THE DETERMINATION OF FOREIGN AID AND ITS IMPACT ON RECIPIENT COUNTRIES

by

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ABSTRACT

This paper attempts to understand the relationship between foreign aid and GDP growth in the recipient country through an instrumental variable approach. The instrument used is based upon the impact of political changes in the donor country. Applying it to the aid-growth relationship shows that aid has a significant impact on growth measured at the annual level. However, the relationship no longer holds when the data is averaged into five-year periods. This latter method does yield important results when the effects of aid on health and education indicators are analyzed, showing a relationship between aid and development.

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Foreign aid has been a common means for developed nations to assist developing countries since the end of World War II. The success of the Marshall Plan in Europe led developed countries to expand large scale aid-giving to other parts of the world. Unfortunately, the lack of clear success since the Marshall Plan has resulted in serious controversy over the usefulness of foreign aid. Intuitively, it seems quite reasonable that aid should redistribute wealth from rich to poor nations and therefore increase the income of the recipient. However, despite three generations of economic modeling reflecting this intuition, the empirical evidence on a link between aid and growth has been tenuous at best. This paper hopes to add to the empirical work done on this topic by applying an instrumental variables approach to this macroeconomic question. The instrument used is rooted in political changes in the donor country and arises from related literature on aid determination.

The aid-growth literature has grown out of evolving theoretical work on the way in which aid may cause growth.[1] The first of these theoretical frameworks arises out of the ISLM model, in which the effect of aid is different in the short and long run. In the short run, aid has an activity effect in that it increases income but in the long run, by increasing the overall level of investment in the economy, it has a capacity effect. The inability of the ISLM model to pick up crowding out effects, however, has led to the use of a two-gap model based on the Harrod-Domar framework. Adding a public sector balance and opening the Harrod-Domar economy provides two additional levels for the framework to operate on, thus allowing aid to act as savings transfers that increase the capacity of the economy. Finally, modern growth models simply show growth as a

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[1] The brief explanation of the three generations of aid-growth models is summarized from a meta study done by Hristos Doucouliagos and Martin Paldam.

function of aid as a share of GDP with a set of control variables. The vast degree of freedom allowed in choosing the control variables, however, seriously hinders the robustness of the results produced by this model.

As is apparent, the theoretical framework behind the aid-growth relationship creates shaky ground for researchers to stand upon. The research resulting from this framework has caused general consensus to swing quite dramatically for or against foreign aid. The initial optimism was confronted by strongly negative overall results in research. This led to skepticism against the effects of aid and against aid-giving itself. However, the success stories have also received much attention: countries like Botswana and South Korea are often cited against those who argue the ineffectiveness of aid[2].

Faced with evidence both of great success and utter failure of aid, modern work has advanced on two fronts: understanding why aid works in some places while it does not work at all in others, and trying to recommend how to make aid work better. The former is primarily an empirical question and will be discussed below. The latter is of greater interest in understanding the way in which foreign aid is perceived and the discussion involves many major economists. The first of them is Jeffrey Sachs, adviser to the United Nations on the Millennium Development Goals (MDG). Sachs' basic argument is that a lot more aid is needed on many more fronts to end world poverty. Part of this argument encourages donor countries to meet the MDG of 0.7% of gross national income given as aid. This increased aid should be distributed in a more planned manner by the donor countries and agencies and applied to complementary sectors to ensure proper development. William Easterly, on the other hand, stands in complete opposition

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[2] It must be noted that both South Korea and Botswana's success has since been attributed to factors other than aid.

to this stance. His argument is that multi-target aid weakens incentives and accountability and, as a result, shows no significant effect on the recipient population. He suggests a more microeconomic approach to aid, where donors should fund smaller homegrown projects that have worked in the past. Of course, this entails improvements in evaluation of aid projects; but Easterly continuously argues that despite these costs, improving incentives for the enforcing agents is the only true way to accomplish the goals of foreign aid.

Regardless of the way in which aid is allocated, the target outcome of development aid has always been GDP growth. However, as we will see, aid has not always caused growth and the relationship between the two variables is very difficult to pin down. This paper will attempt to add to this discussion by developing a new instrument for this relationship. In order to do so, we must first explore the work already done in the aid-growth literature and place this work in that context. We will then establish the basis for the instrument (the effect of political variation on aid allocation) by understanding the mechanism of aid allocation. Once the instrument is fully developed, it will be applied to the aid-growth relationship, as well as to the effect of aid on development indicators.

The rest of this paper will be organized as follows: both the aid-growth relationship and the aid allocation literature will be discussed in Sections I and II respectively, followed by details on data sources in Section III and the model in Section IV. Section V of the essay will then creates a basis for this instrument by showing political differences in aid allocation in the donor country. Section VI will apply the instrument that results from this to the empirics of aid and growth. The next section,

Section VII, will explore the differences between growth and development and apply the instrument to the relationship between aid and variables indicating development. Section VIII will then discuss the sensitivity of these results.

I. The History of Aid-Growth Analysis

Despite the shortcomings in the theoretical background, the questions about the relationship between aid and growth can ultimately be solved only through empirical analysis. Much has already been done in this regard. The earliest form of this analysis involved a simple OLS regression with growth as the dependent variable and aid, GDP and a handful of controls as explanatory variables. In some cases, this regression has been run with investment or savings as a dependent variable. Both Islam (1992) and Mbaku (1993) run such regressions. While Islam finds a positive and insignificant coefficient on aid in explaining growth in Bangladesh, Mbaku finds an insignificant but strongly negative coefficient for the same relationship in Cameroon. Ali and Isse (2005) run similar regressions with cross-country data and again find that aid plays a negative and insignificant role in explaining changes in growth rates.

A possible explanation for the inconsistency of the results found when running a simple OLS regression of this form is the possibility of reverse causality and correlation between the explanatory variables. While most authors recognize the latter and test for it before or after running their regression, the former issue is largely ignored in their writings. Others feel, though, that the risks involved with running such a regression are too high to simply ignore the costs. Alternate methods such as TSLS approach have been applied, as have more complicated techniques such as panel estimators, time-series

estimators and simultaneous equations methods. For example, Kosack and Tobin (2006) use a generalized method of moments framework based on the example set in Arellano and Bond's (1991) analysis of panel data. Kosack and Tobin find that aid contributes strongly to both growth and to human development in recipient countries. Irandoust and Ericsson (2005) and Karras (2006) find similar results. Burke and Ahmadi-Esfahani (2006), on the other hand, use a simultaneous equations method to show that aid had an insignificant effect on growth in Thailand, Indonesia and the Philippines.

But the empirical technique most relevant to this paper is the TSLS method, first employed in Boone (1995) to show that aid has no significant positive effect on growth. Since then, the technique has most often been used in the argument over the conditions in which aid works best. This discussion was brought to the forefront by an article by Burnside and Dollar (2000) that showed that aid works best in recipient countries where policies were 'good'. The Burnside and Dollar analysis used both the OLS and the TSLS methods to make their case. The authors use changes in income and population in the recipient country, along with a set of variables to denote the strategic interests of the donor country, such as dummies for sub-Saharan Africa as European special interests, the Franc Zone as French special interest, and Egypt and Latin America as US special interests, to develop an instrument for aid that is unrelated to growth except through its influence on aid. They also include a measure of arms imports relative to total imports. This predicted value of aid is then used as a dependent variable along with other typically used variables to estimate growth rates. The authors find that the variable for aid usually has an insignificant negative coefficient while the variable denoting aid in good policy environment usually has a positive and significant value. Their results, however, have

both been verified and strongly contested by other authors using similar techniques. A notable example of this is Easterly, Levine and Roodman (2004), which returns to the primary sources of Burnside and Dollar's dataset and extends it to find that the policy results found in the original article disappear. In fact, the sheer number of articles that have been unable to recreate Burnside and Dollar's results is an example of the difficulty faced by researchers in this field in reproducing and extending previous analysis.

In an extension along the same vein, Dalgaard, Hansen and Tarp (2004) ran similar regressions using lagged aid to predict current aid.[3] They find that using this instrument, aid has a significant positive coefficient, while aid squared has a significant negative coefficient, indicating that there are some diminishing returns in the relationship between aid and growth. They also find that once geographical differences are accounted for, aid has a positive effect even in the OLS regressions, while the aid-policy interaction term loses significance. The Dalgaard, Hansen and Tarp (2004) article also brings up another interesting strand of the aid-growth discussion – that of the non-linearity of aid. The direct implication of the result they find is that there may be diminishing returns to aid.

A final tangent of this discussion focuses on different types of aid. Aid is, in this case, divided into three groups: humanitarian and food aid, long term aid (such as aid for education) and early impact aid (such as structural adjustment assistance). Given that only 53% of total aid is the third kind,[4] the focus has shifted to growth-aid regressions using only early impact aid. Clemens, Radelet and Bhavnani (2004 and 2005) and

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[3] As we will see in this paper, this instrument is not a particularly valid one. There can be substantial differences in aid allocation from one year to the next due to political changes.
[4] Clemens, Radelet and Bhavnani (2004).

Dovern and Nunnenkamp (2006) find significant positive relationships between such 'fast-acting' aid and growth in recipient countries.

As we can see, the results from the decades of research on the relationship between aid and growth have been rather inconsistent and difficult to extend. This inconsistency reflects that lack of solid theoretical ground upon which the researchers can stand. As a result, much of the addition to the aid-growth debate is based upon what others have done in the past rather than any innovations in the theoretical work.[5] This essay will follow a similar structure in that it will introduce a new kind of instrument into the framework that others have previously employed. The new instrument arises from a discussion on the politics behind aid allocation. By allowing changes in aid level to be determined by changes in the political leadership in the donor countries, this instrument will attempt to work around the problem of reverse causality that plagues aid-growth regressions.

II. The Literature on Aid Allocation

As indicated above, typical TSLS evaluations of the aid-growth relationship use aid given in previous years or special political relationships as instruments for aid giving. This is based on the presumption that aid is given not only to those who need it but also in ways that reflect the political interests of the donors. A possible way to incorporate these interests into the growth-aid context lies in the existing aid allocation literature, in the extent to which changes in political leadership change the way in which aid is allocated. For example, in an article analyzing Canadian bilateral aid flows between 1984

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[5] This criticism holds for my analysis as well. Nonetheless, given the circumstances, applying new changes to the framework used by other researchers in the past allows for some level of comparison between what is being done and what has been done.

and 2000, Macdonald and Hoddinott (2004) find that the Canadian government's motives for giving aid change over time and aid becomes "increasingly self-interested". While they do not attribute this difference to political changes alone, the authors mention differences between plans set forth by governments during this period. When the Mulroney government came into office in 1988, they promised to focus of poverty alleviation and human rights in their aid giving. However, in 1993, their primary goal became export expansion by giving to fast-growing countries. In 1995, the Chretien government once again pledged aid as a tool to "help the less fortunate and… [for] social justice"[6]. The authors note that the income of the median country receiving aid during the Chretien era was much lower than the recipients of Mulroney aid, confirming that the focus of Canadian aid shifted from export expansion to income levels between the two governments. If such changes in motivation can be attributed to changes in political circumstances in other donor countries, then interaction between the political outlook of the government and key instrumental variables already used may provide a more solid basis to understand the relationship between aid and growth.

