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Foreign Aid, Income Inequality, and Poverty

by

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Abstract[*]

This paper's goal is to examine the effect of foreign aid on income inequality and poverty reduction for the period 1971-2002. Since simple cross-country regressions cannot be taken as "true" time series findings we focus on dynamic panel data techniques, which allow accounting for potential simultaneity and heterogeneity problems. We find some weak evidence that foreign aid is conducive to the improvement of the distribution of income when the quality of institutions is taken into account, however, this result is not robust. This finding is consistent with recent empirical research on aid ineffectiveness in achieving economic growth or promoting democratic institutions.

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1. INTRODUCTION

In the post colonial era, foreign aid has been one of the main vehicles for the rich countries to promote better living conditions in less developed parts of the world, alleviation of poverty and narrowing income disparities having been viewed as its main goals. Yet, the effectiveness of foreign aid has been often questioned, much recent research focusing in particular on average growth effects of foreign aid. While Burnside and Dollar, 2000, qualify the argument that aid can promote growth by the recipient countries having good institutions, in more recent work even this moderate conclusion has been questioned. Thus, Easterly, 2003, Easterly et al., 2004, and Rajan and Subramanian, 2005, claim that there is no evidence of any effect of aid on growth – even when institutional quality is high; and Brautigam and Knack, 2004, and Knack, 2004, argue that aid may, in fact, cause deterioration in the quality of democratic institutions.

Foreign aid, however, may still be beneficial in other respects, for example, by improving the lot of the poorer population segments in receiving countries. It may help to alleviate poverty and equalize income distribution, without necessarily having a discernible average growth effect. While both constitute major objectives of aid giving, to our knowledge, there is surprisingly limited formal empirical evidence on this issue.[1]

From a broad brushed look at the data, there appears to be some tentative evidence pointing towards the existence of a relationship between foreign aid and income inequality in the presence of good institutions see Figure 1. Thus, when corruption is at the bottom third tercile, an increase in foreign aid from low to medium is linked to a

[1] Masud and Yontcheva (2005) cite a few references and perform analyses focusing on specific channels of foreign aid and developmental outcomes, such and health indicators; more generally, the recent World Development Report (World Bank, 2006) argues that aid does not seem to have an equalizing effect. Arvin and Barillas, 2002, employ Granger causality to address causality issues present in the relationship between aid and poverty.

reduction in the Gini coefficient from 0.47 to 0.42 approximately; additionally, if foreign aid increases from medium to high, inequality remains relatively stable. The opposite occurs when the level of corruption is at the top higher tercile. When foreign aid increases from low to medium, the Gini coefficient does not change; however, when foreign aid increases from medium to high the Gini increases from 0.43 to 0.46[2]. This possible association between foreign aid and income distribution appears to have motivated policymakers as it is often implicitly assumed that foreign aid has an egalitarian effect despite the fact that there have been little efforts to formally establish it.

FIGURE 1 HERE

Simple correlations and even cross country analyses may, however, be misleading in this context, and appropriate econometric methods to minimize potential endogeneity in the regressors are called for. To the extent possible, our empirical approach is systematic and comprehensive and uses panel methods that try to deal with possible endogeneity problems explicitly (Arellano and Bover, 1995; Blundell and Bond, 1997). We believe that the application of such dynamic panel technique is a valuable contribution to a thorough understanding of the issue at hand. Based on this analysis, we conclude that foreign aid does not appear to have a significant income distribution effect, even in the presence of good institutions. This negative result concurs with the much more extensive literature on aid and growth cited above, as well as with the literature that examines the effect of aid on democratic institutions, see Brautigam and Knack, 2004, and Knack,

[2] The link between foreign aid and poverty is less clear, although the relevance of institutions in such link is quite apparent in simple data observation.

2004. Arvin and Barillas, 2002, also examine the relationship between aid and poverty, using a different econometric tool, the Granger causality. While the two papers are complementary to each other, the advantage of the dynamic panel analysis presented here is that it is a priori agnostic as to the nature of causal relationship between variables.

The next section presents a simple analytical framework that is used to address the link between aid and the welfare of the poor. Section 3 then describes the data used in the paper as well as simple correlations and cross-country regressions. In Section 4 we undertake a more formal empirical analysis. Our findings show that while foreign aid is negatively linked with inequality in the presence of low corruption such outcome does not appear to be particularly robust. Finally, Section 5 concludes.

2. ANALYTICAL FRAMEWORK

2.1. The model

Consider two countries, a poor recipient and a rich donor. The model focuses on the interactions between the governments of the two. Both governments derive utility from objectives that hinge upon the situation in the recipient country. In particular, to tailor the model closer to the ensuing empirical analysis, we assume that both governments care about the distribution of income there, see Boone, 1996, for related arguments. For analytical simplicity we assume that the recipient country has two income classes and denote e_p and e_r the market endowments of the two classes, $e_p < e_r$, i.e., the respective amounts of income prior to transfers. To avoid dealing with issues involving population size we normalize the size of each group to one. The recipient country's exogenously given budget, normalized to one, is used to transfer income to the population groups; the donor country determines its aid budget A to donate to the poor country. The final

income distribution is determined by initial, market endowments supplemented by the transfers, and we denote x_p and x_r the respective income levels. It is assumed that the domestic government derives utility from the incomes enjoyed by both income groups,

$$V(x_p, x_r) \quad (1)$$

whereas the utility of the donor government derives from the poor income in the recipient country and from transfers to own country's citizens, z:

$$U(x_p, z) \quad (2)$$

Both utility functions satisfy standard assumptions.

