1. INTRODUCTION

In February of 2014, following months of violent demonstrations, Ukrainian President Viktor Yanukovych stepped down. An interim government came to power promising swift economic reforms. The acting president, Oleksander Turchinov, and the new prime minister, Arsenii Yatseniuk, wrote to the International Monetary Fund (IMF or Fund) in April to request a $17bn loan to support 'ambitious reforms' that spanned fiscal issues, banking supervision, privatizations, energy policy, and 'improvements in governance and the business environment' (IMF, 2014). The Fund's decision to lend was reported to unlock billions in aid from foreign donors, including the United States, Canada, Japan, many European countries, and the World Bank (*Reuters*, 2014b). The following month, donors followed another Fund decision; this time to turn off the financing tap. Malian President, Ibrahim Boubacar Keïta, purchased a $40m jet for his office without a competitive bidding process, which left the IMF 'concerned about the quality of recent decisions' of this nation's government (*The Wall Street Journal*, 2014). The World Bank promptly halted a $63m aid disbursement, and announced that it 'may be in a position to resume budget support operations to Mali' only once the IMF concludes its review of country policies (*Reuters,* 2014a).

This article probes the relationship between IMF programs and aid flows. Among the multiple determinants of such flows, this dimension has received little attention, despite far-reaching implications for developing countries. Programs of the IMF commonly stipulate the introduction of extensive policy reforms. Among the advertised benefits of IMF programs, Fund staff have highlighted that they spur additional aid inflows by signaling to donors policy credibility and commitment to reforms (Clements, Gupta, & Nozaki, 2013; IEO, 2002; 2007; IMF, 2004). This promise can provide ex ante justification for intrusive conditionality, including 'mission creep' into policy areas – like health and education – that are not directly related to the Fund's mandate (Babb & Buira, 2005; Kentikelenis, Stubbs, & King, 2015).

For critics, the Fund's policy prescriptions are understood to shrink policy space and thus constrain the developmental paths available to these countries (Chang, 2006; Stiglitz, 2002).

Here, we investigate the purported catalytic effect of IMF programs in greater detail. Does the presence of Fund programs in developing countries catalyze aid? If so, does the effect vary by donor or type of aid? The few attempts to empirically investigate such links have not examined variation in this relationship across country donors (referred to here as bilateral donors) and international or regional donors (referred to here as multilateral donors). In addition, past work has overlooked potential variation across types of aid (e.g., for health versus budget support). This omission is all the more surprising given that no a priori rationale exists for assuming different types of aid respond in the same manner.

This article addresses these shortcomings by presenting a conceptual framework for modeling IMF aid catalysis and empirically tests relevant hypotheses using panel data for 136 recipient countries between 1986 and 2009. We examine the relationship between the presence of IMF-supported programs and total aid flows, as well as flows in eight disaggregated aid categories – education, health, economic infrastructure and services, production sectors, multisector/crosscutting, general budget support, debt-related relief, and humanitarian aid. Subsequently, we examine the dyadic relationships of IMF aid catalysis for 23 Development Assistance Committee (DAC) donor countries – the world's largest aid contributors – and eight multilateral institutions.

Our results indicate that, overall, IMF programs catalyze aid. However, the evidence across different types of aid varies. IMF catalysis is stronger and more robust in sectors linked to its core competency areas, namely debt-related relief and general budget support, weaker and less robust for infrastructure, production, multisector, and humanitarian aid, and non-existent for health and education. These findings suggest that the Fund's credibility is maximized in

its own areas of 'comparative advantage,' and that donors are not influenced by IMF programs in areas not closely linked to its mandate. IMF aid catalysis also exhibits variation across bilateral and multilateral donors. For bilateral donors, the catalytic effect of Fund programs is strong among those with larger voting shares in the IMF, such as the United States and Japan, but weak or non-existent among donors with fewer votes. These findings are consistent with research in international political economy arguing that the Fund's powerful stakeholders drive the organizations' decisions and policies (Dreher, Sturm, & Vreeland, 2013; Thacker, 1999). For multilateral donors, the African Development Bank, Asian Development Bank, and International Development Association display Fund catalysis but results are mixed or non-significant across the other agencies we cover.

This article is structured as follows. First, we outline recent debates on the role of the IMF in the aid allocation process. Second, we present a model that explores the mechanisms via which IMF catalysis operates before establishing a set of testable hypotheses. Third, we describe the data employed and outline our adopted methods. Fourth, we present our findings. In the final section, we contextualize the findings and identify some limitations, policy implications, and directions for future research.

