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IMPACT OF FOREIGN AID TO AGRICULTURE IN REDUCING POVERTY IN
DEVELOPING COUNTRIES.

by

Richard Amoako

B.S., University for Development Studies, Tamale, 2014

A Thesis
Submitted in Partial Fulfillment of the Requirements for the
Master of Science Degree

School of Agricultural Sciences
in the Graduate School
Southern Illinois University Carbondale
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IMPACT OF FOREIGN AID TO AGRICULTURE IN REDUCING POVERTY IN
DEVELOPING COUNTRIES.

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Richard Amoako

A Thesis Submitted in Partial

Fulfillment of the Requirements

for the Degree of

Master of Science

in the field of Agribusiness Economics

Approved by:

Dr. Wanki Moon, Chair

Dr. Kishore Joseph

Dr. Akamani Kofi

Graduate School
Southern Illinois University Carbondale
May 3, 2024

AN ABSTRACT OF THE THESIS OF

Richard Amoako, for the Master of Science degree in Agribusiness Economics, presented on May 3, 2024, at Southern Illinois University Carbondale.

TITLE: IMPACT OF FOREIGN AID TO AGRICULTURE IN REDUCING POVERTY IN DEVELOPING COUNTRIES

MAJOR PROFESSOR: Dr. Wanki Moon

The effectiveness of foreign aid in reducing poverty has been a contentious issue in development economics. This paper focuses specifically on aid directed towards agriculture, a sector critical for rural livelihoods and poverty alleviation. It investigates the empirical relationship between agricultural aid flows and poverty levels in 46 developing countries between 1997-2020. Fixed effects panel regressions estimate models with the \$2.15/day (based on 2017 PPP) poverty headcount ratio as the outcome variable.

The key finding is that agricultural aid has a statistically significant poverty-reducing impact. The regression coefficients indicate that on average, a 1% increase in agricultural aid is associated with a 0.08-1.46% decrease in national poverty rates. This highlights the vital role of rural assistance for global poverty alleviation efforts. Furthermore, the results provide evidence that the poverty-lessening effects of agricultural aid strengthen with higher institutional quality. Beyond agricultural aid, the analysis also confirms past findings regarding the contribution of economic growth, government expenditure, and income inequality to poverty outcomes. Periods of GDP expansion, higher social spending, and more equitable income distributions are linked to falling poverty.

In conclusion, the paper argues for prioritizing foreign aid to agriculture and rural sectors based on their higher growth elasticities compared to other activities. Agricultural assistance helps raise smallholder productivity and rural wages. However, complementary institutional reforms may enable aid to realize more significant effects on the incomes of the extremely poor

over the long term. Targeted rural aid and economic governance initiatives should feature centrally in strategies for eradicating global extreme poverty.

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I would also like to thank my committee members, Dr. Kofi Akamani and Dr. Joseph Kishore, for their helpful insights and direction over the course of this endeavor. Their thoughtful questions and suggestions pushed me to deepen my understanding of the complex issues explored in this study.

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Finally, I would like to recognize my colleague graduate student and friends at the Southern Illinois University. Their support allowed me to fully dedicate time and energy to this research.

DEDICATION

This research paper is dedicated to my mother Comfort, who has always been the driving force behind my academic aspirations and an inspiration to me.

In addition, I would want to dedicate this thesis paper to Gerald, my employer, friend, coach, and mentor who has always believed in, supported, and helped me take on this task. And lastly, my undying love to you, Akua Amofa, my beautiful wife, and my darling son Hayden. Both gave me constant support and served as constant reminders of my skills.

TABLE OF CONTENTS

<u>CHAPTER</u>	<u>PAGE</u>
ABSTRACT.....	i
ACKNOWLEDGMENTS	iii
DEDICATION.....	iv
LIST OF TABLES.....	vi
LIST OF FIGURES	vii
CHAPTERS	
CHAPTER 1 – Introduction.....	1
CHAPTER 2 – Methodology.....	9
CHAPTER 3 – Results.....	19
CHAPTER 4 – Summary, Conclusion, Recommendation	24
REFERENCES	26
APPENDICES	
APPENDIX A – Aid Recipient Countries.....	35
APPENDIX B – Millennium Development Goals.....	36
VITA.....	37

LIST OF TABLES

<u>TABLE</u>	<u>PAGE</u>
Table 2.1- Statistical Summary of Variables Used in the Empirical Model.....	14
Table 3.1- Fixed Effect Estimation Results.....	20
Table 3.2- Aid Interaction with Institutional Qualities Estimation Results	22

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
Figure 2.1- Percentage of Agriculture Aid to Recipient Countries (in million USD)	15
Figure 2.2- Annual Aid to Agriculture Disbursed to Recipient Countries.....	16

CHAPTER 1

INTRODUCTION

According to the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee, aid is grants and concessional loans net of repayment of previous aid loans—a measure that considers loan forgiveness to be current aid. This is referred to as net Official Development Assistance (ODA), and it may be a practical measure of the actual transfer to liquidity-constrained governments. Aid can be used to rebuild post-conflict societies, respond to humanitarian emergencies, or support the aid giver's strategic or commercial interests.

