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Aid and Sectoral Labour Productivity

by Pablo Selaya and Rainer Thiele

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Abstract:

The paper examines empirically the proposition that aid to poor countries is detrimental for external competitiveness, giving rise to Dutch disease type effects. At the aggregate level, aid is found to have a positive effect on growth of labour productivity. A sectoral decomposition shows that the effect is significant and positive both in the tradables and the nontradables sectors. The paper thus finds no empirical support for the hypothesis that aid reduces external competitiveness in developing countries. Possible reasons are the existence of large idle labour capacity and high levels of dollarization in financial liabilities at the firm level.

Keywords: Foreign aid, sectoral labour productivity, Dutch disease

JEL classification: F35, O47

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I. Introduction

The empirical literature on the macroeconomic effects of aid has produced contrasting results. While some authors claim that the effects of aid on growth and development have been historically very close to zero (Rajan and Subramanian, 2008), or even negative (Easterly, 2007), others (like Clemens, Radelet and Bhavnani, 2004; Roodman, 2007a; Hansen and Tarp, 2000) conclude that on average aid has had a positive effect on growth.

Given the actual size of aid transfers, these mixed findings are to some extent disappointing, but conceivably also not surprising "[…] given the heterogeneity of aid motives, the limitations of the tools of analysis, and the complex causality chain linking external aid to final outcomes." (Bourguignon and Sundberg, 2007, p. 316). One way in which most of the recent empirical studies reflect the fact that the causality chain linking aid to outcomes is complex, is the common conclusion that the effects of aid are highly dependent on idiosyncratic characteristics of the recipient countries. This is also the starting point in this paper, where we reformulate the fundamental question on aid's effectiveness in a way that helps to identify specific mechanisms at work, and the individual country characteristics that matter.

Some papers already go along this line by trying to identify factors directly undermining aid's capacity to increase growth. The arguments advanced in these papers basically belong to one of two different strands. The first is concentrated on the negative incentives and effects that aid may have on the institutional quality of the recipient countries (see for example Rajan and Subramanian, 2007, and Bräutigam and Knack, 2004). The basic idea is that foreign aid may reduce the pressure to embark on necessary institutional reforms in the recipient countries. Some of the reasons are that aid appears as a windfall of resources alleviating structural deficits for irresponsible fiscal authorities, or that aid tends to spur corruption and competition for the rents it might create among special-interest groups. [1]

The second strand is related to possible detrimental macroeconomic effects of aid (see for example Adam and Bevan, 2006; Gupta, Powell and Yang, 2006; de Renzio, 2007). The main argument in these studies is that the capacity to "absorb" the aid influx in an effective

[1] See Svensson (2000) and Djankov, Montalvo and Reynal-Querol (2006), for example.

manner can be severely restricted. The combination of a lack of absorption capacity and a relatively large size of aid receipts can translate into inflationary pressures and a tendency of the domestic currency to appreciate. This hurts exportable sectors directly, and may affect aggregate output growth and employment if the effects are sustained over a certain period. The prospect of effects like these may rise even further as donors have promised a substantial scaling-up of financial aid to the poorest countries.

This paper belongs to this second strand. The main question is to which extent foreign aid to poor countries has effectively limited the growth of exportable sectors. In particular, the paper presents an empirical assessment of the effects of aid on growth rates of average labour productivity at the aggregate level, and a disaggregation of this effect between the impact on the tradable (exportable) sector and the nontradable sector. A comprehensive empirical analysis of this issue at the cross-country level is absent in the existing literature on foreign aid. The currently available estimates of the impact of aid on sectoral competitiveness and labour productivity rely on highly stylized simulations (Adam and Bevan, 2006), have been purely concentrated on the manufacturing sector (Rajan and Subramanian, 2005), or the agricultural sector (Feeny and Ouattara, 2007).

Our contribution is twofold. First, we provide estimates of the effects of aid on growth of average labour productivity in sectors producing most of the tradable (exportable) goods and in those producing most of the nontradable goods. The main results show significant positive effects of aid on labour productivity growth in both sectors. They are robust to different econometric specifications, conditioning factors, and the endogenous nature of the relationship between donors' aid disbursements and recipients' economic growth.

In general, our results contrast with those of similar previous studies. Thus, in a second step, we explore mechanisms that provide a plausible explanation for the main findings. More precisely, the paper shows that a large inflow of aid might be beneficial for growth of average labour productivity when the recipient country has high levels of dollarization of financial liabilities. The basic reason is that firms indebted mostly in foreign currency benefit from an overvalued domestic currency, because that reduces their financial costs and burdens. This type of positive balance-sheet effects might be substantial in highly dollarized economies and, therefore, might allow firms, and the economy, to grow faster.

The remainder of the paper is organized as follows. Section II reviews the link between aid and external competitiveness and explains how we analyze it. Section III discusses methodological issues. Section IV presents the empirical results, and Section V concludes.

II. Aid, real appreciation and external competitiveness

To explain what undermines the effect of aid on growth, Rajan and Subramanian (2005) postulate that a plausible reason is that the benefits of aid are reduced by negative side-effects. They present evidence indicating that one of these stems from the possibility that the aid inflows cause overvaluation of the real exchange rate (RER) in the recipient country, and a consequent loss of competitiveness in the exporting sectors, reflected by "systematic adverse effects on growth, wages, and employment in labour intensive and export sectors" (Rajan and Subramanian, 2005, p. 22).

The overall idea resembles closely the mechanics of the Dutch disease problem after an influx of any type of foreign resources. The Dutch disease model[2] predicts that in an economy producing two types of goods (traded and the nontraded), a large inflow of foreign resources tends to push up the nominal exchange rate and make the value of the domestic currency stronger. Additionally, the windfall of foreign resources tends to expand the demand for nontraded goods, raising the price of nontraded goods if they have a relatively limited supply, which in turn tends to put upward pressure on the domestic rate of inflation. If both effects (the nominal appreciation and the increase in domestic inflation) appear combined, the real price of nontraded goods increases relative to the price of traded goods, which is equivalent to say that the real exchange rate (RER) gets overvalued. This is detrimental for growth in the traded sector if wages and other production costs do not adjust downwards in that sector. If the slowdown in the traded sector is long-lasting, it may also retard growth in the whole economy, especially if the production of tradable goods exhibits substantial side effects for the economy such as the adoption of new technology and the opening of new markets.

Among the papers that have analyzed the case of Dutch disease and RER overvaluation after an influx of foreign aid, some show that the Dutch disease effects of aid are small (for example Prati, Sahay and Tressel, 2003), while others suggest that they are potentially larger (for example Elbadawi et al., 2007). However, there is a certain consensus among these

[2] Described in Elbadawi et al (2007) and Nkusu (2004), for example.

studies on two specific points. The first is that a windfall of foreign aid does cause RER overvaluation. The reason is that the negative effects of aid on the RER are difficult to avoid completely, given that recipient countries tend to be limited in their ability to contain the RER overvaluation (e.g., with contractionary monetary policies), or to expand domestic supply (e.g., due to problems of absorptive capacity). Killick and Foster (2007) argue that the doubling of aid to Africa by 2010, for example, will be difficult to manage for the recipient countries in ways that "do not disadvantage producers of tradeable goods, and the private sector generally".