2. BACKGROUND: RECENT DEBATES

A repeated claim by researchers linked to the Fund is that their programs can leverage additional aid flows (Clements et al., 2013; IEO, 2002; 2007; IMF, 2004). The basis for this claim is that IMF programs purportedly transmit positive signals to donors about the recipient country's commitment to policy reform (Bird, 2007; Edwards, 2005; Fang & Owen, 2011). At first glance, the relationship is intuitive given that donors have been known to tie aid flows to the presence of an IMF-supported program and have frequently had input in designing

them (Bird & Rowlands, 2000, 2002; Birdsall, Claessens, & Diwan, 2004; Dijkstra, 2004; Fraser & Whitfield, 2009; Oxfam, 2006). There is also anecdotal evidence of IMF aid catalysis based on media reports and donor statements, as the cases of Ukraine and Mali alluded to in our introduction illustrate.

Even so, this evidence is not systematic, and there is reason to suspect that the relationship may be more nuanced. First, donor motivations are not necessarily homogeneous (Berthélemy, 2006), and different types of aid may have varying determinants (Neumayer, 2005; Thiele, Nunnenkamp, & Dreher, 2007). That is to say, there is no *a priori* justification for assuming that any relationship between the IMF and aid flows will be the same across donors or aid types. Second, Fund programs often go off-track and therefore signing an IMF agreement may do little to confirm government commitment to the policies spelt out in the program (Bird, 2007).[1] Third, geopolitics have been shown to influence the lending decisions of the Fund (Dreher et al., 2013; Thacker, 1999), thereby casting doubt to the proposition that Fund borrowers may be the most committed to reform. Finally, even if IMF programs were an accurate indicator of merit, existing evidence is far from unequivocal on whether donors actually respond to such indicators (Alesina & Dollar, 2000; Claessens, Cassimon, & Campbenhout, 2009; Clist, 2011; Dreher, Nunnenkamp, & Thiele, 2011; Hoeffler & Outram, 2011).

To our knowledge, only four peer-reviewed studies investigate aid catalysis by the IMF (Bird & Rowlands, 1997, 2000, 2002, 2007), and one IMF staff working paper on aid allocation controls for the presence of Fund-supported programs (Dabla-Norris, Minoiu, & Zanna, 2010). In earlier analyses, Bird and Rowlands (1997, 2000, 2002) found no compelling support for positive aid catalysis by IMF programs. But more recently, the authors observe strong evidence of such a relationship among 48 low-income recipients (Bird & Rowlands, 2007), a finding corroborated by Fund staff research (Dabla-Norris et al., 2010).

Extending our understanding of these issues has important implications for the study of international political economy, in particular around questions of control over the activities of intergovernmental organizations and the linkages between donors' aid commitments and their behavior vis-à-vis debtor countries in other fora. In addition, the link between IMF policies and aid commitments raises important policy issues, and is related to current debates over reforms to the IMF. We return to these issues – in light of our findings – in the conclusions.

3. LINKING AID FLOWS AND THE IMF

(a) Conceptual framework

We posit that the purported relationship between IMF programs and aid flows operates via three general pathways. First, the presence of Fund programs may serve as a catalyst for donors because they signal policy credibility; that is to say, they provide a 'stamp of approval' to borrowing countries (Bird & Rowlands, 2007; IEO 2002; 2007). The conditionality component of Fund programs stipulates long lists of reforms on issues such as public spending, bureaucratic organization, and domestic legal environments (Babb & Carruthers, 2008; Kentikelenis, King, McKee, & Stuckler, 2014; Kentikelenis et al., 2015).[2] Insofar as donors value the introduction of such reforms (Claessens et al., 2009), they may follow the IMF into developing countries. Fund programs therefore signal recipient merit, as borrowing countries show they are committed to 'putting their house in order' – information that would have been difficult and expensive for donors to collect and interpret ad hoc.