But why would political differences create distinct mechanisms for the determination of aid? In an article on the politics behind aid allocation, Mayer and Raimondos-Moller (1999) explain aid giving as an activity through a basic two-country model. In such a situation, foreign aid would have to be funded by a tax on income, meaning that the direct monetary effect[7] of foreign aid is to make everyone in the donor country worse off. However, foreign aid can lead to terms of trade changes, which may improve the economic position of the citizens of the donor country, both as consumers

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[6] *Canada in the World*, quoted in Macdonald and Hoddinott (2004).
[7] This simple model does not account for altruism or any of the personal gains of giving.

and through factor income. If these indirect gains outweigh the direct loss of taxation, the country would have the incentive to give aid. This will be true only when factor ownership is unevenly distributed, so that one group will have a strong incentive to ensure aid is given. Assuming a democratic process is in place, the country will be a donor of foreign aid so long as the median voter gains from the process, or so long as those who gain are able to lobby in favor of it. In addition to this very basic citizen's movement, groups with different political ideologies can consciously decide to weigh determinants of aid in different ratios. Thus, to the extent that political differences can place groups with diverse worldviews in powerful positions and can make the decision-making process itself more or less conducive to lobbying, who is in power in the donor country can have very strong implications for which country receives how much aid.

In fact, there is plenty of evidence that decisions on how to allocate aid are made quite deliberately. The literature on aid allocation aims to do one of two things: some aim to explain the behavior of particular countries based on their domestic conditions, while other research attempts to show distinctions between the ways in which different donors behave based on cross-sectional or time-series data. Alesina and Dollar (1998) were some of the first to run a large cross-country regression in this field. They found that on the aggregate, strategic and political issues in the donor country played a larger role in aid allocation than the recipient country's overall policy or political situation. On a donor-by-donor basis, colonial ties, similar voting records in the UN, recipient country income, trade openness and democracy rankings are the most important factors, though colonial ties and UN voting are estimated to have such a strong impact that they outweigh the 'reward' aid for openness and democratic motives. Berthelemy (2006) studies similar

data for a different time period to show the degree of altruism shown in aid commitments by the major donors. He finds that, controlling for colonial ties and special aid relationships (like that between Egypt and the US), only a few European nations and New Zealand base their aid allocations on factors other than trade intensity, while all other donors can be placed on a scale of 'moderately egoistic' to 'egoistic'. Evidence from these and other articles seem to weigh fairly heavily that aid allocations are based more heavily on strategic concerns, which happens to be more susceptible to leadership changes than purely development-based motives.

The research on specific countries confirms this finding and provides further insight into the factors that are important for each donor. We have already discussed this evidence for Canada, but similar analysis is available for the US, Australia, Britain and Denmark. For our purposes, the analysis of the US data is the most informative in relation to political changes. Fleck and Kilby (2006) look for a relationship between whether aid is given (and the share of aid given) and the development and strategic concerns highlighted above. Their contribution to the field is to incorporate an index for the degree of conservativeness of presidents and Congresses into the basic allocation regression. By interacting these indices with each of the determining factors, they are able to pinpoint how conservative presidents and conservative Congresses determine aid allocations differently from liberal governments in general. The authors find that overall, more bilateral aid is given to countries that small donors[8] give to, to US export partners and to countries with higher population, while lower levels of aid are given to import partners and countries with higher GDP per capita. However, they find that conservative presidents tend to give less to countries that receive more aid from small donors. They

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[8] A set similar to the one Berthelemy found to be 'altruistic'.

also give more than liberals to export partners and to countries that vote similarly in the UN. In addition, a Congress that is conservative tends to give less to countries that receive small donor aid and to import partners, while they give more than liberals to export partners. The authors conclude that there are substantial systematic differences between liberals and conservatives in aid allocation, with liberals more closely following small, altruistic donors, while conservatives focus more heavily on commercial concerns.

If the differences between Republicans and Democrats in aid allocations found in Fleck and Kilby (2006) can be replicated and similar results can be found for other major donor countries, then we can assume enough variation exists in aid-giving between conservatives and liberals to be used in an aid-growth relationship. However, since the Fleck and Kilby estimation uses aid given by other donors as an explanatory variable, the estimation that follows will have to be slightly altered from their template. Nonetheless, by imitating their data sources and technique as closely as possible, important conclusions can be drawn on the significance of political changes in donor countries on the aid allocation process.

III. The Model

The regression equation is set up in three different ways in Sections V, VI and VII. First, the basis for the instrument is established; this form is described in A below. Then the instrument is used to set up a two-stage regression, described in B. Finally, a restricted form of the two-stage equation is used as described in C.

A.　　To prove the existence of variation in aid giving based on political changes, Fleck and Kilby's (2006) model was imitated as closely as possible. Fleck and Kilby follow a

general standard in the aid allocation literature in that they proxy for development

concerns, commercial concerns, similarities in political view and wish to spread or

support democracies. In addition, the authors control for population and GDP per capita

and include time and country dummies. In imitating their model, most of the proxies used

are the exactly the same. Data on imports to and exports from the recipient country are

used to proxy for commercial concerns, while UN voting records are used to show

similarities in political view. The same democracy index is also used to proxy for

democratic concerns.

However, there are a few points of departure from their technique. For example,

Fleck and Kilby use small donor aid[9] as a proxy for development concerns. But given the

evidence that some of the small donors also base their aid on strategic reasons[10], this

proxy did not seem as justifiable as the rest. Thus, following the example set in Alesina

and Dollar (1998), GDP per capita and population were used as development concern

proxies rather than as control variables. In addition, the dependent variable in the

following models is the amount of aid received from a particular donor country. Fleck

and Kilby were also concerned with which countries got any aid and which got none.

Since the ultimate concern in this analysis is with the effect of aid that is given, it seems

reasonable not to be too concerned with the complications of binary dependent

variables.[11] Finally, the dependent variable in Fleck and Kilby's findings was aid

received by a country as a share of total aid given by the US. However, given the need to

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[9] Aid given by Scandanavian countries and Canada, thought to be the countries that base their aid-giving most heavily on development concerns based on the empirical evidence.
[10] See Macdonald and Hoddinott (2004).
[11] The aid data contains many "." entries, which the source does not specify as missing or as zeros. In the following analysis, these "."s are treated as missing variables. To ensure that this assumption does not seriously impact the results found, the regressions were also run with "."s replaced by "0"s. This did not alter the results substantially, other than increasing the number of observations. So without any information indicating otherwise, the original assumption is retained.

compare across countries with very different aid budgets, the dependent variable used in this stage of the analysis for the following exercise is simply the value of aid flows.

The OLS equation that is estimated takes the following form:

$$\text{aid}_{i,j,t} = b_0 + b_1 \text{gdppercapita}_{j,t-1} + b_2 \text{population}_{j,t-1} + b_3 \text{import}_{i,j,t-1} + b_4 \text{export}_{i,j,t-1} + b_5 \text{democ}_{j,t-1} + b_6 \text{UNaffinity}_{i,j} + b_7 \text{comrel}_{i,j} + b_8 \text{consparty}_{i,t} + b_9 \text{colony}_{i,j} + b_{10}\text{countrydummy}_j + b_{11} \text{yeardummy}_t + e_{i,j,t}$$

where i represents a donor country, j represents a recipient country and t represents a year between 1980 and 2002[12]. Like Fleck and Kilby, the variables representing strategic concerns are lagged by one year, as it seems realistic that this year's aid would be influenced by last year's performance. Recipient country fixed effects and year effects are also included in the model. The variables that are added to the Fleck and Kilby model are dummy variables for religious commonality between the donor and recipient country, for whether or not the political party in power in the donor country at the time was conservative and for colonial ties between the two countries.

Fleck and Kilby followed their basic model by adding an index for conservative executive and legislative branches in the US into their regression; they accomplished this by interacting it with key variables. While this liberal-conservative index exists for the US for each branch of government, comparable data are not available for other nations. Thus, to extend the analysis to other donor countries, dummy variables for whether or not the largest political party in power is conservative are used. Therefore, the interaction model is as follows:

$$\text{aid}_{i,j,t} = b_0 + b_1 \text{gdp}_{j,t-1} + b_2 \text{gdppercapita}_{j,t-1}*\text{consparty}_{i,t} + b_3 \text{import}_{i,j,t-1} + b_4 \text{import}_{i,j,t-1}*\text{consparty}_{i,t} \ldots + b_{13} \text{consparty}_{i,t} + \text{countrydummy}_j + \text{yeardummy}_t + e_{i,j,t}$$

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[12] The fall of the Berlin wall creates a break in the data for many European nations. However, much of the data are often missing for these countries immediately prior to 1989, so these observations are dropped from the analysis.

B.   These changes in aid giving based on political leadership in the donor country can

be used to form an instrument for aid in order to find a relationship with growth or other

variables of interest in the recipient country. Political changes form a convincing

instrument because they create changes in aid levels that then effect growth. There is no

obvious way in which these changes can affect growth rates in the recipient country

directly. It is plausible that the changing political order could result in differences in other

dependent variables in the equation, such as trade. However, even if political changes

were to act through trade, it would not really affect our analysis significantly because we

are interested in the coefficient on the aid variable in the second stage. The difference

made by trade would still be indicated by the coefficient on the trade variable. Since the

model used is set up to pick up changes in aid levels due to political changes, it will still

give the answer we require. Thus, even if political changes act through other channels, so

long as they do not directly affect growth rates, our instrument for aid holds strong.

In order to use this instrument in a TSLS regression, the conservative party

variable is interacted with a number of variables that indicate the closeness between the

donor and recipient countries. These variables are the same ones that were shown to play

a role in aid giving in the previous regressions: colonial relationship and common

religious majority. The two-stage regression is set up as follows:

$$aid_{j,t} = a_0 + a_1 \, colony_{i,j} + a_2 \, (colony_{i,j}{*}consparty_{i,t}) + a_3 \, samereligion_{i,j}$$
$$+ \, a_4 \, (samereligion_{i,j}{*}consparty_{i,t}) + a_5 \, A_j + e_t$$

$$growth_t = b_0 + b_1 \, aid_t + b_2 \, A_j + e_t$$

where again i, j and t represent the same variables as above and the set A_j includes FDI,

gross domestic savings, interest rate, government debt and inflation in the period in

which aid is given. It also includes openness, democracy and GDP per capita lagged by

one year to reflect factors based on which aid is determined. This set reflects the variables that are typically used in growth regressions to account for the various factors that affect the level or GDP growth in an economy. FDI, GDS and interest rate proxy for the investment environment in an economy, while government debt, inflation and openness reflect sound economic policy. The democracy variable reflects the level of freedom in an economy, while GDP per capita accounts for the general standard of living in the country.

The model using the above equations is run in two forms: annual data on growth and aid (called short run) between 1975 and 2005 and average levels for five-year periods (called long run) between 1960 and 2005.[13] This was done to account for the noise that is typical of annual growth data and to average out any unusual changes in this data. While terming it 'long run' may be seem misleading, in allowing growth between 1995 and 2000 to be based on aid received between 1990 and 1995, it allows aid to act over a longer period of time. In this sense, the relationship found is indeed the impact of aid over a longer time frame then the annual data.

C. The long run version of the above model is also run with alternate dependent variables such as infant mortality rate and education expenditure. These variables reflect a crucial difference between income growth and development, which will be discussed in more detail in Section VII. However, since many of the variables in the regression above would not affect these dependent variables directly, the second of the TSLS regressions is run on a subset of the set A_j:

$$imr_{t-(t-4)} = b_0 + b_1 \, aid_{t-(t-4)} + b_2 \, GDS_{t-(t-4)} + b_4 \, democracy_{(t-1)-(t-5)} + b_5 \, GDPpercapita_{(t-1)-(t-5)} + b_6 \, population_{(t-1)-(t-5)} + e_{t-(t-4)}$$

These regressions are run with both levels of the variable of interest as well as the rates of

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[13] For the long run data, the one year lags from the short run data was recreated by basing average aid between 1961 and 1965 on average openness between 1960 and 1964.

change of these variables.

IV. Data

The results shown below are based on a dataset with 17 OECD donor countries[14] and 144 recipient countries between 1960 and 2005. A full list of donors and recipients can be found in the Appendix. Of the original dataset, data for some donor countries was dropped due to lack of political variation and for others due to inconsistencies in the data on which party was in power. Details on which countries were included in each of the regressions are also in the Appendix.

