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WHAT UNDERMINES AID'S IMPACT ON GROWTH?

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ABSTRACT

We examine one of the most important and intriguing puzzles in economics: why it is so hard to find a robust effect of aid on the long-term growth of poor countries, even those with good policies. We look for a possible offset to the beneficial effects of aid, using a methodology that exploits both cross-country and within-country variation. We find that aid inflows have systematic adverse effects on a country's competitiveness, as reflected in a decline in the share of labor intensive and tradable industries in the manufacturing sector. We find evidence suggesting that these effects stem from the real exchange rate overvaluation caused by aid inflows. By contrast, private-to-private flows like remittances do not seem to create these adverse effects. We offer an explanation why and conclude with a discussion of the policy implications of these findings.

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I. INTRODUCTION

For the layperson and some politicians, the question "Does aid lead to growth?" seems to have a patently obvious answer. Is it not a fact that in poor countries, schools need blackboards and text books, dispensaries are short of medicines, and roads do not get the regular repair they need to be passable? Would not more of each of these lead to better education, healthcare, and transport, and thence to economic growth? Is it not obvious then that foreign aid helps countries grow by providing the resources necessary to buy textbooks, medicines, and regular repair?

Yet the literature on the impact of aid on long-run growth is mired in controversy, with claims and counter-claims about aid effectiveness.[1] Two recent findings make this issue particularly intriguing. First, a number of studies (Easterly (2003), Easterly, Levine, and Roodman (2004), Hansen and Tarp (2001), Roodman (2004), and Rajan and Subramanian (2005)) suggest that even in countries with good policies, there is no robust association between aid and growth (in contrast to the conclusion of earlier influential work by Burnside and Dollar (2000)). If valid, these recent studies suggest that corruption and mismanagement cannot be the only reasons why aid does not boost growth. Second, even though certain kinds of aid may have impact in the short term (see Clemens, Radelet, and Bhavnani, (2004)), the effects are not discernible in the longer term. This suggests that while some aid does reach the recipient and is actually spent on useful things – at least things that lead to short run growth – it is still a puzzle why aid does not have robust and discernible longer-term effects on growth.

In fact, Roodman (2004) concludes after testing the robustness of a number of prior results on aid effectiveness that "if there is one strong conclusion from this literature, it is that on average aid works well outside the tropics but not in them." Though there are plausible stories for why growth may be higher outside the tropics, the rationale for the effectiveness of aid outside the tropics (or its ineffectiveness within) is unclear – suggesting that this result is simply a way of separating countries where aid has worked from countries where it has not, rather than an explanation. What then could be the explanation?

It may well be that resources are not everything. While schools may require textbooks or classrooms, what they may also need is for teachers to show up regularly. By focusing on easy-to-provide resources or salaries, the process of giving aid may miss the harder-to-provide incentives that are critical (see Banerjee et. al., (2004) for examples in relation to education, Kremer et. al. (2004) for health-related interventions, and World Bank (2004) for illustrations of this point based on a wide variety of experiences in the developing world).

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[1] There is a voluminous literature on aid effectiveness. Some key papers, in addition to those cited below, include, Alesina and Weder (2000), Bauer (1971), Collier and Dollar (2002), Dalgaard, Hansen, and Tarp (2004), Friedman (1958), Hansen and Tarp (2000), Roodman (2004), Svensson (2003), and World Bank (1998).

While the construction of classrooms may spur economic activity in the short run, in the long run the critical impetus that good education provides to growth will be missing. Nevertheless, that resources are not everything does not imply they are nothing. What offsets the undoubted benefits of additional resource flows to a resource-poor country? Also, if program design and incentive design are key, why do countries with better policies and governance not seem to use aid any better?

A second explanation is that aid has detrimental long-term effects. Even though aid resources are initially additional to the budget, eventually the country becomes more lax on raising tax revenues, and more aid is necessary just to keep the country on even keel. If that aid is not forthcoming, and if the country's tax raising mechanisms have atrophied, all the short-term beneficial effects of aid may dissipate over the long run as it creates a culture of dependency (see Azam, Devarajan, and O'Connell, 1997, Adam and O'Connell, 1999, and Gupta et. al., 2004). A related explanation is that by expanding a government's resource envelope, aid relaxes their need to explain their actions to citizens, which may have a corrupting influence even on the best intentioned of governments in the long run. In sum, aid may not have discernible effects in the long run because it weakens institutions, and this offsets any positive effect it may have in the short run.

Macroeconomists, however, worry about yet another effect, an effect that is insidious because every single aid project adds to it, but it is not directly discernible in any of them. It is the macroeconomic effect on a country's competitiveness of large windfalls and their associated spending (also referred to in the literature as "Dutch Disease"). There are at least two possible channels through which this might work, depending largely on the exchange rate regime, although the ultimate effect is similar.

First, in a flexible exchange regime, aid inflows push up the nominal exchange rate rendering the traded goods sector uncompetitive if wages in that sector do not adjust downwards. Second, in a fixed exchange rate regime, when aid inflows are spent on domestic goods, they will push up the price of other critical resources that are in limited supply domestically– such as skilled workers or coastal land -- thus rendering industries that face international competition and depend on that resource uncompetitive. While the channels are different, the ultimate effect of aid inflows is the same, namely they result in an overvalued real exchange rate, and hence have adverse consequences on the growth of the traded goods sector in recipient countries.

We have identified two ways aid might have adverse effects in the long run; aid may weaken institutions and aid may adversely affect a country's competitiveness. Our focus will be on the latter, leaving the former to a companion paper.

But how do we go about gathering evidence? Given the limited number of countries, all of which have been studied extensively in aggregate cross-country regressions, researchers have despaired of finding conclusive evidence from such studies. Instead, many development researchers have turned to randomized evaluations of specific programs. These are very useful in suggesting what can work, but by their very nature cannot offer lessons for their

wider applicability. Increased confidence that a specific intervention like providing malaria bed nets reduces the incidence of malaria does not imply that all countries given the funds will undertake the specific intervention or that the intervention will not subtract scarce resources from other necessary activities. Micro-studies cannot take into account leakage or spillover effects, which as the discussion above suggests, may be important to understanding why aid might have little net effect on growth.

Detailed case studies of specific country experiences can suggest channels through which aid may or may not help (World Bank 1998), but they do not indicate what consequences might be systematic. In our view, cross-country studies provide valuable additional information to both micro-studies and case studies, so there is little alternative to them. We want, however, to try and add to cross-country studies by turning from asking *whether* aid enhances growth to asking *why* aid does not do so. In doing so, we will attempt to address some of the methodological limitations of standard cross-country analyses.

We take two complementary tacks. First, we examine in detail a specific channel through which aid might influence growth. Second, we look at the effects of another unrequited capital flow, remittances, and ask whether it has similar effects to aid, and if not, why not.

We follow the methodology in Rajan and Zingales (1998), who suggest that one way to check whether a channel is at work is to see whether industries that might be most affected by a channel grow relatively faster in countries where that channel is likely to be more operative.

So, for instance, we know that poor countries are most likely to have a comparative advantage in producing in labor-intensive industries like textiles. These are also sectors where an aid-induced increase in the real exchange rate could be most harmful. If we want to check that aid inflows inhibit competitiveness, we can examine whether labor-intensive industries grow relatively slower in countries with high aid inflows. In doing so, we can correct for country (and industry) effects so our findings are not as much hostage to particular regression specifications as the traditional cross-country regression. This method allows us to exploit within-country differential effects (growth differences between labor-intensive industries and non-labor-intensive industries) and a country treatment effect (aid inflows) to examine the effect of aid.

We find strong evidence consistent with aid undermining the competitiveness of the labor-intensive (or traditional exporting) sectors. In particular, in countries that receive more aid, labor-intensive (or traditional exporting) sectors grow slower relative to capital-intensive (or non-exporting) sectors. As a result of the reduced competitiveness, employment growth in these sectors is slower, and these sectors account for a lower relative share of the economy in countries that get more aid.

We also examine the effects of the overvaluation of the real exchange rate more directly. We find that aid and overvaluation are positively correlated across countries, with the relationship becoming stronger over time. Furthermore, overvaluation is correlated with the

exogenous components of aid, suggesting that aid does cause overvaluation. Finally, the exogenous (aid-related) component of overvaluation induces the same relative pattern of growth of the labor-intensive and exportable sectors in countries as does the exogenous component of aid.[2]

Of course, it may be that aid boosts the average growth rate of all industries while reducing the relative growth rate of the labor-intensive industries. Put another way, it may be that a little Dutch Disease is the price one has to pay for the overall beneficial effects of aid on manufacturing. Unfortunately, our basic methodology, where we include country fixed effects, does not allow us to estimate the effect of aid (a variable invariant within a country) on average industry growth in a country. However, by dropping the country fixed effect, and including aid as an explanatory variable (along with other traditional country-level explanatory variables for growth), we can estimate the direct effects of aid. The estimated effect is significantly negative, suggesting that aid reduces not just the relative growth rate of labor-intensive industries, but also the average growth rate of manufacturing industry.

Why might Dutch Disease affect overall manufacturing growth rates? Not only could export-oriented labor-intensive sectors be the source of productivity improvements or learning, these industries, which by necessity are on the efficiency frontier, could also be a strong political force pushing for sensible government policy to ensure their continued competitiveness. Their shrinkage could have wider repercussions. Indirect evidence for the impact of the traded sector on long-run growth comes from results that show that exchange rate overvaluation has a negative impact on long-run growth (Easterly and Levine, 2003; and Acemoglu et. al. 2003). In a similar vein, Hausman et. al. (2004) show that a real depreciation can ignite growth spurts that could last up to 10 years.

Chart 1 offers another piece of suggestive evidence. We compute a measure the concentration of manufacturing in labor intensive industries.[3] In Chart 1, we plot the average per capita growth rate for the period 1980-2000 against this ratio for 1990 (a similar pattern emerges for the ratio in 1980) and we find a strong positive association: countries with a relatively high share of manufacturing in labor-intensive industries have grown faster. For example, emerging Asia and South Asia, which have grown fast on average between 1980 and 2000 have tended to have higher concentration of manufacturing in labor-intensive industries (about 0.6) than aid-dependent Africa (about 0.47). The suggestive point is that

[2] We also find that aid causes its adverse effects, at least in part, through an increase in the wages of skilled workers, which is one source of overvaluation.

[3] We divide industries into those that are above the median industry in our sample in labor intensity and those that are below the median. We then compute the share of total value added of above-median labor intensity industries and divide by the share of total value added of below-median labor intensity industries, country by country. This is our concentration measure.

aid, by shrinking the size of labor intensive exporting sectors, may diminish an ingredient that has been present in the growth of a number of successful countries.
Having established the effect of aid, we also examine the effects of remittances as a robustness check on our results. Aid shares with remittances the feature that they are both "unrequited" in the sense of being flows that do not have to be fully repaid. However, we find that remittances do not appear to have adverse effects on competitiveness in receiving countries.

It is well possible that remittances are spent differently, thus reducing their impact on the real exchange rate. For instance, remittances are more likely to be spent on hiring additional unskilled help to build an extension to a house than on hiring doctors or managers to deliver social services. Thus remittances may not increase the demand for scarce resources as much as aid (or may simultaneously contribute to their supply).

But another explanation for our findings is simply that people don't send remittances if the exchange rate is overvalued. Not only is the real value of the remittance diminished if the recipient country has an overvalued exchange rate, but it may be better to send goods, especially if the overvalued exchange rate is accompanied by exchange restrictions. We do find that remittance flows are far smaller to countries with overvalued exchange rates. Thus while remittances may be similar to aid in their tendency to create overvaluation, they persist only in countries that have the macroeconomic management to avoid overvaluation -- the endogenous response of remittances may prevent the pernicious side-effects that we see emerging for aid. This is yet more evidence that aid inflows are special.

This paper is structured as follows. In section II, we investigate empirically the channels through which aid might affect competitiveness using a cross-country cross-industry framework. In section III, we examine the effects of other transfers such as remittances. In section IV, we offer some concluding remarks.