Many studies and publications have resulted in debates about the effectiveness of aid on growth. Studies on the effectiveness of aid on economic growth began in the 1960s, 1970s, and 1980s but were drawn out and produced mixed results because they used different data, models, and estimation strategies by which aid would affect growth (Easterly, 2003). Burnside & Dollar (2000) paper gained attention because it addressed Boone's (1996) cynicism, which discovered that aid is financial consumption rather than investment. The debate over aid effectiveness has evolved from a simple question of whether or not foreign aid is effective in promoting economic growth in recipient countries (Dalgaard, Hansen, & Tarp, 2004; Easterly, 2003), to whether recipient countries' political regimes and institutions or governance play a significant role in determining aid effectiveness (Boone, 1996); Bräutigam & Knack, 2004; Feeny, 2007); or whether aid effectiveness is dependent on the soundness of policies in recipient countries (Burnside & Dollar, 2000).

The effectiveness of aid in poverty reduction has been grounded on the assumption that aid increases the growth rate per capita income and that a decrease in poverty accompanies

income growth (Mosley & Suleiman, 2006; Kaya, Kaya, & Gunter, 2013; Early & Scott, 2010). Aid directed to specific sectors with a disproportionate number of poor or aid that impacts policies focused on people experiencing poverty may be more effective in reducing poverty than aid that focuses on increasing economy-wide per capita GDP. This prompted another line of research into the role of foreign aid in poverty reduction (Collier & Dollar, 2002; (Mosley & Suleiman, 2006; Kaya, Kaya, & Gunter, 2013). Aid given for humanitarian purposes to address an emergency or for donors' political and strategic considerations, for example, should not be expected to reduce a country's poverty level in the same way that aid targeted directly to improving the lives of people experiencing poverty (Kaya et al., 2013).

The primary goal of this study is to examine and test the empirical impact of foreign aid to agriculture on poverty reduction using panel data of 46 developing countries that received aid from 1997 to 2020. In Kaya et al., (2013) view, foreign aid directed at agriculture may be more accurate in reducing poverty than any other type of development if agricultural development is more effective. This research will also examine the effects of aid flows on poverty rates in developing countries over time. The study's research question is: What is the impact of aid to agriculture on poverty reduction in aid-recipient countries? How has the trend in foreign aid flows affected poverty rates in developing countries over time? The poverty headcount ratio of \$2.15 per day was used to analyze poverty reduction (World Bank, 2017 PPP). This study updates and stretches Kaya et al., (2013) with new and updated datasets and adds more periods of the fixed effect of the variable.

This study hypothesizes that foreign aid flows to agriculture significantly impacts poverty reduction.

1.1 Overview of Poverty

Poverty is defined by the United Nations Development Program (UNDP) as "a deprivation of basic capabilities and choices that all human beings should have." The World Bank defines poverty as "pronounced deprivation in well-being," but the Oxford Poverty and Human Development Initiative (OPHI) describes it as "a multidimensional phenomenon that encompasses economic, social, and political dimensions." Income, multidimensional, and relative poverty are all ways to quantify poverty. In most cases, income poverty is characterized by a lack of money or resources to meet fundamental demands. Multidimensional poverty considers various criteria, such as health, education, and living level. Relative poverty is calculated by comparing one's income or level of life to the average income or standard of living in a particular community or region. According to the World Bank, as of 2021, approximately 9.2% of the world's population lives in severe poverty, earning less than \$1.90 daily. However, poverty rates may vary significantly by location and country.

1.2 Overview of Foreign Aid

Foreign aid, sometimes known as official development assistance, began distributing after World War II (Feeny, 2007). The donors' or providers' primary motivations for providing foreign aid include the goal of providing or fulfilling humanitarian needs, assisting poor countries to achieve economic growth and poverty eradication, bringing unity and solidarity, countries' political and economic strategic interests, long-term and short term commercial and trade interests, reinforcing historical background, and promoting and protecting human rights (Riddell, 2014). Foreign aid to recipient countries can be bilateral or multilateral. Bilateral aid has been described as transactions undertaken by a donor country directly with a developing country, including those with Non-Governmental Organizations (NGOs) active in development

and other internal development-related transactions on development awareness. Conversely, multilateral aid is transactions delivered only by an international institution conducting all or part of its activities in favor of development (Biscaye, Reynolds, & Anderson, Relative Effectiveness of Bilateral and Multilateral Aid on Development Outcomes, 2017). Foreign aid or grants come in different forms: improved inputs, innovation technology, capacity building, rehabilitation and construction of roads connecting farming communities to markets, credit to agribusinesses, and private sector investments. These are necessary to spur growth in the agricultural sector (Shaibu & Shaibu, 2022). Foreign aid acts as an income transfer (Burnside & Dollar, Aid, 2000) which may or may not produce growth. The outcome of the income transfer depends on how aid is used: is it invested so that domestic output can increase, or is it consumed?

1.3 Agricultural Growth and Poverty Reduction

With the world's population expected to reach 9 billion by 2050, as well as the COVID-19 pandemic and the Russia-Ukraine war, attention has shifted to the precise role of agriculture in economic development. The sector received much attention in 2008, when high food prices triggered a flurry of government interventions in agricultural markets worldwide. Farmers account for most of the world's poor and three-quarters of the population. Data from the World Bank reveals that Southeast Asia's (SEA) rural population has been declining since the mid-1990s (from 1.7 billion in 1995 to 884 million in 2021), in contrast to Sub-Saharan Africa's (SSA), which has been increasing (from 412 million in 1995 to 679 million in 2021). Africa's rural population will grow by 2.49 percent annually by 2050, while Asia's population will grow by 0.86 percent.