The aid data come from the OECD Development Assistance Committee dataset. Classified by the OECD as Official Development Assistance, this aid includes flows to developing countries to promote economic development and welfare, with at least 25% of the aid consisting of grants. The data used are for actual aid given in the year. The data are presented in millions of current US dollars: it is used in this form for the results in Section V but as a percentage of GDP in subsequent sections. This reflects the differences in interest in the different sections: in aid allocation, which country gets how much aid is the important factor while in Sections VI and VII, which countries gain from large shares of aid relative to its economy's size is the important factor.

The status of donors according to aid given in 2005 is shown in Figures 1 and 2. The largest contributors of development assistance were the United States, Japan, the United Kingdom, Germany and France. However, as Figure 2 shows, the only countries to give more than the United Nations target of 0.7% of GNI were Denmark, the Netherlands, Luxembourg, Norway and Sweden.

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[14] Of 22 total DAC donor countries within the OECD.
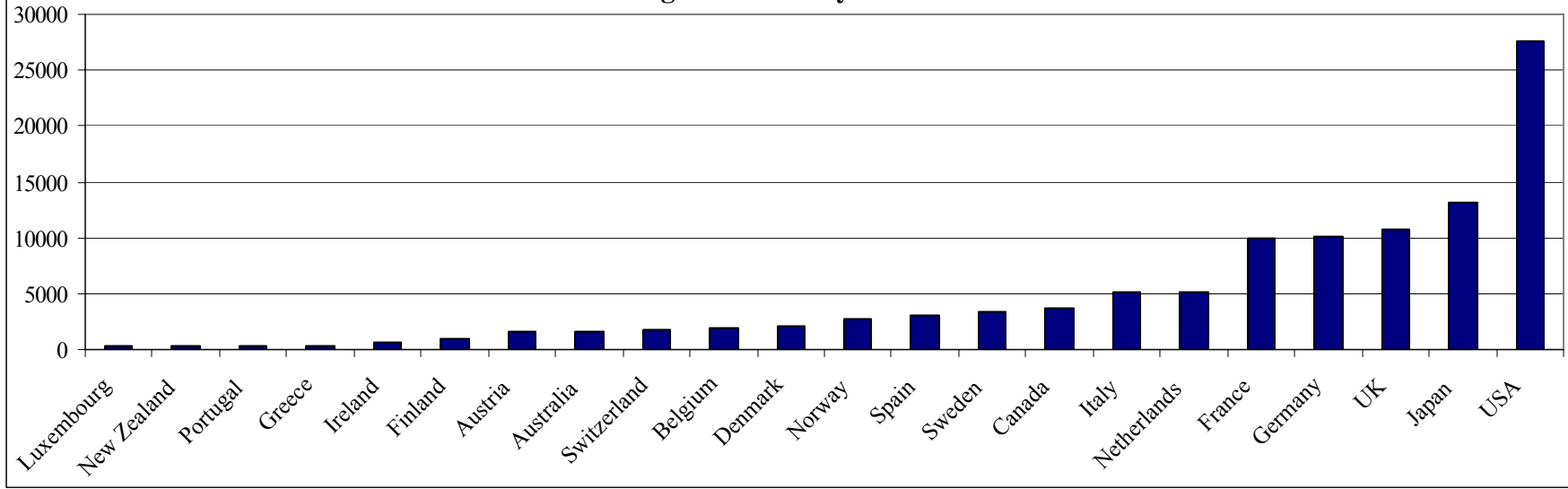
Figure 1: ODA by Volume

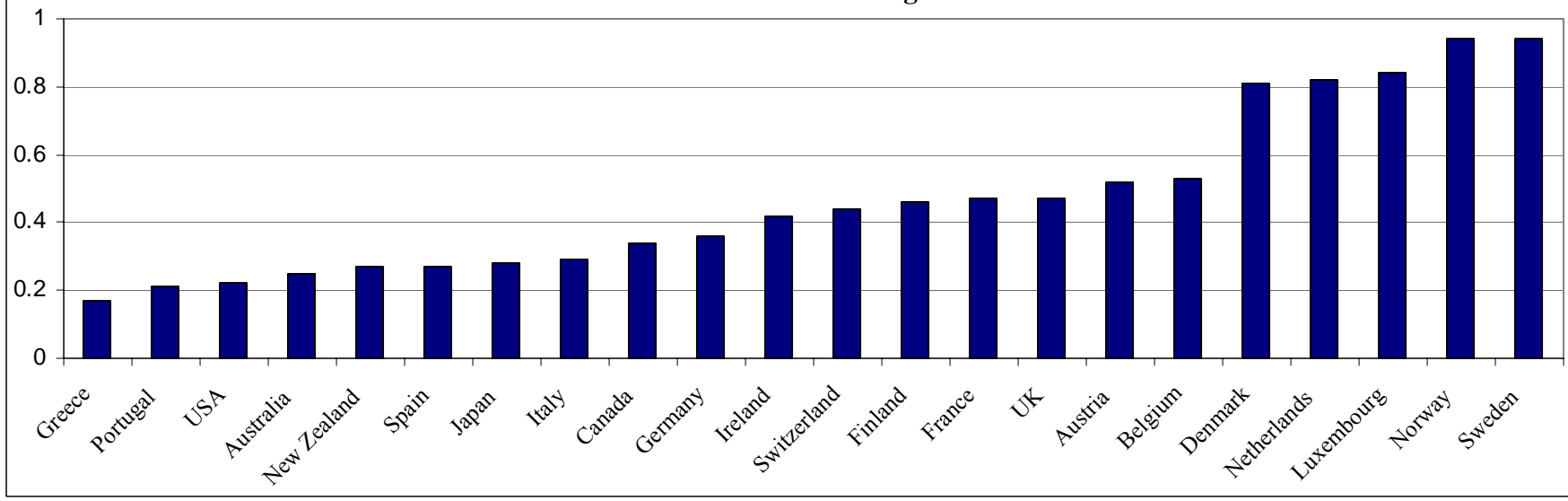## Table 2: ODA as a Percentage of GNI

Figure 3: Average Aid Share
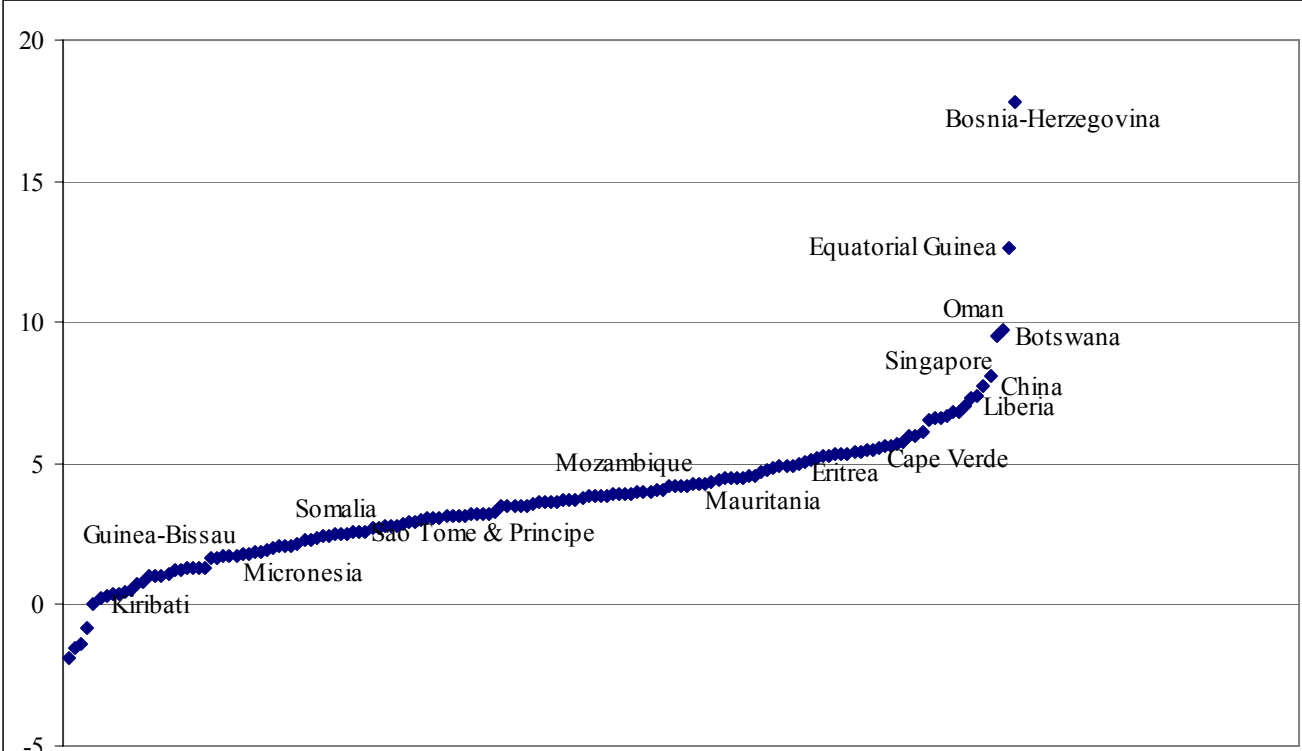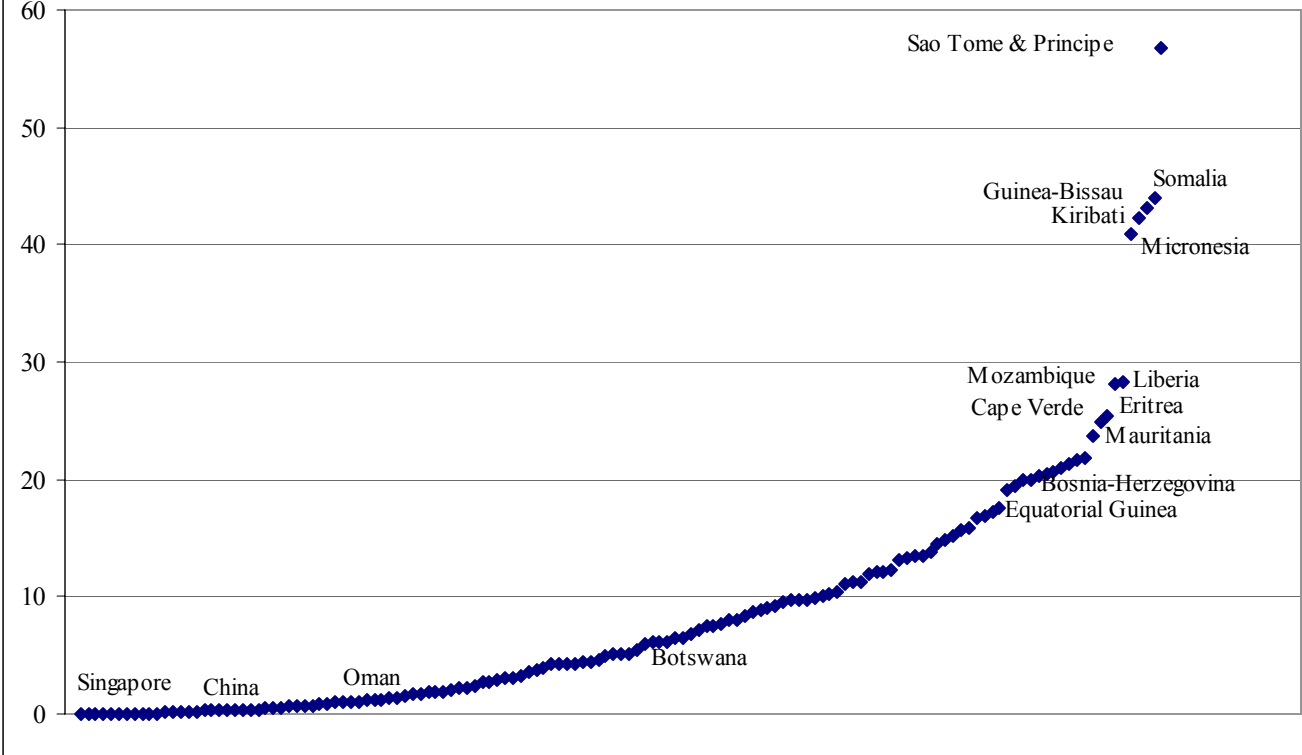
Figure 4: Average Growth Rate

Figure 3 shows the average annual aid as a share of GDP received by the recipient countries in the dataset since 1960. Figure 4 shows the average annual GDP growth rate for the same time period. As is apparent, the biggest recipients and the fastest growing countries are not the same. This is indicative of the problem with using an OLS regression to find a relationship between aid and growth, since aid typically goes to countries that are not growing fast. However, that the average country falls on the slope between 0 and 10 percent growth per year is encouraging for the analysis below as any relationship found will not simply be a function of the outliers.

