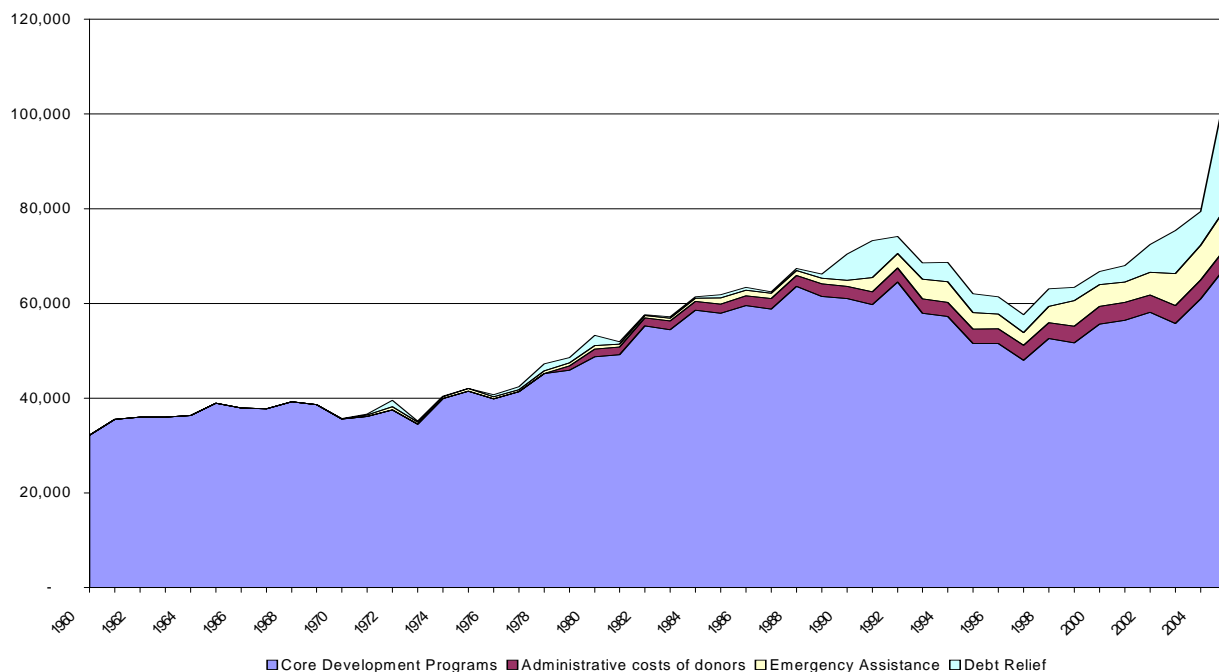


Figure 2.1. Components of net DAC ODA
Source: DAC Online

Since the mid 1940s, the number of donors grew from 5 to over 60 today. During the 1940s and 1950s, 88% of all aid (at aggregate DAC data at current prices) came from the United States (58%), France (22%), and the United Kingdom (8%). However, bilateral ODA from the United States has risen and fallen several times since the 1970s and reached its lowest point in 1998 (US\$ 7 billion), but grew during 2003-2005 (US\$ 19 billion). Bilateral aid from Japan peaked in 1999 (US\$ 10 billion) and averaged US\$ 8 billion over 2003-2005. Bilateral aid from France followed a steady upward trend since the 1970s, except for a dip around 2000.

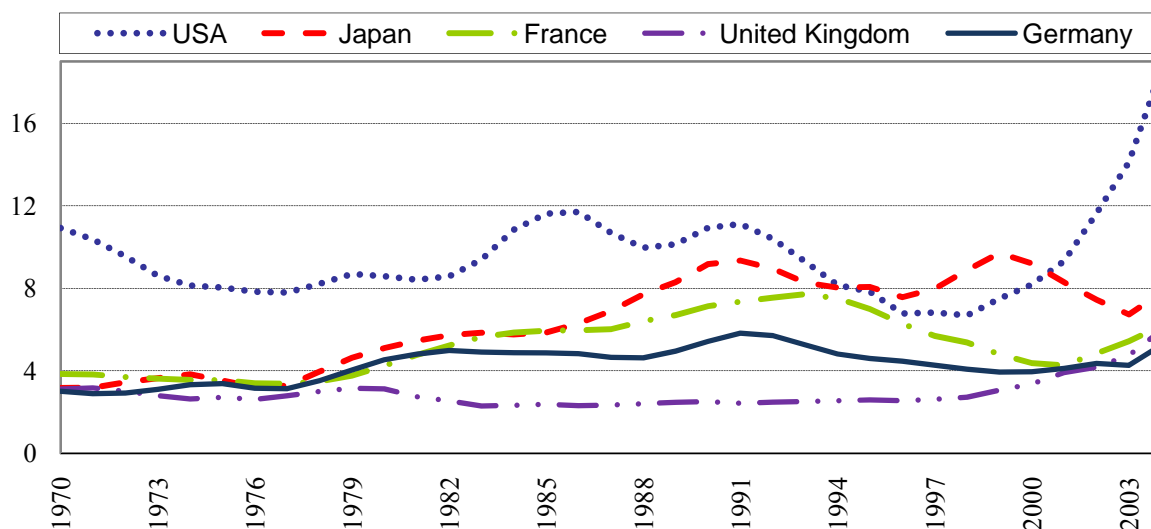


Figure 2.2. ODA by largest bilateral donors since 1970
US\$ billion, 2004 prices and exchange rates, 3-year average net bilateral disbursements
Source: OECD

From 2004 to 2006, the top ten donors provided 86% of the bilateral ODA of all DAC countries. During that period, half of total bilateral ODA of all DAC countries came from just three countries: United States, Japan and the United Kingdom. In real terms, the largest donor by amount in 2006 was the United States, providing US\$ 21 billion, and it was followed by Japan, the United Kingdom, France and Germany.

	2004	2005	2006	3-year average	% of DAC countries
1 United States	16 250	25 582	21 162	20 998	29%
2 Japan	5 917	10 406	7 313	7 879	11%
3 United Kingdom	5 361	8 168	8 718	7 416	10%
4 France	5 567	7 239	7 919	6 908	10%
5 Germany	3 823	7 447	7 034	6 101	9%
6 Netherlands	2 670	3 683	4 282	3 545	5%
7 Canada	1 991	2 833	2 531	2 452	3%
8 Sweden	2 076	2 256	2 852	2 395	3%
9 Norway	1 536	2 033	2 198	1 922	3%
10 Spain	1 400	1 863	2 092	1 785	3%
Other DAC countries	7 714	10 936	10 859	9 836	14%
Total DAC countries	54 304	82 445	76 960	71 237	100%

Figure 2.3. Top 10 bilateral donors, 2004-2006
US\$ million, net bilateral disbursements
Source: OECD

A 1970 UN Resolution recommended that developed countries provide 0.7% of their GNI as ODA although there is no theoretical foundation for this chosen target. However, if we look at total ODA as a share of GNI for the DAC donors, we can see that the US government's average budget for ODA is almost 0.2% of its GNI, whereas Sweden's is 0.9% over the years 2003, 2004 and 2006. The average country effort for DAC donors over these years is 0.46 % of GNI where only five countries achieve the targeted percentage. In terms of the share of total ODA relative to GNI, Sweden is the largest donor among developed countries and together with Norway, Luxembourg, the Netherlands, and Denmark, and, they exceed the United Nations target for ODA of 0.7% of GNI. On average, these five countries allocated 0.86 % of GNI as aid for these last three years whereas the remaining countries allocated about 0.34 % of GNI.

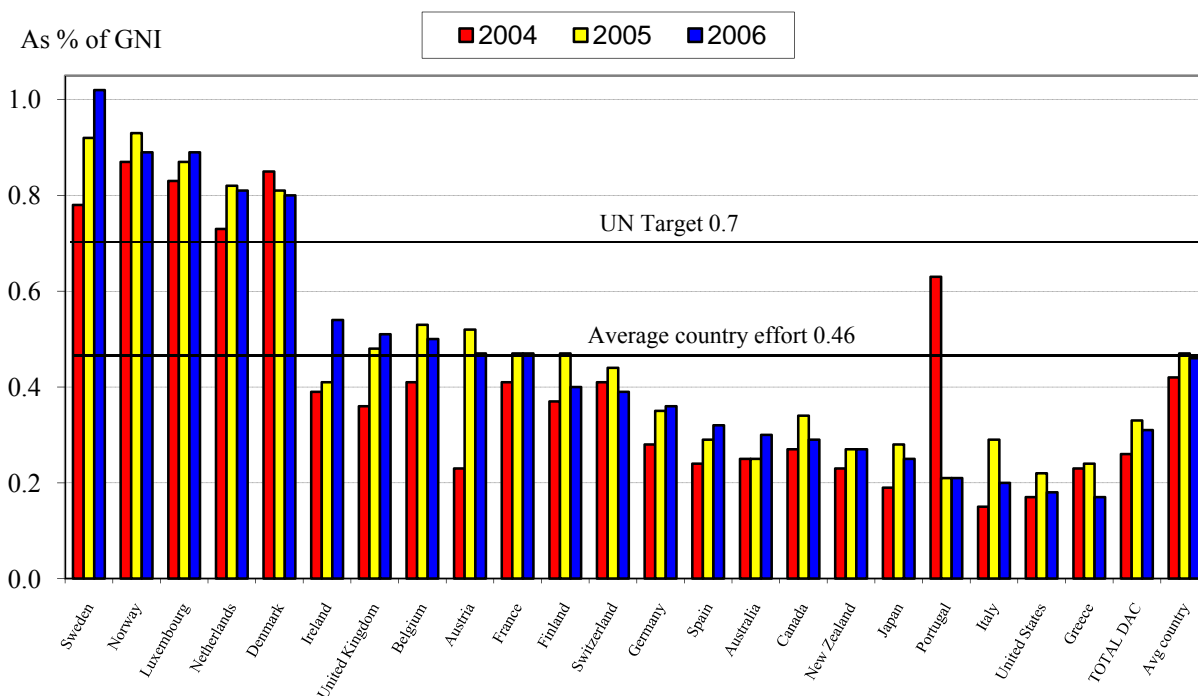


Figure 2.4. ODA as a percentage of GNI
Source: OECD

Since the mid 1970s, almost 70% of total ODA has been provided by bilateral donors and the remaining 30% has been provided by multilateral institutions. Among the multilateral institutions, the European Commission (EC), United Nations (through five United Nations organizations) and International Development Association (IDA) of the World Bank have been the main channels for multilateral ODA since the 1970s.

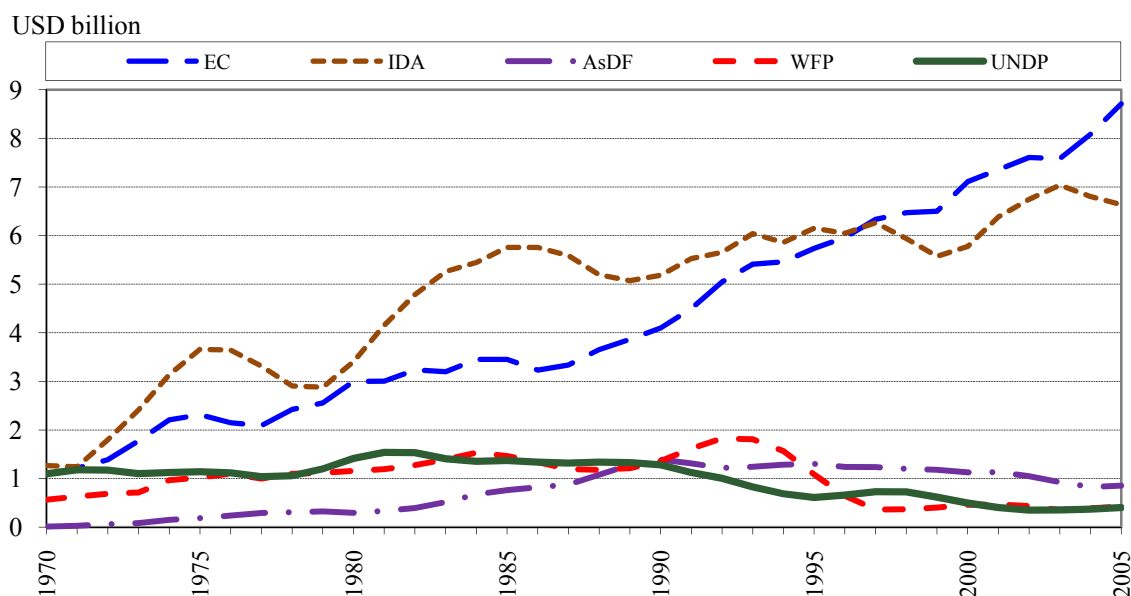


Figure 2.5. ODA by largest multilateral donors since 1970
US\$ billion, 2005 prices and exchange rates, 3-year average net disbursements
Source: OECD

The European Commission (EC) and International Development Association (IDA) of World Bank provided almost 70% of all multilateral ODA during the 2003-2006 period. Five United Nations organizations (United Nations Children's Fund, United Nations Regular Programme of Technical Assistance, United Nations Relief and Works Agency, United Nations High Commissioner for Refugees and World Food Programme) are also in the top ten, along with the Asian Development Fund (AsDF), the African Development Fund (AfDF), and the Global Fund for Aids, Tuberculosis and Malaria (GFATM). ODA from the EC has increased steadily since the 1970s and accounts for an average of US\$ 9 billion per year for the same

period. ODA from IDA fell in the late 1970s, late 1980s, and then again in the late 1990s, but had an upward trend otherwise and accounts for an average of US\$ 7 billion during 2003-2006.

		2004	2005	2006	3-year average	% of all multilaterals
1	EC	8 068	8 687	9 489	8 748	39%
2	IDA	7 283	6 611	5 996	6 630	30%
3	AfDF	919	852	1 541	1 104	5%
4	GFATM	586	995	1 252	944	4%
5	AsDF	694	859	1 020	858	4%
6	UNICEF	650	711	740	700	3%
7	UNRWA	449	508	600	519	2%
8	UNTA	434	580	371	461	2%
9	WFP	253	555	473	427	2%
10	UNDP	374	399	437	403	2%
	Other multilaterals	1 547	1 082	1 929	1 519	7%
	Total multilaterals	21 257	21 838	23 847	22 314	100%

Figure 2.6. Top 10 multilateral donors, 2004-2006

US\$ million, net disbursements

Source: OECD

In 2006, net ODA to the world benefited more than 5 billion people. Aid per capita was US\$ 20 for all developing countries. Developing countries in Asia received US\$ 9 per capita, Africa US\$ 47 per capita, America US\$ 12 per capita, Europe US\$ 33 per capita, and Oceania US\$ 137 per capita.

	Net ODA USD million	Population million
Africa	43 402	926
Asia	32 885	3 635
America	6 910	558
Europe	5 032	155
Oceania	1 127	8
Aid to unspecified regions	15 936	..
All ODA recipients	105 292	5 282

Figure 2.7. Net ODA and population of aid recipient countries by region in 2006, US\$ million

Source: OECD

If we look at the regional shares of total net ODA, we can see that Africa has been the largest recipient of total ODA except for the years between 1999 and 2001. Africa's share of

total ODA fell from 44% in 1990 to 33% in 2005 but increased to 41% in 2006, though debt relief for Nigeria accounts for a substantial share of recent African ODA. Asia has been the second highest recipient of total net ODA and received more than Africa did between the years of 1999 and 2001. Its share has remained mostly steady between 1990 and 2004, but reached a peak in 2005 at 42% of total aid. However, the Asian financial crises, the humanitarian response to the tsunami and debt relief for Iraq have been the main drivers for the recent increase in Asia's share of total net ODA.

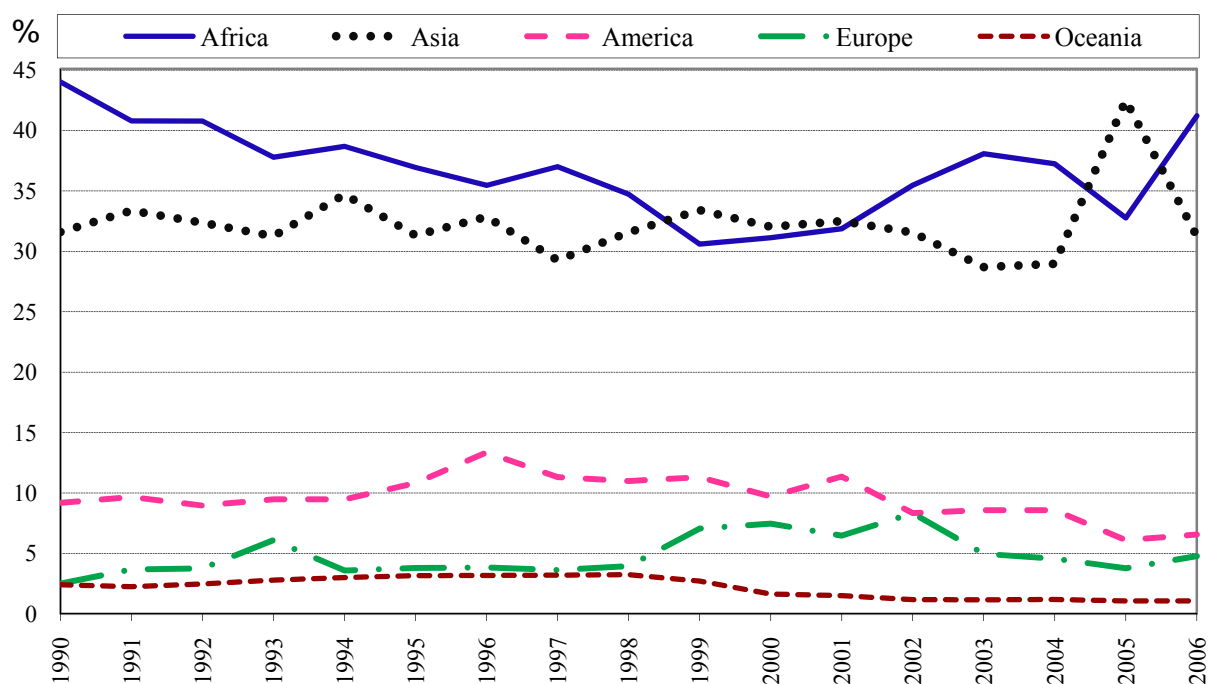


Figure 2.8. Regional shares of total net ODA as a percentage of total ODA, 1990-2006
Source: OECD

Looking at the top ten ODA recipients in 2006, we can see that as a group, they received 34 % of total net ODA for that year. Five of these top ten recipients were in Asia and the remaining five in Africa.

