

Aid Does Matter After All: Revisiting the Relationship between Aid and Growth¹

CAMELIA MINOIU AND SANJAY G. REDDY

The effectiveness of Official Direct Assistance (ODA) to developing countries has been fiercely debated. Analyses of the average effect of aid on growth have long yielded contradictory answers to the question of whether aid spurs economic growth. Despite the abundance of studies that have attempted to investigate the aid-growth relationship, a consensus is yet to emerge. In the recent words of the IMF chief economist, “*the debate about aid effectiveness is one where little is settled*” (Rajan, 2005).

Early protagonists in the debate on aid focused on case studies.² More recent work has evaluated the available data using increasingly complex econometric techniques. In our view, these studies – many of which have come to pessimistic conclusions concerning the impact of aid – have failed adequately to assess the relationship between aid and growth. None of the studies has asked whether aid directed toward developmental purposes spurs economic growth over time periods sufficiently lengthy to produce results. In other words, none has asked the question, what is the *long-term* impact of developmental aid? Furthermore, few studies have attempted to disentangle the effects of different components of aid (such as developmental versus geopolitical aid, multilateral versus bilateral aid or tied versus untied aid) on economic growth. In this chapter, we report the results of an effort to do both of these things together. Our conclusion – at variance with the recent “aid pessimistic” literature – is that developmental aid has a large impact on subsequent economic growth.

We use a large cross-section of recipient countries spanning the period 1960-2000, and explore the impact of developmental aid (as opposed to total aid) on economic growth over periods of up to several decades. In addition to our central finding that developmental aid (appropriately defined) appears to have a large effect on growth, we find (contrary to an important strand of the recent literature) that the quality of the domestic policy environment does not affect the growth-effectiveness of aid, and that there is no evidence of diminishing returns to aid or that the effect of aid on growth depends on whether the recipient country is a low or lower middle income country. Our results are robust to the choice of a wide variety of different specifications of the model and the application of alternative proxies for the explanatory variables (in particular, developmental and geopolitical aid).

This study has important policy implications. For aid to spur economic growth, it must be developmental in nature. Furthermore, the effects of developmental aid can only be observed over long periods of time, sometimes decades, as having translated into growth outcomes. Increased aid flows of the right sort can have substantial growth impact, if donors and recipients are patient.

PREVIOUS STUDIES AND OUR CONTRIBUTION

The Recent Cross-Country Aid-Effectiveness Literature

Two major assumptions have been made in the recent aid effectiveness literature, and in particular that using econometric methods. The first assumption is that total aid has a *contemporaneous* (rather than a lagged) effect on economic growth. The second assumption is that *all* components of aid have the *same* impact on average growth. In this section, we first review selected influential studies, highlighting the consequences of these assumptions for coefficient estimates of the marginal effect of growth in econometric models. Next, we challenge these assumptions and propose new ways of addressing the aid effectiveness question.

As noted, the first assumption underlying empirical studies in the aid effectiveness literature is that *present* aid has a causal effect on *present* growth. The difficulty in estimating the causal impact of present aid on present growth has to do with its possibly endogenous nature: aid may be extended in expectation of good growth performance (rendering aid a determinant of economic growth), or a poor expected growth performance may trigger higher aid flows. To address this issue, an instrumentation approach has been undertaken in most studies. The approach is based on the idea that exogenous variation in aid can be isolated using variation in so-called *friends of the donors* variables (Easterly, 2005) which capture geopolitical influences on the extension of aid. Examples of such variables include dummies for common signatories to ententes or alliances, the size of the recipient countries as measured by their population, indicator variables for Egypt and for oil producing countries (with which to reflect the increase in US aid to these countries after the 1977 Camp David accord), dummy variables for former French, Spanish, Portuguese, and other colonies, and common language dummies. A second frequently used instrument for current aid is past aid. The former approach to instrumentation has been implemented for example, by Boone (1994, 1996), Burnside and Dollar (2000), Easterly (2003, 2005) and Rajan and Subramanian (2005). In contrast, Daalgard, Hansen and Tarp (2004) have taken the second approach. It should be noted, in relation to this choice of instruments, that an important requirement for variables to serve as instruments (in our case, either lagged aid or geopolitical variables) is that they satisfy the exclusion restriction, i.e., they do not have a direct causal impact on growth. If one believes, as we do, that both lagged aid and the geopolitical variables that are used to predict exogenous variation in aid have a direct causal effect on growth (i.e. that they belong to the true model of the determinants of growth), then this untestable restriction fails and the models proposed in the literature suffer from misspecification.

Burnside and Dollar (2000) influentially examined the growth-effectiveness of aid in a panel of 56 countries over the period 1970–1993. They claimed to find little evidence that aid is a determinant of growth in countries with poor domestic fiscal, monetary and trade policies. The authors reported that aid is effective only in countries

where the 'quality' of policies is high, but that aid itself does not play a role in producing policies. Burnside and Dollar (2000) argued that reallocating aid towards countries with 'good' policies would result in a substantial improvement in those countries' growth performance.

