



HOW SHOULD OFFICIAL DEVELOPMENT ASSISTANCE BE ALLOCATED ACROSS COUNTRIES?

A market test for aid allocation and country graduation

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ACKNOWLEDGEMENTS

The authors would like to thank Brian Pinto (World Bank), Dilip Ratha (World Bank) and Chris Tinning (Australian Department of Foreign Affairs and Trade) for their helpful comments.

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Brookings gratefully acknowledges the program support provided by the Bill & Melinda Gates Foundation and the Australian Department of Foreign Affairs and Trade.

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INTRODUCTION

Official development assistance, defined as grants or concessional loans provided for the purpose of development, is in scarce supply. Donors are naturally concerned with how to allocate aid resources most effectively.

Economics has much to say about how to allocate scarce resources, but there is surprisingly little use of economics, as opposed to politics and international relationships, in practical aid allocation models.¹ An early example is a paper by Collier and Dollar (1998) that uses a reduced form model to link aid with poverty reduction by estimating the effect of aid on growth. This allows them to identify a number of variables that should enter an efficient aid allocation formula: country income levels, headcount rates (or poverty gaps), and the strength of the policy environment. A more recent example is Lea and Dercon (2016) who look at aid's impact on reducing poverty now and in the future.

Neither of these examples, however, sheds light on many practical questions that donor country officials face. How should one compare lending to a small island economy with a relatively high per capita income with a grant to a low-income country? Should being designated a fragile state or a least developed country imply that more aid assistance is warranted than the amount suggested by the country income level? If so, by how much? What if the fragility is a self-inflicted wound of poor governance? Should aid decline with recipient country income levels and, if so, at what rate? How should a donor balance using aid to mobilize additional private finance in a middle-income country against providing the same level of assistance to a low-income country?

This paper tries to shed light on the questions above by taking a new approach to aid allocation. Instead of trying to assess aid's impact on poverty reduction, we use a classical welfare economics framework to measure the "consumer surplus" to the recipient country that accrues as a result of aid. In such a framework, aid is modelled as an inframarginal source of foreign exchange. The consumer surplus per unit of aid is determined as the difference between the marginal price of foreign exchange in the recipient country, proxied by the cost of foreign borrowing on commercial markets, and the price the country pays for aid (zero for a grant and below market for concessional loans). Such an approach is feasible today, because many developing countries (including a dozen low-income countries) do actually borrow and have publicly available credit ratings, whereas in the past low-income countries (LICs) had no market access and therefore the cost of commercial foreign borrowing was unobservable.

Our approach is as follows. We build on the general finding that the cost of foreign borrowing is closely linked to credit rating notations and outlook prepared by the major ratings agencies (Afonso et al. 2011).² We construct and estimate a model to estimate the relationship between credit ratings and a number of economic variables, following the approach taken by Ratha et al. (2007, 2011). We take advantage of the fact that there are 92 developing countries, including 12 out of 31 low-income countries, with external long-term sovereign ratings from at least one of the big three rating agencies (Standard and Poor's, Fitch, and Moody's), so the data reflect the wide range of situations in developing countries.

The results of the model are used in two ways. We can generate predicted credit ratings for those that do not have them, thereby extending the analysis to almost all developing countries, including most low-income countries. With almost complete country coverage, it becomes possible to make judgments on the cross-country allocation of aid. We can also infer the

¹ Aid allocation models have found political factors, such as voting alignment at the United Nations, colonial history, and even membership on the Executive Board of Directors of multilateral funds, to be significant. (Dreher et al, 2008; Alesina and Dollar, 2000; Morrison, 2013; among many others)

² <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1347.pdf>

appropriate weights to assign to variables like per capita income, small island status, governance scores, or debt levels, based on their empirical contribution to creditworthiness.

Our results confirm standard findings that, *ceteris paribus*, more aid should go to the poorest countries and those with good governance. They also encourage us to advocate for:

- Expanding aid to small islands and least developed countries;
- Expanding aid to countries facing economic volatility in GDP or exports;
- Expanding aid to high debt countries (if inherited from previous regimes);
- Expanding aid when blended with large amounts of non-concessional finance;
- Eliminating thresholds for aid graduation in favor of smoother declines as incomes rise.

Naturally, expanding aid allocations for some countries implies less funding for others. Accordingly, we also advocate for more market-based loans from official bilateral and multilateral institutions to be extended to developing countries. The welfare benefit for the recipient may be lower than a pure grant, but is probably still positive. Hence, additional access to such non-concessional public resources could offset welfare losses from aid cut-backs in some countries.

The paper proceeds as follows: Section 1 lays out the current state of aid allocation and existing models surrounding it. Section 2 introduces the aid principles guiding our discussion and analysis. Section 3 lays out the data and methods used in our analysis, while Section 4 presents results and Section 5 lays out implications, and Section 6 concludes.

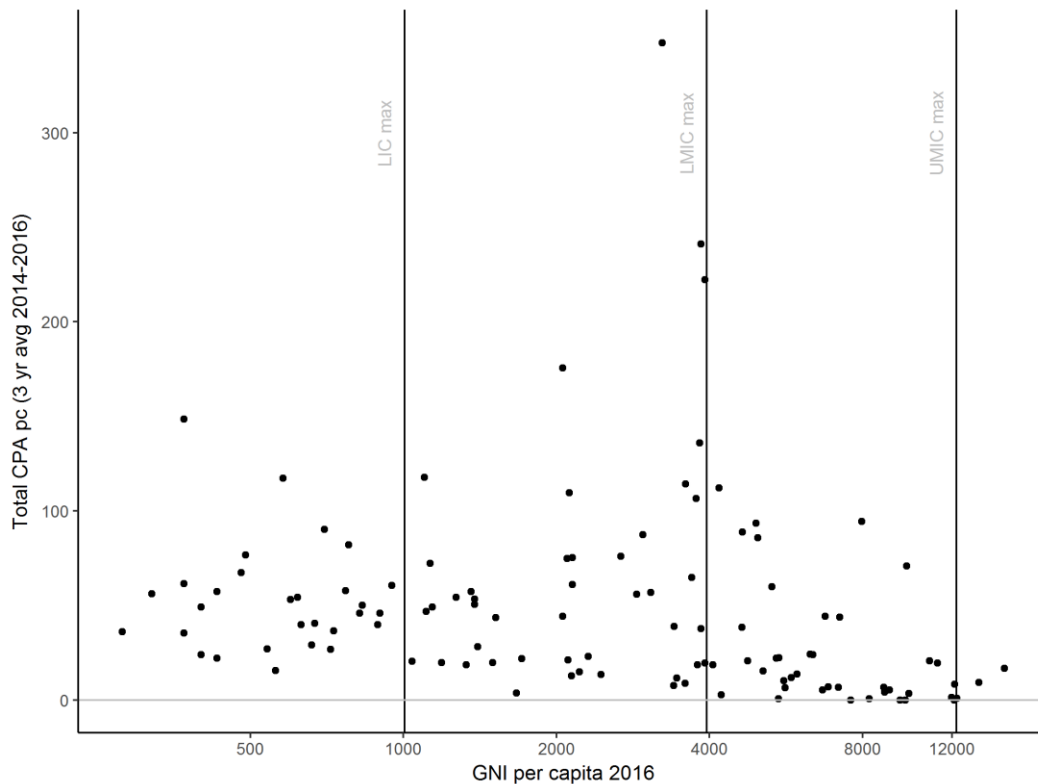
1. THE STATE OF AID ALLOCATION

Only a portion of aid is programmed with government authorities at the country level. Some aid responds to humanitarian crises or is an accounting device that accompanies debt relief exercises. Other portions of aid are not programmed to a country directly—for example, aid that passes through an NGO delivery channel would be subject to completely different allocation criteria as compared to aid to a government. The Development Assistance Committee of the OECD has developed a concept of Country Programmable Aid (CPA) that measures only the portion of aid that is subjected to multi-year programming between a bilateral or multilateral donor and a recipient country. This is the concept of aid that comes closest to the questions in this paper about how to allocate aid to achieve maximum welfare. Compared to the standard definition of aid, CPA removes: humanitarian aid and debt relief on the grounds that these are unpredictable by nature (and in the case of debt relief may not involve new cash flows); donor administrative costs, in-donor scholarships, and in-donor refugee support; and aid that is not programmed by the donor government, such as core funding for non-governmental organizations or local government food aid.

One side note: aid is often a bundle of financial resources and knowledge exchange, with the latter an important element of the value addition of aid. The knowledge exchange can be in the form of dissemination of what has worked in other countries, recommendations for policy reform, project identification and design, the introduction of appropriate social, environmental, governance and financial safeguards, and many other elements. In this paper, we are largely concerned with the allocation of the financial component of aid. The knowledge exchange component can, in principle, be allocated in a different way according to different criteria, although it is understood that some knowledge element is typically embedded in an aid project.

Per capita CPA allocation in 2016 stood at around \$43 per capita in LICs, \$16 in lower middle-income countries (LMICs), and \$5 in upper middle-income countries (UMICs). This apparent progressivity of aid taken together hides the fact that there are substantial variations within country categories in aid allocations. Excluding India raises the weighted average of CPA per capita in LMICs to \$26; excluding China from UMICs raises the average there to \$11. However, large population countries tend to get substantially less CPA per capita than small countries, so the simple average across countries is less progressive: \$50 for LICs, \$64 for LMICs, and \$26 for UMICs.

Figure 1 below shows the pattern of CPA across countries and territories (the single outlier of CPA greater than \$300 per capita is for the West Bank and Gaza). The figure shows very large variation in aid levels. Some countries get a hundred dollars or more per capita per year, others get less than one-fifth this amount. This is not explained by income levels; there is only a mildly negative correlation between CPA and GNI per capita. Within the three income groups of countries we look at, there is far more variation in aid levels within the groups than between the groups.

