More foreign aid, less financial development

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MORE FOREIGN AID, LESS FINANCIAL DEVELOPMENT

ABSTRACT

We examine whether foreign aid substitutes domestic finance. A simple theoretical model is presented to show that foreign aid might raise private consumption but reduce private borrowing, which could be consistent with undermining financial development. The results of empirical tests of the foreign aid–financial development relationship reported employing cross-sectional and panel data sets of 96 developing countries for the period 1971-2015. The results indicate that foreign aid inflows have a negative and highly significant impact on financial development in aid-recipient countries. The results are not affected by model specification, different control variables, variation in country sample, or estimation technique. To our knowledge, this is the first paper to test the foreign aid–financial development linkage.

RIASSUNTO

Più aiuti esteri, meno sviluppo finanziario

In questo articolo esaminiamo se gli aiuti dall'estero costituiscono un sostituto dello sviluppo della finanza interna. In esso si presenta un modello teorico semplice per dimostrare che gli aiuti dall'estero possono favorire un aumento dei consumi di privati e nello stesso tempo una riduzione dei prestiti a privati. Ciò porta ad un indebolimento dello sviluppo finanziario di un paese. I risultati dei test empirici sulla relazione tra aiuti dall'estero e sviluppo finanziario riportati nell'articolo sono stati calcolati utilizzando dati panel relativi a 96 paesi in via di sviluppo nel periodo 1971-2015. I risultati indicano che i flussi degli aiuti dall'estero hanno un impatto negativo e altamente significativo sullo sviluppo finanziario dei paesi che ricevono gli aiuti. Tali risultati non sono influenzati dalla specificazione del modello, dalle variabili di

controllo, da variazioni nel paese campione o da tecniche di stima. A nostra conoscenza, è questo il primo articolo che effettua dei test sul legame tra gli aiuti dall'estero e lo sviluppo finanziario dei paesi.

1. INTRODUCTION

Official donors generally view domestic finance and foreign aid as complementary sources of capital, reflecting the perception that governments and firms in developing economies often face important credit constraints (e.g., United Nations 2002)[1]. The literature on financial development, however, ascribes a role to the financial system that goes well beyond relieving credit constraints. For example, King and Levine (1993), Levine (2005), and McCaig and Stengos (2005) demonstrate a "causal" impact of financial development on economic growth. Mitra (2013) reports that it reduces macroeconomic volatility because it provides a financial buffer. Levine *et al.* (2014) report that financial development reduces racial inequality and Beck *et al.* (2007), Agnello *et al.* (2012) and Lo Prete (2013) find that it reduces income inequality and poverty, probably because of greater access to finance. Altunbaş and Thornton (2012) report that that financial development reduces corruption, probably because financial institutions effectively monitor borrowers and induce them to improve the efficiency with which they allocate resources[2]. If the benefits of a more developed financial system are as wide ranging as these studies appear to suggest, and if foreign aid and financial development are complements, there would appear to be a strong case for using aid to support financial sector development. For example, recent research suggests that financial development is more likely in economies in which the legal code supports creditor rights and efficient contract enforcement (La Porta *et al.*, 1997, 1998; Djankov *et al.*, 2007), where foreign competition is sufficient to diminish the power of local interest groups (Rajan and Zingales, 2003) and to improve the functioning of national banking systems and the quality of financial services (Claessens *et al.*, 2001), and in which inflation is low (Boyd *et al.*, 2001). Accordingly, foreign aid inflows could complement financial

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[1] The "credit constraints" view has some support in the empirical literature. Boone (1996), Morrissey (2012), and Remmer (2004) report results linking foreign aid inflows to the growth of government and interpret this as indicating that governments are credit constrained. Harrison and McMillan (2003) and Bigsten *et al.* (2003) report results suggesting that private firms in African countries face credit constraints. In addition, Nkusu and Sayek (2004) suggest a complementary relationship in arguing that financial development enhances aid-recipient countries' capacity to absorb foreign aid in a way that boosts its effectiveness.

[2] While there is considerable agreement on the importance of domestic finance for economic, development, the role of foreign aid is rather more controversial. Radlet (2008) provides a balanced but generally optimistic assessment of the impact of foreign aid whereas Easterly (2002a) provides a recent statement of the skeptical view.

development if they are channeled to supporting trade and capital account liberalization, the development of legal frameworks favorable to creditor rights and contract enforcement, and upgrading of economic institutions, such as strengthening the technical capabilities of the central bank.

On the other hand, there is also considerable indirect research that suggests foreign aid might adversely impact on financial development – that is, that aid and domestic finance are substitutes. This might occur, for example, if aid relaxed the government budget constraint to the extent that it delayed the introduction of good policies (Easterly, 2002b, 2003), or if it undermined a country's governance by stunting the development of institutions (Knack, 2001; Busse and Gröning, 2009; Moss *et al.*, 2006), or if it resulted in an inflationary boost to government spending (Rajan and Subramanian, 2005; Bulíř and Hamann, 2001). In fact, the direct relationship between domestic finance and foreign aid has received little attention in the development literature. This is an important gap given the contribution of financial development to economic development more generally and the large amount of foreign aid inflows to developing countries. In this paper, we contribute to closing that gap in two ways. First, we develop a model in which foreign aid and financial development are in fact substitute sources of finance. The economic intuition behind the model is that foreign aid raises an agent's consumption but reduces the amount they wish to borrow in the future to realize their optimal consumption path. Second, we test for a negative relationship between foreign aid and financial development using cross-sectional and panel data sets of 96 foreign aid-recipient countries over the period 1971-2015. Our study has both academic and practical merit: it explores a new dimension of how foreign aid impacts on the host country; and it provides an explanation as to why financial development differs substantially across developing economies. Summarizing our results, we find that foreign aid inflows have a negative and statistically significant impact on financial development in aid-recipient countries. Our results are robust and not affected by model specification, different control variables, variations in country sample, or estimation technique. We conclude that the adverse impact of foreign aid on financial development is a channel through which foreign aid can adversely affect economic development.

The rest of the paper is organized as follows. Section 2 presents a theoretical model that links foreign aid inflows to financial development. Section 3 describes our empirical methodology and data. Section 4 presents and our empirical results and Section 5 concludes.

2. FOREIGN AID AND FINANCIAL DEVELOPMENT

We model the substitutability of foreign aid and financial development in a three-agent (host country agent, host country bank, foreign donor) two-period model in which foreign aid inflows impact negatively on financial development. We begin by considering a host country economy populated by a continuum of identical agents whose total population is normalized to one. We assume that the representative agent lives two periods and maximizes:

$$U = u(c_1) + \beta u(c_2) \tag{1}$$

where c_t is the consumption in period t, and β is the discount factor of the domestic consumer. We assume that $u' > 0$ and $u'' < 0$, and that $\beta = \frac{1}{1+r}$, where r is the risk-free interest rate. The budget constraint of the consumer for the period t is:

$$c_1 = AID + B \tag{2}$$

where AID is exogenous foreign aid received and B represents the loan that the consumer receives from the host country bank. The individual is assumed to have no other sources of income in the first period and the volume of debt chosen by the individual is always positive.