Including another component in the recipient government's utility, the benefit from aid's diversion to government consumption, would not change the thrust of the results, but would also generate an additional implication that aid effectiveness hinges upon institutions constraining the ability to divert aid. As this is a relatively simple extension of the basic framework, its complete analysis is left outside the main presentation but is available on request.

The donor country's budget, B, is allocated between aid and own transfers,

$$A + z = B \quad (3)$$

We distinguish between the case where the donor government provides aid to the recipient government which then allocates it among the income groups, and the one where aid commitment to the poor can be directly made by the donor government.

2.2. Analysis

Case 1: Aid is delivered through domestic government

The domestic government maximizes the utility (1) subject to the government budget constraint:

$$b_p + b_r = A+1 \quad (4)$$

where b_p and b_r denote budget transfers to the poor and the rich, respectively; to the income production constraints:

$$x_j = e_j + b_j, \ \ j = p, r \quad (5)$$

and to non-negativity constraints:

$$b_j \geq 0, \text{ or } x_j \geq e_j, \ j = p, r \quad (6)$$

Ignoring the less interesting corner solution and letting H() denote the demand function for the income of the poor, some standard derivations enable us to write the optimal solution as follows:

$$x_p = H(A+1 + e_p + e_r), \ \ x_r = A+1 - H(A+1 + e_p + e_r) \quad (7)$$

so that the increase in the income of the poor as a result of a one dollar aid increase is $H'(A+1 + e_p + e_r) < 1$. For example, when the domestic government's utility is Cobb-Douglas, $V(x_p, x_r) = \beta\log(x_p) + (1-\beta)\log(x_r)$, $0 < \beta < ½$, then $H(A+1 + e_p + e_r) = \beta(A+1 + e_p + e_r)$ and $dx_p/dA = \beta$.

Note that imposing constitutional constraints on the amount of transfers to the rich would enhance the effectiveness of aid in reducing inequality by decreasing the extent of aid fungibility. In this regard, the model can be viewed as implying that aid effectiveness hinges upon institutional quality.

The equilibrium amount of aid maximizes then the donor government's utility subject to the budget constraint and to the reaction of the recipient government, and the first order condition is:

$$U_1 H' - U_2 = 0 \quad (8)$$

For example, when the donor government's utility is Cobb-Douglas, $U(x_p, z) = \alpha\log(x_p) + (1-\alpha)\log(z)$, $0 < \alpha < 1$, then the above condition can be written as follows:

$$\alpha\beta/x_p - (1-\alpha)/z = \alpha\beta/(e_p + A) - (1-\alpha)/(B-A) = 0 \quad (8')$$

and the second order condition clearly holds. Totally differentiating (8') we then obtain that

$$dA/de_p = -(\alpha\beta/(e_p + A))^2 / [-(\alpha\beta/(e_p + A))^2 - ((1-\alpha)/(B-A))^2] \quad (9)$$

which is positive, implying that the amount of aid flows should be positively related to the poor income in the recipient country.

Case 2: Aid can be directly delivered by the donor government

In this case, the domestic government's budget constraint is:

$$b_p + b_r = 1 \quad (10)$$

whereas the income production functions are:

$$x_p = A + e_p + b_p, \; x_r = e_r + b_r \quad (11)$$

When A is large enough, so that the marginal value of further supporting the poor is small from the viewpoint of the donor government, then only transfers to the rich will be made.

The minimal value of A for this to hold is easy to derive:

$$U_p(e_p+A^*, e_r+1)/ U_r(e_p+A^*, e_r+1) = 1 \quad (12)$$

If, however, A<A* then the poor also receive the domestic government's transfer given by:

$$U_p(e_p+A+ b_p, e_r+1- b_p)/ U_r(e_p+A+ b_p, e_r+1- b_p) = 1 \qquad (13)$$

In this case, an increase in foreign aid will be offset by a decrease in the domestic government's support for the poor. To determine the magnitude of the net effect we write the transfer allocation problem of the domestic government as maximizing the utility

$$U(x_p, x_r)$$

subject to

$$x_p + x_r = 1 + e_p + A + e_r$$

The solution to this problem is given by $x_p = H(1 + e_p + A + e_r)$, and $H'(1 + e_p + A + e_r) < 1$ is the increase in the income of the poor as a result of a marginal increase in foreign aid. Note that this is the same as if aid could not be directly delivered by the donor government. The equilibrium amount of aid then maximized the donor government's utility subject to the above reaction function, and the first order condition is as in (8) and, as can be easily shown it increases with the income of the poor, precisely as in the former case.

Summarizing, we obtain

Proposition 1. When aid cannot be directly delivered to the poor by the donor government, only a fraction of it reaches the poor; this fraction is higher the less fungible transfers to the rich are. Further, if the amount of aid is not sufficiently large, this is the outcome even when direct delivery of aid by the donor government is feasible because of

the crowding out of domestic transfers with foreign aid. Also, the amount of aid flows is positively related to the income of the poor in the recipient country.

These results suggest that, unless it is provided in a large amount, foreign aid is generally unlikely to reach its intended beneficiaries in its entirety and some leaks should be expected; and even when it is directly provided to the poor, domestic government decreases its transfers correspondingly so that the effective amount of total transfers remains the same. Further, these leaks are inversely related to the relative weighting of the poor income by the domestic government, so that, in particular, when it is controlled by rich elites who do not care much about the poor, a small part of foreign aid will reach its destination. Additionally, the equilibrium aid donations are positively related to the income of the poor, so that poverty in the recipient country causes larger aid flows.