	2004	2005	2006	3-year average	% of all recipients
1 Iraq	4 650	22 052	8 661	11 788	12%
2 Nigeria	578	6 416	11 434	6 143	6%
3 Afghanistan	2 171	2 752	3 000	2 641	3%
4 Congo, Dem. Rep.	1 824	1 827	2 056	1 902	2%
5 Ethiopia	1 806	1 910	1 947	1 888	2%
6 Viet Nam	1 840	1 907	1 846	1 865	2%
7 Pakistan	1 424	1 626	2 147	1 732	2%
8 Tanzania	1 751	1 481	1 825	1 686	2%
9 Sudan	992	1 832	2 058	1 627	2%
10 China	1 685	1 802	1 245	1 577	2%
Other recipients	60 072	63 687	69 072	64 277	66%
Total ODA recipients	78 793	107 292	105 292	97 126	100%

Figure 2.9. Top 10 ODA by recipient countries, 2004-2006

US\$ million, receipts from all donors, net disbursements

Source: OECD

Iraq has been cited as the major recipient of total ODA with USD 22 billion in 2005, but this was mainly due to debt relief as is the case with Nigeria and the Democratic Republic of the Congo. Debt relief explains about 69% of the increase in ODA between 2004 and 2006, most of which benefited Iraq and Nigeria.

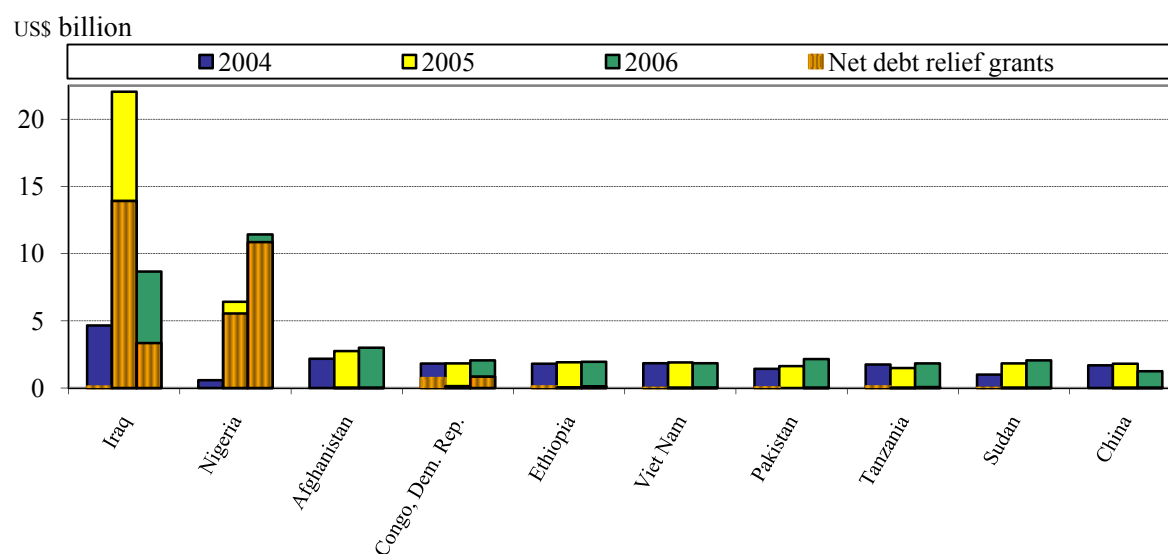


Figure 2.10. Top 10 ODA recipients with their share of net debt relief grants, 2004-2006

US\$ billion, net ODA receipts

Source: OECD

The share of total ODA going to the poorest countries (least developed countries and other low income countries) increased from 47% of total ODA in 2002 to 49% in 2006. However, this result includes the cancellation of large amounts of Nigeria's commercial debt. Thus, a higher share of ODA has not gone to countries with relatively large numbers of poor people since the majority of the population living under \$1 per day resides in the least developed countries. Eighty two percent of rural households who live in the least developed countries can be defined as 'poor' (Policy Brief, April 2008, OECD).

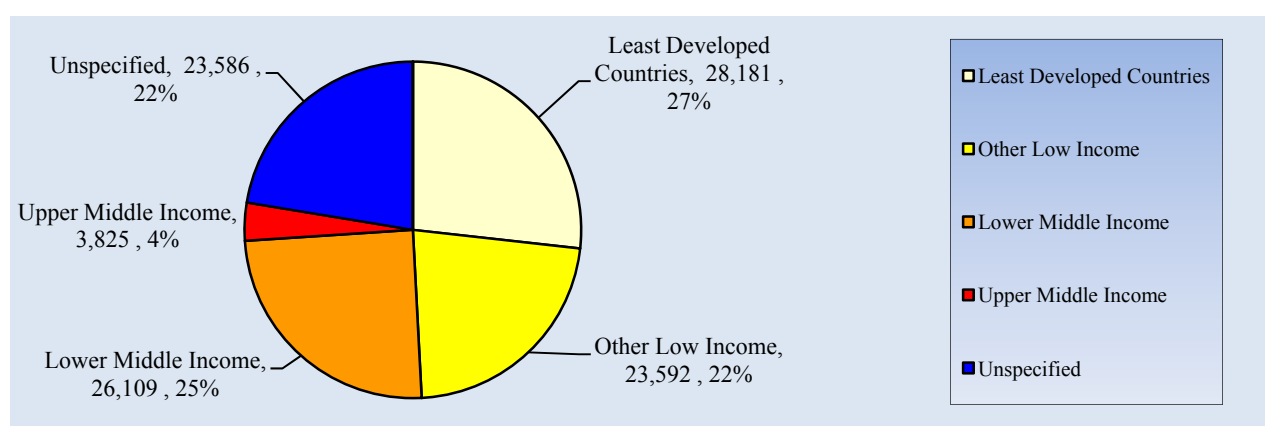


Figure 2.11. ODA by income group, USD million, 2006, net disbursements.
Source: OECD

2.1.4. Composition of Aid and Trends in Agricultural Aid³

Composition of Agricultural Aid

Before we start to look at the trends in agricultural aid, let us take a look at the definition first. The definition of aid to agriculture is not the same among the agencies that report data on this sector. It is even possible that it may change over time within the same agency. Thus, to

³ The statistics are taken from OECD website, IDA Report "Aid Architecture: An Overview of the Main Trends in ODA Flows" and "Development Aid at a Glance 2007", FAO and from "Official Development Assistance to Agriculture" of DFID.

limit the confusion, we will use data⁴ provided by the DAC and CRS databases of OECD and the FAO of the United Nations.

The DAC statistical definition⁵ of assistance to agriculture includes agricultural sector policy, planning and programmes, agricultural land and water resources, agricultural development and supply of inputs, crops and livestock production, agricultural services, agricultural credit, cooperatives, agricultural education, training and research; and institution capacity building and advice. Although forestry and fishing are identified as different sectors starting from 1996, they were included under agriculture in earlier data. The current definition excludes rural development, which is classified as multi-sector aid, developmental food aid and aid to the agricultural sector through NGOs since this is not always sector coded in detail as project and programme aid. Thus DAC statistics only relate to activities that have agriculture as their main purpose and do not capture assistance to that sector delivered within multisector programmes which is why we will use data from FAO to cover some of these limitations.

The External Assistance to Agriculture (EAA)⁶ defined by FAO is the commitments made by bilateral and multilateral donors to the developing countries and countries in transition for the development of agriculture. The EAA consists of data on commitments from DAC , OPEC, the World Bank, Asian and African Regional Development Banks, United Nations Development Programme, FAO, Consultative Group on International Agricultural Research, and the International Fund for Agricultural Development. The commitments made in the form of grants, grant-like and loans are only included. The data does not cover some of the donors like the European Economic Community (EEC), Council for Mutual Economic Assistance (CMEA)

⁴ All data on ODA reported here are extracted from the OECD's DAC and CRS websites at <http://www.oecd.org> and from the statistical division of FAO. All tables are from OECD data unless specified otherwise.

⁵ OECD Briefing, Aid to Agriculture, 2001.

⁶ FAO website at www.fao.org/es/ess/os/ext_agri_p.asp

and some of the regional banks due to availability of data. The assistance also does not cover food aid and other technical cooperation provided in kind. The term "Agriculture" is used in broad sense to cover agriculture, forestry, fisheries, land and water, agro-industries, environment protection, manufacturing of agricultural inputs and machinery, research, training and extension, agricultural services, crop production, regional and river development and rural development/infrastructure. The data provided refers to ODA only (those do meet the ODA criteria) and the aid flows are concessional (includes loans and grants but contain grant element of at least 25%)

Trends in Agricultural Aid

It is expected that ODA to different sectors will play a crucial role to achieve the UN Millennium Development Goals⁷ for 2015⁸. Moreover, just as the great success captured by Marshall Plan⁹ inspired aid to developing countries, the Green Revolution triggered by international support has been cited as a success story for the justification of aid to agriculture. However, the volume of aid to agriculture decreased by almost two thirds in real terms between 1980 and 2006 during which the steepest decline took place in late the 1980s and during the 1990s. Over the same period, total ODA provided by all donors increased more than 50% and since total aid provided to the agricultural sector decreased, its share in total ODA has fallen even more. Aid to agriculture represented 17% of total ODA in the early 1980s and by the end of 1990s, it fell to 8%. In 2006, it represented almost 4% of total ODA¹⁰.

⁷ See Table 5.5 for more detail.

⁸ Development Aid at a Glance 2007, OECD.

⁹ A program, implemented by U.S. Secretary of State George Marshall, sought to provide funds for rebuilding European countries which were largely destroyed in Second World War in 1947.

¹⁰ OECD Briefing, Aid to Agriculture, 2001 and OECD Policy Brief, April 2008.

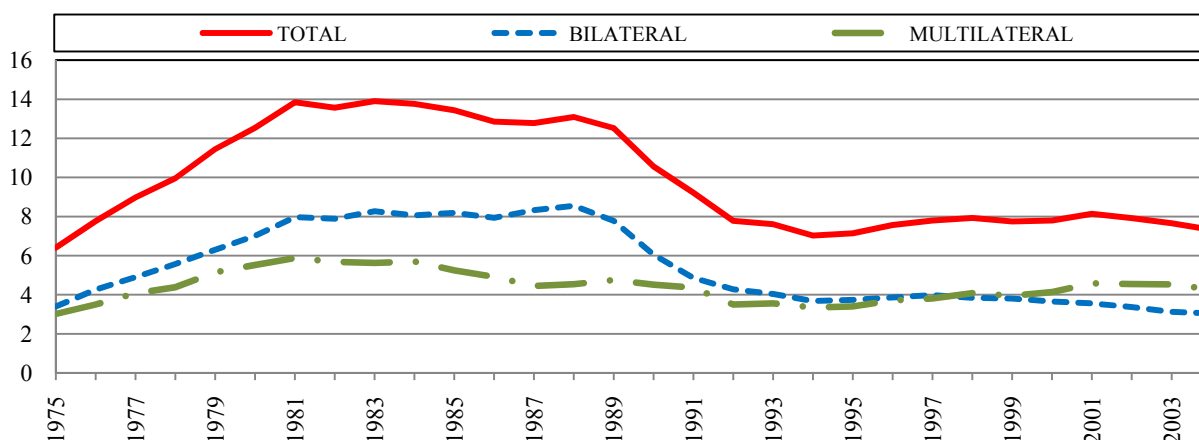


Figure 2.12. Total ODA to agriculture, USD billion, constant 2000 prices, 3-year average disbursements
Source: FAO

The figure above represents the aid to agriculture by both bilateral and multilateral donors. They show slightly different trends over time where bilateral assistance increased during the 1980s and multilateral assistance decreased for the same period. Both bilateral and multilateral aid to agriculture showed a downward trend during the 1990s. For both of these donor groups, the share of aid to agriculture in total ODA has fallen during the past 25 years. ODA for agriculture in low-income countries has declined about 50 % since the early 1990s. In low income countries, the share of ODA in agriculture declined from about 13 % in 1992–1996 to about 6.9 % in 2000–2006. From a regional perspective, Asia and Africa suffered from a drastic decline in aid to agriculture between 1980 and 2006 whereas agricultural aid to South America remained just about unchanged¹¹. Asia, especially India, received most of the agricultural aid during late 1970s and early 1980s in support of the Green Revolution. However, total ODA to agriculture for Asia dropped from a US\$ 4 billion in the 1980s to around US\$ 1.3 billion in 2005. Total ODA to agriculture for Africa varied between US\$ 3 to 4 billion in the

¹¹ World Development Report 2008, Agriculture for Development.

1980s and it was around US\$ 1.2 billion in 2005. The share of agriculture in sector allocable ODA fell by more than half from 19 % in 1990 to 7.7 % in 2006. What is interesting about these amounts are that they represent the same level of agricultural aid these two continents received in 1975.

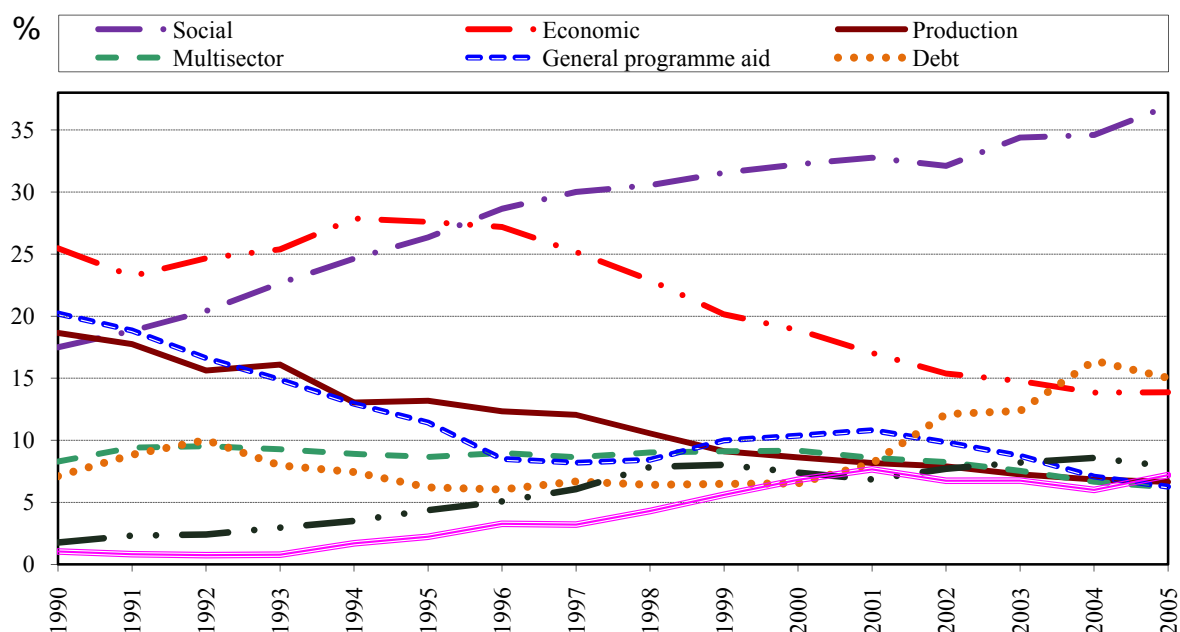


Figure 2.13. ODA by sector since 1990
As a percentage of total ODA, 3-year average commitments
Source: OECD

Since 1990, there has been a shift from infrastructure and production sectors to social sectors¹² within sector allocable ODA¹³. As of 2006, more than 50% of all allocable aid goes to social sectors whereas it was only around 9% during the 1980s. The production sector under

¹² “Social sectors” comprise education, health, water and sanitation, population, government and civil society, and conflict, peace and security. “Infrastructure sector” contains transport and storage, communications, energy, banking & financial services, business & other services. “Production sector” includes agriculture, forestry and fishery, industry and mining, and tourism.

¹³ Sector allocable ODA is defined by DAC as “Total sector allocable ODA is used to better reflect the sector focus of donor’s programmes. It concerns all ODA flows aimed at fostering a particular sector in the recipient country (examples of sectors are: agriculture, education, health, water supply and sanitation, government and civil society, transport and storage, etc.) and thus excludes all the contributions that are not susceptible to allocation by sector (e.g., balance-of-payments support, actions relating to debt, emergency assistance, and internal transactions in the donor country—administrative costs of donors, support to NGOs and unallocated/unspecified ODA)”.

which aid to agricultural sector is covered has suffered most from the decline in its share in total ODA. Production sector's share declined from 19% in 1990 to 7% in 2004, primarily due to the drastic decline in aid to agriculture from 13% to less than 4% of total ODA for the same period. Thus, the share of aid to agriculture and rural areas in total ODA declined more than 50% since early 1990s. Currently, it seems like both bilateral and multilateral donors tend to favor the social sector followed by debt relief.

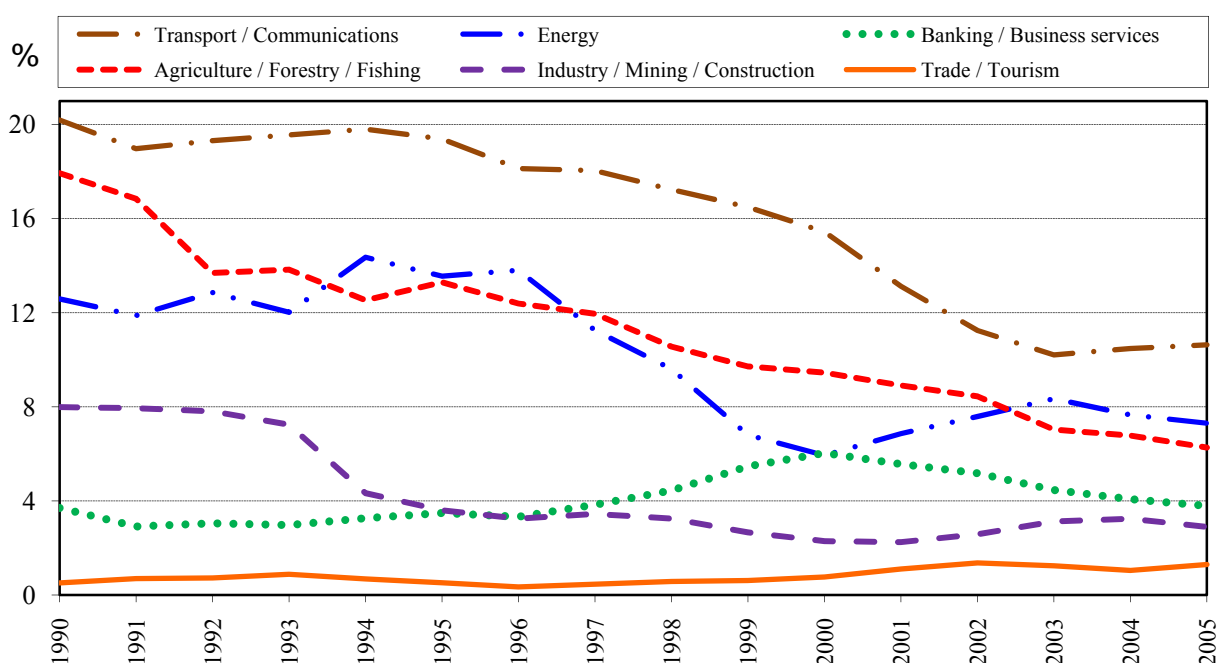


Figure 2.14. Analysis of economic and production sector ODA since 1990
As a percentage of total sector-allocable ODA, 3-year average commitments
Source: OECD

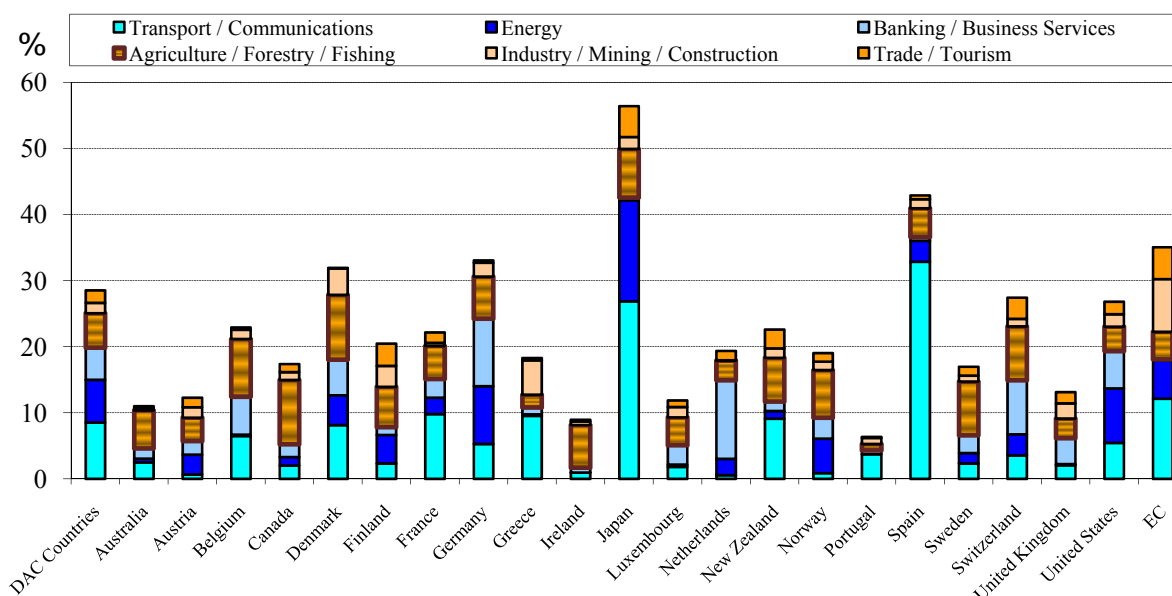


Figure 2.15. Analysis of economic and production sector ODA by donor
As a percentage of total sector-allocable commitments for donor in 2006
Source: OECD

Some Possible Reasons for the Decline in Agricultural Aid

According to FAO, a sustained reduction in hunger is only possible with special emphasis on agricultural and rural development. Thus this decline in the share of aid to agriculture could have serious consequences by limiting agricultural growth especially in regions where improvements are needed most.

