Do donors care about declining trade revenues from liberalization? An analysis of aid allocation

Do Donors Care about Declining Trade Revenues from Liberalization? An Analysis of Aid Allocation

Javed Younas and Subhayu Bandyopadhyay*

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Abstract

Many developing country governments rely heavily on trade tax revenue. Therefore, trade liberalization can be a potential source of significant fiscal instability, and may affect government spending on development activities. Donor nations may take this into account in making their aid allocation decisions for developing nations. Our findings suggest that bilateral donors provide substantially larger amounts of aid to compensate (or reward) liberalizing recipient nations who also face declining trade tax revenues. Interestingly, these effects are statistically insignificant in the context of multilateral aid. Multilateral donors are more focused on income per capita and may be using it as a *de facto* measure of average living standards in the recipient nations.

*The views expressed are those of individual authors and do not necessarily reflect official position of the Federal Reserve Bank of St. Louis, the Federal Reserve System, or the Board of Governors.

Javed Younas, Department of Economics, West Virginia University, Morgantown, WV 26506-6025.
E-mail: jayounas@mail.wvu.edu.

Subhayu Bandyopadhyay, Research Division, Federal Reserve Bank of St. Louis, PO Box 442, St. Louis, MO 63166-0442, and IZA, Bonn
E-mail: Subhayu.Bandyopadhyay@stls.frb.org

1. Introduction

After successive Uruguay Round negotiations and the creation of the World Trade Organization (WTO) in the early 1990s, many developing countries have chosen to dismantle their trade barriers and open their economies to international competition. Though trade theory advocates greater economic gains from trade liberalization, the transition to free trade may involve a substantial adjustment cost in terms of decline in revenues. Since developing countries often rely heavily on trade tax revenue, a reduction or elimination of these taxes may be a source of their fiscal instability. To the extent that public spending is targeted at useful programs like schools, infrastructure, health etc. this may be a significant loss for a poor nation. In the long run, if liberalization is successful, one would expect these problems to be addressed both by provision of better private markets, as well as from rising revenues from different sources (income tax, sales tax, or maybe even trade taxes due to the volume effect) due to rising income levels. However, even in the case of potentially successful liberalization, the donors may be concerned about the short run budgetary implications of trade liberalization for the poorest of nations.

In principle, even in the short run, revenue losses from trade liberalization may be offset by turning to alternative sources of revenue that may be less distortionary. This requires good governance and an efficient domestic tax system. The evidence on this is not very heartening. For example, Baunsgaard and Keen (2005) argue that middle and low income countries fail to carry out substantial tax reforms to replace lost trade revenue by revenue from other sources. They find that middle income countries recovered 45-60 cents from other sources for every one dollar loss in trade tax revenue, while low income countries could recover no more than 30 cents for each lost dollar. Khattry and Rao (2002) find that in low-income countries revenue

constraints remain even after a decade of trade reforms, and emphasize fiscally realistic development strategy in the post-liberalization period. In a broader analysis on limitation of trade policy reform in developing countries, Rodrik (1992) argues that tariff reduction at the cost of fiscal considerations can have disastrous consequences. He cites examples of Turkey and Morocco, where trade taxes were re-imposed due to fiscal problems.

There is a realization among developed nations that trade-related technical and financial assistance should be extended to mitigate detrimental effects of trade reforms in developing countries. The official development assistance (ODA), commonly known as foreign aid, may be used to compensate countries experiencing declining trade revenue. It may also be offered as a reward for pursuing trade liberalization policies. Lahiri and Raimondos-Møller (1997) base their analysis along the latter rationale for aid allocation. They present a model where recipient nations compete to give tariff concessions to donors to get a bigger pie of the foreign aid.

In spite of the sizeable literature in this broad area of trade and aid, empirical analysis of the impact of declining trade revenue on foreign aid allocation is sparse. Most studies focus on the political and strategic interests of donors, while others analyze their developmental and humanitarian concerns, while some investigate both.[1] Recent studies have explored other aspects of donors' aid allocation such as colonial ties of aid recipient countries, support to donor countries in U.N. voting and the level of corruption in the recipient nations (Alesina and Dollar, 2000; Alesina and Weder, 2002; Burnside and Dollar, 2000, and Kuziemko and Werker, 2006). Concerning selectivity of aid allocation, Dollar and Levin (2004) show that more aid has been allocated to poor countries with reasonably good institutions, however, this pattern is somewhat different between bilateral and

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[1] See for example, McKinlay and Little (1977 and 1979), Maizels and Nissanke (1984), Dowling and Hiemenz (1985), Trumbull and Wall (1994), Wall (1995), Neumayer (2003a, 2003b) and Bandyopadhyay and Wall (2007).

multilateral donors. This paper complements the literature by empirically investigating the effect of declining trade revenue (due to liberalization) on the aid allocation decision.

The logic of compensating trade liberalizing developing nations is consistent with the foreign aid objectives for reducing poverty and promoting economic development, captured in the DAC guidelines for poverty reduction.[2] Moreover, bilateral donors are driven by the motivation for pursuing their own economic interests in their potential export markets (see Dudley and Montmarquette, 1976; Neumayer, 2003a). Therefore, aid in bailing out liberalizing nations may also relate to the self-interest motive outlined in these contributions. The donors may worry that fiscal crisis may halt or reverse trade liberalization, which benefit the donors' export interests.

Unlike bilateral donors, multilateral donors have no direct economic benefits from promoting trade links. There is, of course, indirect interest, because donor institutions like the World Bank are funded by developed nations. This indirect interest is probably more diluted because of coordination issues between the different developed member nations. Therefore, we separate out bilateral aid from multilateral aid to see whether there is empirical evidence of different responses of donors to declining revenues of recipients.

The remainder of the paper is organized as follows. The next section illustrates empirical methodology. Section 3 describes the data, Section 4 presents estimation results and section 5 concludes.

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[2] For example, see the guidelines at: http://www.oecd.org/dataoecd/47/14/2672735.pdf.

2. Empirical Methodology

In order to derive consistent and efficient estimates, we control for commonly examined variables in the aid allocation literature (Maizels and Nissanke, 1984; Dowling and Hiemenz, 1985; Trumbull and Wall, 1994; Wall, 1995; Alesina and Dollar, 2000; Kuziemko and Werker, 2006). This approach helps in identifying the similarities and differences in policy objectives of bilateral and multilateral donors.

Three goals guide our sample selection. First, we include only middle and low income aid recipient countries because past studies conclude that they face highest uncompensated loss in trade revenue (Baunsgaard and Keen, 2005; Khattry and Rao, 2002; Rodrik, 1992).[3] Second, since Israel and Egypt receive disproportionately higher amount of aid largely based on political reasons, we exclude them to focus on the economic determinants. Third, since containment of communism rather than development concerns was a major factor for providing aid during the Cold War era (see Boschini and Olofsgård, 2005), we limit our analysis to the Post Cold War period. Another constraint was the non-availability of consistent yearly data for majority of developing countries on revenues from international trade taxes prior to the 1990s. This factor also restricts our analysis to the Post Cold War period. Finally, only the recipient countries who received positive amount of aid for each time period in our sample are included.

Regarding the choice of the model that fits the data well, we prefer using the pooled ordinary least squares (POLS) over the fixed effects (FE) model. The main appeal for using POLS model is that the coefficients of recipient-specific and time-invariant variables such as colonial ties and geographical proximity can also be estimated which is not possible with the FE model. Another disadvantage of the FE model is that it requires estimation of separate

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[3] World Bank (2006) classifies aid recipient countries into high income non-OECD, middle income and low income countries.

parameters for all aid recipient countries in the sample, resulting in substantial loss in degrees of freedom. Much of the variation in the data is used up in estimating the dummy variables for each country which may also affect the precise estimation of coefficients on other explanatory variables. Moreover, variables with little variations over time such as political rights and civil liberties are also estimated imprecisely.