3. PRELIMINARY EMPIRICAL ANALYSIS

3.1. The data

Our inequality data come from the World Income Inequality Database released by the United Nations (2006)[3]. These data are based on household surveys; also, the population and income coverage are comprehensive, and different criteria from various sources are homogenized in order to avoid problems of definition[4]. In particular, we use the Gini Index as a measure of inequality which is available for 111 countries from 1970 to 2005.

[3] These data are based on Deininger & Squire (2004), the Luxembourg Income Study, UNICEF, and several research studies from Central Statistical Offices (United Nations, 2006).

[4] Definitional problems include whether a category applies to household or individuals, whether income is measured gross or net of taxes, and whether expenditure or income is used to calculate the Gini coefficient, see Atkinson and Brandolini, 2001; however, there is no better proxy available to make broad cross-country comparisons of inequality.

[5] Countries included are Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama,

Additionally, our poverty proxies come from a recently released data set by the World Bank, estimated using a program developed by Chen and Ravallion (2000) and based on primary data information from 454 household surveys covering 97 developing countries. Following Chen and Ravallion (2000), the data were standardized using purchasing power parity estimates for consumption produced by the World Bank (2004[6]). We were able to estimate tri-annual poverty indicators of the generic class of additive indices proposed by Foster et. al. (1984) for the period 1981-2001[7].

In particular, we use the so-called poverty headcount index, the poverty gap index, and the squared poverty gap. The headcount index, or *FGT(0)*, represents the percentage of population living below the poverty line. The main limitation of this index is that it does not takes in account the extent of poverty among the poor: for example, someone just below the poverty line is not in the same situation as on with no income at all. The second index attempts to solve this problem; the poverty gap index, or *FGT(1)*, is defined as the mean shortfall from the poverty line when counting the non poor as having zero shortfall, and expressed as a percentage of the poverty line. While this index provides a better indication of the depth of poverty, its shortcoming is that it does not take in account any inequality among the poor in the sense that it will stay unaffected

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Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela, Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Albania, Armenia, Belarus, Bulgaria, Croatia, Hungary, Latvia, Lithuania, Moldova, Romania, Russia, Slovenia, Turkey, China, Fiji, French Polynesia, Indonesia, Kribati, Lao, Malaysia, Marshall, Micronesia, Mongolia, New Caledonia, Northern Mariana, Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Thailand, Tonga, Vanuatu, Algeria, Egypt, Iran, Israel, Jordan, Morocco, Yemen, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Lesotho, Mali, Mauritania, Niger, Nigeria, Rwanda, Senegal, South Africa, Swaziland, Tanzania, Uganda, Zimbabwe.

[6] The poverty estimates were calculated using World Bank's PovCal (Chen and Ravallion, 2000) as such, they are imperfect, especially in what refers to the application to purchasing power parity estimates. These, however, are the best available poverty measures when comparing large number of countries in a time series.

even if one poor transfers money to someone less poor. The *FGT(2)* index, or squared poverty gap, is similar to the previous index except that the poverty gaps are squared, thus giving the highest weighting to the largest poverty gap and hence providing an indicator of the severity of poverty.[8]

With respect to the foreign aid data used in this paper, we include three different concepts: official development assistance (ODA), effective development assistance (EDA), and aid commitments. The first one is our preferred measure and is based on the standard definition of aid according to the Development Assistance Committee of the OECD (2006). It takes into account grants and concessional loans net of repayment of previous aid loans and treats forgiveness of past loans as current aid. In general, it is considered a reasonable measure of the actual transfer to liquidity-constrained governments. For this variable there is data for 176 countries for the period 1970 to 2002.

The second foreign aid indicator used is the effective development assistance, developed by Chang et al. (1998). This measure includes the grant element of aid and excludes the loan component of concessional loans which are made at extremely low interest rates. The premise is that the official development assistance may not accurately measure the cost that donors incur in connection with their aid flows, and as a result, the evolution of net official development assistance over time, as well as across donors and recipients, likely provides a distorted picture of aid trends. When using this approach, we end up with a sample of 133 countries for the period 1975-1995[9]. Finally, our third

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[7] This class of measures has the form $P_x = \frac{1}{n}\sum_{i-1}^{q}\left[\frac{(z - y_i)}{z}\right]^x$ where, x is a non-negative parameter, z is the poverty line or the threshold income/consumption below which someone is considered poor, and y_i is a measure of living standard. We use three poverty measures, when $x = 0$, 1, and 2.

[8] See Atkinson, 1987, for a comprehensive discussion of poverty measures and how they are related to inequality measures.

[9] Interestingly, the correlation between official development assistance and effective development assistance is extremely high, about 0.94, obtained by regressing official development assistance on

concept of aid is based on country aid commitments, which reflect firm obligation, expressed in writing and backed by the necessary funds, undertaken by an official donor to provide specified assistance to a recipient country or a multilateral organization. Bilateral commitments are recorded in the full amount of expected transfer, irrespective of the time required for the completion of disbursements (OECD, 2006)[10]. In this case the size of the sample reaches 191 countries for the period 1973-2002. All the measures of foreign aid used in this paper are calculated as percentages of gross domestic product (World Bank, 2004).

TABLE 1 HERE

Our key institutional variable is the measure of corruption based on the Political Risk Rating from the International Country Risk Guide (ICRG, 2006) that is concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business. The most common form of corruption encountered directly by businesses is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. The original measure ranges from 0 to 6. We rescaled this variable to go from 0 to 1, where 0 represents the lowest level of corruption[11]. Other variables

effective development assistance. Easterly (2003) has questioned the reliability of the EDA data during 1970-1974 as the calculation of the grant element began in 1975, only.