The second point of consensus is that this aid-induced RER overvaluation tends to be present mainly during the short run. This happens because, after the aid inflow has been received, the economy has the possibility of effectively expanding the domestic supply over the medium and longer run. An expansion in domestic supply can happen, for example, when aid is used to build infrastructure such as new rural roads that tends to benefit relatively more the nontradables sector. This helps to contain the tendency of the domestic price level to increase, and the tendency of the RER to get overvalued over the long run.

Against this background, this paper presents a comprehensive econometric assessment of the effects of aid on growth rates of average labour productivity at the aggregate level, and a sectoral disaggregation of this effect, distinguishing the effect of aid on the tradable from the nontradable sectors. Our basic hypothesis is that, if aid causes real appreciation and a reduction in external competitiveness, i.e. Dutch disease type of problems, an inflow of aid should have a negative effect on growth of sectors producing most of the tradable goods, and a positive effect on sectors producing most of the nontradable goods.

Contrary to previous papers in the literature, our results show no evidence of Dutch disease type effects. Hence, we explore some mechanisms that might account for this finding. The exploration is based on the theoretical work from Nkusu (2004), who argues that developing countries may exhibit some particular characteristics that reduce the probability of having RER overvaluation and Dutch disease type of problems after an influx of aid, or characteristics that even allow them to benefit when the RER gets overvalued. One of these characteristics is the existence of idle capacity. When a developing country with idle capacities receives foreign aid resources, the associated expansion in aggregate demand can

be met relatively fast by an expansion of aggregate supply. This reduces the upward pressures on the level of inflation and, thus, also reduces the pressure for RER overvaluation.

A second characteristic reducing risks related to Dutch disease is that production in developing countries is typically highly dependent on imported inputs. This implies that, with input costs largely denominated in foreign currency, a RER overvaluation unambiguously lowers total costs of production. We explore this idea by testing the hypothesis that high levels of dollarization of financial liabilities may offset the negative effects of real appreciation induced by aid, supporting positive, rather than negative, effects of aid on growth.

Our empirical analysis proceeds in four steps. First we seek to identify the marginal effect of aid on growth in aggregate average labour productivity, defined as the average growth rate of output (GDP or Total Value Added) per worker, and denoted by g_{it}^{p}. This is made along the lines of the empirical aid-growth literature. That is, we specify a regression of growth in output per worker on the size of aid effectively disbursed, a, the direct effects of macro policies' quality, $\mathbf{p}$, geographical country-specific determinants, $\mathbf{d}$, conditional effects of a, $\mathbf{p}$ and $\mathbf{d}$ on g_{it}^{p} (captured by a vector Γ containing interaction terms between a, $\mathbf{p}$ and $\mathbf{d}$ with the level of aid disbursed),[3] and other determinants of aggregate average labour productivity growth, Z:

$$g_{it}^{p} = f(a, \mathbf{p}, \mathbf{d}, \Gamma, Z). \quad (1)$$

The second step in the empirical analysis involves a sectoral decomposition of the aggregate effect. We estimate the same type of model, but using measures of growth of productivity in the tradable (exportable) and the nontradable sectors, $g_{it,k}^{p}$:

$$g_{it,k}^{p} = f(a, \mathbf{p}, \mathbf{d}, \Gamma, Z_k), \quad (2)$$

where $k \in \{\text{tradables, nontradables}\}$ and Z_k is a vector of other exogenous determinants of sectoral average labour productivity growth.

[3] The interaction terms reflect the second-order effects considered in the aid-growth literature. In terms of the model in Dalgaard et al (2004), these effects correspond to Burnside and Dollar's (2000) claim that aid works with reasonable policies ($\partial^2 g / \partial a \partial \mathbf{p} > 0$); Hansen and Tarp's (2000) suggestion that aid exhibits diminishing returns ($\partial^2 g / \partial a^2 < 0$); and Dalgaard, Hansen and Tarp's (2004) finding of higher aid effectiveness with better geographic/climatic conditions ($\partial^2 g / \partial a \partial \mathbf{d} > 0$).

These first two steps are aimed to give an answer to the question of whether foreign aid causes a relative loss of external competitiveness (Dutch disease) or not. The following steps are aimed to explore possible reasons. In particular, we analyse if financial conditions and the composition of debt are a relevant part of the explanation. The next steps require then (a) extending the aggregate models in (1) and (2) to control for the characteristics of debt in the aid-recipient countries, and (b) decomposing again this effect into its sectoral components. Accordingly, we estimate

$$g_{it}^{p} = f(a, \mathbf{p}, \mathbf{d}, \Gamma, Z, Z_i^f) \tag{3}$$

and

$$g_{it,k}^{p} = f(a, \mathbf{p}, \mathbf{d}, \Gamma, Z_k, Z_i^f), \tag{4}$$

where Z_i^f is a vector including financial characteristics in country i, in particular characteristics of debt in the country, and variables controlling for the RER evolution.

III. Method and data

1. Econometric specification

The basic econometric specification for the model in (1) is

$$g_{it}^{p} = (a_{it} \ \mathbf{p}_{it} \ \mathbf{d}_i)(\beta_a \ \beta_p \ \beta_d)' + a_{it} \times (a_{it} \ \mathbf{p}_{it} \ \mathbf{d}_i)(\beta_{aa} \ \beta_{ap} \ \beta_{ad})' + Z_{it}'\boldsymbol{\beta}_Z + \tau' \beta_\tau + \varepsilon_{it}^{p}, \tag{5}$$

where g_{it}^{p} is a measure of growth in output per worker (or growth in average labour productivity) in country i during period t; a_{it}, is the size of effective aid in terms of GDP;[4] $\mathbf{p}_{it}$ is the Burnside and Dollar (2000) index of good macro policies; $\mathbf{d}_i$ is a measure of structural characteristics (Dalgaard et al., 2004), proxied by the share of tropical area in the country from Gallup, Sachs and Mellinger (1999); τ is a vector of time-dummies (to control for common shocks); ε_{it}^{p} is a zero-mean error component; and Z_{it} is a vector containing other exogenous determinants of output per worker growth, specifically: (a) the degree of financial depth, measured as the (lagged) ratio of M2 to GDP, (b) the Knack and Keefer (1995) index of institutional quality, constructed from five ICRG variables and trying to reflect security of private property and enforceability of contracts, (c) the level of

[4]Effective aid is defined as the grant equivalent of official disbursements constructed by Chang, Fernandez-Arias and Serven (1998), calculated as the sum of official grants and the grant element in concessional loans.

output per worker at the beginning of every period t, (d) the degree of ethno-linguistic fractionalization in the country (Easterly and Levine, 1997), (e) the number of conflicts in which the government is involved (UCDP/PRIO, 2006), and (f) an interaction term between these last two.