The possibility of likely simultaneous causation between the dependent variable (aid per capita) and two independent variables (income per capita and trade tax revenue) needs to be addressed before we proceed to estimation. One may plausibly argue that the independent variables we use are really endogenous because they are affected by and may also affect the flow of aid. This may suggest a simultaneous estimation technique like the two-stage least squares. There are two problems with using an instrumental variables approach. First, appropriate instruments in these studies for developing countries are difficult to find, and second, employing weak instruments may contaminate estimation results.[4,5] Wooldridge (2003) states that if we assume that the error term μ_{it} is uncorrelated with all past endogenous and exogenous variables, then lagged endogenous variables in simultaneous models are treated as predetermined variables and they are uncorrelated with μ_{it}. Following this logic, we use a one year lagged value for all independent variables. Besides diminishing simultaneity bias, this technique also makes economic sense because information to the donors (about a recipient) is only available with some time lag. The technique also overcomes the problem of contemporaneous correlation.

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[4] The instrumental variables (IV) approach is not common in this literature. Most studies use OLS.

[5] Maizels and Nissanke (1984), while citing Maddala (1977), state that, "all estimation techniques, including 2SLS, are designed to deal only with the contemporaneous simultaneity and the lagged endogenous (dependent) variables are treated in simultaneous models as predetermined variables along with other exogenous variables in the system." Therefore, if aid flows can be assumed to affect a country's economic performance with some time lag, the problem of simultaneous bias is considerably lessened and the necessity of using 2SLS instead of OLS is accordingly greatly diminished.

Moreover, we account for heteroscedasticity and serial correlation in our estimation method. The empirical model takes the following form:[6]

$$\ln\left(Aidpc_{\,i,t}\right) = \beta_0 + \beta_1 \ln\left(Incpc_{\,i,t-1}\right) + \beta_2 \ln\left(Pop_{\,i,t-1}\right) + \beta_3 \ln\left(Infm_{\,i,t-1}\right) + \beta_4 \ln\left(PolCiv_{\,i,t-1}\right)$$
$$+ \beta_5 \ln\left(Open_{\,i,t-1}\right) + \beta_6 \left(Ttaxr_{\,i,t-1}\right) + \beta_7 \left(Idr_{\,i,t-1}\right) + \beta_8 \left(Col_{\,i}\right) + \beta_9 \ln(Dist_{\,i}) + \eta_{t-1} + \varepsilon_{it} \tag{1}$$

where, i = aid recipient countries; t = years

     A$idpc$ = bilateral or multilateral aid per capita received by a recipient country

    Incpc = income per capita of a recipient country

    Pop = population size of a recipient country

    Infm = infant mortality rates in a recipient country

    PolCiv = level of political rights and civil liberties in a recipient country

    Open = trade openness as a ratio of exports plus import to GDP of a recipient country

    Ttaxr = international trade revenue as a ratio to total revenue in a recipient country

    Idr = import duties as a ratio to tax revenue in a recipient country

    Col = dummy variable for colonial experience of an aid recipient country

    Dist = geographical location of an aid recipient country

    η = period specific dummy variables

Aid per capita and income per capita may either be substitutes or complements. They will be substitutes, if compassion or altruism is the driving force. In this case, more aid is given when per capita income falls. Otherwise, they are complements. Among other reasons, self-interest motives that tie developed and developing economies together may justify such behavior.

Past studies find a bias in aid allocation against countries with larger populations (Isenman, 1976; Dowling and Hiemenz, 1985; Trumbull and Wall, 1994; Wall, 1995; Alesina and Dollar, 2000). The literature offers the following explanations that consider both supply side

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[6] The *Ttaxr* and *Idr* variables are not included together in the regression because of very high inter-correlation between them. Import duties make up more than 90 percent of total international tax revenue for a majority of the countries in our sample. Therefore it is reasonable not to introduce these as separate right hand side variables.

and demand side factors: (1) the marginal impact of aid decreases as population increases; (2) high population countries lack administrative expertise to absorb large amounts of aid; and, (3) it is easier for donors to wield political influence over smaller countries than larger ones.

Per capita income alone may not be an adequate reflection of economic needs for aid, especially in view of high income inequalities in several recipient countries. This prompted our use of the infant mortality rate, which relates to the concept of individual well-being. This is also in the tradition of the existing literature in this area (see Trumbull and Wall, 1994; Wall, 1995 etc.).[7] The political rights and civil liberties variable used as a proxy for human rights captures the donor's perception about the objective function of the recipient government. If a recipient (government) values human rights, it is perceived to put a higher weight on the welfare of its people. In turn, it is likely that it will utilize the aid to improve their well-being.

Higher trade openness and lower import barriers by recipient countries directly benefit donor countries by expanding markets for their exports. Trade expansion can be deemed as an outcome of trade liberalization policies including lower import duties and quotas, reducing export taxes and credits, etc. Therefore, we can expect a positive relationship between trade openness and aid per capita.

Bilateral and multilateral donors may allocate more aid to recipient countries experiencing uncompensated loss from trade tax revenue to support public programs that target the poor. In addition, there is a fear that declining trade revenues may lead to tighter fiscal policy which in turn may topple the regime that is engaging in liberalization. This may stop or even reverse the process of trade liberalization. To avoid such political instability, the donors may provide more aid. Finally, we may expect to see a negative relation between trade revenue

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[7] The World Bank Report (2006) defines infant mortality rates as the number of infants dying before reaching one year of age per 1,000 live births in a given year.

and aid if donors reward the recipients for engaging in liberalization. Although observationally equivalent, the latter motive of "reward" is in principle distinct from the "compensation" motive.

Following the literature in this area (for example, Alesina and Dollar, 2000; Neumayer, 2003a), we examine whether a recipient country's experience as a colony of a DAC country or its geographical location have an influence on aid allocation by bilateral and multilateral donors.[8] Information about a recipient country's colonial history is taken from the CIA Factbook (2006). We use a dummy variable that assumes the value of one if a recipient country had been a colony of any of the donors in our study, it is zero otherwise. The geographical location variable tests whether recipient countries closer to the United States, Western Europe, or Japan receive more aid than others.[9] We expect that both colonial experience and geographical location have a positive influence on bilateral aid allocation. Since USA, Japan, Germany and France are major shareholders in multilateral aid agencies, they may wield their influence over policies of these organizations (Alesina and Dollar, 2000; Neumayer, 2003a; Kuziemko and Werker, 2006). In this case, we may also find a positive relation between multilateral aid per capita and these two political-strategic variables.

Although there is high correlation between income per capita and infant mortality rate, past studies routinely include both of them in the same regression as they provide significantly different information to donors.[10] While income per capita indicates the average level of prosperity and economic development, infant mortality rate may capture quality of life issues

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[8] One advantage of using pooled OLS is that, unlike the fixed effects model, the coefficients of the colonial and distance variables, which are time-invariant, can be estimated, as discussed above.
[9] Geographical proximity is measured as the minimum air distance, in kilometers, of a recipient country from New York, Rotterdam, and Tokyo. Its data was taken from Gallup, Sachs and Mellinger (1999). Following Neumayer (2003a), we used existing data for a geographically close country (neighboring), if distance data for a particular country is not available.
[10] Per capita income captures economic need while infant mortality signifies physical need (Trumbull and Wall, 1994; Wall, 1995; Bandyopadhyay and Wall, 2007). Bandyopadhyay and Wall (2007) note that though economic and physical needs are clearly correlated in the long run, they do not necessarily move in the same direction over shorter periods of time.

that income alone cannot account for (for example, a poor person may have access to publicly provided medical care, which may reduce infant mortality and raise the quality of life). Therefore, we include both variables together in all regressions.[11] In addition, equation (1) also includes a time dummy η_{t-1} that accounts for time-specific changes in trade policy of recipient nations.[12] In addition it also controls for events like a flood or a drought in a particular year – which may lead to an aid spike for the corresponding year.