II. AID AND GROWTH: A CHANNEL

A. THEORY

We focus on an important reason why aid could hurt growth – that it reduces the competitiveness of the traded goods sector and results in a re-allocation of resources away from it and towards the non-traded sector. There are at least two possible channels through which this might work, depending largely on the exchange rate regime. First, aid inflows could push up the price of some critical resources that are common to both the traded and non-traded goods industries. For example, aid could be spent on fees to contractors, as well as salaries to engineers, doctors, teachers, civil servants, and aid administrators. Because the non-traded goods industries (or the social sector) does not have external competition, it can raise output prices to compensate for the higher wages. But if the tradable sector competes in the same pool for its managers and foremen, then this sector whose output prices are fixed by foreign competition will lose competitiveness and profitability.

The second channel is that in a flexible exchange regime aid inflows may also push up the nominal exchange rate (for example when the central bank sells the aid inflows in the domestic foreign exchange market), rendering the traded goods sector uncompetitive if wages in that sector do not adjust downwards. These two effects are not mutually exclusive—they lead to the same ultimate effect of a real exchange rate appreciation. Another way of putting it is that in either case, the traded sector becomes uncompetitive and shrinks, but whether this happens in a more or less inflationary environment for wages and prices depends on the exchange rate regime.

Aid inflows do not make these effects inevitable. The more aid is spent on traded goods (imported capital goods, foreign consultants) or goods that are not in limited supply (unskilled labor) and/or is accompanied by domestic fiscal adjustment, the less likely will wages be bid up to an excessive degree and the less likely will the real exchange rate appreciate.[4]

B. Empirical strategy

We use the methodology in Rajan and Zingales (1998) to test the hypothesis that aid might reduce the competitiveness of the traded goods sector. They suggest that one way to check whether a channel is at work is to see whether industries that might be most affected by a channel grow differentially (faster or slower depending on the nature of the effect) in countries where that channel is likely to be more operative. The industry characteristic we are interested in is tradability, the channel is real exchange rate overvaluation, and countries that get more aid are likely to be the ones where the channel is most operative.

If we had data on a number of tradable and non-tradable sectors, and could rank these according to some measure of tradability, we could test whether the output of the tradables sector grew faster than nontradables in countries that received more aid. But we have sectoral data only for the manufacturing sector, which is by and large entirely tradable. So, instead of exploiting the variation across sectors in terms of their tradability (which the data do not allow us to do), we exploit the variation in their labor costs. The rationale for this relates to the Dutch disease channel, which operates through wages. If aid does indeed lead to an increase in wages, then sectors that have greater labor costs should be affected more. We measure labor costs (which we can also call labor-intensity) as the *average across the countries in our sample* of the share of labor compensation to value-added in each industry.

We can also test for the competitiveness channel in a different but related manner. Note that the concern with competitiveness typically tends to focus on the export sector. Insofar as developing countries have comparative advantage in labor-intensive sectors, our measure of labor-intensity described above is also likely to be a proxy for exportables. So one way of checking whether our use of labor-intensity is robust is to define a measure proxying for the

[4] Prati et. al. (2003) find an adverse competitiveness impact of aid based on cross-country regression analysis.

"exportability" of a sector and then test whether in countries that receive more aid, more exportable sectors grow more slowly. The labor-intensity measure has the advantage over the exportability measure that it is less prone to endogeneity bias, and hence our core specification will use the former measure.

Turning next to the outcome measure, we are interested in how the share of a sector in economic activity changes over time. A reasonable proxy is the growth in value added for that sector over the period. We use as the outcome measure the annual average rate of growth of nominal value added deflated by a country-level price deflator (see Appendix 1 for details).[5]

The estimation strategy is then to run regressions of the form:

$Growth_{ij}$ = Constant + $\zeta_{1.....m}$*Country Indicators + $\zeta_{m+1....n}$* Industry Indicators + ζ_{n+1}*(Industry i's share of manufacturing in country j in the initial period) + α (Aid to country j* Labor Intensity of industry i) + ε_{ij} ----(1)

where $Growth_{ij}$ is the annual average rate of growth of value added of industry i in country j over a ten-year period, obtained by normalizing the growth in nominal value added by the GDP deflator; $\zeta_{1.....m}$ are the coefficients of the country fixed effects; $\zeta_{m+1....n}$ are the coefficients of the industry fixed effects; ζ_{n+1} is the coefficient of the initial period share of industry i in total value added in country j (which controls for convergence-type effects). The coefficient of interest for us is α. It captures an interaction between a country-specific aid variable and an industry's labor intensity. We posit that countries that receive more aid should see a more negative impact in industrial sectors that are more labor-intensive, so that we would expect the coefficient α to be negative.

The chief advantage of this strategy is that by controlling for country and industry fixed effects, the problem of omitted variables bias or model specification, which seriously afflicts cross-country regressions, is diminished. Essentially, we are making predictions about within-country differences between industries based on an interaction between a country and industry characteristic.

Because we examine growth differentials between industries within countries, the results are less sensitive to the rationale for why aid is given. For example, even if aid is given only to countries that display poor growth, inter-industry growth differentials should not be seriously affected. However, suppose low growth is primarily because countries have overvalued exchange rates, and aid is systematically given to countries that have more overvalued exchange rates. In this case, we might be attributing to aid what is actually driven by trade and exchange rate policies. Instrumentation allows us to disentangle the effect of aid from that due to policies. We instrument for aid based on strategic, historic, and cultural links

[5] Given that we include country fixed effects in the estimation, the deflation is not strictly necessary.

between donor and recipient (described briefly in Appendix 2 and elaborated in greater detail in Rajan and Subramanian (2005)).[6]

C. Data and their sources

The data and their sources are described in detail in Appendix 1. The data for industry value added growth comes from the *Industrial Statistics Database* (2003) of the United Nations Industrial Development Organization (UNIDO). The data are at the 3-digit level of the International Standard Industrial Classification of All Economic Activities (ISIC, Revision 2) and are available for the 1980s and 1990s.

In order to keep the sample as large as possible without compromising our focus on long-term growth, we include all those sectoral observations where the average growth rate can be computed over at least a seven-year period in the decade. On this criterion, the UNIDO database has data for 47 developing countries for the 1980s and 31 countries for the 1990s.

But our methodology is most applicable when we include broadly similar countries with roughly similar levels of technological endowments. Therefore, we want to exclude, but using an objective criterion, richer emerging market countries such as Malta, Cyprus, Hungary, Korea, Kuwait, and Singapore and focus on the poorer ones. At the same time, we do not want to exclude recipients of significant aid. Our final sample therefore comprises countries that receive aid greater than 1 percent of GDP or are low-income countries according to World Bank definitions in the initial year of the sample.

Our sample thus has 33 countries for the 1980s and 15 countries for the 1990s. The UNIDO database contains data on 28 industries in these countries.[7]

In Table 1, we present means, medians, and standard deviations for the key variables in the analysis. The median growth rate of value added for industries is 1.5 percent for the decade 1980-90 and 3.7 percent for 1990-2000. The average aid inflow into the 33 countries in the 1980-1990 sample is 5.8 percent of GDP and the average aid inflow into the 15 countries in the 1990-2000 sample is 5.0 percent of GDP. The average labor intensity of industries is about 40 percent and 36 percent in the two decades, respectively.

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[6] Given the rationale for instrumenting, all we need are predetermined instruments that correlate with aid but not with a country's policies. We do not need to ensure our instruments are uncorrelated with growth.

[7] Appendix 1 lists all countries for which data were available as well as those countries that were included in the econometric analysis.

D. Results for Aid and Labor Intensity

We present our core specifications in Table 2A. In columns 1-3, we present the estimates for the 1980s and in columns 4-6 the corresponding estimates for the 1990s. In column 1 we report the OLS estimate, in column 2 the "reduced form" OLS estimate in which the instrument for the aid term is entered directly in the second-stage regression instead of the aid term itself, and in column 3, the "pure" IV specifications. In all cases, the labor intensity interaction term is negative and statistically significant at the 5 percent confidence level.[8] The value added by labor-intensive industries grows relatively more slowly than for other industries in countries that receive more aid.

The IV coefficient is larger than the OLS coefficient, indicating that measurement error (which would tend to "attenuate" the coefficient estimate toward zero) might be as great a problem with the OLS estimation as endogeneity. It is worth noting that our core result does not depend on instrumentation, although the latter increases the magnitude of the measured competitiveness effect. The results for the 1990s in columns 4-6 are broadly similar.

What can we say about magnitudes? Since all the regressors are normalized, the interaction term measures the impact of a one standard deviation increase in aid in country j and a one standard deviation increase in the labor intensity of the industry on the growth rate of industry i in country j.[9] Take 2 countries, Zambia and Honduras that are roughly one standard deviation (about 4.2 percentage points) apart in terms of aid to GDP. And take 2 industries, apparel and rubber products that are also about 1 standard deviation (about 8.4 percentage points) apart in terms of their labor share. Using our core IV specification in column 3, the apparel sector should grow 3.5 percent per year slower relative to glass and products in Zambia than in Honduras. This is quite substantial when compared with the average growth rate in the sample of 1.8 percent.

We depict this core result in a non-parametric form in Chart 3. We divide the industries into two groups (above- and below-median) depending on their labor share. Next we estimate for each country the difference in average growth in annual value added between above- and below-median industries. We plot this difference against the aid-to-GDP received by each country. Chart 3 shows that the difference in growth is negatively related to the aid received by a country, and no single country drives it.

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[8] Charts 2A and 2B depict the core result for the two decades. Also, the significance of the coefficient in the reduced form regression (columns 2 and 5 of Tables 2A and 2B) is reassuring (see Angrist and Krueger, 2001).

[9] All standard errors in the second-stage regressions reported in this section are corrected to take account of the fact that the instrument used in the first-stage is estimated. The procedure used to make this correction is the same as that in Frankel and Romer (1999).

In Table 2B, we present our first-stage results corresponding to the core specifications for the 1980s and 1990s. The instruments are very precisely estimated (the coefficients are always significant at the 1 percent level), corresponding to an F-statistic of 23.5 and 27.5, respectively for the two decades, which are large enough that the problems of finite sample bias of instrumental variables estimation and of weak instrumentation are unlikely to be serious (see also Frankel and Romer, 1999).

We subject the core IV results to a number of robustness checks. In Tables 3A (for the 1980s) and 3B (for the 1990s), we check for robustness to samples. For brevity, we will restrict our discussion to the results for the 1980s. The results for the 1990s are broadly similar. In column 1, we exclude outliers, and the coefficient is still negative and significant. Since the datasets are inherently very noisy, we used an alternative method of dealing with outliers. In column 2 we winsorize the data by setting all values of the left and right hand side variables that are above (below) the value of the 99^{th} (1^{st}) percentile to the value of the 99^{th} (1^{st}) percentile observation. In column 3, we do the same, except that we winsorize at the $95^{th}/5^{th}$ percentile. In column 4, we exclude three countries—Israel, Poland, and Thailand--that might be considered different from the rest of the sample. Again, the coefficient is significant and broadly unchanged in magnitude.

In addition to these checks, we perform a battery of tests, involving the deletion of one country and one industry at a time (available from the authors upon request). For the 1980s, this amounts to checking robustness to 60 different sub-samples and to 43 different sub-samples for the 1990s. In all (103) cases, the coefficients were statistically significant, with coefficient values remaining broadly unchanged. This is reassuring about the robustness of our core result.

In Table 4A and B, we perform other robustness checks. In column 1, we restrict the sample to countries whose labor-intensity values are highly correlated with the average across countries,[10] and in column 2, we use initial rather than contemporaneous labor shares. In column 3, we check if our results are robust to instrumentation. Rajan and Subramanian (2005) construct two sets of instruments for aid. In our core specifications in Table 2, the instruments exploit only one source of exogenous cross-country variation, namely the traditional or strategic relationships between donors and recipients of aid. In column 3, we use their second set of instrument, which exploits an additional source of exogenous variation, namely the donor's budgetary position which determines how much aggregate aid it can give (see Rajan and Subramanian (2005) for details). The results are qualitatively similar to our core result in all cases.

[10] This procedure may drop the countries in which labor is most distorted, either because of aid flows themselves pushing up wages and moving labor intensity away from the average or because of other distortions. This is why one cannot use such correlations to examine whether the maintained assumption of a technological propensity to use labor is valid across countries. However, it is a useful robustness check.

In columns 4 and 5, we present results based on clustering of the standard errors, first by industry then by country. Essentially, this recognizes that observations may not be independent. The coefficient estimates continue to be significant both in the 1980s and 1990s.
In the rest of this section, we will examine variants of the basis specification, which will deepen our understanding of the basic result. We will examine the effects of different types of aid, of alternative measures of tradability, and of using a measure of real growth. We will then show that the effects of aid appear to be because of real exchange rate overvaluation, and that aid does not just adversely affect the relative growth rate of certain industries but also the average growth rates of all industries in a country receiving aid. We end the section with additional supporting evidence for the precise channel we focus on.