Some possible reasons for this downward trend in aid to agriculture can be cited as follows:

a. The donors' sectoral priorities have changed from productive and economic sectors to social sectors mainly because of "agricultural aid fatigue". This fatigue might happen due to various reasons one of which can be that development paradigms are changing almost every decade and some development theories openly deny the role of agriculture on economic development and instead cite it as a drag (IFPRI Brief 2020, April 1995).

During the 1950s, the agricultural sector was mostly neglected due to the emphasis on industrialization based on the Neo-Keynesian development models (IFPRI Brief 2020, April 1995).

In the 1960s and 1970s, donor focus was mostly on productive sectors and infrastructure such as support to the green revolution. During that period, new technology, increased technical assistance and improved productivity led to development in the agricultural sector. Not only did official aid levels increase, but so did the growth rate of the developing countries including the ones in Sub-Saharan Africa (Official Development Assistance to Agriculture, DFID, 2004; Riddell 2007). The Green Revolution during this period restored the faith in agriculture. However, the lack of coordination between projects in developing countries and taking on massive risky projects by their governments undermined the effectiveness of the aid allocated to the agricultural sector in the 1970s (IFPRI Brief 2020, April 1995).

The 1980s focused more on supply oriented approaches where market-oriented development strategies were relied upon to regulate the economy. The aid recipient countries were “encouraged” to pursue neo-liberal policies where they would open up their markets, adopt an export oriented, less protective trade regime, privatize state assets and reduce direct government expenditures (Riddell 2007).

These structural adjustments fundamentally affected the agricultural sector because governments of the aid recipient countries were the ones responding to market failures by supplying essentially private services in agriculture, distributing inputs, providing credit and marketing products, often through parastatals (government owned institutions to undertake commercial activities). However, the dismantling of parastatal agencies led to only limited entry of private providers (Agriculture for Development, World Development Report, 2008). Thus,

this policy change reduced the apparent need for assistance to the agricultural sector and caused it to decline since the institutions through which aid had been channeled were no longer there (Kydd and Dorward 2001; Official Development Assistance to Agriculture, DFID, 2004). Moreover, some agricultural projects such as large scale integrated rural development and/or “training and visit” for extension received highly unfavorable evaluations and were declared as failures during that period. Only recently is it acknowledged that although economic growth in most countries requires special attention to agriculture and thus stems from it, policy decisions for this sector are usually external to it. Any structural changes in this sector would require more time. In a world where donors and the policy makers expect to see desired results in shorter time spans, this eventually led to more dissatisfaction (IFPRI Brief 2020, April 1995; Official Development Assistance to Agriculture, DFID, 2004).

During the 1990s and more recently, fighting against poverty once again became the main agenda (Hjertholm and White 2000; Aid Architecture: An Overview of the Main Trends in ODA Flows, IDA Report, 2008). Given that three of every four people, living on less than US\$1 a day live in rural areas and most depend on agriculture and related activities for their livelihood, a renewed interest followed for improvements in this sector (Agriculture for Development, World Development Report, 2008)

b. Another reason for the decline in the share of aid to agriculture may be related to high transaction costs and complexity of monitoring. During the 1960s and 1970s, investment channels like parastatals were used mostly to invest in agriculture. However, drastic structural changes in developing countries reorganized institutions where unnecessarily large, wasteful and overstaffed institutions were mostly eliminated and this led to an increase in transaction costs. It became even harder for the development agencies of the donors to identify partner institutions to

collaborate for the preparation, supervision and monitoring of aid (IFPRI Brief 2020, April 1995; Official Development Assistance to Agriculture, DFID, 2004).

c. The opposition received from the strong farm lobbies and environmental groups in some donor countries could be another reason for the downward trend in aid to agriculture. These two groups saw aid to the agricultural sector as a threat to their major export markets and to the environment by causing pollution and destruction of natural resources respectively which in turn diverted finance to projects for this sector in developing countries (Agriculture for Development, World Development Report, 2008).

d. Some of the decline in aid to the agricultural sector can be explained by changing donor interests where priorities shifted from the production and economic sectors to mainly social sectors (OECD Briefing, Aid to Agriculture, 2001). This increased competition for resources within ODA may be explained by various reasons. One may be that it is easier to find channels to invest in the social infrastructure and services, where especially health and education sectors benefit most and this would lead to lower transaction costs. Moreover, unlike the agricultural sector, these sectors do not take at least a decade or more for the structural changes and it is easier to link the services provided with the targets addressed for the Millennium Development Goals (Official Development Assistance to Agriculture, DFID, 2004; Agriculture for Development, World Development Report, 2008).

e. Increasing emergencies that need to be addressed immediately around the world may be another reason for the decline in the share of aid to agriculture (IFPRI Brief 2020, April 1995).

f. Last but not least, exclusion of the agriculture from the poverty reduction agenda during 1990s may be associated with the decline in aid to the agricultural sector (OECD Briefing, Aid to Agriculture, 2001).

Nevertheless, since 2001, a renewed interest in the agricultural sector has prevailed among donors, developing countries, policy makers and scholars. Even though it is still a modest interest, it can help to refocus on the role of agriculture in promoting economic growth and poverty reduction.

2.2. Donor Country Coordination and Aid Effectiveness

2.2.1. Why do Donors Give Aid and How Do They Decide Who Gets It?

Although the roots of aid giving may be traced back to very early times, official aid giving as we know today began to emerge in the 19th and early 20th centuries as western countries started considering their colonies and other undeveloped countries. However, donors' decisions for bilateral or multilateral aid might depend on several different political and strategic reasons and the primary goal of financial aid may not always be to fight against poverty and promote economic development.

In 1929, the United Kingdom's provision of foreign assistance was made to help colonial governments to develop their economies by means of grants and loans under the Colonial Development Act of 1929, although one of the motivations for aid was to promote employment in Britain by stimulating the colonial economies and their demand for British exports (Little and Clifford, 1965, p.31). When United States provided aid to Latin American countries in the 1930's and 1940's, it was made under the "Good Neighbor Policy" of the Roosevelt Administration. Afterwards, the Marshall Plan was announced in 1947 by General George C.

Marshall, then U.S. Secretary of State, to provide funds to rebuild the countries in Europe and stop the spread of communism. So, even though World Bank describes the primary goal of financial aid from one country or an organization to another country as to fight against poverty and to promote economic development today, official aid giving may be based on some other purposes or political decisions of the donor countries.

Riddell (2007) cites eight historical motives that influenced donor decisions on aid allocation. These are:

1. emergency needs
2. growth and poverty reduction in the recipient country
3. solidarity
4. donors' own national and strategic interests
5. promoting donor country commercial interest
6. historical ties
7. providing and strengthening global public goods and reducing the ill effects of global evils
8. human rights records of recipient countries

He argues that most donors used one or more of these motivations at different times.

There is a vast amount of literature on the determinants of aid that can back up his arguments.

Dudley and Montmarquette (1976) set up a theoretical model to explain the bilateral aid allocation mechanism and they empirically test it. Their results show that the economic needs of the recipient countries are effective as much as the political and/or bandwagon considerations.

Rossiter (1985) argues that diplomatic/strategic goals and development/humanitarian goals are two conflicting sets of goals that affected the US foreign aid disbursement from 1946 to 1979.

Trumbull and Wall (1994) extend Dudley and Montmarquette's (1976) model into a simultaneous optimization by multiple donors. They suggest that political and civil rights play a crucial role for aid allocation rather than recipient needs through per capita income.

Apodaca and Stohl (1999) investigate if a state's human rights record affects the amount of U.S. bilateral aid it receives. Even though they confirm human rights records of the recipient country is a consideration for U.S. economic (not military) aid allocation, it is neither the only nor the primary one.

Alesina and Dollar (2000) find substantial evidence that donor's decision on the allocation of foreign aid is guided by political and strategic considerations as much as the economic needs and policy performance of the recipient countries. In most cases the amount of aid is weakly related to the recipient country's economic performance and strongly related to indicators of cultural, historical and political closeness between the countries.

Burnside and Dollar (2004) argue that in 1990s, donors' decision on the allocation of aid to under-developed countries were in favor of those with better institutional quality.

Kuziemko and Werker (2006) provide statistical evidence that there is a strong relationship between the amount of aid received from the United States and United Nations and holding a seat on the U.N. Security Council. They suggest that the foreign aid flows are used to buy votes from those recipient countries who are currently serving on the U.N. Security Council. This effect increases during years in which key diplomatic events take place.

Kaya, Lyumibov and Miletkov (2007) argue that the donor countries might use foreign aid to affect the financial liberalization decisions of the recipient countries which allows foreign investors to buy domestic equities.

Thus it would be logical to assume that when there are so many different goals for the provision of foreign aid, we cannot expect all aid to cause economic growth and poverty reduction when the reason for disbursing it was not the purpose in the first place.

2.2.2. Aid Effectiveness-A Selective Literature

Foreign aid effectiveness has been a frequently visited and hotly debated issue by many scholars. One main reason for this interest can be the need for justification of giving aid. If official development assistance works, it would mean that the officials of the industrialized countries can reassure their constituents of the benefits of giving aid (Riddell 2007). Of course, when answering the question whether aid works or not, we should lay down the objectives for aid to accomplish and use a yardstick to measure the effectiveness. We can cite five broad economic and development objectives for aid to meet (Radelet 2006);

- (i) to stimulate economic growth through infrastructure, support productive sectors such as agriculture, or bring new technologies or knowledge;
- (ii) to strengthen the education, health, environmental sectors or political systems;
- (iii) to support the subsistence consumption level, especially during relief operations or humanitarian crises;
- (iv) to help stabilize an economy following financial crises; and
- (v) to reduce the poverty levels in the developing world.

However, aid effectiveness studies mostly used the first objective as a yardstick to check whether it works or not. So, does aid work? Apparently, there is still no simple answer to that

question. Some countries received large amounts of aid followed by rapid economic growth while others have experienced slow or even negative growth. Hence we still have ambiguous results for this question. On the other hand, there is plenty of evidence that aid contributed to the improvement of quality of life in aid recipient countries. It helped to extend and improve the quality of services, physical infrastructure, and production, enhance the efficiency and effectiveness of the agricultural sector, and improve the quality of the key institutions. Similarly, aid helped to provide better and more accessible health and education services, supplying essential medicines, schoolbooks and bed-nets. It was also effective in providing emergency relief following natural disasters like the Asian Tsunami in 2004 (Levine et al 2004; Radelet 2006; Riddell 2007). Aid has been particularly successful in some countries such as in Botswana, China, India, Indonesia, Mozambique, Poland, Republic of Korea, and Uganda (Wolfensohn 2002; Radelet 2006). The Green Revolution can also be cited as an example for accomplishment since aid was used as the main instrument to transfer technology and knowledge such as the introduction of new seeds and fertilizers from rich countries to poor countries.

Thus, the relevant question is not “does aid work?” but rather “how can we make aid work better?” (Riddell 2007) This study aims to answer this question by disaggregating total aid into sectoral aid and look at its effect first on overall economic growth (the first objective cited above) and then poverty reduction (the last objective). However, before doing that let us first look at some of the aid effectiveness literature.

Aid and Growth

The empirical link between foreign aid and economic growth has been a controversial issue. Thus far, a consensus has not been reached. Different scholars reach different conclusions

dependent on the countries used, periods observed and assumptions made. The effectiveness literature on aid and growth¹⁴ mainly follows two broad views.

a. Aid is positively related to growth on average but this relation is subject to diminishing returns.

Aid is an important and necessary element because it can be used to increase the savings rate, investment and/or capital accumulation. Scholars supporting this view argue that more development aid is needed to pay for global public goods, provide sufficient humanitarian relief, achieve the Millennium Development Goals and provide more satisfactory levels of official development assistance for the take off of developing countries. Foreign aid, they argue, helps less developed countries to grow and, in the absence of foreign aid, their situation would be worse (Rosenstein-Rodan 1961; Chenery and Strout 1966; Papanek 1973; Hadjimichael et al. 1995; Dalgaard and Hansen 2000; Hansen and Tarp 2000, 2001; Levine et al 2004; Dalgaard et al 2004).

Rosenstein-Rodan (1961) argues that a substantial amount of aid is needed to fill the “financing gap” in low income countries. This gap results from the difference between domestic savings and the level of required investment for economic growth. They state that each dollar of foreign resources in the form of aid would result in an increase of one dollar in total savings and investment.

Chenery and Strout (1966) formulated the aid growth relationship in the Harrod-Domar growth model framework by building on the earlier work of Rosenstein-Rodan. In their “two-gap” model, they argued that low income countries cannot save and accumulate capital and aid to low income countries was intended to fill both a savings gap and a foreign exchange gap. Thus a

¹⁴ Hansen and Tarp (2000) and Clemens et al (2004) supply an excellent survey for the evolution of aid effectiveness literature.

foreign aid flow would bridge the gap between the required and actual investment which would cause economic growth.

Papanek (1973) argues that savings and foreign inflows explain over a third of growth and foreign aid has a substantially greater effect than the other variables.

Hadjimichael et al. (1995) can be cited as the first to allow a nonlinear effect of aid on growth. Their results show that aid has a positive but diminishing effect on growth in 31 African countries for the 1986-1992 periods by using generalized least squares. Durberry et al. (1998), find similar results that strongly support the view that foreign aid does have some positive impact on growth, conditional on a stable macroeconomic policy environment.

The idea that aid works only in the presence of strong macroeconomic policy (good fiscal, monetary and trade policies) is also supported by the results of an empirical study by Burnside and Dollar (2000). They argue that conditional on macroeconomic policy, aid promotes economic growth. Therefore foreign aid should be distributed to countries that implement appropriate policies. However, this study is heavily criticized in different aspects.

Hansen and Tarp (2000, 2001) criticize the results of Burnside and Dollar arguing that their analytical findings are not robust and they show that those results are sensitive to the data and model specification. They provide a survey of empirical analyses from the last 30 years that use of cross-country regressions in assessing the effectiveness of foreign aid. From these 131 regressions, they find that those arguing a negative relation between aid and growth are clearly in minority. When all studies are taken into account, the evidence for a positive relationship is convincing (Hansen and Tarp 2000). Consequently, they argue that there is a robust link between aid and growth even in countries with an unfavorable policy environment. They are also the first to use a Generalized Method of Moments framework for their analytical estimation.

By developing a neoclassical growth model, Dalgaard and Hansen (2001) states that aid can stimulate growth and the relationship between good policies and aid is unclear in contradiction to what Burnside and Dollar (2000) claim.

Chatterjee , Sakoulis and Turnovsky (2003) and Chatterjee and Turnovsky (2005, 2007) look at aid effectiveness from a general equilibrium endogenous growth model framework. Their analysis suggests that the positive effect of aid depends crucially on (i) the restrictions imposed by the donor on how aid must be spent, (ii) the recipient's structural conditions, as embodied by the input-flexibility of the production sector, access to capital markets, the size of the government, and the choice between labor and leisure, and (iii) the duration of the aid program.

Dalgaard, Hansen and Tarp (2004) develop a simple two-period endogenous growth version of the overlapping generations model where aid enters as a pure transfer. They find that aid has a significant effect on productivity and can stimulate the process where growth, development and poverty reduction takes place.

b. Aid has either negative or no effect on growth.

Some scholars in this strand are skeptical about the effectiveness of aid (Griffin and Enos 1970; Bauer 1972; Mosley 1980; Singh 1985; Boone 1994, 1996; Shan 1994; Easterly 1999; Brumm 2003; Easterly et al 2004; Rajan and Subramanian 2005; Subramanian 2007) . They state that although the amount of aid increases year after year¹⁵, most less developed countries, especially the ones in Africa, are still struggling with poverty. They argue that aid money undermines the economic transformation necessary for sustainable growth and enriches corrupt government officials or elites, or there is no significant relationship between aid and growth.

¹⁵ Net disbursements from Development Assistance Committee (DAC) countries to aid recipients are equal to US\$103 billion as of 2007.

Griffin and Enos (1970) hold a skeptical view of aid and argue that foreign assistance has neither accelerated growth nor helped to foster democratic political regimes. If anything, they continue, aid may have slowed down development by leading to lower domestic savings, by distorting the composition of investment and thereby raising the capital-output ratio, by frustrating the emergence of a local entrepreneurial class, and by suppressing institutional reforms. According to their study, they claim that the greater the capital inflows from abroad, the lower the rate of growth of the receiving country so aid programs are frequently counterproductive in regards to economic development.