[10] Multilateral commitments are not taken into account.

[11] Our corruption variable covers the period 1982-2005, only. We take advantage of the high correlation between the Freedom House data (Gastil, 1990) and the ICRG data (ICRG, 2006) to obtain estimates of corruption from 1973 to 1981 by running a simple bivariate regression between these two variables since the simple correlation between them is negative and statistically significant at one percent. A similar

employed in our analysis are real gross domestic product per capita, the inflation rate, liquid liabilities, and the literacy rate (World Bank, 2006). Table 1 provides detailed definitions of all the variables employed; Table 2 presents basic summary statistics; and Table 3 shows simple correlation among variables.

TABLES 2 AND 3 HERE

3.2. A First Approximation: Cross-Country Evidence

We first take a simplistic approach and run cross-country regressions. In the case of income inequality we take simple averages for the period 1972-2001 for each variable and run cross-country regressions in the spirit of Barro (1991) by postulating the following specification:

$$y_i = \beta_0 + X_i \beta_1 + S_i \beta_2 + \varepsilon_i \quad (14)$$

where y_i represents income inequality, as proxied by the Gini coefficient[12]. Similarly, X_i represents the matrix of basic controls which includes the level of initial gross domestic product per capita in 1972, the literacy rate, liquid liabilities (M3) as a percentage of gross domestic product, and the inflation rate. Additionally, S_i represents the matrix of our variables of interest, that is, a proxy for institutions and either of the three measures of foreign aid described above. We use the latest inequality measure available for each country in order to minimize potential endogeneity. For the case of poverty measures we take the same approach as above, but because of the more limited data the variables are averaged from 1980 to 2001, only. The basic empirical specification is suggested by the

method was applied by Barro (1991). Nevertheless, reducing the sample to go from 1982 to 2002 does not change the results.

[12] We also tested changes instead of levels. Results are never statistically significant.

available literature on inequality and poverty (Deininger and Squire, 2004; Li, et al., 1998; World Bank, 2004, and others). On the right hand side, we consider foreign aid relative to gross domestic product and corruption as key explanatory variables. We also include liquid liabilities, the inflation rate, the initial gross domestic product per capita, the literacy rate, and continental dummies.

TABLE 4 HERE

Table 4 shows our basic results. All foreign aid variables yield coefficients that have negative signs which are statistically significant at conventional levels. Also we find that the interactive term between aid and corruption yields the expected sign and is statistically significant[13]. Aid appears to be associated with income inequality in the context of good institutions, as measured by low corruption, only. Notice that whereas the corruption variable by itself does not yield the expected positive sign, this finding is economically irrelevant, as the variable is never statistically significant regardless of the foreign aid measure used[14].

TABLE 5 HERE

Table 5 changes the focus of the analysis towards the effects of foreign aid on poverty reduction. While we run a similar specification as in the case of income

[13] When testing other institutional variables from well-known sources (ICRG, World Bank) we obtain mixed results. While the institutional variable by itself is almost never statistically significant, the interaction with aid is weakly statistically significant in about thirty percent of the cases --ten variables.

[14] This is particularly true in developing countries, where as a result of corruption and bad institutions, resources that are supposed to reach the poorest end up wasted, typically diverted to the less poor (Chong and Gradstein, 2004).

inequality, here we only show the selected coefficients of our variables of interest, namely our aid proxies, and their interactions with corruption[15]. Unlike the results shown for income inequality, we do not find any effects of foreign aid neither on poverty headcount nor in poverty severity. Although we find the expected signs for all of our variables, they do not reach the conventional levels of statistical significance. Moreover, even in the presence of good institutions, as measured by low corruption, it seems that foreign aid does not help reduce poverty, as the interactive term is not statistically significant.

4. DYNAMIC PANEL DATA APPROACH

The cross-country findings above are likely to be biased due to common problems of simultaneity and reverse causation that may arise because income inequality and poverty may be affected by foreign aid, as well as aid allocation may be driven by poverty and income inequality. The analytical framework indicates that disentangling the causality relationship between aid and income distribution could be difficult, as aid flows are expected to be higher into countries with particularly high levels of poverty, as well as to cause changes in income distribution. Econometrically, a panel data approach should help resolve the causal aid effect on poverty and inequality. In this regard, some previous theoretical and empirical research on related issues gives some guidance on the most appropriate methodology to follow. Previous panel data research shows that inequality has been highly stable in recent decades (Li et al., 1998), and that the correlation of inequality between the 1960s and 1980s has hovered around 0.85. Further, the average ratio of incomes of the richest five percent to the poorest five percent across countries has

[15] We tested a very broad range of specifications and the results do not change. Poverty measures remain

barely moved, from 33.2 in 1960 to 31.7 in 1985 (Bruno et al., 1998). Likewise, there are several studies have pointed out the persistence of poverty in developed and developing countries (Bane and Elwood, 1986; Huff, 1999; Wright, 1992; Hoynes et. al., 2006). This suggests that both income inequality and poverty are persistent series. Past levels of inequality and poverty may be important predictors of current levels of income inequality and poverty, respectively, which is likely to bias the cross section findings.