FIGURE 1: COUNTRY PROGRAMMABLE AID COMMITMENTS PER CAPITA, 2014-16

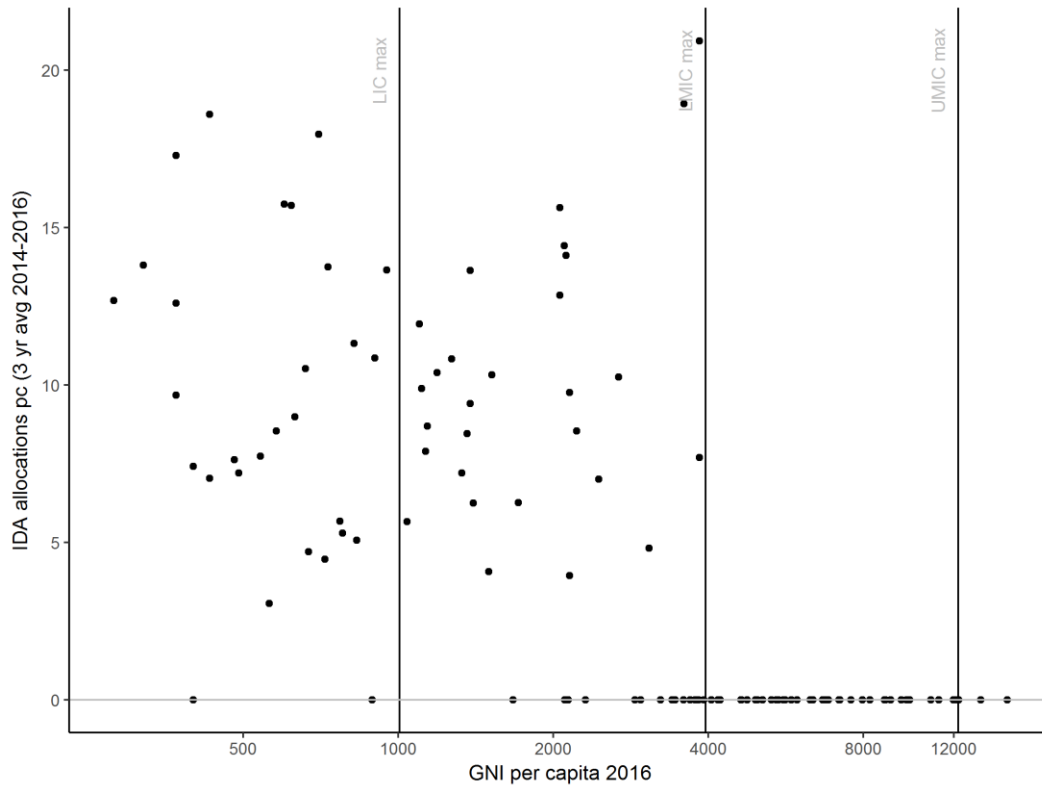
Source: <https://stats.oecd.org/Index.aspx?DataSetCode=CPA>, World Bank World Development Indicators <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD>, Authors' calculations

Note: Countries with population of less than 1 million have been excluded from this graph

A similar pattern holds for International Development Association (IDA) allocations for the same sample of countries in Figure 1 above, although there is a distinct cut-off of IDA at a GNI per capita of about \$4000, coinciding with the change in classification from lower- to upper-middle income. IDA, too, seems to have far greater variation in aid levels within income groups than between them. This is despite the fact that multilateral aid is considered less politicized (Rodrik, 1995), or that multilateral institutions make greater effort to target high need countries (Maizels, Nissanke 1984; Headey, 2007). It is perhaps because multilateral institutions are being asked by their shareholders to consider many factors other than income levels. Consider the allocation formula under the IDA 18 replenishment: per capita aid to a country decreases with income per capita, and increases with the country performance rating (CPR). The CPR, in turn, is a weighted average of recipient country policies and institutions (with a heavy weight placed on governance factors), and performance under the outstanding IDA portfolio. Additional carve outs are made for turn-around regimes, refugee hosts, regional programs, crisis windows, scale up facilities, graduating countries, and other causes (IDA, 2017). The weights have been adjusted compared to previous IDA allocation rounds, to better conform to donor preferences.³

³ IDA 18 Towards 2030: Investing in Growth, Resilience and Opportunity

FIGURE 2: IDA ALLOCATIONS



Source: World Bank. 2015-2017. IDA country allocations for FY15-FY17 (English).
<http://documents.worldbank.org/curated/en/149981508187781672/IDA-country-allocations-for-FY17>.
<http://documents.worldbank.org/curated/en/633291473189696408/IDA-Country-Allocations-for-FY16>.
<http://documents.worldbank.org/curated/en/704121468187734229/IDA-country-allocations-for-FY15>.
 World Bank World Development Indicators
<https://data.worldbank.org/indicator/NY.GNP.PCAP.CD>, Authors' calculations
 Note: Countries with population of less than 1 million have been excluded from this graph

With so many options, the net result of IDA 18 allocations will actually imply a positive correlation between aid and GNI per capita when the sample is restricted to exclude graduated countries and those with a population less than a million⁴. This is not altogether surprising. There is an inherent trade-off between performance-based criteria and needs-based criteria, because both are correlated with per capita income but in opposite directions—richer countries tend to have better policies and institutions, but lower needs across a range of variables. When allocation formulae mix the two, it is inevitable that the end result will be approximately neutral with respect to income levels across the range of IDA recipients.⁵

The fact that there are so many issues that donors would like aid to address points to the need for some form of quantification that would allow for informed trade-offs to be made to distinguish between the different contexts of each developing country.

⁴ Authors' calculations
⁵ Paddy Carter, 2016, "The allocation of World Bank Group resources to leave no one behind", ODI, <https://www.odi.org/sites/odi.org.uk/files/resource-documents/10910.pdf>

2. AID ALLOCATION PRINCIPLES

Surprisingly, most aid allocation systems do not take into account the full system of resources potentially available to a country. Most donors look only at what their aid finances. This kind of approach to aid allocation ignores the fungibility of aid resources with other sources of funds. Devarajan and Swaroop (1998) clearly state the problem: “...research shows that aid intended for crucial social and economic sectors often merely substitutes for spending that recipient governments would have undertaken anyway; the funds freed are spent for other purposes.” They go on to argue that aid should instead be given to support an overall public expenditure program of a recipient country as a way to ensure that the marginal public investment project is also captured in the assessment.

An alternative approach to considering the entire public expenditure pattern is to identify the marginal project. This is unlikely to be aid financed; aid-financed projects are often the best examples of government spending, not the marginal cases. As a matter of practice, marginal public expenditure is financed by government borrowing from private capital markets for general purposes. In the past few years, almost all developing countries (including many low-income countries) have accessed global capital markets while aid has become an inframarginal source of foreign exchange.

Figure 3 illustrates the approach in graphical form. It shows a demand curve for foreign borrowing, $D(f)$, showing how much a country would be prepared to borrow at any given interest rate. The demand for foreign borrowing reflects the marginal return to public investment. Countries that have efficient mechanisms for choosing and implementing public investments (which could in principle be augmented by policy reforms or technical assistance linked to aid) will have a demand curve that is shifted to the right. Those with poor execution will have a demand curve shifted to the left. In the simplified structure below, as we will show, the positioning of the demand curve affects the volume of private financing, but not the allocation of aid.

Figure 3 also shows a supply curve of foreign funds, $S(f)$. $S(f)$ is constructed of two parts: official aid, available at a price of r_0 , up to a certain level, denoted “CPA”, and private commercial flows available at a price r_p . In this simple example, the price of private capital does not change with the amount offered (the traditional small country assumption) but a more complex case of an upward sloping supply curve would yield similar results.

In Figure 3, the recipient country has a welfare gain given by the sum of areas A + B + C. Areas A + C represent the gain from returns to all investment projects that exceed the marginal cost of funds on private capital markets. The quadrilateral B is the additional gain from being able to access foreign funds through aid at a rate below the market rate.

The area of B is given by the amount of aid, “CPA” multiplied by the difference between the marginal cost of foreign borrowing, r_p , and the interest rate charged on official aid, r_0 . For grants, r_0 is zero by definition.⁶

Note that in this set-up, if aid expands, the level of total foreign financing does not change. Aid simply substitutes for private capital. Yet the welfare of the country improves because it now receives foreign capital at a cheaper price.

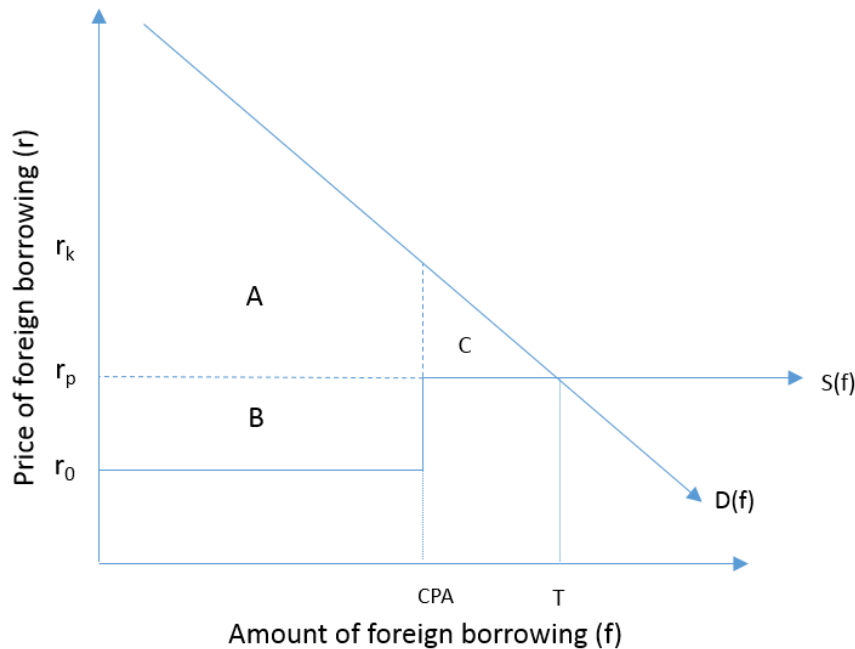
In the figure below, the surplus associated with a marginal increase in aid is simply $r_p - r_0$. The implication is that countries with relatively high borrowing costs due to supply considerations gain more from aid compared to countries with cheaper access to private capital markets. High

⁶ For countries that have no access to private capital markets, the marginal benefit from aid is given as the difference between the marginal return to investment and the cost of aid, $r_k - r_0$.

borrowing costs are often associated with low per capita income (and we shall show below that this is the case), but there are also other factors that should be considered. Importantly, in this simple structure, the surplus associated with aid is not dependent on the demand curve, that is on whether public investments are efficiently executed or not, except insofar as public sector effectiveness is reflected in the market's judgment of default risk.

