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## **Working Papers**

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**Donors' Openness  
to Immigration and  
the Effectiveness of Foreign Aid**

**Anna Minasyan  
Peter Nunnenkamp**

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## **Donors' Openness to Immigration and the Effectiveness of Foreign Aid**

Anna Minasyan and Peter Nunnenkamp

Abstract:

We argue that donors could improve the effectiveness of foreign aid by pursuing complementary and coherent non-aid policies. In particular, we hypothesize that aid from donors that are open to immigration has stronger growth effects than aid from closed donors. We estimate the aid-growth nexus in first differences to mitigate endogeneity concerns. Our empirical results support the hypothesis that donors' openness to immigration strengthens the growth effects of foreign aid.

Keywords: aid effectiveness, migration, remittances, economic growth.

JEL classification: F35, F24, O11

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## 1. Introduction

The World Bank's study "Assessing Aid: What Works, What Doesn't, and Why?" (World Bank 1998) and the underlying contribution of Burnside and Dollar (2000) have triggered a lively and ongoing debate on the role of sound economic policies in the recipient countries for foreign aid to have the desired effects on poverty alleviation and economic growth. It has received considerably less attention how *donor* countries could enhance the effectiveness of their aid.

Berthélemy (2006) concluded from his analysis of selfish and altruistic motives of aid allocation that donors do not behave the same. Concerning donor motives and aid effectiveness, Bearce and Tirone (2010), Kilby and Dreher (2010) and Dreher et al. (2014) found that the growth impact is insignificant or even negative for politically or strategically motivated aid which typically provides favors to political allies, while the growth impact tends to be positive if aid is motivated by the need of recipients.<sup>1</sup>

However, it remains open to question whether donors could improve the effectiveness of aid by pursuing complementary and coherent policies. As argued by Fuchs et al. (2014), foreign aid may be complemented or substituted by donor policies related to private financial flows, imports and exports of goods and services, and international migration. Here, we focus on the donors' openness to immigration since the interaction between aid and migration has received scant attention so far. Specifically, we hypothesize that aid from donor countries that are open to immigration has stronger growth effects than aid from closed donor countries.

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<sup>1</sup> More specifically, it has been discussed whether donors could render aid more effective by: (i) selecting sectors where aid is more likely to have short-term effects (Clemens et al. 2012); (ii) offering appropriate aid modalities, e.g., by untying aid (Clay et al. 2008), replacing loans by grants (Odedokun 2004), and providing general budget support instead of project-specific support (Koeberle et al. 2006); (iii) optimizing aid delivery, e.g., through non-governmental organizations (NGOs) (Dietrich 2013; Acht et al. 2015) and so-called performance based aid (Svensson 2003); (iv) reducing the volatility and unpredictability of aid disbursements (Lensink and Morrissey 2000; Kodama 2012); and (v) improving donor coordination (Easterly 2007; Knack and Rahman 2007).

Section 2 sketches the analytical background of our hypothesis, and Section 3 describes the method and data used to test it empirically. We present our estimation results in Section 4, and conclude in Section 5.

## **2. Why migration matters for aid effects**

According to the OECD Development Centre, donor countries “must also make intelligent use of non-aid policies,” including migration policies, to render aid more effective; the relevant question for OECD policy makers is how to combine aid and non-aid policies to achieve the desired results most effectively (Dayton-Johnson and Katseli 2006: 1). Likewise, the view that “foreign aid is only one aspect of the relationship between rich and poor countries” is underlying the Commitment to Development Index (CDI) of the Center for Global Development (Birdsall and Roodman 2003: 2). This index, which has been compiled annually since 2003, includes migration as a major component to assess the policy coherence of donor countries.<sup>2</sup>

In actual practice, however, the required policy coherence often appears to be violated by donor countries. For instance, some large donor countries, notably France and Japan, ranked at the bottom of the CDI’s 2003 scorecard on migration policies (Birdsall and Roodman 2003). De Haas (2005: 1269) observes that “migration and development policies generally constitute separate policy domains” in the donor countries, which hampers more positive links between migration and development in the recipient countries. It even appears that some donors regard foreign aid as a ‘remedy’ against migration from recipient countries.<sup>3</sup>

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<sup>2</sup> As noted by Birdsall and Roodman (2003: 20), “migration is one of the thorniest topics covered in the index. The effects of migration and migration policy on development have not been as extensively studied as those of aid and trade policies.”

<sup>3</sup> De Haas (2005) considers it a myth that foreign aid is an effective remedy against migration. See also Berthélemy et al. (2009) on the complex relationship between aid inflows and emigration from recipient countries. Fernández-Huertas Moraga and Rapoport (2013) argue that existing international migration regimes are generally too restrictive and inefficient as they ignore important externalities. The public good nature of poverty alleviation encourages free-riding on immigration, while restrictions are justified by apparently unbearable social and political costs.