Bauer (1972) argues that foreign aid is not indispensable to economic progress, it may actually obstruct it and counter arguments are defective. He believes that only under some special circumstances aid would be effective in a country and this would happen when all the necessary conditions for development are present but due to some external political reasons, neither the government nor the private sector can borrow from abroad. However, he does not provide empirical evidence to support his arguments.

Mosley et al. (1980, 1987) are some of the most widely cited studies in aid effectiveness. Mosley (1980) finds a negative but insignificant effect of aid on growth over the period whereas Mosley et al. (1987) find no significant effect. They argue that aid does not seem to spur growth, and thus there is a micro-macro paradox: at the project level, return rates are more than satisfactory, but they are unnoticeable at the macro level where it is not possible to establish any statistically significant correlation between aid and growth across a sample of recipient countries.

Boone (1994, 1996) claims that instead of fostering economic development, foreign aid can cause a poverty trap since it supports predatory governments that consume aid inflows instead of investing in their country. He also reviews the effect of foreign aid on recipient

regimes and finds that aid mostly benefits local political elites. He argues that aid can be effective in his model when it is conditional on policy and/or political reforms, and where aid is not fungible.

Easterly (1999) shows that the financing gap approach (Harrod–Domar, Chenery-Strout two-gap model) fails to predict aid’s effect and points out that for some recipient countries, the increase in foreign aid is associated with a decrease in investment rate and eventually prevents short run economic growth.

Easterly, Levine and Rodman (2004) raise new doubts about the results of Burnside and Dollar (2000) as well about aid effectiveness after updating and filling in missing data that Burnside and Dollar originally used. They advise scholars and policymakers to be more cautious about concluding that foreign aid will work to promote economic growth for countries which adopt good policies.

CHAPTER 3

THEORETICAL FOUNDATIONS OF AID MODELS

3.1. Growth Models

Economic growth can be basically defined as an increase in value of aggregate resources available in an economy. It is traditionally measured as the percent rate of increase in real Gross Domestic Product (GDP) or Gross National Product (GNP). The main question regarding economic growth is that why growth differs across countries. Some countries grow faster than others so what are the key differences between these fast and slow growing countries and what determines economic growth?

Even though introducing a theoretical model of economic growth can be claimed to have started when Adam Smith wrote his famous 1776 book, one of the earliest descriptions of economic growth can be traced back to a Muslim scholar, Ibn Khaldun in the 14th century (Soofi 1995). In addition to the theories of value, distribution, money, prices, public finance, business cycles, inflation, rent, and benefits of trade in his writings, he also wrote about theories on growth and development. According to Ibn Khaldun, aggregate demand can be seen as an important determinant of national income and economic growth which is a concept that is central to the modern Keynesian theory of national income determination and growth theory (Ibn Khaldun, Vol. II, 1377).

Some of the growth models used as a theoretical background for the aid effectiveness literature are going to be introduced in this part. These models are as follows:

i. Classical Theory

The modern formation of economic growth theory can be traced back to the Classical Growth Theory starting with Adam Smith and David Hume. Adam Smith (1776) wrote about his theory of growth in his famous work “*An Inquiry into Nature and Causes of the Wealth of Nations*”.

Smith suggested that growth was related to capital accumulation, technological progress, and institutional and social factors, and hypothesized a supply-side driven model of growth¹⁶. Output was defined as a function of labor, capital and land, and output growth was determined by population growth, investment, land growth and increases in overall productivity. In this theory, the endogenous factors were population growth and investment. The former depended on the sustenance available to accommodate the increasing workforce whereas the latter was determined by the savings rate. New land could be acquired by the conquest of new lands or by increasing the fertility of the current lands with technological improvement. However, Smith argued that division of labor (specialization) is the most important economic determinant of growth since it raises labor productivity which can lead to higher incomes, and higher income leads to increased demand and larger markets. This in turn would lead to further increase in the division of labor.

Smith argued that growth was self-reinforcing because of increasing returns to scale, though not increasing perpetually. He assumed an upper and lower limit in the form of the "stationary state" where population growth and capital accumulation were zero.

David Ricardo (1817), affected by the Malthusian theory of population, argued that the growth of the economy would depend on population growth and the law of diminishing returns. He scientifically explained Smith's model of growth and modified it by adding diminishing

¹⁶ <http://homepage.newschool.edu/het/essays/growth/classicalgrowth.htm>

returns to land. According to Ricardo, factor inputs determine the output growth, though land has limited supply and its quality varies. As an economy grows, more land is used by cultivating the inferior land. As more and more inferior land is cultivated, rent and food prices rise which cause profits to fall since higher wages are required for subsistence level of the workers. The economy in turn would get to a stationary level where landowner's rents cut into the profit of the capitalist leaving less and less for the investment necessary for economic growth. Ricardo also argued that free trade would benefit countries by allowing them to buy goods that were produced at a lower opportunity cost at other countries (comparative advantage) and this would lead to more profit. Thus free trade through comparative advantage would be a central component of the growth theory.

ii. Keynesian Growth Theory and Harrod-Domar Model

Classical growth theorists like Smith and Ricardo were attentive to the role of capital investment on growth, although they did not think of it as being an independent factor. Thus investment on capital did not play the key role in their theories. During the nineteenth century some economists gave a vital role to capital and investment as they learned more about the importance of capital and investment in promoting economic growth. It took until the twentieth-century, however, for economists to see investment as the means to economic growth.

In 1936, John Maynard Keynes published his famous book, "*The General Theory of Employment, Interest and Money*". His model was developed to explain short run business cycles. According to Keynes, investment is one of the key determinants of aggregate demand and aggregate demand affects output /aggregate supply via the multiplier. However he did not extend his theory of demand- determined equilibrium into a theory of growth. It was the Cambridge Keynesians, Roy Harrod and Evsey Domar who extended his theory into a growth model

framework. Roy Harrod (1939) was the first to come up with an extension, and Evsey Domar (1946) separately developed a macro dynamic model through an extension of Keynes's theory. The model was originally used to identify the source of instability in the growth of developed economies where effective demand is normally exceeded by supply capacity and later, it was applied to economic planning in developed economies (Hayami and Godo, 2005).

The Harrod-Domar model became very popular because it had a simple prediction: GDP growth will be proportional to the share of investment spending in GDP and the change in output will be proportional to the change in machines which is, basically, last year's investment. Thus GDP growth this year is just proportional to last year's investment/GDP ratio (Easterly 1999).

According to Harrod-Domar to determine an equilibrium growth rate g for the economy, consider a model where output (Y) is a function of capital (K) at the beginning of the year

$$Y_t = \alpha K_{t-1}$$

where α represents productivity of capital and it is a constant. The level of savings is a function of income and this is equal to investment

$$S = sY = I$$

The change in capital stock is equal to investment minus depreciation of the capital

$$\Delta K = (K_{t-1} - K_{t-2}) = I_{t-1} - \delta K_{t-1}$$

where δ is the depreciation rate per year. Assume $\delta=0$ for simplicity. We then solve the model for the long run case

$$Y_t - Y_{t-1} = \alpha(K_{t-1} - K_{t-2})$$

What we have on the right hand side is last year's net investment I_{t-1} . If we divide both sides by last year's output, we will get the GDP growth of this year proportional to last year's investment/GDP ratio.

$$\frac{Y_t - Y_{t-1}}{Y_{t-1}} = \alpha \frac{I_{t-1}}{Y_{t-1}}$$

This in turn is equal to what is called the warranted rate of growth by Harrod

$$g = \frac{\Delta Y}{Y} = \alpha s$$

where g is the growth rate of output, s is the ratio of saving to income, and α is the productivity of capital or the inverse of the incremental capital output ratio (ICOR). Therefore the factors that explain the growth rate are; saving rate, capital productivity and capital depreciation

The equilibrium growth rate of output is equal to the ratio of the marginal propensity to save and the incremental capital-output ratio. Thus growth increases proportionally with the savings rate and, since the savings rate is considered to increase proportionally with income per capita, it is bound to be low in developing countries. Consequently, growth will be low if savings and investment are left to the market and government planned investment is needed to accelerate economic growth in low income developing countries. So it was said that market failures and lack of capital caused poor countries to remain poor.

One of the critiqued points of the model was that it was assumed that output (GDP) is proportional to machines and labor does not play a key role in production. This was mainly due to the fact that this model was written after the Great Depression and they simply took unemployment as a given because there were always people available to run any additional machines that were built (Easterly 1999,2001).

iii. Neoclassical or Exogenous Growth Model

This model is also known as Solow-Swan growth model because of the seminal work done by Robert M. Solow (1956) and Trevor Swan (1956) to introduce this theory. According to the Harrod-Domar model, the rate of growth of the capital stock which was called the warranted

rate of growth is defined as the ratio of two constants: savings ratio and incremental capital output ratio which describes technology.¹⁷ The rate of growth of labor in the model is called the “natural rate of growth” and society can fully utilize the capital and labor only if the “warranted” and the “natural” rates of growth are equal. This creates a “knife edge” problem because if investment is above the warranted rate, recession follows and if investment is below, inflation follows.

In his Nobel Prize lecture, Solow (1987)¹⁸ states that he first felt discomfort because the steady growth of the Harrod-Domar model was based on the assumptions of constant saving rate, rate of growth of the labor force, and capital output ratio. These three key ingredients were capable of changing from time to time, but rarely and more or less independently. “In that case, however, the possibility of steady growth would be a miraculous stroke of luck” because the equilibrium of the Harrod-Domar model is a razor-edge equilibrium and if the economy deviates from it in either direction there will be an economic calamity. Thus most economies would not have equilibrium growth path most of the time.

The neoclassical growth model modified the Harrod-Domar model by including labor as a factor of production, by allowing diminishing returns to labor and capital individually but constant returns to scale for both factors combined, and by allowing for a reasonable degree of technological flexibility. Instead of the exogenous capital-output ratio of the Harrod-Domar model, the neoclassical growth model used a standard neoclassical production function. Subsequently the capital-output ratio which is now endogenous became the adjusting variable that would lead the system back to its steady-state growth path. The basic assumption of the

¹⁷ One justification for this assumption is that there is zero elasticity of substitution between capital and labor in the aggregate production function with the supply of capital the binding constraint. The other one is that labor is in perfectly elastic supply at an exogenous real wage (Eaton, 1989).

¹⁸ Robert M. Solow, The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1987, Lecture to the memory of Alfred Nobel, December 8, 1987

model is that all economies have access to the same global technology embedded in the production function.

An implication of including diminishing returns to the production function was that in the neoclassical model, the equilibrium rate of growth is not proportional to the saving (investment) rate and is independent of the saving (investment) rate. A low income country that permanently increases its savings rate will have a higher level of output and will grow in the short run. However, a permanent higher rate of growth of output will not be accomplished. In neoclassical growth models, permanent long run growth rate is independent of the saving (investment) rate and it entirely depends on the rate of technological progress. Thus, growth is exogeneously determined (cannot be explained inside the model).

Unlike Harrod-Domar model, the ideas from the neoclassical theory lead to a free market strategy where markets are generally very competitive and do not tend toward monopolies. Free markets provide competition to identify where comparative advantage lies and optimal growth rates can be achieved when countries/agents are producing goods and services for which they have a comparative advantage. Protected markets or government intervention reduces overall productivity; thus government's role in an economy should be none other than to encourage market competition, savings and investment and provide schooling for the people.

One of the critiqued points of the Solow model was that when compared to the classical and Harrod-Domar growth models, the neoclassical model understates the role of capital accumulation in the long run by overlooking the interaction between capital accumulation and technological progress (i.e. new technology is usually embodied in new capital goods).

(Fagerberg, 1994)

iv. Endogenous or New Growth Theory

“Every generation has perceived the limits to growth that finite resources and undesirable side effects would pose if no new recipes or ideas were discovered. And every generation has underestimated the potential for finding new recipes and ideas. We consistently fail to grasp how many ideas remain to be discovered. The difficulty is the same one we have with compounding: possibilities do not merely add up; they multiply.”(Romer)

According to Paul Romer, who is credited to be the one who stimulated the new growth theory, “economic growth occurs whenever people take resources and rearrange them in ways that make them more valuable” (Romer, 2008). In the neoclassical growth model, technological progress was the engine of growth; however growth was exogenously determined outside the model. The famous 1986 paper by Romer¹⁹ suggested that research and development activities can generate externalities which in turn would create a stock of knowledge available to all firms. Thus the most important determinants of growth could be constant returns to scale production function, which is also called an AK production function, accumulation of private capital and/or the associated spillover effects from technology which is characterized by increasing returns.

As Romer states, a traditional explanation of poverty suggests that low income or undeveloped countries lack objects like natural resources or capital. However, as some examples from the history shows, some countries started with little of either (like Taiwan) which suggests that what those countries lack are ideas or technology, not objects. In this new growth theory, technology is not a given anymore; instead it is internalized in a model of how markets function and because of this it is also called as endogenous growth theory. The endogenous growth theory uses microeconomic foundations for the underlying macroeconomic models where the growth

¹⁹ “Increasing Returns and Long-run Growth”

rate is explained as an endogenous equilibrium outcome obtained from utility maximization of the rational agents subject to budget constraints.

In endogenous growth theory, sustained growth results from contemporaneous externalities between agents who accumulate physical and human capital where it can be assumed that human capital and technological knowledge were one and the same. Thus, when these different kinds of capital are accumulated, there is no reason to think that diminishing returns will result in zero marginal product since that accumulation is the technological progress needed to counteract diminishing returns. (Aghion and Durlauf, 2009)

There are two main strands of theoretical literature, emphasizing different sources of economic growth in the endogenous growth theory. The first one of these groups claims that the accumulation of private capital is the essential element for economic growth. This group can be thought as closest to the neoclassical growth model though they do not require exogenous elements, such as a growing population to generate growth. The equilibrium growth rate is an internally generated outcome in this strand. The second group puts emphasis on the endogenous development of knowledge, or research and development and regards these as the engine of growth.

3.2. Foreign Aid in Growth Models

Based on the aforementioned growth models, the empirical literature on foreign aid emphasized the effect of aid on growth mostly via capital formation (both human and physical), increased savings and/or investment, and technological innovation.

Aid effectiveness studies published in the 1950s and 1960s mostly were based on Harrod-Domar growth models that emphasized on the importance of aid as an exogenous net increment

to the capital stock of the recipient countries to achieve self sustaining growth. However, especially during 1950s, very little empirical research was carried out to test that idea.

Millikan and Rostow (1957) and Rostow (1960) suggested that countries could emerge out of economic stagnation and “take-off” into a self sustaining growth via increases in investment and technical assistance. What low income countries mainly lack, they assumed, are capital and technology/technical knowledge and aid could be used to finance both. However, they cautioned, more development assistance could stimulate self sustaining economic growth and stop the spread of communism only under an institutionally favorable environment like democracy and free enterprise. Otherwise the anticipated benefits of aid would not be obtainable. It was also during this time that the provision of foreign aid was accompanied by the establishment of various consultative groups for aid recipients under the leadership of the World Bank or OECD.

Rosenstein-Rodan (1943, 1961) is known for his idea of the “big push” which is defined as providing a substantial amount of aid to fill the “financing gap”. This gap results from the difference between domestic savings and the level of required investment for economic growth. According to the big push model, lack of sufficient investment across sectors of the economy and in infrastructure is the problem with low income countries. However foreign aid can initiate the economic growth through a virtuous cycle by providing investment capital which in turn would generate income and thus increase the economic return to further investment. Rosenstein-Rodan’s “big push” model was later formalized by Murphy, Shleifer, and Vishny in a 1989 paper.

Chenery and Strout (1966) formulated the aid growth relation in the Harrod-Domar growth model framework by building on the earlier work of Rosenstein-Rodan. In their “two-

gap" model, they argued that low income countries cannot save and accumulate capital, and aid to low income countries was intended to fill both a savings gap and a foreign exchange gap. Insufficient national savings cause a savings gap because populations of the low income countries mostly live at the subsistence level and they have too few savings. The second gap, foreign exchange gap, occurs because most of the essential goods needed at the initial stage of industrialization cannot be domestically produced and low income countries lack sufficient foreign currencies for the purchase of these capital goods and services. Thus a foreign aid flow would bridge this gap between the required and actual investment which would cause economic growth. However, Chenery and Strout also argued that improvements of institutions and human skills are required in addition to filling those two gaps since the relationship between aid and growth is not simply automatic or mechanic. (Riddell 2007) This "two-gap" model based on Harrod-Domar growth theory, as Easterly (1999) argues, played an important role in the aid-growth literature and became a guideline for organizations like the UN and the World Bank or many donors when calculating the aid requirements for developing countries. Recently, Bacha (1990) added a third gap, "fiscal constraint", which is argued to limit the growth prospects of the highly indebted group of developing countries emphasizing the impact of foreign transfers on the potential GDP growth rate and on the rate of inflation of the debtor country.

During the 1990s, the Ramsey-Cass-Koopmans (RCK) model, or simply the Ramsey model, has been widely used in the theoretical literature on aid effectiveness. David Cass (1965) and Tjalling Koopmans (1965) independently modified the neoclassical framework of the Solow growth model using a mathematical version of Frank Ramsey's 1928 paper and endogenized the savings rate. In the RCK model, consumers are represented by a single forward looking agent who provides labour to firms and consume output using the wages earned. Thus a welfare

analysis is introduced in addition to the endogenization of the interest rate and saving and the theory is based on microeconomic foundations. Here the capital stock accumulation is determined by the interaction of utility maximizing households and firms in competitive markets.

Boone (1996), Obstfeld (1999), Tornell and Lane (1999) and Dalgaard and Hansen (2001) are some of the scholars who used an RCK framework for their theoretical models. Boone (1996) examines the aid effectiveness within a modified RCK model and looks at the fungibility issues. In this model, he argues, if the government uses the aid inflow to fund tax cuts, it may stimulate productivity which would increase the return on investments. Obstfeld's model (1999) uses an analysis of aid effectiveness in a standard infinite horizon and Uzawa-Lucas model. He suggests a method for systematically studying the effects of resource inflows which are not different from any other increase in income, and base it on a standard optimal growth model modified for consistency with key empirical macro relations.

Dynamic growth models used in aid effectiveness literature can be mainly categorized as descriptive and optimizing approaches in regard to their assumptions about the savings behavior. The descriptive approaches, where a linear function of income determines the savings rate, include Harrod-Domar and Solow growth models, and they are mechanical in nature and the implications are for a given fixed savings rate. On the other hand, the optimizing approaches derive the savings rate from the intertemporal choices of the economic agents where utility is maximized over different periods. The growth models based on optimizing approaches differ according to the nature of the objective function and can be generally categorized as a representative agent (RA) model and an overlapping generations (OLG) model. There are some key differences between the representative agent model and overlapping generations model. The representative agent model assumes a single intertemporal objective function for the whole

economy. All agents are identical and live infinitively. The overlapping generations model, however, assumes a series of heterogeneous agents with finite lifetimes, even though the economy goes on forever (Eaton, 1989). Chatterjee, Giuliano and Kaya (2007) uses a representative agent model to find an explanation for the "missing link" between foreign aid and its effectiveness and Dalgaard, Hansen and Tarp (2004) develop a simple two-period endogenous growth version of the overlapping generations model where aid enters as a pure transfer.