Although Figure 3 shows the simple case where aid itself does not affect the price of borrowing on capital markets, this assumption can be relaxed. As a matter of practice, aid can help mobilize private capital into a specific project by funding up-front costs such as project preparation, or providing a guarantee. It can also have an indirect effect when it catalyzes policy and institutional change that reduces risks faced by private investors and thus drives r_p down. In the framework below, aid would then expand the welfare triangle C, and the size of the expansion would be larger when the amount of foreign borrowing done by the country is larger and when the impact of aid-induced policy changes on the price of borrowing is larger.

FIGURE 3: THE SUPPLY OF AND DEMAND FOR FOREIGN BORROWING



The key insight is that the marginal benefit of aid is proportional to the interest rate prevailing in a country's private commercial markets. But because r_p is partly endogenous to a country's government actions, it has to be decomposed before being used as a guide for allocating aid.

For example, consider a case where a high interest rate reflects bad behavior or bad governance by a receiving country. In such circumstances, aid could be highly effective (people will be suffering), but aid channeled through the government might simply be captured and wasted. In terms of Figure 2, the demand curve for foreign resources may not reflect social welfare maximization at all, but rather the politics of a corrupt regime. Donors should adjust for that. Equally, faced with a corrupt regime, the supply price of private foreign borrowing may go up, suggesting that the welfare impact of aid would be greater. But if aid was allocated on this basis it would create significant moral hazard (even if not channeled through the government) and so donors may again wish to adjust for this.

As another example, a country may face a high interest rate on the supply side because it is already highly indebted. On the one hand, if prior debt was the result of a previous regime,

donors may wish to take into account its impact and help a new government to compensate for the ills of its predecessor. On the other, if high debt is an outcome of the same government's previous macroeconomic mismanagement, donors may not wish to reward it.

From this framework, we derive four basic principles for efficient aid allocation systems.

Principle 1: Aid has a potentially larger welfare benefit in countries where the price of accessing commercial capital is high, but care needs to be taken to sort out the reasons for the high interest rates.

Principle 2: Shifting aid from a country with a low borrowing cost to one with a high borrowing cost will increase aid's system-wide benefits, but changes the distribution of benefits among countries. Aid allocation systems are not, and cannot be, Pareto-optimal.

Principle 3: The return on an actual aid project (r_k) is not relevant to the allocation of aid across countries. It is the return on the marginal project, proxied by the marginal cost of foreign borrowing (r_p) that is the relevant concern, provided, of course that $r_k > r_p$ (required to ensure that aid is indeed financing an inframarginal project). In the case of countries that do not actually access private capital, r_p can be inferred or imputed from modelling as described below.⁷

Principle 4: If aid can lower the cost of accessing private capital, $\frac{d(r_p)}{d(CPA)} < 0$, it amplifies its benefits. Catalytic or blended finance approaches to aid allocation can be understood as examples of putting this principle into practice.

⁷ It is striking that how much attention is paid to estimating r_k by aid agencies in project submissions to their Boards compared to the attention given to estimating r_p .

3. DATA AND METHODS

Using the interest rate in private capital markets as a guide to aid allocation presents two obstacles. First, as indicated above, the interest rate may need to be adjusted from the observed level to avoid giving incentives to poorly behaving countries (avoid moral hazard and adverse selection). Second, not all countries, and in particular not all low-income countries, have observable interest rates. A model therefore has to be used.

In what follows, we use readily observable credit ratings as proxies for the interest rate that could be faced by a recipient country.

We construct a database starting in 1990 with all sovereign credit ratings for developing countries, giving us over 1,000 country-year data points. We then build a model to explain credit ratings on the basis of country fundamentals. Others, including Basu et al. (2013) have developed similar models to explain sovereign ratings, but have not drawn out the implications for aid allocation. Extending the analysis in this way builds on the pioneering work on the shadow pricing of foreign exchange done by Little and Mirrlees (1974).

We use the regression results to impute ratings for those countries that do not currently have a rating. This then allows for a complete ranking of all developing countries in terms of their “shadow price” of foreign exchange.

To complete the analysis, we adjust for factors that may or may not be in a country’s control. Such an adjustment requires a judgment that can vary across donors. Some donors may choose to reward countries for good performance, for example (positive incentives or an “MCC” effect).⁸ Others may argue that needs in such countries are lower.

The advantage of looking at the shadow price of foreign exchange, adjusted for endogenous components, is that it provides useful quantitative guidelines for donors to assess trade-offs. If a country is a small island state, should it receive more aid than a country with an income level that is two-thirds as high? How much should bad governance weigh compared to low-income levels? At present, such trade-offs are largely heuristic and driven by donor perceptions of the outcomes they would like to see (on a political basis) rather than evidence-based. Accordingly, the current aid allocation system results in aid “orphans” and “darlings.”⁹

Data

Sovereign credit ratings in developing countries have a very recent history. Up to the early 1990s, Standard and Poor and Moody’s only issued ratings for around 50 countries, most of whom were high income countries tapping the Yankee bond market (Cantor and Packer 1995). Starting in the late 1990s, there was an increased demand for sovereign ratings in emerging markets, as well as low-income countries. These ratings permitted countries to access external credit and to send signals to the business community over the level of risk of the country. Many studies find that sovereign credit ratings act as a ceiling for the foreign currency rating of sub-sovereign entities and therefore act as a good benchmark for a variety of indicators that creditors might look for (El Daher 1999 Ferri, Liu and Majnoni 2001; Beers and Cavanaugh 2005, Truglia and Cailleteau 2006, Lehmann 2004). Indeed, the US State Department, as part of its program to help countries in sub-Saharan Africa to obtain credit ratings stated that “the rating process, as well as the rating itself, can operate as a powerful force for good governance, sound market-oriented growth, and the enforcement of the rule of law.”¹⁰

⁸ The Millennium Challenge Corporation in the United States has explicit criteria for country selection that provide more aid to those countries that pass a threshold of performance indicators.

⁹ DAC, <https://www.oecd.org/dac/aid-architecture/Aid%20Orphans%20Development%20Brief.pdf>

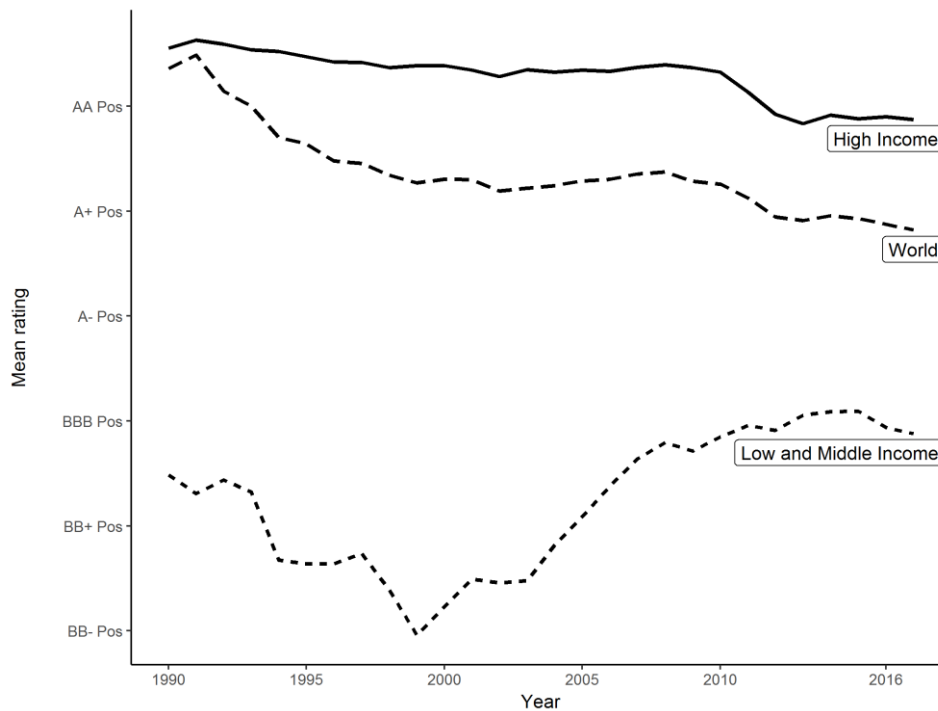
¹⁰ <https://web.archive.org/web/20081008114046/https://www.state.gov/p/af/rt/scr/>

We use long-term foreign currency sovereign credit ratings from three major credit ratings agencies (CRAs): Standard and Poor's, Moody's, and Fitch. Altogether, 153 countries have at least one rating from one of the agencies, of which 92 are developing countries.^{11,12} This means that 48 developing countries do not have ratings. Since the ratings of all three agencies are very highly correlated with one another, we use the average when multiple ratings are available for a country-year observation. We use the entire historical record, starting in 1990 and ending at July 31, 2017. The dataset has ratings as of 2016 or 2017 for all countries with credit ratings.