As noted by the Center for Global Development and *Foreign Policy* magazine when launching the CDI in 2003, “at first glance, it may seem odd to include immigration policy in the CDI. How is the process of development advanced if thousands of Turks exit their native country for Germany or if millions of Mexicans cross the border into the United States? Clearly, migration flows hurt in some ways and help in others. On balance, however, the freer movement of people—like the freer movement of goods—generally enhances development.”<sup>4</sup> The evidence on positive developmental effects of migration in the sending countries has mounted since then.<sup>5</sup>

According to Fernández-Huertas Moraga and Rapoport (2013: 1), “international migration is maybe the single most effective way to alleviate global poverty.” In quantitative terms, the remittances of migrants are a much more important source of external financing for many developing countries than aid inflows (Gammeltoft 2002). However, in addition to migration’s direct contribution to external financing and poverty alleviation, greater openness of donor countries to immigration could also enhance economic growth in the home countries of migrants indirectly by increasing the effectiveness of foreign aid.

The literature offers several arguments leading to our hypothesis that the interaction of aid with the donors’ openness to immigration has positive growth effects in the aid recipient countries. For a start, aid and remittances can be complementary means of financing. While remittances are private flows and primarily benefit the families of migrants in the sending country, “philanthropic remittances” are not uncommon (Ratha et al. 2011: 5). In other words, the diaspora contributes to social and economic development at home by co-financing projects in education, health, and community infrastructure (e.g., Goldring 2004). Synergies between aid and

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<sup>4</sup> See *Foreign Policy*, Ranking the rich. May/ June 2003, page 64 (<http://terpconnect.umd.edu/~dcrocker/Courses/Docs/Aid%20Effectiveness.htm>; accessed: January 2015).

<sup>5</sup> For instance, Adams and Page (2005: 1645) find that “both international migration and remittances significantly reduce the level, depth, and severity of poverty in the developing world.” Anyanwu and Erhijakpor (2010) report similar results for a sample of 33 African countries. See also various contributions on the brain drain/ gain and remittances to the volume edited by Czaika and Vargas-Silva (2012: Part III). Ratha et al. (2011) review the relevant literature.

remittances even exist if projects in education and health are purely aid-financed. According to Ratha et al. (2011), a growing body of evidence suggests that the private income from remittances is largely spent on education and health, rather than conspicuous consumption. In other words, remittances tend to fuel higher demand for productivity enhancing social services that aid helped to provide.

Similar synergies between aid and remittances can be expected in other fields. De Haas (2005) reports that migrant households often tend to have a higher propensity to invest in agriculture and other private enterprises than non-migrant households. Aid and invested remittances could then mutually reinforce each other in promoting economic growth. Aid may help remove critical bottlenecks to a more productive use of invested remittances, e.g., by improving the recipient country's infrastructure and institutions. Conversely, higher local investments financed by remittances could boost the growth effects of aid-financed infrastructure and institutions by making better use of facilities and business opportunities.<sup>6</sup>

Apart from remittances, the migrant diaspora could help improve aid effectiveness in non-financial ways. Migrants tend to acquire superior knowledge when working in the more advanced donor countries. The poorer sending countries may tap into the knowledge acquired by the migrant diaspora, especially when migrants return home: "Access to information through the diaspora and the skills learned by returning migrants can improve technology, management and institutions in the sending country" (Ratha et al. 2011: 6) and, thereby, improve the aid recipient country's absorptive capacity for a productive use of aid inflows.

Furthermore, lobbying by migrants in the donor countries may render aid more effective and strengthen the complementarity between aid and remittances. Lahiri and Raimondos-Møller

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<sup>6</sup> In a similar vein, Dayton-Johnson and Katseli (2006: 21) argue that aid could diffuse the benefits of migration better: "Remittances might expand economic opportunities in migrants' home regions, but with bad roads or telephone service, it might be difficult for workers elsewhere in the country to move to those regions and benefit from expanded opportunities."

(2000) present a theoretical model to explain the striking relationship between the presence of ethnic groups in the donor countries and the allocation of aid across the countries of origin of these groups. The authors argue that foreign ethnic groups “often lobby the (host) government for the benefit of the countries of their origin.” At the same time, potential investors among the migrants living in the donor countries may lobby for particular types of aid, namely those which help remove critical bottlenecks and, thereby, promote the productivity of their own remittances.

Finally, migrant networks encouraging “*continuous* and expanding economic relations between sending and receiving countries” (Grieco and Hamilton 2004: 5; emphasis added) may reduce the typical volatility of aid disbursements, which have been shown to erode the growth effects of aid (Lensink and Morrissey 2000; Kodama 2012).