Dual economy models by Lewis, 1954 viewed agriculture as a backward, unproductive subsistence sector from which labor and resources were drawn to encourage the development of

a dynamic industrial sector, which resulted in an urban bias in development planning (Lipton & Ahmed, 1997). According to the Organization for Economic Cooperation and Development's (2006) report on investment priorities for rural development, rural regions are now directly competing with one another, posing new risks and opportunities. These factors include globalization, changes in public financing of the agriculture sector, and the emergence of significant non-farm niche markets. The report also viewed agriculture as no longer the backbone of most rural economies giving weight to the newly growing sectors such tourism, manufacturing, and energy production.

On the contrary, Johnston and Mellor (1961); Schultz (1951) argued the importance of agriculture to the growth of other sectors (especially in the early stages of development). In fact, substantial evidence shows that agricultural growth has significant aggregate effects in reducing global extreme poverty (Janvry & Sadoulet, 2009). The sector has been critical in promoting growth in non-agricultural sectors, primarily through structural transformation channels from low-level rural sector productivity to higher productivity in urban sectors (McArthur & McCord, 2017). It has also been reported that growth in agriculture has a more significant spillover effect on poverty reduction than growth in non-agricultural sectors, particularly in extreme poverty (Bresciani & Valdez, 2007). Due to the high level of poverty in developing country's rural areas, some papers even suggest that GDP growth has had less impact on poverty reduction than growth in the agricultural sector, despite the sector's contribution to total GDP in SSA being about 15% on the average (OECD-FAO, 2016).

Investment in agricultural development can come from foreign aid and public domestic investment, necessary to help farmers increase productivity. Development aid or grants can take many forms, including improved inputs, innovative technology, capacity building, road

rehabilitation and construction to connect farming communities to markets, credit to agribusinesses, and private sector investments. Foreign aid to the agriculture subsector (also called development flows to agriculture) totaled USD 14.7 billion in 2020, a 15.2 percent increase over 2019. In 2020, Africa received the most aid (41.8 percent), followed by Asia (30.9 percent) and the Americas (11.2 percent) (FAOSTAT, 2020). Farmers need formal credit to buy inputs like seeds, fertilizer, plant protection materials, animal feed, etc.

Given that agriculture contributes more than 4% of global GDP, total commercial credit to agriculture increased from 2.4% in 2016 to 2.9% in 2017. Agricultural producers face a negative bias in credit access. Agriculture received less than 3.5% of total credit in nearly half of the countries. Agriculture's share of total credit supply has increased slightly over the last decade, from 2.2% in 2006 to 2.9% in 2017. Agriculture's share of total credit in Latin America fell from 3.5% in 2007 to 2.1% in 2017. However, it did rise in Asia and the Pacific, Africa, and Europe, partly due to policy responses to the food price crisis in 2008. (FAOSTAT, 2018)

Agricultural productivity plays a crucial role in economic growth and has a huge effect on poverty reduction. By analyzing empirical data, Thirtle et al. (2003) showed that agricultural productivity growth has a substantial impact on poverty reduction, while productivity growth in industry and services does not. They revealed that a 1% increase in crop productivity reduces by over six million the number of people living under \$1 per day, with 95% of these people in Africa and Asia. Ravallion & Datt (1996) showed in India that a 1% increase in agricultural value added per hectare reduces poverty by 0.4% in the short run and 1.9% in the long run. Janvry and Sadoulet (2009) revealed that 1% of agricultural growth in China affects aggregate growth by 0.45%, whereas the indirect effect through the nonagricultural sector was half that amount. Christiansen et al. (2006) unveiled that the poverty elasticity of agriculture is 2.3 times

larger than that of the non-agriculture sector for low-income countries. Christiansen and Demery (2007) showed that 1% per capita agricultural growth reduces poverty by 1.6 times more than industry growth and three times more than growth in the service sector. Tomich, et al., (2019) demonstrated that between 1960 and 2010, a 1% increase in agricultural productivity in developing countries generated, on average, an increase of 1% in GDP per capita. Ivanic & Martin (2018) found that, in poor countries, increases in agricultural productivity generally have a more considerable poverty reduction impact than increases in industry or services. In the same tendency, Ligon & Sadoulet (2018) showed that growth due to agriculture is 3 – 4 times larger than if it was due to non-agricultural activities.

1.4 Foreign Aid, Economic Growth, and Poverty Reduction

Development aid since 1960 has proven to be effective. It is an influential factor of change for the most vulnerable populations as it has been premised on an agenda to help poor developing nations grow out of poverty. Nevertheless, aid has come with its challenges for developing countries. Two prominent areas of concern in recent economic development literature are the effectiveness of foreign aid on growth (Dollar & Burnside, 2000; Hansen & Tarp, 2001; Dalgaard & Hansen, 2001; Collier & Dehn, 2001; McGillivray et al., 2006; (Biscaye, Reynolds, & Anderson, 2016) and the impact of different types of aid on poverty in developing countries (Kaya et al., 2013; Mosley & Suleiman, 2007). From the literature, there is a very limited number of studies that attempt to address the relationship between foreign agricultural aid and agricultural growth, even though there is a vast literature on the effect of foreign aid in general on economic growth (Ssozi, Asongu, & Amavilah, 2019).

Despite massive foreign agricultural inflows, most developing countries' extremely poor continue to live in rural areas and as smallholder subsistence farmers. (Gollin et al., 2014). Similarly, there is substantial evidence that agricultural growth has significant aggregate effects

in reducing extreme global poverty. For example, in March 2002, *The Economist* rebuked then-U.S. Treasury Secretary Paul O'Neill for his skepticism about foreign aid because "there is now a strong body of evidence, led by the research of David Dollar, Craig Burnside, and Paul Collier, (all economists at the World Bank) that "aid does boost growth when countries have reasonable economic policies" (Easterly, 2003).

