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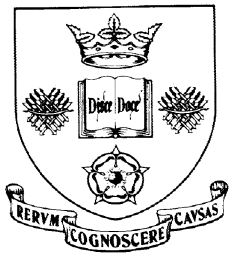

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Aid and Fertility: What Does the Cross-Country Evidence Show?[*]

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Abstract

This paper examines the effects of foreign aid on fertility rates in recipient countries using Rajan and Subramanian's (2008) cross-sectional and panel methods. Our cross-section results suggest that foreign aid has a positive effect on fertility. Interestingly, social sector aid (but not economic aid) is responsible for this demographic effect. The panel evidence confirms the positive effect of foreign aid on total fertility rates, and that social aid is more relevant than economic aid. Given that the literature has found no robust relationship between foreign aid and economic growth, our findings raise the possibility of an aid-induced population poverty trap.

JEL classification: F35, I31, J11

Keywords: foreign aid, population growth, Malthusian traps

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The voluminous aid-growth literature shows that there is little robust evidence that foreign aid helps economic growth, even under good policy and favorable geographical environment. For instance, Rajan and Subramanian (2008) review the existing papers on the link between aid and growth and provide the most updated estimates of the relationship, which is insignificant in most cases.[1] To evaluate the potential of the UN Millennium Project, which among other things calls for doubling the aid budget, one has to ask the question "what aspects of aid offset what must be the indisputable growth enhancing effects of resource transfers" (Rajan and Subramanian, 2008).

Numerous possible offsets to the beneficial effects of aid have been suggested, ranging from government failure and rent seeking (e.g. Boone, 1996; Burnside and Dollar, 2000) to Dutch disease (e.g. Prati and Tressel, 2006; Rajan and Subramanian, 2009).[2] Given that many developing economies are — presumably — still largely affected by a Malthusian trap such that their population growth has an adverse effect on their development process (Weil and Wilde, 2009), it is surprising that the large literature on aid effectiveness has paid little attention to the effects of aid on the demographic transition (Easterly, 2006).[3]

In this paper, we attempt to fill this gap by providing a systematic analysis of the impact of foreign aid on fertility rates. Since our main goal is to shed light on the previous finding of the lack of any significant relationship between aid and economic growth by examining one possible channel which offsets the economic impact of aid, we make no attempt to be innovative in our empirical strategy. More precisely, to facilitate a comparison between our results and previous findings, we follow closely the empirical framework employed by Rajan and Subramanian (2008), one of the most careful and comprehensive recent studies on aid effectiveness.

Using both cross-sectional and panel data as in Rajan and Subramanian (2008), we show that aid has a significant positive effect on the recipient country's fertility rates. This significant

[1] A few authors find an average positive effect of aid on growth (Hansen and Tarp, 2001; Dalgaard, Hansen, and Tarp, 2004; Economides, Kalyvitis, and Philippopoulos, 2008) and others argue that aid only has a positive (or sometimes negative) impact on growth under some conditions (Burnside and Dollar, 2000; Easterly, Levine, and Roodman, 2007). See Doucouliagos and Paldam (2008) for a meta-analysis of this relationship.

[2] There is a parallel between the aid effectiveness literature and the resource curse literature since both rent seeking and Dutch disease have been suggested as causes of the latter (see Cotet and Tsui, 2009).

[3] To our knowledge, the two only exceptions are Azarnert (2008a) who focuses only on African countries and Neanidis (2010). Since these two papers are the closest to our exercise, we discuss them in more detail in the next section. Azarnert (2008b) offers a theoretical model that links the relationship between aid, fertility and human capital and provides anecdotic evidence to support it.

relationship suggests that while noise in the data may be partially responsible for the lack of relation between aid and economic growth, the first-order macro impact of aid is perhaps extensive instead of intensive growth. It is widely accepted that the demographic transition — the transition from high to low fertility rates- played an important role in the take-off of Western economies (Galor and Weil 1996, 2000; Galor 2005).

