

## Sectoral Foreign Aid and Income Inequality

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### Abstract

This study contributes to the empirical understanding of foreign aid and income inequality by investigating the effect of foreign aid on income inequality in recipient countries, based on the disaggregation of foreign aid figures. For this purpose we include four main sectoral foreign aid (social sector, economic sector, production sector and multi sector) as determinants of income inequality. This study utilized the Generalized Method of Moments (GMM) method for a panel of 75 foreign aid recipient countries covering the period of 1995-2009. The results indicated that different sectoral foreign aid affected income inequality differently. Aid to economic sector has significant impact in reducing income inequality. In contrast, aid to multi sector significantly increased income inequality.

**Keywords:** foreign aid, income inequality, GMM

### 1. Introduction

Over the past decade, foreign aid has been regarded as an important tool in fighting poverty in less developed and developing countries. Foreign aid or known as official development assistance (ODA) can be define as a flow or transfer of payment including a grant element made by official agencies, state and local governments, or by their executive agencies for developing countries and multilateral institutions. The main objective of giving foreign aid is to develop economic and welfare development in poor and developing countries. Foreign aid is believed enable to address the poverty and income inequality problem by facilitating faster and sustained economic growth in these countries. Poor countries are facing scarce of capital for saving and investments in order to generate income and economic growth. According to Nelson (1956), Erikson (2005) and Sachs et al. (2005), poor countries have low incomes and savings which leave them in a “vicious circle of poverty” or “poverty trap”. In other words, they experience a “low-level equilibrium trap” where higher income does not lead to increase saving but only results in higher population growth.

The earlier study on the role of foreign aid on economic growth was undertaken by Chenery and Strout (1966) using “two-gap” model. In this model, they assumed that foreign aid filling the financing gap and trade balance gap simultaneously. The financing gap means that a country has insufficient resources for investments. While trade balance gap is the gap between import requirement for a targeted level of production and foreign-exchange earnings, which implies that a country possesses insufficient foreign currency to pay for imports. Perhaps foreign aid will dissolve the “vicious circle of poverty” and connects less developed countries to the virtuous circle of productivity and growth. Then increased in growth will improve the standard of living of the poor countries.

However, after fifty years, the role of foreign aid in fostering economic growth and development in poor countries continues to be a subject of debate among policy makers and researchers. These arguments were supported by the voluminous of empirical literatures which indicated little evidence that foreign aid promoted economic growth. For instances, Cassen (1994), Papanek (1973), Mosley (1980), Mosley et al. (1987) and Boone (1994) found inconclusive result between aid and growth. In contrast, Burnside and Dollar (2000) found positive impact of aid on growth conditional with good fiscal, monetary and trade policies of the recipient countries. However, Easterly (2003) finds that foreign aid is no longer effective in countries with good economic policies in different time, country and sample size.

Despite the lack of robust positive correlation between aid and growth, the economists and policy makers shift to focus on the direct impact of foreign aid on poverty and income inequality in recipient countries. Among the

studies that focus on the impact of aid on poverty are Collier and Dollar (2002), Lensink and White (2002), Kraay and Raddatz (2007) and Bahmani-Oskooee and Ayolola (2009). However, poor economic performance and disappointing poverty reduction experience in major aid recipient contrasted with nations that have managed to achieve significant progress without foreign aid. Currently only a few empirical studies have been performed looking at the impact of foreign aid on inequality (Bourguignon et al. 2008; Calderon et al. 2009; Shaifullah 2011).

Recently, there were several studies contributed to foreign aid and growth literature by assessing the impact of different categories of foreign aid and growth (Ouattara and Strobl 2008; Mavrotas 2005; Mavrotas 2002a). They disaggregated foreign aid into different categories and found different category of foreign aid affected growth differently. These findings spur a question whether income inequality will have the same significant impact when aid is evaluated at disaggregated level. Does different sectoral foreign aid have significant impact on income inequality on the recipient countries? If yes, which sector of aid reduced income inequality? Thus, the objective of this study is to analyze the impact of sectoral foreign aid on income inequality in aid recipient countries.

This paper is organized as follows. The next section reviews the empirical evidence on the impact of foreign aid on income inequality using aggregate foreign aid figures. Then, the model specification and econometric methodology conducted in this study will be described in Section 3. Section 4 discusses the data source of this study, followed by the interpretation of results and discussions in Section 5; finally, Section 6 concludes.

## 2. Literature Review

In the history of foreign aid, Friedman (1958) theoretically argued that aid was only likely to benefit a political elite. The first empirical analysis of the aid on income inequality was done by Chase-Dunn (1975). He indicated that foreign aid has positive impact on income inequality. Then, Boone (1997) and Collier & Dollar (2004) found that aid increases the amount of resources the recipient government has at hand. Aid deteriorates governance since a less “resource-constrained” has reduced interest in being accountable to the local population (Rajan & Subramanian 2007). Aid funds can not only diminish democracy but funds may not even reach their intended purpose (helping the poor). As a matter of fact, these funds are sometimes embezzled and expended by the local elite in association with governing people (Drazen 2000). All political systems are believed to favor high-income political elite (Boone 1997) and as such foreign aid would mean more funds for governing people and the local elite to misappropriate. Aid can be used to maintain and augment existing disparities in income and political clout.