In the second period, the consumer receives income, Y_2, and pays back the debt with interest, r, which is the risk-free interest rate that is determined exogenously (by the bank). Consequently, the budget constraint of the individual agent is:

$$c_2 = Y_2 - (1+r)B \tag{3}$$

where c_2 is consumption at time 2 and $(1+r)B$ is the amount of debt that the agent has to repay the financial institution. We assume that the income that the individual receives in the second period is higher than the debt he has to repay – i.e., $Y_2 - (1+r)B > 0$. Note also that income in the second period is higher as a result of the foreign aid $Y_2 > AID$, (Vasilakis 2011). Using equations (2) and (3), the utility function of the agent can be rewritten as follows:

$$U = u(AID + B) + \beta u(Y_2 - (1+r)B) \tag{4}$$

When choosing the optimal value of B in period 1, the borrower considers that he has to repay his debt in period 2 to satisfy to constraint $Y - (1 + r)B > 0$. At the same time, the borrower knows that he is too small for his behavior to influence the interest rate r. The maximization of (4) with respect to B_i yields the first-order condition:

$$u(AID + B) = \beta(1 + r)u(Y_2 - (1 + r)B_i) \tag{5}$$

Using the assumption that $\beta = \frac{1}{1+r}$, then equation (5) becomes:

$$u(AID + B) = \beta u(Y_2 - (1 + r)B) \tag{6}$$

The LHS of equation (6) reflects the marginal utility of additional debt in period 1, with the RHS of the equation gives the marginal cost of borrowing. Due to the concavity of u, the LHS in the equation (6) is downward-sloping function of B_t, while the RHS is upward-sloping. The two curves are depicted in Figure 1.

FIGURE 1 – *The Equilibrium Level of Debt*
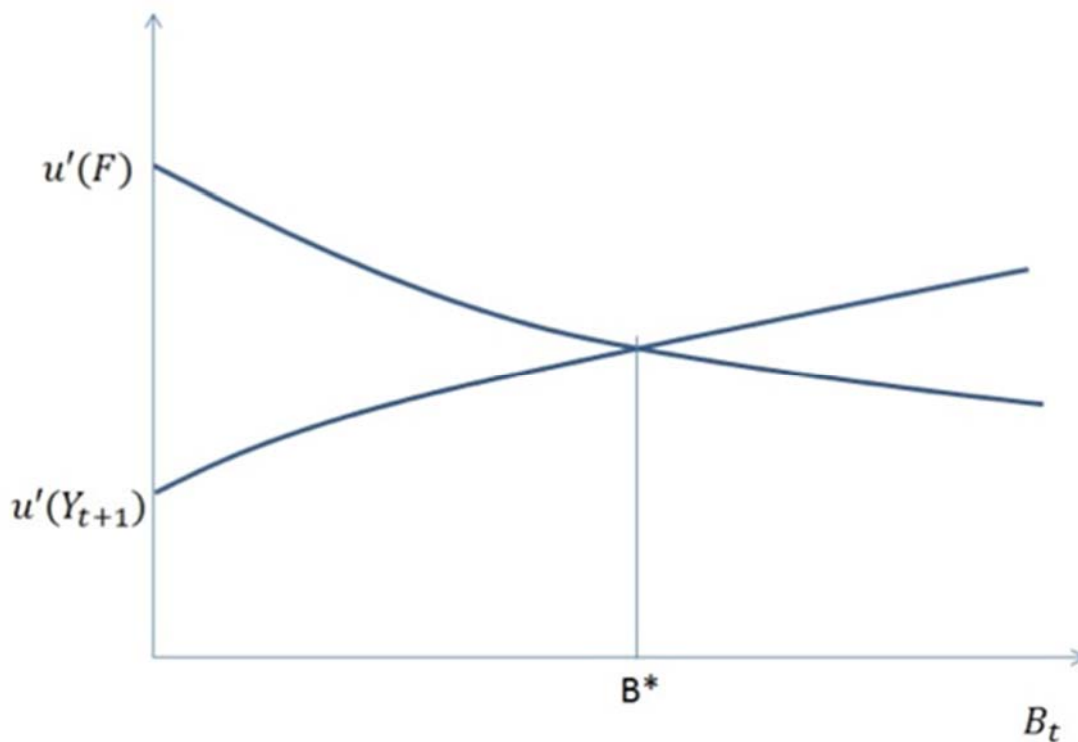
We assumed that $Y_2 > AID$, which it means that second period income exceeds first period aid. Under this assumption, which implies $u'(Y_2) < u(AID)$, there is a unique point of intersection that determines the equilibrium B. Obviously, the LHS moves downward if AID increases while the RHS stays put. This lowers the equilibrium volume of second period debt. The economic intuition here is straightforward: giving foreign aid in period 1 not only raises agents' consumption in that period, but also reduces the amount they wish to borrow in order to realize their optimal consumption path. This reduction in borrowing corresponds to a reduction in financial development.

3. SPECIFICATION AND DATA

To ensure broad the comparability of our analysis with the existing empirical work on the determinants of financial development (Djankov *et al.*, 2007), we include foreign aid in a more general specification that incorporates key variables from the financial development literature. We then extend the framework to control for the possibility that foreign aid could be endogenous. Finally, we check the robustness of our analysis by presenting results generated from estimates using alternative measures of financial development, country sub-samples, and alternative estimation techniques.

Our basic cross-section specification is as follows:

$$FD = \beta_1 + \beta_2\,AID + \beta_3 X + \varepsilon \tag{7}$$

When it comes to measuring financial development, FD, researchers have often focused on the ratio of bank credit to the private sector to GDP as an empirical proxy (Djankov *et al.*, 2007; Levine 2005). This is because the ratio of private credit to GDP is easily available, is an important type of financial service, excludes credits by development banks and loans to the government and public enterprises, and captures the size of a bank's loan book relative to the economic output. Nonetheless, the series has several shortcomings as a proxy, including that it says nothing about financial sector components beyond banks, or about the quality of financial services, or about the efficiency and stability of the financial sector. Moreover, large amounts of credit do not always correspond to the broad use of financial services because credit can be concentrated among large firms and wealthy individuals. However, while researchers have begun to develop alternative indicators of financial development (e.g., Čihák *et al.*, 2013), most of

them span time periods that fall only in the latter part of our sample period. Accordingly, although we present some results from alternative measures of financial development in Section 5, we follow the vast majority of empirical work in this area and use the ratio of bank credit to the private sector to GDP as our main empirical proxy.

Of the independent variables in equation (7), AID is the ratio to GDP of foreign aid inflows, and X is a vector of political economy, institutional, cultural and economic variables that have been shown to influence financial development. The political economy variables are trade openness, as measured by the sum of exports and imports in relation to GDP, and the degree of capital account openness, as measured by the Chinn-Ito index (Chinn and Ito, 2006), which attempts to measure regulatory restrictions on capital account transactions and ranges between -2.5 (most closed) to +2.5 (most open). The institutional and cultural variables include: the origin of a country's legal code, which are zero-one dummy variables to indicate whether a country's code is French or British in origin, respectively; a country's predominant religion, which are zero-one dummy variables to indicate whether a country's code is Catholic, Muslim, or Protestant; and a country's ethnolinguistic fractionalization, which is measured by the Alesina *et al*. (2003) ethnolinguistic fractionalization index, which ranges from 0 to 1 and where the higher the ethnolinguistic division, the poorer is financial development. The economic variables we include are the average rate of inflation and a measure of the level of economic development. In the latter regard, the literature on the impact of foreign aid on institutional development usually includes income as an independent variable. However, recent empirical work by Knack (2004), Acemoglu *et al*. (2005) and Djankov *et al*. (2008) shows the association between *per capita* income and institutional variables often falls out once you control for factors that simultaneously affect *per capita* income and institutional development. Another often-used alternative control variable for the level of income is infant mortality. For example, Barro and Lee (1994) view infant mortality as an endogenous variable determined by income and education, whereby higher income leads to improved nutrition, sanitation, and health care, which reduces infant mortality and raises life expectancy. These authors also show that infant mortality is significantly related an improvement in human capital, which is an important determinant of institutions that affect economic growth (Glaeser *et al*., 2004). In alternative specifications, we find that our results are robust to the inclusion of infant mortality as a determinant of financial development. Finally, we include the Djankov *et al*. (2007) index of creditor rights, which measures the powers of secured lenders in bankruptcy, and ranges

between 0 (most weak) to 4 (most strong); and the Djankov *et al.* (2007) measure of the number of days to resolve a payment dispute through the courts, with a larger number of days expected to impact negatively on financial development.