Finally, fungiblility implies that how aid gets translate into growth and demographic change may not depend on the specific purpose aid is given for (e.g. Devarajan and Swaroop, 1998; Chatterjee, Giuliano, and Kaya, 2009). Interestingly, in the case of demographic changes, we find that it is social sector aid (i.e. assistance in education, health, population, water supply and sanitation) that is responsible for the higher fertility and the faster population growth. Economic aid (i.e. assistance for energy, transportation, and communication) has no robust impact on economic as well as demographic outcomes. This finding is consistent with a sectoral flypaper effect (van de Walle and Mu, 2007) and has important policy implications given the emphasis of social sector aid in the UN Millennium Project and the heavy dependence of the aid recipient countries on agriculture and natural resources. If, as our findings suggest, social aid delays the demographic transition, which played an important role in the long run take-off of the West, attempts to achieve the Millennium development goals by emphasizing social sector assistance may need to be reconsidered.

The paper is organized as follows. Section 1 reviews the scant literature on the empirical link between fertility rates and foreign aid. In Section 2 we present some descriptive statistics and show our cross-sectional and panel estimates. Finally, Section 3 concludes.

1. Literature Review

Azarnet (2008a) studies the relationship between foreign aid, fertility and population growth in a panel of 43 African countries and finds that foreign aid is positively associated with faster population growth and higher total fertility rates. Our paper differs from Azarnert's in several dimensions. First, we generalize his results to a much larger set of developing countries. Second, using different IV techniques we show that the association between foreign aid and fertility is more than just statistical correlation. Finally, our results exploit both the cross-section and the panel dimension of the data. One important advantage of the cross-sectional analysis is that it

allows us to use the instrumental variable procedure that has been exploited in Rajan and Subramanian (2008) in order to address problems of endogeneity and measurement error. In particular, we use a combination of different characteristics of donors as an instrument.[4] We describe this instrument in more detail in Section 2.

Neanidis (2010) presents a theoretical model in which foreign aid may increase or decrease the fertility rate of the recipient country and, as a consequence, has an ambiguous effect on its economic growth.[5] He then estimates a panel model for the period 1973-2007 and finds that, consistent with his model, on average humanitarian aid has a zero impact on both the rate of fertility and the rate of output growth. Another finding of his study is that for countries that have not yet experienced the demographic transition, the impact of humanitarian aid on fertility is positive. The first difference between his empirical analysis and ours is that he focuses on the effect of *humanitarian aid* on fertility rates and economic growth, whereas we study the effect of *total foreign aid* following Rajan and Subramanian (2008).[6] Another difference between Neanidis (2010) and the present paper is that he includes as regressors both the gross disbursements of humanitarian aid and the gross repayments on aid (both as a percentage of the recipient country's GDP). Instead our key control is the ratio of aggregate net development assistance that is disbursed. Finally, as it was the case in Azarnert (2008a), Neanidis only presents panel data results.

2. Empirical Findings

2.1. Descriptive Statistics

Before presenting our main results, we show in Table 1 some descriptive statistics of the variables used in the analysis that already suggest a positive association between aid and fertility. The first column reports the mean and standard deviation (in parenthesis) for the whole sample

[4] This instrument is not available in the panel regressions and the only possibility there is to use generalized method of moments (GMM) techniques.
[5] In the model presented in Azarnert (2008b) foreign aid increases fertility and so it has an unambiguously negative effect on economic growth.
[6] The distinction between these two types of aid is discussed in more detail in Clemens, Radelet, and Bhavnani (2004) and in Neanidis and Varvarigos (2009).

of countries over the 1970-2000 period.[7] In the next three columns, countries are classified into three groups according to their aid dependence, as measured by aid as a fraction of GDP. The last column reports the F-statistics under the null hypothesis that the variables of the three country groups have the same mean. Panel A presents the descriptive statistics of our main regressor aid relative to GDP, whereas Panel B shows those related to fertility, our main demographic variable. The statistics for other country characteristics and control variables are reported in Panel C.