### **3. Method and data**

Rather than propagating our own model on the growth impact of foreign aid and its interaction with donors’ openness to immigration, we closely follow the approach in Clemens et al. (2012). Clemens et al. show that previous attempts to control for the potential endogeneity of aid relied on invalid instruments. Given the difficulty of finding better instruments, Clemens et al. address potential endogeneity problems by differencing the regression equation and lagging aid so that it can reasonably be expected to cause growth.<sup>7</sup> They argue that removing fixed effects through first-differencing, plus lagging aid, mitigates the risks of misspecification due to reversed causality between aid and growth as well as potential omitted variables bias.

Specifically, we base our analysis on Clemens et al.’s (2012) permutations of the study of Rajan and Subramanian (2008) which figures most prominently in the recent literature on aid and

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<sup>7</sup> Brückner (2013) uses variations in rainfall and international commodity price shocks as instruments in order to assess the causal effects of aid on growth for a relatively small sample of least developed recipient countries. The suitability of these instruments is open to debate once the sample is extended to include the whole spectrum of low- and middle-income aid recipients.



growth. We then add our variables of principal interest and extend the specification by two alternative measures of donors' openness to immigration and the interaction of these measures with the aid variable. This results in the following reduced-form empirical model at the country-period level:

$$\Delta Growth_{i,t} = \alpha + \beta \Delta Aid_{i,t-1} + \gamma \Delta DonQual_{i,t-1} + \delta \Delta Aid_{i,t-1} * \Delta DonQual_{i,t-1} + \zeta \Delta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where  $Growth_{i,t}$  is recipient country  $i$ 's average yearly growth of GDP per capita over the five-year period  $t$ .  $Aid_{i,t-1}$  denotes the amount of aid, in percent of the recipient country's GDP, disbursed in the previous five-year period.

Our variable of principle interest,  $DonQual_{i,t-1}$ , reflects the quality of the average donor, in terms of openness to immigration, in recipient country  $i$  at time  $t-1$  weighted by the amount of aid a country receives from donor  $j$ :

$$DonQual_{i,t-1} = \sum_{j=1}^n s_{ij,t-1} * Open_{j,t-1}, \quad (2)$$

where  $s_{ij,t-1}$  is the aid share of donor  $j$  in recipient country  $i$ 's total bilateral aid in period  $t-1$ ;  $Open_{j,t-1}$  represents either the amount of workers' remittances, paid by the donor country as a share of its GDP, or the stock of international migrants as a share of the donor country's population.<sup>8</sup> The most open donors in our sample, in terms of remittances as a share of the donor's GDP, are Luxembourg, Kuwait, Switzerland, Israel and Belgium. In terms of international migration stock as a share of the donor's population, the most open countries are Kuwait, the United Arab Emirates, Israel, Luxembourg and Australia.

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<sup>8</sup> Both measures are drawn from the World Development Indicators. The stock of migrants has been interpolated. We are most grateful to Andreas Fuchs for sharing these data with us.

All regressions are in first differences and account for the control variables used in the original study of Rajan and Subramanian (2008), denoted  $X$ , which we include contemporaneously (as in Clemens et al. 2012): (log) initial GDP per capita, initial trade policy index (the well-known Sachs-Warner index, extended by Wacziarg and Welch), (log) initial life expectancy, (log) inflation, initial M2/GDP, budget balance/GDP, revolutions, and period dummies.<sup>9</sup> In some specifications we additionally include aid squared to test for decreasing returns to aid, following Clemens et al. (2012). Finally,  $\varepsilon$  is the error term.

#### 4. Results

Table 1 presents our baseline regression results covering the 1985-2010 period.<sup>10</sup> It should be recalled that all data are averaged over five years. Our dependent variable is the (change in the) growth rate of real GDP per capita. The explanatory variables of major interest are: (the change in) gross bilateral official development assistance as a percentage of the recipient country's GDP (*Aid*), (the change) in the donor countries' openness to immigration (*DonQual*), and the interaction between these two variables.<sup>11</sup> As detailed above, *DonQual* is defined in two alternative ways: In columns (2) – (4) of Table 1, we employ the amount of workers' remittances, paid by the donor country as a share of its GDP. In columns (5) – (7) of Table 1, we employ the stock of foreign migrants as a share of the donor country's population.

For a start, column (1) of Table 1 does not account for donors' openness to immigration. As can be seen, *Aid* enters with a negative sign, but proves to be statistically insignificant at

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<sup>9</sup> Rajan and Subramanian (2008) also include time-invariant variables which are dropped here by taking differences. See Appendix A and Appendix B for summary statistics as well as detailed variables descriptions and data sources.

<sup>10</sup> The time dimension of our sample is limited by data availability, notably the availability of consistent data on migration and remittances from Fuchs et al. (2014).