3.   Description of Data

The data for aggregate net aid by bilateral donors and multilateral agencies to fifty two recipient countries for the period 1992-2003 is taken from International Development Statistics (2005).[13] It contains aid given for development purposes only and does not include grants, loans, and credits for military purposes.

Following Neumayer (2003a), we converted aid data into constant US$2000 using the unit value of the world import price index, and used the recipient nations' population to express the aid data in real per capita terms. This serves to express per capita aid in terms of its purchasing power for a representative bundle of imports.[14] Moreover, such a dependent variable also controls for a recipient country's size effect.

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[11] The correlations among majority of the independent variables are not very high with the exception of that between real income per capita and the infant mortality rate. To check whether multicollinearity poses a problem, eigenvalues for correlations among explanatory variables were tested and found to be low.

[12] Inclusion of time specific dummy variables allow each time period to have its own intercept for aggregate time effects affecting all countries. Also, one time specific dummy must be dropped in order to avoid perfect collinearity.

[13] Specification-(1) uses one year lagged value for all independent variables. Therefore their data are for the period 1991-2002 (see section 2 for a detailed discussion). Bilateral aid is from twenty two DAC member countries of OECD who are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and the United States of America. The multilateral aid is given by the World Bank, the IMF and the UN including their regional branches.

[14] The estimation results using GDP deflator at constant US$2000 for converting aid into real term are similar.

Data for international trade tax revenue as a ratio to total revenue and import duties as a ratio to tax revenue is taken form World Development Indicators (WDI-2006) and (WDI-2004) respectively. However, as mentioned in WDI (2006&04), the main source of the revenue data is the various issues of Government Finance Statistics, IMF. Following the definitions in these data sources, taxes on international trade include import duties, export duties, profits of export or import monopolies, exchange profits, and exchange taxes, while import duties comprise all levies collected on goods at the point of entry into the country. The levies may be imposed for revenue or protection purposes and may be determined on a specific or ad valorem basis, as long as they are restricted to imported products. Trade openness is measured in a standard way as the ratio of imports plus exports to GDP and is based on the WDI (2006).

Data for income per capita is measured by GDP per capita (purchasing power parity) at constant US$2000. GDP per capita, population, and infant mortality rates are obtained from WDI (2006).[15] To proxy human rights measure, we have used indices for political rights and civil liberties produced by Freedom House (2006). Political rights refer to the freedom of people to participate in the political process by exercising their voting right, being able to organize political parties to compete for public office, and forming an effective opposition and electing representatives who devise public policies and are accountable for their actions. Civil liberties entail freedom of expression and religious belief, the prevalence of rule of law, right to form unions, freedom to marry, and freedom to travel. It also signifies the autonomy of people without interference from the state. These two indicators are derived from a cross country survey every year. Each of these indices is measured on a 1 (best) to 7 (worst) points scale. Following Trumbull and Wall (1994), Wall (1995) and Neumayer (2003a), we have constructed

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[15] There are some missing data values for some countries for infant mortality rates. Since infant mortality rates change slowly over time, values for missing observations are interpolated by calculating averages from available values.

a combined freedom index by adding indices of political rights and civil liberties and then reverting that index, such that it ranges from 2 (worst) to 14 (best).

Figure 1 illustrates the distribution of average bilateral real aid per capita per year over the period 1992-2003. The mean country in our sample received $19.9, while the median country (Uruguay) received only $10.7, reflecting that aid was skewed towards a few countries. While a few countries received a significantly large proportion of bilateral aid per capita (Seychelles, $101.6; Nicaragua, $88.9; Jordan, $78; Maldives, $64; Bhutan, $59; Bolivia, 58), thirty eight received less than $20 on average. While a nation like Bhutan may show up as a large (per capita) aid receiving nation because of its small population, others like Jordan and Nicaragua suggest the importance of political and strategic considerations.

Figure 2 shows the distribution of average multilateral real aid per capita per year over the period 1992-2003. The mean country received $12 while the median country (Ethiopia) received $11. Although a few countries received relatively more aid (St. Vincent and Grenadines, $77; Seychelles, $76; Maldives, $45; Nicaragua, $43; Jordan, $31; Bhutan, $27; Bolivia, 25), multilateral aid is more evenly distributed. It may also be noted that most countries receiving a disproportionately higher amount of aid are common in both bilateral and multilateral aid allocation. This is consistent with the possibility that multilateral lending is largely dictated by donor nations who are influential members. Their objectives in providing aid to a particular recipient nation are not different between the two types of aid (bilateral and multilateral). For example, if the US wants to provide more aid to Jordan to support mid-east peace, it is also likely to influence the World Bank to do so with the Bank's aid dollars. The inclusion of political-strategic variables like colonial link and geographical proximity may throw some light on this issue.

Table 1 lays out data for international trade tax revenue as ratio to total revenue while table 2 presents data for revenue from import duties as a ratio to tax revenue. The time period from 1991 to 2002 is divided into two halves and then averages are taken for the period 1991-96 and for the 1997-02 period. To see how trade revenue has changed over time, we subtract the first half average from the second. We find that a majority of aid recipient countries witnessed a decrease in revenue for international trade taxes i.e., Cote d'lvoire (-16.5), Tunisia (-15.8), Mauritius (-12.6) and Pakistan -11.6. Table 2 reveals a similar pattern for revenue from import duties i.e., Tunisia, (-19.9), Pakistan (-17.1), Philippines (-11.0) and China (-11.0).

Figure 3 illustrates the correlation between bilateral real aid per capita and revenue from trade tax and also with import duties. Panel 1 shows mixed results for the relationship between the level of per capita aid and reliance on trade tax revenue. Panel 2 suggests that more aid is provided to countries experiencing negative growth rate in trade tax revenue. Similar correlations between aid and revenues from import duties are observed from panels 3 and 4. Figure 4 portrays an analogous pattern for multilateral real aid per capita.

4. Estimation Results

4.1. Findings with yearly data

Estimation results for the full sample, including both middle and low income recipient countries, are shown in table 3. For bilateral aid allocation (columns 1 and 2), the sign and significance of the estimated coefficients on population size, income per capita, infant mortality and political/civil rights variables coincide with past findings (Maizels and Nissanke, 1984; Dowling and Hiemenz, 1985; Trumbull and Wall, 1994; Wall, 1995; Alesina and Dollar, 2000; Neumayer, 2003a, 2003b, 2003c). Large (populous) countries receive lower bilateral aid per

capita. Income per capita as well as infant mortality appear to be important indicators of bilateral aid allocation. A one percent decrease in income per capita leads to a 0.16 percent increase in bilateral aid per capita, while a one percent increase in infant mortality rate has an impact of 0.49 percent increase in bilateral aid per capita. A positive and significant coefficient on political/civil rights variable implies that bilateral donors also reward greater respect for human rights in the recipient countries.

The estimated coefficient on trade openness is positive and significant at 5 percent level. This suggests that donors use aid to achieve dual objectives. First, they encourage recipients to expand international trade by reducing trade barriers. Second, they may also try to promote their exports to recipient countries, and thus increase their own benefits through aid (Dudley and Montmarquette, 1976; Neumayer, 2003a). The estimated coefficient on revenue from international trade tax is negative and significant at 1 percent level. Its magnitude suggests that a 1 percent decrease in trade revenue has an impact of 1.2 percent increase in bilateral aid per capita.[16] This could reflect compensation (for falling tax revenues) or reward (for liberalization) or both.

The coefficient on the distance variable is negative and significant, while the coefficient on colonial dummy variables is positive and significant. These suggest that both political and strategic considerations of bilateral donors, as proxied by their geographical proximity and colonial ties, result in supplying more aid (Alesina and Dollar, 2000; Neumayer, 2003a).