Currently, the center of gravity of expert opinion seems to settle around a slightly less optimistic thesis propagated by World Bank economists David Dollar, Craig Burnside, and Paul Collier: aid can help, but it should be concentrated on countries with good macroeconomic policy and governments genuinely committed to improving public services and infrastructure and stamping out corruption. Estimates by Dollar and Burnside (2000) suggest that 1% of GDP in aid given to a poor but well-managed country can increase its growth rate by a sustained 0.5%.

CHAPTER 2

METHODOLOGY

2.1 Model Specification

The general methodological approach of this research is cross-country fixed panel least square regressions of aid efficacy, with the dependent variable being an indicator of headcount rate of poverty (\$2.50 per day based on 2017 PPP). This study is valuable because it gives information on the influence of agricultural aid on poverty reduction, which is one of the Millennium Development Goals (MDG) 1 (eradicating extreme poverty and hunger). The inherent issue in attempting to analyze how effective help has been that many donors use a variety of aid instruments for varied purposes and with changing aims throughout time. It is critical to account for how agricultural aid might reduce poverty. Poverty alleviation has become a prominent policy aim for developing-country governments and the international community.

Over the last decade, there has been a significant amount of research on poverty metrics, drivers, and the impact of growth in poverty reduction. A considerable body of evidence demonstrating that growth and poverty reduction are positively connected (Danielson, 2001; Dollar & Kraay, 2002; Bigsten & Shimeles, 2004). Agricultural growth has long been considered as instrumental in reducing poverty for a variety of reasons (for example, Schultz, 1979). Rural poverty accounts for most of the total poverty in most developing nations, and agriculture is a significant source of income for impoverished rural households. Agriculture in low-income economies has been regarded as a growth engine for the rural and general economy due to its numerous consumption and production linkages and externalities with the rest of the economy (for example, Johnston & Mellor, 1961; Hazell & Haggblade, 1989). Since the role of agricultural growth in poverty reduction has been recognized to be greater than its proportion of

overall GDP, the policy bias against agriculture has come under intense criticism (Krueger, Schiff, & Valdés, 1988). Aid directed through government spending has the potential to lower the number of people living in poverty by boosting spending on social services that contribute to the rise of the poor. This latter channel is highlighted in two recent papers: Aid is related to poverty reduction because it boosts government spending.

2.2 Data, Variables, and Sources

For this empirical study, building on previous literature, four-year averaged panel data from 46 aid-recipient countries ($N = 46$) for 6 time periods ($T=6$) from 1997 to 2020 (Table A2 in the Appendix) was analyzed. In this study, the Development Flows to Agriculture (DFA) dataset, which is based on the OECD's Creditor Reporting System (CRS), provides the most comprehensive coverage of development flows by donor and recipient country from the FAOSTAT website (<https://www.fao.org/faostat/en/#data/EA>). The use of CRS in compiling the DFA dataset capitalizes on the expertise of the OECD and minimizes respondent burden and duplication of work. All other variables except institutional quality were collected from the World Bank database (<https://data.worldbank.org/>). The institutional quality dataset was collected from the FRASER Institute. The Institutional quality indicators is the database of economic freedom (www.fraserinstitute.org/economic-freedom/dataset). Table 1 presents definitions of all variables and descriptions used in this empirical study.

The dependent variable used in this study is the poverty headcount ratio at \$2.15 a day, expressed as the percentage of the population living on less than \$2.15 a day in 2017 purchasing power adjusted prices. As a result of revisions in PPP exchange rates, poverty rates for individual countries cannot be compared with those reported in earlier editions. The predictor variables used in this study include foreign aid to the agriculture sector, pro-poor government expenditures

on health and education, annual GDP growth rate, income share of the lowest 20% quintile, institutional quality measures, rural population, and child mortality rate. The key independent variable is foreign aid specifically directed towards agriculture, measured as total official development assistance disbursed to the agricultural sector in constant 2020 US dollars. This includes bilateral and multilateral aid spent on agricultural development, policy, water resources, training, research, and related areas. Using sector-specific aid allows isolation of the marginal effect of agricultural aid on poverty. The control variables account for overall economic performance, government social spending, income inequality, quality of institutions, demographic factors, and health outcomes.

For this study, economic predictors are annual GDP growth, pro-poor expenditure, institutional quality measures, and income of the lowest 20%. We use annual GDP growth expressed as a percentage (%) to account for variations in economic growth. The favorable impact of economic expansion on eradicating poverty is well supported by academic research. Adam, (2006) examined how much poverty decreases in percentage terms with a given percentage increase in economic growth using a panel dataset of 60 developing nations over 126 intervals. He discovers that the growth elasticity of poverty is 2.79, allowing for changes in income disparity. This means that a 10% rise in economic growth as measured by changes in survey means income will result in a reduction in poverty of \$1.00 per person per day by 27.9%. Pereira et al. (2019) used GDP data disaggregated by state and sector for 20 years in Brazil to discover that low economic growth and low growth elasticity of poverty reduction were the key contributors to Brazil's delayed poverty reduction during that time. Another finding by Dollar and Kraay (2002) is that growth is good for the poor: The poorest 20% of the population's mean incomes increased on average at the same rate as overall mean incomes in 92 different nations