A study that builds on the original Burnside-Dollar approach is that by Collier and Dollar (2002). The authors assess the effect of aid on growth as a function of the quality of the policy environment for the time period 1990–1996 in a cross section of 86 countries. Collier and Dollar (2002) argue in favor of a proxy for the policy environment that is different from the weighted average of budget surplus, inflation and trade openness used by Burnside and Dollar (2000). Specifically, Collier and Dollar (2002) use the World Bank's Country Policy and Institutional Assessment index. The authors claim that the Burnside-Dollar results are robust to uses of alternative samples and time periods. In contrast to that study, however, they do not find evidence of diminishing returns to aid. Other successors to the Burnside-Dollar study include the comment by Easterly, Levine and Roodman (2004) and the reply by Burnside and Dollar (2004). Easterly, Levine and Roodman (2004) enrich the original database by adding four more years (to cover 1970–1997) and find that Burnside and Dollar's initial findings do not hold up to this extension of the original dataset. While the authors do not explicitly argue that aid is ineffective at all, they find no evidence that it works better in 'good' policy environments.

More recently, Dalgaard, Hansen and Tarp (2004), employing a sample of 65 countries, find evidence that aid has been less effective in countries located in tropical areas, but that it is in general growth promoting. The authors argue against the use of the World Bank's Country Policy and Institutional Assessment index (CPIA) as an indicator of countries' policy environment (due to its possible endogeneity to growth and because its use in aid allocation across countries may result in systematic correlation with unobserved unfavorable initial conditions). Rajan and Subramanian (2005) is the most recent study to re-assesses the aid-growth relationship in a cross-country setting (using a sample of 107 countries). As before, the authors rely on an instrumentation strategy to identify the effect of present (total) aid on present economic growth, and find "*little robust*

evidence of a positive (or negative) relationship between aid inflows into a country and its economic growth" (Rajan and Subramanian, 2005, p.1).

Although the aid effectiveness literature is vast, few studies have attempted to identify the impact of different components of aid on growth. The working hypothesis in these studies has been that all aid has the same effect on growth, regardless of the sector to which it is allocated (e.g., general budgetary support or emergency assistance, technical cooperation or health and education). A notable exception is Clemens, Radelet and Bhavnani (2004), who look at the short-run impact of aid allocated to support budget and balance of payments, investments in infrastructure, agriculture and industry (amounting to fifty-three percent of total aid receipts). The authors argue that aid allocated to these sectors is likely to have a discernable impact on growth within the subsequent four years. They find strong evidence that this is the case, with estimates suggesting that \$1 increase in short-impact aid raises income, on average, by \$1.64 (in present value). The authors suggest that aid which is aimed at supporting democracy, the environment, health and education is likely to have a long-term impact on growth, but do not attempt to identify its effect.

Rajan and Subramanian (2005) also investigate the relationship between different components of aid and growth. They distinguish between multilateral and bilateral aid, economic, social and food aid, long-impact and short-impact aid as defined by Clemens, Radelet and Bhavnani (2004), as well as aid originating from Scandinavian countries. In all these cases, the authors attempt to uncover the *contemporaneous* effect of distinct components of aid on average growth, use *friends of the donors variables* as instruments, and find no evidence that the type of aid matters in explaining growth performance. In a similar vein, Miquel-Florensa (2006) disentangles the growth effectiveness of tied aid versus untied aid. Using the dataset of Easterly, Levine and Roodman (2004), the author finds that tied aid is negatively and statistically significantly associated with average growth. However, the result is not robust to the use of different samples. The overall conclusion is that untied aid is more growth-effective than tied aid in countries with more 'favorable' policy environments.

An explanation as to why previous studies had failed to uncover an effect of aggregate aid on growth is offered by Headey (2005) which argued that bilateral aid (amounting to 70 percent of total aid) did not have an impact on growth prior to 1990 (during the Cold War) primarily because it served – at the global level – the donors’ geopolitical interests. It is thus not surprising, according to the author, that aggregate aid does not seem to have influenced average growth between 1970–2001. Headey (2005) uses a dataset of 56 countries spanning the 1970–2001 period and finds evidence that multilateral aid flows were more effective than bilateral aid flows during the pre-Cold War period, a finding explained by the fact that bilateral aid was dominated by largely geostrategically-driven contributions from a few large donors. In contrast, using the post-Cold War sample, the author identifies a large positive effect of bilateral aid on growth, and concludes that the pooling of the two samples might serve as an explanation of why earlier studies (often covering precisely the Cold War period) often found that aggregate aid was growth-ineffective.

Challenging the Assumptions

As noted, many of the previous studies assume that all components of aid have the same impact on economic growth. Furthermore, they frequently assumed that ODA solely has a *contemporaneous* or nearly contemporaneous effect on growth. These two working hypotheses lead to the following model being typically estimated in a cross-country context:

$$Growth_{it} = \beta(Total_Aid/GDP)_i + \delta(Controls)_i + \varepsilon_i \quad (1)$$

where i is an index for recipient countries, t is the time index, and ε_i is a composite error term comprised of fixed effects, time-specific shocks, and random error. The control variables usually account of the possibly confounding effect of other growth determinants, such as initial conditions, the quality of institutions (governance), geographical factors (e.g., frost days or share of land in tropical areas), the quality of the policy environment (in particular, a measure of trade openness or a policy index appropriately defined), inflation (as a measure of domestic monetary policies), political and social

stability. The model is usually estimated in the cross-sectional setting using Ordinary Least Squares (OLS) or Two Stage Least Squares. In the latter case, total aid is usually instrumented for with either past values of aid, or with geostrategic variables from the *friends of the donors* class. In a panel setting, the model is estimated using Fixed Effects or Generalized Method of Moments (GMM) techniques.