Second, IMF-supported programs can play into the calculus of bilateral donor self-interest via an expectation effect. To the extent that donor countries wish to further their own commercial interests but are not in a position to unilaterally advocate them, either for lack of authority or

fear of political backlash, the IMF may function as a proxy, carrying both a carrot (funds and the promise of aid catalysis) and a stick (policy conditionality). Given this scenario, if donor countries expect that an IMF program will promote policy reforms that foster commercial opportunities, aid may be increased to garner favour with recipient countries in future dealings. This mechanism is broadly consistent both with established self-interest arguments viewing aid as a foreign policy tool (Alesina & Dollar, 2000; Kuziemko & Werker, 2006; Berthélemy, 2006; Younas, 2008), and with the fact that Fund programs typically entail policy prescriptions amenable to foreign commercial interests, including privatization, trade liberalization, and deregulation (Buira, 2003; Goldstein 2001). It also aligns with evidence that powerful country interests determine IMF outputs (Dreher, Sturm, & Vreeland, 2009; Dreher et al., 2013; Thacker, 1999; Stone, 2008).

Third, donors' bureaucratic decision-making processes may also affect aid selection and allocation decisions. Large organizations – like USAID and the European Commission – are bureaucracies that are partly motivated by self-preservation interests (Barnett & Coleman, 2005; Selznick, 1949). From this perspective, providing aid to countries with Fund programs reduces the risk of being blamed for bad allocation decisions: even if aid projects fail or funds are mismanaged, bureaucrats can point to the presence of a Fund program as a higher authority legitimating their decisions. The oversight structures invoked can operate at both individual and organizational levels. At the individual level, staff are accountable to their superiors for their decision-making effectiveness, where repeated unjustified project failure can result in reprimanding or demotion. Similarly, the organizational entity as a whole is accountable to external funders (commonly governments), where repeated unjustified failures could result in withdrawal of funding.

(b) Hypotheses

On the basis of these pathways, we set out a number of hypotheses. The first, central hypothesis that we test concerns the general presence of the purported IMF catalysis on total aid commitments. Insofar as policy signaling and bureaucratic self-preservation is extant, we expect recipient countries with active Fund programs to have higher total aid commitments in the following year, i.e. IMF aid catalysis will be present.

We then look specifically at aid assigned with a purpose code for education, health, economic infrastructure and services, production sectors, multisector/crosscutting, general budget support, debt-related relief, and humanitarian aid. We focus on education and health sectors because of the IMF's recent comments on the ability of their programs to catalyze aid specifically in these sectors (Clements et al., 2013), which could provide ex ante justification for further Fund involvement in these areas. General budget support also warrants special attention given its status as a highly selective form of aid in an area firmly entrenched within the Fund's core mandate. The other sectors represent top-level purpose code categories outside of social sector and general program assistance, thereby incorporating the greatest possible remaining sectoral-specified aid commitments.

Given that budget support is the most liable to mismanagement – as donors have the least control over spending decisions – we expect the signaling effect of IMF aid catalysis to be strongest for this form of aid. In addition, as the IMF had a key role in setting up debt-relief through the Highly-Indebted Poor Countries (HIPC) initiative, we also expect IMF aid catalysis for debt relief to be strong. For health, education, infrastructure, production, and multisector aid, the IMF has claimed that one of the benefits of their programs is the ability to catalyze aid in these policy areas (Clements et al., 2013; IEO, 2002; 2007; IMF, 2004). We therefore hypothesize IMF aid catalysis there also. On the other hand, we do not expect any IMF aid catalysis for humanitarian aid, as this form of aid is reserved for unpredictable exogenous events such as natural disasters.

Another set of hypotheses concerns variations in the behavior of different bilateral donors. We examine dyadic relationships of the 23 DAC members for which data was available.[3] We hypothesize that, if present, IMF aid catalysis will be stronger for donor countries with the greatest amount of influence over the IMF (measured by voting shares) – notably, the United States – which ensures Fund policy prescriptions match their own ideas on what constitutes sound economic policy (Panitch & Gindin, 2012).

Finally, we examine multilateral donors, including three regional development banks (African Development Bank, Asian Development Bank, and Inter-American Development Bank), the World Bank's International Development Association, European Union Institutions, two United Nations programs (United Nations Development Programme and UNICEF), and a health-specific financing organization (Global Fund). Recognizing that all these organizations are liable to risk-averse bureaucratic considerations, we posit that different priorities in the various organizations translate into variation in the extent of IMF catalysis. We predict the IMF signal will be stronger for development banks given their shared focus on fiscal and structural policies, and for the World Bank in particular given the close working relationship between the two organizations (Babb, 2009; Woods, 2006). The relationship may be weaker for the United Nations programs[4] given their differing governance structures, organizational mandates, and bureaucratic cultures. We have no analytical priors on the extent of the relationship for European Union Institutions and the Global Fund beyond bureaucratic and signalling arguments.