CHAPTER 4

DEVELOPMENT AID TO AGRICULTURE AND ECONOMIC GROWTH

4.1. Introduction

The link between foreign aid and economic growth has been a hotly debated issue visited by many scholars. Thus far, a consensus has not been reached and results from the theoretical and empirical studies are mixed. The most commonly cited factors for aid failure are corruption (Svensson 2000), aid fungibility (Chatterjee et al. 2007) and/or weak institutional quality (Burnside and Dollar 2000) in the recipient countries. In addition to these common factors associated with recipient countries, aid allocation by donor countries based on political, strategic and historical ties (Alesina and Dollar 2000; Kuziemko and Werker 2006) rather than the need of the recipient countries is also frequently cited as a reason for aid failure.

Scholars who argue that aid is effective in generating growth (Rosenstein-Rodan 1961; Chenery and Strout 1966; Papanek 1973; Hadjimichael et al. 1995; Dalgaard and Hansen 2001; Hansen and Tarp 2000, 2001; Dalgaard et al 2004) state that more development aid is needed to pay for global public goods, provide sufficient humanitarian relief, achieve the Millennium Development Goals, and for the take off of developing countries. They believe that foreign aid helps less developed countries to grow and, in the absence of foreign aid, their situation would be worse. Additionally, while some researchers acknowledge the lack of strong empirical support for the effectiveness of aid, they supply evidence for the positive effect of foreign aid on economic growth contingent on political stability, strong and sound structural and/or institutional

conditions (Isham et al 1995; Burnside and Dollar 2000, 2004; Kudlyak 2002; Collier and Dehn 2001; Collier and Dollar 2002; Islam 2003; Pettersson 2007).

Researchers who are skeptical about the effectiveness of aid (Griffin and Enos 1970; Bauer 1972; Mosley 1980; Singh 1985; Boone 1994, 1996; Shan 1994; Easterly 1999; Brumm 2003; Easterly et al 2004; Rajan and Subramanian 2005; Subramanian 2007) argue that although the amount of aid increases year after year²⁰, most less developed countries, especially the ones in Africa, are still struggling with poverty. They argue that aid money undermines the economic transformation necessary for sustainable growth and enriches corrupt government officials or elites, and that there is no significant relationship between aid and growth.

Although there are a considerable number of empirical and theoretical studies suggesting aid ineffectiveness in increasing economic growth and reducing poverty, we should be cautious about this conclusion since we have seen a lot of success stories as well. Aid has been particularly successful in some countries such as in Botswana, China, India, Indonesia, Mozambique, Poland, Republic of Korea, and Uganda (Wolfensohn 2002; Radelet 2006). The Green Revolution can also be cited as an accomplishment since aid was used as the main instrument to transfer technology and knowledge such as the introduction of new seeds and fertilizers from rich countries to poor countries. Moreover, aid helped to provide better and more accessible health services, supplying essential medicines and providing emergency relief following natural disasters like the Asian Tsunami in 2004 (Levine et al 2004; Radelet 2006).

Factors such as corruption, weak institutional quality and/or aid allocation decisions based on strategic and political considerations that arise within recipient and donor countries have been cited as possible reasons for aid ineffectiveness. However, research findings of aid

²⁰ Net disbursements from Development Assistance Committee(DAC) countries to aid recipients is equal to US\$103 billion as of 2007.

ineffectiveness may be also due to issues related to modeling and measuring aid effectiveness rather than an actual lack of impact of aid (Clemens et al. 2004).

Aid effectiveness literature follows two main streams. Earlier studies mostly focused on the effect of aggregate aid on overall economic performance. Later studies concentrated on the effect of aid given to specific sectors on aggregate and sectoral economic performance as detailed sectoral aid data became available from bilateral and multilateral aid agencies.

Following the latter strand of literature, where aid is disaggregated, we focus in this study on the effectiveness of one particular type of aid, agricultural aid, on economic growth.

In the next section of the paper, we will present a theoretical background for the empirical model. Then we will review some of the aid effectiveness literature that focuses on specific sectors in section 3. Section 4 will focus on presentation of our model and the estimation technique. Section 5 will present our results and lastly, conclusions will be laid out in section 6.

4.2. A Theoretical Background for the Empirical Model

There are some key channels for aid to stimulate growth. Foreign aid is a vital component for a successful breakthrough to sustained growth mostly via human and physical capital formation, increased savings and/or investment and technological innovation (such as the introduction of new seeds and fertilizers in the Green Revolution). Aid also increases worker productivity through investments in sectors as health, education, environment by providing better and more accessible health services, introducing new medicines and other health technologies, increasing life expectancy and the level of education and directly improving people's lives (Levine et al 2004; Radelet 2006).

Hansen and Tarp (2000) categorizes aid and growth literature into three generations. The theoretical framework for the first generation studies was mostly based on the Harrod-Domar

growth model and Chenery and Strout (1966) two-gap model. In this generation of studies, foreign aid was perceived as an exogenous increment to the physical capital stock and caused growth via changing savings and investment.

The second generation studies focused on the link between aid and growth via both direct and indirect linkages. They argued that this link can be indirect via increased investment, or direct via reduced form equations. Capital accumulation is still the key for economic growth in this generation of studies and in addition to the Harrod-Domar growth model, a simple Solow growth model was used as a theoretical background in these studies.

The third generation of aid effectiveness studies was mainly based on modified neoclassical or endogenous growth theory. There are four main contributions to the aid effectiveness literature from this generation of studies. The first one is that most of these studies use cross sectional time series data with large numbers of years and countries. Secondly, they are mainly based on the endogenous growth theory accompanied by new analytical techniques. Scholars started to include proxies for macroeconomic policies, exogenous factors and structural reforms as determinants of economic growth in the reduced form growth regressions in addition to the standard macroeconomic variables controlling for time and country effects. Third, the endogeneity between aid and growth (or policy and aid) was addressed in most studies and appropriate econometric techniques, such as instrumental variable or dynamic panel data models were used to control for the bias that would result from this problem. Lastly, the relationship between aid and growth was treated as non linear by including a squared aid term and/or interaction between aid and policy variables.

A modified neoclassical growth model used by Hansen and Tarp (2000) provides the analytical framework for this study. Accordingly, income growth per worker can be expressed as

$$g_{yt} = \beta_0 + \beta_1 \log(i_t) - \rho \log(y_0)$$

where g is per worker income growth, i and y_0 represent investment and initial income respectively and β and ρ are the estimated parameters. Investment can be expressed as

$$i_t = \varphi_0 + \varphi_1 s_t + \varphi_2 a_t$$

where s is the savings ratio, a is the aid inflow and φ are the estimated parameters. The growth equation can be linearized by a first-order Taylor approximation after aid and savings are inserted and we get

$$g_{yt} = \tilde{\beta}_0 + \frac{\beta_1 \varphi_1}{\bar{i}} s_t + \frac{\beta_1 \varphi_2}{\bar{i}} a_t - \rho \log(y_0)$$

$$\bar{i} = \varphi_0 + \varphi_1 \bar{s} + \varphi_2 \bar{a}$$

where \bar{i} , \bar{s} and \bar{a} represent the average investment rate, savings ratio and aid inflow, respectively.

This linearized expression was typically estimated by instrumental variable or least square techniques and used by authors such as Mosley (1980), Mosley et al (1987), Levy (1988) and Boone (1996). However, Hansen and Tarp (2000, 2001) and Dalgaard and Hansen (2001) used a second-order Taylor approximation which would yield a more precise reduced form with quadratic and interaction terms.

$$g_{yt} = \tilde{\beta}_0 + 2 \frac{\beta_1 \varphi_1}{\bar{i}} s_t + 2 \frac{\beta_1 \varphi_2}{\bar{i}} a_t - \frac{1}{2} \frac{\beta_1 \varphi_1^2}{\bar{i}^2} s_t^2 + \frac{1}{2} \frac{\beta_1 \varphi_2^2}{\bar{i}^2} a_t^2 - \frac{\beta_1 \varphi_1 \varphi_2}{\bar{i}^2} s_t a_t - \rho \log(y_0)$$

Savings in this reduced form equation can be substituted either by government and private investments or by policy and institutional variables.

4.3. Aid for Development

A primary emphasis in this empirical study is accounting for heterogeneity in the types of aid given in terms of the scope of aid's intended use. When we look at aid purpose classification provided by donors, we can see that not all aid is given for development purposes. For example, aid given for humanitarian purposes to address an emergency or for political and strategic considerations cannot be expected to affect the productive capacity of a country in the same way as aid targeted directly to enhancing production efficiency. Apodaca and Stohl (1999), Alesina and Dollar (2000), Kuziemko and Werker (2006) and Burnside and Dollar (2004) are among scholars who argue that aid is not always distributed to the neediest countries and other factors may be important determinants of the aid allocation decision. Apodaca and Stohl (1999) argue that a state's human rights record may affect the amount of U.S. bilateral aid it receives whereas Alesina and Dollar (2000) find evidence that donor's decision on the allocation of foreign aid is guided by political and strategic considerations as much as the economic needs and policy performance of the recipient countries. Kuziemko and Werker (2006) provide statistical evidence that there is a strong relationship between the amount of aid received from the United States and United Nations and holding a seat on the U.N. Security Council. Burnside and Dollar (2004) argue that in the 1990s, donors' decision on the allocation of aid to underdeveloped countries were in favor of those with better institutional quality, a targeting that could potentially increase the effectiveness of aid.

Some recent studies investigated the possibility that the effect of different kinds of aid may be of importance for understanding the macroeconomic effect of aid in aid recipient countries. Owens and Hoddinott (1999) look at the consequences of alternative relief and development interventions (relief assistance directed to agricultural extension and increased

holdings of capital stock) on the well being of households in rural Zimbabwe and find that the wealth is increased by these kinds of aid more than by humanitarian aid. Mavrotas (2002) uses program, project, and technical assistance aid to India and finds a negative relation between these types of aid and growth. However Mavrotas (2003) finds that while project and food aid have a negative impact on growth, and on other macroeconomic variables, program aid and technical assistance have a positive impact in the case of Uganda. Clemens et al. (2004) divide aid into three categories which are emergency and humanitarian, long-impact, and short-impact aid and look at the effect of short-impact aid on economic growth. They find that short-impact aid has a strong, positive and statistically significant effect on growth and their results are robust to various specifications. Gomanee et al. (2005), restrict their analysis to a sample of Sub Saharan Africa countries and measure the total effect of aid on growth excluding types of aid that are unlikely to have any medium term impact on growth (e.g. technical assistance). Cordella and Dell'Araccia (2007) focus on budget support and project aid, and find that while project aid is preferable when recipients have little own resources and developmental preferences that are far apart from those of the donor, budget support is preferable when recipients have relatively large own resources and preferences relatively close to those of the donor. Pettersson (2007) could not find any evidence suggesting that non-fungible aid works better than fungible aid in his empirical model of aid effectiveness and growth. He also finds non-fungible aid to be welfare improving. However, he states that his results turned out not to be robust to small changes in the empirical model.

We would like to contribute to the existing studies that disaggregate the aid variable to look at its effect on economic growth by focusing on the effect of foreign aid directed to the

agricultural sector. We will do this by providing an empirical investigation of whether foreign aid given to the agricultural sector has a significant effect on economic growth.

Research relating economic growth and poverty reduction has found that overall economic growth has had less impact on poverty reduction than growth in the agricultural sector, to some extent due to the high level of poverty in rural areas of developing countries. Thus, the agricultural sector can be viewed as the “engine of growth” at the early stages of development and a sustainable rapid transition out of poverty requires raising productivity in this sector (Johnston and Mellor 1961; Haggblade and Hazell 1989; Timmer 1988, 2002, 2005; Ravallion and Datt 1999, 2001; Lucas and Timmer 2005). Growth in the agricultural sector increases overall growth (Johnston and Mellor 1961; Ranis and Fei 1961; Matsuyama 1992; Thirtle et al 2001; Gollin et al 2002; Timmer 2002, 2005; Tiffin and Irz 2006) and agricultural growth is causally prior to growth in the other sectors and industrial development (Rangarajan 1982; Kanwar 2000; Kogel and Furnkranz-Prskawetz 2000; Irz and Roe 2000). The mechanism for a successful structural transformation into an industrialized economy from an agricultural oriented one requires the agricultural sector to provide food, labor, and even savings for urbanization and industrialization. Although this process causes a decline in the relative weight of agricultural sector in the overall economy, the industrial and service sectors grow faster because of this modernized agricultural sector that leads to a migration of rural work force to the other sectors.

Despite this suggested link between growth originating from the agricultural sector, sustainable long run growth and poverty reduction, the total share of official development assistance allocated to the agricultural sector has fallen during the past three decades. According to Millennium Development Goals (MDG 8), adopted by 192 United Nations members in 2000, developing countries share responsibility to pursue poverty reduction and good governance and

developed countries should support the efforts of developing countries by increasing the amount of aid and improving aid's effectiveness (Table A2). However, the volume of aid to agriculture decreased by almost two thirds in real terms between 1980 and 2006, with the steepest decline occurring in the late 1980s and the 1990s. Over the same period, total Official Development Assistance (ODA) provided by all donors increased more than 50%. Aid to agriculture represented 17% of total ODA in the early 1980's and by the end of the 1990's it fell to 8%. In 2006, agricultural aid represented about 4% of total ODA. Thus this decline in the share of aid to agriculture could have serious consequences by limiting agricultural growth especially in regions where improvements are needed most.

4.4. Empirical Model and the Estimation Procedure

A Barro type growth regression on panel data was used for the empirical analysis. We disaggregated the aid variable into several categories, including aid given to the agricultural sector, to investigate the response of growth in income per capita to changes in sector-specific foreign aid. We use a panel of 66 countries over the 1975-2003 period²¹ for the empirical model. Our panel consists of four year averaged annual data for all the variables following Burnside and Dollar (2000), Dalgaard and Hansen (2001) and Clemens et al. (2004). No specific selection method was adopted for the countries included in this study. Rather, it was the availability of the data that determined the panel. The following specification is estimated:

$$\frac{\dot{y}_{i,t}}{y_{i,t}} = \alpha + \beta \ln y_{i,t} + \delta agra_{i,t} + \varphi (agra_{i,t})^2 + \theta X_{i,t} + \varepsilon_{i,t}$$

$$agra_{i,t} = \Psi Z_{i,t} + \epsilon_{i,t}$$

²¹ The list of aid-recipient countries used in the sample is provided in Table 4.4.

where $\frac{\dot{y}_{i,t}}{y_{i,t}}$ represents growth in income per capita in country i at time t (superscript dot represents the derivative with respect to time), α , β and θ are the estimated parameters, $\ln y_{i,t}$ represents initial income per capita, $agraid_{i,t}$ measures aid given to the agricultural sector, $X_{i,t}$ is a set of controls that represent country characteristics in the literature, θ and Ψ are vectors of estimated parameters, $Z_{i,t}$ is a vector of exogenous instruments (i.e., $Z_{i,t}$ is not correlated with the error term $\varepsilon_{i,t}$), and $\varepsilon_{i,t}$ and $\epsilon_{i,t}$ are white noise. A squared aid term is included to capture the nonlinear relationship between agricultural aid and growth where aid may be subject to diminishing returns²².

We used the Generalized Method of Moments (GMM) estimation technique to investigate the sensitivity of growth in income per capita to changes in sector-specific foreign aid. We adopted this technique over least squares (OLS) due to possible endogeneity of the aid variable. Endogeneity of the aid variable has been an issue in the aid effectiveness literature for two major reasons. One is related to possible reverse causation, where the amount of aid is determined by the past growth performance. Specifically, aid might be endogenous if donors allocate more resources to countries with poor growth performances. The other concern is related to simultaneous causation, where an omitted variable may affect both aid and growth variables. For these reasons, the choice of econometric technique should be able to provide consistent estimators in the presence of endogenous explanatory variables and country specific effects and we use generalized method of moments estimation technique to overcome this problem.

To test whether aid is indeed endogenous, we performed a Durbin-Wu-Hausman type (DWH) test and it failed to reject the null hypothesis that aid is exogenous for growth. This indicates that ordinary least squares (OLS) estimates do not deviate significantly from

²² Following Burnside and Dollar (2000), Dalgaard and Hansen (2001), Hansen and Tarp (2000, 2001), Dalgaard et al. (2004), Lensink and White (2001), Clemens et al. (2004).

Instrumental Variable (IV) estimates. However, as Hansen and Tarp (2001) argue, we cannot conclude that aid is exogenous simply on this basis. They claim that both OLS and IV estimators are inconsistent in this case and that implies that the test statistics are not tests of endogeneity of aid in the growth regressions. There might be two reasons for the inconsistency of these estimators. First one is that the IV estimator works under the assumption that the exogenous variables are not correlated with the error term in the model so there cannot be any country specific unobserved effects apart from country specific variations in the explanatory variables. Thus the IV estimator is inconsistent here because country specific effects are correlated with the initial level of income. Secondly, if there is a correlation between these country specific effects and the policy variables used in the model, the IV estimator would be inconsistent again. For these reasons, the choice of econometric technique should be able to provide consistent estimators in the presence of endogenous explanatory variables and country specific effects and we use Generalized Method of Moments estimation technique to overcome this problem.

We employed a cross-sectional time series (panel data) framework for our empirical analysis. There are some advantages of using panel data growth regressions. First of all, it allows us expand the sample information. By increasing the number of observations, the number of degrees of freedom also increases and this enables larger models to be tested. Although we get the main evidence from the cross sectional variation, the time series variation within a country provides additional information such as terms of trade and inflation that varies significantly over time within countries (Barro 1996). Moreover, in a panel data framework, we can control for unobserved changes over time that affect all countries as well as controlling for time-invariant unobserved differences by including time and country dummies.

We use the following dependent variable: annual gross domestic product (GDP) per capita growth rate. The data on GDP per capita growth rate are from the World Bank's World Development Indicators (WDI) 2007 CD-ROM.

The main explanatory variable in this analysis is the amount of foreign aid given for agricultural purposes. However, we include aid given to other sectors as well to compare the results. We use two aid datasets for the analysis. The first is from the Food and Agriculture Organization of the United Nations (FAO)²³, and the second is from the Organisation for Economic Co-operation and Development's (OECD) Development Assistance Committee (DAC) International Development Statistics (IDS) online database from its Creditor Reporting System (CRS). These data cover bilateral and multilateral donors' aid and other resource flows to developing countries and countries in transition. The CRS report presents sectoral and geographical information on aid and it shows commitments. The FAO data consists of aggregated data for external assistance to agriculture for all recipients by bilateral and multilateral donors for all purposes including research and extension and rural development and infrastructure. The data provided refers to ODA only (that do meet the ODA criteria²⁴) and the aid flows are concessional (includes loans and grants but contains grant element of at least 25%).

The control variables for the growth regressions follow the examples from previous prominent literature and include initial GDP per capita, a squared aid variable, dummy for East Asia, an index of institutional quality from the International Country Risk Guide (ICRG), annual

²³ I would like to thank Mohamed Barre from FAO for providing me the data for foreign aid given to the agricultural sector.