In the work summarized in this chapter, we depart from (1) in two major ways. We assume that (a) different components of aid have a distinct effect on growth, and (b) that aid has a discernible impact on economic growth over the long-term. In relation to the first point, we argue that aid expended in a manner that can reasonably be anticipated to promote development (e.g., aid aimed at and/or spent on building growth-promoting infrastructure such as roads, bridges or ports or on health and education) can be expected to have a different effect on growth than aid that could not reasonably be anticipated to have this effect (e.g. aid spent on strengthening a military or reinforcing a political alliance).³ For this reason, we distinguish between aid spent in a manner that could reasonably be anticipated to promote development and aid of all other kinds. We refer to the former type of aid as *developmental aid*, and to the latter type of aid as *geopolitical aid*. Of course, it may be the case that geopolitical aid, thus defined, ultimately has an effect on development. The definitions we offer are “expenditure side” definitions, which do not directly hinge on the *motives* for providing aid. Of course, there may be an empirical tendency for aid that is motivated by geopolitical considerations to be non-developmental according to the expenditure side definition we provide here, which we may rely on in our efforts to differentiate these econometrically. The heart of this distinction between different types of aid is a view that total aid contains a developmental, possibly growth-enhancing expenditure component (*developmental aid*), in addition to a growth-neutral or possibly growth-depressing expenditure component (*geopolitical aid*).

Our second departure from the standard model derives from the belief that developmentally-oriented aid takes longer to translate into development outcomes than the periods of one or four years that have been assumed in the recent literature. Our definition of developmental aid is therefore closest to that of *long-impact aid* proposed by Clemens,

Radelet and Bhavnan (2004) and Rajan and Subramanian (2005). Since it is natural to expect that investments in infrastructure, health and education should affect economic growth over the long-run, we allow for various possible lags of developmental aid to enter the model as distinct determinants of present average growth. There is no reason to treat geopolitical aid differently (unless one believes that it has no effect on growth, which is an empirical question), and multiple lags of geopolitical aid are also included in the model. We are thus specifying a very broad model that allows each component of aid to have a distinct, long-term effect on growth. As will be explained in the next section, data limitations will place a restriction on the model we can estimate.

To illustrate the departure in this chapter from the consensus in the literature, we specify the following model:

$$\begin{aligned} \text{Growth} = & \beta_{1k} \sum_{k \neq 0} (\text{Developmental_Aid/GDP})_{i,t-k} \\ & \beta_{2k} \sum_{k \neq 0} (\text{Geopolitical_Aid/GDP})_{i,t-k} + (\text{Controls})_{ii} + \varepsilon_{ii} \end{aligned}$$

where lags up to k periods have been specified as entering the model directly for the two distinct components of aid.

A direct comparison between Equations 1 and 2 can help to explain why previous studies of the effect of aid on economic growth might have failed to uncover a systematic relationship between the two. Specifically, in Equation 1, isolating the exogenous variation in total aid with geostrategic variables (such as colonial dummies) may result in only the geopolitically-motivated portion of aid being captured by the fitted second-stage regressor. In that case, it is hardly surprising that total aid is unable to explain the growth performance of recipient countries, since geopolitical aid may well have either zero or a negative impact on growth. Similarly, restricting developmental and geopolitical aid to have the same marginal effect on growth (represented by β in Equation 1) leads to a downward bias in the estimator for β under the assumption that one component of aid has a positive effect on growth, and the other operates in the opposite direction. If geopolitical aid has a negative (or zero) effect on economic growth, any positive effect on growth from developmental aid will be 'buried' by the effect of geopolitical aid. (For technical details, see

Reddy and Minoiu (2006: Appendix 1A and 1B)). Since our aim is to identify the growth-impact of developmental aid without interference from that of geopolitical aid, we allow for the two components of aid to have distinct effects on growth. Whether or not this is the case can be determined empirically. Our results are outlined in the next section.

EMPIRICAL FINDINGS

The Sample

We use information on aid disbursements (representing net loans and grants) from the Organization for Economic Co-operation and Development – Development Assistance Committee database (DAC, 2006) and Gross Domestic Product (GDP) data from the World Bank's World Development Indicators (2006) for 107 countries between 1960 and 2000. All other variables are from Rajan and Subramanian's (2005) and were made available to us by courtesy of the authors. Reddy and Minoiu (2006: Appendix 2) contains a complete list of the variables and their sources. Since we wish to assess the long-term impact of aid on growth, we focus on the determinants of average growth in the 1990s. All control variables represent averages over 1990–2000, while developmental aid enters the specifications in lagged form. Depending on data availability, the sample varies between a minimum of 64 and a maximum of 77 countries. Summary statistics for selected variables used in the regressions are reported in Reddy and Minoiu (2006: Appendix 3).

Proxies for Developmental Aid

We face several challenges in defining proxies for developmental aid. The ideal procedure for isolating the developmental component of total aid would entail classifying aid by type of expenditure, and classifying expenditures by their expected effect on economic growth. For example, aid that is spent on infrastructure (e.g., for building roads, irrigation systems, water and electricity delivery systems, housing, etc.) and aid spent on health, education and population policies, would

fall under the category of developmental aid since such expenditures are expected to have a positive impact on development and economic growth. In contrast, aid covering the administrative costs of donors or aimed at emergency relief would not be classified as developmental in nature. However, data on aid by type of expenditure only goes back to 1990 (for disbursements) and to 1973 (for commitments). It is thus not appropriate for purposes of our analysis.