We transform ratings and outlooks into cardinal numbers following the approach of Basu et al. (2013) who in turn use the method of Ratha, De and Mohapatra (2011). We then invert and re-scale the ratings, assigning a value of 1 for a AAA rating plus stable outlook and a value of 62 for the worst outcome (a C rating).

Using this numerical ordering of credit ratings, we can chart average sovereign ratings over time. As shown in Figure 4, the average GDP-weighted sovereign rating for developing countries has been improving since 1999, whereas the average developed country rating has been deteriorating steadily since 1990.

FIGURE 4: GDP WEIGHTED AVERAGES OF RATINGS PER YEAR



Source: Authors' calculations

Model

We use a standard, unweighted OLS model, following Ratha, De and Mohapatra (2007), using individual country-year observations to regress the cardinal sovereign rating score on a range of independent variables. Because we are interested in using the model to also estimate

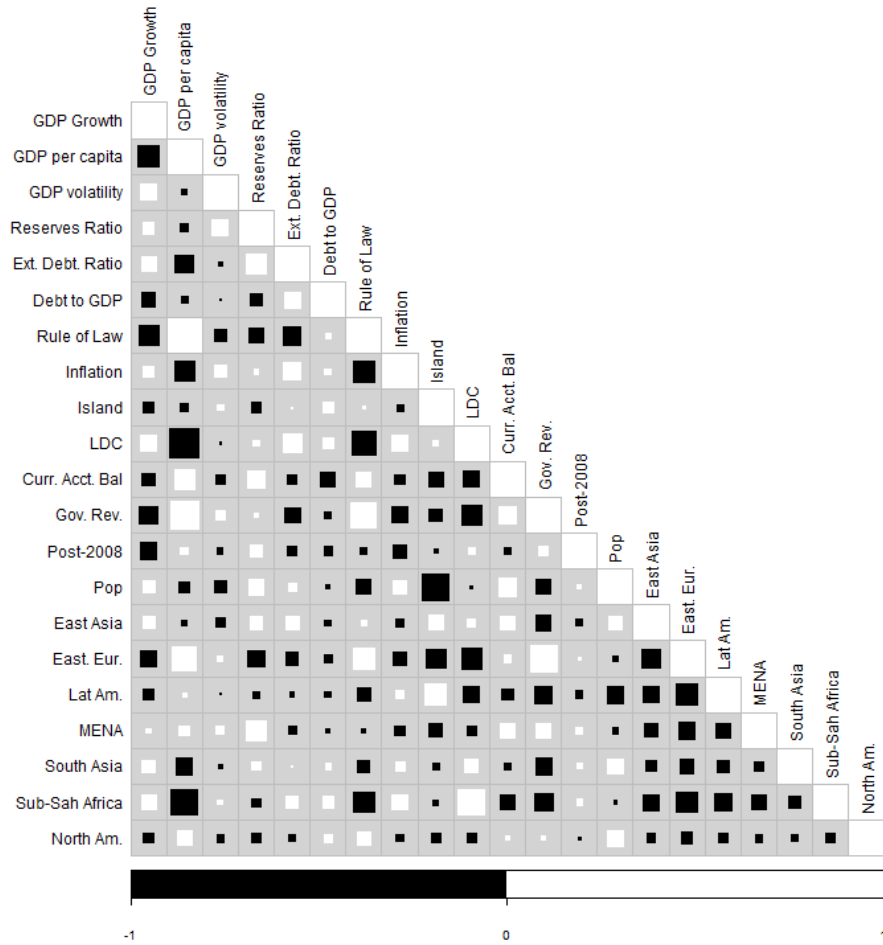
¹¹ Low and Middle Income countries by World Bank July 1, 2017 income group classification
¹² 12 Low-income countries, 35 Lower Middle Income countries, 45 Upper Middle Income countries

shadow ratings for those countries that do not have actual ratings data, we use OLS as the preferred method (Basu et al, 2013). This requires an assumption that each step in the credit rating scale is equivalent. This assumption could be relaxed by using ordered probit models, but then we would not be able to compute out of sample ratings. Nevertheless, we include the results from ordered probit estimates in the appendix. We find the results to be consistent with our OLS estimates in terms of direction and significance.

Our choice of independent variables follows the literature. Variables such as macropolicy (proxied by the rate of inflation and GDP growth), size (proxied by population) and the rule of law, reflect potential returns to investment. Variables such as per capita income level and GDP volatility, gross government debt/GDP, the reserves ratio (reserves divided by imports), and the external debt ratio (external debt divided by exports of goods and services, including remittances where available), and gross government revenue/GDP reflect the risk of non-repayment. These variables are logged and lagged. Dummy variables are also added, including status as a small island, a least developed country (LDC), a landlocked country, and geographic region. A dummy for the post-2008 period is included to account for changes in global capital markets that may have occurred.

The covariates mentioned are displayed in a correlation matrix in Figure 4 below. There is a high degree of multicollinearity between rule of law and per capita income, between LDC status and per capita income, and between the sub-Saharan Africa dummy and per capita income. Population size and small island status is also collinear, for obvious reasons. Otherwise, the correlations are low.

FIGURE 4: CORRELATION MATRIX OF INDEPENDENT VARIABLES



Source: Authors' Calculations

To check the robustness of our results (See annex for a selection), the regressions were run with developing countries only; for different time periods; and with different variables.¹³ In cases where a choice had to be made between several correlated variables (for example, rule of law and control of corruption), the variable with the best explanatory power was chosen.

¹³ Other literature on this topic, such as Gueye and Sy (2010) and others, includes covariates, such as the current account balance, as well as “push factors” influencing emerging market bond spreads such as the federal funds rate, oil price index, the VIX index, the slope of the U.S. yield curve and the U.S. high yield spreads. We find none of these covariates to be significant in our OLS or Ordered Probit model. Other variables for income, such as GNI per capita or GDP per capita in PPP terms produce nearly identical results. We present here the results including GDP per capita in constant terms to make the interpretation of coefficients easier.

4. RESULTS

Table 1 below shows the main results. In the first column, all countries, including high income countries, are considered. Most variables are significant with the expected sign. Faster GDP growth and higher GDP per capita levels improve creditworthiness. Higher foreign exchange reserves, a larger current account surplus and a stronger rule of law are also significant. Larger population countries are more creditworthy. By contrast, GDP volatility, high levels of debt, and inflation worsen creditworthiness. All countries see a deterioration in the post-2008 period.

TABLE 1: DETERMINANTS OF SOVEREIGN CREDIT RATINGS

VARIABLES	(1) All countries Rating (numeric)	(2) Developing only Rating (numeric)	(3) Developing only Rating (numeric)
3-year moving avg GDP growth	-0.320*** (0.047)	-0.360*** (0.052)	-0.239*** (0.047)
Log GDP per capita (Constant prices)	-5.221*** (0.240)	-4.528*** (0.291)	-4.174*** (0.233)
GDP volatility %	0.284*** (0.047)	0.374*** (0.052)	0.226*** (0.038)
Reserves Ratio (Reserves/Imports)	-0.024*** (0.004)	-0.045*** (0.005)	-0.031*** (0.004)
External Debt Ratio (Debt/XGS)	0.006*** (0.002)	0.005** (0.002)	0.003* (0.002)
Gross Debt to GDP ratio	0.092*** (0.004)	0.089*** (0.007)	0.090*** (0.007)
Rule of Law (index)	-7.953*** (0.272)	-6.549*** (0.374)	-7.315*** (0.347)
Inflation	0.210*** (0.023)	0.162*** (0.023)	0.176*** (0.022)
Current Account Balance	-0.090*** (0.016)	-0.028 (0.020)	
Government Revenue to GDP	-2.481 (1.685)	4.269** (2.109)	
Small Island dummy	-1.876*** (0.521)	2.563*** (0.600)	2.971*** (0.587)
LDC dummy	-2.107*** (0.622)	0.623 (0.633)	
Post-2008 dummy	1.181*** (0.262)	0.817** (0.325)	1.321*** (0.313)
Population	-1.972*** (0.097)	-1.082*** (0.126)	-1.401*** (0.119)
East Asia dummy	1.966** (0.829)	2.448** (1.217)	1.956 (1.240)
Europe and Central Asia dummy	2.944*** (0.783)	5.997*** (1.207)	6.257*** (1.220)
Latin America dummy	4.858*** (0.832)	6.790*** (1.163)	6.220*** (1.203)
Middle East North Africa dummy	2.082** (0.894)	4.133*** (1.284)	4.700*** (1.288)
South Asia dummy	3.755*** (1.084)	5.301*** (1.377)	5.300*** (1.373)
Sub-Saharan Africa dummy	2.691*** (0.927)	4.393*** (1.264)	4.549*** (1.277)
Constant	99.803*** (2.902)	77.626*** (3.531)	80.317*** (3.160)
Observations	1,801	1,051	1,148
R-squared	0.896	0.729	0.702

Standard errors in parentheses | *** p<0.01, ** p<0.05, * p<0.1

In the second column, high income countries are dropped from the analysis. After all, the underlying purpose is to look at allocations of aid to developing countries. The results are mostly similar but the importance of the current account balance disappears. The sign on government revenues reverses. Column (2) suggests that more government revenue is weakly associated with reduced creditworthiness (this could perhaps reflect endogeneity—countries like Brazil and Argentina with a past record of defaults have high current ratios of domestic revenue to GDP). The small island dummy shows up strongly. Developing country islands are less creditworthy than other countries at similar income levels.¹⁴ LDC status, as defined by the United Nations, has no impact.