4. DATA AND METHODS

(a) Dependent and explanatory variables

In our analyses we utilize the Organisation for Economic Co-operation and Development's (OECD) Aid Statistics database, which reports official development assistance from each donor to each recipient country in a specific year. It covers an extensive number of years, but due to limited data availability on control variables we are concerned with the period 1986-2009. For data disaggregated by sector, we take 1995 as our initial year due to underreporting on earlier years (OECD, 2014b). While the database does not include all bilateral and multilateral donors (new donors like China, India, and Venezuela are notable omissions), it covers the bulk of international aid flows for the period. The database is also known to contain inaccuracies, especially on aid disbursement prior to 2002 (Stuckler, McKee, & Basu, 2013). To circumvent this issue, we followed the OECD's (2014b) advice and prioritized aid commitment over disbursement data. Aid commitments are a preferable measure in any case because they more accurately reflect donor decision-making behavior and donors have greater control over them – disbursements are influenced by the recipients' willingness and administrative capacity to receive aid and meet donor conditions (Berthélemy, 2006; Boussalis & Peiffer, 2011; McGillivray & White, 1993; Neumayer, 2003c). Recipients are restricted to all nations considered developing countries by the OECD, with a total of 136 countries covered once availability of other variables is taken into account. Further details on data sources are presented in Table 1. Descriptive statistics are reported in the Web Appendix.

[Table 1 about here]

We investigate the effects of countries' participation in Fund programs on commitments of ODA in millions of constant US dollars, transformed into the natural logarithm of aid. Nominal aid is chosen because in practice donors are more likely to allocate a fixed overall

amount of aid per country than on a per capita basis or as a proportion of the recipient's GDP (Feeny & McGillivray, 2008; Nunnenkamp & Öhler, 2011).

We measure the presence of an IMF-supported program per country-year using a dummy variable (Clements et al., 2013). In line with the previous literature on aid allocation, we also include a standard set of possible determinants as explanatory variables. First, donors may act altruistically by assisting nations facing the most pressing developmental challenges. We include GDP per capita as a proxy for recipient need (Berthélemy & Tichit, 2004; Berthélemy, 2006; Dollar & Levin, 2006; Hoeffler & Outram, 2011), where recipients with a higher level of development are expected to receive less aid. Second, donors may reward recipients that demonstrate good governance and appropriate institutions with additional aid. We incorporate a series of variables as a measure of recipient merit: growth of GDP per capita (Berthélemy & Tichit, 2004; Hoeffler & Outram, 2011), level of democracy (Alesina & Dollar, 2000; Alesina & Weder, 2002), and political terror (Clist, 2011; Hoeffler & Outram, 2011; Neumayer, 2003a; 2003b). Recipients with higher economic growth and levels of democracy should receive more aid, while those with more political terror should receive less aid, all else held constant. Third, foreign aid may be deployed by donors as a foreign policy tool for rewarding allies, admonishing off-siders, and furthering commercial interests. We control for donor self-interest with recipient country temporary membership on the UN Security Council, as these countries have been shown to receive more aid (Kuziemko & Werker, 2006). When examining specific donor countries, we also include dyadic variables for political and commercial motives: voting similarity between donor and recipient in the United Nations General Assembly (Alesina & Dollar, 2000; Dreher et al., 2011; Neumayer, 2005), and the logarithm of exports plus imports between recipient and donor (Berthélemy, 2006; de Mesquita & Smith, 2009; Neumayer, 2003a; Nunnenkamp & Thiele, 2006; Younas, 2008). A positive relationship with aid is expected for each variable. Fourth, an additional

control for war on the recipient country's territory is added to the model (Balla & Reinhardt, 2008; Brück & Xu, 2012). It is not clear whether this should increase or decrease aid as it can be interpreted by donors as either an indicator of poorer recipient merit or greater recipient need. Fifth, because we use nominal aid rather than aid per capita as the dependent variable, a control for recipient population is required (Dreher & Fuchs, 2011; Dreher et al., 2011; Fleck & Kilby, 2010; Kuziemko & Werker, 2006).