To arrive at proxies for developmental aid, we take another approach. First, we treat all multilateral aid as developmental in nature, since, as the definition for multilateral aid from the Development Assistance Committee database reads, “*multilateral transactions are those made to a recipient institution which conducts all or part of its activities in favor of development*” (DAC, 2006⁴) and multilateral aid channeled through international organizations is less likely to have a geopolitical rationale. Furthermore, we take total bilateral aid from the Nordic countries to be a proxy for development aid, since Nordic countries are reputed to have aid programs that are more developmentally-oriented than other donor countries. Total bilateral aid from Denmark, Finland, Norway, Sweden, and Iceland (comprising group G1 of donors) is the first proxy for developmental aid that we consider. Since this proxy of developmental aid may be subject to the claim that bilateral aid from other donors also contains development components (which would otherwise remain unaccounted for in our analysis), we extend the list of G1 donor countries by adding five more donors (comprising group G2 of donors). The additional countries are Austria, Canada, Luxembourg, the Netherlands, and Switzerland. The choice of countries is, admittedly, based on a subjective judgement of the development-orientation of these donor countries’ aid programmes.

A second proxy that reduces this subjectivity, is based on the aid-quality ranking according to the Commitment to Development Index (for aid) developed by Roodman (2006). A donor country is ranked higher according to the index if the country offers a larger proportion of grants rather than loans, if its aid is less likely to be tied, if it channels aid towards poorer and less ‘corrupt’ governments, and if its aid programmes consist of fewer projects (not to place a strain on a recipient country government’s administrative capacity). According

to the Commitment to Development Index (for 2005), the highest ranked 5 donor countries (defined as group G3 of donor countries) are Denmark, Norway, Sweden, the Netherlands, and Switzerland. Finally, the highest ranked 10 donor countries form group G4 of development-friendly donor countries, and include the donors from G3 as well as Ireland, UK, Belgium, Finland, and France. Notably, one shortcoming of our approach is that the 2005 aid quality ranking of donors may not be representative of the quality of aid of the same donors in the past. Despite this possible source of concern, and in light of lack of alternative feasible approaches to identifying proxies for developmental aid, we use cumulative bilateral aid from donor groups G1, G2, G3, and G4, in turn, as proxies for development aid to estimate Equation (2).

Proxies for Geopolitical Aid

A possible proxy for geopolitical aid is the share of total aid predicted by geostrategic variables. Another possible proxy is cumulative bilateral aid from donor countries that extend aid for geostrategic reasons (computed as total aid minus total bilateral aid from the each of the four groups of development-friendly donor countries). Since our main results are similar for the two proxies, we present findings in this chapter based on the former proxy. Thus, geopolitical aid in our empirical model represents the share of total aid predicted by the following set of geostrategic variables: a dummy for common membership in the Entente Alliance, a dummy for Egypt and Israel after the Camp David accord, past and present colonial relationship dummies (with France, UK, Spain and Portugal), as well as a common language indicator variable. The variable is taken from the Rajan and Subramanian (2005) database, and had been constructed by the authors with the aim of isolating the component of total aid that is exogenous to countries' growth performance. Since we believe that this instrument does not satisfy the restriction of not having a direct causal effect on growth, we include it as an independent variable in the empirical model, and interpret it as a proxy for geopolitical aid. Summary statistics for developmental and geopolitical aid are presented in Reddy and Minoiu (2006: Appendix 3).

The Estimated Model

Our proxy for geopolitical aid represents the component of total aid that is predicted by geostrategic variables. Since it is only available for our regression analysis as an average over several decades, we estimate a version of the model that slightly differs from Equation 2 as it only considers the *contemporaneous* effect of geopolitical aid. First, we write the model in panel form:

$$Growth_{it} = \beta_{1k} \sum_{k \neq 0} (Developmental_Aid/GDP)_{i,t-k} + \beta_2 (Geopolitical_Aid/GDP)_{it} + \delta (Controls)_{it} + \varepsilon_{it}$$

To estimate cross-sectional regressions using OLS, averages are taken for all variables over the relevant time periods, as follows: the dependent variable is average growth in the 1990s, (lagged) developmental aid is averaged over 1960–1990, while geopolitical aid is averaged over 1990–2000. The other covariates also represent averages over 1990–2000. The set of covariates includes the following determinants of average growth: initial per capita GDP, initial level of life expectancy, institutional quality (proxied by an index of institutional quality equal to the average of the following six Institutional Country Risk Guide governance indicators: corruption, rule of law, repudiation risk of government contracts, bureaucratic quality, ethnic tensions, and expropriation risk), a measure of geography (representing the average of frost days and tropical land area), initial government consumption, a measure of social and political unrest (namely, the number of revolutions and coups over the period), the average and standard deviation of the terms of trade, initial level of a policy variable (namely, the Sachs-Warner (1995) trade openness indicator variable updated by Wacziarg and Welch (2003)), and East Asia and sub-Saharan Africa dummies.