Geographic location is significant. Compared to the North America region, all other regions have worse creditworthiness, with Latin America being most risky. Sub-Saharan Africa fares better than any region other than East Asia.

In column (3), we drop the insignificant variables. Doing this raises the number of observations (several countries do not have reported current account balances) and permits a greater cross-section of countries to be included. The remaining results hold. We use the coefficients from Column (3) for estimating implied credit ratings for those countries that do not have explicit data. This generates a universe of 130 developing countries.¹⁵

¹⁴ In column (1) the island dummy is reversed, maybe because highly creditworthy countries like Singapore, the Bahamas and the Seychelles are among high-income islands.

¹⁵ 10 low- and middle-income countries have insufficient information. They are: American Samoa; Kiribati; Korea, Dem. People's Rep.; Marshall Islands; Micronesia, Fed. States.; Nauru; Somalia; South Sudan; Tuvalu; West Bank and Gaza

5. IMPLICATIONS

The framing above can inform on-going debates on aid allocation, including those around country comparisons and trade-offs, and graduation and exit strategies, and how these relate to different sectoral considerations.

Cross-country comparisons

The estimated coefficients permit us to impute credit ratings, and hence relative country rankings, across almost all developing countries. We have actual data on 92 developing countries for 2016 or 2017, and imputed ratings for another 32 countries. We adjust the credit rating to remove endogenous elements (rule of law, inflation, and the reserve ratio). What remains are country characteristics not easily changed by governments, at least in the short-term. In our view, these should be the fundamental determinants of aid allocations, for economic welfare purposes, which are also compatible with avoiding adverse selection and moral hazard problems that would occur if aid were simply allocated on the basis of need or towards the least creditworthy countries.

Take Botswana. Its estimated credit rating is BBB. This is relatively good for a country at its income level, but is primarily driven by very good scores on inflation and a high reserve ratio. If the creditworthiness approach were applied mechanically, Botswana would not be a good candidate for significant aid allocations, because aid would simply substitute for relatively cheap foreign borrowing. But in our view, this would unreasonably penalize Botswana for its good policies. Correcting for these, Botswana's rating would fall to BB+; it would go from an investment grade country to a speculative country. There is a stronger case for aid in these economies. A similar argument applies to Costa Rica, again a case of an investment grade country that holds this position because of its strong policies, in this case on the rule of law. Making the adjustment would lower Costa Rica's rating from BBB- to BB+.

At the other end of the scale, there are countries that have far worse credit ratings than they should, due to poor policy performance. Afghanistan is among those classified as highly speculative (B-) due to its poor ranking on the rule of law. Adjusting for this, Afghanistan's structural credit rating is probably closer to BB-, implying that from an economic point of view it is less worthy of aid than its actual rating would suggest. Much the same applies to Bangladesh.

To some degree, donors have to judge which variables they view as exogenous to current recipient governments and which they view as endogenous, so the adjustments they make can be done in different ways. Our purpose is not to impose our own judgment on how to do this, but to simply demonstrate how any donor can make these adjustments in an empirical way.

The results of our adjustment for three variables—the rule of law, inflation, and the reserve ratio—are presented in Table 2 below, with countries further subdivided into those who would be viewed by rating agencies as highly speculative with significant risk (B+ and below), non-investment grade speculative (BB- to BB+), and investment grade (BBB- and above). Not surprisingly, the poorest countries, many in Africa, are among the list of those with the worst adjusted credit rating. But several Caribbean countries—Jamaica, Grenada, Belize, Dominica, St. Vincent, and Haiti—also appear in this column, reflecting the special issues faced by small island economies.

Most developing countries receiving aid are in the non-investment speculative grade category, even after adjusting for endogenous variables. These countries are not simply speculative because of their own policies. They appear to be speculative because of structural effects.

There are several upper middle-income countries in this list, including Jordan, Ukraine, Colombia, and Argentina—suggesting that aid could also be highly beneficial in these places.

The third column of countries with investment grade levels on their adjusted ratings where the welfare gains from aid are lowest includes some of the usual suspects—China, Mexico, Malaysia, Turkey, Kazakhstan, South Africa, and Brazil—but also some surprises. Middle income countries like Nigeria, the Philippines, Thailand and Indonesia appear here. Nigeria’s case is instructive. Its actual credit rating is highly speculative (B+). But this is largely the result of its own policies—it is in the bottom quarter of all countries based on the rule of law. Removing the negative effect of this variable on the credit rating would leave Nigeria as an investment grade country, where the benefit of aid is low.

This example also illustrates the judgment involved in using the model to make real-world decisions. If a donor decides not to attribute bad policy to the government (for example if a new government adopts a reform-minded stance), then the adjusted credit rating would change, in some cases by a considerable degree, sharply influencing the judgment about the marginal benefit of aid.

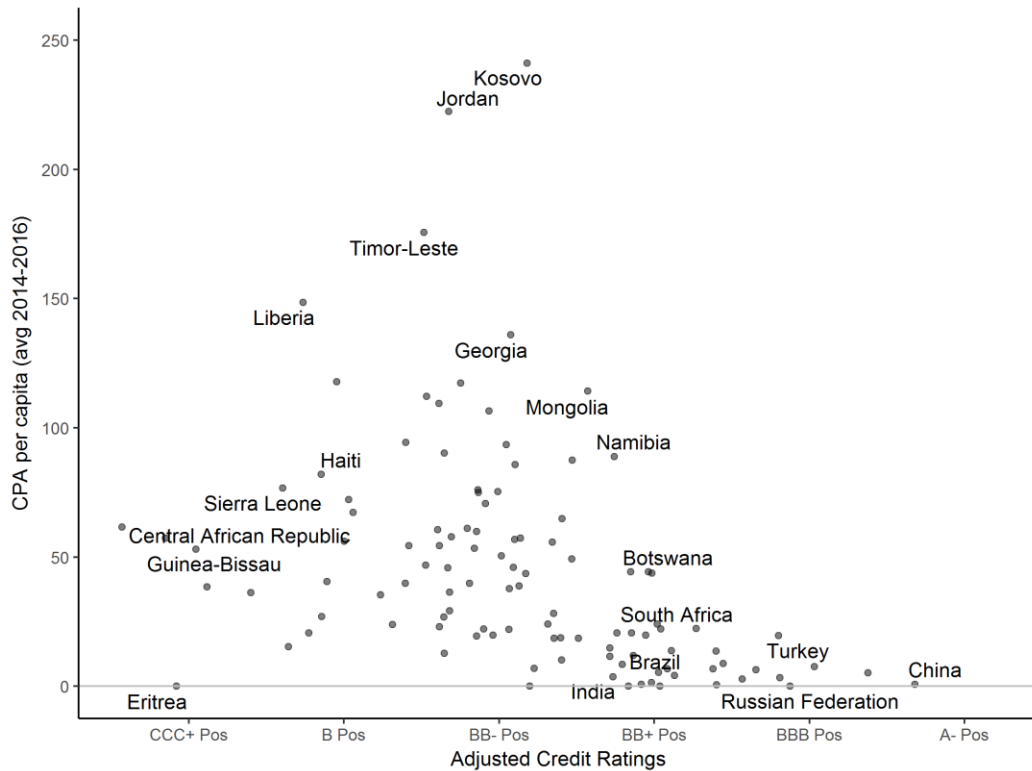
TABLE 2: COUNTRIES IN INVERSE ORDER OF ADJUSTED CREDIT RATING

Highly speculative and significant risks (B+ and worse)	Non-investment grade speculative (BB- to BB+)	Investment Grade (BBB- to AAA)
1. São Tomé and Príncipe	40. Congo, Rep.	74. Belarus
2. Gambia, The	41. Djibouti	75. Macedonia, FYR
3. Yemen, Rep.	42. Ethiopia	76. Kosovo
4. Sierra Leone	43. Jordan	77. Angola
5. Eritrea	44. Albania	78. Côte d'Ivoire
6. Burundi	45. Montenegro	79. Cameroon
7. Belize	46. Rwanda	80. Tunisia
8. Dominica	47. Senegal	81. Croatia
9. Guinea-Bissau	48. Solomon Islands	82. Cuba
10. Central African Republic	49. Nepal	83. Morocco
11. Jamaica	50. Burkina Faso	84. Swaziland
12. Grenada	51. Armenia	85. Paraguay
13. St. Vincent & Grenadines	52. Congo, Dem. Rep.	86. Bangladesh
14. Mozambique	53. Mali	87. Dominican Republic
15. Liberia	54. Ghana	88. Azerbaijan
16. Comoros	55. Uganda	89. Cambodia
17. St. Lucia	56. Serbia	90. Guatemala
18. Bhutan	57. Honduras	91. Namibia
19. Mauritania	58. Zambia	92. Ecuador
20. Togo	59. Afghanistan	93. Gabon
21. Haiti	60. El Salvador	94. Uzbekistan
22. Kyrgyz Republic	61. Mauritius	95. Equatorial Guinea
23. Guinea	62. Nicaragua	96. Costa Rica
24. Malawi	63. Sudan	97. Panama
25. Suriname	64. Fiji	98. Iraq
26. Guyana	65. Kenya	99. India
		108. Peru
		109. Romania
		110. Iran, Islamic Rep.
		111. Kazakhstan
		112. South Africa
		113. Nigeria
		114. Algeria
		115. Philippines
		116. Thailand
		117. Russian Federation
		118. Turkey
		119. Malaysia
		120. Indonesia
		121. Mexico

27. Libya	66. Lao PDR	100. Brazil	
28. Niger	67. Georgia	101. Vietnam	
29. Maldives	68. Pakistan	102. Argentina	
30. Chad	69. Bolivia	103. Botswana	
31. Zimbabwe	70. Egypt, Arab Rep.	104. Bulgaria	
32. Samoa	71. Sri Lanka	105. Colombia	
	72. Bosnia and Herzegovina	106. Myanmar	
33. Ukraine	73. Tanzania	107. Turkmenistan	
34. Madagascar			
35. Lebanon			
36. Lesotho			
37. Benin			
38. Tajikistan			
39. Moldova			

Our basic model suggests that more aid should flow to countries with higher marginal costs of borrowing (worse adjusted credit ratings). Figure 5 below shows that there is already some negative correlation between aid allocations and adjusted credit ratings, but the correlation is weak: the adjusted credit rating only explains 17 per cent of the variance in aid per capita allocations across countries. The potential scope for system-wide improvements in aid allocations seems to be considerable.