Several remarks are in order. First, Panel A shows that there is substantial variation in aid dependence in our sample of recipient countries. Second, from Panel B we can see that high aid-dependent countries have higher fertility (measured by the total fertility rate, i.e. the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with prevailing age-specific fertility rates).[8] For good reasons, however, Panel C shows that there are a number of systematic and significant differences across countries according to their aid dependence. For instance, poor, politically unstable (as measured by *revolutions*), and more ethnically fractionalized countries receive more foreign aid. This is also the case for countries with bad policies and a low initial life expectancy. This suggests that foreign aid is not randomly assigned across countries, which might be efficient from the point of view of aid allocation, but at the same time it imposes a challenge when evaluating aid effectiveness.[9]

Another interesting feature of the data is that our dependent variable, the total fertility rates, are very persistent over time.[10] This can be a result of culture, institutions, or market forces that are hard to capture empirically. In any case, we take into account this high correlation in the regressions that we estimate in the next section.

[7] The data comes from the OECD DAC 2002 database. See Rajan and Subramanian (2009) for more details.
[8] This is consistent with the facts documented in Azarnert (2008a) in relation to Sub-Saharan African countries.
[9] It is also important to note that although poor countries tend to receive more aid, it is unclear whether aid and fertility should be positively correlated because an important component of foreign aid is contraceptive and family planning assistance.
[10] The average correlation across decades is 0.76.

2.2. Cross-Sectional Results

2.2.1. OLS estimation

In this section we estimate the following regression:

$$FERTILITY_i = \alpha + \beta_1 AID_i + \gamma' X_i + \varepsilon_i \qquad (1)$$

where $Fertility_i$ represents the log of country i's average total fertility rate. Our main variable of interest is Aid_i, which represents the average ratio of aid received by country i in terms of its GDP.[11] The vector X_i includes the set of country i's characteristics discussed in the previous section (initial level of per capita GDP, initial level of policy, initial level of life expectancy, a geography control, institutional quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, ethnic fractionalization, and a dummy variable for East Asia and another one for Sub-Saharan African countries). We also include initial fertility as an additional control to account for mean reversion and the possibility of any omitted economic and cultural factors that may affect fertility. Figure 1 displays the conditional correlation between foreign aid (as a percentage of GDP) and fertility in the 1980-2000 time interval. It is apparent that the relationship between the two variables is positive and concave. Moreover, this correlation does not seem to be driven by significant outliers. We next proceed to estimate this relationship in a more systematic way.

The results of the OLS estimation of (1) are shown in Table 2. In all the time periods considered with the exception of the 1990-2000, foreign aid has a significant positive impact on fertility. The significant effect on fertility is robust to controlling for the square of aid in the regression (except in (2)). Moreover, the negative coefficient associated with the squared term is significant over the 1980-2000 and 1990-2000 periods, suggesting the existence of a diminishing impact of aid on fertility as aid disbursements increase.

The data also allows one to study the impact of different types of aid flows depending on their purpose. One particularly interesting distinction is between social and economic aid. Social sector aid includes education, health and population, and water supply and sanitation, whereas economic aid refers to aid targeted to energy, transport and communications. Table 3 shows the

[11] These averages are taken over different time intervals specified below.

estimates associated with social aid.[12] The results are very similar to those obtained in Table 2, i.e. there is a strong correlation between social aid and fertility rates, both including and excluding the square of aid as a regressor, with the exceptions of specification (5). Finally, when one considers economic aid as a regressor (see Table 4) its impact on fertility rates is positive in almost all cases although it is estimated less precisely, except in specification (1).

2.2.2. IV estimation

The OLS regressions estimated above present obvious endogeneity problems due to omitted variables and reverse causality going from the recipient's fertility rate to its received foreign aid.[13] For instance, it is reasonable to think that aid goes to countries that have high fertility rates because they also present related macroeconomic and socioeconomic problems, as it is suggested in the descriptive statistics of Table 1. Therefore, it is problematic to take the estimates of the previous section as evidence of causal effects. Following Rajan and Subramanian (2008) in this section we use their instrumental variable to attempt to isolate the exogenous component of aid and estimate its impact on the total fertility rates of recipient countries.