A reasonable alternative to dealing with the problem of persistence as well as with that of endogeneity is to use a dynamic panel specification. The use of a dynamic specification introduces potential problems of serial correlation in the error process. The presence of serial correlation is important not only because of its implications in testing the validity of the instruments used in the regression analysis but also because of its impact on the consistency of the estimates. As suggested by the literature (Loayza et al. 2000), the modeling strategy for panel data equations with autoregressive errors consists in specifying a dynamic regression with uncorrelated disturbances, which implies the need for the lagged value of the dependent variable as an additional control. Taking into account the particular characteristics of the series under examination, we consider as the most suitable estimation method the fixed effects dynamic panel data GMM-IV techniques (Arellano and Bover, 1995; Blundell and Bond, 1997). By using this method we estimate a regression equation in differences and a regression equation in levels simultaneously, with each equation using its own specific set of instrumental variables. Notice that by applying this method, there is no need to account for fixed effects explicitly as the estimation is testing for differences[16].

statistically insignificant to foreign aid.

[16] This approach has been used by Hansen and Tarp (2001) and Rajan and Subramanian (2005) in the context of the link between foreign aid and economic growth.

The consistency of the GMM estimator depends on whether lagged values of the explanatory variables are valid instruments in the regression. We address this issue by considering two specification tests suggested by Arellano and Bond (1991) and Arellano and Bover (1995). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. Failure to reject the null hypothesis gives support to the model. The second test examines the hypothesis that the error term is not serially correlated. We test whether the differenced error term (that is, the residual of the regression in differences) is first-, and second-order serially correlated. First-order serial correlation of the differenced error term is expected even if the original error term (in levels) is uncorrelated, unless the latter follows a random walk. Second-order serial correlation of the differenced residual indicates that the original error term is serially correlated and follows a moving average process at least of order one. If the test fails to reject the null hypothesis of absence of second-order serial correlation, we conclude that the original error term is serially uncorrelated and use the corresponding moment conditions.

TABLE 6 HERE

Our benchmark specification is similar to the one presented in the cross section, namely, we control for gross domestic product per capita, liquid liabilities, inflation rate, literacy, corruption and focus on two variables of interest, foreign aid and its interaction with corruption. Additionally, as shown above, income inequality and poverty tend to be persistent, thus consistent with the dynamic panel method employed, we also control for

lagged dependent variable values. In the case of our inequality regressions we use an annual unbalanced panel that goes from 1970 to 2005. However, since our poverty data are available tri-annually, we use three-year averages and construct a balanced panel that goes from 1981 to 2001. Table 6 shows the results when using the dynamic panel data method described above. We find a negative sign for our variable of interest, although it is not statistically significant. Further, we find evidence on the link between foreign aid and corruption with respect to income inequality, as shown by the interactive term[17]. However, in the case of our preferred foreign aid measure, the coefficient of the interactive term is statistically significant at ten percent only, and it is not very robust to changes in specification[18].

TABLE 7 HERE

Using similar specifications, we also test for the association between foreign aid and poverty. Table 7 shows the coefficients and standard errors of our variables of interest[19]. Even though we find the expected signs for our variables of interest as well as for the interactive terms between foreign aid and corruption, the resulting coefficients are not statistically significant in most cases, with the exception of regressions that use the aid commitment, the weakest measure of the three used in this paper, as a proxy for foreign aid. Furthermore, the overall effect of foreign aid on poverty is not statistically significant in most of the cases.

[17] We also tested both the Theil inequality measure as well as several dimensions of the Atkinson inequality index obtaining very similar results.

[18] In the case of the interaction between corruption and aid commitment we obtain a positive and statistically significant coefficient at five percent. When testing additional institutional variables we obtain mixed results, similar as in the cross-section as only about twenty percent of the additional case are statistically significant at conventional levels (also, see footnote 12)

In general, the validity of our set of instruments is confirmed by the two tests proposed. The first test, the Hansen test of over identification of restrictions is rejected for both the inequality and poverty regressions. At the same time, we find that the error terms of our differenced equations follow an autoregressive process of first order, but not of second order, which implies that the error terms of the levels equation does not follow an autoregressive process. Also, the hypothesized dynamic structure of the model is confirmed by the highly significant and positive coefficients of the first lag of our dependent variable[20].

5. CONCLUSIONS

This paper contributes to the literature on aid effectiveness by examining the effect of aid on income distribution and poverty. While these constitute the primary objectives of foreign aid, research on how their achievement is affected by foreign aid is very scarce. We focus on both the direct effect of aid and on how this effect is possibly mediated by recipient countries' institutions, trying to carefully deal with endogeneity concerns.

In line with the recent line of research that discerns failures of foreign aid to promote growth even in the presence of good institutions (e.g., Easterly, 2003, and Easterly et al., 2004) or to enhance the quality of democratic institutions (Brautigam and Knack, 2004, and Knack, 2004), we find that aid by itself does not appear to have a statistically significant effect on inequality and poverty reduction. While both our simple cross-section approach and our dynamic panel estimation seem to suggest that good

[19] Full regression results are available upon request.

[20] Results are robust to changes in specification, as well as to different lag structures of the equations and sets of instrumental variables. Furthermore, in the instrumental variable matrix we also include external instruments, in particular, legal origin and a linguistic fractionalization index. Exclusion of all the external instruments does not change our results. Also, notice that poverty and inequality persistence are unconditional on the presence of other regressors.

institutions may be necessary for aid to reach the poor, we fail to detect any robust impact of foreign aid in this regard, even when institutional quality is taken into consideration. Whereas these results complement the existing ones that deal with the growth effects of aid, the urgency of the examined objectives makes the apparent ineffectiveness of aid appear even more dramatic.