over a period of 40 years. Consequently, we substituted annual GDP growth (%) for GDP per capita, the predictor utilized by Kaya et al. (2013). Pro-poor expenditure (PPE) is the government's share of GDP spent on health and education. Gomanee et al., 2005 described the pro-public expenditure as most likely to increase aggregate welfare and was added to this empirical study to capture the government's pro-poor policy's impact on eradicating poverty. Lanjouw and Ravallion (1998) claim that when spending increases, the advantages of spending grow increasingly pro-poor, implying that marginal spending is progressive. Thus, there is now a body of evidence indicating social expenditure, particularly on health and education, not only promotes human welfare (is pro-public), but also tends to do so in a pro-poor manner as the level of spending increases. This study used the income share of the lowest 20% instead of the Gini coefficient to capture the effect of income inequality. We think the income share of the lowest 20% examines well how income inequality influences poverty than the Gini coefficient. Another variable included in this study is the measurement of institutional quality indicators. To expand to the study of Kaya et al., 2013, the variable institutional quality indicators (property right protection, impartial public administration, military intervention in rule of law legal enforcement of contract, and impartial court) were added to the model. Noman & Stiglitz, (2015) has argued that inefficient and failing institutions in Africa put their economies at risk and economic backwardness. This emphasizes the role institutions play in reducing poverty and inequality; institutions' effectiveness has been identified as the main factor in reducing poverty. In this regard, we can draw attention to the writings of Dollar and Kraay (2000) and Ravallion and Chen (2003), who make the case that economic growth can lessen poverty in a setting with solid institutional policies. Institutions are a key factor in determining economic growth, as demonstrated by North (1992), and later supported by numerous studies Keefer & Knack, 2007;

Rodrik, 2005; Acemoglu et al., 2005; and Acemoglu & Robinson, 2012. According to Knack and Keefer (2007), the institutional setting in which economic activity is conducted in low-income countries greatly affects those nations' capacity to catch up to developed nations.

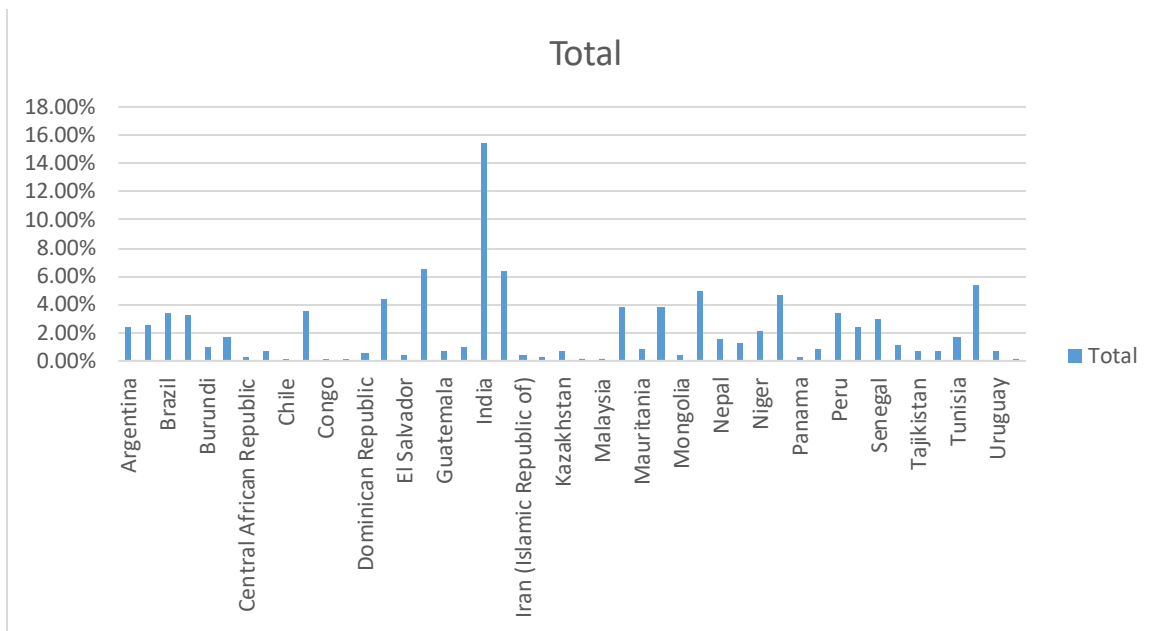
Rural population and child mortality are incorporated as non-economic predictors in the empirical model. Given that the rural population is more at risk for poverty due to inadequate social services, poor infrastructure, and limited access to markets, the rural population adjusts for the number of individuals living in rural areas. O'Hare & Bar-Zeev (2013) and Rodgers (1979) both found that income has a significant role in predicting child survival. When it comes to child mortality, undernourishment, and childhood malnutrition in emerging nations, Klasen (2007) looks at the connection between the incomes of the poor. He determines the pairwise (Pearson) correlation coefficients between the variables, and the results demonstrate that there is a statistically significant association between the poverty headcount ratio at \$1 and child mortality of 0.743. Compared to adults, kids are more prone to disease. When a member of a poor family becomes ill, they frequently lose their savings, income, and source of future income, which causes them to become even poorer. The newborn mortality rate utilized by Kaya et al. (2013) will be replaced by the child mortality rate in this investigation. Klasen (2007) observed a pairwise (Pearson) correlation between poverty and infant mortality of 0.6828, which is lower than the correlation between poverty and child mortality of 0.7426. Table 1 gives a summary and description of all variables used in this empirical study.

Table 2.1 Statistical Summary of Variables used in the Empirical Model.