Since the decision-making process on allocation of aid is likely subject to informational time lags, all explanatory variables are lagged by one year (Feeny & McGillivray, 2008). We also include year dummies to account for time-variant confounds that all recipient countries are equally subject to, such as changes over how aid was allocated after the Cold War or general fluctuations in the overall level of aid (Brück & Xu, 2012; Fleck & Kilby, 2010; Harrigan & Wang, 2011), and a set of country dummies to control for time-invariant recipient-level characteristics. Where we cannot introduce country dummies in a chosen estimation technique (see below), we instead add regional dummies (Balla & Reinhardt, 2008; Boussalis & Peiffer, 2011);[5] and, when examining bilateral donors, a further dummy variable representing whether or not the recipient was a colony of the donor since 1900 – a donor self-interest variable for which we would expect a positive effect.

(b) Estimation techniques

Our longitudinal analysis investigates two dimensions of aid flows over the period 1986-2009: what determines recipient selection for aid, and the magnitude of aid committed. The unit of analysis is recipient-year. With regard to model specification, the principal issue faced is that our dependent variable is a corner solution outcome (Wooldridge, 2002). That is, since donors tend to allocate aid to a limited number of recipient countries, there are a large number of zero values present. To deal with the bounded nature of the dependent variable, we

employ a two-part estimation technique: probit estimation determines the probability of whether or not a recipient receives aid (selection equation), and ordinary lease squared estimation on strictly positive observations explains how much aid the selected countries will receive (allocation equation).

This method is instinctively appealing because it matches the donor decision-making process of initially deciding which countries are worthy of receiving any aid before allocating from a budget pool the amount that aid worthy countries will receive (Boussalis & Peiffer, 2011; Drury, Olson, & van Belle, 2005; Neumayer, 2003c; 2005). Unlike single-step estimation techniques (e.g., Tobit or Poisson variants), it also avoids imposing the stringent assumption that explanatory variables have the same impact on the probability of receiving aid as they do on the amount of aid allocation thereafter (Berthélemy & Tichit, 2004; Clist, 2011). However, the two-part technique assumes recipient selection is independent from aid amount allocated thereafter, which runs the risk of introducing selection bias at the second part if recipient selection is not independent from the explanatory variables. Heckman's (1979) two-step method offers a correction to potential selection bias, but lacks a variable that could fulfil the requisite exclusionary restriction – without which the validity of estimations depends on restrictive distributional assumptions that may not always be met (Harrigan & Wang, 2011; Neumayer, 2003a). Previous studies have also found little difference in results between the two-part model and Heckman's two-step method (Fleck & Kilby, 2010; Hoeffler & Outram, 2011). The uncorrected two-part model is therefore maintained as our preferred specification, while results of the Heckman two-step method are reported in robustness checks.

The two-part model is set-out formally as follows:

Selection equation: $$Pr(lnAID_{i,t} > 0) = F(\alpha IMF_{i,t-1} + \beta Y_{i,t-1} + \lambda_t + u_{i,t}) \quad (1)$$

Allocation equation: $$lnAID_{i,t} = \gamma IMF_{i,t-1} + \delta Y_{i,t-1} + \lambda_t + \eta_i + v_{i,t} \quad (2)$$

where *AID* denotes nominal aid commitments in millions of constant US dollars, i is the recipient country, t is the year, $F(\ldots)$ is the cumulative distribution function, *IMF* is a dummy variable for the existence of a Fund program, α and γ are coefficients of *IMF* for the selection and allocation equation, Y is a vector of control variables, λ_t is a set of year dummies included in both equations, η_i is a set of recipient dummies included in the allocation equation (country fixed effects), β and δ the respective vector of coefficients on the controls, and u and v the error terms. A drawback of the selection equation is that we are unable to introduce country dummies due to the well-known incidental parameters bias found in limited dependent variable models (Greene, 2004). To reduce the potential bias from estimation without country-specific effects, we include in the vector of controls the regional dummies and, for bilateral donors, a colonial dummy. In robustness checks, we augment the selection equation with additional variables to account for time-invariant factors.

The key assumption underlying this approach is that the choice of the recipient and the amount of aid allocated are independent from each other, that is to say u and v should not be correlated (Nunnenkamp & Öhler, 2011). While the equations are viewed as econometrically separate, results of the second equation should be interpreted as conditional upon receiving aid, since only selected recipients of aid are included in that stage (Clist, 2011). We expect the effect of a Fund program as well as the other explanatory variables to maintain the same direction across both equations, but make no predictions as to how the magnitude of the effects may differ.