FIGURE 5: COUNTRY PROGRAMMABLE AID ALLOCATIONS AND ADJUSTED CREDIT RATINGS, 2014-2016



Source: <https://stats.oecd.org/Index.aspx?DataSetCode=CPA>, Authors' calculations
 Note: Countries with populations smaller than 1 million excluded from this chart.

Trade-offs between country characteristics

The model allows for comparisons between countries with different characteristics. Consider, for example, the contrasting cases of Papua New Guinea (PNG) and Ethiopia in 2014. PNG is almost four times as rich, with a per capita income level of around \$1,700 compared to \$450 in Ethiopia in 2014.¹⁶ It also has a far worse score in terms of its adherence to the rule of law. On the one hand, these factors suggest PNG should get less aid than Ethiopia. On the other, PNG is a small island with a relatively small population, faced with greater GDP volatility, and a higher level of external debt, factors that the government can do little about in the short run. It also has somewhat better macroeconomic management outcomes, proxied by lower inflation rates. Consideration of these factors should encourage donors to provide it with more aid per capita. Taking all factors into account, our model suggests PNG and Ethiopia should receive roughly similar amounts of aid per capita. Yet the reality does not match this advice: IDA committed \$14 per capita to Ethiopia, while committing \$7 to PNG¹⁷. But IDA is only one donor; PNG actually gets more than twice as much aid¹⁸ from all donors combined (\$83) compared to Ethiopia (\$30).

As another example, consider the comparison of Mali and Rwanda in 2015. Mali is less creditworthy than Rwanda, so at first blush it seems that Mali should get more aid, even though the two have similar levels of GDP per capita. However, Rwanda's credit rating reflects a far better score on the rule of law due to reforms undertaken by the current government. Donors might feel it unfair (and not incentive-compatible) to penalize Rwanda for this success. Taking this into account, the two countries have almost the same adjusted creditworthiness and so should receive the same aid levels. Yet Rwanda, a donor darling, receives about one-third more aid per capita (\$89) than Mali (\$57).

Our last example comes from comparing Bhutan and Haiti in 2015, neither of which have creditworthiness ratings. However, their ratings can be estimated based on the values of the independent variables in model (3). Unsurprisingly, Haiti gets a very poor creditworthiness score, while Bhutan's is far better. The bulk of this difference, however, is generated by very different scores on the rule of law. Bhutan is one of the best-governed developing countries, while Haiti is among the worst. Adjusting for this, the two countries should receive about the same aid volumes. Bhutan is richer than Haiti, with a faster growth rate, but it is also smaller and has a higher volatility of GDP growth. In actuality, Bhutan receives about one-third more aid per capita than Haiti (\$127 compared to \$81) when all donors are considered, with similar patterns to IDA, though less consistently; IDA is committing \$6 to Haiti and \$26 per capita to Bhutan.

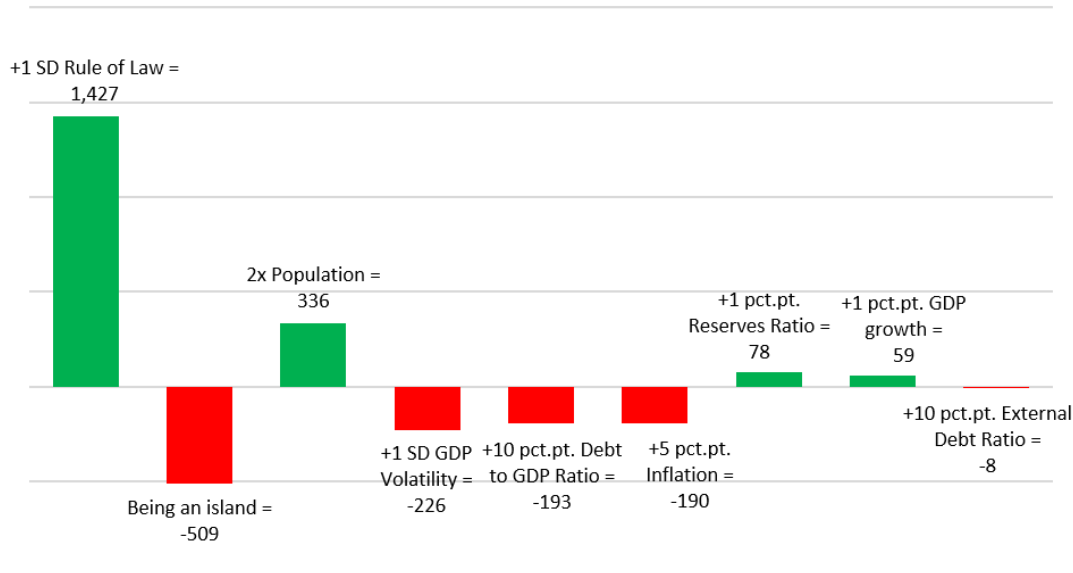
These examples can be formalized quantitatively. The model coefficients provide estimates of how much of each variable leads to an equivalent impact on the credit rating. To ease interpretation, we express the equivalence impact in terms of additions to GDP per capita, simulated around a base value per capita income level of \$1,000 per year (Figure 5). The first column shows that the impact on creditworthiness of a worse rule of law by one standard deviation is equivalent to a higher GDP per capita of \$1,427. Being a small island economy worsens a country's creditworthiness by the same as having a lower GDP per capita of \$509. A 10 percentage point increase in debt/GDP should be treated like a \$193 decrease in income levels. A 5 percentage point increase in inflation has the same impact as a \$190 decrease in income.

¹⁶ GDP per capita figures are expressed in constant 2010 US\$.

¹⁷ 3-year averages

¹⁸ In country programmable aid (CPA) per capita 3-year average

FIGURE 5: DOLLAR TRADEOFFS FOR VARIOUS VARIABLES AT A STARTING INCOME OF \$1,000 PER CAPITA



Source: Authors' calculations

By using these values, donors can decide which variables they want to ascribe to the policy of the incumbent government (and therefore reward or penalize) and which they want to treat as given in adjusting the country credit rating.

Blending and the catalytic function of aid

There is much discussion of using aid as a catalytic element to mobilize additional private financing. Inspection of Figure 3 shows that a rightward shift of the supply curve for private borrowing does not change recipient country welfare (provided the small country assumption holds). What is more important is the price of foreign borrowing. To the extent that blending aid and private finance can reduce the price of the latter, there is an incremental benefit to aid. The size of this benefit depends on two elements: the additional amount mobilized, and the reduction in price.

Mobilization ratios vary greatly across sectors and countries. According to the *Better Finance* report, mobilization can be as little as 20 cents of private capital for each dollar of public aid, or as much as \$20 of private capital for each dollar of aid. Many funds are based on a first loss model in which the provider of concessional capital is willing to take on the first 20-30 percent of the losses, thereby doing just enough to push up the investment quality of the assets. These funds typically have a ratio of 3:1 in the capital stack, meaning \$1 of concessional capital (subordinated donor funds as first loss) crowds in around \$3 of commercial capital.

It is more complicated to estimate the improvement in the cost of borrowing that can be associated with blended projects. On the equity side, expected returns on blended finance vehicles and facilities generally fluctuate between 10-20 percent for institutional investors (depending on risk allocation).

As these numbers indicate, it may be the case that aid has a greater impact in a middle-income country if it can mobilize significant private funds at reduced costs, for example by raising a project rating above investment grade.

Graduation and exit strategies

Because aid is a scarce resource, donors have pushed aid agencies to “graduate” recipient countries from aid. For example, the current eligibility ceiling for an IDA recipient is \$1,905, and the threshold for initiating the IBRD graduation process is \$6,895.¹⁹ Seventy-five countries are currently eligible to receive IDA resources²⁰, of which 59 countries get only IDA resources (that is, have not yet started the graduation process).²¹

In our model, graduation should be driven by creditworthiness. When countries can freely access capital markets at reasonable cost, there is no longer a strong case for aid (at least as a financial transfer—there may be a stronger case for aid to share experiences and to provide global public goods). Our empirical findings suggest, however, that there is strong support for the idea that richer countries have a lower marginal benefit from aid and hence deserve smaller aid allocations per capita. The model suggests that the reduction in aid as income levels rise should be gradual, not sharp, and should be continuous. The coefficient estimates suggest that a doubling of income levels results in an improvement in credit rating scores of about one letter (for example, from B- to BB-). This is significant, but is not the dominant factor in determining creditworthiness. Factors such as the rule of law are equally important and should perhaps be given more weight in thinking about graduation. In particular, donors should seriously consider whether improved performance on the rule of law (and the corresponding increase in growth and income levels) should be penalized by forcing a country to graduate, or whether it should be rewarded by adjusting the credit rating.