Variables	Variable Description	Mean	Std. Dev.
<i>Dependent variable:</i>			
Poverty Headcount	Percentage of the population living on less than \$2.15 a day	17.680	19.442
<i>Economic Variables:</i>			
Aid to agriculture	Aid disbursed to recipient countries for agriculture purposes in millions of USD.	67.406	103.42
Annual GDP growth	Annual percentage growth rate of GDP at market prices.	3.759	4.210
Pro-poor expenditure on health	The government's share of GDP spent on health.	9.642	4.565
Pro-poor expenditure on education	The government's share of GDP spent on education.	4.062	1.634
Income share of lowest 20%	Share that accrues to subgroups of the population indicated by deciles or quintiles.	5.655	1.921
<i>Institutional quality:</i>			
Protection of property rights.	0 = no protection, 10 = protected	4.563	1.056
Legal enforcement of contract	0 = not enforced, 10 = highly enforced	4.057	1.176
Impartial Court	0 = partial, 10 = not partial	4.350	1.129
<i>Non-Economic Variables:</i>			
Rural population	Population of a country living in rural areas.	33, 873, 217	1,230,018
Child mortality	Mortality rate, under 5 per 1,000 live births	52.841	47.830

Foreign aid to recipient countries may be sector-specific, such as health, military, agriculture, education, etc. Aid for agriculture (a sub-category of Net Official Aid) to recipient countries was used. Aid to agriculture data has both commitments and disbursement data. All data used in the analysis were from disbursement data. This was used based on the theory as the sum of aid paid out. Figure 1 below shows the percentage of foreign aid to agriculture disbursed to recipient countries from 1997 to 2020.

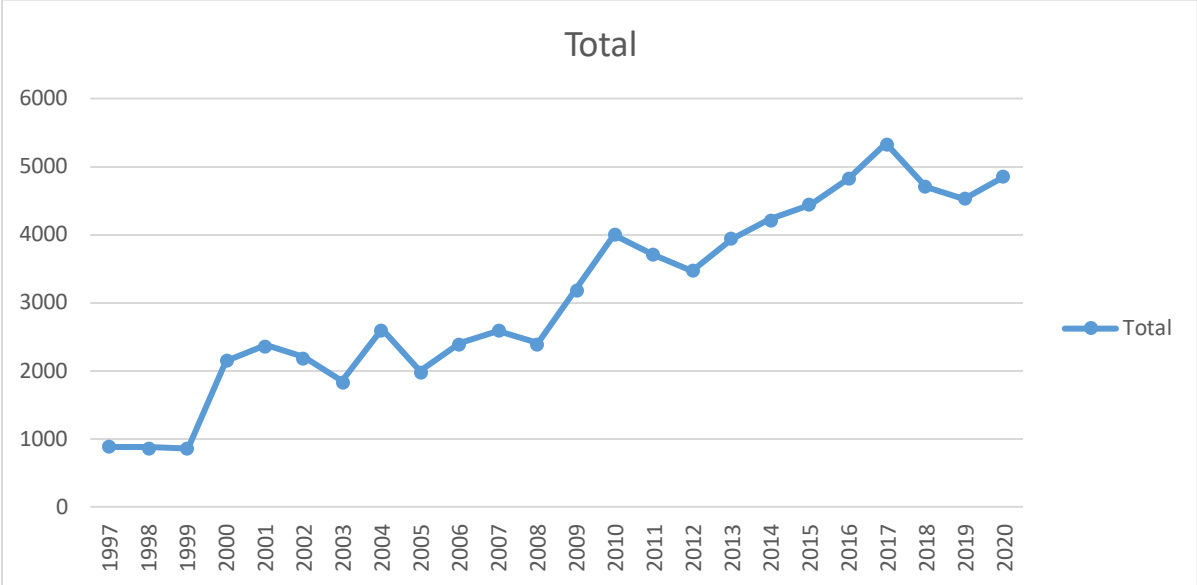
Figure 1. Percentage of Agriculture Aid to Recipient Countries over time (in million USD)



The unit of measure used was the US dollar expressed in millions (share of total agricultural assistance). Figure 1 demonstrates that during the past 23 years, India has gotten the most lavish aid, while Venezuela has gotten the least. The total amount of aid to agriculture reached its most outstanding point and expanded at its fastest rate in 2020, according to the Food and Agriculture Organization (FAO) of the United Nations report 2022, as donors mobilized funds to offset the COVID-19 pandemic's harmful effects partially. Additionally, they state that overall aid disbursement to agriculture increased by 15.2 percent from 2019 to 2020, reaching USD 14.7 billion. The Americas (11.2%), Asia (30.9%), and Africa (41.8%) all received more

aid than the other three continents combined. Figure below shows the summary of aid to the agriculture sector disbursed annually.

Figure 2. Annual Aid to Agriculture Disbursed to Recipient Countries



Aid disbursement was annually increasing until 2010 probably because of the skepticism about the effectiveness of aid in these countries. However, after 2012, donor increased their disbursement probably because of a study about aid having a positive impact on economic growth but policy contingent. Again, it declined in 2018 and has again begun to rise be of the harmful effect of COVID-19 in developing countries.