Column 2 includes import duty revenue and drops international trade tax revenue. They are not included together in the regression due to their high inter-correlation. The estimated coefficient on revenues from import duties is negative and significant at 1 percent level. The size

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[16] Since dependent variable is in logged form while international trade tax is not, we multiply its estimated coefficient by 100 to derive its actual magnitude and therefore impact on bilateral aid per capita.

of its coefficient is also about the same as of international trade tax revenue in column 1. The results for all other variables including trade openness also remain about the same as in column 1. For developing nations, these findings are positive. They gain from efficiency increases from freer trade and the possible adverse revenue consequences for their governments are largely compensated by aid inflows.

Columns 3 and 4 outline the results for multilateral aid. Similar to the bilateral case, the estimated coefficients on both population and income per capita are significant and negative. The coefficient on the infant mortality rate is positive but significant at only 10 percent level, and its magnitude is also relatively small, suggesting that multilateral donors focus less on alleviating infant mortality. A positive and significant coefficient on political/civil rights variable suggests that multilateral donors also reward recipient countries valuing greater respect for human rights.

Surprisingly, the coefficients on both trade openness and international trade tax revenue are insignificant. Given the emphasis of the multilateral institutions like the WTO or the World Bank on trade openness, these findings are somewhat surprising. It is possible, however, that because the multilateral agencies have no direct trading links with recipient countries, their self-interest motive for providing aid for trade is less strong than bilateral donors. On the other hand, the coefficient on income per capita is significantly larger (0.42), suggesting that multilateral donors raise their flow of aid to support poorer nations.

The variables measuring the effect of political and strategic considerations, i.e., colonial link and geographical proximity, also have significant and positive impact on multilateral aid. It may be noted that the significance of these factors has been confirmed in previous studies (Neumayer, 2003b) in the contexts of both bilateral and multilateral aid.

Column 4 includes revenue from import duties and drops the international trade tax revenue variable. Like international trade tax revenue, the coefficient on import duties is also insignificant, suggesting that multilateral agencies are not directly concerned about declining tax revenues due to recipient liberalization. The coefficient on trade openness has a negative sign and is significant at only the 10 percent level. Infant mortality rate is not significant. Income per capita has a large and significant effect on multilateral aid allocation. Other findings are similar to the trade tax revenue case discussed above.

To further examine how sensitive the donors are to economic conditions in developing countries, we reduce our sample by including only low income aid recipient countries. Table 4 shows results for thirty-seven low income aid recipients. The results for bilateral aid are similar to the full sample findings in table 3, except that the geographical distance variable is not significant when international trade tax revenue is included in the regression (column 1). The coefficient on infant mortality is significant when either measure of trade revenues (international trade tax revenue or import duties) is included. Income per capita is significant only when international trade tax is included. The statistical and economic significance of trade openness and international trade tax remain about the same as with full sample size.

Column 2 of table 4 includes revenue from import duties while dropping international trade tax revenue. The findings for import duties are similar to international trade taxes, suggesting that recipient countries experiencing loss in international trade revenue receive more aid. The magnitude of coefficients on both the *Ttaxr* and *Idr* variables are comparable to the full sample case (table 3, columns 1 and 2), suggesting that in this respect (i.e., consideration for falling trade tax revenues) middle and low income countries are treated alike. However, this may not be good enough for the poorest of nations because they are likely to face more binding

resource constraints and have relatively weaker revenue recovery possibilities from alternate sources.

Interestingly, income per capita loses statistical significance. Infant mortality rate remains significant and the coefficient is larger. This further strengthens the results in table 3 that bilateral donors seem to target alleviation of physical miseries (like infant mortality) in the recipient nations. The coefficient on the geographical distance variable is significant. The results for other variables are not significantly altered. Regressions in columns 1 and 2 of table 4 explain 63 percent and 65 percent of the variance in bilateral aid per capita, respectively, showing a much better fit of these models compared to the regressions for the full sample case (table 3, columns 1 and 2).

Similarly, results for multilateral aid per capita are shown in columns 3 and 4. The results for reduced sample size involving only low income countries remain about the same as for the full sample case. As before, the effects of trade openness and of revenues (international trade tax and import duties) are insignificant. On the other hand, the size and significance of the coefficient on income per capita has increased, while the impact of the infant mortality rate turns out to be insignificant. The results suggest that multilateral donors are largely focused on income per capita in the low income nations and use it as a *de facto* measure of economic development (or underdevelopment).

4.2.   Three-year data averaging

We also consider three-year data averaging to reduce the effect of unusually high or low levels of aid allocation as donors may lack information about a recipient country in any one year. The results for both middle and low income countries are presented in table 5. Columns 1 and 2

relate to bilateral aid allocation, while 3 and 4 to the multilateral case. The central results are not qualitatively altered. The effect of infant mortality rate is even larger on bilateral aid, while its effect on multilateral aid is insignificant. On the other hand, the effect of income per capita on bilateral aid is weakly significant with a smaller coefficient size when international trade tax revenue is included. It is insignificant when revenues from import duties are controlled for in the regression. The results for all other variables remain about the same as before. These findings confirm that bilateral donors reward recipient countries promoting trade openness and also compensate for declining trade revenues, while multilateral donors do not show a direct concern in this regard.

Estimation results of a reduced sample involving low income countries are shown in table 6. The result remains about the same except that the effect of the colonial dummy variable on bilateral aid has turned insignificant, while it stays significant for multilateral donors. Since, colonial dummy remained significant for all other regressions, this result is puzzling, and needs more detailed analysis in a separate study.

5. Conclusion

Though trade liberalization results in greater economic efficiency and growth, it is also a potential source of fiscal instability in developing countries as they rely heavily on revenue from trade taxes. There is a realization among developed nations that trade-related technical and financial assistance should be extended to mitigate detrimental effects of trade reforms in developing countries. This paper empirically examines this issue for the cases of bilateral and multilateral aid allocation. We control for commonly examined variables in this literature to avoid *ad hoc* econometric treatment and try to derive consistent and efficient estimates.