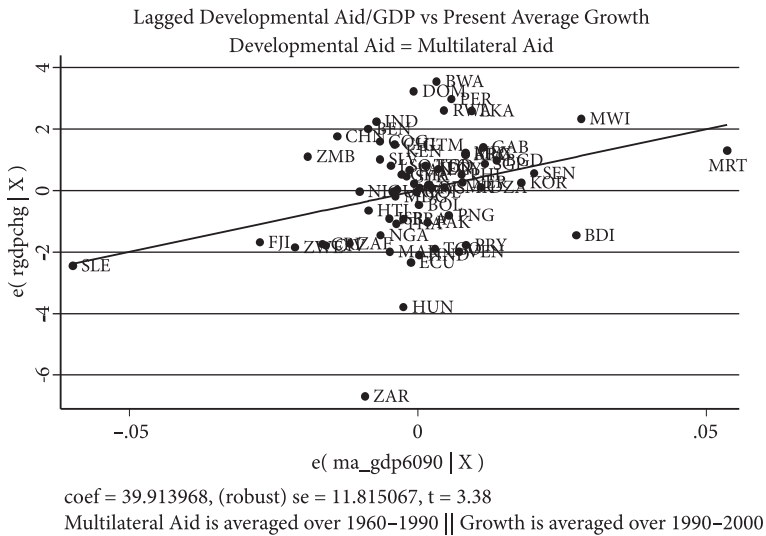
The estimated model is given below:

$$Growth_i = \beta_1 (Developmental_Aid/GDP)_i + \beta_2 (Geopolitical_Aid/GDP)_i + \delta Controls_i + \varepsilon_i$$

Partial Correlations and Cross-Sectional Regression Results

We present partial scatterplots that illustrate the conditional relationships between the variables of interest, namely our proxies for developmental and geopolitical aid, and average growth in the 1990s. At the same time, we discuss regression results presented in Reddy and Minoiu (2006). Figure 1 below depicts the conditional relationship between lagged developmental aid (averaged over 1960–1990) and growth in the 1990s when the sole proxy for developmental aid is aid extended by multilateral institutions.

FIGURE 10.1
 Conditional scatterplot of lagged developmental aid (proxied by lagged Multilateral Aid) against average growth

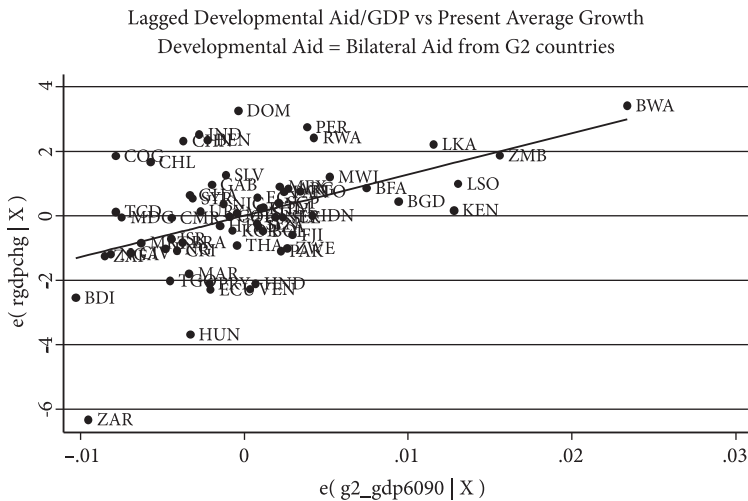


As expected, there is a positive and statistically significant relationship between past multilateral aid and current growth. The result is also evident in the regression analyses outlined in Reddy and Minoiu (2006: Appendix 5, Table 5A). Lagged multilateral aid has a large subsequent effect on average growth. Average growth in the

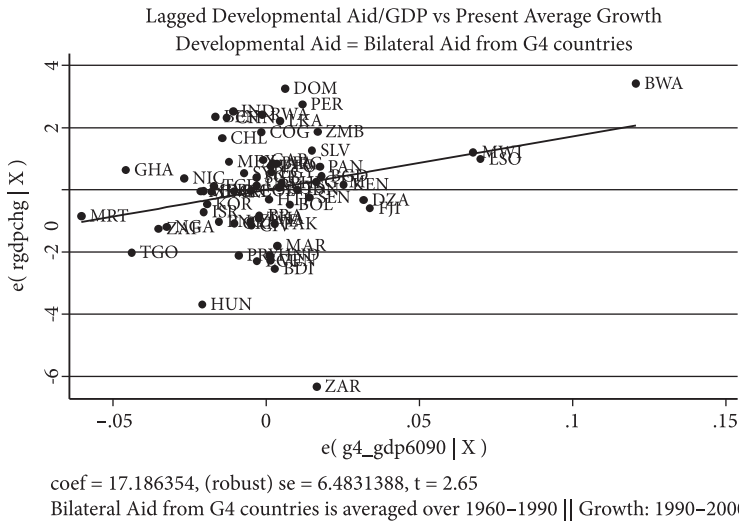
1990s is higher by one third of a percentage point on average when the share of multilateral aid in GDP increases by 1 percentage point. At the same time, geopolitical aid appears to have a negative and statistically significant, yet smaller effect on average growth. Despite our attempt to control for possible confounding factors, these results should be interpreted with caution. It may be the case that growth-enhancing elements of aid have been omitted from this specification. For example, since our proxies for developmental and geopolitical aid do not add up to total aid (by construction), we cannot ensure that all forms of aid (productive or unproductive) have been accounted for in this specification. For this reason, in subsequent specifications we use richer proxies for developmental aid.

Next, we illustrate the conditional scatterplots of lagged developmental aid against average growth (Figure 2). We focus on two proxies for developmental aid, representing total bilateral aid from

FIGURE 10.2
Conditional scatterplots of lagged development aid (proxied by lagged Total Bilateral Aid from groups G2 and G4 of development-friendly donor countries) against average growth



coef = 128.25029, (robust) se = 32.617775, t = 3.93
Bilateral Aid from G2 countries is averaged over 1960–1990 || Growth: 1990–2000



groups G2 to G4 of development-friendly donor countries. In each specification underlying the conditional scatterplot, the share of multilateral aid in GDP is included as a control variable to attenuate the possible bias in the coefficients on bilateral aid that might arise if multilateral aid were omitted. The remaining sources of bias in these coefficient estimates are those developmental components of total aid (if any) that have not been accounted for by our proxies for developmental aid. An example would be bilateral aid from donor countries that are not included in groups G2 and G4.