<sup>11</sup> In addition to the control variables taken from Rajan and Subramanian (2008), we also control for gross multilateral aid as well as repayments of (bilateral and multilateral) aid. However, these additional control variables typically enter statistically insignificant (except for multilateral repayments when accounting for squared aid inflows and repayments).

conventional levels. This is in line with the original finding of Rajan and Subramanian (2008), according to whom aid per se is not effective in stimulating growth in the recipient countries. The results on the control variables taken from Rajan and Subramanian (2008) are similar to those in Dreher et al. (2013), who also employ the approach of Clemens et al. (2012) by taking first differences and lagging aid. While several variables are insignificant at conventional levels, the coefficients on *Initial GDPpc (log)*, *Inflation (log)* and *Revolutions* have negative signs as expected and are significant at the five percent level or better.

In column (2) we include *DonQual* based on workers' remittances as an indicator of donors' openness to immigration and the interaction of *Aid* with *DonQual*. The estimation in column (3) includes the aid variables in squared terms to account for decreasing returns to aid, while the estimation in column (4) also accounts for the interaction of *Aid* in squared terms with *DonQual*. Columns (5) – (7) report the same steps with the migration stock, instead of workers' remittances, as an indicator of donors' openness to immigration. The results on the control variables used by Rajan and Subramanian (2008) are hardly affected by these modifications and by the choice of the indicator underlying *DonQual*, compared to the basic specification in column (1).

As concerns our variables of principal interest, the coefficients on both *Aid* per se and the two variants of *DonQual* per se are statistically insignificant at conventional levels. However, we find significant and positive interactions between aid and donors' openness to immigration, at least at the five percent level, for almost all estimations.<sup>12</sup> This supports our hypothesis that bilateral aid is more likely to have positive growth effects when recipient countries receive aid mainly from donor countries that are relatively open to immigration.

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<sup>12</sup> Column (7) is the only exception when we consider migration stock as an indicator of donors' openness to immigration and also account for squared aid and its interaction with *DonQual*.

We are particularly interested in the marginal effect of aid on growth over the whole range of *DonQual*. We calculate the marginal effect of  $\Delta Aid$  which is equal to  $\beta + \delta \Delta DonQual_{i,t-1}$  (according to equation 1), based on the regression results in columns (2) and (5) of Table 1. Figure 1 portrays the marginal effect, together with the 95 percent confidence interval, when *DonQual* is based on workers' remittances, while Figure 2 portrays the marginal effect when *DonQual* is based on international migration stocks. Both figures clearly reveal that the growth impact of aid improves the more open donors are to immigration and the more aid recipients receive from open donor countries, as evident from the positive and statistically significant coefficients of the corresponding interaction terms ( $\delta$ ).

Specifically, if there is no change in *DonQual* as measured by aid-weighted remittances in donors' GDP ( $\sim 0$  percentage point), the marginal effect of  $\Delta Aid$  on  $\Delta Growth$  is statistically insignificant (Figure 1). However, if there is a positive change in this measure of *DonQual* that exceeds the actual average change of aid-weighted remittances in donors' GDP ( $>0.004$ ), then the effect is positive and statistically significant. To illustrate, a 0.01 percentage point increase of aid-weighted remittances within a period of five years increases the effect of aid on growth by 0.68 percentage points (statistically significant at one percent level), if *Aid* is increased by one percentage point.

A similar logic applies for the complementary effect of migration stocks on the aid-growth nexus. As Figure 2 shows, negligible changes of *DonQual* in terms of aid-weighted migration stocks in donors' population ( $\sim 0$ ) are associated with statistically insignificant marginal effects of  $\Delta Aid$  on  $\Delta Growth$ ; the effect can be positive or negative. However, once this measure of *DonQual* increases substantially, the growth impact of aid strengthens. For instance, when the aid-weighted migration stocks in donors' population increase by 15 percentage points within a

period of five years, the effect of aid on growth increases by 0.8 percentage points (statistically significant at five percent level), if *Aid* is increased by one percentage point.

Taken together, we derive from columns (2) and (5) in Table 1 that the effectiveness of aid in promoting growth in the recipient countries depends considerably on the donors' openness to immigration. With the exception of column (7), this finding also holds when accounting for aid in squared terms (columns 3 and 6) plus the interaction between squared aid and *DonQual* (columns 4 and 7). Interestingly, these extensions do not point to decreasing returns to aid; neither do they suggest that the impact of *DonQual* on the effectiveness of aid depends in a non-linear way on the amount of aid.

We test for the robustness of our major results in several ways.<sup>13</sup> First, we employ the specification of Burnside and Dollar (2000), instead of the specification of Rajan and Subramanian (2008). In other words, we replace all control variables *X* in equation (1) taken from Rajan and Subramanian by the control variables used by Burnside and Dollar, whereas all other characteristics of equation (1) are left unchanged. For the sake of brevity, we restrict the presentation of results with the alternative specification of Burnside and Dollar (2000) to the marginal effects of aid on growth over the range of *DonQual*. Figure 3 corresponds to Figure 1 above, i.e., *DonQual* is based on workers' remittances and aid squared is omitted. As can be seen, the pattern is similar to Figure 1.