In a similar way, the econometric specification for the sectoral decomposition proposed in equation (2), is

$$g^{p}_{it,k} = (a_{it}\ \mathbf{p}_{it}\ \mathbf{d}_i)(\lambda_a\ \lambda_p\ \lambda_d)' + a_{it} \times (a_{it}\ \mathbf{p}_{it}\ \mathbf{d}_i)(\lambda_{aa}\ \lambda_{ap}\ \lambda_{ad})' + Z'_{it,k}\boldsymbol{\lambda}_{Z_k} + \tau'\lambda_\tau + \varepsilon^{p_k}_{it}, \qquad (6)$$

where $g^{p}_{it,k}$ is a measure of output per worker in sector k, $k \in \{\text{tradables, nontradables}\}$, and the new estimated coefficients are the λ's.

To estimate the models in (3) and (4), which are extensions of the previous two regressions meant to identify as directly as possible the presence of RER overvaluation and Dutch disease, it is necessary to extend the vector Z_{it} with variables reflecting the evolution of the RER and the characteristics of debt in the recipient country (in particular those related to the level of dollarization of financial liabilities). The variables considered for this extension are (a) the rate of RER devaluation (and the square of it), which helps to control for the effects that the RER has directly on growth,[5] (b) the amount of external debt measured as a proportion of GDP, and (c) the currency composition of the external debt.

The central econometric concern for the estimation of all these regressions is the endogenous character of aid: aid disbursements are obviously determined to some extent by the recipient country's growth process itself (Berthélemy, 2006, and Nunnenkamp and Thiele, 2006). All the recent empirical literature on foreign aid effectiveness has turned to the use of instrumental variables (IV) to address the problem of endogeneity. We follow this line and perform two-stage least squares (2SLS) estimations, using the set of instruments in Dalgaard and Hansen (2001) and Dalgaard, Hansen and Tarp (2004).[6] Given that our 2SLS estimates ran into statistical problems (as we will discuss in detail below), we also applied the GMM-

[5]The square of the RER devaluation is included to model formally the idea that there exists an "equilibrium RER", or a RER level that keeps the balance between keeping exports competitive and keeping the level of inflation controlled. See for example Elbadawi et al. (2007, footnote 1, p. 1).

[6] These are Aid/GDP, lagged; (Aid/GDP) squared, lagged; (Policy x Aid/GDP), lagged; Policy x (log Initial GDP per capita); Policy x (log Initial GDP per capita) squared; Policy x (log Population); and a dummy for countries in the Central Francophone Africa zone. This instrumentation strategy is described and motivated in detail in Dalgaard et al (2004), but in general it is aimed to reflect donors' overall preference to send aid to the smallest and poorest countries, those with better macro policies and to account for some strategic interests of donors in specific groups of countries (former colonies, important trade partners, or political allies, for example).

DIF estimator suggested by Arellano and Bond (1991) and the GMM-SYS estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998).

2. Data on sectoral labour productivity

Our estimations require measures of average labour productivity in the tradable (exportable) and the nontradable sectors. We build these measures with data from the World Bank's World Development Indicators on labour force participation, sectoral employment and sectoral real Value Added (defined as the net output of a sector --measured in constant USD-- after adding up all outputs and subtracting intermediate inputs).

The proxies we constructed for labour productivity in the *tradable* (exportable) sector are (a) the non-services GDP per worker and (b) the sum of Agricultural and Industrial Value Added per worker. The proxy constructed for the *nontradables* sector is based on Value Added per worker in the Services sector.

This distinction between tradables and nontradables sectors is made under the assumptions that the overall production in the economy comes from activity in agriculture, industry and the services sectors, and that production of nontradables is concentrated in the services sector, while production of tradables takes place primarily in the agricultural and industrial sectors. This assumption is supported by the survey in Tica and Družić (2006, Table 1), who review a large number of empirical papers analyzing the effects of productivity gaps on terms of trade, and report that none of those studies treats the services sector as producing tradables (the 58 papers reviewed by them treat production of tradables as taking place in the agricultural sector, or the industrial sector, or both). The argument gathers a lot of strength when it is placed in the context of developing countries, where trade in agricultural and manufacturing goods (containing for example exports of raw agricultural commodities, agroindustrial products, minerals, etc.) tends to be much higher than trade in services.

The WDI provides a measure of real Value Added per worker in the Agricultural sector, but not in the other sectors. We therefore constructed proxies for Value Added per worker in the Industrial and Services sectors. An important point is that an accurate labour productivity measure requires an estimate of the number of workers actually employed in the different sectors, rather than estimates of the number of workers in the labour force or the potential number of workers in each sector. Accordingly, we construct series for the effective sectoral allocation of labour based on sectoral employment data from the WDI. The series for sectoral employment were built based on interpolations of the employment data in the Agricultural,

Industrial and Services sectors, and completed to fill gaps towards the end of the sample period under the assumption that the sectoral distribution of employment kept stable over time.[7] For all the estimations in the remainder of the paper then, the proxies used for levels of sectoral labour productivity levels are measures of real Value Added in the Agricultural, the Industrial and the Services sectors, divided by the estimated number of employed workers in each corresponding sector.

The sample covers a group of 69 developing economies over 40 years, the period between 1962 and 2001. All the variables were averaged over periods of 4 years, to capture the evolution of trends rather than the incidence of cycles, and to make the results comparable to those in previous empirical studies. Our sample does not go beyond 2001 because many of the variables used in the regressions could not be updated further than that for many countries in the sample.

Summary statistics of our variables are displayed in Annex Table A1, and the description of the countries and periods considered is given in Annex Table A2.

IV. Results

1. Impact of aid in the aggregate

The estimated effects of aid on growth of aggregate average labour productivity, that is the results of regression (5), are displayed in Table 1. Column 1 contains the 2SLS estimates.

The coefficients of interest (the coefficients on the aid variable and the 3 aid-interaction terms) show that aid has a positive and direct impact on growth of aggregate labour productivity, and that these benefits can be increased in countries with good policies, whereas they are lowered in countries where the amount of tropical area is large (Dalgaard et al., 2004). This last finding can be interpreted as indicating that aid effectiveness is limited in countries where location and climate are disadvantageous or, in particular, in countries with large a amount of tropics, where the burden of diseases is larger (as suggested by Gallup et al., 1999, for example) or where growth in agricultural productivity is restricted (see Masters and Wiebe, 2000, for example).

[7] As a control, we constructed a series for the sectoral composition of the labour force assuming that for any given country, a larger fraction of the labour force was concentrated in sectors where the production of Value Added was higher. This change of measure yields qualitatively equivalent results to those reported in the following tables.

