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The Impact of Agricultural Aid on Agricultural Sector Growth

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Introduction

The Millennium Development Goals, which were originally developed by OECD, were adopted by 192 United Nations Members in 2000 for the purpose of meeting the needs of the World's poorest and reduce poverty. One of the reasons development assistance flows from donor countries to low income developing countries is to achieve these Millennium Development Goals. Recently, aid effectiveness discussions have been at the center of attention because a common concern in aid donor countries is whether the aid given for developmental assistance purposes is effective or not (Burnside, Dollar, Easterly). This concern casts doubt on the efficiency of foreign aid which usually leads the donor countries to what is termed "aid fatigueness". Previous literature on aid effectiveness only used aggregate aid to address these concerns. Our study deviates from this literature by dividing foreign aid into its components to assess the impact of agricultural foreign aid on agricultural output in low income developing countries.

What kind of growth is good for the poor?

Even though there are polar views on the effects of economic growth on development and poverty reduction, it is argued that economic growth benefits the poor on average (Dollar and Kraay, 2002). Although the majority of early development strategies relied on urban bias and industrialization as the main source for economic growth and development during 1960s and 1970s (Schiff and Valdez, 1998; Timmer, 1988), agriculture has been considered to have an active role in the development process since the prominent article by Johnston and Mellor (1961). A significant number of

researchers (Irz and Roe; Kanwar; Kogel and Furnkranz-Prskawetz; Rangarajan; Ravallion and Datt; Thirtle *et al.*; Timmer; Stern; Wichmann) suggest that agricultural growth promotes poverty reduction, hence the agricultural sector is an “engine of growth” at the early stages of development.

Research relating economic growth to poverty reduction has found that general GDP growth has had less impact on poverty reduction than growth in the agricultural sector, partly because of the high level of poverty in rural areas of developing countries [CGIAR, 2000; Ravallion and Datt ,1996; Timmer ,1997]. In most of the developing countries, the agricultural sector is the major source for employment (up to 81%), income (more than 50% of primary income on average) and export earnings (30% to 50%) but its share in GDP (from 3.5% to 36%) is not as high as its share in those economic activities and people who depend on agriculture for their livelihood live in poverty. The average percentages of the world’s poor that live in rural areas vary from 62 % to 90% (FAO, 2004; Thirtle et al., 2001; Lucas and Timmer, 2005). The regions which are affected from poverty most are South Asia, East Asia and Sub-Saharan Africa and they contain 90% of the world’s poor. Thus growth in the agricultural sector would be more pro-poor in the rural areas of developing countries than growth in the nonagricultural sector since agricultural growth is considered to have direct (Johnston and Mellor 1961) and indirect/roundabout linkages (Timmer, 2002) to the growth process and it can be used as the “engine of growth” for “agricultural-demand-led-industrialization” (Adelman, 1984).

Foreign Aid for Agricultural Growth

Foreign aid can be simply defined as economic assistance provided to a country by another country or organization. It can be given for economic, political or humanitarian purposes and can be classified as loans and grants, bilateral and multilateral aid or tied and untied aid. Two prominent areas of concern in recent economic development literature are the effectiveness of foreign aid and the impact of different types of aid on poverty in developing countries.

In aid effectiveness studies, some authors supply evidence for the positive effect of foreign aid on economic growth contingent on some political, structural and/or institutional conditions (Burnside and Dollar, 2000; Dalgaard and Hansen 2001; Chatterjee and Turnovsky, 2005, 2007). Others are more cautious about concluding that foreign aid will spur economic growth (Boone, 1996; Easterly, 1999; Easterly, Levine and Rodman, 2003). More recent analysis considers the differences in types of foreign assistance and addresses the possibility that different types of assistance have different economic impacts (Chatterjee, Sakoulis and Turnovsky, 2003; Chatterjee, Giuliano, Kaya, 2007).

Although there is a vast literature on foreign aid's effect on economic growth, a very limited number of studies tried to address the relationship between foreign assistance given to the agricultural sector for the purpose of agricultural growth (Dewbre, Thompson and Dewbre, 2007). The study by Norton, Ortiz and Pardey (1992) can be cited here too even though they used a total aid variable to look at its effect on agricultural growth. Because of the impact of agricultural growth on poverty reduction, our study of the effectiveness of development assistance is focused on the impact of

agricultural oriented assistance on the growth of agricultural sectors of developing countries.