Second, we exclude non-DAC donors from the sample of donor countries. It is well known that some donors from the Arabian Peninsula are major sources of workers' remittances. Thus, one might suspect that our results are mainly driven by these donor countries. This is not the case, however. The results from column (2) of Table 1 hold when *DonQual* is based on

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<sup>13</sup> For the sake of brevity, we only refer to robustness tests with workers' remittances as the preferred indicator of donors' openness to immigration in the following. The corresponding results with migration stocks are generally weaker, as was already the case in Table 1.

workers' remittances only from traditional DAC members. As can be seen in Table 2, the interaction of *Aid* and *DonQual* is statistically significant at the five percent level and the coefficient of the interaction term is of similar size when non-DAC donors are excluded from our sample.<sup>14</sup>

Third, we assess whether our basic results are driven by DAC donors with relatively high remittances as percentage of their GDP. In column (1) of Table 3, we exclude Luxembourg with outstandingly high remittances/GDP, followed by those DAC donors that rank next in terms of remittances/GDP (columns 2-5). Independent of the DAC donor excluded, the interaction of *Aid* and *DonQual* is statistically significant at the one percent level and the size of the coefficient of the interaction term is hardly affected compared to column (2) in Table 1.

Finally, we exclude either the poorest or the richest quartile of recipient countries from our sample to test whether the complementarity between aid and donors' openness to immigration (as indicated by remittances/GDP) is restricted to a particular sub-group of aid recipients. As shown in Table 4, the statistical significance of the interaction of *Aid* and *DonQual* weakens to the ten percent level when excluding the poorest recipients (column 1). The results are hardly affected, compared to the full sample of recipients, when excluding the richest recipients (column 2). Taken together, Table 4 could be taken as an indication that it is mainly the poorer recipient countries that benefit from the complementarity of aid and donors' openness to immigration.

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<sup>14</sup> It should be noted, however, that the interaction of *Aid* and *DonQual* is no longer significant at conventional levels when *DonQual* is based on international migration stocks (not shown).

## 5. Summary

We argue that donors could improve the effectiveness of foreign aid by pursuing complementary and coherent non-aid policies. In particular, we hypothesize that aid from donors that are open to immigration has stronger growth effects than aid from closed donors. We estimate the aid-growth nexus in first differences to mitigate endogeneity concerns. Our empirical results support the hypothesis that donors' openness to immigration strengthens the growth effects of foreign aid.

Our findings have important implications for both the donors and recipients of foreign aid. Political resistance in various donor countries against more immigration not only involves costs for the donors themselves (e.g., in terms of access to foreign skills and improving the age structure of the workforce) but also for the recipients of development aid. In particular, the effectiveness of aid is eroded if financial generosity is misconceived as an alternative to less restrictive immigration policies, which should be of concern at least for altruistic donors. From the perspective of aid recipients, it appears that maximizing aid inflows is unlikely to have the desired effects on economic growth and poverty alleviation unless development cooperation with donors is broadened to cover complementary (non-aid) policies such as international migration.

Our analysis of the complementarity of aid and donors' openness to immigration suggests two avenues of future research. On the one hand, taking a broader perspective by accounting for various non-aid policies may help identify further complementarities. This research direction would be closely related to the Commitment to Development Index (CDI) of the Center for Global Development, which covers various policy areas that could complement aid and, thereby, result in a coherent approach of helping the poor. On the other hand, further research may take the opposite direction to identify the exact transmission channels underlying the complementarity between aid and migration. Refined analyses, including micro-level surveys, could offer

important insights on the role of remittances, the acquisition of superior skills and knowledge by (returning) migrants, and lobbying by migrants in the donor countries for migration to improve the effectiveness of aid.



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Figure 1 – Marginal effects of aid on growth as *DonQual* changes: Remittances/GDP (based on column (2) of Table 1)