The estimation results indicate that bilateral donors provide substantially larger amount of aid to recipient countries experiencing decline in revenue from international trade taxes as well as imports duties. Moreover, trade openness by recipient countries also has positive and significant impact on bilateral aid allocation. Interestingly, the impacts of international trade tax revenue and trade openness on multilateral aid are insignificant. These suggest that bilateral donors use aid either to compensate recipient countries for lost trade revenue or to reward them for moving towards free trade regimes. Irrespective of their specific intention, the detrimental effects of trade liberalization are partially offset through inflow of foreign assistance. Multilateral donors do not directly target these variables and seem to be more focused on income per capita, probably using it as a *de facto* measure of poverty and economic well-being.
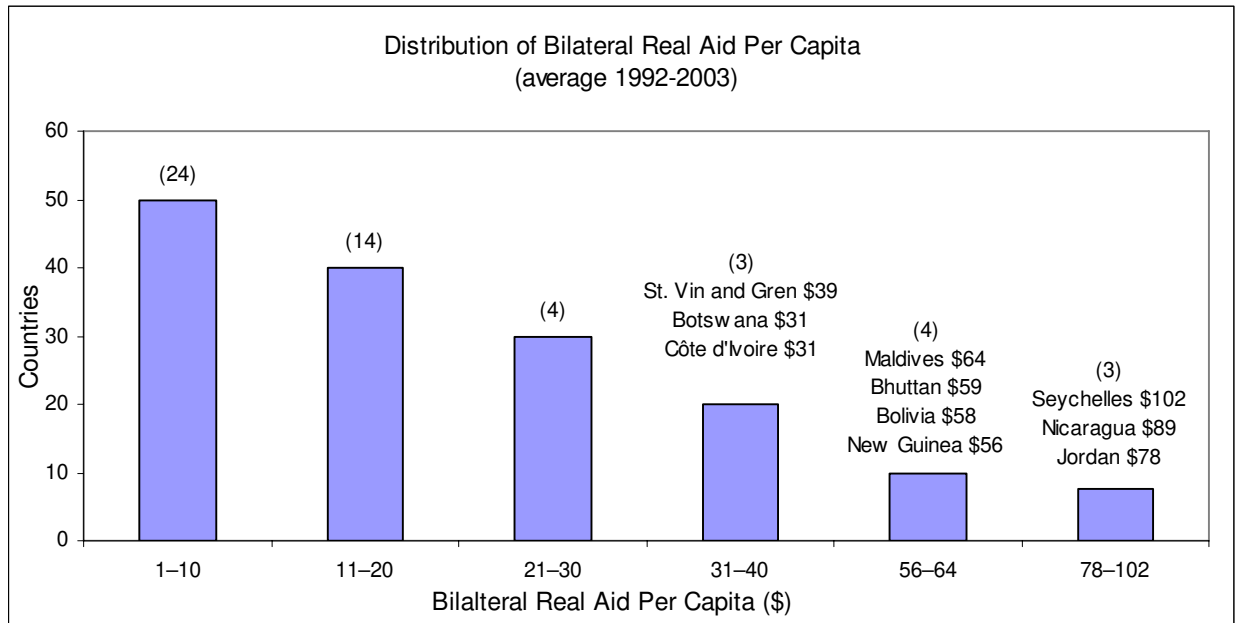
An increase in infant mortality and a higher level of the political rights/civil liberties both increase bilateral aid, showing donor nations' concern about (recipient) health conditions and human rights. Unfortunately, residents of recipient nations with poor human rights records suffer at the hands of their rulers (who deny them basic freedom) and also due to hardship that is imposed on them because of a cut in foreign aid. Finally, the political and strategic biases in aid allocation of bilateral donors are also reflected in the actions of multilateral donors. Perhaps, this indicates that influential developed nations (who largely fund multilateral aid) may, as a group, have similar strategic and political interests. To come to a definitive conclusion on this issue, we need a separate and focused analysis. ∎
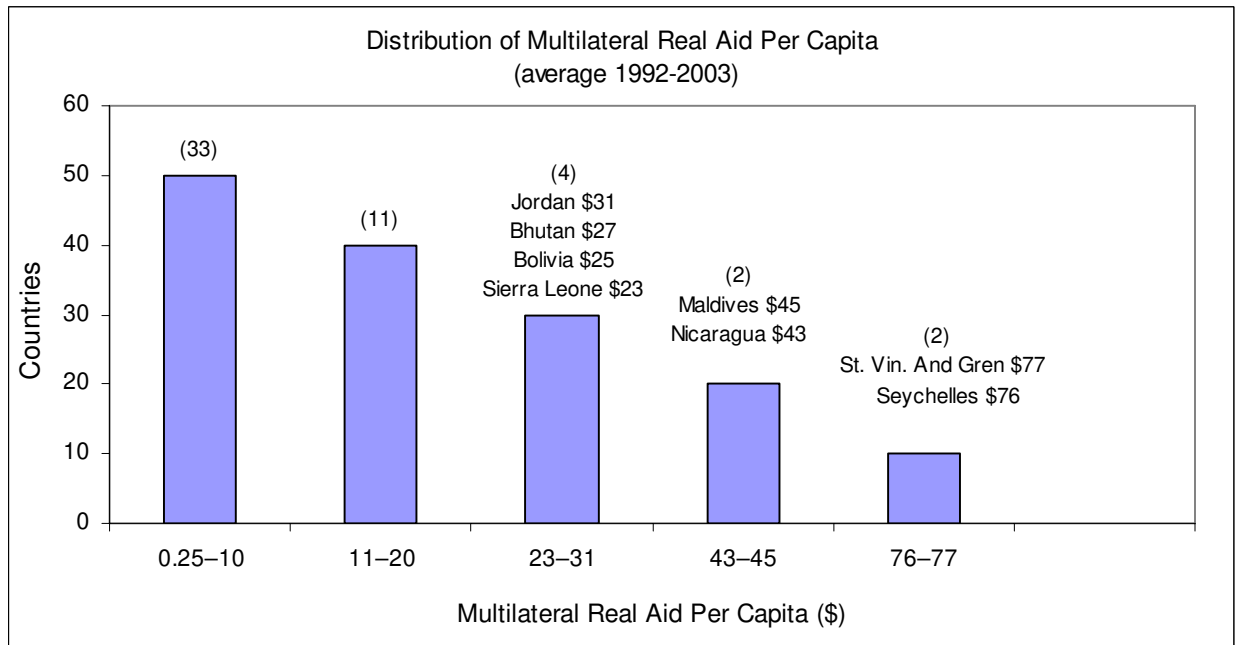
References

Alesina, A., Dollar, D., 2000. Who gives foreign aid to whom and why? *Journal of Economic Growth, 5:33-63.*

Alesina, A., Weder, B., 2002. Do corrupt governments receive less foreign aid? *American Economic Review, 92(4):1126-1137.*

Bandyopadhyay, S. and H.J. Wall, 2007, The Determinants of Aid in the Post-Cold War Era, forthcoming, in S. Lahiri edited "Theory and Practice of Foreign Aid", Elsevier.

Baunsgaard, T., Keen, M., 2005. Tax revenue and (or?) trade liberalization. *International Monetary Fund Working Paper.*

Boschini, A., Olofsgård, A., 2005. Foreign aid: an instrument for fighting poverty or communism? Unpublished Manuscript, Stockholm University.

Burnside, C., Dollar, D., 2000. Aid, policies, and growth. *American Economic Review, 90(4):847-868.*

Central Intelligence Agency., The World Factbook, various issues.

Dollar, D., Levin, V., 2004. The increasing selectivity of foreign aid, 1984-2002. *World Bank Policy Research Paper 3299.*

Dowling, J.M., Hiemenz, U., 1985. Biases in allocation of foreign aid: some new evidence. *World Development, 13(4):535-541.*

Dudley, L., Montmarquette, C., 1976. A model of supply of bilateral aid. *American Economic Review. 66(1):132-142.*

Freedom House., 2006. Freedom in the World. New York: Freedom House.

Gallup, J.L., Sachs J.D. and A.D. Mellinger, 1999, Geography and Economic Development. *Center for International Development, Harvard University. Working Paper 001.*

Isenman, P. (1976). Biases in aid allocations against poorer and larger countries. *World Development, 4:631-641*

Lahiri, S., Raimondos-Møller, P. 1997. Competition for aid and trade policy. *Journal of Internaional Economics, 43:369-85*

Khattry, B., Rao, J.M., 2002. Fiscal faux pas? An analysis of the revenue implications of trade liberalization. *World Development, 30: 1431-44*

Kuziemko, I., Werker, E., 2006. How much is a seat on the security council worth? foreign aid and bribery at the United Nations. *Journal of Political Economy, 114(5):905-930.*

Maddala, G. S., 1977. Econometrics. McGraw-Hill Publishers.

Maizels, A., Nissanke, M., 1984. Motivations for aid to developing countries. *World Development, 12(9): 879-900.*

McKinlay, R. D., Little, R., 1977. A foreign policy model of U.S. bilateral aid allocation. *World Politics, 30(1):58-86*

McKinlay, R. D., Little, R., 1979. The U.S. aid relationship: a test of the recipient need and the donor interest models. *Political Studies, 27(2):236-250*

Neumayer, E., 2003a. The determinants of aid allocation by regional multilateral development banks and United Nations agencies. *International Studies Quarterly, 47(1):101-122*

Neumayer, E., 2003b. Is respect for human rights rewarded? an analysis of total bilateral and multilateral aid flows. *Human Rights Quarterly, 25(2):510-527*

Neumayer, E., 2003c. Do human rights matter in bilateral aid allocation? a quantitative analysis of 21 donor countries. *Social Science Quarterly, 84(3):650-666*

Organization for Economic Cooperation and Development., 2005. International Development Statistics Online.