2.3 Estimation of Models

The study used fixed-effects panel data model with country specific effects to examine the impact of aid to agriculture on poverty reduction. The Panel Least Square (PLS) is the estimator used in the model. The OLS is known as the best linear unbiased estimator and is largely used in many empirical studies. We hypothesize the following basic relationship:

$$P_{it} = \beta_0 + \beta_1 Aid_{it-1} + \beta_2 GDPgrowth_{it-1} + X_{it}\delta + v_i + u_{it}$$

where the subscript i denotes countries and t denotes time, P_{it} is the poverty headcount ratio at \$2.15 a day (2017 PPP, % of the population), Aid_{it-1} measures aid to agriculture, $GDPgrowth_{it-1}$ measure annual GDP growth rate (expressed as % share of GDP), X_{it} is the column vector of the other variables, v_i captures the time-invariant country-specific effects, and u_{it} is the stochastic error terms that represents the omitted variables. Foreign aid may affect the composition of public spending and hence, raw pro-poor expenditure data may experience a double count. This is accounted for by succeeding Gomanee et al. (2005) and Kaya et al., (2013) where we substituted the aid component of PPE by generating PPEres from the residual of the unweighted PPE index on aid to agriculture. We estimate the following specification using four-year averaged data, following Kaya, et al. (2013) for a panel of 46 developing and six periods of aid recipient countries over the 1997 – 2020 period:

$$P_{it} = \beta_0 + \beta_1 Aid_{it-1} + \beta_2 GDPgrowth_{it-1} + B_3 PPEres_{it-1} + X_{it}\delta + v_i + u_{it}$$

The fixed effect estimator accounts for the unobserved heterogeneity of each country and assumes a correlation between the observed and unobserved variables. Under heteroscedasticity, the coefficients of the regression analysis remain unbiased but high variation in the estimate causes the OLS to be inefficient. We conducted a Wald diagnostic F-statistics test to check if the joint significance of the coefficients for all variables in the regression model is equal to zero. We

rejected the null hypothesis. This suggests that at least one of the coefficients is not equal to zero, indicating a significant impact on the dependent variable. This means that time-fixed effects are necessary in our baseline regression model. Country fixed effects account for time-invariant factors at the country level that influence poverty. Time period fixed effects account for global shocks and trends. The model is estimated using the fixed effects panel least squares estimator. Standard errors are clustered at the country level to account for arbitrary correlation of errors within country.

CHAPTER 3

RESULTS AND DISCUSSION

Table 2 below shows the results of fixed effect estimation. Columns (1) and (2) of Table 2 are the results of the country-fixed effect and time-fixed effect estimation respectively for the four-year average data of 46 aid recipient countries. Aid to agriculture has a negative and highly statistically significant relationship with the headcount poverty ratio in both the country-fixed effect and time-fixed effects estimation results. In the country fixed estimation, a 1% increase in aid is associated with a 0.08% decrease in the headcount poverty ratio. The time-fixed effects estimation shows a substantially larger marginal effect of aid on poverty. A 1% increase in aid is associated with a 1.46% decrease in the headcount poverty ratio. In the country-fixed effect estimation, income share of the lowest 20% has a negative and statistically significant relationship with the headcount of people living in poverty. The result shows that a 1% increase in the income share of the lowest 20% is associated with an anticipated 0.005% decrease in the headcount of people living in poverty. On the other hand, the time-fixed effect estimation suggests that a 1% increase in the income of the lowest 20% is associated with a 0.71 increase in the headcount of people living in poverty. Impartial court systems have a significant effect on poverty headcount but had opposing coefficient for the country-fixed effect and time-fixed effect. Rural Population is statistically significant with expected signs in both estimations.

Table 3.1 Fixed Effect Estimation Results

	Country-Fixed Effect	Time-Fixed Effect
Variable	(1)	(2)
Aid	-0.083*** (21.121)	-1.456*** (7.728)
Annual GDP growth	0.001 (0.472)	0.894*** (4.334)
Income Share of Lowest 20%	-0.005* (1.807)	0.711*** (4.350)
PPEres	0.986*** (81.132)	0.228 (0.165)
Legal enforcement of contract	-0.045 (1.176)	-0.710 (1.504)
Impartial court	0.007* (1.688)	-0.493*** (4.501)
Property right protection	-0.047 (-0.068)	0.386 (0.622)
Child mortality	0.024 (1.238)	2.457*** (14.887)
Rural population	0.069** (2.502)	1.235*** (10.296)
Constant	11.885 (26.246)	-1.194 (0.512)
R-squared	1.00	0.84
Number of observations	276	276
Number of countries	46	46

Notes: The dependent variable is the poverty headcount ratio at \$2.50 a day. The absolute values of White heteroscedastic-consistent t-statistics are given in parentheses. All variables measured in logs; Explanatory power for fixed effect estimates reported by R^2 rather than adjusted R^2 . The F-statistic tests the joint significance of all coefficients (rejects the null hypothesis that all are jointly zero). ***Significant at 1% level; **Significant at the 5% level; *Significant at the 10%.

3.1 Interaction Effect of Aid and Institutional Quality

Drawing from Dollar and Kraay (2000) and Ravallion and Chen (2003), who view the effectiveness of aid as policy contingent, we would introduce the interaction effect of aid to agriculture in a setting with solid institutional measures. Although Dollar and Kraay (2000) and Ravallion and Chen (2003) used policy indicators such as inflation, and budget surplus as policy measures, we believe these indicators are worthy in good institutional settings. The regression after the introduction of interaction term or moderation is as follows:

$$P_{it} = \beta_0 + \beta_1 Aid_{it-1} + \beta_2 GDPgrowth_{it-1} + B_3 PPEres_{it-1} + \beta_4 Aid * Inst_{it-1} + X_{it}\delta + v_i + u_{it}$$

Aid*Inst is the interaction between aid to agriculture and the measure of institutional qualities indices (protection of property rights, legal enforcement of contract, and impartial court). Table 4 below gives the estimated result of the fixed effect of the pooled data after introducing an interaction term. When aid interacted with institutional qualities indices, it was found to be more statistically significant at a 1% level of significance. The effect of the coefficient again was higher in reducing poverty headcount rates. On balance, the evidence suggests that aid does contribute to growth.