The alternate dependent variables were obtained from the World Development Indicators database. The health variables include infant mortality rate (per 1,000 live births), child mortality rate (mortality rate under 5) and the number of hospital beds (per 1,000 people). The education variables are from the EdStats database at the World Bank and include net enrollment rate in secondary school, public education expenditure as a percentage of GDP and secondary school enrollment. Data on population, real GDP per capita (in current prices) and a measure of openness[15] (in current prices) were obtained from the Penn World Tables. Data on inflation rate and interest rate were obtained from the WDI database. Total GDP and public and publicly guaranteed debt, both in current US dollar, were also obtained from this database, as was foreign direct investment (net inflow) and gross domestic savings, both expressed as a percentage of GDP.

Data on the democratic status of the recipient country are taken from the Polity IV index. This variable is on a scale of -10 to 10 going from extreme autocracy to extreme democracy. The rankings are a compilation of indices on the presence of institutions that

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[15] Openness is measured as total trade (imports and exports) as a percentage of GDP.

present political choice, institutional constraints on the executive branch and civil liberties for citizens.

Data on the party in legislative power were collected from a variety of sources, both on and off-line. Information was collected from websites on historical election results from individual countries (such as Professor Adam Carr's elections database and Election Resources on the Internet), as well as from *European Political Facts of the Twentieth Century*, a book containing election and party information for many of the donors. The left and right alignment of the party in power is based on data from the Database of Political Institutions compiled by Thorsten Beck, Philip E. Keefer and George R. Clarke at the World Bank. This latter source is used in Section V and in the short run growth regressions, but extended through the former resources for years prior to 1975 for the long-run models. In cases where the data in this database and the data in the manual sources were significantly different, the donor countries were dropped from the dataset.

Finally, the variables representing closeness between donor and recipient countries were compiled with data from the CIA World Factbook. Information on the way in which countries were classified is presented in the Appendix. Countries were classified as colonies if at any point in history one of the donor countries was responsible for its administration. Donor and recipient countries were also aligned according to common religious majorities; this includes the largest religious groups, if no clear majority is present.[16]

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[16] The original version included a variable for common language, representing ease of interaction between the countries, but this was taken out as it did not add very much to the first stage results.

Table 1 shows the summary statistics for the raw data used in this analysis. The first thing to note from the Table is that the number of observations for each of the variables differs quite substantially. We will later see the result of this in that the number of observations for each of the regressions can vary quite dramatically. Next, we notice that when the data are averaged, as shown in the last five columns, the standard deviation of most of the variables is reduced. However, it must be noted that the five-year data includes the time period 1960 to 2005, whereas the annual data only includes data from 1975 to 2005; this explains some of the differences between the two sets of data.

As Table 1 shows, the average growth rate between 1975 and 2005 is 3.3%, with the minimum value belonging to Liberia in 1990 and the maximum to the same country in 1997, presumably during an upswing from the previous slump. The average GDP growth in the long run is approximately 3.8%, with the minimum growth rate in Lesotho between 1991 and 1995, and the maximum in the same country between 1996 and 2000.

Of the dependent variables, aid share averages around 4.3% of GDP in the annual data and 4.1% in the averaged data, with smaller standard deviation in the long run. The unusual property of this data is that aid share sometimes becomes negative; this occurs when repayment burdens leave the country effectively receiving negative aid. In the short run, the minimum value represents Dominica in 2004, while the maximum represents Sao Tome and Principe in 1995, whose GDP in that year is $45 million. In the averaged data, the minimum represents Afghanistan between 1981 and 1985, while the maximum again represents Sao Tome and Principe between 1991 and 1995.

Lastly, it is important to note the wide gap between the maximum and minimum number of each variable in each phase. This is a result of the vast number of countries

Table 1: Summary Statistics

Variable	Annual Data					Five-year Average Data				
	Obs.	Mean	Standard deviation	Min.	Max.	Obs.	Mean	Standard deviation	Min.	Max.
GDP growth	3969	3.3369	6.9071	-51	106	1060	3.8225	4.6326	-21.6	39.4
Aid share	3658	4.2884	7.0812	-1.3021	129.8492	1004	4.0522	6.0292	-0.2234	62.7424
GDP	4049	35057	107991	20.57	2228862	1072	26187	86415	13.11	1509957
Population	4619	28.4190	114.871	0.0532	1294.85	1386	24.966	103.536	0.042	1278.908
FDI	3510	2.2402	5.6932	-83	145	906	2.0254	3.9793	-17	51.4
GDS	3761	15.1837	16.3726	-86	76	1045	15.4491	15.8530	-72.4	78.3333
Interest rate	2638	6.6073	22.9672	-98	790	613	5.9708	15.8484	-85	202
GDP per capita	3995	4337.41	5123.80	99.45	43139.52	1106	3505.74	4707.20	72.3613	34320.24
Debt	3206	58.191	69.864	0	861.573	847	161.240	556.561	0	8044.5
Openness	3995	78.6894	48.3396	0.84711	427.8757	1106	74.5669	46.8457	2.01522	387.4237
Inflation	3389	58.1921	574.6584	-22	23773	905	51.2712	330.5221	-5.75	6517
Democracy	3678	-1.0261	6.9737	-10	10	1098	-1.5318	6.5271	-10	10

used in the analysis and the diverse countries that receive aid from the OECD nations.

V. How is Aid Allocated?

The United States

As the estimation of this section is based on work already done by Fleck and Kilby, it would be useful to compare the results below with those found by the authors of their article. Using separate estimates for conservative presidents and Congress, Fleck and Kilby find that in general, the United States gives more aid to countries receiving small donor aid, countries that the US exports to and to countries with higher population; countries that the US imports from and countries with high GDP per capita tend to receive less aid in general. Conservative presidents tend to give significantly less to countries receiving small country aid and more to countries with similar UN voting patterns, while conservative Congress tends to give more aid to export partners but significantly less to import partners and to countries receiving more aid from small donors. Their conclusion is that while development concerns and commercial concerns are the primary characteristics of American aid, conservative presidents focus more on political concerns rather than development, while conservative Congress cares more for commercial concerns than for development.

Columns 1 and 2 in Table 2 show results for US aid allocation based on the altered model used in this paper. These results show that the US generally gives less aid to richer countries (that have high GDP per capita) and to export partners; they also typically give more to countries they import from. However, conservative governments are different from the norm in that give more than usual to export partners, less than usual

to import partners and, surprisingly, significantly less to countries with Christian majorities. It is important to note that in general, Christian countries usually get less American aid as a share of GDP than non-Christian countries, with the respective average aid levels at $35 million and $61 million. However, Christian countries receive 1.39% of GDP in American aid on average and non-Christians get only 0.79%. This means that while conservatives give less to Christian countries, they are indeed balancing out the aid shares more evenly than liberals.

The results also show that conservatives tend to give more aid in general than liberals. When accounting for differences between liberals and conservatives, the results show that when the Republican Party is in power, almost $53 million more is given in foreign aid than when Democrats are in power. Between 1980 and 2002, the United States gave out approximately $40 billion in aid on average per year. This means that conservatives give 0.13% more aid than liberals on average. While on a percentage scale, this may seem like a small amount, for any individual recipient country, this may translate into millions more in aid dollars.

The conclusion to be drawn from these results is that while the US is concerned about development issues, US bilateral aid is primarily based on commercial concerns. The results also seem to indicate that Republicans use aid more often as a tool to accomplish commercial policies rather than as rewards for similarities between the recipient country and the US.

Table 2: Factors Affecting Individual Country Bilateral Aid Allocation 1980-2002

COEFFICIENT	(1)	(2)	(3)	(4)	(5)	(6)
	US aid		Australia aid		Netherlands aid	
GDP per capita	-20.34**	-18.13**	-2.565**	-1.574	-0.895	-0.671
	(8.89)	(9.22)	(1.11)	(1.17)	(2.04)	(2.01)
GDP per capita * Cons		0.404		-0.189		-0.153
		(3.67)		(0.96)		(0.79)
Population	-0.0641	0.164	0.0253	0.0237	-0.366***	-0.183***
	(0.20)	(0.32)	(0.044)	(0.064)	(0.045)	(0.063)
Population * Cons		0.106		0.0102		-0.0346***
		(0.078)		(0.022)		(0.010)
Import	0.0392*	0.0761***	-0.139***	-0.222***	0.0697**	-0.0143
	(0.023)	(0.026)	(0.017)	(0.036)	(0.032)	(0.039)
Import * Cons		-0.120**		0.195***		-0.0559
		(0.049)		(0.074)		(0.054)
Export	-0.0497*	-0.0979***	0.0424***	0.0757***	-0.132**	-0.187***
	(0.029)	(0.034)	(0.011)	(0.017)	(0.066)	(0.069)
Export * Cons		0.135**		-0.267**		0.177
		(0.054)		(0.12)		(0.11)
Democracy	1.089*	0.692	-0.0481	-0.0378	0.496***	0.409*
	(0.60)	(0.83)	(0.053)	(0.055)	(0.13)	(0.22)
Democracy * Cons		0.772		0.170		0.119
		(0.86)		(0.13)		(0.21)
UN affinity	10.19	11.43	0	0	0.108	17.85
	(11.8)	(13.8)	(0)	(0)	(13.3)	(16.9)
UN affinity * Cons		-12.04		-3.129		-18.24
		(20.2)		(12.5)		(12.9)
Common religion	-41.11	-42.12	-0.603	1.355	-434.4***	-259.0***
	(91.7)	(91.5)	(4.99)	(5.06)	(50.7)	(76.5)
Common religion * Cons		-26.40***		-3.307**		-3.906
		(9.95)		(1.56)		(2.72)
Colonial tie					0	-77.60***
					(0)	(18.9)
Colonial tie * Cons						87.85***
						(9.58)
Conservative government	41.38**	52.69***	1.336	9.366	4.853	14.31
	(16.5)	(17.6)	(1.62)	(10.3)	(18.8)	(20.6)
Constant	54.07	51.56	-1.017	-3.400	435.4***	250.5***
	(86.8)	(86.6)	(3.70)	(3.79)	(53.4)	(79.8)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1716	1716	341	341	1137	1137
R-squared	0.69	0.69	0.74	0.75	0.62	0.66

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The difference in the number of observations between each set of country regressions arises because some countries give aid to a larger number of recipients than others.