Our sample comprises 96 aid-recipient developing countries over the period 1971-2015[3]. Data on foreign aid flows are from the OECD database on the Geographical Distribution of Financial Flows to Developing Countries, which provides details of foreign aid flows from Development Assistance Committee (DAC) countries; data on the economic variables are from the World Bank's World Development Indicators database; data on linguistic fractionalization is from Alesina *et al.* (2003); and data on religion and legal origin are from La Porta *et al.* (1999) and the CIA Factbook. Summary statistics for the key series are presented in Table 1. There is a substantial variety in the data across countries, as indicated by the generally high standard deviations of the series. However, very broadly, the countries in the sample had relatively low levels of financial development (median 21.6 per cent of GDP), received considerable amounts of foreign aid (median 4.1 per cent of GDP), were poor, as reflected in high infant mortality rates (median 59.8 infant deaths per live 1,000 births), were relatively open on trade account (median exports plus imports in relation to GDP of 68.6 per cent) but relatively closed on capital account (median index of -0.7), had modest average rates of annual inflation (median 4.3 per cent), and relatively weak creditor rights (median index 1.55).

A key estimation difficulty is to overcome the problem of "reverse causality" in that foreign aid inflows may also be influenced by financial development – for example, if donors' aid allocation is affected by perceived financial constraints – in which case OLS estimates of equation (7) will be biased and inconsistent. The challenge is to find instruments that create exogenous variation in foreign aid flows but that are not directly correlated with financial development (other than through their indirect impact on the endogenous regressor) or the error term. In practice, the

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[3] The countries in the sample are Algeria, Angola, Argentina, Bangladesh, Barbados, Belize, Benin, Bhutan, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Colombia, Comoros, Democratic Republic of Congo, Republic of Congo, Costa Rica, Cote d'Ivoire, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial New Guinea, Eritrea, Ethiopia, Fiji, Gabon, The Gambia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Jamaica, Jordan, Kenya, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malaysia, Mali, Mauritania, Mauritius, Mongolia, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sri Lanka, Sudan, Suriname, Swaziland, Syria, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Uganda, Uruguay, Venezuela, Yemen, Zambia, and Zimbabwe.

literature on the economic impact of foreign aid has not found a convincing instrumental variable to identify the causal effects of aid[4]. We address the issue of causality by instrumenting

TABLE 1 - *Summary Statistics*

	Bank credit to GDP[a]	M2 to GDP	Foreign aid to GDP	Infant mortality[b]	Trade openness[c]	Capital account liberalization index[d]	Average annual inflation	Credit rights index[e]	Days to enforce legal contract[e]
Mean	25.93	37.40	4.60	79.66	74.58	-0.42	12.50	1.61	5.97
Median	21.58	30.86	4.11	59.79	68.64	-0.70	4.30	1.55	5.98
Maximum	95.41	167.37	14.58	267.06	168.98	2.46	240.63	4.00	7.29
Minimum	2.66	8.99	0.18	5.81	19.58	-1.80	-4.21	0.00	3.30
Std. Dev.	18.22	24.73	3.64	64.63	34.75	0.96	34.61	1.23	0.53
Observations	97	97	97	97	97	97	97	97	97

Notes:
[a] Ratio of bank credit to the private sector to GDP.
[b] Infant mortality measures the number of infant deaths per 1,000 live births.
[c] The ratio to GDP of exports plus imports.
[d] The Chinn-Ito (2008) index of capital account liberalization, which takes on a higher value the more open the economy is to cross-border capital transactions.
[e] The Djankov *et al.* (2007) index measures the legal rights of creditors against defaulting debtors in different jurisdictions, with higher values indicating more creditor rights.
[f] Logarithm of the number of days.

for the share of foreign aid inflows in the host country's GDP by employing the procedure suggested by Tavares (2003). To this end, we build three variables that are likely to affect foreign aid but can at the same time reasonably be seen as totally exogenous to a country's policy choices. The procedure is as follows. First, we select the ten largest DAC donor countries by

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[4] See Edwards (2014) on the likely futility of the search for such instruments in cross-country studies. In fact, there is a clear pattern in the recent aid literature of successive authors stressing the greater validity of their foreign aid instruments compared to those used in previous studies (e.g., Rajan and Subramanian, 2008; Frot and Perrotta, 2011; Galiani *et al.*, 2017).

Gross Domestic Product (these countries were Australia, Canada, France, Germany, Italy, Japan, South Korea, Netherlands, Spain, the United Kingdom, and the United States). Second, we compute for each pair of developing country/DAC donor country three variables that capture their geographic and cultural proximity. The variables were the inverse of the bilateral distance between them, and two dummy variables – a dummy variable taking the value of 1 if the countries shared the same majority religion, and a dummy variable taking the value of 1 if the countries had a shared colonial history[5]. Finally, we take the value of the foreign aid outflows of each of the ten DAC donor countries and multiply them in turn by the inverse of the distance between the DAC donor country and the host country, and by the dummy variables for a shared religion and colonial history. The sum of each category (distance, religion and colonial history) constitutes an instrument for foreign aid receipts for each developing (aid recipient) country in the sample[6]. The logic behind this construction is that when a donor country increases its aid outflow, developing countries that are culturally and geographically closer to that donor country receive exogenously higher aid inflows. Given that cultural proximity is to a large extent determined by the colonial strategies of western nations largely over the course of the 18th and 19th century, Tavares (2003) argues that these instruments are plausibly exogenous. In addition, because geographical distance between donors and aid recipients cannot be manipulated, it also seems plausibly exogenous. At the same time, it is difficult to imagine how these instruments could directly impact on financial development other than through their influence on foreign aid.

4. EMPIRICAL RESULTS

We investigate the impact of foreign aid and financial development in both cross-sectional and panel data regressions. The cross-sectional analysis helps us identify the characteristics that

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[5]The bilateral distance data are from the CEPPI Ultimate Gravity database available at: http://www.cepii.com/anglaisgraph/bdd/gravity.aspvariable , and the remaining series are the authors' calculations based on information in the Central Intelligence Agency World Factbook available at https://www.cia.gov/library/publications/the-world-factbook/ .

[6] For example, each country in the sample will have three exogenous variables that will serve as instruments for the level of foreign aid receipts, defined as:

Aid-Distance $i = \Sigma_{j=1}^{10\ largest}\{(\text{Inverse of bilateral distance }_{i,j})\} * \text{Aid outflows }_j$

Aid-Religion $i = \Sigma_{j=1}^{10\ largest} \text{Religion }_{i,j} * \text{Aid outflows }_j$

Aid-Colonial history $i = \Sigma_{j=1}^{10\ largest} \text{Colonial history }_{i,j} * \text{Aid outflows }^j$

In the first stage of the instrumental variables estimates that we present in the paper, we regress actual foreign aid on the exogenous instruments.

explain why one country has a higher level of financial development than another. A panel framework is needed, however, to assess how financial development is affected by foreign aid over time, and how different determinants of financial development interact dynamically.