Data and methods

This study will employ a cross-section time-series econometric model to analyze the impact of agricultural aid on agriculture in developing countries. Since there may be country specific unobserved heterogeneity which does not change across time with this model, we employed fixed effects regression models to correct for omitted variable bias. We will assess the impact of aid on agricultural output. We employ annual data from 1974 through 2005 for developing countries that are aid recipients. Variables related to cross-country differences are incorporated in the model to control for their impacts on the dependant variables.

We use agriculture value added as the dependent variable. Data on this variable are from World Bank's World Development Indicators 2007 (WDI).

The explanatory variable we are interested in most in this study is foreign assistance given to the agricultural sector for rural development purpose. Data on foreign assistance are available from the FAO Statistical Database of Food and Agriculture Organization of the United Nations.

The control variables for our analysis include GDP per capita, fertilizer consumption, irrigated land, land under cereal production, livestock production index, rural population, sum of exports and imports of goods and services measured as a share of gross domestic product, agricultural machinery(tractors) and crop production index. Data on these variables are from World Bank's World Development Indicators 2007. To

control for the differences in country sizes, all inputs and outputs were measured on a per hectare basis to achieve comparability (Norton, Ortiz and Pardey, 1992; Dewbre, Thompson and Dewbre, 2007).

To measure the effect of explanatory variables on agricultural output growth, it is important to identify a mechanism through which these variables can affect agricultural output growth. Our dependent variable, agriculture value added, can be defined as a function of revenue minus cost where revenue and cost are determined by the quantity of output, input and their prices respectively.

We include trade dependence (imports plus exports as a percentage of GDP) as international exposure could increase urban bias and per capita GDP as a proxy for income. Fertilizer consumption, agricultural machinery (tractors) and irrigated land are included to control for the differences in the agricultural sector. Since agriculture value added includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production, land under cereal production, livestock production index and crop production index are used to control for production in those areas. Finally, rural population is used as a proxy for employment in the agricultural sector.

The following empirical model is specified and estimated

$$Agvalueadded_{it} = \beta_0 + \beta_1 Agrasst_{it} + \beta_2 X_{it} + v_{it}$$

Agvalueadded corresponds to agriculture value added, *Agrasst* shows foreign assistance given to agricultural sector for rural development purpose, X_{it} is the set of controls, including variables that are considered standard determinants of agricultural growth in the literature.

Results

Our analysis will estimate the impacts of agricultural assistance and country specific economic characteristics on the growth of agricultural output in developing countries. The results from the estimations are presented in Table 1. The results indicate a positive and statistically significant relationship between growth in the agricultural output and agricultural assistance for rural development. All other signs for the explanatory variables are as expected.

IV. Conclusion

Growth in the agricultural sector is considered to be more pro-poor than the growth in the nonagricultural sector for developing countries. For this reason, the primary objective of our study is to assess the impact of agricultural foreign aid on agricultural output in developing countries. We found that there is a positive and statistically significant relationship between growth in the agricultural output and agricultural assistance for rural development so foreign assistance given for developmental purposes can achieve its goal if aid is targeted for the agricultural sector of the developing countries.

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APPENDIX

Table 1.

Explanatory variables	Dependent variable Agricultural value added per ha
Agricultural assistance for rural development	0.408 (1.76)*
GDP per capita	0.085 (5.28)***
Land under cereal production, ha	0.002 (0.53)
Agricultural machinery tractors per ha	1.955 (2.84)***
Irrigated land of cropland	-0.567 (0.27)
Fertilizer consumption 100 grams per ha	0.276 (4.63)***
Rural population per ha	133.329 (8.44)***
Trade of GDP (openness)	-0.960 (2.40)**
Livestock production index 1999-2001	0.849 (2.51)**
Constant	-119.926 (1.96)**
Observations	1455
Number of ifscode	112
R-squared	0.63
Robust t statistics in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

Table 2. List of Recipient Countries Included in Our Panel Data

Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Belize, Benin, Bhutan, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Chad, Chile, China, Colombia, Congo-Dem. Rep., Congo-Rep., Costa Rica, Cote d'Ivoire, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Eritrea, Estonia, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Honduras, Hungary, India, Indonesia, Iran, Islamic Rep., Jamaica, Jordan, Kazakhstan, Kenya, Korea, Rep., Kyrgyz Republic, Lao PDR, Latvia, Lebanon, Lesotho, Lithuania, Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Rwanda, Senegal, Serbia & Montenegro, South Africa, Sri Lanka, St. Lucia, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Venezuela, Vietnam, Yemen-Rep., Zambia, Zimbabwe,