The selfish countries: Australia

In general, the United States is treated in the aid allocation literature as a 'slightly selfish' nation in that it bases a lot of its decision-making on commercial concerns. In an article on donors' motives in 2006, Jean-Claude Berthelemy separates out three nations as 'egoistic' based on the elasticity of aid to trade. These countries – Australia, Italy and France – base most of their aid allocation on domestic. To see if these differences hold, the results from the aid allocation regressions for Australia are shown in Columns 3 and 4 in Table 2. In general, Australian aid is based on purely domestic concerns, as only the coefficients on imports and exports are significant in the regression. Australia generally gives $222,000 (0.04% of $5 billion in average annual aid given out) less to countries it imports from while giving $75,000 (0.01%) more to countries to which it exports goods and services. However, even in Australia, there is a difference in the way in which the two parties act. When the Liberal-National Coalition is the ruling party, they give $195,000 (0.04%) more to import partners than is usually given, while they give $267,000 (0.05%) less to export partners. Curiously, the religion result found in the US also holds for Australia. Conservatives give $3.3 million (0.6%) less to countries with Christian majorities than is typical in Australian aid giving. However, unlike the US, Christian countries receive approximately $3 million more on average from Australia[17] and this is 0.65% as a share of GDP, while for non Christian countries, Australian aid makes up 0.46%. This means that while the situations are slightly different, Australian conservatives act in a similar fashion as American conservatives to better redistribute aid amongst the recipient nations.

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[17] Christian nations receive $11 million on average while non-Christian nations receive $8 million.

The altruistic countries: the Netherlands

The Berthelemy (2006) article also named the countries that are 'altruistic' in their aid giving, in that they do not base their aid on trade concerns. These countries are: Switzerland, Norway, Austria, Ireland, Netherlands, Denmark and New Zealand. To show that political differences exist even in the altruistic countries, the results for the Netherlands are shown in Columns 5 and 6 in Table 2 above. The results show the Netherlands generally gives less aid to countries with larger population and to export partners, while they give much less to other Christian countries[18] and to recipient countries with colonial ties to the Netherlands. They do, however, give more aid to countries with democratic governments. As with the other donor countries, when the Christian Democrats, the conservative party in the Netherlands, are in power, even less aid is given to large countries, while substantially more is given to countries which were Dutch colonies.

Cumulative results

A summary of the results from each of the countries is show in Table A5 in the Appendix. The table shows the results from regressions from the other 14 countries in the dataset. According to the findings, the difference between the ways in which parties allocate aid in different countries can vary from a little to a lot. Nonetheless, in almost all the countries, some difference does exist. To see these differences on average, the data is pooled together; the results from this pooling are shown in Table 3. A cautionary note is necessary here: from the data we have, we have made statements on how conservatives in

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[18] Non-Christian nations receive $2 million more on average from the Dutch though Christians receive 0.07% higher aid share of GDP. Conservatives in the Netherlands seem, once again, willing to use their time in office to balance out this difference in aid share among recipients of Dutch aid.

Table 3: Factors Affecting Bilateral Aid Allocation 1980-2002

COEFFICIENT	(1)	(2)	(3)
GDP per capita	-1.420	-1.046	-0.543
	(1.31)	(1.32)	(1.31)
GDP per capita * Cons			-1.500***
			(0.51)
Population	-0.0320	0.0558	0.115**
	(0.047)	(0.047)	(0.046)
Population * Cons			0.166***
			(0.0079)
Import	0.0116**	0.00479	0.0311***
	(0.0058)	(0.0054)	(0.0070)
Import * Cons			-0.0521***
			(0.013)
Export	-0.0145**	-0.00824	-0.0314***
	(0.0070)	(0.0068)	(0.0088)
Export * Cons			0.0499***
			(0.016)
Democracy	0.224*	0.115	-0.0965
	(0.12)	(0.12)	(0.14)
Democracy * Cons			0.473***
			(0.14)
UN affinity	3.234*	1.661	2.850
	(1.67)	(1.70)	(2.49)
UN affinity * Cons			-2.258
			(3.29)
Common religion		-12.80***	-8.208***
		(1.79)	(2.19)
Common religion * Cons			-7.585***
			(1.90)
Colonial tie		60.49***	70.01***
		(2.52)	(3.41)
Colonial tie * Cons			-20.44***
			(4.97)
Conservative government		9.504***	12.14***
		(0.93)	(2.69)
Constant	132.3**	39.91	-137.7**
	(55.1)	(55.1)	(54.8)
Year dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Observations	18032	13593	13593
R-squared	0.08	0.14	0.17

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Observations in this form of analysis represent how much donor i gives to recipient j in year t. This means there are 17 observations for each recipient in each year.

the US act, as opposed to conservatives in Australia and the Netherlands. Combining all the data from the different donor countries as we have done in Table 3 involves some risk in that it assumes that conservatives in all the donor countries act in the same way. As we have seen though, conservatives in each country act in different ways based on their circumstances. Despite the unsteadiness of this assumption, such a pooling of data allows a synthesized form of the results found for each of the countries.

Table 3 shows that in general, countries with higher population, import partners and previous colonies receive more aid from donors, while export partners and nations with Christian majorities receive less aid. Not surprisingly, being a former colony makes the biggest difference: donors give former colonies $70 million (25% of average $2.7 billion of aid given out each year) more in aid than the average recipient nation. When conservative parties are in power, matters become slightly different. In those cases, countries with high population, export partners and countries with democratic governments get more aid than they do on average. Countries with high GDP per capita, import partners, countries with Christian majorities and former colonies, on the other hand, receive less aid than they usually do. The surprising factor, though, is that conservative governments generally give $12 million (4%) more in bilateral aid than liberal governments.

Regardless of the way in which the data are sliced and the results are presented, the general message to take away is that conservatives act differently from liberals when in office. Given that the net differences are substantial, we assume in this analysis that they are large enough that political differences can provide enough variation in aid from regime to regime to act as an instrument for aid. This instrument can then be applied to

the aid-growth discussion to better understand the relationship between the two variables

in the real world.

VI. Aid and Growth

Bilateral aid and growth

Applying political changes in donor countries and closeness between donors and

recipients as instruments for aid yields some interesting results. Table 4 applies the TSLS

method[19] established above to understand the relationship between bilateral aid from the

US, Australia and the Netherlands, and GDP growth in recipient countries. The results

are shown for both annual data (short run) and for five-year average (long run) data.

Table 4 shows that for the most part, only FDI has a positive effect in both the short and

the long run. Other variables have significant effects on growth, but none do so

consistently. Gross domestic savings have a positive effect on growth in countries

receiving Australian and Dutch aid, but show no effect when American aid is considered.

Debt and GDP per capita show negative effects on growth, but also in an inconsistent

manner.

Similar patterns occur with the region dummies, with variables floating in and out

of significance. Latin American countries show slower growth in the short run relative to

Eastern Europe and Central Asia, but only when Australian aid is predicted. Middle

Eastern and North African countries show a positive effect both in the short and long run

when Dutch aid is predicted.

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[19] OLS regressions were also run for the same data. The results followed similar patterns of significance for
the most part, except for the US short run results, which showed a positive significant relationship between
aid and growth. In addition, the coefficients on the aid share variable for the Dutch regressions were much
smaller in the OLS regression, usually hovering around 1.

Table 4: The Relationship between Bilateral Aid and Growth

COEFFICIENT	US aid		Australia aid		Netherlands aid	
	(1)	(2)	(3)	(4)	(5)	(6)
	Short Run	*Long Run*	*Short Run*	*Long Run*	*Short Run*	*Long Run*
Bilateral aid share	-0.824	2.516	-1.473**	-0.337	12.10***	10.18*
	(1.33)	(5.76)	(0.58)	(0.26)	(4.03)	(5.34)
FDI	0.171***	0.439***	0.325***	0.600***	0.242***	0.526***
	(0.046)	(0.15)	(0.062)	(0.10)	(0.050)	(0.11)
GDS	0.00431	0.143	0.0373***	0.0792***	0.0873***	0.125***
	(0.048)	(0.20)	(0.013)	(0.021)	(0.021)	(0.040)
Interest rate	0.0347***	-0.0154	-0.000178	0.0108	-0.00274	0.0242
	(0.0098)	(0.089)	(0.0065)	(0.016)	(0.0066)	(0.019)
GDP per capita	-0.000154**	0.000145	-0.000218**	-0.0000686	-0.0000305	0.0000960
	(0.000072)	(0.00034)	(0.000085)	(0.00013)	(0.00010)	(0.00016)
Debt	0.000880	-0.0165	-0.00915**	-0.00492	-0.0498***	-0.0321**
	(0.014)	(0.032)	(0.0037)	(0.0047)	(0.014)	(0.016)
Openness	0.0100	-0.0265	0.00863*	-0.0206***	0.0142**	-0.00483
	(0.0066)	(0.021)	(0.0049)	(0.0077)	(0.0057)	(0.011)
Inflation	-0.000143	-0.00215	-0.000753	-0.00116**	-0.000111	-0.00114*
	(0.00018)	(0.0015)	(0.00049)	(0.00053)	(0.00023)	(0.00067)
Democracy	0.0124	0.0269	0.0234	0.0320	-0.0420	0.0119
	(0.037)	(0.12)	(0.035)	(0.052)	(0.031)	(0.058)
Africa	-1.240	1.477	-1.386	-0.536	-1.002	-0.279
	(1.23)	(2.84)	(1.01)	(1.30)	(0.76)	(1.34)
East Asia &	-0.447	2.237	0.648	0.267	1.431	1.616
Pacific	(1.22)	(3.34)	(1.23)	(1.47)	(0.91)	(1.52)
Latin America	-1.241	-0.177	-1.766*	-1.389	0.467	0.846
& Caribbean	(0.78)	(1.45)	(1.05)	(1.32)	(0.89)	(1.49)
Middle East &	1.112	1.982	1.204	0.757	4.698***	4.124*
North Africa	(0.98)	(1.64)	(1.16)	(1.64)	(1.42)	(2.13)
South Asia	0.362	2.858	0.230	0.976	0.692	1.792
	(1.38)	(3.79)	(1.10)	(1.53)	(0.94)	(1.65)
Constant	5.432*	1.329	4.100**	5.035***	0.716	9.713***
	(2.99)	(7.73)	(1.65)	(1.56)	(2.14)	(3.20)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1383	362	936	297	1478	376
R-squared	0.05	.	0.10	0.25	.	.

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Observations in the above table represent total bilateral aid received by country j in year t from the restricted list of donors. This means that for each recipient country in each year, there is only one observation. Aid is predicted in the first stage on the combination of the closeness variables and political variables from different donor countries into one equation.

Turning to the variable of interest, the coefficient on the aid variable, unfortunately, is far from consistent. American aid shows a negative short run

relationship with growth, but the insignificance of the coefficient means that we cannot be certain of any effect at all. Australian aid seems to slow down growth in the short run as well but the coefficient on the aid share variable, in this case, is significant. Dutch aid, on the other hand, shows a significant and positive effect. In particular, the coefficient on the Dutch aid variable is significantly larger in magnitude than any other variable in the regression. The short run evidence then seems to argue for altruistically given aid as opposed to the commercially or politically motivated form.

In the long run, the effects become smaller but continue to be inconsistent. American aid now shows a positive value, though it continues to be insignificant. Australian aid is also insignificant but bears a negative coefficient even in the long run. Once again, Dutch aid shows a positive and significant effect of aid on growth. A point to note from Table 4 is that the magnitude of the effects of aid on growth is much higher than on any of the other variables.

The irregularity in the direction of the relationship between bilateral aid and growth is at first discouraging; however, the inconsistencies seem to tell a story. First, to expect bilateral aid from an individual donor to have a large enough impact on growth to show a significant result is a bit of a stretch. Of the aid received by recipient countries, each of the donors shown above is only a small contributor. However, the regressions may be picking up relationships between growth and general patterns of aid. The places to which the US and Australia give aid are growing slowly or not at all, perhaps because they receive less aid from other nations. The places to which the Netherlands gives aid are growing fast and using the aid they are given effectively. This may provide some support that aid decisions based on development concerns alone produce results that are

superior to other decision-making processes. This contradicts the argument in the aid literature that features of the recipient country alone determine whether or not aid will be effective.