E. Different Types of Aid

So far our measure of aid has been total aid. We need to check whether our results are robust to alternative definitions of aid, and whether there is any pattern when we do so. In particular, aid should have less of an impact on domestic wages or on the exchange rate the more it is spent on imports. Ideally, if we could measure ex ante the import-intensity of the usage of different types of aid, we could test whether the coefficient on the aid-labor intensity interaction term varies according to the type of aid. In practice, it is very difficult to do this, not least because aid is fungible. However, there seems to be a widely shared view that technical assistance is very import-intensive because it largely goes as payments to foreign consultants. We exploit this fact by testing whether the adverse competitiveness effect is mitigated in the case of technical assistance.

In column 1 of Table 5A, we use a measure of total aid without the technical assistance component. We continue to find evidence of a negative impact on labor-intensive industries. And, consistent with the prior that technical assistance is more import-intensive, the magnitude of the coefficient is larger than in the core specification (-4.1 percent compared to -3.5 percent). In column 2, we introduced technical assistance as the aid measure and find that the coefficient, though still negative and significant, is smaller in absolute value (-2.6 percent). Nevertheless, the coefficient is still negative and significant, which may, in part, be explained by the fact that technical aid may proxy for all forms of aid or that there is fungibility between types of aid.

Clemens et al. (2004) argue that one should distinguish between aid meant to produce results in the short term, and aid meant to produce results in the long term. From our perspective, however, the horizon over which spending should have effect is immaterial, what matters is when spending occurs. This then offers a natural robustness check of our results. Using the Clemens et al. database, which the authors kindly shared with us, in column 3 we include aid that is likely to have impact in the short term and in column 4, aid that is likely to have an impact in the long term. In both columns, the estimate of the interaction term is negative and is statistically significant. In Table 5B, we repeat this exercise for the 1990s and the results are very similar.

These results suggest that while there may be some differences in the impact depending on the type of aid, all forms of aid yield the same robust result of an adverse competitiveness effect.

F. Alternative Competitiveness Indicators: Exportability

As we argued earlier, variation in labor-intensity allows us to test whether the wage channel associated with Dutch disease is at work. An alternative way of testing for Dutch disease is to see whether export sectors are differentially affected by aid.

We note two points. First, it is possible that during the period under analysis, import restrictions (especially if they take the form of quantitative restrictions) in aid receiving countries could have rendered import competing industries non-tradable. Thus a focus on export sectors would be tantamount to focusing on tradables. If, however, there were no import restrictions in the countries being studied, this second test for the competitiveness effect amounts to asking whether aid depresses export sectors more than other tradable (mostly import-competing) sectors. This is not inconsistent with Dutch disease, which makes the explicit prediction that tradable sectors as a whole will be affected more than nontradables, but also implies that within tradables, labor intensive sectors (exportables in developing countries) will be affected more than other sectors (usually importables).

Turning to implementation, since actual export performance reflects a variety of factors including trade policy and geography, it is hard to argue that the ratio of actual exports to output from an industry is exogenous, that is, it only reflects the technological degree of its exportability. For this reason, we have used labor-intensity which is likely to be exogenously (technologically) determined, in our core specification. Nevertheless, if we measured exportability across a spectrum of developing countries, rather than country-by-country, this could be a reasonably exogenous measure

We create two proxies for exportability. First, we create an indicator variable for each industry, which takes the value 1 if the industry has a ratio of exports to value added (averaged across all developing countries) greater than the median across industries.[11] The indicator takes the value zero otherwise. Call this indicator "exportability1."[12] The other indicator variable is simply the ratio of exports to value added for an industry that is constructed by averaging across a spectrum of developing countries. Call this measure "exportability2."

When we estimate our basic regression specification, but with labor intensity replaced by the two exportability indicators, we find that exportable industries grew slower in countries that

[11] We obtained these data from Nicita and Olarrega (2001).

[12] The correlation between the labor-intensity and exportability measure is 0.34, suggesting that they are capturing similar things.

receive more aid both in the 1980s and the 1990s (Table 6), with three out of four coefficients statistically significant at standard levels and the fourth close to significant. These results show that aid directly affects the relative fortunes of the export sector in developing countries, and provide additional confirmation of the core result that labor-intensive sectors are affected by aid.

G. Appropriate measure of quantities

The share of nominal value added of an industry in nominal manufacturing value added reflects its economic importance – its share of value created at market prices. Given that common deflators like a GDP deflator or the growth rate of the manufacturing sector are absorbed by the country fixed effect, our dependent variable could also be seen as the growth in a sector's nominal share. If the external sector's indirect contribution to economic growth (through increases in productivity and increases in foreign exchange earnings) depends on its nominal share, then this is the dependent variable we want to focus on for our analysis.

However, it is also interesting to examine the growth in real value added. This poses a special problem: the increase in nominal value added in each sector is composed of two parts; the increase in real value added and the increase in output prices in that sector. We have already argued that if the effect we have hypothesized is at work, aid increases the rate of output price increases in the non-traded, capital-intensive industries relative to the traded, labor-intensive industries. This means that if we want to compute the growth in real value-added in an industry, we have to deflate nominal growth in that industry by a industry-specific price deflator, rather than the country-wide, industry-invariant GDP deflator.

Unfortunately, we do not have an industry-specific price index. So, we look at another measure of real activity, employment. In Table 7, the dependent variable is employment growth in the industry in the relevant decade. The aid interaction term has the predicted negative sign and is significant for the 1980s (columns 1-3). The results are marginally weaker for the 1990s (columns 4-6) with all the interaction coefficients negative and all of them significant, except for the interaction with the exportability2 indicator.

In sum then, both nominal and real measures of value added growth suggest that growth is lower in labor intensive and exportable sectors when a country receives more aid.

H. Aid and Overvaluation

To summarize, we have shown the link between aid and the relative growth of the labor-intensive and exportable industries. We claim that this arises because of the effect of aid on the real exchange rate, which in turn adversely affects the labor-intensive and exportable industries. This then leads to the natural question: how can we be sure that our core result does indeed reflect such an overvaluation effect and what is the connection between aid and overvaluation. To answer these questions we can bring to bear more direct evidence relating to real exchange rate overvaluation.

A measure of real exchange rate overvaluation is obtained using the method in Frankel (2004). A country's real exchange rate (measured as the price level of GDP relative to the United States from the Penn World Tables) is regressed on its level of per capita income in PPP terms. This regression captures the Balassa-Samuelson relationship, which suggests that a country's real exchange rate will appreciate over time as its productivity in the traded sector, and hence level of income, rises. The residual in the regression – the difference between the predicted exchange rate (which is a measure, albeit imperfect, of the equilibrium rate) and the actual rate -- is a measure of overvaluation.[13, 14]

In Figures 4A-4C, we plot the exchange rate overvaluation against the aid inflows received by the countries in our regressions sample for three time periods 1970-1980, 1980-1990, 1990-2000. As is clear from the figures, aid inflows and overvaluation are positively correlated, with the correlation becoming stronger in more recent decades, This suggests that the cumulative effect of aid on real exchange rate overvaluation builds up over time, as one might expect.

To see if overvaluation is "causing" the impact on the labor-intensive and exportable sectors sectors, in the baseline regression, we interact the degree of overvaluation with labor intensity (instead of interacting aid and labor-intensity). The results are reported in Table 8 columns 1 and 3. The coefficient of the interaction term in the OLS regression is significant and negative as predicted for the 1980s and 1990s.

But can we say something stronger about the relationship between aid and overvaluation? If aid did "cause" overvaluation, we would expect to see a strong relationship between the "exogenous" determinants of aid and overvaluation. This then calls for instrumental variable estimation where we use our instrument for aid (Appendix 2) in explaining the degree of overvaluation in the first stage, and use the predicted overvaluation in the interaction in the second stage. In the first-stage regression we find that the coefficient of the exogenous component of aid on overvaluation is very strong and highly significant.[15] This provides

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[13] In our analysis, we measure the average overvaluation for each country for the period 1980-90 as the average of the values for 1980 and 1990. In other words, we estimate the Balassa-Samuelson relationship separately for 1980 and 1990, and average the overvaluation estimates over these two periods. We repeat this procedure for 1990 and 2000 to obtain the average overvaluation for 1990-00.

[14] This procedure is similar to that used by Dollar (1992) to calculate the misaligment of the real exchange rate. It yields plausible estimates for the degree of over/under valuation. For example, most CFA countries seem to be over-valued in 2000 but also seem to be more undervalued in 1990 before the devaluation of the CFA franc. The estimates for many east Asian countries as well as China also seem plausible.

[15] In the first-stage regressions, the coefficient on the instrument is .283 and .369 for the 1980s and 1990s, respectively, with corresponding t-values of 4.31 and 6.69.

additional evidence in favor of the causation running from aid to overvaluation. The IV results for the second stage (columns 2 and 4) suggest that the component of overvaluation caused by exogenous aid inflows does hurt competitiveness.[16]

The pattern of the interaction coefficients is also similar to those in Tables 2A and 2B; that is, the IV estimations yield significantly greater coefficients than OLS estimations and the coefficient for the 1980s is greater than that for the 1990s.

I. Relative or absolute effects?

The difference-in-difference methodology only allows us to measure relative growth rates of different sectors. Specifically, our result shows that labor-intensive and exportable sectors grow slower than capital-intensive and non-export sectors in countries receiving aid. Coupled with the other checks we have provided, this offers plausible evidence that the channel we have postulated – exchange rate overvaluation as a result of aid inflows – is at work. We believe this is a step forward in the literature. However, our methodology thus far does not allow us to say whether aid causes labor-intensive sectors to decline or whether aid depresses the average growth of the manufacturing sector. To see this more clearly, consider the basic model represented in equation 1.

$Growth_{ij}$ = Constant + $\zeta_{1.....m}$*Country Indicators + $\zeta_{m+1....n}$* Industry Indicators + ζ_{n+1}*(Industry i's share of manufacturing in country j in the initial period) + α (Aid to country j* Labor Intensity of industry i) + ε_{ij}

The derivative of growth in industry i in country j with respect to aid is *not* α times labor-intensity (i). It is (θ + α times labor-intensity (i)) where θ is an unidentified effect of aid on the average growth rate of industries in a country, which is absorbed in the country fixed effects, $\zeta_{1.....m}$. Our results shed no light on θ, so we cannot sign the impact of aid on labor-intensive sectors.

One way to estimate θ is to drop the country fixed effects and substitute them with aid as well as range of country-level variables that should affect average growth rates for industries in countries. In departing from the Rajan-Zingales methodology, we open ourselves to the standard criticism of cross-country regressions -- that we may not have included all the country-level variables that might matter. But in return for this, we obtain a rough estimate of the average effect of aid. In Tables 9A and 9B, we depict the results for the 1980s and 1990s, respectively. Moving across the columns, we add variables that are typically considered important determinants of average growth, including initial income per capita, trade policy,

[16] We obtained very similar results when we used the Easterly and Levine (2003) measure of overvaluation. We also obtained similar results when we interacted the aid measure with the exportability indices (available from the authors). The coefficients in Tables 2 and 9 suggest that a 1 percentage point increase in the ratio of aid to GDP has the same impact on labor-intensive sectors as a 3.8 percent overvaluation.

institutional quality, life expectancy, and geography. What is remarkable is that we find a robust negative effect for the aid coefficient while the coefficient of the aid-labor share interaction term remains negative and significant as in the core specification.

Taking column 6 as the most general specification, we find that a one percentage point increase in the ratio of aid-to-GDP reduces average annual manufacturing sector growth (when evaluated at the mean value of labor intensity) by 0.45 percent in the 1980s and 0.52 percent in the 1990s.

J. Labor or Capital?

Before we end this section, we offer two other pieces of evidence in support of our interpretation of the basic interaction results. The satisfied reader can skip to the next section.