Recently, Calderón et al. (2006) found no robust relationship between inflows of foreign aid and income inequality even though in good institutional quality. However, the undoing of foreign aid benefits through trade barriers restricting access to markets in developed countries is also discovered (Bourguignon et al. 2008). Foreign aid is found to improve income distribution in the presence of good institutions (Calderon et al. 2009). Two studies, on the other hand, find a negative relationship (Bjørnskov 2009; Layton & Nielson 2009) but the relationship to be robust in one of the cases. Although the other study produces somewhat inconclusive results, they find a robust “zero to positive” correlation between aid and inequality (Layton & Nielson 2009). It is also found that aid deteriorates the current period inequality more than inequality in the following period or later. Recently, Shaifullah (2011) presented the theoretical perspectives of foreign aid's impact on income distribution and look for empirical evidence of such an alleged relationship in a panel of 94 countries over 20 years. They found the evidence to the contrary that aid causes small reductions in inequality.

Until now, the past studies of foreign aid and income inequality employed aggregate foreign aid figures and found inconclusive result about the impact of foreign aid on income inequality. However, the current contribution to foreign aid and growth literature by assessing the impact of different categories of foreign aid on growth show more significant findings. As pointed by Ouattara and Strobl (2008), aggregate aid figures lead to an aggregation bias findings because these figures cannot disentangle the individual effect of foreign aid on growth. In addition, Mavrotas (2005) argues that the state of aid coordination may differ in each country. Thus it makes sense to predict that the impact of aid in each country is not similar. Besides that Mavrotas (2002a) was divided aid to India during the period 1970–1992 into three categories, which are program aid, project aid, and technical assistance grants. He indicates that all three types of aid affected growth negatively.

Here, there is clear evidence that disaggregation foreign aid figures produced more appropriate findings rather than aggregate figures. Study on the impact of foreign aid on income inequality should be focus on the disaggregate foreign aid figures in order to disentangle the individual effect of different categories of foreign aid on income inequality. Thus, this study will analyze the impact of foreign aid on income inequality using the disaggregated foreign aid figures into sectoral level.

### 3. Methodology

#### 3.1 Model Specification

This study modified Calderon et al.(2009) model in estimating the impact of sectoral foreign aid on income inequality. The basic specification of this study can be represented by the following equation:

$$Y_{it} = \beta_0 + \beta_1 Aid_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (1)$$

where all variables are in logarithm form as a percentage of GDP except inflation rate.  $Y$  represents income inequality, as proxied by the Gini coefficient.  $Aid$  is the set of sectoral aid, which includes aid to social sector, economic sector, production sector and multi sector. Firstly, aid to social sector aims to improve aid human capital, living standards and reduce income inequality in recipient countries. The sub-sectors of this aid are aid to education, health, population program and reproductive health, water supply and sanitation, government and civil society, and others. Secondly, aid to economic sector may improve total productivity in the recipient economies and directly adds to investment and help to the constraint on public funds available for necessary public investment. Aid of this sector aims to increase growth and reduce income inequality. Aid to this sector consists of aid to transportation and storage, communications, energy, banking and financial services, business and other services. Thirdly, aid to production sector aims to increase capital accumulation by enlarging the pool of resources available for investment. The sub-sectors of this aid are agriculture, forestry, fishing, industry and mining, construction, trade policies and regulations. Lastly, aid to multi sector, which aid for general environment protection, and other multi sectors. Both of these aids also are expected to reduce income inequality.  $X$  is a set of control variables which includes the level of real GDP, employment, trade openness and inflation rate.  $\varepsilon$  denotes an error term. All the variables are expected to be negatively correlated to income inequality except inflation rate. Thus the sign of the estimated coefficient of all variables must be in the negative sign.

#### 3.2 Econometric Methodology

This study conducted the General Method of Moments (GMM) estimation procedure to examine the impact of sectoral aid on income inequality. This technique allows us to eliminate time invariant country-specific effects and to control for the endogeneity of the explanatory variables. We assume that all explanatory variables are potentially endogenous. Time-invariant variables are eliminated from (1) since under our estimator the data is first differenced. This study follows the GMM system which is developed by Blundell and Bond (1998). The consistency of the GMM estimator depends on whether lagged values of the explanatory variables are valid instruments in the regression.

### 4. Data Sources

This study utilized a panel data set of 75 aid recipient countries for the period 1995-2009. The data on GINI coefficient is sourced from the online database of Standardized World Income Inequality Database (SWIID), Version 3.1 (Solt, 2011). SWIID interpolates the missing data that is available from the World Income Inequality Database (WIID). The sectoral aid data was collected from OECD in Development Assistance Committee (DAC) and Credit Reporting System (CRS). The data covered both bilateral and multilateral donors. The sectoral ODA data was listed in terms of commitments starting 1995-2009 and the disbursements of sectoral ODA available starting 2002 until 2009. We calculated the sectoral disbursement for the period 1995-2001 data base on the commitments data using Clement et al (2004) approach. In this approach, we assume that the fraction of disbursements in each of aid category in given period is equal to the fraction of commitments in each category in that period. The real GDP, employment rate, trade openness and inflation rate were derived from the World Development Indicator online database.