Rodrik, D., 1992. The limits of trade policy reform in developing countries. *Journal of Economic Perspective, 6: 87-105.*

Trumbull, W. N., Wall, H.J., 1994. Estimating aid allocation criteria with panel data. *Economic Journal, 104: 876-882.*

Wall, H. J., 1995. The allocation of official development assistance. *Journal of Policy Modeling, 17(3):307-314.*

World Bank., 2004 & 2006. *World Development Indicators CD Rom 2006.* Washington D.C.

Wooldridge, J. M., 2003. Introductory Econometrics. South-Western Publishers

Figure 1

Distribution of Bilateral Real Aid Per Capita
(average 1992-2003)

(24)
(14)
(4)

(3)
St. Vin and Gren $39
Botswana $31
Côte d'Ivoire $31

(4)
Maldives $64
Bhuttan $59
Bolivia $58
New Guinea $56

(3)
Seychelles $102
Nicaragua $89
Jordan $78

Countries

1–10   11–20   21–30   31–40   56–64   78–102

Bilalteral Real Aid Per Capita ($)

Figure 2

Distribution of Multilateral Real Aid Per Capita
(average 1992-2003)

(33)
(11)

(4)
Jordan $31
Bhutan $27
Bolivia $25
Sierra Leone $23

(2)
Maldives $45
Nicaragua $43

(2)
St. Vin. And Gren $77
Seychelles $76

Countries

0.25–10   11–20   23–31   43–45   76–77

Multilateral Real Aid Per Capita ($)

21

Table 1: Revenue from International Trade Taxes (% of Total Revenue)

Countries	Average 1991-96	Average 1997-02	Change	Countries	Average 1991-96	Average 1997-02	Change
Algeria	17.2	12.7	-4.5	Mauritius	39.3	26.7	-12.6
Argentina	7.1	5.6	-1.5	Mexico	6.1	3.8	-2.3
Bhutan	0.7	1.1	0.3	Moldova	7.9	5.2	-2.7
Bolivia	6.4	5.7	-0.7	Morocco	16.5	14.9	-1.6
Botswana	17.0	9.5	-7.6	Nepal	23.8	23.6	-0.3
Brazil	1.9	2.7	0.7	Nicaragua	11.8	7.2	-4.6
Bulgaria	6.9	3.7	-3.2	Oman	3.1	3.3	0.2
Burundi	17.0	17.5	0.4	Pakistan	25.3	13.7	-11.6
Cameroon	19.0	25.8	6.9	Papua New Guinea	23.2	23.4	0.2
China	10.5	7.3	-3.2	Paraguay	15.0	11.6	-3.4
Colombia	9.4	7.3	-2.0	Peru	10.1	8.9	-1.2
Congo DR	32.0	27.9	-4.1	Philippines	27.8	18.0	-9.7
Cote d'Ivoire	60.1	43.9	-16.2	Poland	8.9	2.6	-6.3
Croatia	8.4	6.4	-2.0	Romania	4.6	4.3	-0.3
Dominican Rep.	40.3	36.1	-4.1	St. Vin and Gren	40.5	39.5	-0.9
Ethiopia	18.7	25.9	7.2	Sierra Leone	39.7	47.9	8.2
Hungary	7.7	3.1	-4.6	Slovenia	8.3	2.9	-5.4
India	23.8	18.9	-4.9	South Africa	3.2	2.7	-0.5
Indonesia	4.8	3.1	-1.7	Sri Lanka	19.7	13.1	-6.6
Jordan	25.4	17.2	-8.2	Syria	11.4	9.3	-2.1
Kenya	12.3	12.5	0.2	Thailand	17.1	10.2	-6.9
Latvia	4.4	1.4	-3.0	Tunisia	27.4	11.5	-15.8
Lithuania	3.6	1.6	-2.0	Uruguay	5.3	3.6	-1.6
Madagascar	47.8	46.4	-1.4	Venzuela	9.2	7.8	-1.4
Malaysia	13.7	7.6	-6.1	Yemen	17.4	9.0	-8.4
Maldives	31.3	28.0	-3.3	Zimbabwe	18.2	17.8	-0.4

Note: Data is taken from World Development Indicators (2004 & 2006) and Government Finance Statistics, IMF (2005). St. Vin. and Gren.= St. Vincent and the Grenadines.

**Table 2: Revenue from Import Duties (% of Tax Revenue)**

Countries	Average 1991-96	Average 1997-02	Change	Countries	Average 1991-96	Average 1997-02	Change
Algeria	18.7	13.3	-5.3	Mauritius	41.8	32.2	-9.6
Argentina	4.9	5.7	0.8	Mexico	6.9	4.4	-2.4
Bhutan	3.2	3.2	-0.1	Moldova	2.7	4.5	1.8
Bolivia	9.3	7.1	-2.3	Morocco	19.3	18.4	-1.0
Botswana	36.5	34.4	-2.1	Nepal	33.3	31.7	-1.6
Brazil	2.6	3.3	0.7	Nicaragua	16.5	9.5	-7.0
Bulgaria	7.0	4.6	-2.4	Oman	12.5	12.2	-0.3
Burundi	18.3	16.0	-2.3	Pakistan	35.2	18.1	-17.1
Cameroon	25.3	30.1	4.7	Papua New Guinea	24.0	24.1	0.1
China	18.0	7.0	-11.0	Paraguay	20.8	18.8	-2.0
Colombia	10.6	9.6	-1.0	Peru	11.1	11.0	-0.2
Congo DR	30.1	31.1	1.0	Philippines	31.2	20.1	-11.0
Cote d'lvoire	33.7	29.7	-4.0	Poland	9.3	3.0	-6.4
Croatia	8.8	7.3	-1.5	Romania	5.1	4.8	-0.3
Dominican Rep.	41.5	40.4	-1.2	St. Vin and Gren	46.4	44.8	-1.6
Ethiopia	23.5	28.8	5.3	Sierra Leone	41.1	49.1	8.0
Hungary	9.0	3.5	-5.4	Slovenia	9.2	3.0	-6.2
India	31.0	26.1	-4.9	South Africa	3.2	2.8	-0.5
Indonesia	5.3	2.8	-2.5	Sri Lanka	23.5	15.4	-8.1
Jordan	38.3	25.1	-13.2	Syria	12.2	12.4	0.2
Kenya	14.6	15.8	1.2	Thailand	18.6	11.7	-6.8
Latvia	4.7	1.6	-3.1	Tunisia	33.0	13.2	-19.9
Lithuania	4.1	1.8	-2.3	Uruguay	4.7	3.3	-1.4
Madagascar	48.5	55.0	6.6	Venezuela	11.7	11.9	0.1
Malaysia	13.6	13.0	-0.7	Yemen	33.0	25.5	-7.5
Maldives	62.1	63.9	1.8	Zimbabwe	19.9	17.9	-2.0

Note: Data is taken from World Development Indicators (2004 & 2006) and Government Finance Statistics, IMF (2005). St. Vin. and Gren.= St. Vincent and the Grenadines.