The two diagrams speak for themselves. Our proxies for lagged developmental aid (averaged over 1960–1990) are strongly positively correlated with average growth in the 1990s, conditional on the set of covariates. The regression results corresponding to this figure are shown in Reddy and Minoiu (2006: Appendix 5, Tables 5C and 5E, first column of lowermost panel). The coefficient estimates throughout these specifications are large and statistically significant at the 1 percent level of significance. The magnitude of the coefficients on total bilateral aid from groups G2 and G4 is remarkable: an increase in the share of total bilateral aid in GDP from the G2 group of donor countries by 1 percent (between 1960–1990) is associated with an increase in average per capita GDP growth rate in the 1990s by 1.28

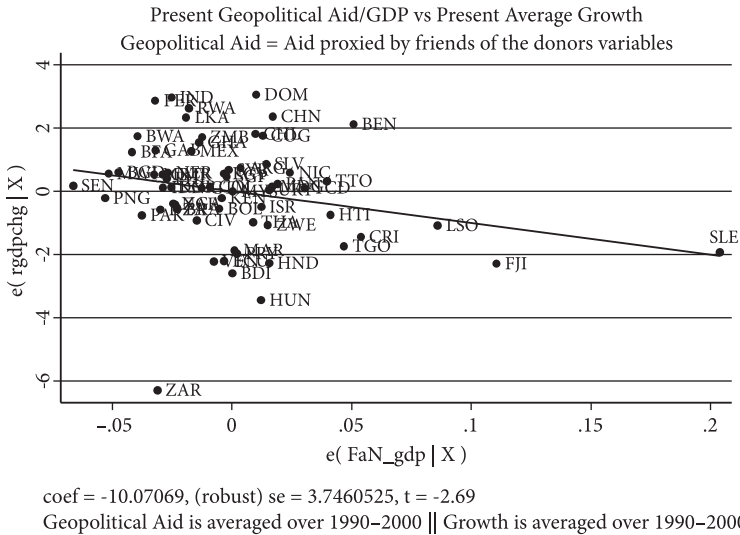
percentage points. Similarly, for the group of donor countries G4, the analogous coefficient estimate is 0.17 percentage points.

As shown in the remaining tables in Reddy and Minoiu (2006: Appendix 5, Tables 5B-5E), this positive and statistically significant relationship is robust to the use of alternative proxies for developmental aid (namely, total bilateral aid from groups G1 to G4 of donor countries), as well as alternative time-periods over which the developmental aid is lagged and averaged. Developmental aid averaged over periods such as 1960–1970, 1960–1975, 1960–1980, 1960–1985, 1960–1990, 1970–1980, 1970–1990, and 1980–1990, is always accompanied by a statistically significant and large marginal effect on subsequent growth (in the 1990s). This is a consequence of the high degree of correlation of aid across the time periods considered. For this reason, we believe that the best specification among those shown is that in which aid is lagged over 1960-1990, i.e., the entire period for which data are available. In that model, the possibility of omitted variables such as lagged aid from other time periods is minimal. We decided not to include several lags of aid as explanatory variables in any given model due to the small sample size (between 64 and 77 countries) and the relatively large number of covariates.

We find that the proxy for geopolitical aid is consistently negatively correlated with growth, but that its coefficient estimate is not always statistically significantly different from zero. Insofar as geostrategical aid is endogenous to the growth performance of a country (for example, since strategic alliances may be formed in anticipation of higher aid flows of the richer partners in those alliances), this finding should be interpreted with caution. However, the presumption in the literature has been that geopolitically-motivated aid is exogenous to growth, and for this reason it has been considered an appropriate instrument for total aid. Under this assumption, the inclusion of present geopolitical aid as an explanatory variable would not give rise to misspecification (unless one believes that *past* geopolitical aid is likely to affect current growth, and has been omitted). In our models, present geopolitical aid (expressed as the share of total aid predicted by *friends of the donors* variables) is often negatively correlated with growth. As shown in Reddy and Minoiu (2006: Appendix 5, Tables 5B–5E), the coefficients reach a magnitude of -10.6. This means that

an increase in the ratio of geopolitical aid to GDP by 1 percentage point (in the 1990s) is associated with an average growth rate (in the 1990s) lower by 0.1 percentage point. The negative (contemporaneous) relation between geopolitical aid and average growth is depicted in Figure 3.

FIGURE 10.3
 Conditional scatterplot of present geopolitical aid (proxied by the share of total aid explained by geostrategic variables) against average growth. The regression corresponds to Reddy and Minoiu (2006: Appendix 5, Table 5E, lowermost panel, column 1).



Panel Regression Results

The coefficient estimates from our cross-country regressions involving averaged variables may be biased due to the omission of time-invariant country unobserved characteristics which might be correlated with the covariates. For this reason, we estimate our model in a panel setting as well, using a GMM estimation procedure. We use the ‘system GMM’ estimator developed by Blundell and Bond (1998)

which specifies a rich set of moment conditions likely to be valid for the type of data often used in cross country growth-regressions (see, for example, Bond, Hoeffler and Temple, 2001). The sample consists of 71 recipient countries, the variables are five-year averages from 1960 to 2000, and the specifications include a full set of time dummies. The results are reported in Reddy and Minoiu (2006: Appendix 7, Table 7).