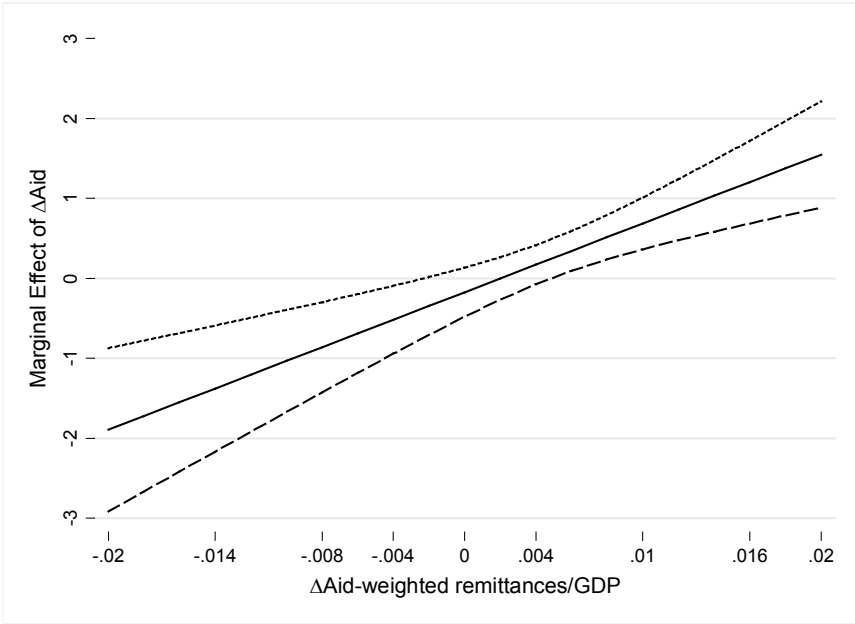


Figure 2 – Marginal effects of aid on growth as *DonQual* changes: Migration stock/population (based on column (5) of Table 1)

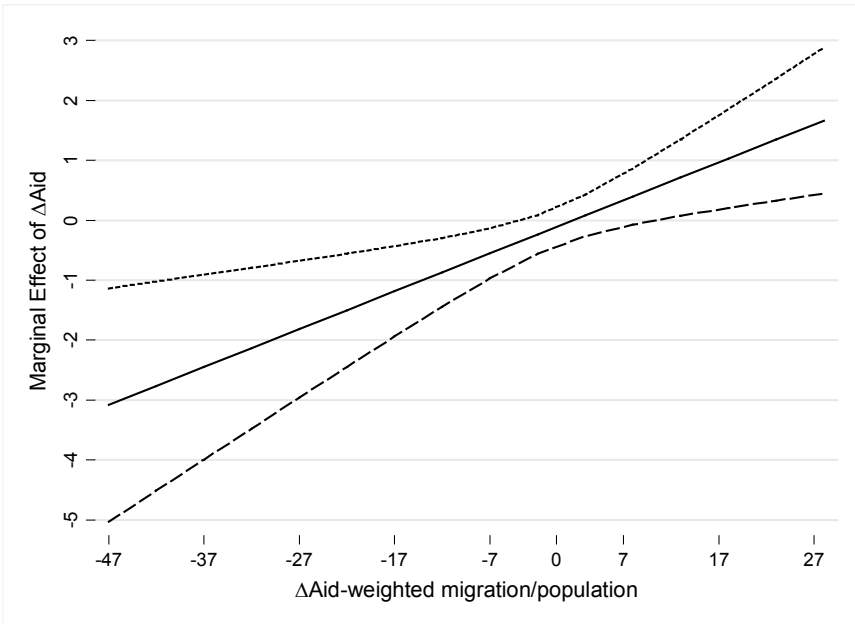


Figure 3 – Marginal effects of aid on growth as *DonQual* changes: Remittances/GDP (based on specification of Burnside and Dollar, 2000)

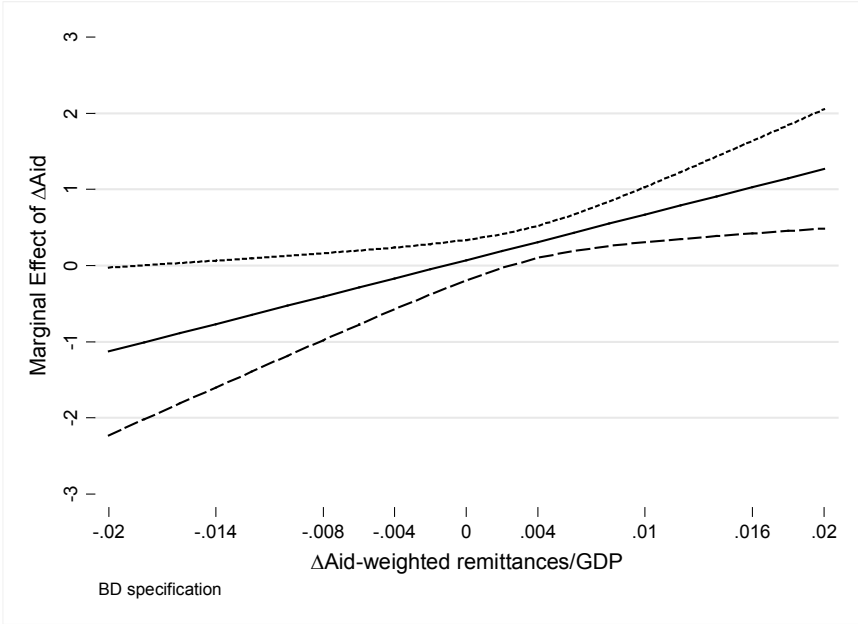


Table 1 – Baseline estimation results, all donors, 1985-2010, Rajan and Subramanian (2008) specification