Cumulative aid and growth

As Table 4 shows, the impact of aid given by specific countries varies dramatically based on the source of the aid and on individual country decision-making. What then are the results on aggregate? Table 5 shows the results from a cross-country panel that includes aid given by each of the donor countries in our dataset. Columns 1 and 2 show the results from the annual dataset. Aid share has a significant and positive effect in both the OLS and the TSLS regressions. In addition, the OLS results show that FDI and GDS have significant positive effects on growth, while increasing GDP per capita, debt and inflation have significant negative effects, though the effects are much smaller than that of aid share, FDI or GDS.

The problem with these OLS results though, as discussed earlier, is that the coefficient on aid share does not necessarily imply causation as much as simple correlation. This problem is avoided by running a TSLS regression on the same dataset with the political variation instrument. The results from this regression are shown in Column 2. The direction and level of significance on all of the variables remains the same, except inflation. However, the magnitudes of the coefficients change quite substantially, particularly that on aid share, which almost doubles. A 1-percentage point increase in aid share increases GDP growth by 0.29-percentage points. The coefficient on FDI falls however, implying that some of the positive effect of aid had been misattributed

Table 5: The Relationship between Bilateral Aid and Growth

COEFFICIENT	(1) OLS	(2) TSLS	(3) OLS	(4) TSLS
	Short Run	*Short Run*	*Long Run*	*Long Run*
Aid share	0.157***	0.290***	0.00730	-0.0296
	(0.037)	(0.091)	(0.072)	(0.20)
FDI	0.182***	0.176***	0.393***	0.400***
	(0.035)	(0.038)	(0.066)	(0.066)
GDS	0.0524***	0.0641***	0.0641***	0.0560**
	(0.0100)	(0.013)	(0.019)	(0.027)
Interest rate	-0.00160	-0.00176	0.0121	0.0122
	(0.0047)	(0.0048)	(0.014)	(0.014)
GDP per capita	-0.000179***	-0.000149**	-0.0000495	-0.0000793
	(0.000058)	(0.000063)	(0.00011)	(0.00011)
Debt	-0.0167***	-0.0217***	-0.00486	-0.00777
	(0.0028)	(0.0041)	(0.0043)	(0.0092)
Openness	0.00373	0.00416	-0.0182***	-0.0177***
	(0.0035)	(0.0037)	(0.0063)	(0.0064)
Inflation	-0.000323**	-0.000257	-0.00120**	-0.00112**
	(0.00015)	(0.00016)	(0.00049)	(0.00056)
Democracy	-0.00907	-0.0168	0.0345	0.0374
	(0.021)	(0.022)	(0.042)	(0.043)
Africa	-1.406**	-1.711***	0.246	0.422
	(0.59)	(0.62)	(0.93)	(0.99)
East Asia & Pacific	-0.360	-0.645	1.074	1.225
	(0.66)	(0.69)	(1.07)	(1.08)
Latin America & Caribbean	-1.407**	-1.419**	-0.388	-0.242
	(0.60)	(0.63)	(0.91)	(0.91)
Middle East & North Africa	1.036	1.072	1.576	1.748
	(0.71)	(0.74)	(1.18)	(1.19)
South Asia	0.387	0.316	1.750	2.053*
	(0.72)	(0.75)	(1.19)	(1.20)
Constant	4.406***	3.343***	7.379	3.299***
	(1.26)	(1.07)	(4.62)	(1.16)
Year dummies	Yes	Yes	Yes	Yes
Observations	1574	1486	392	385
R-squared	0.15	0.13	0.23	0.23

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

to FDI in the OLS regression. In addition, the negative coefficient on debt also doubles.

Table 5 also shows the results from the data on five-year periods in Columns 3 and 4. These columns paint a much simpler picture. Growth is significantly positively correlated with FDI and GDS and negatively correlated with openness and inflation.

Once again, the first two bear a much larger coefficient than the second two. Disappointingly, aid share comes up insignificant in both the OLS and the TSLS estimation, showing that once the data is smoothed out, aid seems to have no real effect on GDP growth.

An interesting aspect of these results is that both the Africa and Latin America dummies show significant negative effects in the short run in comparison to Eastern Europe. However, once the data is averaged out, they lose their significance. This seems to imply that the constant conversation concerning the slow growth of these two regions may be preoccupying itself with what may turn out to be simple short run fluctuations.

The more important question regarding the results above is their implications for aid effectiveness. To put these coefficients into context, it is necessary to understand the results of an increase in the ratio of aid-to-GDP. According to the annual results, a 1-pecentage point increase in aid-to-GDP increases growth by 0.29-percentage points. This means that at the mean, a 1% increase in the aid as a share of GDP increases annual growth rate by 0.37%.[20] So for a country with a growth rate of 5%, this means that 1% more aid, as a share of GDP, would increase the rate of growth to 5.37%. However, it must be noted that this 1% increase in aid-to-GDP seems small but when expressed in dollar terms, the amount is quite substantial. With the average GDP of the recipient countries for the dataset at a little over $35 billion, a 1% increase in aid-to-GDP represents a $350 million increase in aid. But given that aid given by the OECD Development Assistance Committee members in 2006 was over $300 billion, this increase represents only a 0.1% increase in the aid already given by the donor nations.

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[20] The coefficient is multiplied by mean aid and divided by mean growth rate.

Unfortunately, when the data is segmented into five-year period, any effect of aid on growth disappears and no similar conclusions can be drawn.

The analysis above leads to findings that are surprisingly different from what was expected. In particular, the expectation was that the annual level data (given the noise) might not pick up a relationship between aid and growth, but the less volatile five-year averages should show significant positive results. That the opposite has happened is a concern, since the annual data remains quite noisy. This means that the results found for the annual data are difficult to interpret, as the coefficient may be picking up the effect of another factor that affects both aid levels and growth rates. As a result, the five-year data should give a better understanding of the relevant variation. As they stand, the results seem to imply that aid does not have a particularly substantial effect on GDP growth.

However, there may be another problem with this analysis: the nature of growth regressions. While the instrument applied might account for reverse causality with aid, many of the other variables may also display a similar trait. For example, increased openness may cause higher growth, but higher growth may itself cause the economy to become more open due to increased push for access to foreign markets. If that is the case, the coefficients on the variables other than aid may be misleading. This is the unfortunate conclusion in many growth regressions: there is simply too much to account for. In order to find the truest relationship, instruments would have to be developed for most, if not all, of the variables in the regression.

Instead of following that seemingly impossible path, the rest of this paper will try to understand some interesting alternatives. An important assumption we have implicitly made in the above analysis is that growth will fulfill the aims of development assistance.

It is true that economic growth can lead to development if the increased government revenue is invested in improving the standard of living. Alternately, it may accomplish this goal by increasing personal income, which leads indirectly to investments in health and education. Unfortunately, there is no hard evidence that either of these mechanisms hold in reality. In order to explore this further, we will now attempt to find an empirical relationship between aid and development.

VII. Aid and Development

The United Nations Development Programme defines human development as improvements in income but also in human capital – in health and in education. In order to understand the relationship between aid and these factors, a shorter version of the aid regression is run with health and education dependent variables. Because this kind of data tends to be less noisy and depend upon fewer factors then growth, the instrument we have developed may be more successful in finding a relationship between aid and the variables indicating development, as well as reflect the relationship more accurately.

The relationship between aid and development has not been dealt with in the literature to the same extent as the aid-growth relationship. However, some work has been done as an offshoot of the aid-growth literature, in an investigation into whether aid causes pro-poor growth. This discussion is based on evidence that aid funds government consumption spending rather than capital spending. In fact, Feyzioglu, Swaroop and Zhu (1999) shows that 75 cents of every dollar of development assistance goes to current spending with the remaining 25 cents going to capital spending. If this is true, then while aid may not cause growth, it may improve the standard of living in the recipient country

if the increased government spending is directed at the poor. In fact, this is what Mosley, Hudson and Verschoor (2004) demonstrates; they find that aid leads to more pro-poor spending and this in turn is associated with lower poverty headcounts. Gomanee, Girma and Morrissey (2005) present similar results using quantile regressions, showing that aid is particularly effective in countries with low levels of human development. However, Gomanee et al (2005) agree with the evidence that aid improves welfare indicators, but argue that the effect is direct or through growth, and not through public spending.

To test the hypothesis that while aid may not cause growth, it may result in improvements in development, the two-stage analysis used earlier is applied to a number of dependent variables related to health and education. As mentioned in Section III, the model applied is the same format as that applied to growth, with fewer independent variables in the second stage. The summary statistics for the development variables are presented in Table 6. The health variables – infant mortality rate, child mortality rate and the number of hospital beds – pick up the availability of healthcare to children and to adults, and are all presented per 1,000 people in the recipient country. The variables are such that reductions in infant and child mortality rates and increases in hospital beds are desired results. The infant mortality rate data in Table 6 shows that of every 1,000 children born, an average of 71 die immediately after birth, with the fewest such deaths in Singapore between 2001 and 2005 and the most in Mali between 1961 and 1965. In addition, 107 children on average die under the age of five, with the same minimum and maximum as infant mortality rate. Finally, Table 6 shows that on average countries are equipped with 4 hospital beds for every 1,000 people, with the highest number in the Slovak Republic between 1981 and 1985 and multiple countries at the minimum.

Table 6: Summary Statistics

Variables	Obs.	Mean	Standard deviation	Minimum	Maximum
			Five-year Average Data		
IMR	1218	71.1581	49.2954	3	255
CMR	1213	107.1516	84.2638	4	450
Hospital beds	746	4.0602	5.3236	0	90
Secondary school enrollment	779	1899640	7707746	924	97200000
Net enrollment rate (secondary)	409	48.5245	26.7776	1	98.3333
Education expenditure	763	4.3254	2.6407	0	42

The education variables reflect both citizens' and the government's prioritization of education. Secondary school enrollment represents the number of students enrolled in secondary school in the recipient country in a given year. The net enrollment rate variable expresses the number of pupils in secondary school as a percentage of the total secondary school aged people in the population. Finally, education expenditure includes current and capital expenditure on education by local, regional and national governments expressed as a percentage of GDP in the year. Table 6 shows the summary statistics for these variables. Average secondary school enrollment in recipient nations is 1.8 million students, with the minimum in Seychelles between 1975 and 1980 and the maximum in China between 2000 and 2005.[21] For net enrollment rate, the average is close to 50%, with the minimum in Oman between 1970 and 1975 and the maximum in the Seychelles between 1995 and 2000. Finally, the average expenditure on education is about 4% of GDP, with multiple countries spending almost 0% and the maximum of 42% in Sudan between 1975 and 1980.

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[21] Without having these values relative to total population makes comparison across countries difficult but for the purposes of the later regression, it is important to use the raw numbers.

In addition to running the regressions on the values of each of the variables, regressions are also run using growth rates of the variables. This growth is calculated by fitting the data to an exponential curve.[22] This allows us to understand the impact of aid on the rate of change of each of the variables.

Health dependents

Table 7 shows the two-stage results for the relationship between aid and the variables related to health. Not surprisingly, the results from infant and child mortality rates show very similar patterns. As Columns 1 and 3 show, aid share is negatively but insignificantly related to both child and infant mortality rate. GDS, GDP per capita and democracy all show significant negative relationships with both these variables. Of these variables, democracy shows a surprisingly large impact: a unit increase in the democracy rankings is related to a 1-percentage point decrease in infant mortality rate and a 1.8-percentage point decrease in child mortality rate. Among the recipient nations, African countries show a significant higher infant and child morality rate with respect to Eastern European countries, while South Asian countries have a significantly higher infant mortality rate.

However, while aid has no significant effect on the levels of mortality rates, it does have a statistically significant effect on the rate at which they change. Columns 2 and 4 show that aid share has a significant negative effect on the growth of both infant and child mortality rate. A 1-percentage point increase in aid share causes the growth rate of both infant and child mortality rates to slow down by approximately 0.005-percentage points. GDS has a similar effect, though the magnitude of the effect is about a quarter of

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[22] These values were determined using the 'logest' function in Microsoft Excel.