When interpreting results, the relative importance attached to each equation will vary insofar as the inclusiveness of donors also varies. We define inclusiveness as the share of recipient-years with assigned aid commitments out of total recipient-years. For 'inclusive' donors (those with aid commitments on almost all observations), coefficients yielded from the selection equation are of much less substantive significance than those of the allocation

equation, even where statistically significant. The opposite holds for selective donors (those with aid commitments on relatively few observations), where the coefficients of the allocation equation are of much less analytical merit than those of the selection equation, as they only apply to a handful of observations. Since – to our knowledge – no hard rule exists, we follow a '90/10' rule: where donors are very inclusive (*inc>90%*), coefficients on selection equations are disregarded; where donors make very few aid commitments (*inc<10%*), coefficients on allocation equations are disregarded. The omission of this issue from earlier studies is surprising given that variation in inclusiveness provides a useful additional insight into the nature of donor behavior.

Another potential concern in the analysis is the endogeneity of IMF participation. On the one hand, for reasons discussed above, IMF programs may lead to an increase in aid commitments; on the other hand, donors could induce an IMF program, as past work has documented that they have substantial input in IMF lending decisions or the design of programs (Dreher et al., 2009; Dreher et al., 2013; Thacker, 1999; Stone, 2008). By extension, aid commitments could increase the likelihood of IMF program participation, thereby introducing simultaneity bias to the analyses. Concerns over two-way causality are potentially most serious around debt-related relief because commitments could be the product of a joint donor decision-making process at fora like the Paris Club (comprised of official lenders).[6] Lagging our explanatory variables to some extent mitigates these endogeneity concerns (Younas, 2008), but does not eliminate them entirely (Fuchs, Dreher & Nunnenkamp, 2014). We attempt to address this issue more fully in robustness checks using System GMM estimation, which utilizes internal instruments to attend to potential endogeneity concerns (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). However, we are unable to employ such a technique in our selection equation, so our results on aid selection must be interpreted with care.[7]

In examining the effect of Fund programs on the sectoral composition of aid, we consider all donors together (see Figure 1). We report results on education, health, economic infrastructure and services, production sectors, multisector/crosscutting, general budget support, debt-related relief, and humanitarian aid. We also look at dyadic relationships on total aid for selected donors (see Figure 2). Our sample of bilateral donors includes the 23 DAC members for which data were widely available, as well as major reporting multilateral donors – two with the highest aid flows (European Union Institutions and International Development Association), three development banks (African Development Bank, Asian Development Bank, and Inter-American Development Bank), two United Nations programs (United Nations Development Programme and UNICEF), and a health-specific financing organization (Global Fund).

[Figure 1 about here]

[Figure 2 about here]

(c) Robustness checks

We perform a number of robustness checks. First of all, to alleviate against potential omitted variable bias we explore whether our results are robust to augmentations. Although the existing literature provides a wealth of additional candidates, we limit ourselves to variables that do not unduly restrict the sample: infant mortality rates, as an indicator of recipient social needs (Younas, 2008); total reserves as a share of total external debt, a need variable showing the extent to which recipients can finance their debt commitments and balance of payment deficits (Bird & Rowlands, 1997; Younas, 2008); current account balance as a share of gross domestic product, in case donors respond to recipient needs by off-setting poor external economic performance (Feeny & McGillivray, 2008); debt service as a share of gross national income, as donors may support countries with high debt burdens either due to self-

interest – guaranteeing debt repayment – or due to altruistic considerations (Berthelemy 2006; Bird & Rowlands, 2007; Powell & Bird, 2010); and foreign direct investment inflows as a share of GDP, which could be either a merit-based variable capturing recipient market openness or a self-interest variable representing the business interests of Western powers in the recipient (Balla & Reinhardt, 2008). We further augment our selection equation for sectoral aid and for multilateral donors with a time-invariant self-interest variable: a dummy for whether or not the recipient was a colony of any of the Western powers since 1900 (Winters & Martinez, 2015). And for bilateral donors, we incorporate two additional time-invariant self-interest variables (in the selection equation) and a further time-variant self-interest indicator (in both selection and allocation equations): the logged distance between capital cities in the recipient and donor country (Boussalis & Peiffer 2011; de Mesquita & Smith, 2009; Dreher et al., 2011; Neumayer, 2003b); a dummy for whether or not at least 9% of the donor and recipient populations speak the same language (Clist, 2011);[8] and a dummy for the existence of a formal military defense pact in the dyad (Drury et al., 2005; Winters & Martinez, 2015).[9]