4.1 Results from Cross-Sectional Estimations

The cross-sectional results are reported in Table 2. Columns 1 to 4 report results for data averaged over the period 1971-2015. Column 1 reports a baseline OLS estimate of the impact of foreign aid on financial development controlling only for the level of economic development (proxied by infant mortality). The coefficient on foreign aid is negative and statistically significant at the 1% level, while that on infant mortality is not significant. In columns 2 and 3 we add successively the different political economy, institutional and cultural variables. These results suggest that trade openness, liberalization and both French- and British-based legal codes promote financial development, whereas linguistic fractionalization and inflation undermine it, with each of these variables statistically significant (though only at the 10% level in the case of inflation). More importantly, in both cases, the coefficient on foreign aid remains negative and statistically significant. In column 4 we control for the endogeneity of foreign aid by using the instrumental variable approach described in section 3. The estimated coefficient on foreign aid is somewhat larger and remains negative and statistically significant at the 1% level, which can be interpreted as the impact of foreign aid on financial development being robust to the endogeneity problem. The legal code controls lose their statistical significance, suggesting that these variables are sensitive to equation specification and methodology. The *p*-value obtained from the Sargan overidentification test (p=0.43) suggests that we cannot reject the null hypothesis that the instruments are exogenous, and the Davidson-McKinnon test of endogenous regressors is consistent with the exogeneity of foreign aid with respect to bank credit. In columns 5 and 6, we report OLS and IV results, respectively, for regressions that introduce the Djankov *et al.* (2007) measures of creditor rights and the number of days to resolve a payments dispute through the courts. For consistency with the Djankov et al. (2007) dataset, all series in these estimates are expressed as averages over the period 1979 to 2002. The coefficients on foreign aid and the contract enforcement variable are negative and statistically significant; the coefficient on creditor rights has the expected positive sign but is not statistically significant, and the trade openness variable is no longer statistically significant.

TABLE 2 - *Financial Development and Foreign Aid: Cross-Sectional Regression.*
Dependent Variable: Ratio to GDP of Bank Credit to the Private Sector[a]

	1971 to 2015				1979 to 2002	
	1 OLS	2 OLS	3 OLS	4 IV [b]	5 OLS	6 IV [c]
Foreign aid to GDP	-0.849*** (0.279)	-0.899*** (0.294)	-0.887*** (0.313)	-1.198** (0.299)	-1.138*** (0.376)	-2.105*** (0.703)
Infant mortality rate	-0.015 (0.021)	-0.012 (0.019)	-0.007 (0.019)	-0.002 (0.018)	-0.009 (0.027)	-0.010 (0.026)
Trade openness		0.122*** (0.040)	0.107*** (0.044)	0.112*** (0.035)	0.074 (0.063)	0.098 (0.054)
Capital account openness		1.778 (1.310)	1.778 (1.675)	1.780 (1.387)	1.524 (2.710)	0.689 (1.919)
French legal code			14.210*** (4.764)	14.554 (10.987)	22.492*** (5.980)	23.281*** (11.841)
British legal code			11.979*** (3.713)	11.529 (10.773)	13.598** (5.834)	11.394** (5.369)
Majority Muslim religion			-1.880 (3.021)	-2.697 (3.214)	-2.168 (4.331)	-4.953 (4.739)
Majority Catholic religion			-1.866 (4.187)	-2.792 (3.754)	-2.349 (5.107)	-5.943 (5.509)
Ethnolinguistic fractionalization			-11.074** (5.315)	-10.823** (4.750)	-6.444* (2.915)	-3.657* (1.728)
Creditor rights					1.491 (1.344)	1.194 (1.313)
Contract enforcement days					-7.015** (3.218)	-7.684** (3.085)
Inflation				-0.059* (0.0033)	-0.007 (0.006)	-0.009 (0.007)
Intercept	28.984*** (2.390)	20.628*** (3.053)	15.985*** (5.105)	17.331 (11.104)	48.771** (20.209)	56.393** (21.989)
R-squared [d]	0.106	0.264	0.342	0.330	0.418	0.361
F-statistic (*p*-value)	6.050 (0.003)	6.450 (0.000)	5.533 (0.000)	4.330 (0.000)	2.630 (0.001)	2.520 (0.013)
Observations	94	94	91	91	57	57

Notes:

[a] Values in parenthesis are White heteroskedastic adjusted standard errors. *, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.

[b] Sargan test statistics for the overidentification of instruments: $\chi2 (3) = 2.781$ (p> $\chi2$ = (0.427)); and endogeneity test of

endogenous regressors: $\chi^2(1) = 6.398$ (p> χ^2 = (0.011)).

[c] Sargan test statistics for the overidentification of instruments: $\chi25) = 3.836$ (p> $\chi2$= (0.573)); and endogeneity test of endogenous regressors: $\chi2(1) = 5.431$ (p> $\chi2$ = (0.020)).

[d] R-squared is adjusted for degrees of freedom except in the IV estimates, where it is the centered R-squared.

The above results show clearly that the correlation between foreign aid and financial development is negative and highly significant in a cross-sectional setting and suggest that a 1 percentage point increase in foreign aid is associated with a reduction in financial development of between 0.8-2.1%. The results can be interpreted as offering baseline support for the view that foreign aid has a negative impact on financial development and that countries that receive more foreign aid are likely to be characterized by less financial development. However, these results are not without limitations, as they do not consider changes in financial development over time. This issue is taken up in more detail below.

4.2 Results from Panel Data Estimations

Several countries in our sample made substantial improvements in their levels of financial development over the period, others experienced a deterioration, and there were large changes in the levels of foreign aid inflows to the countries. The six countries that made the greatest progress in financial development and received the largest increase in foreign aid inflows, and the six countries that experienced the largest deterioration in financial development and the largest decline in aid inflows are shown in Table 3. In Malaysia, South Africa, and Thailand, for example, the ratio to GDP of bank credit to the private sector increased by about 85, 83 and 93 percentage points of GDP respectively, whereas the ratio fell in Algeria, Equatorial Guinea, and Guinea Bissau by about 29, 16 and 19 percentage points respectively. In the case of foreign aid, the largest increases were experienced by Liberia, Mozambique, and Sierra Leone with increases of about 57, 10, and 12 percentage points, respectively, and the largest falls were experienced by Cape Verde, Papua New Guinea, and the Seychelles, with falls of about 17, 11 and 14 percentage points, respectively.

To investigate the time dimensions of the impact of foreign aid on financial development, we use the same sample of 96 developing countries as in the cross-sectional estimates, but we construct a panel dataset with the data are averaged over 4-year periods between 1971 and 2015. In Table 4, we report only the IV results from the panel estimations. We start with random effects estimates, which allow us to capture the impact of the time-invariant control variables. Column 1 reports a baseline estimate of the impact of foreign aid on financial development controlling for infant mortality and adding regional dummies and excluding sample outliers. The results show that both foreign aid and infant mortality are negatively and significantly related to financial

development, with the coefficient on the aid variable suggesting that an increase in aid of 1% leads to a decrease in financial development of between 0.2 to 0.3%. In columns 2 and 3, we report estimates with the additional control variables. The coefficients on aid and infant mortality remain negative and statistically significant; the coefficients on openness to trade and capital flows are now positive and highly significant, consistent with the Rajan and Zingales (2003) political economy view of financial development; and inflation has the expected negative and statistically significant impact. The institutional and cultural variables are no longer significant. In column 4 we introduce the creditor rights and contract enforcement control variables. The number of observations in this estimate falls sharply, reflecting the more limited time span of the creditor rights index. The coefficients on foreign aid, infant mortality, and trade and capital account openness maintain their statistical significance but creditor rights is the only other significant control variable with the sign on the coefficient consistent with the Djankov *et al.* (2007) finding that better creditor rights promote financial development.