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FIGURE 1
INEQUALITY, FOREIGN AID, AND INSTITUTIONS

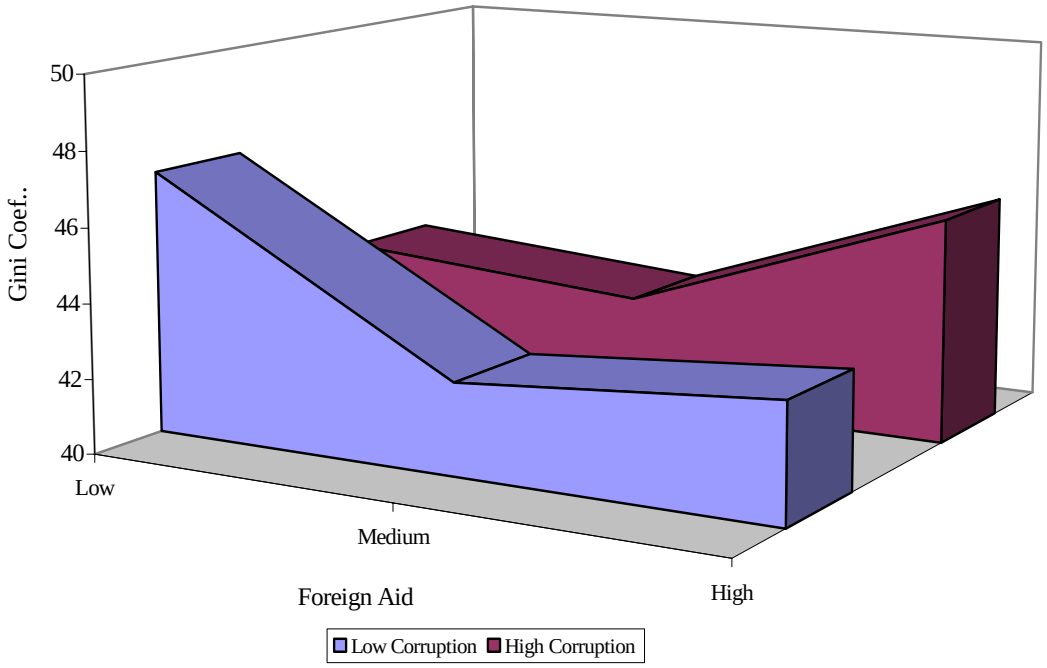

TABLE 1

DEFINITIONS AND SOURCES

Variable	Definition
Gini Index	It measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Source: United Nations (2006).
Poverty Headcount Index	Population below $1 a day is the percentage of the population living on less than $1.08 a day ($32.74 per month) at 1993 international prices. Source: PovcalNet (World Bank). See Chen and Ravallion (2000) for description of calculations.
Poverty Gap	Poverty gap is the mean shortfall from the poverty line (counting the non poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence. Source: PovcalNet (World Bank). See Chen and Ravallion (2004) for a detailed description of calculations.
Squared Poverty Gap	In addition to the Head Count and Poverty Gap Indices, a third measure which better reflects changes in the severity of poverty is the Squared Poverty Gap Index. This is defined similar to the Poverty Gap Index except that the poverty gaps are squared, thus giving the highest weighting to the largest poverty gap. The need for this Index arises because the Poverty Gap Index may not adequately capture concerns over distribution changes within the poor. For example, if a policy resulted in money transfer from someone just below the poverty line to the poorest person, the Squared Poverty Gap Index will reflect this change, while the Poverty Gap Index will not. Source: PovcalNet (World Bank). See Chen and Ravallion (2004) for a detailed description of calculations.
ODA/GDP	ODA is based on the standard definition of aid according to the OECD. It takes into account grants and concessional loans net of repayment of previous aid loans and treats forgiveness of past loans as current aid. It includes grants or loans to countries and territories on Part I of the DAC List of Aid Recipients (developing countries) which are undertaken by the official sector, with promotion of economic development and welfare as the main objective, at concessional financial terms (if a loan, have a grant element of at least 25 per cent); grants, loans and credits for military purposes are excluded. Source: OECD.
EDA/GDP	EDA (as percentage of GDP) is defined as the sum of grant equivalents and grants, excluding technical assistance. EDA = EDA GQ + Grants - TA - B Debtf, where EDA GQ = Grant equivalents; Grants = Grants; TA = Total Technical Assistance; B Debtf = Debt forgiveness used to adjust bilateral grants. This adjusted measure uses the same conventional grant data but aggregates grant equivalents of loans (GQ) rather than the full face value of all loans deemed concessional. Source: OECD
Commitment/GDP	Total amount of the transactions committed in millions of current US$ / GDP . Source: OECD.
log GDP per capita (constant 2001 US$)	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant U.S. dollars. Source: WDI (World Bank 2006).
Inflation rate	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Source: WDI (World Bank 2006).
Liquid liabilities	Liquid liabilities are also known as broad money, or M3 as a percentage of GDP. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents. Source: (World Bank 2006).
Literacy rate	Adult literacy rate is the percentage of people ages 15 and above who can, with understanding, read and write a short, simple statement on their everyday life. Source: WDI (World Bank 2006).
Corruption	Index for Corruption. It ranges from zero to one, increasing with higher risks of corruption. Assessment of the corruption within the political system. The most common form of corruption met directly by business is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. It is also more concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business.Source: International Country Risk Guide (ICRG, 2006)
Policy	Good policy index. Constructed following the methodology by Burnside and Dollar (2000).
Value added in the agricultural sector	Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Source: World Development Indicators.
Value added in the industrial sector	Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Source: World Development Indicators.
Language	Shares of languages spoken as "mother tongues", generally based on national census data. Source: Alesina et al. (2003).
UK legal origin	Dummy equals one if country has common law origins, zero otherwise. Source: La Porta et al. (1998).
French legal origin	Dummy equals one if country has French Commercial Code, zero otherwise. Source: La Porta et al. (1998).
Socialist legal origin	Dummy equals one if country has Socialist/Communist laws, zero otherwise. Source: La Porta et al. (1998).