Secondly, as mentioned earlier, a potential concern in our analyses is the endogeneity of IMF participation. In an attempt to address this issue, we estimate our allocation equation using the two-step System GMM estimator (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998), which has been employed in a few previous studies on aid allocation (Dreher & Fuchs, 2011; Lee & Lim, 2014; Powell & Bird 2010).[10] System GMM controls for endogeneity bias by using internally derived instruments.[11] However, a common problem with the technique is the over-fitting of endogenous variables through the proliferation of instruments. We address this concern by collapsing our instrument set (Roodman 2009a; 2009b). Along with the IMF program dummy, we treat as endogenous the 'recipient needs' variable (Lee & Lim, 2014) – in our case GDP per capita – as well as GDP

per capita growth given the possible causal link between aid and economic performance (Doucouliagos & Paldam, 2008). Since the null hypothesis on the Arellano-Bond test for AR(1) is rejected throughout, a lagged dependent variable enters the model as a further endogenous variable.[12]

Lastly, we investigate whether our findings hold when using the Heckman two-step method in case selection bias is present. In the first step, the procedure is essentially the same as our base specification, with a probit model used to determine recipient selection. In the second step, all observations are included as well as the inverse Mill's ratio obtained from the first step in a linear model explaining aid allocation. Inclusion of the inverse Mill's ratio corrects for any potential selection bias.

4. RESULTS

(a) Sector and total aid commitments

In Table 2, we present the results of our quantitative analyses on aid commitments for sector selection, sector allocation, and total allocation. For donor selection of aid recipients, we do not report the coefficients for education, health, infrastructure, production, and multisector aid because donor inclusiveness breaches our 90% threshold.[13] For general budget support and debt relief, IMF programs exhibit a positive and statistically significant relationship at $p<0.01$, and for humanitarian aid at $p<0.05$. Since coefficients for probit regressions are not directly interpretable, we convert them into average marginal effects – interpreted as the extent to which being on an IMF program increases the probability of being selected as an aid recipient.[14] On average, IMF recipients are 25% more likely to receive general budget support, 26% for debt relief, and 4% for humanitarian aid, holding all else constant. General

budget support is – perhaps unsurprisingly – also the most selective sector, with only 49% of observations selected for aid. GDP per capita holds its expected negative effect throughout but GDP per capita growth is significantly positive only for debt-relief. The democracy variable is significantly positive for budget support and humanitarian aid and political terror shows a significant positive effect for humanitarian aid, whereas UNSC membership yields no significant effects.

For allocation of aid, we find a positive and statistically significant relationship of IMF programs on infrastructure, production, multisector, and debt-relief, as well as for multilateral, DAC, and total aid. All else held equal, recipients on an IMF program receive on average an additional 24% infrastructure, 22% production, 17% multisector, 70% debt-relief, and 17% total aid. For education, health, general budget support, and humanitarian aid, the IMF coefficient fails to reach standard thresholds of significance. Turning to control variables, very few reach statistical significance across our models, probably because their effect has been captured to some degree by the country dummies. GDP per capita has a significant negative effect only for humanitarian aid, and for total multilateral and total aid. GDP per capita growth displays a significant positive effect only for education aid, as well as multilateral, DAC, and total aid. We also observe the expected positive effect of democracy at standard thresholds of significance for education, infrastructure, and production (and approaching significance for health), as well as for multilateral, DAC, and total aid. Political terror displays a significant negative effect for infrastructure and production, but has an unexpected positive effect for humanitarian aid. War, however, never reaches standards thresholds of significance. Surprisingly, UNSC temporary membership is also non-significant across all models, contrasting Kuziemko and Werker's (2006) study. Overall, the allocation model explains 84% of the variance for total aid; and variance explained by sector ranges from 54% for budget support to 74% for multisector aid.[15]

[Table 2 about here]

In Table 3, we present robustness findings on sector and total models. Rather than commenting on each separate model specification, we report here only in terms of the overall robustness of the results on each sector (for full results, see Web Appendix). On selection models, our base results for sector and total aid are highly robust. On allocation models, statistically significant benchmark findings on the IMF coefficient are highly robust for debt-related relief, total multilateral, and total aid; somewhat robust for production, which becomes negative on the System GMM model only, and total DAC aid, which has a reduced effect size in the augmented model and loses significance on both augmented and System GMM models (though is still approaching significance thresholds); but not robust for infrastructure and multisector aid. Non-significant findings obtained on the IMF program variable in the base models were also consistently observed for education, health, and humanitarian aid.