Their instrument is based on the idea that non-economically-motivated aid is unlikely to be driven by economic outcomes. In other words, they model the supply of aid based on donor-related rather than recipient-specific characteristics. The aid supply equation from a donor *d* to a recipient *i* in period *t* is given by

$$
\begin{aligned}
A_{dit} = {} & \alpha_0 + \alpha_1 COMLANG_{di} + \alpha_2 CURCOL_{dit} + \alpha_3 COMCOL_{di} + \alpha_4 COMCOLUK_{di} \\
& + \alpha_5 COMCOLFRA_{di} + \alpha_6 COMCOLSPA_{di} + \alpha_7 COMCOLPOR_{di} + \alpha_8 ln\frac{POP_d}{POP_i} \\
& + \alpha_9 ln\frac{POP_d}{POP_i} COMCOL_{di} + \alpha_{10} ln\frac{POP_d}{POP_i} COMCOLUK_{di} \\
& + \alpha_{11} ln\frac{POP_d}{POP_i} COMCOLFRA_{di} + \alpha_{12} ln\frac{POP_d}{POP_i} COMCOLSPA_{di} \\
& + \alpha_{13} ln\frac{POP_d}{POP_i} COMCOLPOR_{di} + \varepsilon_{dit}
\end{aligned}
$$

[12] Data on social and economic aid is only available since 1970.
[13] Moreover there may be significant measurement error problems in the data.

where *COMLANG* is a dummy for whether the donor and recipient share a common language; *CURCOL* is a dummy for whether the recipient is currently a colony of the donor, and *COMCOL* is a dummy for whether the recipient was ever a colony of the donor. The next four controls are dummies for colony origin: United Kingdom, France, Spain, and Portugal. Finally, $\frac{POP_d}{POP_r}$ measures the relative initial population size between the donor and the recipient. This ratio is then interacted with the colonial origins. The estimated aid a_{drt} is then aggregated to obtain the estimated total aid received for country *r*, $\hat{A}_{rt} = \sum_d \hat{A}_{drt}$. Rajan and Subramanian (2007) show that the first-stage relationship between the above instruments and aid is strongly positive.

Table 5 shows the IV estimates using total foreign aid as a regressor. The effect of aid on fertility is positive and significant in all periods except in the 1990-2000.[14] A comparison between these estimates and the OLS ones (Table 2) indicates that the IV coefficients are significantly larger, suggesting that there is significant measurement error in some of the variables included in the analysis. The F-tests of the first stage are always significant at the 1% level, suggesting that our instruments are not weak.

We interpret these findings as strong evidence in favor of the Malthusian mechanism i.e. the fact that increases in foreign aid generate significant increases in fertility rates. The IV estimates suggest that this result is robust to potential endogeneity or reverse causality problems.

Tables 6 and 7 show the corresponding IV estimates using social and economic aid as the key covariates, respectively.[15] The impact of social aid is positive in all cases but significant only in specifications (1)-(3). Economic aid has now a slightly more significant impact than in the OLS estimation (see Table 4), although again its effect is rather weak in most cases.

[14] The impact is positive but insignificant in the 1980-2000 period when one includes the square term (column (6)).
[15] As in Table 5, the p-values associated with the first-stage F-tests are in all cases smaller than 0.01 which suggests that our instruments are not weak.

2.3. Panel Results

In this section we show that the positive relationship between foreign aid and fertility rates is still present when we exploit the panel dimension of the data. The set of controls are the same as in the cross-section estimation, although we choose not to control for initial fertility to avoid endogeneity problems in the fixed effects estimation and to limit problems of measurement error.

Table 8 displays the panel estimates. Controlling for country fixed effects (column 1) the effect is positive and statistically significant at the 5% level. Instrumenting aid with lags of aid (column 2) the coefficient associated with aid remains statistically significant, and its size increases significantly when one includes the square of aid as a control (column 3).

Table 9 shows that, as it was the case in the cross-section exercise (Tables 3 and 6), the effect of social aid is positive and statistically significant. On the other hand, the effect of economic aid is insignificant in all specifications (see Table 10).

3. Concluding Remarks

We have documented in this paper a robust positive relationship between aid and fertility in the recipient countries. The lack of a correlation between aid and economic growth and a robust positive correlation between aid and fertility rates are consistent with the Malthusian and the neoclassical growth theories where some factors of production, such as land, are supplied inelastically. According to the unified growth theory (Galor and Weil, 2000), the Malthusian regime is a pseudo-steady state which vanishes in the long run as population becomes sufficiently large so that the population-induced technological progress permits a take-off to the post-Malthusian regime. On the other hand, if foreign aid has a significant positive impact on the quantity of children, which in turn raises the price of the quality of children, foreign aid may postpone the demographic transition and hence the transition from the post-Malthusian regime to the modern growth regime. When this is true, attempts to achieve the Millennium development goals by emphasizing foreign aid assistance may need to be reconsidered.