Table 1: Aid and average labour productivity

Dependent variable:	Growth in GDP per worker				
	2SLS (1)	2SLS/FE (2)	GMM-DIF (3)	GMM-SYS (4)	GMM-SYS (5)
Aid/GDP	3.05***	4.75**	0.30	2.62***	2.67***
	[1.0]	[2.2]	[0.8]	[0.9]	[0.9]
(Aid/GDP), squared	-0.0055	0.038	-0.058**	-0.038**	-0.036**
	[0.04]	[0.06]	[0.03]	[0.02]	[0.01]
(Aid/GDP)*Policy	0.17**	-0.1	-0.11**	-0.038	-0.038
	[0.08]	[0.09]	[0.05]	[0.06]	[0.06]
(Aid/GDP)*Tropical area	-3.20***	-5.29**	0.035	-2.32**	-2.38***
	[0.9]	[2.3]	[0.8]	[0.9]	[0.9]
Policy index	0.69***	1.19***	1.28***	1.06***	1.07***
	[0.2]	[0.2]	[0.2]	[0.2]	[0.2]
Tropical area	-0.55			-0.94**	-0.90**
	[0.5]			[0.5]	[0.5]
(log) Initial GDP per worker	-0.49*	-1.90**	-6.06***	-0.82***	-0.76***
	[0.3]	[0.7]	[1.3]	[0.3]	[0.2]
ICRG institutions index	0.36***	0.25	0.25	0.40***	0.41***
	[0.09]	[0.2]	[0.2]	[0.09]	[0.10]
M2, lagged	-2.36**	-1.79	-3.54	-3.51***	-3.41***
	[1.1]	[1.6]	[2.2]	[1.2]	[1.2]
Ethnic fractionalization	-0.42			-0.36	
	[0.9]			[1.0]	
Assassinations	-1.01*	-1.91**	-0.73	-1.21**	
	[0.6]	[1.0]	[0.9]	[0.6]	
Ethnic fract.*Assassin.	1.38*	2.58**	0.34	1.36*	
	[0.8]	[1.2]	[1.5]	[0.8]	
Observations	460	459	457	505	505
R2	0.34	0.19	.	.	.
Number of countries	69	68	69	69	69
Sargan test, overid.	(0.79)	(0.92)	(1.0)	(1.0)	(1.0)
Cragg-Donal test, underid.	(0)	(0.0018)			
Anderson-Rubin test, joint signif.	(0.062)	(0.23)			
Durbin-Wu-Hausman test, endogeneity	(0.022)	(0.024)			
Hausman test for FE	(0.36)				
Number of instruments	26	20	137	179	151
AR(1)			(0.0027)	(0.0023)	(0.0025)
AR(2)			(0.55)	(0.72)	(0.71)
ME of aid > 0 (mean)	1.05***	1.18*	0.11	0.96***	0.97***
	[0.43]	[0.8]	[0.29]	[0.36]	[0.31]
ME of aid > 0 ("good country")	3.34***	4.36**	0.051	2.45***	2.5***
	[0.96]	[2.05]	[0.72]	[0.92]	[0.84]
ME of aid > 0 ("bad country")	0.08	-0.59	0.035	0.15	0.15
	[0.32]	[0.63]	[0.21]	[0.16]	[0.15]

Notes. Robust standard errors in brackets, p-values in parentheses. *** , ** and * denote statistical significance at the 1, 5 and 10% levels. Aid/GDP instrumented as in Dalgaard et al (2004).

The rest of the coefficients in Column 1 have the expected signs: "good" policies are "good" for growth by themselves, initial conditions matter (the coefficient on the initial level of output per worker is significant), sound institutions (measured by the ICRG index) have a positive effect on growth, and a high number of conflicts does not contribute to higher rates of growth, just as do not either more ethnical division in the country. The only puzzling effect in column 1 is the negative and significant effect of financial depth (measured by the lagged ratio of money and deposits, M2, to GDP). This can be due to an omitted variable bias, since a high M2/GDP ratio might be correlated with high levels of other sources of foreign capital --for example foreign bonds, or external debt--, which act as substitutes of aid to some extent.

The last part of column 1 in Table 3 shows a test for the hypothesis that the marginal effect (ME) of aid, defined as $\frac{\partial g_{it}^{p}}{\partial a}$, is positive. Given that the ME of aid is

$$\frac{\partial g_{it}^{p}}{\partial aid_{it}} = \beta_a + 2\,\beta_{aa}\,aid_{it} + \beta_{ap}\,\mathbf{p}_{it} + \beta_{ad}\,\mathbf{d}_i\,, \tag{7}$$

it is necessary to choose a fixed point to estimate the marginal effect. The most obvious point is the mean of the different variables composing it (that is, the mean levels of aid, the macro policy index, and the percentage of tropical area in the country). However, Figures 1 and 2 show that the distributions for aid and the share of tropical area are highly asymmetric.