Figure 3: Correlations between Bilateral Real Aid Per Capita and Trade Tax Revenue and Import Duties
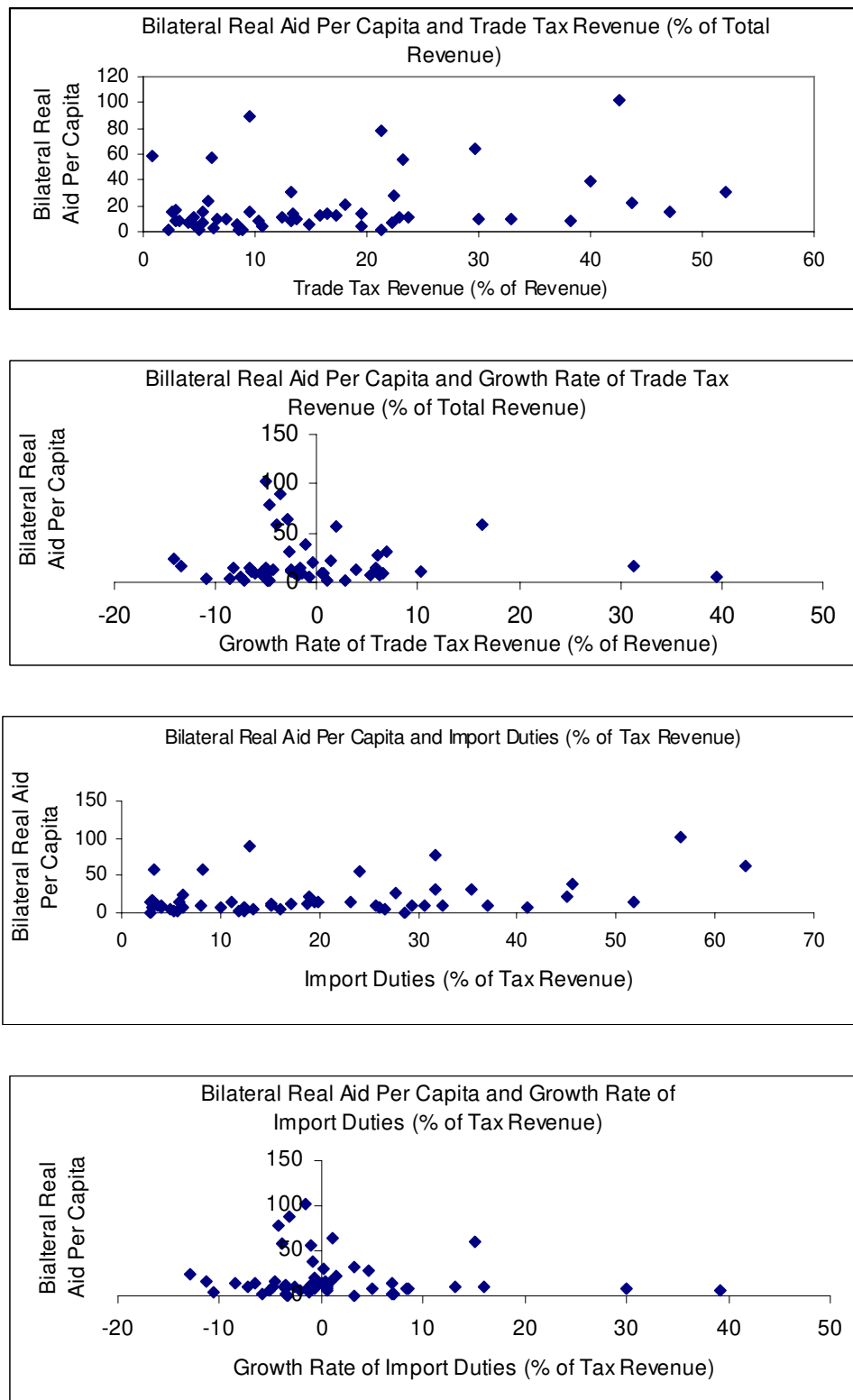
Figure 4: Correlations between Multilateral Real Aid Per Capita and Trade Tax Revenue and Import Duties
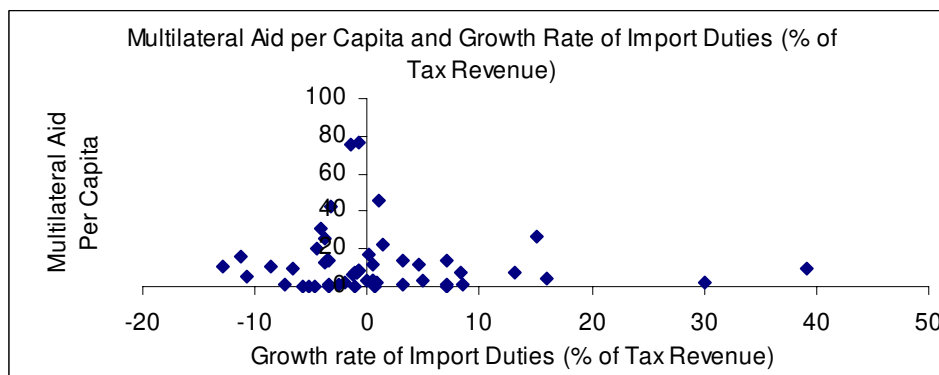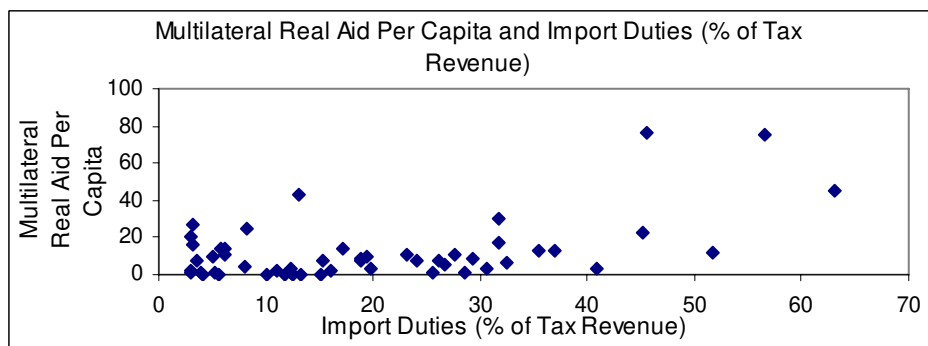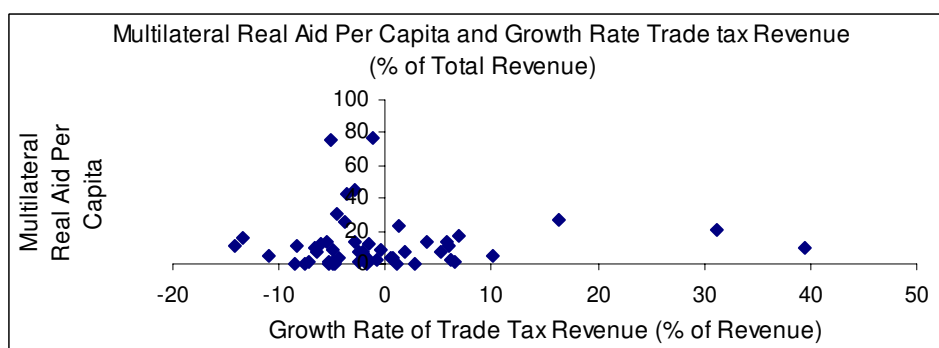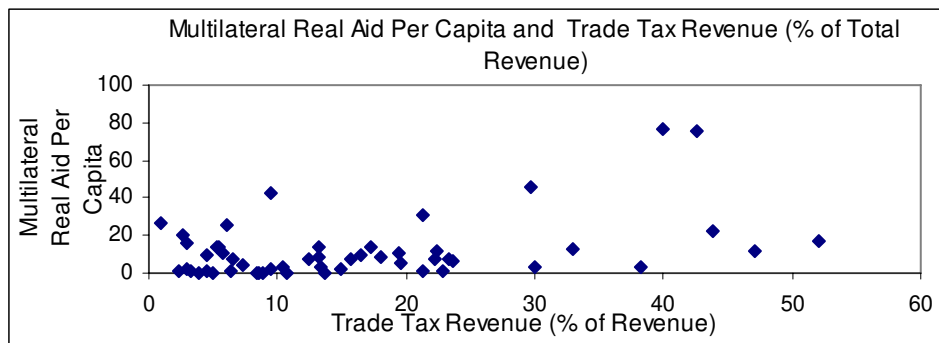
Table 3
Estimation technique: Pooled OLS (time effect included); yearly data
(Sample includes Middle and Low Income Net Aid Recipient Countries)