We have established in this paper a robust empirical relationship between aid and total fertility rates. Whether the aid-induced population growth is good or bad for economic

development is an important question that we leave it for future research. A finding that this effect is robustly negative would strengthen the case to use foreign aid in part to precisely control population growth, as suggested in Blackorby, Bosswort, and Donaldson (1999).

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Table 1: Descriptive Statistics

	All countries (1)	Low-aid countries (2)	Middle-aid countries (3)	High-aid countries (4)	F-statistics (5)
			Panel A. Foreign Aid		
Aid / GDP	5.525	0.307	3.669	14.827	107.3***
	(6.212)	(0.191)	(2.531)	(4.740)	
			Panel B. Demographic Outcomes		
Fertility	4.895	3.413	4.846	6.556	633.65***
	(1.613)	(1.226)	(1.287)	(0.832)	
			Panel C. Other Country Characteristics and Controls		
Initial per Capita GDP	7.654	8.244	7.655	7.031	3736.99***
	(0.765)	(0.660)	(0.657)	(0.580)	
Initial level of policy	0.317	0.437	0.333	0.158	33.56***
	(0.294)	(0.352)	(0.276)	(0.189)	
Initial level of life expectancy	52.881	60.817	53.965	42.300	1545.79***
	(9.774)	(6.726)	(8.275)	(5.064)	
Geography	-0.547	0.062	-0.692	-0.890	44.37***
	(0.765)	(1.020)	(0.534)	(0.473)	
Initial level of institutions	0.526	0.629	0.505	0.462	585.77***
	(0.128)	(0.106)	(0.119)	(0.108)	
Initial inflation	18.865	37.743	11.401	14.313	18.37***
	(34.54)	(60.723)	(11.617)	(19.668)	
Initial M2 / GDP	23.483	29.824	24.266	15.201	130.06***
	(12.389)	(13.890)	(11.969)	(5.669)	
Initial budget balance/GDP	-3.831	-1.311	-4.713	-4.672	18.40***
	(4.84)	(2.827)	(4.667)	(6.026)	
Revolutions	0.231	0.189	0.239	0.260	31.51***
	(0.218)	(0.182)	(0.248)	(0.187)	
Ethnic fractionalization	0.467	0.357	0.491	0.535	69.09***
	(0.293)	(0.281)	(0.293)	(0.287)	
Number of Countries	78	20	39	19	

Notes: In columns (2)-(4), countries are classified into three groups, according to their aid dependence.

Table 2: The Effect of Foreign Aid on Fertility Rates. OLS.

	1960-2000		1970-2000		1980-2000		1990-2000	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid/GDP	0.004*	0.011	0.006*	0.016*	0.009**	0.025***	-0.000	0.014***
	(0.002)	(0.008)	(0.003)	(0.01)	(0.003)	(0.008)	(0.002)	(0.005)
Aid/GDP square		-0.000		-0.000		-0.0008**		-0.0006***
		(0.000)		(0.000)		(0.0004)		(0.0002)
Number of observations	71	71	74	74	70	70	66	66
R^2	0.887	0.889	0.908	0.911	0.951	0.954	0.982	0.984

Cross-sectional OLS regressions in all columns, with robust standard errors reported in parentheses. The set of controls are: initial per capita GDP, initial population, initial life expectancy, geography, institution quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, and ethnic fractionalization. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 3: The Effect of Social Foreign Aid on Fertility Rates. OLS.

	1970-2000		1980-2000		1990-2000	
	(1)	(2)	(3)	(4)	(5)	(6)
Social Aid/GDP	0.027*	0.084**	0.031**	0.102**	-0.000	0.042***
	(0.014)	(0.034)	(0.014)	(0.042)	(0.006)	(0.015)
Social Aid/GDP square		-0.014**		-0.021*		-0.006***
		(0.007)		(0.01)		(0.002)
Number of observations	74	74	70	70	66	66
R^2	0.907	0.911	0.949	0.951	0.982	0.983

Cross-sectional OLS regressions in all columns, with robust standard errors reported in parentheses. The set of controls are: initial per capita GDP, initial population, initial life expectancy, geography, institution quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, and ethnic fractionalization. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 4: The Effect of Economic Foreign Aid on Fertility Rates. OLS.