TABLE 2
SUMMARY STATISTICS

	Observations	Mean	Std. Dev.	Min.	Max.
Cross section					
Gini coefficient	111	44.61	11.32	24.50	74.61
Poverty Headcount index	97	17.98	20.94	0.00	84.31
Poverty Gap	97	7.12	10.81	0.00	47.02
Squared Poverty Gap	97	4.02	7.28	0.00	39.21
ODA/GDP	156	9.49	12.38	0.01	80.80
EDA/GDP	132	6.19	7.09	-0.03	34.83
Commitment/GDP	168	4.01	5.62	0.00	46.27
Corruption	109	0.51	0.17	0.00	0.95
Inflation rate	138	72.63	188.88	-1.83	1184.35
M3/GDP	161	41.33	29.85	0.06	188.62
Literacy rate	135	68.56	24.56	10.52	99.80
Initial GDP pc	156	6.89	1.23	4.55	10.70
Panel data (annual data)					
Gini coefficient	761	43.12	10.75	18.10	79.50
ODA/GDP	3876	8.73	13.34	0.00	241.80
EDA/GDP	2168	6.37	9.11	-0.15	90.55
Commitment/GDP	3822	3.92	7.25	0.00	177.93
Corruption	4134	0.52	0.14	0.00	1.00
Inflation rate	3360	58.66	576.70	-100.00	23773.13
Liquid Liabilities	3801	40.09	35.40	0.00	753.98
Literacy rate	3835	68.09	25.58	5.75	99.80
GDP per capita	3897	6.95	1.25	3.74	10.70
% value added in the agricultural sector	3659	23.45	15.14	0.07	74.27
% value added in the industrial sector	3646	27.97	12.01	4.16	88.03
UK legal origin	4859	0.38	0.49	0.00	1.00
French legal origin	4859	0.48	0.50	0.00	1.00
Socialist legal origin	4859	0.13	0.33	0.00	1.00
Language	5464	0.41	0.28	0.00	0.92
Panel data (three-year averaged data)					
Poverty Headcount index	775	19.70	21.60	0.00	89.63
Poverty Gap	775	7.71	10.75	0.00	55.68
Squared Poverty Gap	775	4.27	7.15	0.00	41.71

TABLE 3
SIMPLE CORRELATIONS

	Gini coefficient	ODA/GDP	EDA/GDP	Commitment/ GDP	Corruption	Inflation rate	Liquid Liabilities	Literacy rate	GDP pc	% value added in the agricultural sector	% value added in the industrial sector	UK legal origin	French legal origin	Socialist legal origin
ODA/GDP	0.028													
	0.485													
EDA/GDP	0.072	0.955												
	0.135	0.000												
Commitment/GDP	0.109	0.659	0.662											
	0.004	0.000	0.000											
Corruption	0.085	0.005	0.051	-0.021										
	0.024	0.789	0.019	0.210										
Inflation rate	0.027	-0.387	-0.422	-0.302	-0.330									
	0.470	0.000	0.000	0.000	0.000									
Liquid Liabilities	0.012	0.007	0.017	0.039	0.033	-0.030								
	0.760	0.705	0.486	0.033	0.073	0.091								
Literacy rate	-0.118	0.043	0.129	-0.075	-0.139	0.341	-0.036							
	0.001	0.012	0.000	0.000	0.000	0.000	0.041							
GDP pc	-0.040	-0.282	-0.285	-0.230	-0.305	0.636	0.054	0.240						
	0.309	0.000	0.000	0.000	0.000	0.000	0.006	0.000						
% value added in the agricultural sector	-0.037	0.305	0.404	0.270	0.262	-0.823	0.026	-0.394	-0.554					
	0.334	0.000	0.000	0.000	0.000	0.000	0.167	0.000	0.000					
% value added in the industrial sector	-0.065	-0.364	-0.377	-0.285	-0.066	0.436	0.030	0.056	0.360	-0.580				
	0.086	0.000	0.000	0.000	0.000	0.000	0.104	0.001	0.000	0.000				
UK legal origin	0.041	0.067	0.082	0.094	-0.106	0.065	-0.063	0.170	0.052	0.046	-0.098			
	0.263	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.006	0.000			
French legal origin	0.471	-0.038	-0.018	-0.040	0.156	-0.072	0.046	-0.138	-0.282	-0.039	0.012	-0.760		
	0.000	0.021	0.404	0.014	0.000	0.000	0.008	0.000	0.000	0.022	0.467	0.000		
Socialist legal origin	-0.555	-0.036	-0.094	-0.070	-0.073	-0.017	0.030	-0.054	0.338	0.000	0.123	-0.301	-0.367	
	0.000	0.028	0.000	0.000	0.000	0.289	0.087	0.001	0.000	0.992	0.000	0.000	0.000	
Language	-0.013	0.068	0.085	0.071	0.219	-0.488	-0.010	-0.180	-0.410	0.405	-0.181	0.112	-0.016	-0.104
	0.724	0.000	0.000	0.000	0.000	0.000	0.579	0.000	0.000	0.000	0.000	0.000	0.286	0.000