Table 1.2 Aid Interaction with Institutional Qualities Estimation Results.

	Cross-Section Fixed Effect	Time-Fixed Effect
Variables	(1)	(2)
Aid	-0.124*** (5.696)	-2.657*** (2.973)
Annual GDP growth	0.002 (0.866)	0.861*** (4.154)
Income Share of Lowest 20%	-0.005* (1.727)	0.721*** (4.471)
PPEres	0.980*** (72.685)	-0.009 (0.006)
Legal enforcement of contract	-0.018 (0.442)	1.067 (1.596)
Impartial court	0.006 (0.446)	0.471 (1.094)
Property right protection	-0.118*** (2.676)	-3.584*** (3.287)
Child mortality	0.017 (0.891)	-2.516*** (14.243)
Rural population	0.076** (2.563)	1.168*** (9.715)
Aid*Protection of property right	0.032*** (2.641)	2.028 8** (3.630)
Aid*Legal enforcement of contract	-0.011 (0.085)	-0.893*** (3.237)
Aid*Impartial court	0.0001 (0.018)	-0.561** (0.036)
Constant	11.932 (25.801)	2.778 (1.060)
R-squared	1.00	0.86
Number of observations	276	276
Number of countries	46	46

Notes: The dependent variable is the poverty headcount ratio at \$2.50 a day. The absolute values of White heteroscedastic-consistent t-statistics are given in parentheses. All variables measured in logs; Explanatory power for fixed effect estimates reported by R^2 rather than adjusted R^2 . ***Significant at 1% level; **Significant at the 5% level; *Significant at the 10%.

Table 3 above is the estimated results after introducing an interaction of aid to agriculture with institutional quality measures. The base effect of aid remains negative and significant. A 1 unit increase in aid decreases the poverty ratio by 0.12% in the cross-section model and 2.66% units in the time-fixed effects model, on average. The interactions between Aid and Property Rights Protection, and Aid and Legal Contract Enforcement are positive and statistically significant. This indicates that while higher aid reduces poverty on average, this relationship is dampened by better property rights protection and contract enforcement. The results demonstrate that foreign aid is associated with decreasing poverty rates on average, but this equalizing relationship weakens as countries develop better functioning economic institutions.

CHAPTER 4

SUMMARY, CONCLUSION, RECOMMENDATION

4.1 Summary

This study aimed to examine the impact of foreign aid to agriculture on poverty reduction in developing countries. The data set used is 46 aid recipient countries for the period 1997–2020. Period averages of data were computed for: 1997–2000 (period 1), 200–2004 (period 2), 2005–2008 (period 3), 2009–2012 (period 4), 2013 – 2016 (period 5), and 2017 – 2020 (period 6). The results indicate that aid to agriculture has a statistically significant negative relationship with poverty levels. Specifically, the fixed effects models estimate that a 1% increase in agricultural aid is associated with a 0.08-1.46% decrease in the poverty headcount ratio. These findings support past research showing that aid targeted at agriculture and rural development is effective at reducing poverty (Kaya et al., 2013; Mosley & Suleiman, 2007). As the majority of the extremely poor live in rural areas and rely on agriculture for their livelihood, agricultural aid likely helps alleviate poverty by raising rural incomes, increasing food security, and stimulating the rural economy.

4.2 Conclusion

The results also echo previous studies emphasizing the importance of economic growth for poverty reduction (Dollar & Kraay, 2002; Pereira et al., 2019). The coefficient on GDP growth is positive and significant, suggesting periods of economic expansion are associated with falling poverty rates on average. Additionally, the study confirms past findings on the role of income inequality in influencing poverty. The income share of the poorest quintile has a statistically significant negative relationship with poverty levels (Bigsten & Levin, 2004; Ravallion & Chen, 2003). More equitable income distributions are thus conducive to poverty

alleviation. The interaction models in this analysis provide evidence that the effectiveness of agricultural aid in reducing poverty is enhanced in countries with better economic institutions. The poverty-reducing impact of aid diminishes as property rights protections and impartial courts strengthen. This aligns with previous arguments on the importance of institutional quality for aid efficacy (Gregorio, et al., 2008; Holt, 1991).

4.3 Recommendation

These findings have meaningful policy implications. Development aid directed specifically at agricultural and rural sectors appears to be a powerful tool for poverty alleviation globally. Policymakers aiming to tackle extreme poverty should likely prioritize foreign assistance to smallholder farmers and rural areas. However, strengthening economic institutions may be a prerequisite for agricultural aid to realize its full potential in raising the incomes of the poorest.

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APPENDIX A

46 AID RECIPIENT COUNTRIES USED IN THIS RESEARCH THESIS ARE OUTLINED

AS FOLLOWS:

Argentina, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Chile, Columbia, Congo, Croatia, Dominican Republic, Egypt, El Salvador, Ethiopia, Guatemala, Honduras, India, Indonesia, Iran, Jamaica, Kazakhstan, Lesotho, Malaysia, Mali, Mauritania, Mexico, Mongolia, Morocco, Nepal, Nicaragua, Niger, Pakistan, Panama, Paraguay, Peru, Rwanda, Senegal, Sri Lanka, Tajikistan, Thailand, Tunisia, Turkey, Uruguay, Venezuela.

APPENDIX B

THE 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>.

VITA

Graduate School
Southern Illinois University Carbondale

Richard Amoako

ritchyvanny@yahoo.com

University for Development Studies
Bachelor of Science, Agricultural and Resource Economics, July 2014

Thesis Paper Title:
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