²⁴ Official development assistance is defined as flows to countries on the DAC List (www.oecd.org/dac/stats/daclist) and to multilateral institutions for flows to ODA recipients which are:

- i. provided by official agencies, including state and local governments, or by their executive agencies; and
- ii. each transaction of which:
 - a. is administered with the promotion of the economic development and welfare of developing countries as its main objective; and
 - b. is concessional in character and conveys a grant element of at least 25 per cent

inflation rate, budget balance, Sachs-Warner trade openness indicator, location in the tropics, log of life expectancy and civil war.

The initial GDP per capita, inflation rate, life expectancy, and population data are extracted from the World Bank's World Development Indicators (WDI) 2007 CD-ROM. Budget balance variable is taken from World Bank's World Development Indicators 2003 CD-ROM. ICRG indicator, Sachs-Warner trade openness indicator, arms import and the location in the tropics variables are obtained from Roodman's extended "Anarchy of Numbers" dataset (Roodman 2004). Civil war²⁵ and policy²⁶ variables are constructed according to the Clemens et al. (2004) and Burnside and Dollar (2000) specifications, respectively.

Initial GDP per capita in logarithmic form is used to allow for conditional convergence among countries in our sample. The neoclassical growth model predicts a negative coefficient for initial GDP per capita. The squared aid variable is included to capture the nonlinear relationship between agricultural aid and growth where aid is subject to diminishing returns.

Budget balance, inflation rate and Sachs-Warner trade openness are included to capture the policy environment of the developing countries. Sachs-Warner trade openness dummy classifies an economy as closed if it has an average tariff rate exceeding 40%, non-tariff barriers covering more than 40% of imports, a socialist economic system, a state monopoly of major

²⁵ Clemens et al. (2004) constructed a dichotomous variable using information from the Correlates of War 2 (COW2) database (Meredith Reid Sarkees [2000], "The Correlates of War Data on War: An Update to 1997", *Conflict Management and Peace Science* 18 [1]: 123-144) and the Peace Research Institute, Oslo (PRIO) Armed Conflict Database (Nils Petter Gleditsch, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg and Håvard Strand [2002], "Armed conflict 1946-2001: A new dataset," *Journal of Peace Research* 39 [5]: 615-637). Thus according to Clemens et al. (2004), the following were considered catastrophic civil wars likely to influence national economic growth: AFG2-5, AGO1-5, AGO5-6, BDI5-7, BIH5-6, COG6-7, COL4-7, DZA5-7, ETH1-5, GNB7-7, GTM2-3, IRN2-4, IRQ1, IRQ3-6, KHM1-5, LBN1-5, LBR4-6, LKA4-7, MMR3-6, MOZ2-5, NIC2-5, PER3-6, RWA6-6, SDN3-7, SLE5-7, SLV2-5, SOM3-6, TCD2-4, TJK5-6, UGA2-4, ZWE1-2 and I use the same classification modified according to the time periods used in this study.

²⁶ A linear combination of the three policy variables are used to construct the policy variable. These are budget balance, Sachs-Warner openness variable and inflation variables. Weights are determined according to the method by Burnside and Dollar (2000).

exports or black market premium exceeding 20%. The inflation rate is used as a proxy to measure monetary policy and budget balance variable is used as a proxy for fiscal policy.

A dummy variable for Egypt is included to control for the aid given to that country especially by the United States, to support the Camp David peace accords with Israel, and US policies in the region since 1970s. East Asia²⁷ and location in the tropics dummy variables are used to control for regional differences. Including a unique intercept for East Asian countries is important because data show that recent growth rates in East Asia have been surprisingly high. Moreover location in the tropics requires a closer investigation as well because in the empirical work, aid seems to be less effective for countries in the tropics. Dalgaard et al (2004) argue that there might be two possible interpretations for this finding. The first one is that climate may affect productivity directly because it is important when determining how effective individual countries are in combining capital and labor to produce output and many of these countries are reliant on agricultural production (Bloom and Sachs 1998; Gallup et al 1999; Sachs 2001, 2003; Masters and McMillan, 2001). The second reason for this finding may root from the influence of climatic circumstances on the evolution of other slow-moving structural characteristics such as institutions (Hall and Jones, 1999; Acemoglu et al, 2001; Easterly and Levine, 2003).

The ICRGE indicator, published in Political Risk Group's IRIS III dataset, is used to account for institutional quality where an average of corruption in government, bureaucratic quality and rule of law (law and order tradition) indicators are used to construct it. Life expectancy and population variables are used as a proxy for health conditions and the country size respectively. Finally, period dummies are used to control for the unobserved changes over time.

²⁷ The countries included in the East Asia dummy variable are China, Indonesia, South Korea, Malaysia, Philippines, Singapore and Thailand.

In their studies, Burnside and Dollar (2000), Hansen and Tarp (2000, 2001), Dalgaard et al.(2004), and Clemens et al. (2004) expressed their concerns about the endogeneity problem causing bias between foreign aid and growth variables. To minimize the effect of this problem, they use lagged values of aid and other policy and social indicator variables of the recipient country as instruments in their regression analysis. In an attempt to reduce the effect of this problem on the results, we used lagged values of the instruments (including lagged aid variables) for the aid variables. Since lags of an endogenous variable are exogenous (at time t , past values are fixed which means they are pre-determined), we hope to minimize the endogeneity problem.

Aid and aid squared are instrumented throughout the paper by exogenous independent instruments following Hansen and Tarp (2001) and Clemens at al. (2004) unless specified. These instruments include a dummy for Egypt, lagged arms imports, a lagged policy index and its square (formed according to the specification provided by Burnside and Dollar 2000), the natural logarithm of population interacted with policy, initial GDP per capita and its square interacted with policy, lagged aid variables (aid and aid squared) and their interaction with policy.

4.5. Results

The main results from the statistical estimation are presented in Table 1 where growth is regressed on agricultural aid. The only aid variable used in these regressions is aid directed to the agricultural sector because we believe that it has some possibility of affecting growth. Other types of aid variables will be included in Table 2 to compare the results.

Table 1 reports the results from OLS, IV and GMM estimations for comparison. Starting from regression 1 in column 1, the coefficient on agricultural aid is significantly different from zero. In the first and third column of Table 1, average growth in real GDP per capita is regressed on agricultural aid, agricultural aid squared, and initial GDP per capita using ordinary least

squares and instrumental variables techniques so that it is possible to see the results and evaluate the impact of treating aid as endogenous. Even though GMM method is used for our core regressions in this study, the results from the IV estimation technique (columns 4.1 and 4.2) are also presented in Table 1 since it has been used by most scholars in the aid effectiveness literature.

Column 5.1 of Table 1 presents the core results where the coefficient on agricultural aid is significantly different from zero. However, the presence of some influential observations may bias our results by causing overestimation or underestimation of the coefficients. Countries included in the core regression are graphed in Figure 1 for agricultural aid and GDP per capita growth and we can indeed see that there are a few influential observations in our dataset for agricultural aid (India) and GDP per capita growth (Democratic Republic of Congo). Therefore four outliers²⁸ are excluded from the core the regressions for a robustness check and the results are presented in the final column (Column 5.2) of Table 1. Removing these outliers leads to an increase in the coefficient of aid that is still significant at the 10% level. Except for the loss of significance on the squared aid term, which shows the diminishing returns, all other coefficients remain statistically significant at the same levels.

Hansen's J statistic is a test of overidentifying restrictions and it is used to test the null hypothesis of no correlation between the instruments and the observed residuals. Hansen's test fails to reject the null hypothesis in all regressions in both Tables 1 and 2. A rejection would have cast doubt on the validity of the instruments.

The expected signs for some of the coefficients have roots in the traditional growth theory. Having an open economy according to Sachs-Warner trade openness indicator, a high number for the ICRG index, being in East Asia and longer life expectancy are all associated with

²⁸ They are: India (1974-1977, 1978-1981, 1982-1986), and Democratic Republic of Congo (1990-3).

growth. Having a current catastrophic civil war, location in the tropics and high inflation rates are associated with slower growth. In our results, we confirm that having an open economy, a higher score for the ICRG index, being in East Asia and longer life expectancy are positively and statistically significantly correlated with growth. As expected, location in the tropics and high inflation rates are negatively and statistically significantly correlated with growth. A current civil war is negatively correlated with growth whereas lagged civil war is positively correlated with growth though only the latter is statistically significant in Table 1. Most right-hand side variables are statistically significant and they jointly explain about 44% of the variance in growth rates.

The average level of agricultural aid in our sample was \$105 million, and aid was measured in tens of millions of dollars in our analysis. Using the estimates of aid impact from the GMM model without the 4 outlier observations, a country with the average level of aid would have a per capita GDP growth rate that is .76 percentage points higher than a country receiving zero agricultural aid over the four year period, *ceteris paribus* ($.0766*10.5 - .0004*10.5^2$). Increasing aid by \$10 million from the average would increase growth by .08 percentage points.

For the next step, we classified foreign aid into three more categories following Chatterjee et al. (2007): social infrastructure aid, investment aid, and non-investment aid. In their paper, Chatterjee et al. create social-infrastructure aid by using aid to social infrastructure and services in the CRS database. They define investment aid as the sum of economic infrastructure aid and aid to the production sector where agricultural aid is included. In this study, we divided the investment aid category into two as well; agricultural aid and investment aid that does not include aid to the agricultural sector. The remaining components in the aid dataset are used to construct the non-investment aid category. This step is especially important not only to test the robustness of our results because omitting other subcategories of aid may cause bias on the

coefficient of agricultural aid due to omitted variable bias, but also to make a comparison of the effect of aid in different subcategories. By only including agricultural aid in Table 1, we implicitly assumed that the effects of other aid types on growth are restricted to zero. In their paper, Chatterjee et al. (2007) theoretically argue that when foreign aid is fungible, the equilibrium growth rate is independent of foreign aid and its allocation, and their empirical results support this prediction. Thus it would not be unreasonable for us to restrict the effect of other aid types to zero. However, we relax this assumption now and present the results in Table 2.

The effect of subcategories of aid on economic growth is presented in Table 2. All regressions are estimated using the GMM method with the outliers removed. Specifications with various combinations of aid subcategories are presented in columns 1 to 7. The results still indicate a positive and statistically significant relationship between growth and agricultural aid which supports the validity of results from the restricted model in Table 1.

Agricultural aid's coefficient is significant and positive in all columns through 1 to 7 in Table 2. In column 7, all four aid categories are included. One difference to note when we compare the results with Table 1 is that the coefficient on the agricultural aid category is larger when different aid subcategories are used. Using the estimates from Table 2, we can see that the effect of average agricultural aid ranges from 1.2 to 2 percentage point increase in growth relative to zero aid. If there is an increase of 10 million dollars in agricultural aid, this additional increase in aid at the mean would produce an additional 0.2 percentage points in average annual growth. As we can see here, agricultural aid's impact on growth is more than double of our results in Table 1 where the effect of aid subcategories are restricted to zero. However, the standard errors of the coefficients also increase in the presence of aid subcategories in Table 2.

The increase in the standard errors, thus, might be due to the high correlation between agricultural and investment aid (0.78) and/or between investment and social infrastructure aid (0.76).

The effects of other aid subcategories are not significantly different from zero in all but two columns in Table 2. However, aid given to social infrastructure and services (which includes aid given to support the education, health, population policies, water supply and sanitation and government and civil society sectors) becomes negatively and statistically significantly correlated with growth in two of the regressions out of four in which it was used (columns 2 and 5). This result might be due to the fact that almost all aid in this category can be considered as aid that would affect growth over a longer time period. Thus it would require a more detailed investigation and caution us when suggesting policy recommendations regarding this subcategory of aid.

All other signs for the explanatory variables are as expected at the traditional significance levels. As in Table 1, having an open economy according to Sachs-Warner trade openness indicator, a high number for the ICRG index, being in East Asia, recovering from a past civil war and longer life expectancy are positively and statistically significantly correlated with growth. On the other hand, location in the tropics and high inflation rates are negatively and statistically significantly correlated with growth. Having a current catastrophic civil war was not statistically significant in any of the regressions in Table 1; however, it becomes significant in all but one column in Table 2.

4.6. Conclusions

The link between foreign aid and economic growth has been a controversial issue. A consensus has not been reached yet and results from theoretical and empirical studies are mixed.

However the lack of consensus on the effect of foreign aid on economic growth may be due to various reasons. This study argues that one of the reasons might be that not all aid is given for development purposes and it would not be surprising to see that aid given for humanitarian reasons or emergency relief, for example, does not promote growth in the short run. However, if aid is directed to the agricultural sector of the developing countries, it might affect economic growth over a four year period since most of the poor in the developing world depend on agriculture for their livelihood. Our empirical model supports this view and we find that aid given to the agricultural sector is positively and significantly related to growth. Using the estimates of aid impact, a country with the average level of aid would have a per capita GDP growth rate that is .76 percentage points higher than a country receiving zero agricultural aid over the four year period, *ceteris paribus*. Increasing aid by \$10 million from the average would increase growth by .08 percentage points. When different aid subcategories are included in the estimation procedure, the coefficient on the agricultural aid gets larger and the average effect of agricultural aid ranges from 1.2 to 2 percentage point increase in growth relative to zero aid. An increase of 10 million dollars in agricultural aid at the mean would produce an additional 0.2 percentage point growth over the four year period. These results are robust to different specifications.

Our results from this study do not suggest that aid given for investment and/or consumption purposes is ineffective. Rather, we believe that the agricultural sector of a developing country requires more attention because the agricultural sector can be viewed as the “engine of growth” at the early stages of development. Thus, aid given for developmental purposes might be directed to this sector at the early stages of development, and this might represent a path for a sustainable transition out of poverty.

Table 4.1. The Effect of Agricultural Aid on Economic Growth

	Dependent variable: GDP per capita growth						
	(1) OLS	(2) OLS	(3) 2SLS	(4.1) 2SLS	(4.2) 2SLS without outliers	(5.1) GMM	(5.2) GMM without outliers
Agricultural aid	0.0740452 (0.0214289)***	0.0765239 (0.0162207)***	0.1136996 (0.0319618)***	0.0736090 (0.0218385)***	0.0589736 (0.0494831)	0.0657201 (0.0192561)***	0.0766496 (0.0426254)*
Agricultural aid squared	-0.0003365 (0.0001120)***	-0.0003904 (0.0000814)***	-0.0005270 (0.0002105)**	-0.0003712 (0.0001298)***	-0.0000784 (0.0007125)	-0.0003342 (0.0001118)***	-0.0004124 (0.0006283)
Log initial GDP per capita	0.7387752 (0.2456851)***	0.0513515 (0.3659354)	1.3874085 (0.2873530)***	-0.1765093 (0.3733449)	-0.2202111 (0.4271856)	-0.2575987 (0.3086066)	-0.1407834 (0.3660142)
East Asia		1.1541562 (0.6216512)*		1.3178117 (0.5774888)**	1.3003391 (0.5429126)**	1.6709107 (0.4145277)***	1.4765687 (0.4628499)***
Institutional quality		0.3115295 (0.1323859)**		0.5910041 (0.1304016)***	0.5682621 (0.1161339)***	0.5145072 (0.0926446)***	0.5318836 (0.0949331)***
Inflation		-2.3467500 (0.4311392)***		-2.1346606 (0.3626904)***	-1.8149952 (0.3578108)***	-2.0243552 (0.2868708)***	-1.8990213 (0.3181818)***
Budget balance		-0.0064153 (0.0221920)		-0.0101368 (0.0177534)	-0.0059015 (0.0207851)	-0.0179830 (0.0128222)	-0.0126739 (0.0144803)
Trade openness		1.7704535 (0.4782859)***		1.4192333 (0.4343862)***	1.5147614 (0.4464324)***	1.2898184 (0.3447764)***	1.2990264 (0.3626078)***
Location in the tropics		-0.9808850 (0.3983707)**		-1.2552424 (0.3631713)***	-1.2754430 (0.3751902)***	-1.4358824 (0.3316724)***	-1.3771021 (0.3390919)***
Log initial life expectancy		2.8231300 (1.5775461)*		2.7970742 (1.4113700)**	2.6662187 (1.7027917)	3.2905659 (1.3412128)**	2.8770875 (1.4354060)**
Civil war		-1.0173996 (0.9407898)		-0.8218429 (0.9356469)	-0.9461343 (0.9837969)	-1.1894525 (0.8341664)	-1.2089645 (0.8414796)
Lagged civil war		1.6533300 (0.8313792)*		1.5844698 (0.7612635)**	1.5470752 (0.9328177)*	1.6925186 (0.7027708)**	1.7099588 (0.6460345)***
Constant	-3.2634145 (1.8169201)*	-9.8439653 (4.6735324)**	-10.2665188 (2.3048990)***	-12.8343052 (3.9942419)***	-11.8526124 (4.6482849)**	-13.5795766 (3.8936671)***	-12.9769232 (4.0346871)***
Observations	715	354	344	278	273	278	273
R-squared	0.10	0.40	0.22	0.47	0.45	0.46	0.44
Uncentered R-squared			0.30	0.53	0.52	0.52	0.51
Influential outliers removed	no	no	no	no	yes	no	yes
Period dummies	yes	yes	yes	yes	yes	yes	yes
Hansen j statistic			0.015	0.48	0.61	0.48	0.68

Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4.2. The Effect of Sectoral Foreign Aid on Economic Growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agricultural aid	0.1698904 (0.0574636)***	0.2080118 (0.0569302)***	0.1243038 (0.0647657)*	0.1939304 (0.0603611)***	0.1862532 (0.0640209)***	0.1388766 (0.0642945)**	0.1383855 (0.0696934)**
Agricultural aid squared	-0.0015118 (0.0006811)**	-0.0021816 (0.0006898)***	-0.0013092 (0.0009160)	-0.0017250 (0.0006330)***	-0.0017904 (0.0008685)**	-0.0011208 (0.0008594)	-0.0010274 (0.0008135)
Investment aid	-0.0177201 (0.0191824)			-0.0103440 (0.0304160)		-0.0251563 (0.0140440)*	0.0017668 (0.0228319)
Investment aid squared	-0.0000574 (0.0001252)			-0.0001159 (0.0001317)		0.0000146 (0.0000807)	-0.0000761 (0.0001139)
Non-investment aid			-0.0086355 (0.0179844)		0.0385181 (0.0292558)	0.0050585 (0.0198716)	0.0254717 (0.0317930)
Non-investment aid squared			0.0000277 (0.0000853)		-0.0001179 (0.0001178)	0.0000070 (0.0000898)	-0.0000716 (0.0001264)
Social infrastructure aid		-0.0689787 (0.0299972)**		-0.0310481 (0.0389883)	-0.1391368 (0.0386780)***		-0.0829704 (0.0525156)
Social infrastructure aid squared		0.0004848 (0.0002879)*		0.0003026 (0.0003296)	0.0010220 (0.0003091)***		0.0006082 (0.0004232)
Initial GDP pc	-0.3998304 (0.3680958)	-0.0842774 (0.4065669)	-0.2469871 (0.3646481)	-0.2643740 (0.3927429)	0.0094358 (0.4109903)	-0.4034267 (0.3392381)	-0.2756000 (0.4000832)
East Asia	2.0645049 (0.4051692)***	1.3694306 (0.4206292)***	1.4161561 (0.3995286)***	2.0132259 (0.6451501)***	1.4209416 (0.4288528)***	2.0283521 (0.5206872)***	1.5994351 (0.6423788)**
Institutional quality	0.4755774 (0.0836593)***	0.3887706 (0.0852346)***	0.4832145 (0.1027469)***	0.3910243 (0.0785346)***	0.4209917 (0.0877764)***	0.4437114 (0.0954911)***	0.3885194 (0.0849622)***
Inflation	-1.6255827 (0.3761014)***	-1.4532115 (0.3708729)***	-1.4486811 (0.3763222)***	-1.5917051 (0.3737134)***	-1.5121627 (0.3634170)***	-1.3949982 (0.3644769)***	-1.4095696 (0.3974582)***
Budget balance	-0.0190240 (0.0166807)	-0.0072278 (0.0200334)	-0.0210578 (0.0169950)	-0.0081838 (0.0232469)	-0.0217044 (0.0199910)	-0.0214021 (0.0158906)	-0.0105886 (0.0227782)
Trade openness	1.0367869 (0.4192069)**	1.2153044 (0.4163674)***	1.1354787 (0.4106232)***	1.1630943 (0.4187868)***	1.0952299 (0.4115723)***	1.1511444 (0.4006895)***	1.0776665 (0.4044844)***
Location in the tropics	-1.7208566 (0.3573354)***	-1.4797755 (0.3727048)***	-1.4288728 (0.4207510)***	-1.7911497 (0.3771542)***	-1.1967772 (0.4173358)***	-1.4326645 (0.4103317)***	-1.2596663 (0.4451903)***
Log initial life expectancy	4.8791349 (1.8732795)***	3.9101444 (1.8427177)**	3.8649997 (2.0344373)*	4.4268621 (1.8278582)**	4.0715258 (2.0237495)**	4.7632901 (2.0698893)**	5.1306616 (2.1177435)**
Civil war	-1.8311159 (0.6888424)***	-1.5184952 (0.7064519)**	-1.8013719 (0.8001766)**	-0.7946649 (0.5109394)	-0.9406000 (0.7151782)	-1.7310429 (0.6881512)**	-1.0116064 (0.4922402)**
Lagged civil war	1.9379819 (0.5939281)***	1.9644925 (0.5960385)***	1.9313000 (0.5775495)***	1.4149749 (0.5888220)**	1.8040516 (0.5744656)***	1.7089138 (0.5708597)***	1.5217886 (0.5557660)***
Constant	-18.5549843 (5.9975888)***	-16.6141498 (5.6956003)***	-15.6444396 (6.4037866)**	-17.2422624 (5.7224705)***	-17.9801902 (6.3485873)***	-17.6876700 (6.6433775)***	-19.7434682 (6.9271458)***
Observations	186	179	186	179	179	186	179

Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4.3. Countries Included in the Core Regression

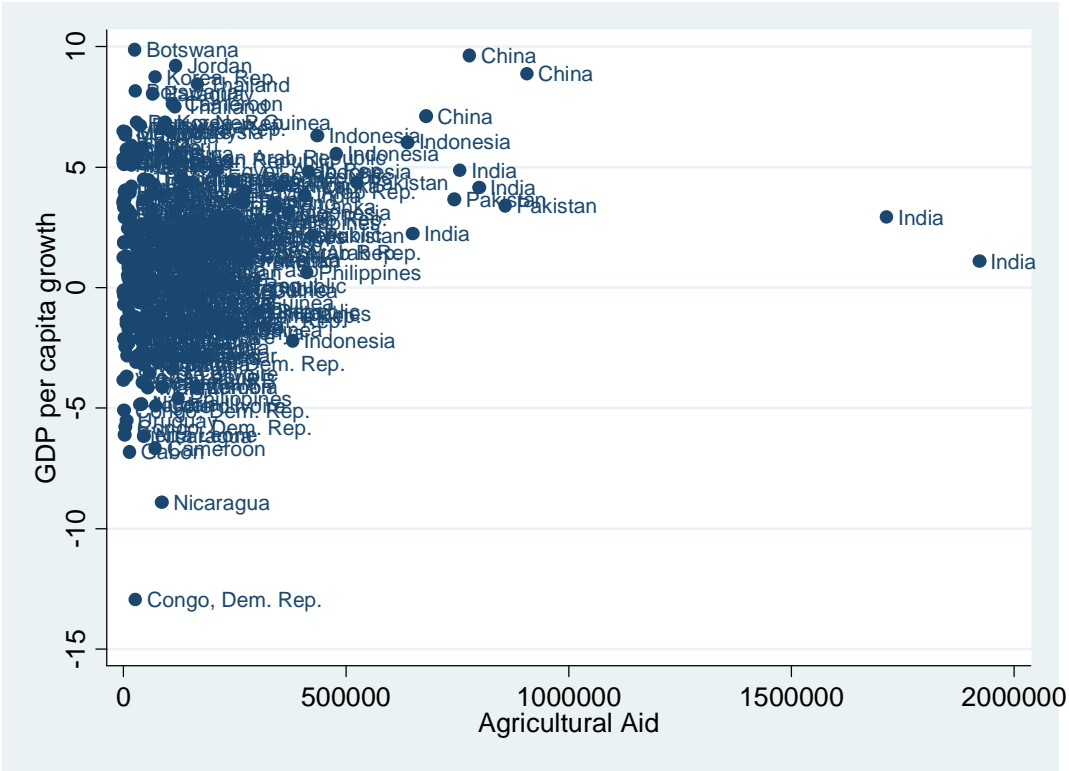


Table 4.4. List of Recipient Countries Included in Our Panel Data

Algeria	Argentina	Bolivia	Botswana	Brazil	Bulgaria
Burkina Faso	Cameroon	Chile	China	Colombia	Congo Dem. Rep.
Congo Rep	Costa Rica	Cote D'Ivoire	Cyprus	Czech	Dominican Republic
Ecuador	Egypt	El Salvador	Ethiopia	Gabon	Gambia
Ghana	Guatemala	Haiti	Hungary	India	Indonesia
Iran	Jamaica	Jordan	Kenya	Korea	Madagascar
Malawi	Malaysia	Mexico	Morocco	Nicaragua	Niger
Nigeria	Pakistan	Papua New Guinea	Paraguay	Peru	Philippines
Poland	Romania	Senegal	Sierra Leone	Singapore	South Africa
Sri Lanka	Syria	Thailand	Togo	Tunisia	Turkey
Uganda	Uruguay	Venezuela	Zambia	Zimbabwe	

CHAPTER 5

DOES AGRICULTURAL AID REDUCE POVERTY?

5.1. Introduction

There are some key channels for aid to stimulate development. These channels can act via increased economic growth and/or reduced poverty rate. The theoretical and empirical literature on foreign aid mostly emphasized on its effect on economic growth. Foreign aid is a vital component for a successful breakthrough to sustained growth mostly via human and physical capital formation, increased savings and/or investment and technological innovation (such as the introduction of new seeds and fertilizers in the Green Revolution). Aid also increases worker productivity through investments in sectors as health, education, environment by providing better and more accessible health services, introducing new medicines and other health technologies, increasing life expectancy and the level of education and directly improving people's lives (Levine et al 2004; Radelet 2006). Though, scholars mostly concentrated on the link between aid and growth to assess aid's effectiveness, the link between foreign aid and poverty reduction is another aspect of its effect on development.

According to Millennium Development Goals (MDG 8), adopted by 192 United Nations members in 2000, developing countries share responsibility to pursue poverty reduction and good governance and developed countries should support the efforts of developing countries by increasing the amount of aid and improving aid's effectiveness (Table A2). According to FAO, a sustained reduction in hunger is only possible with special emphasis on agricultural and rural

development. However, the volume of aid to agriculture decreased by almost two thirds in real terms between 1980 and 2006, with the steepest decline occurring in the late 1980s and the 1990s. Over the same period, total Official Development Assistance (ODA) provided by all donors increased more than 50%. Aid to agriculture represented 17% of total ODA in the early 1980's and by the end of the 1990's it fell to 8%. In 2006, agricultural aid represented about 4% of total ODA.

The exclusion of the agriculture from the poverty reduction agenda during 1990s may be an important factor associated with this decline in aid to the agricultural sector which could have serious consequences by limiting agricultural growth especially in regions where improvements are needed most. Research focusing on poverty reduction has found that the agricultural sector can be viewed as the “engine of growth” at the early stages of development. Due to high level of poverty in rural areas of developing countries, a sustainable rapid transition out of poverty requires a special emphasis on the agricultural sector (Johnston and Mellor 1961; Haggblade and Hazell 1989; Timmer 1988, 2002, 2005; Ravallion and Datt 1999, 2001; Lucas and Timmer 2005).

We argue that since the agricultural sector of a developing country is the “engine of growth” that might lead to a sustainable rapid transition out of poverty, foreign aid given to the agricultural sector might affect the welfare of the poor both directly and indirectly. We would like to contribute to the existing studies relating aid to poverty reduction by disaggregating the aid variable and provide an empirical investigation of whether foreign aid given to the agricultural sector has a significant effect on the welfare of the poor.

In the next section of the paper, we will focus on aid's effect on poverty. Section 3 will present our model, the estimation technique and the data. Section 4 will present our results and lastly, conclusions will be laid out in section 5.

5.2. Aid and Its Effect on Poverty

Mosley et al. (2004) argue that the total effect of aid (A) on poverty (P) can be characterized as a combination of its direct effect, its effect on growth or income per capita (Y) and its effect on policy (Φ)

$$\frac{dP}{dA} = \frac{\delta P}{\delta A} + \frac{\delta P}{\delta Y} \left[\frac{\delta Y}{\delta A} + \frac{\delta Y}{\delta \Phi} \frac{\delta \Phi}{\delta A} \right] + \frac{\delta P}{\delta \Phi} \frac{\delta \Phi}{\delta A}$$

The term in the brackets has been the hotly debated issue among many scholars where the link between foreign aid and economic growth is investigated. However for the purpose of this study, we will mainly focus on the remaining terms following Mosley et al. (2004)²⁹.

The first term is pretty straightforward. However, as Mosley et al. (2004) argue, identifying the terms in the 'policy vector' that can influence poverty is an issue that requires closer attention since policy variables emerging from aid-growth regressions are highly controversial (such as the policy variables -budget deficit, inflation and openness- used by Burnside and Dollar, 2000, or the World Bank Country Policy and Institutional Assessment (CPIA) score used by Collier and Dollar 2001; 2002). Accordingly, they propose using the composition of public expenditure as a policy instrument instead, arguing that it impacts the livelihoods of the majority of people, it can be changed relatively quickly and it is easier to manipulate in the interests of the poor (Mosley et al. 2004; Van de Walle and Nead, 1995). Thus following Gomanee et al. (2003) and Mosley et al. (2004), we construct an overall measure of pro-poor expenditure (PPE index) and use it as a policy measure in our statistical analysis. We

²⁹ Kaya et al (2009) focus on this part by using an empirical investigation on the effect of foreign aid given to the agricultural sector and its effect on growth.

will, then, investigate the direct and indirect effect of sectoral aid through the policy variable on poverty alleviation.

5.3. Empirical Model and the Estimation Procedure

For our analysis, we disaggregated the aid variable into several categories, including aid given to the agricultural sector, to investigate the response of the poverty indicator to changes in sector-specific foreign aid. We classified foreign aid into four categories following Kaya et al. (2009) and Chatterjee et al. (2007): agricultural aid, social infrastructure aid, investment aid, and non-investment aid. In their paper, Chatterjee et al. (2007) create social-infrastructure aid by using aid to social infrastructure and services in the CRS database. They define investment aid as the sum of economic infrastructure aid and aid to the production sector where agricultural aid is included. Following Kaya et al. (2009), we divided the investment aid category into two as well; agricultural aid and investment aid that does not include aid to the agricultural sector. The remaining components in the aid dataset are used to construct the non-investment aid category.

We use a panel of developing countries over the 1975-2003 period³⁰ for the empirical analysis. Our panel consists of annual data for all the variables. No specific selection method was adopted for the countries included in this study. Rather, it was the availability of the data that determined the panel. The following specification is estimated:

$$P_{i,t} = \alpha + \beta y_{i,t} + \gamma Aid_{i,t} + \varphi PPE_{i,t} + \theta X_{i,t} + \varepsilon_{i,t}$$

where $P_{i,t}$ represents the poverty indicator in country i at time t , α , β , γ , φ and θ are the estimated parameters, $y_{i,t}$ represents income per capita, $Aid_{i,t}$ measures sector specific aid, $X_{i,t}$ is a set of controls that represent country characteristics which consists of inequality, the degree

³⁰The list of aid-recipient countries used in the sample is provided in Table 4.4.

of urbanization and population growth rate, and $\epsilon_{i,t}$ is white noise. All variables except the Gini coefficient are used in logarithms.

As argued previously, aid might affect the poverty indicator indirectly through the policy variable (PPE index) by influencing the composition of the pro-poor expenditure. So we can specify the pro-poor expenditure as a function of aid as follows:

$$PPE_{i,t} = \tau + \xi Aid_{i,t} + \Psi y_{i,t} + \zeta Z_{i,t} + \epsilon_{i,t}$$

where $PPE_{i,t}$ represents the pro-poor expenditure in country i at time t , τ , ξ , Ψ , and ζ are the estimated parameters, $y_{i,t}$ represents income per capita, $Aid_{i,t}$ measures sector specific aid, $Z_{i,t}$ is a set of controls and $\epsilon_{i,t}$ is white noise. To solve this simultaneity problem, we estimated the poverty equation with different specifications and used the two-step generalized method of moments (GMM) estimation technique.

We used the two-step Generalized Method of Moments (GMM) estimation technique to investigate the sensitivity of poverty indicator to changes in sector-specific foreign aid and PPE index. We adopted this technique over least squares (OLS) due to possible endogeneity of the public expenditure and aid variables. The two-step efficient GMM estimation technique should be able to provide consistent estimators in the presence of endogenous explanatory variables and country specific effects.

In their studies, Gomanee et al. (2003) expressed their concerns about the endogeneity problem causing bias between foreign aid and poverty variables because more aid might be allocated to poorer countries. To minimize the effect of this problem, they use lagged values of aid variables of the recipient country as instruments in their regression analysis. In an attempt to reduce the effect of this problem on the results, we also used lagged values of the aid variables following Hansen and Tarp (2000, 2001) and Gomanee et al. (2003). Since lag of an endogenous

variable is exogenous (at time t , past values are fixed which means they are pre-determined), we hope to minimize the endogeneity problem.

Data

We use the poverty headcount ratio at \$1 a day (corrected for purchasing power) as our dependent variable for the poverty indicator. The data on poverty headcount ratio are from the World Bank's World Development Indicators (WDI) 2007 CD-ROM.

The main explanatory variables in this analysis are sector specific foreign aid (especially aid given for agricultural purposes) and the pro-poor expenditure (PPE) indices. Detailed explanations on how to construct the PPE categories are included under a separate heading below. As for the aid variable, we use two aid datasets for the analysis. The first is from the Food and Agriculture Organization of the United Nations (FAO), and the second is from the Organisation for Economic Co-operation and Development's (OECD) Development Assistance Committee (DAC) International Development Statistics (IDS) online database from its Creditor Reporting System (CRS). These data cover bilateral and multilateral donors' aid and other resource flows to developing countries and countries in transition. The CRS report presents sectoral and geographical information on aid and it shows commitments. The FAO data consists of aggregated data for external assistance to agriculture for all recipients by bilateral and multilateral donors for all purposes including research and extension and rural development and infrastructure. The data provided refers to ODA only (that do meet the ODA criteria) and the aid flows are concessional (includes loans and grants but contains grant element of at least 25%). All aid data refers to aid as a share of GDP.

GDP per capita is used to control for the level of development among countries in our sample and is extracted from the United Nations' Statistics Division website³¹. We expect a negative coefficient for GDP per capita in the poverty equation and positive coefficient in the expenditure equation. GINI coefficient is used as a proxy to capture the effect of inequality on poverty, annual population growth rate is used as a proxy for country size and urban population as a percentage of total population is used to control for the level of urbanization. Gini coefficient is obtained from World Bank Development Research Group's PovcalNet Online Poverty Analysis Tool website³² and the population data are from the World Bank's World Development Indicators (WDI) 2007 CD-ROM.

Constructing the PPE Indices

Following Gomanee et al. (2003), we estimated a simple regression of poverty indicator on GDP per capita, each government expenditure type and regional dummies representing Sub-Saharan Africa, East Asia, Central America, Middle East and transition economics. The results from these regressions will help us identify which government expenditure types are more effective on alleviating poverty and accordingly, we can construct a PPE index to estimate the elasticity of poverty indicator to each type of public expenditure. The results are presented in Table 5.1.

The expenditure types we use in these regressions include government expenditure on education, health, social security and welfare including housing and amenities, defense, recreational, cultural and religious affairs, economic affairs and services (which already includes agricultural expenditure) and agriculture. The expenditure data are obtained from IMF's

³¹ <http://unstats.un.org>

³² <http://go.worldbank.org/NT2A1XUWP0>

Government Financial Statistics (GFS) yearbooks and World Bank's World Development Indicators (WDI) 2007 CD-ROM.

The results in Table 5.1 show that higher income levels are associated with lower headcount poverty ratios for each expenditure type. Expenditures on education, health and economic affairs and services (which include agricultural expenditure) have a negative and significant effect on headcount poverty ratio. Agricultural expenditure by itself is also decreasing the headcount poverty ratio but the result is not statistically significant. Most right-hand side variables are statistically significant and they jointly explain about 60% of the variance in headcount poverty ratio.

Based on these results, we included education, health and economic affairs and services expenditure categories to construct two different PPE indices. The first one is an unweighted index:

$$PPE_{unweighted} = P_e + P_h + P_{es}$$

where

P_e represents public expenditure on education (% of GDP)

P_h represents public expenditure on health (% of GDP)

P_{es} represents public expenditure on economic affairs and services (% of GDP)

However, this index implies that the effect of each expenditure category is uniform on headcount poverty ratio. Thus, to check the robustness of our results, we also use a weighted PPE index constructed from the beta coefficients. Beta coefficients are obtained from the regression analysis performed on expenditure variables that have been standardized so that they

have variances of 1. They are mostly used in statistical analysis to see which independent variables have the greater effect on the dependent variable³³.

$$PPE_{beta\ coefficient} = 0.1597 P_e + 0.1948 P_h + 0.2737 P_{es}$$

In addition to these two indices, a third PPE index is constructed from a regression analysis where the poverty indicator is regressed on the expenditure categories following Mosley et al. (2004). Table 5.2 reports the results for that approach. As presented, public expenditure on education, health, social security and welfare including housing and amenities, and economic affairs and services (which includes agricultural expenditure) are significant determinants of poverty headcount ratio. However, the coefficient on health expenditure is positive here contrary to our previous findings. Mosley et al. (2004) argue that since the health expenditure category presents ambiguous results and ‘refuses to behave’, it would be better to omit it in the construction of the PPE index. We follow the same route and construct the PPE index as follows:

$$PPE_{regression} = 0.27 \log P_e + 0.23 \log P_{ss} + 0.48 \log P_{es}$$

where

P_e represents public expenditure on education (% of GDP)

P_{ss} represents public expenditure on social security and welfare including housing and amenities (% of GDP)

P_{es} represents public expenditure on economic affairs and (% of GDP)

5.4. Results

The main results from the statistical estimation are presented in Tables 6 and 7. The first three columns (1, 2 and 3) of Table 5.4 show the results where headcount poverty ratio is regressed on PPE indices and thus capture the indirect effect of sectoral aid variables. In these

³³The standardized beta coefficients represent how many standard deviations the dependent variable would change given a one standard deviation change in an independent variable (An Introduction to Modern Econometrics using Stata, Page 80, Christopher F. Baum, 2006)

regressions, agricultural aid, social infrastructure aid, investment aid, and non-investment aid variables are used to estimate the PPE indices in the first step and for the second step, PPE indices are used to estimate the headcount poverty ratio.