The idea of a smooth reduction in aid per capita as a country gets richer would also permit smoother transitions for agencies that provide specific development services. For example, GAVI, the Vaccine Alliance, supports countries to access cheap vaccines. If it prematurely cuts off countries because they have reached a certain level of income, it can create problems for the continued provision of vaccines in the recipient country, unless that country can access other financing relatively cheaply. A more appropriate response would be a smooth reduction in aid from GAVI, replaced by domestic funding as the latter ramps up with income levels. Such an approach would stand in contrast to the IDA criteria that has a very rapid reduction of aid once a given threshold of per capita income is passed.²²

Donors do, however, have a legitimate concern to exit from a country at a certain point. A smooth reduction could imply that this point is never reached—aid levels might go down, but do not hit zero. One way of addressing this issue is to compare the welfare costs of aid with the administrative costs to the donor of providing aid. Such costs are not available on a bilateral country-by-country basis (and will vary by country and organization), but a rough guide can be to use the average administrative cost for each donor agency. This information is readily available and consistently reported on to the Development Assistance Committee of the OECD. In Figure 6 below, we show the average for selected donors. A logical argument is that, when the benefits of aid are less than the administrative costs of supplying it, then graduation or exiting from a country should be seriously considered (or fee-for-service programs should be instituted). In Figure 6 below, administrative costs are compared to the marginal cost of borrowing for selected countries, proxied by the 10-year government bond yield in U.S. dollar terms. The data show that several highly creditworthy countries like Chile, Vietnam, and Botswana, fall under the threshold of administrative costs of donors like GAVI, the U.S., Sweden,

¹⁹ As of July 1, 2017 income classifications, which are used throughout this paper

²⁰ <http://ida.worldbank.org/about/borrowing-countries> Accessed August, 2018

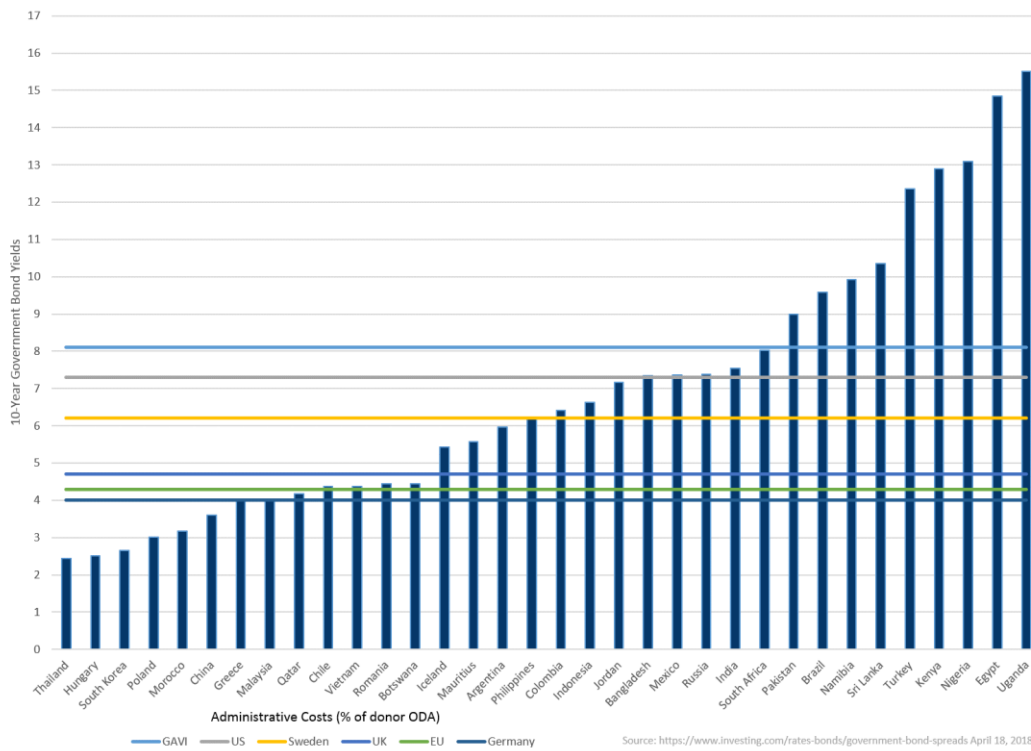
²¹ <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519> Accessed August, 2018

²² <http://documents.worldbank.org/curated/en/605191468191042391/pdf/103835-BR-Box394865B-OUO-9-IDA-SecM2016-0060.pdf>

and the UK, but above the threshold for the EU and Germany, while China, Morocco, and Thailand fall below the administrative costs of all donors.²³

The cost comparisons suggest that donors like GAVI, as well as other multilaterals, should be the first to graduate out of more creditworthy countries—their aid has a higher supply price—and should concentrate their aid on the poorest countries; indeed, close to 100 percent of GAVI funds flow to low and lower middle-income countries. The key point is that donors, both multilateral and bilateral, should ask themselves whether their administrative costs of delivery of their assistance programs cover the welfare gains that recipient countries receive. The figure also shows that the case for graduating upper middle-income countries like Brazil and South Africa rests with the implicit adjustment to their credit rating to take into account poor policy performance. Absent these adjustments, as Figure 6 shows, these countries face very high costs of market borrowing and hence large welfare gains from aid.

FIGURE 6: ADMINISTRATIVE COSTS OF SUPPLYING AID COMPARED TO 10-YEAR RECIPIENT BOND YIELDS



Source: <https://www.investing.com/rates-bonds/government-bond-spreads> April 18, 2018, OECD CRS Purpose code 91010 gross disbursements and Total gross disbursements for 2016, own calculations as of August 2018

²³ These are of course administrative costs across all recipients, there is no guarantee that the administrative cost of any one donor would be identical in the recipient countries mentioned.

6. CONCLUSION

We propose that donors pay more attention to the economic welfare gains from aid in deciding when their aid allocations. At present, aid allocation formulae, when made explicit, do not have a solid empirical base for weighing different criteria against each other, making it hard to judge the myriad factors that donors may wish to consider.

We suggest that economics has much to offer in thinking through aid allocation. It is, after all, a science about the best use of scarce resources. Our approach is to recognize that aid—meaning a below-market access to foreign capital—is an inframarginal source of foreign capital, and that its marginal benefit is proportional to the marginal cost a country faces when borrowing on private capital markets. We construct a model to estimate how the cost of borrowing depends on a set of observable country policy and structural characteristics.

The modelling approach permits us, first, to extend the analysis to those countries where the cost of borrowing is not observable. This is particularly important because most low-income countries do not borrow from private foreign capital markets, yet are the most important targets for aid.

Second, the model parameters allow us to compare country characteristics. Does a richer, small island economy deserve more or less aid than a lower income, non-island economy?

Third, the model allows donors to adjust for country performance. In some instances, historical poor policies that affect the cost of borrowing should be taken as given, especially if a reform-minded new government takes over. In other instances, donors may be reluctant to reward a country for poor policies leading to high costs of borrowing. Judgments about how to quantify adjustments to borrowing costs may be needed to ensure moral hazard problems are avoided.

In many ways, our results should offer comfort to donors. They are making adjustments in the right direction, even without the benefit of quantification. Donors focus on giving countries less aid as their per capita income rises, and graduating them once incomes surpass a threshold. These are moves in the right direction, although not always implemented well. We find evidence to suggest that, in addition to per capita income, donors should also consider: small island status, volatility of GDP, debt ratios, and the rule of law. Our point is that donor concerns should be narrowly targeted on those issues that affect creditworthiness, not on the much broader set of issues that donors might consider to be part of “good governance.” For this reason, far more attention should be paid to improvements to the rule of law, our proxy for good structural policy. This variable dominates changes in creditworthiness.

Our empirical results suggest that the reduction in aid as recipient country incomes rise should perhaps be more gradual than is currently the case. We also believe that considerable gains in system-wide welfare could be achieved from better aid allocation. We of course recognize that economics is not the only determinant of aid and that other factors too are important. But there is enough data on borrowing now to suggest that bringing more economics into the empirics of aid allocation is justified.

ANNEX I: ROBUSTNESS CHECKS TO REGRESSION MODEL

Combined rankings with OLS

VARIABLES	(1) Low & Lower mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.333*** (0.071)	-0.239*** (0.047)	-0.247*** (0.041)
Log GDP per capita (Constant prices)	-3.571*** (0.316)	-4.174*** (0.233)	-5.283*** (0.196)
GDP volatility %	-0.011 (0.097)	0.226*** (0.038)	0.191*** (0.036)
Reserves Ratio (Reserves/Imports)	-0.024*** (0.008)	-0.031*** (0.004)	-0.021*** (0.003)
External Debt Ratio (Debt/XGS)	0.001 (0.002)	0.003* (0.002)	0.007*** (0.002)
Gross Debt to GDP ratio	0.071*** (0.009)	0.090*** (0.007)	0.095*** (0.004)
Rule of Law (index)	-4.899*** (0.466)	-7.315*** (0.347)	-8.291*** (0.251)
Inflation	0.104*** (0.030)	0.176*** (0.022)	0.217*** (0.022)
Small Island dummy	0.491 (0.822)	2.971*** (0.587)	-0.857* (0.516)
Post-2008 dummy	1.655*** (0.341)	1.321*** (0.313)	1.695*** (0.258)
Population	-1.287*** (0.151)	-1.401*** (0.119)	-2.092*** (0.093)
Constant	85.057*** (3.506)	80.317*** (3.160)	101.855*** (2.570)
Observations	556	1,148	1,938
R-squared	0.666	0.702	0.890

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard & Poor's rankings with OLS