### 5. Results and Discussions

The estimated results of the impact of sectoral foreign aid on income inequality are summarized in Table 1. Before discussing the results on the estimated coefficients it is crucial to analyze our diagnostic tests. The first test concerns the validity of the instruments. The Hansen p-value is greater than 5 percent significance level, which is 0.749. It implies that we failed to reject the null hypothesis of no over-identifying restrictions. The second test concerns the question of 1<sup>st</sup> and 2<sup>nd</sup> order serial correlation. The p-values of the Arellano and Bond test for AR (1) is 0.042 which are less than 5 percent for shows that the residuals are correlated at 1<sup>st</sup> order conditions. However the residuals are not correlated at 2<sup>nd</sup> order conditions when p-values of the Arellano and Bond test for AR (2) are greater than 5 percent significance level, which is 0.296. Thus both Hansen and Arellano-Bond statistics confirm that the instruments used have no-over-identifying restriction and residuals are independent.

Turn to the estimated coefficients; Table 1 presents the estimated results of the effect of sectoral foreign aid on

income inequality in recipient countries. The results indicated that aid to economic sector exhibit a negative and significant impact on income inequality at 1 percent significant level. Meaning that aid to economic sector is effective in reducing income inequality in aid recipient countries. Moreover, aid to multi sector indicated a positive and significant at 5 percent level impact on income inequality. This result shows that aid to this sector seems to increase income inequality. Even though aid to social sector and production sector do not appear to exert any statistically significant effect on income inequality, but they affected income inequality by the opposite direction. Aid to social sector has a negative correlation to income inequality and aid to production is positively correlated to income inequality. Then GDP and employment attempted to have negative and significant at 5 percent level and positive impact at 5 percent significant level on income inequality, respectively. The inflation rate has a negative significant impact on income inequality, while trade openness was not significant in affecting income inequality.

Table 1. Sectoral foreign aid and income inequality, 1995-2009

| Independent Variable            | (1)       |         |
|---------------------------------|-----------|---------|
| <i>Constant</i>                 | 3.507***  | (-5.9)  |
| <i>Real GDP</i>                 | -0.033**  | (-2.33) |
| <i>Employment</i>               | 0.257**   | (-2.31) |
| <i>Aid to Social Sector</i>     | -0.017    | (-1.04) |
| <i>Aid to Economic Sector</i>   | -0.038*** | (-3.50) |
| <i>Aid to Production Sector</i> | 0.003     | (-0.28) |
| <i>Aid to Multi Sector</i>      | 0.024**   | (-1.87) |
| <i>Trade Openness</i>           | -0.008    | (-0.18) |
| <i>Inflation</i>                | -0.0008** | (-2.28) |
| Number of Observations          | 872       |         |
| Number of Countries             | 75        |         |
| Diagnostic Checking             |           |         |
| <i>AR (1) test (p-value)</i>    | 0.042     |         |
| <i>AR (2) test (p-value)</i>    | 0.296     |         |
| <i>Hansen test (p-value)</i>    | 0.749     |         |

Note: Dependent variable is *Gini coefficient*. The figures in parentheses are Robust t-statistic.

\*\* The coefficient is significant at 5%. \*\*\* The coefficient is significant at 1%.

## 6. Conclusion

This paper has contributed to the recent empirical literature on impact of foreign aid on income inequality. We tested the impact of sectoral aid (social sector, economic sector, production sector and multi sector) on income inequality using the GMM-SYS approach to dynamic panel estimator for a sample of aid recipient countries over the period 1995–2009. This method is powerful in solving the endogeneity problem and produced unbiased estimation results. This study support the findings pointed by Mavrotas (2005), Mavrotas and Ouattara (2006a) that different category of aid exerted a different macroeconomic and social effects on the recipient economy. It depends on the category and the purpose of giving that aid. Our findings suggest that aid to economic sector plays significant role in reducing income inequality in aid recipient countries. Aid to this sector includes of aid to transportation and storage, communications, energy, banking and financial services, business and other services. These sectors are main sectors that generate economic growth in a country. Thus, aid to this sector will increase economic efficiency, total productivity, economic growth and reduce income inequality in the recipient economies. In contrast, aid to multi sector seems to increase income inequality. This type of aid includes aid goes to the general environment protection, and other multi sectors which is more benefited of the top segment of the society. Thus, study on the impact of foreign aid on income inequality using disaggregated aid figures provided more appropriate and important findings rather than aggregate aid figures. Hopefully these findings can be a benchmark for policy makers to design more appropriate and better policy to make aid more effective and achieved its goals.

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