Figure 1: Aid/GDP – Density plot

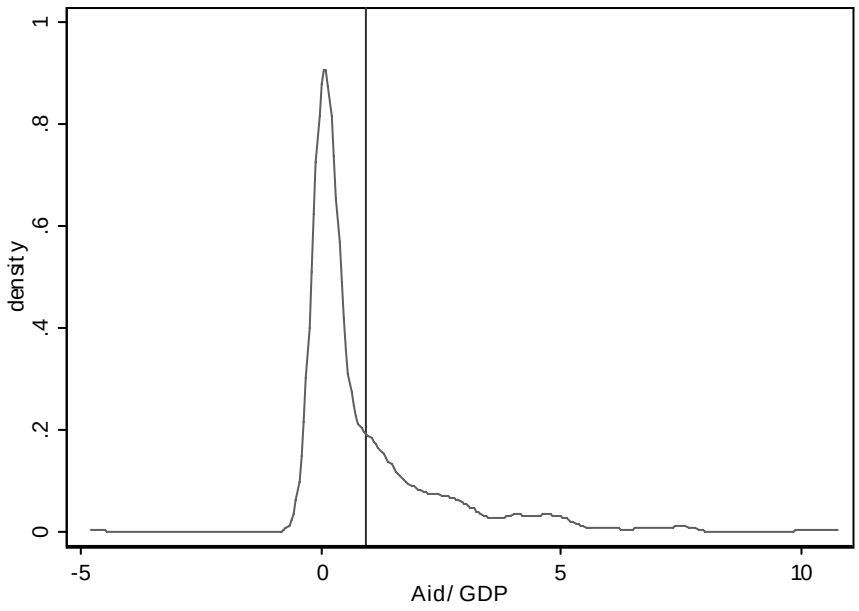

Figure 2: Tropical area index – Density plot

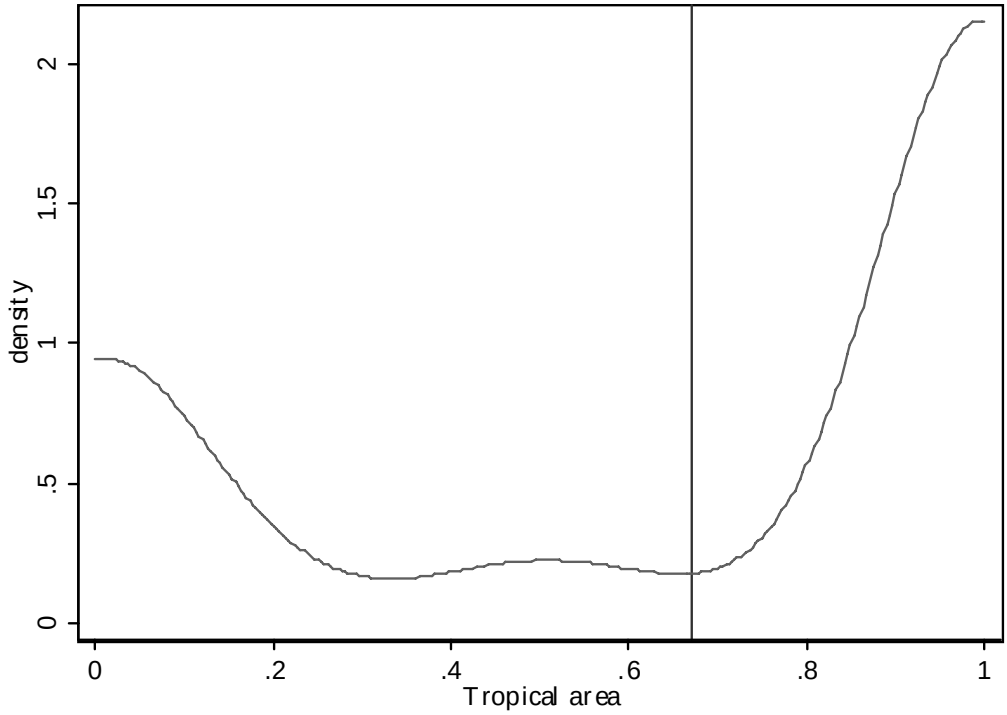

Figure 1 shows that the distribution of aid is skewed to the left and has a relatively fatter right-hand side tail. This reflects the fact that countries receive in general some (relatively low level of) aid; but, with a certain frequency, countries receive a much larger amount of aid, e.g. in the form humanitarian aid after a natural disaster, or for the reconstruction of an area after a period of conflict. Figure 2 shows the distribution for the amount of tropical area in the countries in the sample, which is bimodal, and reflects the fact that most of the aid-recipients are located either in highly tropical areas, or in places that are considerably far from the tropical lands. This is relevant because, with this type of distributions, the average country may not reflect the most typical characteristics, and evaluating the marginal effect at the mean can be misleading. Table 1 therefore also presents the marginal effects of aid evaluated at two other points. The first is defined as a hypothetical "good country", receiving a low amount of aid (equivalent to the level at the 25th percentile in the aid distribution), being located outside the tropics (at the 25th percentile in the distribution of tropical area), and exhibiting a high level for the quality-of-policy index (at the 75th percentile of the Burnside-Dollar policy index distribution). The second hypothetical point of evaluation is a "bad country", or a country that receives a large amount of aid (75th percentile), has a low level for the index of good macro policies (25th percentile) and is located in a very tropical

area (75th percentile). These two definitions are arbitrary, but they can be understood as an approximation of the upper and lower bounds for the "typical" marginal effect of aid.

It turns out that aid has a net positive and highly significant effect in the average country. The effect is equally significant, but 3 times larger for a "good country", and statistically not different from zero for a "bad country".

As for the validity of the 2SLS regressions, the tests on the quality of instrumentation show overall good results: (1) a high p-value for the Sargan test of overidentification does not allow to reject the hypothesis that the set of instruments employed are valid, (2) a low p-value for the Cragg-Donald test of underidentification implies that the instruments are not weak, (3) the low p-value for the Anderson-Rubin test for joint significance of the endogenous regressors cannot reject the hypothesis that the instruments are jointly significant, and (4) the low p-value for the Durbin-Wu-Hausman test of endogeneity of the instruments allows to reject the hypothesis that the endogenous regressors can be treated as exogenous, indicating that the use of IV in this specification is appropriate.

However, even though the specification is comprehensive with respect to the main determinants of growth, it is possible that there are important unobserved individual country characteristics that are being omitted in the regression. To control for this, Column 2 in Table 1 presents the same regression as in Column 1, but estimates the model including individual country fixed effects. The results are relatively similar to the ones in Column 1 regarding the significance of the coefficients of interest, the tests on the quality of instrumentation, and the significance of the marginal effect of aid evaluated at different points. From the statistic for the (Hausman) test of fixed-effects, it is not possible to reject the hypothesis that the country fixed effects are significant and, thus, correctly included in Column 2.

This poses a serious problem for these first two regressions. The reason is that if both the unobserved country characteristics and the lagged level of the dependent variable are significant and belong into the regression, then the 2SLS regression in Column 1 is misspecified (because it lacks the fixed-effects terms), and the 2SLS/FE regression in Column 2 gives inconsistent estimates (because differencing the data and estimating the regression with the lagged level of the dependent variable on the right-hand side introduces correlation between one of the regressors and the error term, by construction).

An appropriate estimator for a panel data model where (a) unobserved individual fixed effects are relevant and (b) a lagged level of the dependent variable needs to be included as a regressor, is the GMM-DIF estimator. This method estimates the regression in first differences, and instruments the lagged differences in the right-hand side with lagged levels of the variables. The number of lags to be included can be chosen arbitrarily, but following Roodman (2007b), we restrict them to be only the ones starting from the second.

Column 3 in Table 1 presents the regression with the GMM-DIF estimator. The results are quite different from the ones before. In particular, aid now has no significant effect on growth. Column 3 reports however a high coefficient for the lagged level of the dependent variable, which reflects a high level of autocorrelation. As shown by Arellano and Bover (1995), lagged levels are weak instruments of current differences when the series are highly persistent. The autocorrelation tests displayed in column 3 show high AR(1) for the error term in the model in differences (which is expected to happen), but high AR(2) as well, supporting the conjecture that the dependent variable is highly persistent. In this case, first-differences cannot be strongly instrumented by lagged levels.

The alternative is to use the GMM-SYS estimator, which complements the model in differences with equations in levels and instruments based on lagged differences. The GMM-SYS estimates suggest that aid has a positive effect on growth, that the effect is not dependent on the quality of macro policies but on the type of structural country characteristics, and that the overall effect operates with diminishing returns. The estimates of the marginal effects of aid are similar to those in column 1. A higher p-value for the absence of AR(2) shows an improvement in the quality of estimation and instrumentation compared to the GMM-DIF estimation in column 3.

Finally, Column 5 in Table 1 drops the variables associated with country conflict and division; this helps to reduce problems of multicollinearity and the total number of instruments, does not change the significance of the rest of the variables in the model, and allows a more precise estimation of the marginal effects. We therefore regard it as the preferred econometric specification.

2. Sectoral disaggregation of the impact of aid

Table 2 presents the sectoral decomposition of the aggregate effect of aid on growth. To provide a benchmark, column 1 shows again the aggregate effects of aid on growth (corresponding to Column 5 in Table 1, the preferred specification for the aggregate model). Columns 2 and 3 contain estimates for the sectors likely to be producing most of the exportable goods (the tradables sector). The proxy for output in the tradables sector considered in Column 2 is output in the non-Services sector, and the one considered in Column 3 is the aggregation of Value Added in the Agricultural and the Industrial sectors.

The most important difference between these two regressions is that column 3 shows a significant coefficient for the aid-squared term, while column 2 does not. But the rest of the coefficients of interest are similar in size and significance in the two specifications. Despite the difference in the coefficient on the aid-squared term, the overall conclusion from the marginal effects remains the same: aid is shown to have a positive marginal effect in the tradables sector in the average country, a three times higher effect in countries with more favourable conditions, and no significant effect in countries with less favourable conditions.