Our main findings from the cross-sectional setting are replicated in the panel framework. We find that developmental aid has a large and statistically significant effect on growth after approximately twenty-five years. An increase in total bilateral aid in GDP from group G1 of donor countries by 1 percentage point, leads to an increase by 1.75 percentage points in average growth rate 2.5 decades later. The same coefficient magnitude is found for developmental aid proxied by total bilateral aid from group G3. The coefficient corresponding to G1 is of almost 1 percentage point. Furthermore, the coefficient estimates for lagged multilateral aid and geopolitical aid are not statistically significantly different from zero. In the GMM specifications, we fail to reject the Hansen test of over-identifying restrictions, which indicates that the instruments used by the GMM estimator are valid.

ROBUSTNESS CHECKS

Alternative Proxies for Developmental Aid

We subjected our main results to a series of robustness checks. First, we identify an alternative proxy for developmental aid. Developmental aid is defined as the share of total aid predicted by National Rainfall Index (NRI), developed by the Food and Agriculture Organization, Environment and Natural Resource Service (FAO-SDRN). In developing this proxy, our premise is that the level of developmental aid offered to recipient countries is related to their agricultural productivity. Since the NRI serves as an indicator of the quality of the agricultural season, we use its exogenous variation to predict the (exogenous) part of total aid which can be interpreted as developmental in nature. More precisely, we create a variable that represents the

share of total aid in GDP predicted by NRI lagged one period. Then we use that variable as a proxy of developmental aid alongside that for geopolitical aid. The results in a cross-sectional setting are reported in Reddy and Minoiu (2006: Appendix 8, Table 8B).

We find that the previously uncovered positive and statistically significant relationship between lagged developmental aid and average growth in the 1990s holds up when this alternative proxy for developmental aid is used. However, the magnitude of the coefficient estimates is lower. A one percentage point increase in the developmental aid to GDP ratio (over 1960–1990) is associated with an almost one quarter of a percentage point increase in average growth (in the 1990s). In this model, the coefficient on geopolitical aid is not statistically significant, which suggests that geopolitically-motivated aid may well have a neutral impact (as contrasted with our previous finding of a possibly depressing effect on economic growth).

Alternative Specifications

Three other propositions have been central to the recent aid effectiveness literature. The first is that a big push in aid is needed by countries caught in a 'poverty trap' (Sachs et al, 2004) in order to set themselves on a trajectory of sustained economic growth. The hypothesis is that geopolitics, geography, disease, lack of infrastructure, and low levels of technology, produce income levels that are too low to allow for capital investment sufficient to trigger and sustain growth. We tested this premise by evaluating whether the impact of aid on growth depends on the income level of the country (in particular, whether they are low or lower middle income countries). Our results indicated that there were no income thresholds affecting countries' ability to use aid productively. The interaction terms between developmental aid and income levels had statistically insignificant coefficient estimates. However, developmental aid continued to display a high level of positive conditional correlation with subsequent average growth.

Second, a number of studies have advanced the conclusion that there are diminishing returns to aid. Again, this finding was not evident using our data and specifications. Our models suggested that there are either no diminishing returns to aid or small negative effects.

However, these results were not robust across multiple specifications and time periods, so a definite conclusion could not be reached.

Third, a number of authors, including Burnside and Dollar (2000) and Collier and Dollar (2002) have asserted that aid is effective only in 'good' policy environments. Using a number of proxies for the quality of the policy environment, we re-estimated our specifications including interaction terms between the components of aid and the policy variables. These proxies included: the Sachs-Warner (1995) openness indicator variable, the updated Sachs-Warner variable (Wacziarg and Welch, 2003), the World Bank CPIA ratings (used by Collier and Dollar, 2002), and the policy index representing a weighted average of budget surplus, inflation and openness (constructed by Burnside and Dollar, 2000). We found no evidence that developmental aid is more growth-effective in countries with 'better' domestic policies. Again, developmental aid appeared to spur growth regardless of the quality of policy environment as captured by these variables.

CONCLUSIONS

We offer new evidence that aid 'matters' for growth and indeed that it can matter a great deal. However, only certain kinds of aid have a statistically and economically discernible impact on average growth, and only over the *long-term*. This chapter contributes to the aid effectiveness literature by disentangling the *distinct* effects of developmental and geopolitical aid on growth. Furthermore, it reports evidence that aid assistance to developing countries translates into development outcomes with a lag, sometimes involving several decades.

Using a variety of proxies for developmental aid and numerous specifications, we found that developmental aid has a positive, large, and statistically significant effect on subsequent growth. These proxies included total bilateral aid from Nordic countries, as well as countries that rank high on a widely-used aid-quality index. Furthermore, developmental aid predicted as the share of total aid explained by the quality of the agricultural season also had a statistically significant effect on subsequent growth. In contrast, geopolitical aid was found

to either have a negative or zero effect on average growth. In a series of robustness checks, we did not find evidence that aid is more growth-effective in 'better' policy environments, that there are diminishing returns to aid, or that there are income thresholds in the ability of countries to utilize aid productively.

In conclusion, recent judgments regarding the growth ineffectiveness of aid are not supported by the data. Aid matters for growth. However, it is *developmental* aid rather than *geopolitical* aid that matters. The policy implications of this study stand in contrast to those of previous studies. A change in the composition of total aid that favors developmental aid, as well as an increase in the total volume of ODA extended to developing countries, are policy measures likely to have a substantial and large effect on the future growth of those countries. To validate and improve these results, we believe that further research should aim at identifying the growth impact of distinct categories of aid over the medium and long-term, using more fine-grained data. This appears to be a promising area for research aimed at moving beyond the debate on whether aid is effective and shedding light on the now pertinent question of *what* makes aid effective.