Columns 5 to 7 report estimates using fixed effects, which allows us to investigate what causes financial development levels to change over time within each country. This technique gives insights into how variations in aid explain variations in financial development in each country around its own mean, but this advantage comes at the cost of dropping the time-invariant variables, including that for contract enforcement. In columns 5 and 6, the coefficients on foreign aid, infant mortality, trade and capital account openness and inflation remain statistically significant and have the expected signs. Column 7 reports results over the shorter sample period incorporating the creditor rights control variable but the coefficient on the variable is not statistically significant. In the estimates reported in columns 1 to 7, the test statistics of over-identifying restrictions is only statistically significant at the 5% level or above in column 1, suggesting that the instruments generally remain valid; and the p-values for the Davidson-MacKinnon statistic are consistent with the exogeneity of foreign aid with respect to bank credit.

Djankov *et al.* (2007) suggest that history matters for financial development, in the sense that past levels of financial development have an impact on the current level of financial development. As the lagged dependent variables and the time-invariant country specific error terms are correlated, both random and fixed effects models produce inconsistent estimations. We follow Arellano and Bover (1995) and use system GMM (sysGMM) estimation in which

TABLE 3 - *Percentage Point Change in Financial Development and Foreign Aid, 1971-2015*

Bank credit to the private sector to GDP		Foreign aid to GDP	
(a) Largest increases			
Barbados	55.3	Bhutan [a]	2.19
Malaysia	85.2	Burundi	9.24
Mauritius	57.0	Liberia	57.00
St. Lucia	66.2	Mozambique [a]	10.14
South Africa	83.3	Sierra Leone	11.78
Thailand	92.8	Zimbabwe	9.15
Barbados	55.3	Bhutan [a]	2.19
(b) Largest declines			
Algeria	-28.8	Botswana	-10.64
Cote d'Ivoire	-12.6	Cape Verde [a]	-16.89
Equatorial Guinea [b]	-15.8	Dominica [c]	-10.72
Eritrea	-14.5	Eritrea [d]	-11.31
Guinea-Bissau [b]	-18.2	Papua New Guinea	-14.35
Sri Lanka	-15.5	Seychelles	-24.81

Notes:
[a] Starting period is 1979-1982.
[b] Starting period is 1983-1986.
[c] Starting period is 1975-1978.
[d] Starting period is 1991-1994.

lagged levels and lagged differences of the dependent variables are used as instruments. These results are reported in columns 8 and 9. In both estimates, the impact of foreign aid on financial development remains negative and statistically significant, and lagged financial development has a positive and significant impact on the current level of financial development, implying that the reducing effect of foreign aid on financial development increases over time. However, the control variables appear to be much more sensitive to estimation methodology. In column 8, capital account openness is the only remaining control variable that is statistically significant; in column 9 (which reports results estimated over the shorter sample period), the coefficient on infant mortality, trade and capital account openness, legal codes and creditor rights are statistically significant and of the expected signs. In the GMM estimates, the Sargan test of

overidentification restrictions indicates that we can be reasonably confident of the validity of the instruments in most of the estimates, and the Arellano-Bond test statistic does not indicate that second-order serial correlation is an issue.

5. ROBUSTNESS TESTS

We test the robustness of our results in several ways. First, we re-ran our cross-sectional and panel regressions using two alternative indicators of financial development. In Section 3, we discussed the shortcomings of the ratio of private credit to GDP as an indicator but pointed to the lack of suitable alternatives for regression estimates over long time periods. The most commonly used alternative indicators for assessing a country's level of financial development are the ratio of broad money (M2) to GDP and the stock market turnover ratio, which equals the value of the trades of shares on domestic exchanges divided by total value of listed shares. The former ratio captures the degree of monetization in the economy and has the merit of being widely available across countries and time; however, it has the disadvantage of not capturing the broad access to bank finance by individuals and firms, or the quality and efficiency of providing banking services. The stock market turnover ratio indicates the trading volume of the market relative to its size, with more liquid stock markets being viewed as reducing disincentives to long-run investment (since liquid markets provide a ready exit-option for investors), which can foster more efficient resource allocation and faster economic growth (Beck and Levine, 2004). The major disadvantage of this indicator from our perspective is the limited number of developing economies with stock markets of any significance. Thus, employing the turnover data provided by Čihák *et al.* (2013) reduces the number of countries in the sample to 46. Selected estimates for these alternative definitions are reported in Table 5. The results where the M2 ratio is the measure of financial development (columns 1-5) are substantially the same as those for the private credit ratio reported in Table 4: in particular, the coefficients on foreign aid are always negative and statistically significant and the test statistics for the validity of the instruments and for the endogeneity of foreign aid with respect to bank credit in the IV estimates are acceptable. The more limited set of results where stock market turnover is measure of financial development (columns 5-8) also indicate substitutability between domestic finance and foreign aid, though we have rather less confidence in them given the limited sample size. Note also that in these estimates, inflation appears to have a statistically significant and positive impact on financial development.

Table 4 – *Financial Development and Foreign Aid: Panel Regression, Four-Year Average Data. Dependent Variable: Ratio of Bank Credit to the Private Sector to GDP*[a]

	1971-2015			1979-2002	1971-2015		1979-2002	1971-2015	1979-2002
	1 IV-Random effects [b]	2 IV-Random effects [b]	3 IV-Random effects [b]	4 IV-Random effects [b]	5 IV-Fixed effects [b]	6 IV-Fixed effects [b]	7 IV-Fixed effects [b]	8 sysGMM [d]	9 sysGMM [d]
Lagged financial development								0.202*** (0.049)	0.273*** (0.013)
Foreign aid to GDP	-0.270** (0.110)	-0.277** (0.118)	-0.265** (0.128)	-0.535** (0.269)	-0.251** (0.119)	-0.396*** (0.142)	-0.396*** (0.142)	-0.653*** (0.258)	-1.011** (0.107)
Infant mortality rate	-0.066*** (0.012)	-0.038*** (0.020)	-0.041*** (0.013)	-0.161*** (0.029)	-0.099*** (0.020)	-0.075*** (0.022)	-0.049*** (0.017)	-0.069*** (0.061)	-0.067*** (0.011)
Trade openness		0.109*** (0.020)	0.103*** (0.021)	0.161*** (0.029)		0.084*** (0.029)	0.156*** (0.039)	0.033 (0.060)	0.153*** (0.013)
Capital account openness		1.494*** (0.434)	1.511*** (0.473)	1.601*** (0.529)		0.974* (0.539)	1.320*** (0.514)	1.841** (0.907)	1.754*** (0.294)
French legal code			13.356 (10.141)	13.212 (10.541)				-58.867 (41.231)	-11.813 (7.432)
British legal code			17.330 (14.450)	14.527 (15.402)				56.292 (80.878)	13.633*** (3.908)
Majority Muslim religion			-4.794 (3.792)	-0.071 (4.494)				-2.886 (5.542)	-0.190 (1.073)
Majority Catholic religion			-0.384 (3.792)	1.217 (4.919)				-2.166 (4.051)	0.393 (1.130)
Ethnolinguistic fractionalization			-11.567 (5.093)	-5.629 (6.909)				-9.705 (6.400)	2.505 (1.676)
Creditor rights				3.472** (1.535)			-0.894 (5.453)		3.289*** (0.355)