Column 4 shows the estimates of the effects of aid in the Services sector, which is taken as a proxy for the sector producing most of the nontradable goods in a developing economy. This column reveals a more independent impact from aid compared to Columns 2 and 3 in the sense that the interaction term with tropical area is no longer significant. Evaluated at the mean, the size of the marginal effects turns out to be roughly equal in services and non-services sectors. For “good” countries, the size of the marginal effect is even lower than in columns 2 and 3, while for “bad” countries it becomes significantly positive.

Overall, these findings do not point to systematic differences in the impact of aid on tradable and nontradable production. This is the main result of the paper. It can be interpreted as providing empirical evidence against the hypothesis that aid is detrimental for external competitiveness and growth in average labour productivity, or that aid causes Dutch disease. If aid was a cause of Dutch disease, two "symptoms" after an inflow of aid would have to be a decline in the growth of the exportable (or tradables) sector, and a relative increase in the growth rate of the nontradables sector. The estimates of the marginal effects of aid in Columns 1-4 of Table 2 suggest the opposite: evaluated at the mean and at the "good" country levels (where estimates are statistically significant), aid does not seem to cause a

slowdown in the exportables sector compared to the aggregate level, nor an acceleration of the nontradables sector compared to the aggregate level.

Decomposing further the effect in column 3 (that is, decomposing the proxy for the tradables sector), Columns 5 and 6 indicate that the positive effects of aid on growth of the exportables sector actually come from the Industrial sector rather than the Agricultural sector. This implies that the external competitiveness of manufactures, minerals and agroindustrial products (all activities within the Industrial sector) is unlikely to deteriorate in response to an inflow of foreign aid.

3. Real appreciation and the absence of Dutch Disease

A more rigorous test of the link between aid, growth and Dutch disease needs to account for variables that might play a central role in this relationship. Columns 2 and 3 in Table 3 account for the effects of changes in the RER. The rate of RER devaluation is treated as endogenous within the model. After controlling for it, the marginal effects of aid estimated drop to half the size of the ones in the preferred specification (reproduced in Column 1). The square of RER devaluation is included in Column 3 to capture the idea that countries tend to benefit from a devaluated RER (because that tends to increase exports' competitiveness), but that after a certain point a too fast rate of RER devaluation can be passed to higher inflation rates, which starts to limit the (initial) benefits of RER devaluation.

Columns 4 and 5 in Table 3 account for the degree of external indebtedness and the currency composition of debt. Column 4 introduces the ratio of external debt to GDP, and Column 5 the percentage of dollarization in the country's overall level of debt, as a measure of the currency composition of the debt and the country's financial exposure to changes in the exchange rate.

From columns 2 to 5 it can be seen that the variables measuring RER devaluation, the ratio of external debt to GDP and the measure of debt's currency composition are marginally significant or not significant individually. However, when all these new variables are included at the same time, three of them become highly significant, and the fourth marginally significant (Column 6).

Table 3: Aid, labour productivity and financial factors

Dependent variable:	Growth in GDP per worker					
	(1)	(2)	(3)	(4)	(5)	(6)
Aid/GDP	2.67***	1.30**	1.43***	2.67***	2.22**	1.39***
	[0.9]	[0.5]	[0.5]	[0.9]	[0.9]	[0.5]
(Aid/GDP), squared	-0.036**	-0.016	-0.015	-0.020**	-0.022**	-0.023**
	[0.01]	[0.01]	[0.01]	[0.009]	[0.009]	[0.009]
(Aid/GDP)*Policy	-0.038	-0.051	-0.066	-0.13*	-0.018	-0.16**
	[0.06]	[0.05]	[0.06]	[0.08]	[0.06]	[0.07]
(Aid/GDP)*Tropical area	-2.38***	-1.31**	-1.45***	-2.33***	-2.10**	-1.11**
	[0.9]	[0.5]	[0.5]	[0.9]	[0.9]	[0.5]
Policy index	1.07***	1.05***	1.10***	1.04***	1.04***	1.11***
	[0.2]	[0.2]	[0.2]	[0.2]	[0.2]	[0.2]
Tropical area	-0.90**	-0.76*	-0.75*	-0.87	-1.11**	-0.95**
	[0.5]	[0.4]	[0.4]	[0.5]	[0.5]	[0.5]
(log) Initial GDP per worker	-0.76***	-0.89***	-0.85***	-0.98***	-0.98***	-1.11***
	[0.2]	[0.2]	[0.2]	[0.2]	[0.3]	[0.2]
ICRG institutions index	0.41***	0.39***	0.38***	0.47***	0.46***	0.52***
	[0.10]	[0.10]	[0.09]	[0.1]	[0.1]	[0.1]
M2, lagged	-3.41***	-1.83	-1.86	-3.64**	-3.74**	-1.9
	[1.2]	[1.2]	[1.2]	[1.5]	[1.6]	[1.4]
Nominal devaluation		0.079	0.36**			0.40***
		[0.1]	[0.2]			[0.1]
Nominal devaluation, squared			-0.0081***			-0.0085***
			[0.002]			[0.002]
Ext. Debt/GDP				-0.0070*		-0.0083**
				[0.004]		[0.004]
Debt currency comp (%USD)					0.4	1.76*
					[1.3]	[0.9]
Observations	505	427	427	402	409	339
Number of countries	69	65	65	60	61	57
Number of instruments	176	220	264	200	200	303
AR(1)	(0.0025)	(0.0097)	(0.013)	(0.0084)	(0.0083)	(0.034)
AR(2)	(0.71)	(0.61)	(0.76)	(0.49)	(0.49)	(0.52)
ME of aid > 0 (mean)	0.97***	0.35**	0.38**	0.74***	0.61***	0.35**
	[0.31]	[0.21]	[0.2]	[0.28]	[0.27]	[0.17]
ME of aid > 0 ("good country")	2.50***	1.14***	1.24***	1.20***	1.20***	0.53**
	[0.84]	[0.51]	[0.47]	[0.45]	[0.49]	[0.3]
ME of aid > 0 ("bad country")	0.15	-0.12	-0.15	0.10	0.023	-0.0037
	[0.15]	[0.12]	[0.11]	[0.11]	[0.11]	[0.11]

Notes. GMM-SYS regressions. Robust standard errors in brackets, p-values in parentheses. *** , ** and * denote statistical significance at the 1, 5 and 10% levels. Aid/GDP instrumented as in Dalgaard et al (2004).

All the additional variables in regression 6 in Table 5 are treated as endogenous. This specification therefore provides a good basis to decompose the effect of aid on growth and implement a more thorough test of the relationship between aid, growth and Dutch disease. It is reproduced as a baseline regression in column 1 in Table 4, where the results of the sectoral decomposition are displayed.