	1970-2000		1980-2000		1990-2000	
	(1)	(2)	(3)	(4)	(5)	(6)
Economic Aid/GDP	0.005	0.01	0.005	0.008	0.000	0.011
	(0.003)	(0.007)	(0.003)	(0.008)	(0.002)	(0.008)
Economic Aid/GDP square		-0.000		-0.000		-0.0007*
		(0.000)		(0.000)		(0.0004)
Number of observations	74	74	70	70	66	66
R^2	0.909	0.909	0.948	0.948	0.982	0.983

Cross-sectional OLS regressions in all columns, with robust standard errors reported in parentheses. The set of controls are: initial per capita GDP, initial population, initial life expectancy, geography, institution quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, and ethnic fractionalization. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 5: The Effect of Foreign Aid on Fertility Rates. IV.

	1960-2000		1970-2000		1980-2000		1990-2000	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
First stage								
Endogenous variable: foreign aid and its square								
A_{dit}	64.542***	73.04***	54.117***	52.598***	49.639***	52.557***	37.067**	46.585***
	(14.46)	(18.095)	(11.478)	(13.141)	(9.243)	(9.994)	(14.955)	(15.789)
A^2_{dit}		-138.236		30.704		-100.672		-328.848
		(175.901)		(125.937)		(128.367)		(198.534)
R^2	0.691	0.694	0.751	0.751	0.828	0.83	0.664	0.681
F-test	10.42	9.6	14.8	13.45	22.03	20.24	8.4	8.23
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Second stage								
aid/GDP	0.009	0.037***	0.021***	0.054***	0.022***	-0.027	0.008	0.026
	(0.007)	(0.012)	(0.008)	(0.014)	(0.007)	(0.302)	(0.006)	(0.037)
aid/GDP square		-0.001**		-0.001**		0.003		-0.001
		(0.000)		(0.001)		(0.021)		(0.002)
Number of observations	69	69	72	72	68	68	64	64
R^2	0.878	0.863	0.884	0.873	0.942	0.818	0.976	0.982

2SLS regressions in all columns, with robust standard errors reported in parentheses. The instrument is constructed by Rajan and Subramanian (2008) based on donor-related characteristics. The set of controls are: initial per capita GDP, initial population, initial life expectancy, geography, institution quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, and ethnic fractionalization. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 6: The Effect of Social Foreign Aid on Fertility Rates. IV.

	1970-2000		1980-2000		1990-2000	
	[1]	[2]	[3]	[4]	[5]	[6]
First stage						
Endogenous variables: social aid and its square						
A_{dit}	11.735***	9.697***	9.033***	9.237***	9.605**	11.47**
	(2.198)	(2.453)	(2.19)	(2.38)	(4.243)	(4.543)
A^2_{dit}		41.213*		-7.015		-64.425
		(23.512)		(30.571)		(57.122)
R^2	0.652	0.67	0.65	0.65	0.485	0.5
F-test	9.23	9.05	8.52	7.73	4	3.81
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Second stage						
social_aid/GDP	0.095**	0.272***	0.121**	0.121	0.032	0.047
	(0.04)	(0.066)	(0.038)	(2.188)	(0.021)	(0.053)
social_aid/GDP square		-0.047***		0.000		-0.005
		(0.015)		(1.067)		(0.012)
Number of observations	72	72	68	68	64	64
R^2	0.887	0.878	0.927	0.927	0.975	0.982

2SLS regressions in all columns, with robust standard errors reported in parentheses. The instrument is constructed by Rajan and Subramanian (2008) based on donor-related characteristics. The set of controls are: initial per capita GDP, initial population, initial life expectancy, geography, institution quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, and ethnic fractionalization. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 7: The Effect of Economic Foreign Aid on Fertility Rates. IV.