Since our methodology can only pick up relative growth rates of different industries, one immediate alternative explanation of the basic interaction between labor intensity and aid is that industries with a high need for capital (and thus lower labor share) grow relatively faster as a country receives aid inflows. This would be a relatively benign explanation of our findings, suggesting that aid relieves financing constraints and increases the overall resource envelope.[17]

There are three reasons why this is an unlikely explanation. First, as we have seen, the effect of aid on the average growth of manufacturing industries in a country is negative, not consistent with the benign "aid is financing" explanation. Second, we have also seen the adverse effects of aid on the relative growth rates of labor intensive industries (or exportable industries – unlike labor intensity, exportability is a less direct proxy for industries that are not capital intensive) comes through an overvaluation of the real exchange rate. Again, this is inconsistent with the benign explanation.

Third, if the capital-enhancing channel is at work (rather than the real-exchange-rate-overvaluation channel), countries that receive more aid should see an increase in the output of industries that are more dependent on external financial resources. To control for any possible effect of aid in alleviating financing constraints, we include the interaction of aid inflows with the Rajan and Zingales (1998) variable that measures the dependence of a particular industry on external resources to finance investment. Thus, if aid increases the resource envelope available to the industrial sector, we should expect the coefficient of this interaction term to be positive. Moreover, if the availability of capital rather than labor intensity is what matters, the coefficient on the labor intensity-aid interaction term should fall in magnitude when we include the financial dependence-aid interaction.

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[17] The simplest example of aid providing more resources to the private sector would be one where the government reduces its borrowing from the banking system in response to the aid, and hence makes more credit available to the private sector.

In Table 10, we estimate the coefficient of the financial dependence interaction separately in columns 1 and 3 and together with the labor intensity interaction in columns 2 and 4. Only the labor intensity interaction is statistically significant. Therefore, it does not appear that the channel through which the relative growth rates are affected by aid is via capital-intensive sectors getting increased access to resources. The magnitudes of the labor intensity-aid interaction coefficients are similar to those estimated in columns 3 and 6 of Table 2A, suggesting that labor intensity is not an indirect proxy for resource intensity.[18]

K. Channels of Influence: Skilled and Unskilled Wages

One channel through which the overvaluation might come about is that the increased spending as a result of aid inflows increases prices in the non-traded goods sector. As a result, wages of worker-types that are in limited supply, and also used by the non-traded sector, will be pushed up. If these worker-types are also used by the traded sector, its profitability will be squeezed. Similar arguments can be used for other commonly used scarce resources such as coastal land.

Note that this is not the only channel through which profitability can be squeezed. With flexible exchange rates, the adverse competitiveness effects of aid inflows can result from an appreciation of the nominal exchange rate. However, to the extent that exchange rates were largely fixed in the 1980s (see Reinhart and Rogoff (2002)), and we find adverse effects of aid inflows on competitiveness in the period 1980-1990, we should also see the wage channel in operation.

Skilled labor is likely to be in limited supply in developing countries. Therefore, in the 1980s, we should see wages in industries using more skilled labor growing faster than wages in industries using less skilled labor in countries that receive more aid.

Unfortunately, unlike labor intensity, we do not have data on skills or education levels needed in particular industries in developing countries. These data however are available for the United States (Rajan and Wulf, 2004). With the critical assumption that relative skill requirements carry over even to developing countries (that is, an industry like professional and scientific equipment (ISIC 385) with about 87 percent of workers with at least a high school degree in the United States is likely to require better educated workers even in a developing country than an industry like apparel (ISIC 322) which has only about 55 percent of workers with at least a high school education), we can check which type of labor is affected by aid.

[18] Another proxy for reliance on external finance may be the average size of establishments, with small (and thus young) establishments requiring more external finance than large establishments. When we include the average size of establishments in an industry in a country interacted with aid inflows, the coefficient for the labor intensity aid interaction still remains unchanged (estimates available from the authors).

In a regression of the annual average growth of dollar wages per employee in a sector in a country over the 1980s against initial wages (to correct for sectoral convergence), country and industry fixed effects, and an interaction term between the skill index of sector i and aid received by country j, the interaction effect is positive and significant.[19] This implies that average wages in sectors that use more of the relatively scarce skilled labor do indeed grow much faster in countries that receive more aid, suggesting that skilled wages are being driven up by aid. At least one of the channels through which overvaluation might come about is indeed at work.

Before concluding this section, one point is worth noting. A broad pattern discernible in the data is that the results on the adverse competitiveness impact of aid are stronger—both in magnitude and statistical significance—for the 1980s. In the core specification in Table 2, the coefficient in the 1990s is about two-thirds that in the 1980s even though the average value added growth is almost twice as high in the 1990s. A similar pattern is present when the alternative measures of exportability—see Table 7 and 8—are used.

Some of this may be because policy changes affect our ability to identify tradable industries with our measures. For instance, if greater opening up in the 1990s made import competing industries more tradable in developing countries, then aid would have adverse competitiveness effects even in these industries. As a result, our exportability measures would identify only a subset of tradable industries in the 1990s, and we would find an attenuation of the measured loss of competitiveness of exportable industries vis-á-vis other industries (because the latter also include import-competing industries that also lose competitiveness) as a result of aid. The fact that we also see an attenuation of the labor intensity interaction suggests this cannot be the entire explanation.

This then suggests the possibility that the macroeconomic management of aid inflows improved in the 1990s, perhaps as a result of the move towards greater trade openness and greater exchange flexibility, or it may be that aid was better utilized so that supply side effects limited real appreciation. Thus it may well be that the adverse effects of aid on competitiveness were attenuated in the 1990s because of better management. Nevertheless, the measured adverse effects, while smaller, are still present.

[19] The coefficient of the aid-skill intensity of industry interaction term is 0.10 (standard error of 0.004) and significant at the 1 percent level.

III . THE EFFECTS OF REMITTANCES[20]

A. Remittances and Competitiveness

We now turn to the question of whether the effects of aid are unique or are shared by other unrequited transfers such as remittances. We continue to use our difference-in-difference methodology, only changing the flow from aid to remittances from abroad.[21]

In columns 1-5 of Table 11, we test for different specifications to see whether remittances have an impact on competitiveness and on alleviating financing constraints in the 1990s.[22] None of the interaction coefficients in the table is statistically significant.

Research on remittances is still at an early stage, so explanations of the contrasting effects of remittances and aid must be considered tentative. But a large body of micro-evidence suggests that remittances can have a positive effect on entrepreneurship, supply of labor, and increased investment (see IMF 2005, for a survey). Even so, it is somewhat puzzling that remittances do not give rise to the kinds of adverse competitiveness effects resulting from aid inflows.

One possible explanation is that remittances are spent on items like adding a room to a house, which in turn increases the demand for plentiful unskilled labor or for imported cement, and thus does not lead to real exchange rate appreciation. Certainly, the data suggest that remittances do not lead to higher wage growth in industries that are more skilled labor intensive (estimates not reported).

However, a more compelling explanation comes from examining the pattern of remittance inflows and exchange rate overvaluation. As Chart 5A suggests, countries that had overvalued exchange rates in the 1990s received significantly lower remittances. The same pattern is seen when we plot remittances in the 1990s against exchange rate overvaluation in the 1980s (Chart 5B).

It is plausible that emigrants stop sending funds as they see an overvalued exchange rate, and as they find it cheaper to send goods directly. It is also likely that overvalued exchange rates

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[20] Although in this paper, we consider the impact of remittances, it is possible to extend our methodology to other flows such as natural resources, foreign direct investment, and other capital flows.

[21] Unlike the case of aid, where instrumentation is important to disentangle the impact of aid from that of policy, for remittances, which are private flows, instrumentation is less imperative.

[22] Reliable data for remittances are available for a reasonable sample of countries only for the 1990s. Hence we restrict our analysis to this period.

in many of these countries were accompanied by exchange controls and dual exchange rates, which IMF 2005 finds are deterrents to remittances.

Whatever the reason, we may have an explanation of the apparent puzzle. The reason that remittances do not lead to a significant loss of competitiveness is that they tend to dry up if an exchange rate starts getting overvalued. Thus, it is only countries that through astute macroeconomic policies manage to keep the real exchange rate competitive in the face of remittances that continue to attract them. The endogeneity of remittances offers one explanation of why we do not see remittances adversely affecting the growth of tradable industries. Aid, by contrast, might even increase if exchange rate overvaluation leads to poor economic performance, thus further exacerbating the problem.

IV. CONCLUDING REMARKS

In this paper, we provide evidence that aid inflows have systematic adverse effects on the relative growth of labor intensive and export sectors, and this is probably because aid causes exchange rate overvaluation. We can also assert with some confidence that aid depresses the growth rate of the manufacturing sector in a country. Despite the fact that for many aid-receiving countries the manufacturing sector might be less important currently than agriculture, it is worth remembering that that was also true for many of the fast-growing countries when they first embarked upon development. Manufacturing exports provided the vehicle for their growth take-off, so any adverse effects on such exports should prima facie be a cause for concern about the effects of aid on growth. Also, taking both the relative and average growth effects of aid together, we have shown the employment generating labor-intensive sectors grow far more slowly in countries that receive more aid. This should be a source of concern for those who see aid as an instrument to reduce inequality, for labor intensive sectors are the ones that can absorb the poor and landless who leave agriculture.

None of this establishes that aid harms overall growth, or that the adverse effect on manufacturing competitiveness are not offset by other beneficial effects on social welfare. At the very least, though, our findings raise the bar on the quality of government spending: aid has to be spent really effectively so that the productivity or welfare improvements from increased public investments can offset any dampening effects from a fall in competitiveness. More generally, however, it is perhaps more fruitful to move beyond the inconclusive debate of whether aid is effective, and focus on specific ways it can be made to work better, by better understanding the reasons that might impair or enhance its effectiveness.

There are ways the effect of aid inflows on real exchange rates can be mitigated, for example through sterilization. These methods are no panacea – for instance, sterilization can push up the domestic interest rate and crowd out private investment (Berg et, al., (2005)).

Nevertheless, they deserve consideration, with the beneficial effects of absorbing aid inflows being carefully weighed against the costs of the side effects that absorption entails. [23] Finally, our paper suggests we should not lose sight of issues like how much aid can be handled to begin with, how the aid should be delivered, and when. At the very least, our work suggests a poor country need not have the absorptive capacity to take in a massive quantity of aid up front without it creating substantial adverse effects on the country's export competitiveness. Far better to build up the supply of the other critical resources that will be needed to use aid effectively such as a larger body of skilled workers. Yet education and training of the unskilled, even if undertaken on a war footing, takes time. A massive expansion of the resources devoted to education can create the very adverse effects in the short term that it will hopefully avoid in the longer term. A better solution might be to start slow but to accelerate as capacity is built. Even though the world is impatient for the poor to develop, development, especially when mandated from the outside, may require patience.

[23] Put another way, some of the ways to mitigate the adverse effects of aid inflows on the real exchange rate could also reduce potential benefits. For example, aid inflows could simply be stored as reserves and not spent, but this would not be particularly helpful for a resource-starved country.

Table 1. Summary Statistics

A. Across Countries and Industries in the Base Sample

Variable Names		Mean	Median	Standard deviation	Minimum	Maximum	Number of observations
Growth Rate of Value Added $_{ij}$	1980s	0.018	0.015	0.119	-0.457	0.754	712
	1990s	0.030	0.037	0.108	-0.530	0.337	357
	All	0.022	0.026	0.116	-0.530	0.754	1069
Initial Industry Share $_{ij}$	1980s	0.044	0.022	0.067	0.00005	0.562	712
	1990s	0.041	0.020	0.064	0.00007	0.525	357
	All	0.043	0.021	0.066	0.00005	0.562	1069

B. Across Industries in the Base Sample

Variable Names		Mean	Median	Standard deviation	Minimum	Maximum	Number of observations
Labor Share $_{i}$	1980s	0.403	0.424	0.084	0.193	0.515	28
	1990s	0.358	0.365	0.088	0.174	0.515	28
Financial Dependence $_{i}$		0.243	0.219	0.336	-0.451	1.140	27
Institutional Intensity Variable $_{i}$		0.863	0.873	0.066	0.702	0.961	21
Skill index $_{i}$		0.823	0.851	0.080	0.622	0.939	22

C. Across Countries in the Base Sample

Variable Names		Mean	Median	Standard deviation	Minimum	Maximum	Number of observations
Aid to GDP $_{j}$	1980s	0.058	0.046	0.042	0.008	0.176	33
	1990s	0.050	0.036	0.042	0.006	0.139	15
Remittances to GDP $_{j}$	1990s	0.043	0.038	0.048	0.002	0.191	15
Real Exchange Rate Overvaluation $_{j}$	1980s	-0.029	-0.015	0.353	-0.667	0.664	32
	1990s	-0.107	-0.011	0.392	-0.721	0.821	15

Table 2A. Impact of Aid on Competitiveness: Core Specification
(*Dependent variable is annual average rate of growth of value added of industry i in country j*)

	(1) 1980s OLS	(2) 1980s OLS (reduced form)	(3) 1980s IV	(4) 1990s OLS	(5) 1990s OLS (reduced form)	(6) 1990s IV
Initial industry share(ij)	-0.026***	-0.027***	-0.026***	-0.015***	-0.013**	-0.016***
	[0.005]	[0.005]	[0.005]	[0.005]	[0.006]	[0.006]
Aid/GDP(j)* Labor share(i)	-0.012**	-0.020***	-0.035**	-0.015***	-0.012**	-0.022**
	[0.005]	[0.006]	[0.014]	[0.006]	[0.005]	[0.009]
Observations	712	712	712	357	357	357
R-squared	0.41	0.42	0.38	0.33	0.32	0.32
Average growth rate			0.018			0.030

All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. In columns (2) and (5), the instruments for the endogenous variables rather than the endogenous variables themselves are included as regressors. Instruments for the 2 endogenous variables are described below and explained in detail in Appendix 2.