Table 4: Aid, labour productivity and financial factors – Sectoral decomposition

Dependent variable:	GDP per worker (1)	Non-Services GDP per w. (2)	Agric.&Indus. VA per w. (3)	Services VA per worker (4)	Agricultural VA per w. (5)	Industrial VA per w. (6)
Aid/GDP	1.52***	1.62**	1.98***	1.58*	5.25	3.04***
	[0.5]	[0.7]	[0.7]	[0.9]	[6.1]	[1.0]
(Aid/GDP), squared	-0.023**	-0.012	-0.037*	-0.054	-0.35	0.0096
	[0.009]	[0.02]	[0.02]	[0.04]	[0.4]	[0.05]
(Aid/GDP)*Policy	-0.15**	-0.11	-0.15*	-0.34**	0.034	-0.26*
	[0.08]	[0.08]	[0.09]	[0.1]	[0.4]	[0.2]
(Aid/GDP)*Tropical area	-1.28**	-1.64**	-1.79***	-0.46	-1.74	-2.67***
	[0.5]	[0.7]	[0.7]	[0.8]	[3.9]	[1.0]
Policy index	0.95***	0.84***	0.90***	1.43***	1.47	1.40***
	[0.2]	[0.2]	[0.2]	[0.4]	[1.4]	[0.4]
Tropical area	-0.87*	-0.31	-0.14	-2.42**	1.42	-0.2
	[0.5]	[0.7]	[0.6]	[0.9]	[3.2]	[1.0]
(log) Initial level dep. var.	-1.11***	-0.98***	-0.89***	-1.57***	-2.53	-1.52***
	[0.2]	[0.2]	[0.2]	[0.3]	[2.3]	[0.3]
ICRG institutions index	0.53***	0.51***	0.47***	0.60***	-1.38	0.49***
	[0.1]	[0.1]	[0.1]	[0.2]	[1.4]	[0.2]
Fin. depth (M2/GDP), lagged	-2.17	-0.88	-1.39	-5.75**	-11.7	-4.14
	[1.4]	[1.6]	[1.8]	[2.7]	[15]	[2.8]
Real exch. rate devaluation	0.42***	0.22	0.32	0.46**	-0.27	0.32
	[0.1]	[0.2]	[0.2]	[0.2]	[0.8]	[0.3]
Real exch. rate dev., squared	-0.0091***	-0.0071**	-0.0086***	-0.0093**	0.0027	-0.0079
	[0.002]	[0.003]	[0.003]	[0.004]	[0.01]	[0.005]
Ext. Debt/GDP	-0.0077**	-0.0073*	-0.0068	-0.018**	0.0026	-0.017**
	[0.004]	[0.004]	[0.004]	[0.008]	[0.02]	[0.007]
Debt currency comp. (%USD)	1.62*	2.43*	2.33*	3.28	-7.01	1.16
	[1.0]	[1.3]	[1.3]	[2.9]	[7.2]	[1.7]
Observations	339	339	339	339	339	339
Number of countries	57	57	57	57	57	57
Number of instruments	303	302	302	302	302	302
AR(1)	(0.035)	(0.086)	(0.072)	(0.04)	(0.29)	(0.0011)
AR(2)	(0.54)	(0.37)	(0.3)	(0.54)	(0.31)	(0.18)
ME of aid > 0 (mean)	0.37***	0.27	0.42**	0.76**	3.25	0.81***
	[0.17]	[0.24]	[0.26]	[0.47]	[3.69]	[0.31]
ME of aid > 0 ("good country")	0.6**	0.62*	0.81**	0.63	4.46	1.23***
	[0.29]	[0.39]	[0.4]	[0.52]	[5.03]	[0.55]
ME of aid > 0 ("bad country")	-0.024	-0.21	-0.12	0.51	2.59	0.032
	[0.11]	[0.18]	[0.2]	[0.44]	[3.16]	[0.27]

Notes. GMM-SYS regressions. Robust standard errors in brackets, p-values in parentheses. *** , ** and * denote statistical significance at the 1, 5 and 10% levels. Aid/GDP instrumented as in Dalgaard et al (2004).

Table 4, similar to Table 2, provides no support for the case that aid causes Dutch disease: in Columns 3 and 6, for example, growth in sectors producing most of the exportables is shown to be positively affected by aid, and with a marginal effect larger than in the overall economy. Again it is the Industrial sector where the impact appears to be strongest These findings strengthen our evidence on the absence of Dutch disease type of problems caused by aid, because they turn out to be robust to the inclusion of the effects of changes in the RER and other relevant financial variables.

A second interesting finding from Table 4 is the statistical significance of variables that reflect the exposure of the aid-recipient economies to changes in the RER, because it can be seen as suggestive evidence in support of positive balance-sheet effects in aid-recipient economies. The currency composition of foreign debt is significant only in sectors that are producing most of the exportable goods, suggesting that the positive balance-sheet effects are more likely to benefit firms producing these (exportable) goods. When this is combined with results from other studies showing that aid causes real appreciation, the results in Table 4 suggest that one reason for aid not creating Dutch disease type of problems might be that firms in those economies benefit from (possibly aid-induced) appreciations of the RER, and this might probably be partially due to having an important share of their debt denominated in foreign currency.

This evidence also opens space for discussion and revision of the finding that RER overvaluation has contractionary effects (as suggested for example by Shi, 2006), and tends to support the importance of balance-sheet effects mentioned in the literature on the contractionary effects of devaluations (see Frankel, 2005, for a recent survey on the topic).

V. Summary and Conclusion

This paper presents an empirical assessment of the hypothesis that aid is detrimental for external competitiveness and growth in average labour productivity in the recipient countries. This evidence is based on a sectoral decomposition of the effects of aid on aggregate growth, and on an extension of the typical aid-growth econometric specification to control for the effects of (a) changes in the RER and (b) financial characteristics of the debt in the different sectors. The findings are robust to different specifications, conditioning factors, and the endogenous nature of aid disbursements.

Our main results point to the absence of Dutch Disease effects: aid is found to have a positive marginal effect on growth of output per worker, at the aggregate level, and in both the tradable and the nontradable sectors. One possible explanation is the existence of idle capacity in the recipient countries, which can help to promptly meet the increase in aggregate demand caused by aid inflows. Another explanation, explored in the paper, is that Dutch disease type of problems need not materialize in an aid-recipient economy because firms in the tradable sector might benefit from an aid-induced RER appreciation. This would be the case if their debt is denominated mostly in foreign currency. We find evidence supporting the idea that the sectors producing most of the exportable goods indeed tend to benefit from a real appreciation by having an important part of the debt denominated in foreign currency.

Taken together, the finding that aid may cause RER appreciation but not Dutch disease type of problems, and the finding that the marginal effects of aid in countries with "bad" policies and "weak" structural characteristics are close to zero but not negative, suggest that the effectiveness of aid depends much more on the ability of donors to reduce the negative incentives associated with the use of foreign aid in the recipient countries than on the ability to control the macroeconomic type of problems supposedly undermining the effects of foreign aid on growth.

In practice, our findings suggest that the success of the planned scaling-up of aid to the poorest countries does not depend so much on whether the resources are spent or absorbed by local governments (in the sense of Killick and Foster, 2007), nor on the limitations that donors and agencies put on them to guarantee the right use of the aid resources, but rather on whether it is possible to find a way to maintain incentives in the recipient countries and to overcome structural bottlenecks such as low agricultural productivity in tropical areas.