Table 7: The Relationship between Bilateral Aid and Health Variables

COEFFICIENT	Infant Mortality Rate		Child Mortality Rate		Hospital Beds	
	(1)	(2)	(3)	(4)	(5)	(6)
	Level	*Growth*	*Level*	*Growth*	*Level*	*Growth*
Aid share	-0.105	-0.00497**	-0.768	-0.00459*	0.121	0.0108
	(0.74)	(0.0025)	(1.29)	(0.0026)	(0.076)	(0.021)
GDS	-0.529***	-0.00110*	-0.928***	-0.00133**	0.00167	0.00512
	(0.15)	(0.00057)	(0.27)	(0.00059)	(0.023)	(0.0066)
GDP per capita	-0.00437***	-0.00000227	-0.00775***	-0.00000146	0.000126	-0.00000234
	(0.00075)	(0.0000025)	(0.0013)	(0.0000026)	(0.000082)	(0.000022)
Democracy	-1.029***	-0.000810	-1.806***	-0.00157	0.0528	0.0119
	(0.30)	(0.0010)	(0.53)	(0.0010)	(0.033)	(0.0093)
Population	-0.00695	-0.00000214	-0.00905	-0.00000162	0.000903	0.000861***
	(0.010)	(0.000034)	(0.018)	(0.000035)	(0.00096)	(0.00024)
Africa	43.32***	0.108***	78.52***	0.123***	-3.561***	-0.101
	(6.66)	(0.022)	(11.7)	(0.023)	(0.76)	(0.21)
East Asia &	4.435	0.00956	5.209	0.0138	-3.619***	-0.248
Pacific	(7.67)	(0.026)	(13.5)	(0.027)	(0.81)	(0.23)
Latin America	9.741	-0.0122	16.60	-0.00617	-4.275***	0.0320
& Caribbean	(6.26)	(0.021)	(11.0)	(0.021)	(0.60)	(0.15)
Middle East &	3.003	-0.0388	-3.682	-0.0456*	-2.758***	0.120
North Africa	(8.10)	(0.027)	(14.2)	(0.028)	(0.77)	(0.20)
South Asia	16.67**	-0.0185	22.74	-0.0274	-4.793***	-0.292
	(8.45)	(0.028)	(14.9)	(0.029)	(0.88)	(0.23)
Constant	83.21***	0.846***	130.8***	0.819***	6.071***	1.047***
	(8.17)	(0.028)	(14.4)	(0.029)	(0.86)	(0.23)
Period dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	377	362	377	362	234	177
R-squared	0.58	0.29	0.59	0.35	0.25	0.12

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

that of aid. Once again, Africa deviates from the general trend by showing a significantly

larger change in both infant and child morality rates in relation to Eastern Europe. Middle

East and North African nations, on the hand, shows a significantly lower rate of change

of child mortality in relation to Eastern European countries.

Columns 5 and 6 show that when hospital beds per 1,000 people is used as the

dependent variable, only the region dummies show up as statistically significant, with

similar magnitudes across the board. This implies that the control region, Eastern Europe

and Central Asia, has significantly more hospital beds than the rest of the developing

world[23]. When the rate of change of the number of hospital beds is taken into account, only population shows a statistically significant relationship with the dependent variable. While the variable of interest, aid share, is insignificant in both columns 5 and 6, it does have a positive relationship with the dependent variables.

Implications can be drawn from the results above about the effect of aid on development variables. A 1% increase in aid-to-GDP reduces the rate of growth of infant mortality rate by 1.6% at the mean while it reduces the growth of child mortality rate by 1.3%. Unfortunately, no such conclusions can be drawn about hospital beds due to lack of significance on the aid share variable. Thus, while aid has no direct effect on the levels of infant and child mortality, it reduces the rate at which they change. It does not, however, have any statistically significant effect on the third aspect of health investigated above.

Education dependents

Table 8 shows similar results for the variables related to education. As can be immediately noted, these results do not show as strong a relationship with aid as the health variables above. Columns 1 and 2 show results with secondary school enrollment and the growth rate of the variable as dependents. As with the health variables, aid share does not affect the number of people enrolled in secondary school, but reduces the rate of change of enrollment by 0.05-percentage points. Column 1 also shows that democracy has a significant and fairly large negative effect on secondary school enrollment. However, if democracy implies freedom, this may simply be a reflection of students choosing to drop out before secondary school due to available employment options.

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[23] This reflects the difference between developing and transitional economies.

Table 8: The Relationship between Bilateral Aid and Education Variables

COEFFICIENT	Secondary School Enrollment		Net Enrollment		Education Expenditure	
	(1)	(2)	(3)	(4)	(5)	(6)
	Level	*Growth*	*Level*	*Growth*	*Level*	*Growth*
Aid share	80537	-0.0514**	1.356*	-0.00650	-0.00922	-0.0111
	(123435)	(0.025)	(0.69)	(0.014)	(0.050)	(0.011)
GDS	23154	-0.00368	0.202	0.00331	0.0130	-0.00952***
	(24022)	(0.0045)	(0.16)	(0.0038)	(0.011)	(0.0024)
GDP per capita	65.51	-0.0000401*	0.00247***	-0.0000109	0.0000270	0.0000151
	(117)	(0.000021)	(0.00063)	(0.000013)	(0.000049)	(0.000010)
Democracy	-140146***	0.00997	0.343	-0.00157	0.0350*	-0.00201
	(47517)	(0.0094)	(0.31)	(0.0073)	(0.021)	(0.0044)
Population	43388***	-0.000210	0.0134	0.000124	-0.00227***	-0.000153
	(1682)	(0.00033)	(0.016)	(0.00032)	(0.00072)	(0.00015)
Africa	-752507	0.337*	-34.62***	0.0604	0.973**	0.237**
	(1009059)	(0.19)	(5.98)	(0.13)	(0.45)	(0.10)
East Asia &	2480346**	0.0610	-8.322	-0.0872	0.885*	0.279**
Pacific	(1185317)	(0.22)	(7.07)	(0.16)	(0.52)	(0.11)
Latin America	951246	0.225	-18.90***	0.137	0.219	0.244**
& Caribbean	(946685)	(0.17)	(5.44)	(0.11)	(0.43)	(0.095)
Middle East &	-421843	0.260	-10.85	-0.0487	1.857***	0.157
North Africa	(1234613)	(0.23)	(7.04)	(0.15)	(0.55)	(0.12)
South Asia	-6328208***	0.248	-24.22**	-0.0619	-0.356	0.332***
	(1394710)	(0.27)	(11.8)	(0.25)	(0.57)	(0.13)
Constant	-619155	1.514**	44.10***	0.988***	3.618***	1.047***
	(3450313)	(0.60)	(8.67)	(0.19)	(0.55)	(0.12)
Period dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	303	217	185	119	315	283
R-squared	0.75	0.07	0.41	0.10	0.15	0.13

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Increasing GDP per capita, on the other hand, reduces the growth rate of secondary school enrollment (though the effect is marginal) and may stabilize this rate. Finally, East Asia shows significantly higher enrollment than Eastern Europe, while South Asia shows a significantly lower enrollment.

Columns 3 and 4 show the effects of these variables on net enrollment at secondary school level and the rate of change of net enrollment. As we can see, increasing aid share increases net enrollment by 1.356-percentage points. This means that while aid does not affect the absolute number of people who enroll in secondary school, it

does increase the percentage of attendance among secondary school aged people. This may simply be a reflection of a lowering population of secondary school age students. Net enrollment is also increased by increasing GDP per capita and is lower in Africa, Latin America and South Asia relative to Eastern Europe. The interesting thing is that none of these factors have any significant effect on the rate of change of net enrollment.

Finally, turning to education expenditure as a percentage of GDP, we can see that aid has no statistically significant effect on either the level or rate of change of the variable. We do see interesting patterns in the region dummies, with Africa and East Asia showing positive and consistent relationships with both levels and growth rates of education expenditure. The other three regions also show some positive relationships, implying that perhaps the control region, Eastern Europe, shows below average expenditure on education.

The above results allow us to draw a few conclusions about the effects of increasing aid on education. A 1% increase in aid-to-GDP increases net enrollment at the mean by 0.11%. The same change in aid-to-GDP reduces the rate of growth of secondary school enrollment by 0.09%. This result is promising if the secondary school enrollment has been decreasing over time.

Once again, aid does impact education variables of interest, though the patterns of the effects are inconsistent and make it difficult to draw conclusions. Nonetheless, that the smoothed out five year aid data shows an effect is promising in that the results can be trusted more than the annual level data.

VIII. Robustness

In the aid-growth literature, robustness is even more important than in typical econometric analysis since the theoretical background leaves room for many reasonable variations of the estimation. The sensitivity of the results to slight variation in estimation is a good indicator of the reliability of the findings. Unfortunately, when approaching this particular problem, a high level of reliability is difficult to find. The above estimations are only one form of the regressions run in this exercise and the results did vary to some extent based on the estimation used.

In particular, lagging was a challenge in this exercise. Assuming growth in a year is based on FDI or aid in the same year may be problematic in that growth is often modelled as a long-term change. However, in this context, aid in particular year is based upon political conditions in the donor country and conditions in the recipient nation in the previous year. Then, basing growth in a year on aid received the year before would imply that that growth is in year t is based on some variables, such as openness, in year t-2. Without a logical argument for such an assumption, the current format seems the most reasonable.

However, it is important to note that altering the variables did change both the magnitude of the coefficient on aid share, though the direction and significance of the effect remained largely the same. For example, Table 9 shows the annual aid-growth regression run with one right hand variable dropped in Columns 2 and 3. Dropping the debt variable, which was significant in the original regression (Column 1), almost halves the coefficient on aid share. Similarly, dropping the interest rate variable in Column 3 also changes the coefficient but only marginally. In both cases, the coefficient on aid

Table 9: Annual Bilateral Aid and Growth

COEFFICIENT	(1) TSLS	(2) TSLS	(3) TSLS
Aid share	0.290***	0.133*	0.275***
	(0.091)	(0.077)	(0.10)
FDI	0.176***	0.191***	0.184***
	(0.038)	(0.039)	(0.036)
GDS	0.0641***	0.0499***	0.0566***
	(0.013)	(0.013)	(0.014)
Interest rate	-0.00176	0.00288	
	(0.0048)	(0.0049)	
GDP per capita	-0.000149**	-0.0000709	-0.000161**
	(0.000063)	(0.000051)	(0.000063)
Debt	-0.0217***		-0.0212***
	(0.0041)		(0.0047)
Openness	0.00416	0.00251	0.00473
	(0.0037)	(0.0032)	(0.0034)
Inflation	-0.000257	-0.000596***	-0.000421**
	(0.00016)	(0.00016)	(0.00017)
Democracy	-0.0168	0.00358	-0.0172
	(0.022)	(0.021)	(0.020)
Africa	-1.711***	-2.281***	-0.637
	(0.62)	(0.60)	(0.60)
East Asia & Pacific	-0.645	-0.573	0.472
	(0.69)	(0.63)	(0.67)
Latin America & Caribbean	-1.419**	-2.493***	-0.611
	(0.63)	(0.55)	(0.61)
Middle East & North Africa	1.072	0.0671	1.302*
	(0.74)	(0.66)	(0.67)
South Asia	0.316	0.141	1.504**
	(0.75)	(0.71)	(0.71)
Constant	3.343***	4.451***	2.495***
	(1.07)	(1.01)	(0.94)
Year dummies	Yes	Yes	Yes
Observations	1486	1584	1991
R-squared	0.13	0.11	0.10

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

share continues to be significant and positive regardless of the changes.