Table 2B. Impact of Aid on Competitiveness, 1st Stage Regressions
(Dependent variable is Aid/GDP (j) Labor share (i))*

	(1) 1980s	(2) 1990s
Fitted Aid (j)* Labor share (i)	0.591***	0.540***
	[0.122]	[0.103]
Observations	712	357
R-squared	0.25	0.33

All standard errors are robust and reported below coefficient estimates. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects, which along with the other regressor, are omitted for presentational simplicity. The dependent variable (which is the endogenous regressor in the second-stage) is the product of aid/GDP in country j times labor share (i), which refers to the share of wages in valued added in industry i averaged over all countries. Fitted aid is obtained from estimating a gravity-type model of bilateral aid flows as described in Appendix 2. Columns 1 and 2 correspond respectively to the second-stage regressions in columns 3 and 6 in Table 2A.

Table 3A. Impact of Aid on Competitiveness: Robustness to Samples, 1980s
(*Dependent variable is annual average rate of growth of value added of industry i in country j***)**

	(1) Outliers excluded	(2) "Winsorize" sample at 1% and 99%	(3) "Winsorize" sample at 5% and 95%	(4) Exclude higher income countries
Initial industry share (ij)	-0.039***	-0.024***	-0.020***	-0.026***
	[0.008]	[0.005]	[0.004]	[0.005]
Aid/GDP (j)*Labor share (i)	-0.032**	-0.031**	-0.023**	-0.028*
	[0.015]	[0.013]	[0.010]	[0.014]
Observations	683	712	712	658
R-squared	0.42	0.41	0.43	0.4

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described below and explained in detail in Appendix 2. In column (1), outliers are excluded according to the Hadi (1992) procedure. In column (2), values of all the left- and right- hand side variables that are greater (smaller) than the 99th (1st) percentile are set at the 99th (1st) percentile. This is repeated in column (3), except that the cut-off is set at the 95th (5th) percentile. In column (4), three higher income countries—Israel, Thailand, and Poland—are excluded.

Table 3B. Impact of Aid on Competitiveness: Robustness to Samples, 1990s
(*Dependent variable is annual average rate of growth of value added of industry i in country j***)**

	(1) Outliers excluded	(2) "Winsorize" sample at 1% and 99%	(3) "Winsorize" sample at 5% and 95%
Initial industry share (ij)	-0.042***	-0.016***	-0.017***
	[0.011]	[0.006]	[0.005]
Aid/GDP (j)*Labor share (i)	-0.020**	-0.022**	-0.015*
	[0.010]	[0.009]	[0.008]
Observations	338	357	357
R-squared	0.33	0.32	0.37

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described below and explained in detail in Appendix 2. In column (1), outliers are excluded according to the Hadi (1992) procedure. In column (2), values of all the left- and right- hand side variables that are greater (smaller) than the 99th (1st) percentile are set at the 99th (1st) percentile. This is repeated in column (3), except that the cut-off is set at the 95th (5th) percentile.

Table 4A. Impact of Aid on Competitiveness: Other Robustness Checks, 1980s
(*Dependent variable is annual average rate of growth of value added of industry i in country j*)

	(1) Low labor share correlation countries excluded	(2) Initial labor share used	(3) Alternative instrument for aid	(4) Standard error clustered by industry	(5) Standard error clustered by country
Initial industry share (ij)	-0.026***	-0.025***	-0.026***	-0.026***	-0.026***
	[0.006]	[0.005]	[0.005]	[0.005]	[0.005]
Aid/GDP (j)*Labor share (i)	-0.031**	-0.026**	-0.035**	-0.035**	-0.035**
	[0.013]	[0.013]	[0.015]	[0.016]	[0.017]
Observations	636	712	712	712	712
R-squared	0.41	0.39	0.38	0.38	0.38

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described below and explained in detail in Appendix 2. In column (1), countries whose labor share parameters are not significantly correlated with the average labor share parameter for the whole sample are excluded. In column (2), the initial value of the labor share rather than the average during the time period is used. In column (3), a different instrument is used for aid which is described in the text. In columns (4) and (5), standard errors are clustered, respectively, by industry and country.

Table 4B. Impact of Aid on Competitiveness: Other Robustness Checks, 1990s
(*Dependent variable is annual average rate of growth of value added of industry i in country j*)

	(1) Low labor share correlation countries excluded	(2) Initial labor share used	(3) Alternative instrument for aid	(4) Standard error clustered by industry	(5) Standard error clustered by country
Initial industry share (ij)	-0.015***	-0.015***	-0.016***	-0.016***	-0.016***
	[0.006]	[0.006]	[0.006]	[0.005]	[0.005]
Aid/GDP (j)*Labor share (i)	-0.020**	-0.016*	-0.020**	-0.022**	-0.022*
	[0.010]	[0.009]	[0.009]	[0.008]	[0.011]
Observations	313	357	357	357	357
R-squared	0.34	0.32	0.32	0.32	0.32

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described below and explained in detail in Appendix 2. In column (1), countries whose labor share parameters are not significantly correlated with the average labor share parameter for the whole sample are excluded. In column (2), the initial value of the labor share rather than the average during the time period is used. In column (3), a different instrument is used for aid which is described in the text. In columns (4) and (5), standard errors are clustered, respectively, by industry and country.

Table 5A. Impact of Aid on Competitiveness: Robustness to Measures of Aid, 1980s
(*Dependent variable is annual average rate of growth of value added of industry i in country j***)**

	(1) 1980s Aid variable excludes technical assistance	(2) 1980s Aid variable is technical assistance	(3) 1980s Aid variable is short impact aid	(4) 1980s Aid variable is long impact aid
Initial industry share (ij)	-0.026***	-0.026***	-0.023***	-0.028***
	[0.005]	[0.005]	[0.006]	[0.005]
Aid/GDP(j)* Labor share (i)	-0.041**	-0.026***	-0.069**	-0.041***
	[0.019]	[0.008]	[0.035]	[0.014]
Observations	712	712	712	712
R-squared	0.35	0.42	0.21	0.38

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described in Appendix 2. Short and long-impact aid are from Clemens et. al. (2004).

Table 5B. Impact of Aid on Competitiveness: Robustness to Measures of Aid, 1990s
(*Dependent variable is annual average rate of growth of value added of industry i in country j***)**

	(1) 1990s Aid variable excludes technical assistance	(2) 1990s Aid variable is technical assistance	(3) 1990s Aid variable is short impact aid	(4) 1990s Aid variable is long impact aid
Initial industry share (ij)	-0.016***	-0.016***	-0.016***	-0.015***
	[0.006]	[0.006]	[0.006]	[0.006]
Aid/GDP(j)* Labor share (i)	-0.022**	-0.018**	-0.025**	-0.021**
	[0.010]	[0.008]	[0.010]	[0.009]
Observations	357	357	357	357
R-squared	0.32	0.32	0.32	0.32

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described in Appendix 2. Short and long-impact aid are from Clemens et. al. (2004).

Table 6. Impact of Aid on Competitiveness: Robustness to Alternative Competitiveness Indicators

(*Dependent variable is annual average rate of growth of value added of industry i in country j*)

	(1)	(2)	(3)	(4)
	1980s	1990s	1980s	1990s
Initial industry share(ij)	-0.022***	-0.017***	-0.025***	-0.014**
	[0.006]	[0.006]	[0.005]	[0.006]
Aid/GDP(j)* Exportability1 index (i)	-0.052**	-0.047**		
	[0.023]	[0.020]		
Aid/GDP(j)* Exportability2 index (i)			-0.077	-0.038*
			[0.051]	[0.021]
Observations	712	357	712	357
R-squared	0.4	0.32	0.38	0.31

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Exportability1 index (i) is a dummy that takes a value of 1 if industry (i) has a ratio of exports to value added that exceeds the industry median value for a group of developing countries. Exportability2 index (i) is the ratio of exports to value added for industry (i) calculated as the average for a group of developing countries. Instruments for the endogenous variables are described in Appendix 2.

Table 7. Impact of Aid on Competitiveness: Effect on Employment, 1980s

(Dependent variable: annual average rate of growth of employment of industry i in country j)

	(1)	(2)	(3)	(4)	(5)	(6)
Initial employment(ij)	-0.007**	-0.009***	-0.006**	-0.009**	-0.009*	-0.007*
	[0.003]	[0.003]	[0.002]	[0.004]	[0.005]	[0.004]
Aid/GDP(j)* Labor share(i)	-0.021***			-0.012*		
	[0.008]			[0.007]		
Aid/GDP(j)* Exportability1 index(i)		-0.036**			-0.031**	
		[0.017]			[0.015]	
Aid/GDP(j)* Exportability2 index (i)			-0.071*			-0.018
			[0.040]			[0.012]
Observations	633	633	633	332	332	332
R-squared	0.29	0.3	0.25	0.27	0.26	0.24

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Exportability1 index (i) is a dummy that takes a value of 1 if industry (i) has a ratio of exports to value added that exceeds the industry median value for a group of developing countries. Exportability2 index (i) is the ratio of exports to value added for industry (i) calculated as the average for a group of developing countries. Instruments for the endogenous variables are described in Appendix 2.

Table 8. Effect of Real Exchange Rate Overvaluation on the Growth of Value Added

(Dependent variable is decade average of annual growth rate of value added of industry i in country j)

	(1) 1980s OLS	(2) 1980s IV	(3) 1990s OLS	(4) 1990s IV
Initial industry share(ij)	-0.027***	-0.027***	-0.015***	-0.017***
	[0.005]	[0.007]	[0.005]	[0.006]
Overvaluation(j)* Labor Share(i)	-0.017***	-0.077**	-0.017***	-0.034**
	[0.004]	[0.035]	[0.006]	[0.017]
Observations	702	702	357	357
R-squared	0.43	0.2	0.33	0.31

All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Overvaluation (j) refers to the degreee of overvaluation of country j's real exchange rate and its calculation is described in the text. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. In columns (2) and (4), the instruments for overvaluation are the same as those for the aid variable.