Dependent variables →	Ln (Bilateral Aid Per Capita)		Ln (Multilateral Aid Per Capita)	
Independent variables ↓	[1]	[2]	[3]	[4]
Ln (Population)	-0.393 (17.68)***	-0.399 (17.74)***	-0.461 (18.70)***	-0.448 (18.68)***
Ln (Income Per Capita)	-0.157 (2.74)***	-0.117 (2.10)**	-0.416 (5.52)***	-0.419 (5.64)**
Ln (Infant Mortality)	0.486 (5.69)***	0.528 (5.99)***	0.204 (1.77)*	0.144 (1.21)
Ln (Pol. & Civ.)	0.352 (5.20)***	0.330 (5.03)***	0.381 (4.81)***	0.356 (4.72)***
Ln (trade Openness)	0.173 (2.10)**	0.215 (2.51)**	-0.124 (1.36)	-0.161 (1.73)*
Intl. Trade Tax/Revenue	-0.012 (3.67)***	—	-0.001 (0.32)	—
Import Duties/Tax Revenue	—	-0.011 (4.12)***	—	0.004 (1.52)
Ln (Distance)	-0.277 (4.23)***	-0.251 (3.79)***	-0.537 (8.31)***	-0.548 (8.47)***
Colonial History	0.496 (7.04)***	0.477 (6.94)***	0.431 (5.52)***	0.391 (5.08)***
R-squared	0.537	0.538	0.541	0.543
No. of Observations	624	624	624	624

Note: Estimated with heteroscedasticity and serial correlation robust standard errors. Year dummies included but not reported. Absolute t-values are shown in parentheses. Superscripts ***, ** and * indicate significance at 1, 5 and 10 percent levels, respectively. Pol. & Civ.= Political rights and Civil Liberties; Intl= International.

Table 4
Estimation technique: Pooled OLS (time effect included); yearly data
(Sample includes Low Income Net Aid Recipient Countries)

Dependent variables →	Ln (Bilateral Aid Per Capita)		Ln (Multilateral Aid Per Capita)	
Independent variables ↓	[1]	[2]	[3]	[4]
Ln (Population)	-0.385 (15.50)***	-0.389 (15.22)***	-0.440 (15.95)***	-0.442 (16.25)***
Ln (Income Per Capita)	-0.156 (2.22)**	-0.094 (1.32)	-0.476 (5.72)***	-0.484 (5.97)***
Ln (Infant Mortality)	0.149 (1.66)*	0.278 (2.69)***	0.073 (0.53)	-0.021 (0.20)
Ln (Pol. & Civ.)	0.317 (4.16)***	0.325 (4.48)***	0.318 (3.77)***	0.284 (3.50)***
Ln (Trade Openness)	0.392 (4.56)***	0.497 (5.51)**	-0.032 (0.28)	-0.084 (0.71)
Intl. Trade Tax / Revenue	-0.009 (2.37)**	—	-0.005 (1.14)	—
Import Duties / Tax Revenue	—	-0.014 (5.04)***	—	0.002 (0.64)
Ln (Distance)	0.096 (1.38)	-0.153 (2.21)**	-0.351 (3.97)***	-0.342 (3.89)***
Colonial History	0.449 (6.38)***	0.457 (6.68)***	0.342 (4.27)***	0.311 (3.91)***
R-squared	0.630	0.645	0.540	0.539
No. of Observations	444	444	444	444

Note: Estimated with heteroscedasticity and serial correlation robust standard errors. Year dummies included but not reported. Absolute t-values are shown in parentheses. Superscripts ***, ** and * indicate significance at 1, 5 and 10 percent levels, respectively. Pol. & Civ.= Political rights and Civil Liberties; Intl= International.

Table 5
Estimation technique: Pooled OLS (time effect included); 3-year data averaging
(Sample includes Middle and Low Income Net Aid Recipient Countries)

Dependent variables →	Ln (Bilateral Aid Per Capita)		Ln (Multilateral Aid Per Capita)	
Independent variables ↓	[1]	[2]	[3]	[4]
Ln (Population)	-0.391 (10.56)***	-0.396 (10.53)***	-0.460 (13.07)***	-0.446 (13.01)***
Ln (Income Per Capita)	-0.155 (1.73)*	-0.112 (1.27)	-0.412 (3.59)***	-0.414 (3.74)***
Ln (Infant Mortality)	0.505 (3.77)***	0.552 (3.97)***	0.223 (1.26)	0.159 (0.87)
Ln (Pol. & Civ.)	0.376 (3.49)***	0.352 (3.32)***	0.401 (3.15)***	0.372 (3.11)***
Ln (Trade Openness)	0.203 (1.67)*	0.254 (1.76)*	-0.106 (0.75)	-0.150 (1.04)
Intl. Trade Tax/Revenue	-0.013 (2.51)**	—	-0.002 (0.32)	—
Import Duties/Tax Revenue	—	-0.012 (2.79)***	—	0.005 (0.91)
Ln (Distance)	-0.273 (2.62)***	-0.244 (2.30)**	-0.537 (5.52)***	-0.549 (5.65)***
Colonial History	0.500 (4.48)***	0.477 (4.38)***	0.433 (3.74)***	0.391 (3.43)***
R-squared	0.582	0.583	0.609	0.611
No. of Observations	208	208	208	208

Note: Estimated with heteroscedasticity and serial correlation robust standard errors. Year dummies included but not reported. Absolute t-values are shown in parentheses. Superscripts ***, ** and * indicate significance at 1, 5 and 10 percent levels, respectively Pol. & Civ.= Political rights and Civil Liberties; Intl= International.

Table 6
Estimation technique: Pooled OLS (time effect included); 3-year data averaging
(Sample includes Low Income Net Aid Recipient Countries)

Dependent variables →	Ln (Bilateral Aid Per Capita)		Ln (Multilateral Aid Per Capita)	
Independent variables ↓	[1]	[2]	[3]	[4]
Ln (Population)	-0.376 (9.00)***	-0.378 (8.83)***	-0.431 (9.35)***	-0.435 (9.50)***
Ln (Income Per Capita)	-0.154 (1.33)	-0.082 (0.71)	-0.469 (3.46)***	-0.475 (3.64)***
Ln (Infant Mortality)	0.180 (1.09)	0.329 (2.02)**	0.109 (0.50)	0.001 (0.01)
Ln (Pol. & Civ.)	0.342 (2.64)***	0.349 (2.90)***	0.334 (2.35)**	0.295 (2.15)**
Ln (Trade Openness)	0.443 (3.05)***	0.576 (3.95)***	-0.018 (0.10)	-0.044 (0.22)
Intl. Trade Tax/Revenue	-0.010 (1.66)*	—	-0.006 (0.89)	—
Import Duties/Tax Revenue	—	-0.016 (3.63)***	—	0.002 (0.29)
Ln (Distance)	-0.098 (2.62)***	-0.244 (2.30)**	-0.349 (2.54)**	-0.337 (2.47)**
Colonial History	0.500 (0.87)	0.164 (1.49)	0.342 (2.66)***	0.308 (2.40)**
R-squared	0.673	0.692	0.593	0.590
No. of Observations	148	148	148	148

Note: Estimated with heteroscedasticity and serial correlation robust standard errors. Year dummies included but not reported. Absolute t-values are shown in parentheses. Superscripts ***, ** and * indicate significance at 1, 5 and 10 percent levels, respectively. Pol. & Civ.= Political rights and Civil Liberties; Intl= International.