TABLE 4 - *continued*

	1971-2015			1979-2002	1971-2015		1979-2002	1971-2015	1979-2002
	1	2	3	4	5	6	7	8	9
	IV-Random effects [b]	IV-Random effects [b]	IV-Random effects [b]	IV-Random effects [b]	IV-Fixed effects [b]	IV-Fixed effects [b]	IV-Fixed effectsb[b]	sysGMM [d]	sysGMM [d]
Contract enforcement days				1.062 (5.173)					
Inflation			-0.060** (0.029)	0.000 (0.001)			0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
Regional dummies	YES	YES	YES	YES	NO	NO	NO	YES	YES
Intercept	38.474*** (2.789)	26.648*** (3.117)	15.646 (14.527)	-3.610 (33.237)	34.012*** (1.283)	27.679*** (2.449)	22.411*** (6.341)	89.245 (86.864)	0.869 (3.916)
R-squared	0.156	0.287	0.204	0.257	0.063	0.109	0.133		
J-statistic (*p*-value)	10.761 (0.013)	7.208 (0.066)	2.896 (0.235)	1.253 (0.740)	0.332 (0.954)	11.208 (0.965)	2.678 (0.613)		
Davidson-MacKinnon test statistic (*p*-value)	4.162 (0.042)	5.175 (0.023)	27.354 (0.000)	6.550 (0.011)	5.939 (0.015)	5.465 (0.019)	4.275 (0.038)		
Observations	804	754	690	524	720	655	553	657	657

Notes:
a *, ** and *** indicate statistical significance at the 5% and 1% levels, respectively.
b Random effects model, standard errors in parenthesis.
c Fixed effects model, standard errors in parenthesis.
d Sys GMM = system GMM, Arellano-Bond test for AR(2) in first differences : z = -2.23, p > z = 0.025. Sargan test of overidentification restriction $\chi2(6) = 14.03$, p > $\chi2$ = 0.026.
e Sys GMM = system GMM, Arellano-Bond test for AR(2) in first differences : z = -2.23, p > z = 0.025. Sargan test of overidentification restriction $\chi2(6) = 9.07$, p > $\chi2$ = 0.056.

TABLE 5 - *Financial Development and Foreign Aid: Panel Regression, Four-Year Average Data.*

Dependent Variable: Alternative measures of financial development [a]

Dependent variable:	Ratio of M2 to GDP						Stock Market Turnover		
	Random effects [b]		Fixed effects [c]		sysGMM [d]	sysGMM [e]	Random effects [b]	Fixed effects [c]	sysGMM [f]
	1971-2015	1972-2002	1971-2015	1979-2002	1971-2015	1979-2002		1971-2015	
	1	2	3	4	5	6	7	8	9
Lagged financial development					0.031 (0.009)	0.033*** (0.014)			0.506*** (0.066)
Foreign aid to GDP	-0.344*** (0.121)	-0.452* (0.219)	-0.641** (0.227)	-0.366* (0.220)	-0.318*** (0.113)	-0.356* (0.140)	-3.363** (1.371)	-1.755* (0.995)	-2.171* (1.109)
Infant mortality rate	-0.084*** (0.013)	-0.088*** (0.016)	-0.132*** (0.019)	-0.117*** (0.018)	-0.168*** (0.013)	-0.174*** (0.014)	-0.009 (0.091)	-0.006 (0.088)	-0.305* (0.170)
Trade openness	0.143*** (0.021)	0.262*** (0.028)	0.134*** (0.044)	0.207*** (0.030)	0.229*** (0.010)	0.216** (0.011)	-0.082 (0.094)	0.147* (0.088)	-0.021 (0.067)
Capital account openness	1.376*** (0.021)	1.359*** (0.535)	0.498 (0.554)	0.494 (0.512)	2.140*** (0.260)	1.956*** (0.323)	-1.108 (2.408)	0.403 (1.440)	-1.626 (1.947)
French legal code	20.504 (15.043)	28.944 (19.191)			63.870*** (11.676)	45.534*** (5.947)	-38.190 (33.450)		-0.473 (23.246)
British legal code	24.214 (14.980)	31.067 (19.110)			58.133*** (9.265)	41.534*** (5.947)	-11.823 (31.749)		17.949 (22.335)

TABLE 5 - *continued*

Dependent variable:	Ratio of M2 to GDP						Stock Market Turnover		
	Random effects [b]		Fixed effects [c]		sysGMM [d]	sysGMM [e]	Random effects [b]	Fixed effects [c]	sysGMM [f]
	1971-2015	1972-2002	1971-2015	1979-2002	1971-2015	1979-2002		1971-2015	
	1	2	3	4	5	6	7	8	9
Majority Muslim religion	0.880 (3.833)	2.632 (5.193)			-10.431*** (1.426)	-11.442*** (1.628)	41.077** (15.162)		20.197** (9.875)
Majority Catholic religion	-6.060 (3.921)	-15.081*** (5.853)			-9.117*** (1.882)	-5.642 (3.676)	9.512 (14.610)		3.278 (8.675)
Ethnolinguistic fractionalization	11.108** (5.348)	-22.474*** (8.712)			-2.839 (8.177)	6.068 (4.228)			
Creditor rights		3.630* (1.871)		-2.469 (3.734)		4.017** (0.313)			
Contract enforcement days		10.526 (6.457)							
Inflation	-0.062** (0.026)	-0.000 (0.001)	-0.114** (0.037)	-0.068 (0.032)	-0.000 (0.001)	-0.001** (0.000)	0.047 (0.196)	0.025*** (0.005)	0.067** (0.024)
Regional dummies	YES	YES	NO	NO	YES	YES	NO	NO	NO

Dependent variable:	Ratio of M2 to GDP						Stock Market Turnover		
	Random effects [b]		Fixed effects [c]		sysGMM [d]	sysGMM [e]	Random effects [b]	Fixed effects [c]	sysGMM [f]
	1971-2015	1972-2002	1971-2015	1979-2002	1971-2015	1979-2002	1971-2015	1971-2015	
	1	2	3	4	5	6	7	8	9
Intercept	18.318	57.408	39.390***	35.240***	-27.690**	-21.950***	52.107	11.280	21.086
	(15.034)	(41.205)	(2.733)	(6.314)	(11.621)	(4.974)	(34.179)	(10.217)	(23.036)
R-squared	0.247	0.332	0.224	0.279			0.041	0.041	
J-statistic	0.294	0.890	4.202	3.621			6.320	3.709	
(*p*-value)	(0.588)	(0.640)	(0.244)	(0.164)			(0.097)	(0.054)	
Davidson-MacKinnon	6.442	5.265	4.653	4.635			3.012	5.022	
test statistic	(0.011)	(0.021)	(0.032)	(0.031)			(0.082)	(0.026)	
(*p*-value)									
Observations	671	533	616	495	657	495	212	212	171

Notes:

[a] Values in parenthesis are White heteroskedastic adjusted standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

[b] Random effects model, standard errors in parenthesis.

[c] Fixed effects model, standard errors in parenthesis.

[d] SysGMM = system GMM, Arellano-Bond test for AR(2) in first differences : z = -2.19, p > z = 0.028. Sargan test of overidentification restriction $\chi 2(5)$ = 4.16, p > $\chi 2$ = 0.245. ys GMM = system GMM, Arellano-Bond test for AR(2) in first differences : z = -2.23, p > z = 0.025. Sargan test of overidentification restriction $\chi 2(6)$ = 14.03, p > $\chi 2$ = 0.026.