Table 9A. Absolute vs. Relative Effects, 1980s

(Dependent variable is decade average of the annual growth rate of value added of industry i in country j)

	1	2	3	4	5	6
Initial industry share (ij)	-0.023***	-0.023***	-0.024***	-0.027***	-0.027***	-0.027***
	[0.005]	[0.005]	[0.005]	[0.006]	[0.006]	[0.006]
Aid/GDP (j)* Labor share (i)	-0.034**	-0.028***	-0.028***	-0.025**	-0.025**	-0.025**
	[0.014]	[0.010]	[0.009]	[0.010]	[0.010]	[0.010]
Aid/GDP (j)	-0.017	-0.018**	-0.019**	-0.023***	-0.021**	-0.016*
	[0.013]	[0.008]	[0.008]	[0.009]	[0.008]	[0.009]
Initial Per Capita GDP (j)		0.013**	0.006	0.005	0	0
		[0.005]	[0.005]	[0.005]	[0.008]	[0.008]
Trade Policy (j)			0.027***	0.027***	0.027***	0.027***
			[0.005]	[0.006]	[0.006]	[0.006]
Institutional Quality (j)				0.003	0.002	0.001
				[0.005]	[0.005]	[0.005]
Life Expectancy (j)					0.008	0.007
					[0.006]	[0.007]
Geography (j)						0.016***
						[0.006]
Observations	712	702	702	650	650	650
R-squared	0.09	0.12	0.16	0.16	0.16	0.17

Table 9B. Absolute vs. Relative Effects, 1990s

(Dependent variable is decade average of the annual growth rate of value added of industry i in country j)

	1	2	3	4	5	6
Initial industry share (ij)	-0.019***	-0.019***	-0.020***	-0.022***	-0.020***	-0.020***
	[0.006]	[0.007]	[0.007]	[0.007]	[0.007]	[0.006]
Aid/GDP (j)* Labor share (i)	-0.023**	-0.022**	-0.021**	-0.017**	-0.018***	-0.017**
	[0.010]	[0.010]	[0.010]	[0.007]	[0.007]	[0.007]
Aid/GDP (j)	-0.045***	-0.044***	-0.042***	-0.040***	-0.023**	-0.020**
	[0.010]	[0.009]	[0.009]	[0.010]	[0.009]	[0.009]
Initial Per Capita GDP (j)		-0.014*	-0.024**	-0.027	-0.059***	-0.057***
		[0.008]	[0.010]	[0.017]	[0.019]	[0.019]
Trade Policy (j)			0.018**	0.018**	0.017**	0.023***
			[0.008]	[0.008]	[0.008]	[0.009]
Institutional Quality (j)				0.006	-0.015**	0.003
				[0.008]	[0.008]	[0.015]
Life Expectancy (j)					0.067***	0.061***
					[0.013]	[0.013]
Geography (j)						-0.019
						[0.012]
Observations	357	357	357	333	333	333
R-squared	0.15	0.17	0.19	0.21	0.28	0.28

The estimations in Tables 10A and 10B are based on instrumenting for both the aid variables, using the instruments described in Appendix 2. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include industry but not country fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. For details on the measures for trade policy, life expectancy, and geography, see Rajan and Subramanian (2005a). The institutional quality measure is from the ICRGE and is described in Rajan and Subramanian (2005b).

Table 10. Impact of Aid on Competitiveness: Is the Channel Labor or Capital?
(*Dependent variable is annual average rate of growth of value added of industry i in country j*)

	(1) 1980s	(2) 1980s	(3) 1990s	(4) 1990s
Initial industry share(ij)	-0.025***	-0.025***	-0.013**	-0.016***
	[0.005]	[0.005]	[0.006]	[0.006]
Aid/GDP(j)* Financial dependence(i)	0.003	0.016	-0.01	-0.004
	[0.010]	[0.011]	[0.010]	[0.011]
Aid/GDP(j)* Labor share(i)		-0.042***		-0.021**
		[0.013]		[0.009]
Observations	680	680	343	343
R-squared	0.41	0.38	0.32	0.33

All regressions based on IV estimations. All standard errors, reported below the coefficient estimates, are robust, and corrected for the fact that the instrument in the first-stage is estimated, using the procedure suggested in Frankel and Romer (1999). ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Aid/GDP (j) refers to the share of aid to GDP in country j averaged over the period. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Instruments for the endogenous variables are described in Appendix 2. Financial dependence (i) measures the dependence of an industry i on external finance and is from Rajan and Zingales (1998).

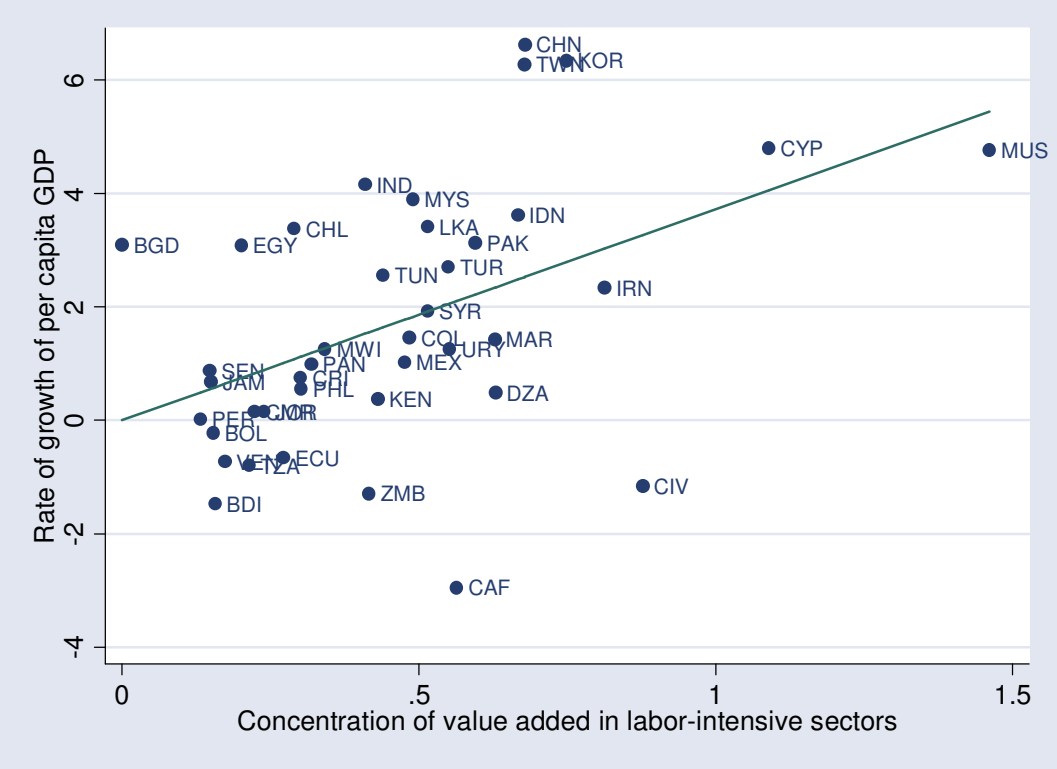
Table 11. Impact of Remittances, 1990s

(Dependent variable is decade average of annual growth rate of value added of industry i in country j)

	(1)	(2)	(3)	(4)	(5)
Initial industry share(ij)	-0.012**	-0.012**	-0.012**	-0.012**	-0.012**
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Remittances(j)* Financial dependence(i)	0			-0.001	0.001
	[0.007]			[0.008]	[0.006]
Remittances(j)* Labor share(i)		0.004		0.004	
		[0.006]		[0.007]	
Remittances(j)* Exportability index(i)			0.006		0.006
			[0.013]		[0.013]
Observations	343	343	343	343	343
R-squared	0.32	0.33	0.32	0.33	0.32

All estimations use ordinary least squares. Standard errors, reported below the coefficient estimates, are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. All regressors are standardized so that the coefficients measure the impact of a one standard deviation increase in the j variable times a one standard deviation increase in the i variable. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j. Labor share (i) refers to the share of wages in valued added in industry i averaged over all countries. Financial dependence (i) measures the dependence of an industry i on external finance and is from Rajan and Zingales (1998). Remittances (j) denotes the share of private remittances to GDP in country j averaged over the period. Exportability index (i) is a dummy that takes a value of 1 if industry (i) has a ratio of exports to value added that exceeds the industry median value for a group of developing countries.

Chart 1: Aggregate Growth and Concentration of Value-Added in Labor-Intensive Manufacturing



The rate of growth of per capita GDP is for the period 1980-2000. Concentration of value added in labor-intensive sectors is measured as the ratio of value-added in sectors that are above the median in terms of labor-intensity to those below the median. This variable is for the period 1990.

Chart 2A : The Core Specification: Conditional Correlation between Aid-Labor Interaction and Growth

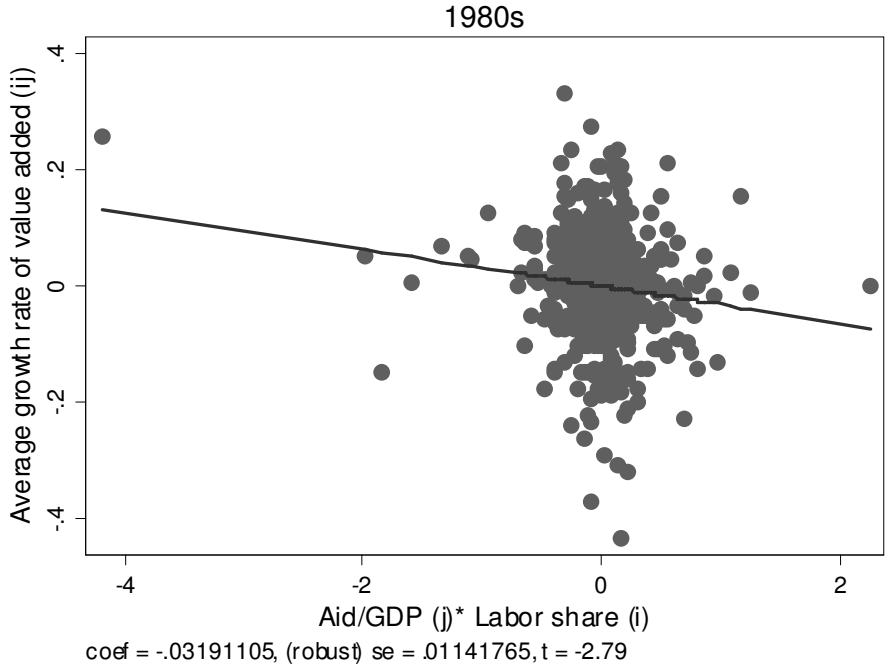
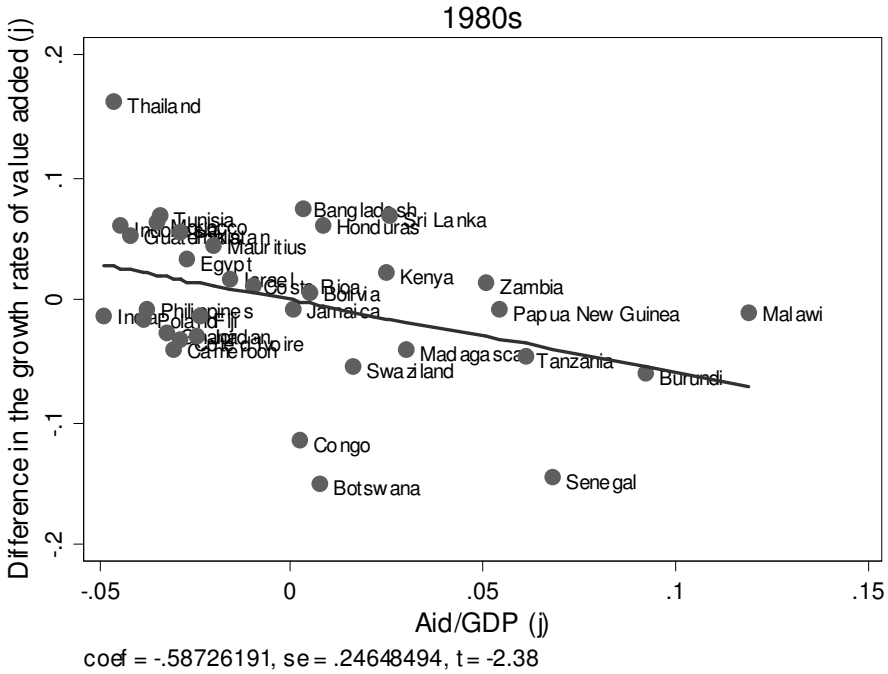


Chart 2B: The Core Specification: Conditional Correlation between Aid-Labor Interaction and Growth