	1970-2000		1980-2000		1990-2000	
	[1]	[2]	[3]	[4]	[5]	[6]
First stage						
Endogenous variables: economic aid and its square						
A_{dit}	49.092***	64.83***	46.327***	48.623***	13.453	20.46
	(15.141)	(16.786)	(11.273)	(12.229)	(13.172)	(14.021)
A^2_{dit}		-318.19*		-79.212		-242.09
		(160.875)		(157.069)		(176.297)
R^2	0.639	0.662	0.732	0.733	0.438	0.459
F-test	53.29	8.73	12.51	11.41	3.32	3.26
p-value	0.000	0.000	0.000	0.000	0.001	0.001
Second stage						
	[1]	[2]	[3]	[4]	[5]	[6]
economic_aid/GDP	0.023***	-0.094	0.024***	0.051	0.023	0.072
	(0.007)	(0.788)	(0.008)	(0.119)	(0.025)	(0.115)
economic_aid/GDP square		0.006		-0.002		-0.004
		(0.042)		(0.008)		(0.008)
Number of observations	72	72	68	68	64	64
R^2	0.852	0.873	0.922	0.925	0.95	0.955

2SLS regressions in all columns, with robust standard errors reported in parentheses. The instrument is constructed by Rajan and Subramanian (2008) based on donor-related characteristics. The set of controls are: initial per capita GDP, initial population, initial life expectancy, geography, institution quality, initial inflation, initial M2/GDP, initial budget balance/GDP, revolutions, and ethnic fractionalization. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 8: The Effect of Foreign Aid on Fertility Rates. Panel, 1960-2000.

	FE	FE	GMM	GMM
	(1)	(2)	(3)	(4)
Aid/GDP	0.005**	0.008	0.004***	0.013**
	(0.002)	(0.005)	(0.001)	(0.006)
Aid/GDP squared		-0.000		-0.000
		(0.000)		(0.000)
Chi-square (Hansen over-id test)			1.000	1.000
AR(2) (test for serial correlation)			0.029	0.036
Number of observations	247	247	171	171
Number of countries	76	76	68	68

In columns (3) and (4) regressions use the Arellano and Bond (1991) difference GMM estimator. Other controls are: initial level of trade policy, initial inflation, institutional quality, financial depth measured as the ratio of M2 to GDP, the ratio of budget balance to GDP, and revolutions. All standard errors are robust and reported below coefficient estimates. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 9: The Effect of Social Aid on Fertility Rates. Panel, 1970-2000.

	FE	FE	GMM	GMM
	(1)	(2)	(3)	(4)
Social Aid/GDP	0.020**	0.049**	0.019**	0.047**
	(0.009)	(0.021)	(0.009)	(0.021)
Social Aid/GDP squared		-0.004*		-0.004*
		(0.002)		(0.002)
Chi-square (Hansen over-id test)			1.000	1.000
AR(2) (test for serial correlation)			0.074	0.075
Number of observations	243	243	168	168
Number of countries	75	75	68	68

In columns (3) and (4) regressions use the Arellano and Bond (1991) difference GMM estimator. Other controls are: initial level of trade policy, initial inflation, institutional quality, financial depth measured as the ratio of M2 to GDP, the ratio of budget balance to GDP, and revolutions. All standard errors are robust and reported below coefficient estimates. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 10: The Effect of Economics Aid on Fertility Rates. Panel, 1970-2000.

	FE	FE	GMM	GMM
	(1)	(2)	(3)	(4)
Economic Aid/GDP	0.002	-0.000	0.003	-0.003
	(0.002)	(0.004)	(0.002)	(0.005)
Economic Aid/GDP squared		0.000		0.000
		(0.000)		(0.000)
Chi-square (Hansen over-id test)			1.000	1.000
AR(2) (test for serial correlation)			0.041	0.052
Number of observations	241	241	165	165
Number of countries	75	75	68	68

In columns (2) and (3) regressions use the Arellano and Bond (1991) difference GMM estimator. Other controls are: initial level of trade policy, initial inflation, institutional quality, financial depth measured as the ratio of M2 to GDP, the ratio of budget balance to GDP, and revolutions. All standard errors are robust and reported below coefficient estimates. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Figure 1: Conditional Relationship between Aid and Fertility, 1980-2000.