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Table A1: Summary statistics

		Obs.	Mean	p25	p50	p75	Std. Dev.	Min.	Max.
GDP per capita	growth rate	505	1.41	-0.50	1.68	3.22	3.18	-12.68	10.60
	level	505	3,546.1	1,108.9	2,102.2	4,098.1	3,900.6	225.8	20,535.6
GDP per worker	growth rate	505	1.09	-0.82	1.38	2.83	3.13	-12.49	9.73
	level	505	8,229.8	984.4	3,410.0	7,870.3	12,759.9	195.8	73,613.2
Non-Services GDP per worker	growth rate	505	1.35	-1.03	1.43	3.46	4.30	-16.35	34.28
	level	505	9,394.9	889.7	3,599.9	8,597.4	15,661.9	137.0	117,040.3
Agri.&Indust. VA per worker	growth rate	504	1.23	-1.05	1.40	3.33	4.35	-18.29	34.15
	level	504	7,794.3	791.4	3,350.2	7,565.6	12,033.9	123.9	81,051.6
Services VA per worker	growth rate	505	1.17	-1.10	1.08	3.33	4.82	-24.20	53.38
	level	505	8,450.6	1,869.6	3,810.5	7,922.1	11,865.0	152.9	67,612.8
Agricultural VA per worker	growth rate	504	3.22	-1.53	0.84	2.99	38.51	-47.16	724.87
	level	504	11,708.3	496.8	1,789.1	10,615.9	33,081.3	106.6	283,446.9
Industrial VA per worker	growth rate	504	1.73	-1.44	1.72	4.63	5.48	-23.43	25.73
	level	504	9,786.9	2,190.9	4,400.0	10,945.2	13,228.8	297.6	90,083.8
Aid/GDP		505	0.93	0.01	0.23	1.23	1.54	-4.78	10.78
Policiy index		505	1.62	1.43	1.70	2.26	0.99	-6.58	2.80
Tropical area		505	0.67	0.04	1	1	0.44	0	1
Franco-zone dummy		505	0.093	0	0	0	0.29	0	1
Ethnic fractionalization		505	0.448	0.14	0.5	0.72	0.30	0	0.93
Assasinations		505	0.349	0	0	0.25	0.75	0	7
ICRG institutional quality index		505	4.949	3.37	4.99	6.11	2.36	0.56	10
Financial depth (M2), lagged		505	0.311	0.18	0.25	0.40	0.19	0.04	1.30
Sub-Saharan Africa		505	0.269	0	0	1	0.44	0	1
East Asia		505	0.125	0	0	0	0.33	0	1
Nominal devaluation rate		427	0.333	0	0.03	0.12	1.54	-0.20	18.45
Esternal debt/GDP		402	61.99	28.94	48.89	76.10	59.43	0	768.15
Long term debt, currency composition (%USD)		409	0.480	0.34	0.48	0.63	0.20	0	0.98

Table A.2: Sample

		1966-69	1970-73	1974-77	1978-81	1982-85	1986-89	1990-93	1994-97	1998-2001
Argentina	ARG		x	x	x	x	x	x	x	x
Australia	AUS			x	x	x	x	x	x	x
Burkina Faso	BFA		x	x	x	x	x	x	x	x
Bulgaria	BGR							x	x	x
Bolivia	BOL		x	x	x	x	x	x	x	x
Brazil	BRA	x	x	x	x	x	x	x	x	x
Botswana	BWA			x	x	x	x	x	x	x
Canada	CAN			x	x	x	x	x	x	x
Chile	CHL	x	x	x	x	x	x	x	x	x
China	CHN						x	x	x	x
Cote d'Ivoire	CIV				x	x	x	x	x	x
Cameroon	CMR			x	x	x	x	x	x	x
Congo, Rep.	COG						x	x	x	x
Colombia	COL	x	x	x	x	x	x	x	x	x
Costa Rica	CRI		x	x	x	x	x	x	x	x
Denmark	DNK	x	x	x	x	x	x	x	x	x
Dominican Republic	DOM					x	x	x	x	x
Algeria	DZA								x	x
Ecuador	ECU	x	x	x	x	x	x	x	x	x
Egypt, Arab Rep.	EGY			x	x	x	x	x	x	x
Ethiopia	ETH					x	x	x	x	x
Gabon	GAB					x	x	x		
Ghana	GHA	x	x	x	x	x	x	x	x	x
Gambia, The	GMB		x	x	x	x	x	x		
Guatemala	GTM	x	x	x	x	x	x	x	x	x
Honduras	HND	x	x	x	x	x	x	x	x	x
Haiti	HTI	x	x	x	x	x	x	x	x	x
Hungary	HUN					x	x	x	x	x
Indonesia	IDN		x	x	x	x	x	x	x	x
India	IND	x	x	x	x	x	x	x	x	x
Iran, Islamic Rep.	IRN			x	x	x	x	x	x	x
Jamaica	JAM			x	x	x	x	x	x	x
Japan	JPN		x	x	x	x	x	x		
Kenya	KEN		x	x	x	x	x	x	x	x
Korea, Rep.	KOR		x	x	x	x	x	x	x	
Sri Lanka	LKA	x	x	x	x	x	x	x	x	x
Morocco	MAR	x	x	x	x	x	x	x	x	x
Madagascar	MDG		x	x	x	x	x	x	x	x
Mexico	MEX		x	x	x	x	x	x	x	x
Mali	MLI						x	x	x	x
Malaysia	MYS		x	x	x	x	x	x	x	x
Nigeria	NGA	x	x	x	x	x	x	x	x	x
Nicaragua	NIC		x	x	x	x	x	x	x	x
Norway	NOR			x	x	x	x	x	x	x
New Zealand	NZL				x	x	x	x	x	x
Pakistan	PAK	x	x	x	x	x	x	x	x	x
Peru	PER	x	x	x	x	x	x	x	x	x
Philippines	PHL	x	x	x	x	x	x	x	x	x
Papua New Guinea	PNG					x	x	x	x	x
Poland	POL								x	x
Paraguay	PRY	x	x	x	x	x	x	x	x	x
Romania	ROM							x	x	x
Senegal	SEN		x	x	x	x	x	x	x	x
Singapore	SGP	x	x	x	x	x	x	x	x	x
Sierra Leone	SLE	x	x	x	x	x	x	x	x	x
El Salvador	SLV	x	x	x	x	x	x	x	x	x
Togo	TGO			x	x	x	x	x	x	x
Thailand	THA	x	x	x	x	x	x	x	x	x
Trinidad and Tobago	TTO			x	x	x	x	x	x	
Tunisia	TUN		x	x	x	x	x	x	x	x
Turkey	TUR		x	x	x	x	x	x	x	x
Tanzania	TZA							x	x	x
Uganda	UGA					x	x	x	x	x
Uruguay	URY	x	x	x	x	x	x	x	x	x
United States	USA			x	x	x	x	x	x	x
Venezuela, RB	VEN	x	x	x	x	x	x	x	x	x
South Africa	ZAF							x	x	x
Congo, Dem. Rep.	ZAR		x	x	x	x	x	x	x	
Zambia	ZMB	x	x	x	x	x	x	x	x	x