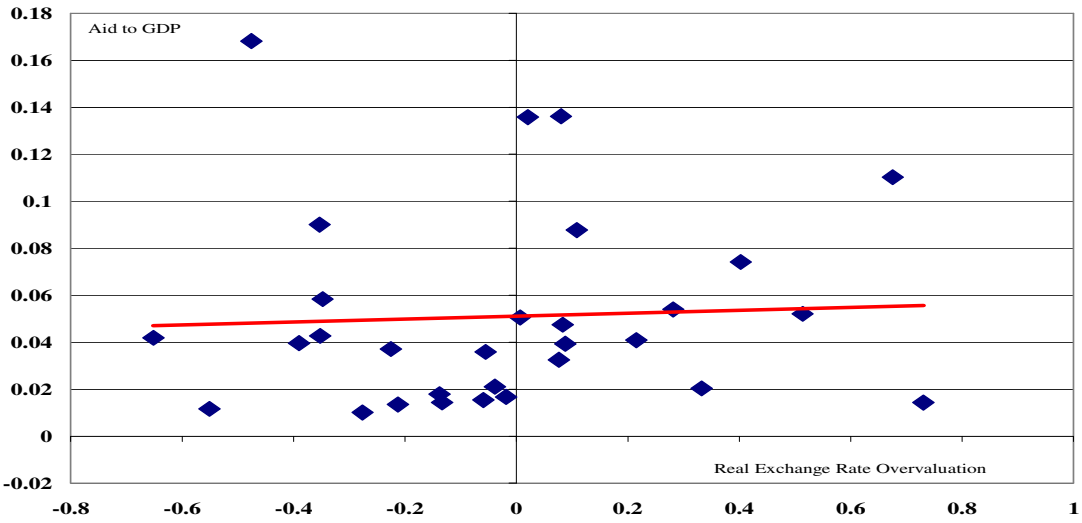
Chart 3: Non-Parametric Depiction of Core Result



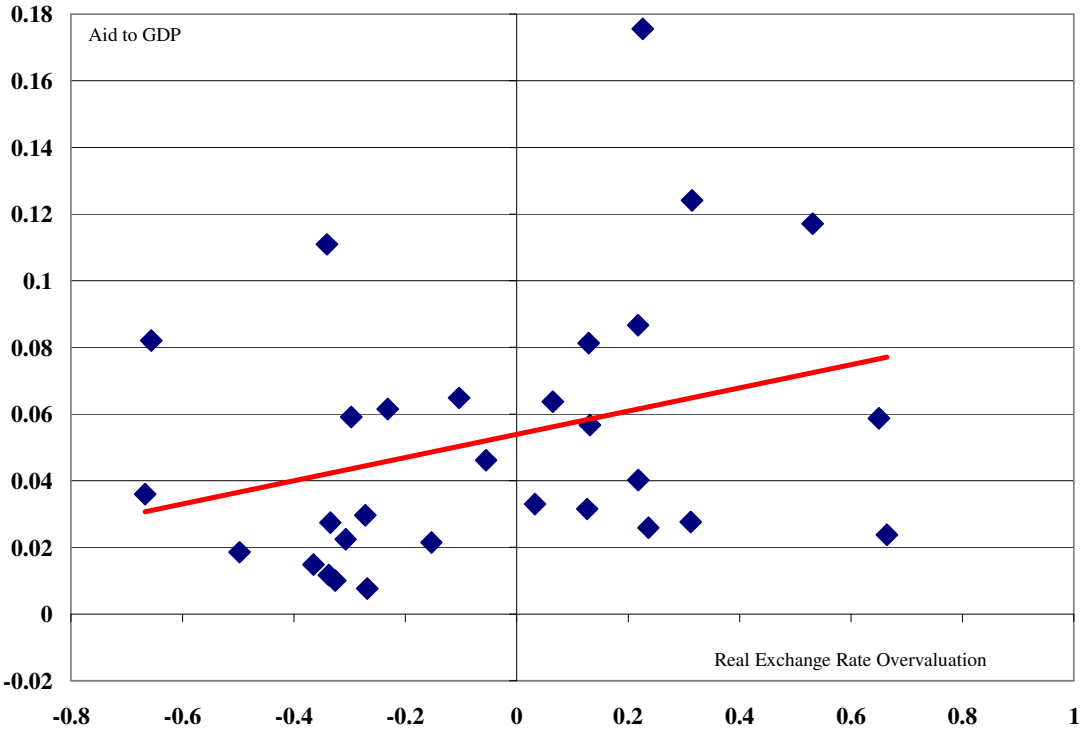
We divide the industries into two groups (above and below median) depending on their labor share. Next we estimate for each country the difference in average growth in annual value added between above and below median industries. The y-axis measures this difference, which is plotted against the aid-to-GDP received by each country (x-axis).

Chart 4: Exchange Rate Overvaluation and Aid

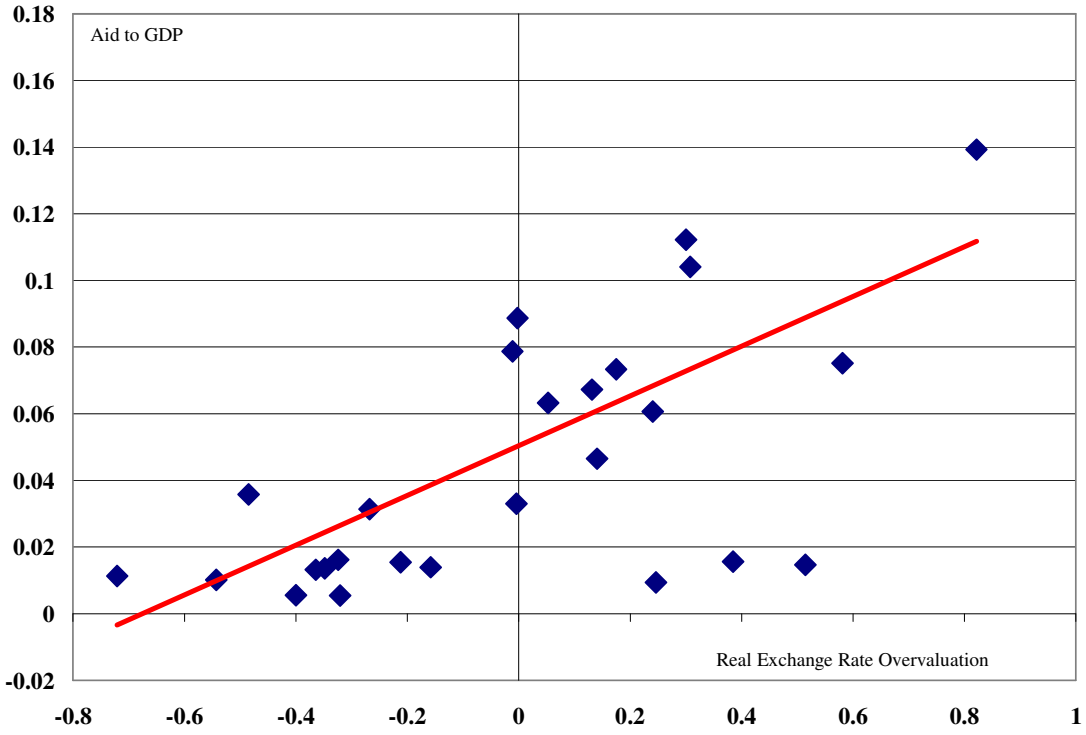
Panel A: 1970-80



Panel B: 1980-90

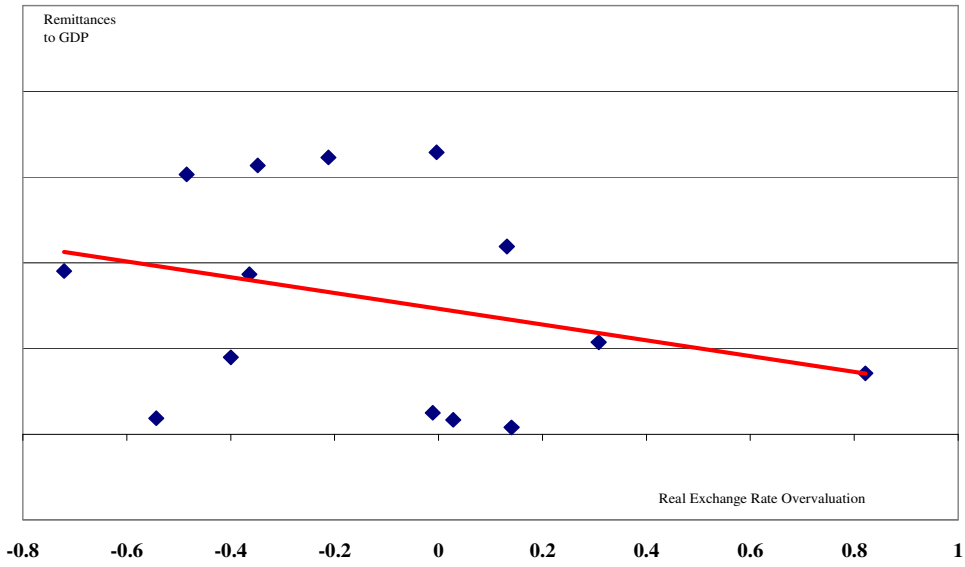


Panel C: 1990-00



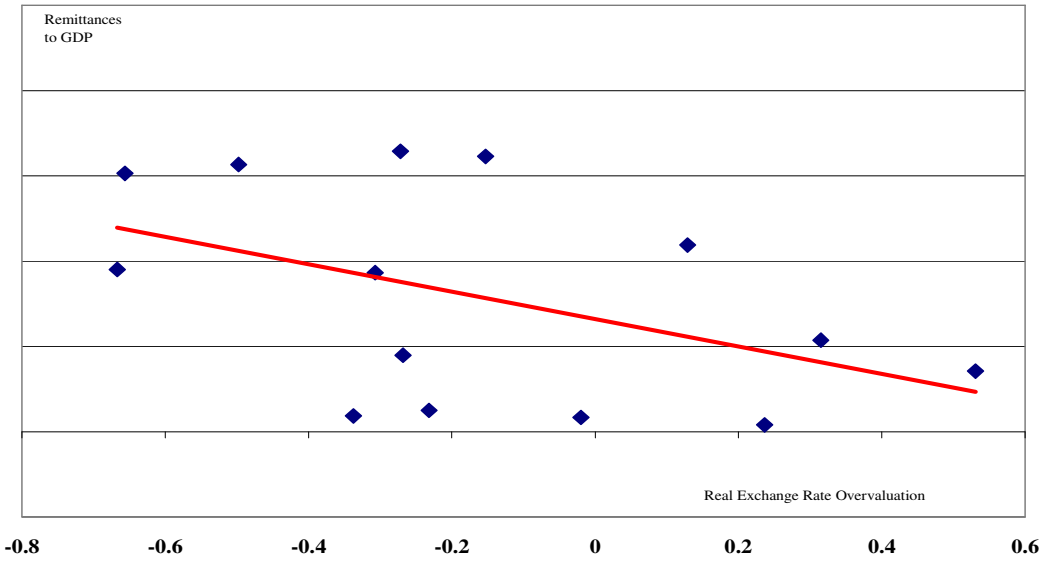
The definition of real exchange rate overvaluation is elaborated in the text.

Chart 5A: Remittances and Exchange Rate Overvaluation, 1990-2000



Note: Countries as in the sample of baseline regressions for the 90s, where observations are available, excluding Jordan.

Chart 5B: Remittances and Lagged Exchange Rate Overvaluation



Note: Countries as in the sample of baseline regressions for the 90s, where observations are available, excluding Jordan.

The definition of real exchange rate overvaluation is elaborated in the text. In Chart 5B, remittances are for the period 1990-2000, while real overvaluation is for the period 1980-90.

Appendix 1: Main Data Sources and Description

- *Industrial Statistics Database* (2003) of the United Nations Industrial Development Organization (UNIDO) for data on value added and labor share. Data are at 3-digit level of the International Standard Industrial Classification of All Economic Activities (ISIC, Revision 2). [UNIDO database].
- *World Development Indicators* (World Bank) for the data on aggregate manufacturing growth.
- *International Financial Statistics* (IMF) for data on remittances..
- *WITS (World Integrated Trade Solution) data (*World Bank) for tradability index.
- *OECD's Development Assistance Committee (DAC)* for data on aid.

Appendix Table 1A. List of Variables and Data Source

Variable Names	Description	Source
Growth Rate of Value Added $_{ij}$	Industry *i*'s annual growth rate of value added in country *j*, averaged over each decade.	UNIDO (2003).
Initial Industry Share $_{ij}$	Industry *i*'s share in country *j*'s total manufacturing value added at the beginning of the decade.	UNIDO (2003).
Labor Share $_{i}$	The labor share index for industry *i*, measured in terms of the ratio of wage to value added. The industry index was constructed by taking the average across years and countries for each industry and decade.	UNIDO (2003).
Financial Dependence $_{i}$	The measure of external financial dependence for all firms in industry *i* during the 1980s.	Rajan and Zingales (1998).
Overvaluation j	The degree of a country's real exchange rate overvaluation obtained in the following manner: residuals from a regression of a country's price level (relative to the United States) on its per capita income level are subtracted from the actual price level.	Authors' calculations.