VARIABLES	(1) Low & Lower mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.395*** (0.084)	-0.297*** (0.049)	-0.283*** (0.044)
Log GDP per capita (Constant prices)	-2.489*** (0.363)	-3.298*** (0.262)	-4.816*** (0.217)
GDP volatility %	0.083 (0.118)	0.219*** (0.040)	0.133*** (0.037)
Reserves Ratio (Reserves/Imports)	-0.023*** (0.009)	-0.046*** (0.005)	-0.027*** (0.004)
External Debt Ratio (Debt/XGS)	0.004* (0.002)	0.010*** (0.002)	0.014*** (0.002)
Gross Debt to GDP ratio	0.088*** (0.011)	0.108*** (0.008)	0.101*** (0.004)
Rule of Law (index)	-5.364*** (0.517)	-6.775*** (0.383)	-8.160*** (0.275)
Inflation	0.064* (0.035)	0.159*** (0.024)	0.231*** (0.024)
Small Island dummy	-0.803 (0.971)	1.913*** (0.661)	-2.099*** (0.577)
Post-2008 dummy	1.505*** (0.378)	1.025*** (0.330)	1.466*** (0.275)
Population	-1.293*** (0.184)	-1.210*** (0.129)	-2.189*** (0.101)
Constant	75.562*** (4.421)	69.097*** (3.495)	98.899*** (2.858)
Observations	470	1,000	1,778
R-squared	0.609	0.696	0.883

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Moody's rankings with OLS

VARIABLES	(1) Low & Lower Mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.499*** (0.130)	-0.333*** (0.078)	-0.268*** (0.066)
Log GDP per capita (Constant prices)	-4.052*** (0.567)	-4.340*** (0.368)	-4.984*** (0.315)
GDP volatility %	-0.203 (0.164)	0.276** (0.112)	0.204** (0.096)
Reserves Ratio (Reserves/Imports)	-0.048*** (0.012)	-0.082*** (0.008)	-0.039*** (0.005)
External Debt Ratio (Debt/XGS)	0.003 (0.005)	0.003 (0.003)	0.007** (0.003)
Gross Debt to GDP ratio	0.122*** (0.019)	0.123*** (0.010)	0.128*** (0.006)
Rule of Law (index)	-6.356*** (0.810)	-8.376*** (0.508)	-8.581*** (0.399)
Inflation	0.163*** (0.053)	0.074** (0.036)	0.145*** (0.036)
Small Island dummy	2.713 (2.687)	3.058*** (0.832)	0.911 (0.802)
Post-2008 dummy	1.436* (0.780)	0.391 (0.582)	0.250 (0.519)
Population	-1.609*** (0.244)	-1.055*** (0.167)	-1.845*** (0.143)
Constant	89.847*** (7.108)	72.934*** (4.772)	91.558*** (4.068)
Observations	261	642	1,000
R-squared	0.612	0.731	0.841

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Fitch rankings with OLS

VARIABLES	(1) Low & Lower Mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.262*** (0.077)	-0.109** (0.054)	-0.150*** (0.048)
Log GDP per capita (Constant prices)	-4.025*** (0.337)	-3.746*** (0.273)	-4.991*** (0.227)
GDP volatility %	0.019 (0.102)	0.279*** (0.044)	0.240*** (0.038)
Reserves Ratio (Reserves/Imports)	-0.016* (0.008)	-0.027*** (0.006)	-0.017*** (0.004)
External Debt Ratio (Debt/XGS)	-0.000 (0.002)	0.003 (0.002)	0.004** (0.002)
Gross Debt to GDP ratio	0.057*** (0.009)	0.088*** (0.008)	0.088*** (0.005)
Rule of Law (index)	-4.142*** (0.517)	-6.841*** (0.443)	-8.285*** (0.288)
Inflation	0.093*** (0.031)	0.207*** (0.027)	0.260*** (0.026)
Small Island dummy	0.369 (0.834)	1.795** (0.774)	-1.809*** (0.687)
Post-2008 dummy	1.152*** (0.366)	0.528 (0.384)	1.102*** (0.297)
Population	-1.271*** (0.161)	-1.332*** (0.150)	-2.065*** (0.108)
Constant	83.249*** (3.786)	75.465*** (3.843)	98.987*** (3.015)
Observations	436	870	1,538
R-squared	0.719	0.663	0.885

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Combined rankings with Ordered Probit

VARIABLES	(1) Low & Lower Mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.119*** (0.021)	-0.054*** (0.010)	-0.047*** (0.008)
Log GDP per capita (Constant prices)	-1.156*** (0.099)	-0.874*** (0.053)	-0.976*** (0.042)
GDP volatility %	0.006 (0.028)	0.049*** (0.008)	0.039*** (0.007)
Reserves Ratio (Reserves/Imports)	-0.007*** (0.002)	-0.007*** (0.001)	-0.004*** (0.001)
External Debt Ratio (Debt/XGS)	0.000 (0.001)	0.001** (0.000)	0.001*** (0.000)
Gross Debt to GDP ratio	0.022*** (0.003)	0.020*** (0.002)	0.020*** (0.001)
Rule of Law (index)	-1.385*** (0.141)	-1.534*** (0.081)	-1.557*** (0.056)
Inflation	0.026*** (0.009)	0.037*** (0.005)	0.043*** (0.004)
Small Island dummy	0.137 (0.239)	0.635*** (0.126)	-0.200* (0.103)
Post-2008 dummy	0.505*** (0.100)	0.297*** (0.066)	0.350*** (0.052)
Population	-0.333*** (0.045)	-0.276*** (0.026)	-0.404*** (0.020)
Observations	556	1,148	1,938
Pseudo R2	0.113	0.106	0.174

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

S&P rankings with Ordered Probit

VARIABLES	(1) Low & Lower Mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.131*** (0.024)	-0.067*** (0.011)	-0.053*** (0.008)
Log GDP per capita (Constant prices)	-0.769*** (0.104)	-0.661*** (0.058)	-0.847*** (0.045)
GDP volatility %	0.031 (0.033)	0.046*** (0.009)	0.026*** (0.007)
Reserves Ratio (Reserves/Imports)	-0.007*** (0.002)	-0.010*** (0.001)	-0.005*** (0.001)
External Debt Ratio (Debt/XGS)	0.001 (0.001)	0.002*** (0.000)	0.002*** (0.000)
Gross Debt to GDP ratio	0.025*** (0.003)	0.025*** (0.002)	0.020*** (0.001)
Rule of Law (index)	-1.440*** (0.152)	-1.475*** (0.088)	-1.509*** (0.059)
Inflation	0.015 (0.010)	0.034*** (0.005)	0.045*** (0.005)
Small Island dummy	-0.175 (0.270)	0.448*** (0.141)	-0.377*** (0.112)
Post-2008 dummy	0.469*** (0.107)	0.245*** (0.070)	0.310*** (0.054)
Population	-0.319*** (0.054)	-0.238*** (0.028)	-0.412*** (0.021)
Observations	470	1,000	1,778
Pseudo R2	0.107	0.116	0.187

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Moody's rankings with Ordered Probit

VARIABLES	(1) Low & Lower Mid	(2) Developing	(3) All countries
3-year moving avg GDP growth	-0.139*** (0.034)	-0.070*** (0.016)	-0.049*** (0.012)
Log GDP per capita (Constant prices)	-1.125*** (0.154)	-0.843*** (0.078)	-0.932*** (0.062)
GDP volatility %	-0.033 (0.042)	0.053** (0.022)	0.054*** (0.017)
Reserves Ratio (Reserves/Imports)	-0.014*** (0.003)	-0.017*** (0.002)	-0.007*** (0.001)
External Debt Ratio (Debt/XGS)	0.001 (0.001)	0.001 (0.001)	0.001* (0.001)
Gross Debt to GDP ratio	0.032*** (0.005)	0.025*** (0.002)	0.024*** (0.001)
Rule of Law (index)	-1.629*** (0.221)	-1.659*** (0.112)	-1.564*** (0.081)
Inflation	0.043*** (0.014)	0.015** (0.007)	0.025*** (0.006)
Small Island dummy	0.790 (0.690)	0.626*** (0.168)	0.186 (0.145)
Post-2008 dummy	0.342* (0.201)	0.058 (0.116)	0.026 (0.095)
Population	-0.412*** (0.067)	-0.189*** (0.034)	-0.325*** (0.027)
Observations	261	642	1,000
Pseudo R2	0.132	0.156	0.195

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Fitch rankings with Ordered Probit

VARIABLES	(1) Low & Lower Mid	(2) Developing	(3) Lower Mid
3-year moving avg GDP growth	-0.115*** (0.024)	-0.031*** (0.011)	-0.035*** (0.009)
Log GDP per capita (Constant prices)	-1.450*** (0.117)	-0.850*** (0.059)	-0.962*** (0.048)
GDP volatility %	0.028 (0.032)	0.056*** (0.009)	0.044*** (0.007)
Reserves Ratio (Reserves/Imports)	-0.005* (0.003)	-0.006*** (0.001)	-0.003*** (0.001)
External Debt Ratio (Debt/XGS)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)
Gross Debt to GDP ratio	0.021*** (0.003)	0.019*** (0.002)	0.018*** (0.001)
Rule of Law (index)	-1.236*** (0.167)	-1.386*** (0.095)	-1.517*** (0.064)
Inflation	0.028*** (0.010)	0.042*** (0.006)	0.050*** (0.005)
Small Island dummy	0.006 (0.263)	0.334** (0.158)	-0.404*** (0.136)
Post-2008 dummy	0.344*** (0.115)	0.125 (0.077)	0.201*** (0.059)
Population	-0.363*** (0.053)	-0.273*** (0.031)	-0.405*** (0.023)
East Asia dummy	-0.549*** (0.192)	0.156 (0.284)	0.450** (0.199)
Europe and Central Asia dummy	0.813*** (0.214)	1.213*** (0.282)	0.501*** (0.191)
Latin America dummy	-0.832*** (0.225)	1.326*** (0.278)	1.081*** (0.202)
Middle East North Africa dummy	-1.420*** (0.241)	0.775*** (0.299)	0.201 (0.212)
South Asia dummy	-0.569** (0.255)	0.797** (0.329)	0.571** (0.260)
Sub-Saharan Africa dummy		1.047*** (0.293)	0.480** (0.216)
Observations	436	870	1,538
Pseudo R2	0.161	0.119	0.201

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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