As Table 9 demonstrates, if there are other variables which have a strong effect on growth which are not included in this regression, they may distort the coefficients. While there is broad consensus in the literature that growth regressions must account for investment conditions, economic policy, freedom in investment decisions and differences

between income levels in countries at the beginning of each period, the variables used to proxy for each of these categories vary quite substantially between models. The differences in results based on each set of right-hand variables reflect this indecisiveness in the literature. Nonetheless, the possibility of a missing right hand variable is a very real one in this kind of regression and the sensitivity of the results to varying estimations, as demonstrated above, is a matter of concern in determining the reliability of the results. That in this particular case the coefficient of aid share remains significant and positive despite changes in composition is very promising.

Another query that naturally arises from the results above is the extent to which the results reflect the use of region as opposed to country dummies. This means that there is always a chance that the regressions are only picking up the differences between regions and are unable to reflect differences between individual recipients. To address this issue, the short run aid-growth estimation is run for recipients within each region. Table 10 shows the results from this variation on the two-stage model. As shown below, the factors that determine growth rates in each region vary substantially. However, the important point to note is that aid share shows a strong positive relationship with growth in both Africa and Latin America, the two regions that have been showing significant negative relationships with growth in the prior analysis. This means that while both the regions grow slowly relative to Eastern Europe, the countries within the region that receive more aid grow faster.[24]

The implication of this table is quite gloomy for the analysis, since it seems as though the positive aid-growth relationship in Africa and Latin America create the

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[24] When a similar set of regression were run for the five year averaged data, all the coefficients on the aid share variable were insignificant, showing that the effect seen in Table 5 was not simply the average effect of significant individual effects.

Table 10: The Relationship between Aid and Growth by Region

COEFFICIENT	(1) Africa	(2) Europe & Central Asia	(3) East Asia & Pacific	(4) Latin America & Caribbean	(5) Middle East & North Africa	(6) South Asia
Aid share	0.403***	1.574	-0.233	0.810**	1.725	-0.554
	(0.10)	(1.32)	(0.20)	(0.32)	(1.87)	(0.69)
FDI	0.116*	0.0464	0.266*	0.292***	-0.393	1.124
	(0.060)	(0.093)	(0.16)	(0.089)	(0.59)	(0.75)
GDS	0.0640***	0.128	0.145***	0.106**	0.142	0.0638
	(0.017)	(0.13)	(0.039)	(0.050)	(0.10)	(0.056)
Interest rate	0.0207	-0.0962**	0.00648	-0.00137	0.119	0.396***
	(0.016)	(0.046)	(0.029)	(0.0055)	(0.086)	(0.12)
GDP per capita	-0.000161	-0.000128	-0.00102***	0.0000335	-0.000426*	-0.00197
	(0.00013)	(0.00048)	(0.00031)	(0.00011)	(0.00024)	(0.0016)
Debt	-0.0361***	-0.0714*	-0.0372*	-0.0282***	-0.0298	-0.0295
	(0.0075)	(0.038)	(0.021)	(0.010)	(0.025)	(0.030)
Openness	0.0159**	-0.0492*	0.0143	-0.00717	0.0109	0.0689
	(0.0072)	(0.027)	(0.015)	(0.0060)	(0.030)	(0.044)
Inflation	0.0000827	-0.0120	-0.0688***	-0.000482*	0.0652	0.0564
	(0.00023)	(0.038)	(0.015)	(0.00026)	(0.064)	(0.12)
Democracy	0.0524	-0.239**	-0.0635	-0.0693	-0.672	0.0202
	(0.039)	(0.10)	(0.057)	(0.050)	(0.54)	(0.059)
Constant	-0.171	-40.06	6.327**	1.969	-5.347	4.154
	(1.50)	(30.0)	(2.51)	(2.25)	(9.21)	(3.54)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	615	72	174	403	114	108
R-squared	0.15	0.59	0.51	0.14	0.15	0.42

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

positive significant effect in the aggregate. However, this does explain the difference between the annual and the five-year average results. Nonetheless, these results seem to support the idea that aid does not necessarily cause growth.[25]

Conclusion

A summary of the results found in the above estimations is shown in Table A6 in the Appendix. Unfortunately, the conclusion we can reach when looking at these results is similar to that reached in similar exercise in the past: the results are inconclusive. What

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[25] Regressions similar to Table 10 were also run for the development variables, but the sample sizes become so small that no real effect is found in most cases.

we have found is that the annual data shows a fairly consistent causal relationship between aid and growth, assuming the instrument applied is a good one. However, we have also seen that this result can be explained by positive performance in Africa and Latin America, implying that the five-year results that aid does not cause growth may be the true one.

However, we have found that aid causes improvements in a handful of health and education variables, either by affecting the variables themselves or slowing growth in the variables. While this was not the original goal of this analysis, it provides supports for the policy standpoint that aid should not be abandoned as a tool.

Unfortunately, this seems to be the common conclusion with growth regressions. As indicated earlier, there is always a chance that the regressions include too few or too many variables in an attempt to understand the factors that effect aid. In addition, there may be reverse causality between the dependent variables and the variables other than aid. However, while a truly robust relationship has not been found, that some effects of aid have been traced is quite promising. Ultimately, the question of the true effect of aid on growth must be based on a much stronger theoretical ground than is possible at present.

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APPENDIX

Table A1: Donor Countries

Donor Country	Included in	
	Section V[26]	Section VI and VII[27]
Australia	√	√
Austria	√	√
Belgium		
Canada	√	√
Denmark	√	√
Finland	√	√
France	√	√
Germany	√	√
Greece		
Ireland	√	
Italy	√	√
Japan		
Luxembourg		
Netherlands	√	√
New Zealand	√	√
Norway	√	√
Portugal	√	√
Spain	√	√
Sweden	√	
Switzerland		√
United Kingdom	√	√
United States	√	√

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[26] Countries dropped due to lack of political variability except for Switzerland, which was dropped due to the unavailability of UN voting data, and Greece, which was dropped due to insufficient aid activity.
[27] Countries that were dropped in addition to those dropped in Section I were due to inconsistencies in the data on political leadership.

Table A2: Recipient Countries

Africa – Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Republic of Congo, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe
Asia and the Pacific – Brunei, Cambodia, China, Fiji, Indonesia, Kiribati, Laos, Malaysia, Micronesia, Mongolia, Myanmar, North Korea, Papua New Guinea, Philippines, Samoa, Singapore, South Korea, Thailand, Tonga, Vanuatu, Vietnam
Europe and Central Asia – Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Croatia, Cyprus, Georgia, Kazakhstan, Kyrgyz Republic, Macedonia, Malta, Moldova, Serbia & Montenegro, Slovenia, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan
Latin America and the Caribbean – Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad & Tobago, Uruguay, Venezuela
Middle East and North Africa – Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen
South Asia – Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka

Table A3: Colonial/Administrative Ties

Donor Country	Former Colonies
Australia	Papua New Guinea
France	Algeria, Benin, Burkina Faso, Cambodia, Cameroon, Central African Republic, Chad, Comoros, Republic of Congo, Cote d'Ivoire, Djibouti, Dominican Republic, Gabon, Guinea, Haiti, Laos, Lebanon, Madagascar, Mali, Mauritania, Morocco, Niger, Senegal, Syria, Togo, Tunisia, Vanuatu, Vietnam
Italy	Somalia
Netherlands	Indonesia, Suriname, Samoa
Portugal	Angola, Brazil, Cape Verde, Guinea-Bissau, Mozambique, Oman, Sao Tome & Principe, Uruguay
Spain	Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Equatorial Guinea, Guatemala, Hondura, Mexico, Nicaragua, Panama, Paraguay, Peru, Philippines, Venezuela
United Kingdom	Afghanistan, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Bhutan, Botswana, Brunei, Cyprus, Dominica, Egypt, Fiji, Gambia, Ghana, Grenada, Guyana, India, Iraq, Israel, Jamaica, Jordan, Kenya, Kiribati, Kuwait, Lesotho, Malawi, Malaysia, Maldives, Malta, Mauritius, Nigeria, Pakistan, Qatar, Seychelles, Sierra Leone, Singapore, Somalia, South Africa, Sri Lanka, Sudan, Swaziland, Tanzania, Tonga, Trinidad & Tobago, Tuvalu, Uganda, United Arab Emirates, Vanuatu, Yemen, Zambia, Zimbabwe
United States	Cuba, Micronesia

Table A4: Majority Religious Groups

Buddhist – Bhutan, Cambodia, Laos, Mongolia, North Korea, Singapore, South Korea, Sri Lanka, Thailand

Christian – Angola, Antigua and Barbuda, Argentina, Armenia, Bahamas, Barbados, Belarus, Belize, Bolivia, Botswana, Brazil, Bulgaria, Burundi, Cameroon, Cape Verde, Central African Republic, Chile, Colombia, Congo, Costa Rica, Croatia, Cuba, Cyprus, Dominica, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Kazakhstan, Kenya, Kiribati, Lesotho, Liberia, Macedonia, Madagascar, Malawi, Malta, Mexico, Micronesia, Moldova, Mozambique, Namibia, Nicaragua, Nigeria, North Korea, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Rwanda, Samoa, Sao Tome & Principe, Serbia & Montenegro, Seychelles, Slovenia, South Africa, Suriname, Tanzania, Tonga, Trinidad & Tobago, Tuvalu, Uganda, Ukraine, Uruguay, Vanuatu, Venezuela, Zaire, Zambia, Zimbabwe

Hindu – India, Mauritius, Nepal, Suriname, Trinidad & Tobago

Indigenous – Angola, Benin, Cameroon, Central African Republic, Congo, Cote D'Ivoire, Guinea-Bissau, Liberia, Madagascar, Togo

Jew – Israel

Muslim – Afghanistan, Albania, Algeria, Azerbaijan, Bahrain, Bangladesh, Bosnia-Herzegovina, Brunei, Burkina Faso, Chad, Comoros, Cote d'Ivoire, Djibouti, Egypt, Eritrea, Ethiopia, Guinea, Guinea-Bissau, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyz Republic, Lebanon, Libya, Malaysia, Maldives, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Oman, Pakistan, Qatar, Saudi Arabia, Senegal, Serbia & Montenegro, Sierra Leone, Somalia, Sudan, Syria, Tajikistan, Tanzania, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Yemen

No affiliation – China, Swaziland, Vietnam

Table A5: Significant Variables in Individual Countries' Allocation of Bilateral Aid

COEFFICIENT	Austria	Canada	Denmark	Finland	France	Germany	Ireland	Italy	New Zealand	Norway	Portugal	Spain	Sweden	United Kingdom
GDP per capita		-					-			-			-	
GDP per capita * Cons		-	-									-		+
Population						+								+
Population * Cons		+				-								
Import	-	+	+		-				-					-
Import * Cons	+	+		+					+			-		+
Export	+	+		+	+				+			+	+	+
Export * Cons	-					+		-	-					-
Democracy	-				-		+						-	
Democracy * Cons		+							+			+		+
UN affinity														
UN affinity * Cons		-							+	+				
Common religion				+	+						-			+
Common religion * Cons		-												-
Colonial tie								+						+
Colonial tie * Cons								-				+		-
Conservative government		+								-	-	-	+	-

Table A6: Summary of TSLS Regression Results

Dependent	Aid	FDI	GDS	Interest rate	GDP per capita	Debt	Openness	Inflation	Democ-racy	Population
Annual growth rate	+*	+*	+*	-	-*	-*	+	-	-	
Five-year growth rate	-	+*	+*	+	-	-	-*	-*	+	
Infant mortality rate	-		-*		-*				-*	-
Infant mortality rate (growth)	-*		-*		-				-	-
Child mortality rate	-		-*		-*				-*	-
Child mortality rate (growth)	-*		-*		-				-	-
Hospital beds (per 1000)	+		+		+				+	+
Hospital beds (growth)	+		+		-				+	+*
Secondary school enrollment	+		+		+				-*	+*
Secondary school enrollment (growth)	-*		-		-*				-*	-
Net enrollment	+*		+		+*				+	+
Net enrollment (growth)	-		+		-				-	+
Education expenditure	-		+		+				+*	-*
Education expenditure (growth)	-		-*		+				-	-