Exportability1 index$_i$	A dummy that takes a value of 1 if industry *i* has a ratio of exports to value that exceeds the industry median value. For each industry, the average ratio of exports to value added was calculated using a group of developing countries.	WITS data, World Bank (at the 3-digit ISIC code).[24]
Exportability2 index$_i$	For each industry, it is the average ratio of exports to value added calculated for a group of developing countries.	WITS data, World Bank (at the 3-digit ISIC code).
Aid / GDP$_j$	The ratio of aid to GDP for country *j*.	OECD DAC database.
Rvamfgpc$_j$	The annual average rate of per capita value added growth in manufacturing.	World Development Indicators
Remittances$_j$	The ratio of remittances to GDP for country *j*.	IMF's International Financial Statistics

1. Growth Rate of Real Value Added:

The UNIDO dataset provides nominal value added both in terms of US dollars and local currency. The value added figure in US dollars is used for all regression analysis. The nominal value added (in current US dollars) was changed to a real value added (in constant Year 2000 US dollars), using the U.S. Producer Production Index provided by the International Monetary Fund's *International Financial Statistics* (IFS). This measure was, in turn, compared with the real value added in local currency to ascertain its reliability. [25] More

[24] *The Trade and Production Database* provides the WITS trade data at the 3-digit ISIC code. This database is available at: www.worldbank.org/research/trade

[25] Since local PPI was not available for all developing countries in IFS, alternative deflators needed to be used to construct the measure of real value added in local currency. Accordingly, whenever PPI was not available, we used the effective deflator constructed with the index of industrial production as in Rajan and Zingales (1998). This deflator is the ratio of the growth rate of nominal value added in the entire manufacturing sector (from the UNIDO database) to the growth rate of the index of industrial production (from IFS). Alternatively, a GDP deflator was used whenever these two series were not available.

specifically, we required the correlation between the two be higher than 0.75 to be included in our base sample.

We then calculated the average annual growth rate of real value added for industry *i* in country *j*, for the 1980s and 1990s. We calculated this wherever data existed for at least a seve-year period.

2. Average Labor Share:

For each decade, the average labor share for industry *i* was computed by taking the unweighted average of the labor share across developing (non-OECD) countries and across years for which the data on the growth rate of real value added and initial industry share was available in the UNIDO database.[26] Here, the labor share refers to the ratio of 'wages and salaries' to 'value added'.

Appendix Table 1B. Aid as a Percentage of GDP

1980s		1990s	
Malawi	17.56%	Tanzania	13.92%
Burundi	14.90%	Ethiopia	10.83%
Senegal	12.41%	Senegal	10.40%
Tanzania	11.71%	Bolivia	7.88%
Papua New Guinea	11.09%	Kenya	6.73%
Zambia	10.72%	Jordan	6.32%
Madagascar	8.67%	Cameroon	4.65%
Sri Lanka	8.20%	Sri Lanka	3.57%
Kenya	8.13%	Egypt	3.29%
Swaziland	7.24%	Morocco	1.55%
Honduras	6.48%	Philippines	1.37%
Botswana	6.37%	Tunisia	1.32%
Bolivia	6.15%	Mauritius	1.13%
Bangladesh	5.91%	Indonesia	1.02%
Congo	5.87%	Costa Rica	0.94%
Jamaica	5.68%	Panama	0.81%
Costa Rica	4.61%	Algeria	0.64%
Israel	4.03%	India	0.56%
Mauritius	3.59%	Russia	0.46%
Fiji	3.30%	Cyprus	0.34%
Jordan	3.15%	Uruguay	0.29%
Egypt	2.96%	Malaysia	0.28%

[26] 954 observations for forty countries are used for the 1980s, and 642 observations for twenty eight countries are used for the 1990s.

Cote d'Ivoire	2.77%	South Africa	0.27%
Pakistan	2.75%	Chile	0.25%
Cameroon	2.59%	Colombia	0.24%
Ghana	2.38%	Oman	0.18%
Tunisia	2.25%	Venezuela	0.05%
Morocco	2.14%	Korea	0.04%
Philippines	1.86%	Singapore	0.03%
Guatemala	1.48%	Kuwait	0.02%
Indonesia	1.17%	China (Hong Kong)	0.02%
Thailand	1.01%		
Malta	0.99%		
Panama	0.99%		
Cyprus	0.92%		
India	0.76%		
Barbados	0.73%		
Uruguay	0.37%		
Algeria	0.33%		
Chile	0.32%		
Colombia	0.30%		
Bahamas	0.19%		
Singapore	0.16%		
Korea	0.08%		
Venezuela	0.07%		
Iran	0.06%		
Kuwait	0.03%		

Countries with aid less than 1% of GDP are not included in the regression analysis because they included a number of emerging market and other countries such as Malta, Cyprus, and Kuwait that cannot be considered meaningful aid recipients. Peru is dropped from the base sample due to its unusually high level of growth rates in all industries in the UNIDO database (i.e. exceeds 100% in all sectors). Niger is dropped from the 1990s sample as the data contained an observation where the ratio of wages to value added exceeded 17. We also dropped observations when this ratio exceeded one (this resulted in 10 and 12 observations being dropped respectively from the sample for the 1980s and 1990s). In addition, the following countries' labor share parameters are not significantly correlated with the average labor share parameter: Bolivia, Egypt, Jordan, Mauritius and Zambia for the 1980s, and Egypt, Ethiopia, and Syrian Arab Republic for the 1990s.

Appendix Table 1C. Description of ISIC 3-digit Industries

ISIC Code	Industrial sectors	Average labor share 1980s	Average labor share 1990s	External financial dependence	Exportability 1 80s	Exportability 1 90s	Exportability 2 80s	Exportability 2 90s
311	Food products	0.36	0.32	0.14	1	0	1.25	1.18
313	Beverages	0.26	0.22	0.08	0	0	0.14	0.28
314	Tobacco	0.24	0.18	-0.45	0	0	0.23	0.66
321	Textiles	0.47	0.43	0.40	1	1	1.35	2.28
322	Wearing apparel, except footwear	0.51	0.46	0.03	1	1	2.46	2.21
323	Leather products	0.45	0.44	-0.14	1	1	2.65	9.57
324	Footwear, except rubber or plastic	0.49	0.48	-0.08	1	1	1.69	26.81
331	Wood products, except furniture	0.47	0.43	0.28	1	1	1.24	2.12
332	Furniture, except metal	0.50	0.51	0.24	0	0	0.46	1.50
341	Paper and products	0.39	0.32	0.18	0	0	0.36	0.62
342	Printing and publishing	0.51	0.41	0.20	0	0	0.13	0.22
351	Industrial chemicals	0.35	0.26	.	1	1	1.81	3.05
352	Other chemicals	0.36	0.28	0.22	0	0	0.79	1.13
353	Petroleum refineries	0.19	0.17	0.04	1	1	2.15	3.16
354	Misc. petroleum and coal products	0.30	0.31	0.33	1	0	16.77	1.94
355	Rubber products	0.42	0.38	0.23	0	0	0.61	1.74
356	Plastic products	0.36	0.34	1.14	0	0	0.46	1.30
361	Pottery, china, earthenware	0.46	0.43	-0.15	0	1	1.03	13.21
362	Glass and products	0.44	0.35	0.53	0	0	0.66	1.13
369	Other non-metallic mineral products	0.37	0.28	0.06	0	0	0.25	0.33
371	Iron and steel	0.38	0.31	0.09	0	1	0.81	2.01
372	Non-ferrous metals	0.33	0.29	0.01	1	1	3.52	4.70
381	Fabricated metal products	0.45	0.40	0.24	0	0	0.48	0.86
382	Machinery, except electrical	0.51	0.42	0.45	1	1	1.39	2.34
383	Machinery, electric	0.38	0.35	0.77	0	0	1.05	1.89
384	Transport equipment	0.47	0.43	0.31	1	1	2.68	3.38
385	Professional & scientific equipment	0.43	0.43	0.96	1	1	6.88	7.16
390	Other manufactured products	0.43	0.39	0.47	1	1	2.57	4.13

Appendix 2: Instrumentation Strategy

In this appendix, we briefly describe our instrumentation strategy, which is elaborated in greater detail in Rajan and Subramanian (2005). We exploit the fact that aid is often extended for non-economic reasons. Our main identification assumption is that strategically-motivated aid is unaffected by economic outcomes. This notion is far from new. A number of papers have used this to explain aid flows (Alesina and Dollar, 2000; and Barro and Lee, 2004). But we are not aware of papers that have taken the obvious next step of exploiting it to develop instruments for aid which could be used in aid-growth analyses.

We derive our aid instruments along the lines of Frankel and Romer (1999). Our basic model is as follows. Once a donor d decides on a total quantum of aid, it allocates it to a recipient r using the following equation:

$$\begin{aligned}\theta_{drt} &= \beta_0 + \beta_1 STRAT_{drt} + \beta_2 USISEG_{drt} + \beta_3 COMCOL_{dr} + \beta_4 COMCOLUKdr + \beta_5 COMCOLFRA_{dr} \\ &+ \beta_6 COMCOLSPA_{dr} + \beta_7 COMCOLPOR_{dr} + \beta_8 CURCOL_{drt} + \beta_9 COMLANG_{dr} + \upsilon_{drt} \\ &= \beta' Y_{drt} + \upsilon_{drt}\end{aligned} \qquad \text{--(1)}$$

where θ_{drt} is the share of donor country d's aid allocated to recipient r in year t, and Y is the vector of explanatory variables that capture different (non-economic) aspects of donor-recipient relationships.[27] The variables include: STRAT takes on a value of 1 if the donor and recipient are common members of, or signatories to, an Entente or Alliance in any given time period;[28] USISEG takes on a value of 1 for US-Egypt and US-Israel observations after the Camp David agreement; COMCOL a value of one if the recipient was ever a colony of the donor, COMCOLUK, COMCOLFRA, COMCOLSPA, and COMCOLPOR refer in turn to colonial relationships involving respectively the U.K. France, Spain and Portugal); CURCOL a value of one if there is a contemporaneous colonial relationship between donor and recipient; and COMLANG is a dummy that takes a value of one if the donor and recipient share a common language. A key identifying assumption is that none of the right hand side variables directly relates to growth in the recipient country.

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[27] In order to estimate equation 1, we needed to compute the share of a country's total (i.e. bilateral and multilateral) aid that went to any particular recipient. To do this, we obtained a decomposition of multilateral aid into its underlying bilateral constituents. The OECD DAC database contains a series called "imputed" bilateral aid, which does precisely this.

[28] In the Correlates of War database from which these data are obtained, there are 4 types of alliances: a common alliance; a defense alliance; a neutrality or non-aggression alliance; and an entente alliance. We use the last as it seems the most consistent with the economic relationships we are interested in.

The predicted share $\hat{\theta}_{drt} = \beta' Y_{drt}$ (where Y are the regressors in matrix notation) is then used to calculate the (instrumented) aid to GDP ratio received by country r in year t as follows:

$$\hat{A}_{rt} = \frac{\sum_{d} GDP_{dt} A_{dt} . \hat{\theta}_{drt}}{GDP_{rt}} \qquad \text{--- (2)}$$

where GDP_{dt} is the GDP of the donor country d in dollars in year t and A_{dt} is the Aid to GDP ratio for that donor country in that year. $\hat{A}_{rt}$ averaged over the relevant period will be the instrument we use in the paper.

Exclusion restriction

A major concern with all instruments is the exclusion restriction, namely that the instrument, while correlated with the endogenous aid variable, may have an independent impact on the left hand side variable (in this case, growth). But a major advantage of the cross-country cross-industry framework that we employ is that this concern loses much of its sting. Recall that the major concern with our instrumenting variables (strategic variables, colonial relationships, and proximity to donors etc.), is that they induce or are correlated with some *country-specific* attribute: for example, proximity (geographical and strategic) to donors might be bad because donors require bad policies or support bad leaders or require greater defence-related spending. Alternatively, proximity to donors might be good because they impose good conditionality. Also, certain colonial relationships may imply a certain quality of current institutions with impacts on growth. In our framework, any impact on country-specific attributes is absorbed in the country fixed effects. In other words, the exclusion restriction concern loses force because it is hard to see why relationships with donors should systematically affect growth in *particular* industrial sectors.

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