Dependant variable: $\Delta$ Growth	Remittances/GDP				Migration stock/population		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Aid	-0.1 [0.170]	-0.172 [0.156]	-0.337 [0.280]	-0.371 [0.306]	-0.11 [0.160]	-0.213 [0.301]	-0.156 [0.319]
DonQual (remittances/GDP)		36.524 [126.943]	25.841 [122.966]	65.721 [140.645]			
Aid*DonQual (remittances/GDP)		86.029*** [20.426]	83.435*** [19.514]	126.431** [58.719]			
Aid squared*DonQual (remittances/GDP)				-1.681 [1.887]			
DonQual (migration stock/population)					-0.01 [0.050]	-0.017 [0.048]	-0.045 [0.053]
Aid*DonQual (migration stock/population)					0.063*** [0.021]	0.062*** [0.019]	0 [0.052]
Aid squared*DonQual (migration stock/population)							0.003 [0.002]
Aid squared			0.007 [0.007]	0.008 [0.008]		0.005 [0.007]	0.003 [0.007]
Bilateral repayments squared			0.217 [0.220]	0.216 [0.221]		0.306 [0.219]	0.28 [0.218]
Multilateral aid squared			-0.018 [0.016]	-0.02 [0.018]		-0.014 [0.016]	-0.005 [0.020]
Multilateral repayments squared			1.856** [0.888]	1.857** [0.893]		2.131** [0.890]	2.252** [0.902]
Multilateral aid	0.069 [0.154]	0.201 [0.158]	0.559 [0.358]	0.581 [0.376]	0.146 [0.152]	0.462 [0.357]	0.329 [0.411]
Bilateral repayments	0.092 [0.344]	0.064 [0.315]	-0.673 [0.955]	-0.671 [0.955]	-0.014 [0.343]	-1.075 [0.963]	-1.003 [0.957]
Multilateral repayments	-0.623 [0.979]	0.304 [0.946]	-3.669* [2.145]	-3.777* [2.155]	-0.052 [0.911]	-4.550** [2.169]	-4.523** [2.178]
Initial GDP p.c. (log)	-8.680*** [1.311]	-8.534*** [1.399]	-8.593*** [1.375]	-8.649*** [1.386]	-7.987*** [1.422]	-8.070*** [1.396]	-8.156*** [1.390]
Initial life expectancy (log)	0.008 [0.079]	-0.003 [0.072]	-0.015 [0.069]	-0.02 [0.068]	-0.026 [0.071]	-0.041 [0.068]	-0.028 [0.071]
Openness (trade)	0.834 [0.548]	0.738 [0.544]	0.68 [0.583]	0.696 [0.587]	0.877 [0.547]	0.762 [0.591]	0.732 [0.605]
Inflation (log)	-1.127*** [0.387]	-1.252** [0.521]	-1.229** [0.523]	-1.220** [0.526]	-1.276** [0.522]	-1.251** [0.526]	-1.232** [0.519]
Initial M2/GDP	0.005 [0.015]	-0.021 [0.023]	-0.025 [0.023]	-0.024 [0.023]	-0.015 [0.022]	-0.019 [0.022]	-0.02 [0.022]
Budget balance/GDP	0.145 [0.124]	0.139 [0.137]	0.136 [0.147]	0.135 [0.146]	0.152 [0.133]	0.14 [0.148]	0.13 [0.149]
Revolutions	-0.855** [0.357]	-0.920*** [0.337]	-0.901*** [0.340]	-0.894*** [0.340]	-0.831** [0.349]	-0.824** [0.349]	-0.838** [0.347]
Constant	0.702** [0.335]	2.408* [1.422]	2.669* [1.397]	2.627* [1.409]	2.245 [1.392]	2.562* [1.374]	2.579* [1.367]
Adjusted R-squared	0.224	0.262	0.264	0.263	0.237	0.241	0.241
Number of observations	257	257	257	257	257	257	257
Number of recipient countries	70	70	70	70	70	70	70

OLS panel estimation in first differences following the specification of Rajan and Subramanian (2008) as in Clemens et al. (2012). All aid and repayment variables are calculated as % of recipients' GDP and are lagged. All regressions include period (5-year) dummies.

Significance levels \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Table 2 – Robustness test for Column 2, Table 1, traditional DAC donors only

Dependant variable: $\Delta$ Growth	Remittances/GDP
Aid	-0.152 [0.171]
DonQual (remittances/GDP)	-14.813 [244.778]
Aid*DonQual (remittances/GDP)	104.774** [42.418]
Adjusted R-Squared	0.226
Number of observations	257
Number of recipient countries	70

OLS panel estimation in first differences following the specification of Rajan and Subramanian (2008) as in Clemens et al. (2012). All regressions include period (5-year) dummies. Significance levels \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All control variables from Table 1 are included in the regressions. Traditional DAC donors are defined as DAC members as of 2009.