REFERENCES

- Bauer, Peter Thomas (1959). *United States Aid and Indian Economic Development*. American Enterprise Association: Washington, D.C.
- Bauer, Peter Thomas (1971). *Dissent on Development: Studies and Debates in Development Economics*. Weidenfeld and Nicolson: London, and Harvard University Press: Cambridge, MA.
- Bauer, Peter Thomas (1981). *Equality, the Third World and Economic Delusion*. Weidenfeld and Nicolson: London, and Harvard University Press: Cambridge, MA.
- Blundell, Richard and Stephen Bond (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87: 115–143.
- Blundell, Richard, Anke Hoeffler and Jonathan Temple (2001). GMM estimation of empirical growth models, Discussion paper 3048, Center for Economic Policy Research, London.
- Boone, Peter (1994). The impact of foreign aid on savings and growth. Working paper 1265, Centre for Economic Performance, London School of Economics, London.
- Boone, Peter (1996). Politics and the effectiveness of foreign aid. *European Economic Review* 40(2): 289–329.
- Burnside, Craig and David Dollar (2000). Aid, policies and growth. *American Economic Review* 90 (4): 847–869.

278 • Growth Divergences

- Burnside, Craig and David Dollar (2004). Aid, policies and growth: Reply. *American Economic Review* 94 (3): 781–784.
- Clemens, Michael A., Steven Radelet and Rikhil Bhavnani (2004). Counting chickens when they hatch: The short-term effect of aid on growth. CGD working paper no. 44, Center for Global Development, Washington, DC.
- Collier, Paul and David Dollar (2002). Aid allocation and poverty reduction. *European Economic Review* 46 (8): 1475–1500.
- Dalgaard, Carl-Johan, Henrik Hansen and Finn Tarp (2004). On the empirics of foreign aid and growth. *The Economic Journal* 114 (496): 191–216.
- Development Assistance Committee Online database (2006). Paris, Development Assistance Committee (DAC). URL: www.oecd.org/dac/stats/idsonline
- Easterly, William (2003). Can foreign aid buy growth? *Journal of Economic Perspectives* 17 (3): 23–48.
- Easterly, William (2005). What did structural adjustment adjust? The association of policies and growth with repeated IMF and World Bank adjustment loans. *Journal of Development Economics* 76 (1): 1–22.
- Easterly, William, Ross Levine and David Roodman (2004). New data, new doubts: A comment on Burnside and Dollar's "Aid, Policies and Growth". *American Economic Review* 94 (3): 774–780.
- Headey, Derek (2005). Foreign aid and foreign policy: how donor undermine the effectiveness of overseas development assistance. Centre for Efficiency and Productivity Analysis Working paper 05, School of Economics, University of Queensland, Australia.
- Miquel-Florensa, Josepa (2006). Aid effectiveness: A comparison of tied and untied aid. Unpublished manuscript, Columbia University.
- Rajan, Raghuram (2005). Aid and growth: The policy challenge. *Finance and Development* 42 (4). URL: <http://www.imf.org/external/pubs/ft/fandd/2005/12/straight.htm>
- Rajan, Raghuram and Arvind Subramanian (2005). Aid and growth: What does the cross-country evidence really show? IMF Working paper WP/05/127, International Monetary Fund, Washington, DC.
- Reddy, Sanjay and Camelia Minoiu (2006). Development aid and economic growth: a positive long-run relation. Working paper 29, Department of Economic and Social Affairs, United Nations, New York.
- Roodman, David (2006). Building and running an effective policy index: Lessons from the commitment to development index. Essay, Center for Global Development, Washington, DC.
- Sachs, Jeffrey D. and Andrew M. Warner (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity* 1: 1–118.
- Sachs, Jeffrey D., John W. McArthur, Guido Schimdt-Traub, Margaret Kruk, Chandrika Bahadur, Michael Faye, and Gordon McCord (2004). Ending Africa's poverty trap. *Brookings Papers on Economic Activity* 1: 117–240.
- Sen, Amartya (1982). Just Deserts. *The New York Review of Books* 29 (3). URL: http://finance.sauder.ubc.ca/~bhatta/BookReview/sen_on_bauer.html
- Wacziarg, Romain, and Karen Horn Welch (2003). Trade liberalization and growth: New evidence. NBER working paper 10152, National Bureau of Economic Research, Cambridge, MA.
- World Bank (2006). World Development Indicators online. World Bank Group, Washington, DC. URL: <http://devdata.worldbank.org/dataonline/old-default.htm>

NOTES

- ¹ Based on Reddy and Minoiu (2006). We would like to thank the Department of Economic and Social Affairs of the United Nations for supporting this research. We are grateful to Kathleen Apltauer for her help in editing this chapter.
- ² See, e.g., the work on this subject by Peter Bauer (1959, 1971, 1981) and the review of Bauer (1981) by Sen (1982).
- ³ Clearly, there is a need for a threshold with which to undertake such differentiation. We note this requirement without explicitly specifying such a threshold.
- ⁴ More specifically, DAC Glossary on Aid Statistics, 2006. URL: http://www.oecd.org/glossary/0,2586,en_2649_34447_1965693_1_1_1_1,00.html