[e] Sys GMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = -1.88, p > z = 0.060. Sargan test of overidentification restriction $\chi 2(5)$ = 4.91, p > $\chi 2$ = 0.086.

[f] Sys GMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = -1.04, p > z = 0.299. Sargan test of overidentification restriction $\chi 2(22)$ = 19.23, p > $\chi 2$ = 0.631

As a second robustness test, we widen the data panel from four-year averages to annual data. While averaging the data has the advantage of ironing out 'lumps' in the annual series and abstracting from business cycle effects, it does mean that we do not exploit fully the time dimension of the data. In Table 6, we report panel regression results for the private credit and M2 ratios as measures of financial development. The results confirm a strong negative relationship between foreign aid and financial development on both measures of financial development and using alternative estimation techniques, with the coefficients ranging in size from -0.15 to -0.40 (private credit to GDP) and from -0.11 to -0.48 (M2 to GDP). The estimated coefficients on the remaining control variables do not differ substantially from the results report for the four-year average data. In particular, infant mortality is significantly and negatively associated with financial development and trade and capital account openness generally have a positive impact on financial development (though less so when M2 to GDP is the measure of financial development).

Third, we take account of the fact that many countries in our sample ceased being major receivers of foreign aid because of progress in their economic development. In these countries, it is likely that private credit would have expanded substantially. To separate out this impact, we present estimates employing a sample of countries whose gross national income *per capita* remained below the eligibility threshold for financial support set annually by the International Development Association (IDA). Galiani *et al.* (2017) show that foreign aid as a share of gross national income falls sharply on average as countries cross the threshold, suggesting that donors tend to reinforce rather than compensate for reductions in IDA aid following threshold crossings. Table 7 reports results from annual data panel regressions in which the country sample is limited to those countries below the IDA threshold; results are reported for two measures of financial development and from alternative estimation techniques. The negative relationship between foreign aid and financial development remains robust to this change in country sample for both measures of financial development and for alternative estimation techniques. The estimated coefficients on the other control variables are also broadly similar, though there is a greater suggestion – at least for the M2 to GDP measure of financial development – that inflation is a more important determinant of the level of financial development in poor countries.

Fourth, we try to take some account of the fact that foreign policy and political relationships are the most important determinants of aid flows so that these flows will reflect the changing goals of donors. For example, Alesina and Dollar (2000) find that countries often provide aid to former colonies in the hope of retaining influence; and more recently, Feck and Kilby (2010) report that US aid flows increased with the Cold War and the War on Terror. To control for this potential influence, we examine the robustness of our results to the impact on aid flows of the Cold War. Specifically, we report results for estimates that interact a 0-1 dummy variable for the Cold War (where 1 indicates the start of the post-Cold War period assumed to be from the fall of the Berlin Wall in 1989) with foreign aid flows. The results are reported in Table 8 where we focus on countries whose gross national income was below the IDA threshold and employ the private credit ratio as the measure of financial development. The interaction term is positive and statistically significant suggesting a shift in the distribution of aid flows that was more favorable to financial development. However, this shift was not sufficiently large to overcome the adverse overall impact of foreign aid on domestic financial development (i.e., the sum of the coefficient on foreign aid and the interaction term remained negative and statistically significant)[7].

Finally, several studies employ foreign aid *per capita* and real GDP *per capita* as explanatory variables rather than the ratio of foreign aid to GDP and infant mortality employed in our estimates. Notwithstanding our concerns discussed above about *per capita* income simultaneously affecting institutional development, we present results incorporating these alternative variables in Table 9. The negative relationship between foreign aid and financial development remains robust to the use of these alternative independent variables.

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[7] In separate regressions (results not reported) we included as an alternative a 0-1 dummy for the War on Terror, where 1 indicates the War on Terror period, assumed to start in 2001 (Feck and Kilby 2010). The results were very similar to those reported in Table 8.

TABLE 6 - *Financial Development and Foreign Aid: Panel Regressions, Annual Data, 1971-2015*[a]

Dependent variable:	Ratio to GDP of bank credit to private sector			Ratio of M2 to GDP		
	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [d]	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [e]
Lagged financial development			0.782*** (0.093)			0.774*** (0.035)
Foreign aid to GDP	-0.482** (0.103)	-0.501*** (0.104)	-0.151** (0.087)	-0.484*** (0.108)	-0.487** (0.108)	-0.110*** (0.027)
Infant mortality rate	-0.141*** (0.010)	-0.137*** (0.010)	-0.137*** (0.010)	-0.278*** (0.011)	-0.276*** (0.011)	-0.110*** (0.027)
Trade openness	0.150 (0.011)	0.155*** (0.012)	0.019* (0.011)	0.147*** (0.012)	0.148*** (0.012)	0.026*** (0.005)
Capital account openness	0.950*** (0.221)	0.950*** (0.221)	0.468* (0.273)	0.167 (0.233)	0.140 (0.234)	0.173* (0.092)
French legal code	16.364 (10.006)		5.617 (3.932)	30.320** (12.651)		3.428* (1.770)
British legal code	16.138* (9.629)		2.912 (1.966)	24.859* (12.152)		
Majority Muslim religion	-3.453 (3.985)		-7.866 (5.355)	-2.869 (5.069)		
Majority Catholic religion	-5.199 (3.969)			14.231 (5.052)		
Ethnolinguistic fractionalization	0.170 (0.107)	0.202* (0.108)		0.128 (0.112)	0.132 (0.011)	
Inflation	-0.005 (0.010)	-0.003 (0.010)	-0.012 (0.017)	-0.011 (0.010)	-0.011 (0.010)	-0.035*** (0.005)
Regional dummies	YES	NO	NO	YES	NO	NO

TABLE 6 - *continued*

Dependent variable:	Ratio to GDP of bank credit to private sector			Ratio of M2 to GDP		
	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [d]	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [e]
Intercept	15.646	25.050	8.728	25.955	47.259***	9.639***
	(15.527)	(1.255)	(3.387)	(12.924)	(1.304)	(1.490)
R-squared	0.400	0.337		0.468	0.352	
J-statistic	3.513	2.546		4.677	0.458	
(*p*-value)	(0.061)	(0.111)		(0.097)	(0.499)	
Davidson-MacKinnon test statistic (*p*-value)	7.487	15.100		6.065	10.461	
	(0.006)	(0.000)		(0.014)	(0.002)	
Observations	3065	3065	3001	3113	3113	3046

Notes:

[a] *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

[b] Random effects model, standard errors in parenthesis.

[c] Fixed effects model, standard errors in parenthesis.

[d] Sys GMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = -1.52, p > z = 0.13. Sargan test of overidentification restriction $\chi^2(76) = 0.59$, p > $\chi^2 = 0.34$.

[e] SysGMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = 0.04, p > z = 0.97. Sargan test of overidentification restriction $\chi^2(114) = 91.5$, p > $\chi^2 = 0.94$.