Table 3 – Robustness tests for Column 2, Table 1, excluding DAC donors with high remittances/GDP

	w/o Luxembourg	w/o Switzerland	w/o Belgium	w/o Netherlands	w/o New Zealand
Dependant variable: $\Delta$ Growth	(1)	(2)	(3)	(4)	(5)
Aid	-0.157 [0.153]	-0.191 [0.158]	-0.22 [0.171]	-0.173 [0.165]	-0.172 [0.156]
DonQual (remittances/GDP)	71.254 [135.872]	50.691 [128.151]	66.983 [137.864]	44.526 [125.927]	37.683 [127.104]
Aid*DonQual (remittances/GDP)	91.556*** [21.016]	91.550*** [21.027]	97.025*** [23.379]	86.947*** [20.937]	86.170*** [20.446]
Adjusted R-Squared	0.26	0.265	0.265	0.261	0.262
Number of observations	257	257	257	257	257
Number of recipient countries	70	70	70	70	70

OLS panel estimation in first differences following the specification of Rajan and Subramanian (2008) as in Clemens et al. (2012). All regressions include period (5-year) dummies. Significance levels \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All control variables from Table 1 are included in the regressions.



Table 4 – Robustness tests for Column 2, Table 1, excluding poorest/ richest quartile of recipient countries

Dependant variable: $\Delta$ Growth	w/o Poorest (<25)	w/o Richest (>75)
Aid	-0.131 [0.165]	-0.155 [0.138]
DonQual (remittances/GDP)	32.846 [127.044]	5.609 [97.264]
Aid*DonQual (remittances/GDP)	63.667* [35.649]	76.115*** [16.479]
Adjusted R-Squared	0.405	0.336
Number of observations	198	206
Number of recipient countries	68	67

OLS panel estimation in first differences following the specification of Rajan and Subramanian (2008) as in Clemens et al. (2012). All regressions include period (5-year) dummies. Significance levels \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All control variables from Table 1 are included in the regressions. Poorest/richest quartiles (below 25% and above 75%) have been defined according to the initial GDP p.c. (log) levels for each period.

Appendix A – Summary statistics, Column 2, Table 1

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
Growth	257	1.5660	3.2170	-17.9900	12.7700
Aid	257	3.6220	4.3380	0.0074	26.6900
Remittances/GDP	257	0.0042	0.0024	0.0007	0.0190
Initial GDP p.c. (log)	257	8.0980	0.9200	5.3350	10.2100
Multilateral repayments	257	0.2280	0.3420	0.0000	2.0840
Multilateral aid	257	2.2020	3.6070	0.0001	19.0100
Bilateral repayments	257	0.3760	0.5860	0.0013	4.1560
Initial life expectancy (log)	257	62.6900	10.5400	36.5500	79.4100
Openness (trade)	257	0.6230	0.4860	0.0000	1.0000
Inflation(log)	257	0.3540	0.7060	-0.0047	4.1920
Initial M2/GDP	257	7.5550	15.2300	0.0023	105.7000
Budget balance/GDP	257	-0.1100	0.6100	-5.5090	2.3520
Revolutions	257	0.2800	0.4550	0.0000	2.6000

## Appendix B – Definition of variables and sources

Variable	Definition	Sources
Aid	Average gross bilateral aid disbursements in percent of GDP.	DAC (2012), Table DAC2a
Don Qual: remittances/GDP	Workers' remittances and compensation of employees, paid (% of GDP).	Fuchs et al. (2014)
Don Qual: migration stock/population	International migration stock (% of population, interpolated).	Fuchs et al. (2014)
Growth	Average annual growth rate of real GDP p.c. in constant international dollars.	Clemens et al. (2012), updated up to 2010 based on the original data sources.*
Multilateral aid	Average gross multilateral disbursements in percent of GDP.	DAC (2012), Table DAC2a
Multilateral repayments	Average multilateral repayments in percent of GDP.	DAC (2012), Table DAC2a
Bilateral repayments	Average bilateral repayments in percent of GDP.	DAC (2012), Table DAC2a
Initial GDP p.c. (log)	Natural log of initial GDP p.c. in international prices.	Clemens et al. (2012), updated up to 2010 based on the original sources.**
Initial life expectancy (log)	Natural log of first non-missing value in each period of total life expectancy.	
Openness	Openness index is based on black market premium, average tariff rates, export marketing board, socialist regime and etc.	
Inflation (log)	Natural log of (1+consumer price) inflation.	
Initial M2/GDP	Money and quasi-money (M2) to GDP.	
Budget balance/GDP	Overall budget balance, including grants. Measured as cash surplus/deficit to GDP.	
Revolutions	Average number of revolutions per period.	

\*Online access to Clemens et al. (2012) supplementary material: <http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0297.2011.02482.x/supinfo>

\*\*Online access to Clemens et al. (2012) dataset: <http://www.cgdev.org/publication/counting-chickens-when-they-hatch-timing-and-effects-aid-growth-working-paper-44>