TABLE 4
FOREIGN AID AND INSTITUTIONAL QUALITY ON INCOME INEQUALITY

	Gini coefficient		
ODA/GDP	-1.531		
	(0.448)***		
ODA/GDP* Corruption	2.539		
	(0.834)***		
EDA/GDP		-1.468	
		(0.618)**	
EDA/GDP* Corruption		2.783	
		(1.274)**	
Commitment/GDP			-1.974
			(0.902)**
Commitment /GDP* Corruption			3.399
			(1.589)**
Corruption	-14.941	-11.430	-13.175
	(10.871)	(11.135)	(11.513)
Inflation rate	0.009	0.002	0.004
	(0.005)	(0.005)	(0.006)
M3/GDP	-0.065	-0.050	-0.063
	(0.061)	(0.075)	(0.065)
Literacy rate	0.146	0.125	0.107
	(0.092)	(0.092)	(0.087)
Initial GDP per capita	-3.166	-2.714	-2.797
	(1.536)**	(1.786)	(1.620)*
Constant	59.677	56.024	60.062
	(15.908)***	(17.166)***	(16.959)***
Continental dummies	Yes	Yes	Yes
Observations	60	63	66
R-squared	0.50	0.49	0.49

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

TABLE 5
FOREIGN AID AND INSTITUTIONAL QUALITY ON POVERTY

	ODA/GDP	EDA/GDP	Commitment/GDP
	Dependent variable: Poverty Headcount index		
Aid	-0.921	-0.585	-0.496
	(0.868)	(1.031)	(1.571)
Aid *corruption	3.099	2.837	2.912
	(2.020)	(2.561)	(3.445)
Observations	60	64	66
R-squared	0.66	0.65	0.64
	Dependent variable: Poverty Gap		
Aid	-0.651	-0.399	-0.561
	(0.503)	(0.611)	(0.873)
Aid *corruption	2.001	1.725	2.143
	(1.155)*	(1.483)	(1.923)
Observations	60	64	66
R-squared	0.58	0.56	0.55
	Dependent variable: Squared Poverty Gap		
Aid	-0.453	-0.251	-0.447
	(0.335)	(0.411)	(0.559)
Aid *corruption	1.364	1.104	1.545
	(0.769)*	(0.986)	(1.246)
Observations	60	64	66
R-squared	0.52	0.50	0.49

* significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Coefficients shown come from regressions using the same specification as those shown in Table 4.

TABLE 6
FOREIGN AID AND INSTITUTIONAL QUALITY ON INCOME INEQUALITY
DYNAMIC PANEL DATA

	Gini coefficient		
ODA/GDP	-0.743		
	(0.46)		
ODA/GDP* Corruption	1.300		
	(0.78)*		
EDA/GDP		-1.077	
		(1.86)	
EDA/GDP* Corruption		1.884	
		(0.77)**	
Commitment/GDP			-1.427
			(0.771)*
Commitment /GDP* Corruption			3.469
			(1.542)**
Corruption	1.341	0.855	4.027
	(5.44)	(13.39)	(3.71)
Inflation rate	-0.0007	-0.0001	-0.0004
	(0.00)	(0.00)	(0.00)
Liquid Liabilities	0.008	-0.058	0.024
	(0.02)	(0.05)	(0.02)
Literacy rate	-0.042	-0.044	-0.011
	(0.013)***	(0.013)***	(0.04)***
GDP per capita	-0.814	0.823	0.832
	(0.055)*	(0.054)*	(0.053)*
First Lag of Gini coefficient	0.821	0.640	0.827
	(0.064)***	(0.088)***	(0.054)***
Constant	7.688	12.685	5.087
	(2.19)**	(4.18)**	(1.58)**
Observations	245	166	278
Number of Countries	47	43	55
F Test	72.477	66.709	74.994
Prob > F	0.00	0.00	0.00
Hansen test of overid. restrictions	37.756	36.048	41.39
P-value	1.00	1.00	1.00
Test for AR(1) (p-value)	0.076	0.163	0.089
Test for AR(2) (p-value)	0.256	0.332	0.246

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

TABLE 7
FOREIGN AID AND INSTITUTIONAL QUALITY ON POVERTY
DYNAMIC PANEL DATA

	ODA/GDP	EDA/GDP	Commitment/GDP
	Dependent variable Poverty Headcount index		
Aid	-0.042	0.083	-0.242
	(0.087)	(0.174)	(0.199)
Aid *corruption	0.230	-0.307	1.096
	(0.266)	(0.549)	(0.566)*
Observations	436	309	470
Hansen test (p-value)	1.00	1.00	1.00
Test for AR(1) (p-value)	0.00	0.02	0.00
Test for AR(2) (p-value)	0.32	0.76	0.46
	Dependent variable: Poverty Gap		
Aid	-0.035	-0.013	-0.137
	(0.046)	(0.079)	(0.097)
Aid *corruption	0.108	-0.017	0.560
	(0.144)	(0.229)	(0.303)*
Observations	436	309	470
Hansen test (p-value)	1.00	1.00	1.00
Test for AR(1) (p-value)	0.00	0.03	0.00
Test for AR(2) (p-value)	0.93	0.89	0.92
	Dependent variable: Squared Poverty Gap		
Aid	-0.028	-0.021	-0.082
	(0.034)	(0.044)	(0.065)
Aid *corruption	0.058	0.011	0.327
	(0.104)	(0.148)	(0.205)
Observations	436	309	470
Hansen test (p-value)	1.00	1.00	1.00
Test for AR(1) (p-value)	0.00	0.02	0.00
Test for AR(2) (p-value)	0.67	0.74	0.55

* significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Coefficients shown come from regressions using the same specification as those shown in Table 6.