The results from the first stage of these regressions are presented in Table 5.3. These results suggest that a higher income per capita increases the share of pro-poor public expenditure. When we look at the coefficients on the aid variables, we find that social infrastructure and investment aid categories are not significant determinants of pro-poor expenditure. On the other hand, agricultural and non-investment aid variables promote pro-poor expenditure and they are both statistically significant in all columns.

In Table 5.4, the results from the second stage are presented. They confirm that, different classifications of pro-poor expenditure variables are negatively and significantly correlated with poverty headcount ratio, as expected. The coefficients on pro-poor expenditure variables range from 0.8 to 0.9 stating that a 1 percentage point increase in pro-poor expenditure's share in GDP will result in about 0.9 percentage point decrease in the percent of population living at \$1 a day. Columns 4 and 5 of Table 5.4 show results where we estimated the poverty equation by only using foreign aid given to the agricultural sector and alternative PPE indices constructed by using only expenditure categories for education and health. Other sectoral aid variables are not used in these regressions because those aid categories might be highly correlated with these expenditure types. We expect no correlation between aid given to the agricultural sector and these new PPE indices and we confirm that expectation when we look at the correlation between these variables (correlation between agricultural aid and PPE index is 0.005 in column 4 and 0.0003 in column 5). We also use the each individual expenditure data instead of a PPE index in column 6 of Table 5.4 to check for the robustness of our results. The results show that agricultural aid variable is

also effective directly on the poverty alleviation. The agricultural aid coefficient is statistically significant through columns 4 to 6. The pro-poor expenditure indices are also significant but their coefficient is smaller than the estimates in columns 1 to 3. This result verifies our hypothesis that agricultural aid alleviates poverty both through increased agricultural public expenditure and through its direct effect. A 1 percentage point increase in agricultural aid's share in GDP will result in about 0.17 percentage point decrease in the poverty headcount ratio at \$1 a day. The agricultural aid variable's coefficient is almost the same in all these columns.

The level of urbanization is also associated with lower headcount poverty ratio. However this result is not robust to different specifications and is only significant in the first three columns (1, 2 and 3).

The relationship between income growth and poverty is represented by the percentage change in the poverty headcount ratio from a 1 percentage point change in GDP per capita. Our findings show that a 1 percentage point increase in income growth will reduce the poverty headcount ratio around 0.8 percentage point when agricultural aid's effect is measured indirectly through a PPE index and 1.5 percentage point when agricultural aid's effect is measured directly. These results are highly significant suggesting that poverty reduction is influenced by the development level of the countries and more developed countries are more successful in alleviating poverty.

Ravallion (1997) argues that the effect of income inequality on the poverty indicator will depend on how the income distribution varies over time and the specific measures of poverty. We find that a higher Gini coefficient which represents high inequality countries increases the level of poverty headcount ratio. This finding is consistent with the results of scholars who argue that the size of the poverty elasticity varies systematically with income inequality (Ravallion and

Sen, 1996; Ravallion, 1997; Hanmer et al., 1999; Hanmer and Naschold 2000) and higher inequality leads to a lower rate of poverty reduction at any given positive rate of growth (Ravallion 1997).

5.5. Conclusions

There are some key channels for aid to influence the welfare of the poor and these channels can act via increased economic growth and/or reduced poverty. The theoretical and empirical literature on foreign aid effectiveness mostly concentrated on its effect on economic growth implicitly assuming that only through increased economic growth, aid could affect the poverty levels of the developing countries. However, this is not the only channel for aid since total effect of aid on poverty can be characterized as a combination of its direct effect, its effect on growth and its effect on policy. For the purpose of this study, we mainly focus on the direct and indirect effect of sectoral aid especially aid to the agricultural sector on poverty reduction. We investigate the indirect effect of sectoral aid through a policy variable where an overall measure of pro-poor expenditure (PPE) index is constructed.

We are mainly focused on the relationship between aid given to the agricultural sector and poverty reduction because three of every four people living on less than US\$1 a day lived in rural areas as of 2002 and most of them depend on agriculture and related activities for their livelihood (WDR 2008). Thus, if aid is directed to the agricultural sector of the developing countries, it might target the welfare of the poor directly. Our empirical model supports this view and we find that aid given to the agricultural sector is effective in reducing poverty both directly and indirectly through the policy variable. We find that noninvestment aid is also effective on poverty reduction by increasing the level of the pro-poor expenditure.

Aid given to the investment and social infrastructure sectors do not appear to be significant determinants of policy variables in our results. Chatterjee et al. (2007) find strong evidence of fungibility for investment and social infrastructure aid so fungibility might be an explanation for this insignificant relationship. Another explanation might be related to the evaluation period for aid's effect. Aid allocated to the investment and infrastructure sectors would be expected to have an effect on poverty rates over a longer period whereas aid allocated to the agricultural sector might have a quicker and more direct effect on poverty especially since most of the poor reside in rural areas. Thus, our results do not suggest that aid given for investment and/or infrastructure purposes is ineffective on poverty reduction. Rather, we believe that the agricultural sector of a developing country requires more attention because the agricultural sector can be viewed as the "engine of growth" at the early stages of development. Therefore, aid given for developmental purposes might be directed to this sector at the early stages of development, and this might represent a path for a sustainable transition out of poverty.

Table 5.1. OLS Poverty Regressions to Determine PPE Weights

	Dependent variable : Poverty Headcount Ratio						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP per capita	-0.73283*** (0.08218)	-0.74934*** (0.10558)	-0.71944*** (0.08372)	-0.53225*** (0.05570)	-0.72262*** (0.09794)	-0.82591*** (0.08570)	-0.77245*** (0.09442)
Education expenditure	-0.24225* (0.13671)						
Social security and welfare inc. housing and amenities		-0.07511 (0.12088)					
Health expenditure			-0.15654* (0.09593)				
Military expenditure				-0.00986 (0.07049)			
Recreational, cultural and religious affairs expenditure					-0.05713 (0.07680)		
Economic affairs and services expenditure						-0.29703** (0.12119)	
Agriculture, forestry, fishing and hunting expenditure							-0.04473 (0.09299)
Sub-Saharan Africa	0.09042 (0.34759)	-0.24813 (0.29495)	-0.08679 (0.31176)	1.32762*** (0.13578)	-0.08464 (0.35546)	-0.13693 (0.29852)	-0.22058 (0.30841)
East Asia	0.13958 (0.22451)	-0.09806 (0.26800)	0.00034 (0.21515)	0.37425** (0.15349)	0.32567 (0.27382)	0.15038 (0.21228)	0.03192 (0.25911)
Central America	0.73316*** (0.25452)	0.52876** (0.23236)	0.77725*** (0.27435)	1.33978*** (0.11559)	0.55992** (0.24153)	0.50331** (0.21408)	0.53442** (0.23693)
Middle East	-0.88298*** (0.19919)	-1.13229*** (0.13560)	-1.04882*** (0.14273)	-0.77177*** (0.11779)	-1.02199*** (0.20760)	-0.97030*** (0.14936)	-1.10045*** (0.16860)
Transition economics	-0.75655*** (0.15763)	-0.72707*** (0.17429)	-0.66499*** (0.17044)	-0.54659*** (0.09037)	-0.71018*** (0.19605)	-0.50738** (0.21628)	-0.74706*** (0.21634)
Constant	6.19805*** (0.98421)	7.06472*** (1.09439)	6.33207*** (0.91433)	5.46733*** (0.53785)	6.70574*** (0.99629)	6.81059*** (0.65118)	7.24128*** (0.72021)
Observations	112	111	112	294	95	112	103
R-squared	0.60	0.61	0.60	0.69	0.60	0.62	0.58
Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%							
All variables measured in logs except for the regional dummies.							

Table 5.2. OLS Poverty Regression to Determine PPE Weights

Dependent variable : Poverty Headcount Ratio	
GDP per capita	-0.77220*** (0.09577)
Education expenditure	-0.26554** (0.13168)
Health expenditure	0.22473** (0.11221)
Social security and welfare inc. housing and amenities	-0.22780** (0.09535)
Economic affairs and services expenditure	-0.47747*** (0.10641)
Constant	5.02965*** (0.94410)
Observations	111
R-squared	0.53
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%	
All variables measured in logs.	

Table 5.3. The Results of First Stage from 2-Step GMM Regressions

	Dependent variables		
	Beta coefficient weighted PPE	PPE constructed from the OLS regression in Table 2	Unweighted PPE
GDP per capita	0.288646** (0.108025)	0.2800987 ** (0.1210128)	0.3239551 *** (0.11000)
Gini index	0.008623 (0.007839)	0.0070329 (0.0072025)	0.0099371 (0.0081492)
Urbanization	-0.44024*** (0.087084)	-0.188809* (0.113504)	-0.4525733*** (0.080651)
Population growth annual	0.392614** (0.184797)	0.0991371 (0.2027819)	0.4368375** (0.1881465)
Agricultural aid	0.072009*** (0.034748)	0.1020685*** (0.028895)	0.0591866 * (0.0338576)
Investment aid	0.007892 (0.026803)	-0.0107349 (0.0230765)	0.001131 (0.0299562)
Social infrastructure aid	-0.01029 (0.037033)	-0.0076035 (0.0251731)	-0.0020199 (0.0381)
Noninvestment aid	0.083947 (0.040796)	0.0793904* (0.0406656)	0.0988273 ** (0.0386472)
Constant	-5.08962*** (0.570468)	-4.771033*** (0.6089921)	-3.601591 *** (0.5733954)
Observations	75	74	75
R-squared	0.49	0.44	0.38
Robust standard errors in parentheses* significant at 10%; ** significant at 5%; *** significant at 1% All variables measured in logs except for Gini index.			

Table 5.4. 2-Step GMM Regressions with Agricultural Aid and PPE

	Dependent variable : Poverty Headcount Ratio					
	(1)	(2)	(3)	(4)	(5)	(6)
Agricultural aid				-0.17255*	-0.17377*	-0.17551*
				(0.10616)	(0.10541)	(0.09572)
Beta coefficient weighted PPE	-0.88284**					
	(0.40402)					
Unweighted PPE		-0.82775**				
		(0.40579)				
PPE from the OLS regression in Table 2			-0.82571**			
			(0.35406)			
Beta coefficient weighted PPE excluding economic affairs and services expenditure				-0.30564**		
				(0.15119)		
Unweighted PPE excluding economic affairs and services expenditure					-0.29469*	
					(0.15333)	
Education expenditure						-0.38009*
						(0.21467)
Health expenditure						-0.00059
						(0.23564)
Social security and welfare expenditure						0.14360
						(0.18418)
GDP per capita	-0.78150***	-0.77631***	-0.86554***	-1.13943***	-1.14403***	-1.16339***
	(0.13992)	(0.14549)	(0.12877)	(0.29833)	(0.29753)	(0.25919)
Gini index	0.03696***	0.03767***	0.03644***	0.03736***	0.03747***	0.03228**
	(0.01272)	(0.01290)	(0.01229)	(0.01311)	(0.01320)	(0.01433)
Urbanization	-0.60276**	-0.56690**	-0.29056*	-0.27311	-0.26629	-0.36906
	(0.23647)	(0.24408)	(0.16344)	(0.27474)	(0.27489)	(0.32635)
Population growth annual	0.29991	0.28073	0.05339	0.21008	0.20280	0.34974
	(0.32162)	(0.33484)	(0.25380)	(0.24912)	(0.25031)	(0.26349)
Constant	4.08184**	5.59464***	4.72734***	7.37999***	8.01364***	8.74447***
	(1.60901)	(1.10095)	(1.35986)	(1.69390)	(1.53384)	(1.64916)
Observations	75	75	74	82	82	81
Robust standard errors in parentheses* significant at 10%; ** significant at 5%; *** significant at 1%						
All variables measured in logs except for Gini index.						

Table 5.5. The UN Millennium Development Goals

The Millennium Development Goals (MDGs) are eight objectives that respond to the world's main development challenges to be achieved by 2015. The MDGs are drawn from the actions and targets contained in the Millennium Declaration adopted by 189 nations and signed by 147 heads of state and governments during the UN Millennium Summit in September 2000.

Goal 1: Eradicate extreme poverty and hunger.

Goal 2: Achieve universal primary education.

Goal 3: Promote gender equality and empower women.

Goal 4: Reduce child mortality.

Goal 5: Improve maternal health.

Goal 6: Combat HIV/AIDS, malaria and other diseases.

Goal 7: Ensure environmental sustainability.

Goal 8: Develop a Global Partnership for Development.

The eight goals are broken down into 18 quantifiable targets measured by 48 indicators. More information on the MDG can be found at <http://www.undp.org/mdg/basics.shtml>.

Table 5.6. Government Financial Statistics

Expenditure Classification	Source
82B. DEFENSE (B2)	IMF, GDF.
82C. EDUCATION (B4)	IMF, GDF.
82D. HEALTH (B5)	IMF, GDF.
82E. SOCIAL SECURITY & WELFARE (B6)	IMF, GDF.
82F. HOUSING & COMMUNITY AMENITIES (B7)	IMF, GDF.
82G. RECREATIONAL, CULTURAL, & RELIG AFFAIRS (B8)	IMF, GDF.
82H. ECONOMIC AFFAIRS & SERVICES (B9 TO B13)	IMF, GDF.
82HB. AGRI, FORESTRY, FISHING, & HUNTING (B10)	IMF, GDF.
82HC. MINING & MINERAL RESOURCES, MANUF, & CONSTRUCTION (B11)	IMF, GDF.
82HD. FUEL & ENERGY (B9)	IMF, GDF.
82HI. TRANSPORTATION & COMMUNICATION (B12)	IMF, GDF.
82HL. OTH ECONOMIC AFFAIRS & SERVICES (B13)	IMF, GDF.

CHAPTER 6

CONCLUSIONS

Foreign aid effectiveness has been a frequently visited and hotly debated issue by many scholars. One main reason for this interest can be the need for justification for giving aid. If official development assistance works, it would mean that the officials of the industrialized countries can reassure their constituents of the benefits of giving aid. Nonetheless, aid effectiveness studies mostly used aid's effect on stimulating economic growth and reducing poverty as a yardstick to check whether it works or not.

There are some key channels for aid to stimulate development and influence the welfare of the poor. These channels can act via increased economic growth and/or reduced poverty. The theoretical and empirical literature on foreign aid effectiveness mostly concentrated on its effect on economic growth implicitly assuming that aid could affect the poverty levels of the developing countries only through increased economic growth. However, this is not the only channel for aid since the total effect of aid on poverty can be characterized as a combination of its direct effect, its effect on growth and, its effect on policy. Foreign aid is a vital component for a successful breakthrough to sustained growth and poverty reduction mostly via human and physical capital formation, increased savings and/or investment and technological innovation. Aid also increases worker productivity through investments in sectors as agriculture, health, education, and environment by providing better and more accessible services, introducing new

technologies, increasing life expectancy and the level of education, and directly improving people's lives (Levine et al 2004; Radelet 2006).

Much of the research on aid effectiveness has focused on the effect of aggregate aid on general economic growth. This study focuses more specifically on the effect of agricultural aid on overall economic growth and poverty reduction. A primary emphasis in this study is accounting for heterogeneity in the types of aid given in terms of the scope of the aid's intended use. For example, aid given for humanitarian purposes, to address an emergency, or for political and strategic considerations cannot be expected to affect the productive capacity of a country in the same way as aid targeted directly to enhancing production efficiency. However, if aid is directed to the agricultural sector of the developing countries, it might affect economic growth and lead to increased welfare in the long run.

Our empirical models in this study support this view and we find that aid given to the agricultural sector is positively and significantly related to growth. Using the estimates of aid impact, a country with the average level of aid would have a per capita GDP growth rate that is 0.76 percentage points higher than a country receiving zero agricultural aid over the four year period, *ceteris paribus*. Increasing aid by \$10 million from the average would increase growth by 0.08 percentage points. When different aid subcategories are included in the estimation procedure, the coefficient on the agricultural aid gets larger and the average effect of agricultural aid ranges from 1.2 to 2 percentage point increase in growth relative to zero aid. An increase of 10 million dollars in agricultural aid at the mean would produce an additional 0.2 percentage point growth over the four year period. These results are robust to different specifications.

We then empirically investigate the effect of aid given to the agricultural sector on poverty reduction. We are primarily focused on the relationship between aid given to the

agricultural sector and poverty reduction because three of every four people living on less than US\$1 a day lived in rural areas as of 2002, and most of them depend on agriculture and related activities for their livelihood (WDR 2008). Thus, if aid is directed to the agricultural sector of the developing countries, it might also target the welfare of the poor directly. Our empirical model supports this view and we find that aid given to the agricultural sector is effective in reducing poverty both directly and indirectly through a policy variable (pro-poor expenditure). Our results confirm that aid affects the poverty rate through different types of pro-poor expenditures and that these expenditures are negatively and significantly correlated with poverty headcount ratio. The coefficients on pro-poor expenditure variables range from 0.8 to 0.9, meaning that a 1 percentage point increase in pro-poor expenditure's share in GDP will result in about 0.9 percentage point decrease in the percent of population living at \$1 a day. We, then, estimate the direct effect of aid on the poverty indicator by using foreign aid given to the agricultural sector and alternative pro-poor expenditure indices constructed to be uncorrelated with aid given to the agricultural sector. Our results show that the agricultural aid variable is also directly effective in poverty alleviation and the results are statistically significant. A 1 percentage point increase in agricultural aid's share in GDP will result in about 0.17 percentage point decrease in the poverty headcount ratio at \$1 a day. Thus agricultural aid alleviates poverty both through increased pro-poor public expenditures and through a direct effect.

Our results from this study do not suggest that aid given to other sectors or for other purposes are ineffective. Rather, we believe that the agricultural sector of a developing country requires more attention because the agricultural sector can be viewed as the “engine of growth” at the early stages of development. Accordingly, aid given for developmental purposes might be

directed to this sector at the early stages of development, and this might represent a path for a sustainable transition out of poverty.

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