TABLE 7 - *Financial Development and Foreign Aid, Panel Regressions IDA-Eligible Countries Only, Annual Data, 1971-2015*[a]

Dependent variable	Ratio to GDP of bank credit to private sector			Ratio of M2 to GDP		
	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [d]	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [e]
Lagged financial development			0.707*** (0.045			0.876*** (0.006)
Foreign aid to GDP	-0.364*** (0.083)	-0.374*** (0.083)	-0.105** (0.026)	-0.447*** (0.087)	-0.641*** (0.095)	-0.042*** (0.011)
Infant mortality rate	-0.108** (0.009)	-0.103*** (0.009)	-0.020* (0.011)	-0.238*** (0.010)	-0.243*** (0.011)	-0.056*** (0.005)
Trade openness	0.058*** (0.012)	0.058*** (0.012)	0.043*** (0.007)	0.071*** (0.013)	0.047*** (0.014)	0.006 (0.004)
Capital account openness	0.406 (0.259)	0.437* (0.265)	0.470*** (0.110)	0.645* (0.274)	0.145 (0.395)	-0.027 (0.081)
Inflation	-0.016 (0.010)	-0.003 (0.014)	-0.034*** (0.004)	-0.040** (0.011)	-0.039*** (0.011)	-0.027*** (0.002)
Institutional and cultural variables	YES	NO	YES	YES	NO	YES
Regional dummies	YES	YES	YES	YES	YES	YES
Intercept	42.383*** (9.145)	26.370*** (1.364)	8.363*** (1.599)	39.010*** (8.511)	51.653*** (1.637)	7.290*** (1.527)
R-squared	0.475	0.393		0.422	0.352	
J-statistic (*p*-value)	1.057 (0.308)	1.231 (0.267)		0.777 (0.378)	2.873 (0.090)	
Davidson-MacKinnon test statistic (*p*-value)	27.182 (0.000)	27.342 (0.000)		4.347 (0.037)	13.904 (0.000)	
Observations	1720	1720	1685	1760	1630	1723

TABLE 7 - *continued*

Dependent variable	Ratio to GDP of bank credit to private sector			Ratio of M2 to GDP		
	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [d]	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [e]
Intercept	42.383*** (9.145)	26.370*** (1.364)	8.363*** (1.599)	39.010*** (8.511)	51.653*** (1.637)	7.290*** (1.527)
R-squared	0.475	0.393		0.422	0.352	
J-statistic (*p*-value)	1.057 (0.308)	1.231 (0.267)		0.777 (0.378)	2.873 (0.090)	
Davidson-MacKinnon test statistic (*p*-value)	27.182 (0.000)	27.342 (0.000)		4.347 (0.037)	13.904 (0.000)	
Observations	1720	1720	1685	1760	1630	1723

Notes:
[a] *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.
[b] Random effects model, standard errors in parenthesis.
[c] Fixed effects model, standard errors in parenthesis.
[d] Sys GMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = -0.48, p > z = 0.631. Sargan test of overidentification restriction $\chi 2 (78) = 43.94$, p > $\chi 2 = 0.99$.
[e] Sys GMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = -1.97, p > z = 0.048. Sargan test of overidentification restriction $\chi 2 (78) = 46.73$, p > $\chi^2 = 0.99$.

TABLE 8 - *Financial Development, Foreign Aid and the Cold War: Panel Regressions.*

Dependent Variable: Ratio to GDP of bank credit to the private sector[a]

	IV-Random effects [b]	IV-Fixed effects [c]	sysGMM [d]
Lagged financial development			0.775***
			(0.007)
Foreign aid to GDP	-0.829***	-0.861***	-0.143***
	(0.138)	(0.139)	(0.020)
Foreign aid*Cold War	0.495***	0.524***	0.031**
	(0.160)	(0.106)	(0.015)
Infant mortality rate	-0.075***	-0.067***	-0.031***
	(0.012)	(0.012)	(0.010)
Trade openness	0.067***	0.067***	0.024***
	(0.012)	(0.013)	(0.004)
Capital account openness	0.193	0.226	0.074
	(0.272)	(0.278)	(0.176)
Inflation	-0.015	-0.012	-0.012
	(0.010)	(0.010)	(0.011)
Institutional and cultural variables	YES	NO	YES
Regional dummies	YES	NO	NO
Intercept	39.491***	23.087***	23.089***
	(9.332)	(1.472)	(1.472)
R-squared	0.442	0.302	
J-statistic (*p*-value)	0.016	4.703	
	(0.899)		
Davidson-MacKinnon test statistic (*p*-value)	43.63	39.31	
	(0.000)	(0.000)	
Observations	1720	1720	1720

Notes:
[a] ** and *** indicate statistical significance at the 5% and 1% levels, respectively.
[b] Random effects model, standard errors in parenthesis.
[c] Fixed effects model, standard errors in parenthesis.
[d] SysGMM = system GMM, Arellano-Bond test for AR(2) in first differences : z = -0.54, p > z = 0.586. Sargan test of overidentification restriction $\chi^2(195) = 46.17$, p > $\chi^2 = 0.999$

TABLE 9 - *Financial Development and Foreign Aid: Alternative Independent Variables.*

Dependent Variable: Ratio to GDP of Bank Credit to the Private Sector[ab]

	IV-Random effects [c]	sysGMM [d]
Lagged financial development		0.330***
		(0.015)
Foreign aid per capita	-0.150**	-0.093***
	(0.057)	(0.024)
Per capita GDP	0.0035***	-0.044***
	(0.001)	(0.000)
Trade openness	0.181***	0.140***
	(0.028)	(0.017)
Capital account openness	0.808	0.513
	(0.552)	(0.364)
French legal code	6.449	-4.055
	(13.834)	(15.446)
British legal code	11.893**	1.539
	(13.747)	(14.395)
Majority Muslim religion	-0.334	1.4478
	(4.121)	(1.456)
Majority Catholic religion	-1.805	-0.122
	(4.502)	(1.741)
Ethnolinguistic fractionalization	-8.987	-3.858
	(5.930)	(2.421)
Inflation	-0.014	-0.063***
	(0.032)	
Regional dummies	YES	NO
Intercept	10.063	9.981
	(14.123)	(15.032)
R-squared	0.246	
J-statistic	0.022	
(*p*-value)	(0.899)	
Davidson-MacKinnon test statistic	41.73	
(*p*-value)	(0.000)	
Observations	513	511

Notes:

[a] In these estimates the ratio to GDP of foreign aid and the infant mortality rate are replaced, respectively, by foreign aid per capita and per capital GDP.

[b] ** and *** indicate statistical significance at the 5% and 1% levels, respectively.

[c] Random effects model, standard errors in parenthesis.

[d] SysGMM= system GMM, Arellano-Bond test for AR(2) in first differences : z = -1.86, p > z = 0.062. Sargan test of overidentification restriction χ^2 (40) = 275.73, p > χ^2= 0.000.

6. CONCLUSION

In this paper, we examined whether foreign aid complements or substitutes for domestic finance. First, we presented a simple theoretical model to show that foreign aid might raise private consumption but reduce private borrowing, which could be consistent with undermining financial development. Second, we presented empirical estimates of the impact of foreign aid on financial development employing cross-sectional and panel data sets of up to 96 aid-recipient countries for the period 1971-2015. These results suggest foreign aid can explain differences in financial development across countries and over time, and that it has a negative and statistically significant impact on financial development in aid-recipient countries, with the result not being sensitive to model specification, control variables, country sample variation, or estimation technique. This empirical finding is consistent with the view that foreign aid can discourage financial development, for example, by creating incentives for governments to delay reforms, by enabling them to undertake low-quality programs, or by feeding an inflationary boost to domestic spending. This conclusion has an important practical implication. First, it reveals a mechanism by which foreign aid can negatively affect economic performance – that is, if financial development promotes economic growth, as suggested by many empirical studies, then foreign aid that undermines financial development may also harm economic growth. Second, contrary to the general view that one role of foreign aid is to ease financial constraints in recipient countries, our results suggest that foreign aid and credit from the domestic financial system are substitutes rather than complements, and that foreign aid may "crowd out" domestic finance in the aid-recipient country.

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