[Table 3 about here]

(b) Bilateral aid commitments

Next, we report on results obtained from analyses disaggregated by bilateral donor. To summarize information from over 70 separate regressions, we limit presentation of findings to the IMF program coefficients, donor inclusiveness, and goodness-of-fit for each model. Complete results are available in the Web Appendix. In the left panel of Figure 3, we present the IMF program coefficients for aid selection of each bilateral donor and their measures of inclusiveness. France, Germany, and Japan exceed our high inclusiveness threshold (*inc>90%*), while smaller economies like Australia, Denmark, Luxembourg, Portugal, and New Zealand are far more selective (*inc<50%)*. Statistically significant positive effects are obtained in the models for Belgium, Canada, Denmark, Italy, Japan, Norway, Spain, Sweden,

Switzerland and the United States, while a significant *negative* effect is yielded for Australia. In Figure 4, we report average marginal effects and plot them against each donor's IMF votes as a proportion of total votes. It is clear that marginal effects are considerably diverse across donor countries. Italy is, on average, 9% more likely to assign aid to a recipient with a Fund program than to one without; whereas Australia is about 7% *less* likely to assign aid to a recipient with a Fund program. With the exception of outliers Australia, Netherlands, and high IMF voter share donors (France, Germany, Japan, United Kingdom and United States), a positive correlation between marginal effects and donor IMF votes is also apparent: donors such as Belgium, Canada, and Italy have a relatively high numbers of votes and also positive and statistically significant marginal effects; whereas donors like Ireland, Portugal, and New Zealand have very few votes and no or even negative IMF program effects. For donors with very high voting shares, their outlier position on the plot probably reflects the fact that are not very selective in deciding which recipients will receive aid (because they have larger aid budgets), leaving very little space for the IMF to exert influence on recipient selection.

[Figure 3 about here]

[Figure 4 about here]

Our allocation model, as reported in the right panel of Figure 3, explains between 55% (Denmark) and 88% (Germany) of the total variance in aid commitments, again reflecting substantial differences across donor countries. We find a positive and statistically significant relationship of IMF programs for aid from Canada, France, Germany, Italy, Japan, Netherlands, and the United States, and a negative effect for Luxembourg. In Figure 5, we plot the allocation coefficients – interpreted as the percent change in aid allocation due to an IMF program – against IMF votes for each donor. The largest bilateral donor, the United States, increases aid commitments by over 29% when a recipient is on a Fund program.

Echoing findings on aid selection, we also observe a positive association between the increase in aid allocation due to recipient participation in a Fund program and donor IMF vote shares, which now includes donors with very high voting shares as well.

[Figure 5 about here]

In Table 4, we report the results of our robustness checks for bilateral donors. Again, we limit our presentation to a summary account of the robustness of the IMF findings for each donor. On selection models, the statistically significant benchmark findings are highly robust for Belgium, Denmark, Italy, Norway, Sweden, and the United States; and somewhat robust for Australia, Canada, Spain, and Switzerland, where on the augmented model significance is lost and effect sizes reduced. Consistent non-significance on the IMF coefficient is observed throughout for all other bilateral donors, though a swing in effect direction occurs for United Kingdom on the augmented model. On allocation models, standard thresholds of significance are rarely reached using System GMM estimation, largely due to the stringent Windmeijer standard errors employed.[16] Significant benchmark findings on the IMF coefficient are highly robust for Japan, Luxembourg, and the United States; somewhat robust for Germany, where effect direction reverses in the augmented model, and for Canada, France, and Italy, where significance is lost on augmented and System GMM models and effect sizes attenuate somewhat; but not robust for the Netherlands, which experiences a major swing in effect direction on the System GMM model and loses significance in the augmented model. IMF coefficients on non-significant benchmark results are, as we would expect, more variable: for Denmark, Greece, Portugal and Sweden, effect direction sometimes switches but remains non-significant; and for all remaining donors roughly equivalent effect size is maintained in either three or four out of the four models.

[Table 4 about here]

(c) Multilateral aid commitments

Results for the effects of IMF programs on aid commitments by multilateral donor are presented in Figure 6, along with donor inclusiveness and goodness-of-fit statistics (for full results, see Web Appendix). For donor selection, we do not consider the IMF program coefficients for the European Union Institutions and United Nations Development Programme models as they exceed our high inclusiveness threshold (*inc>90)*. IMF programs show a positive and statistically significant effect on aid commitments for the African Development Bank, Asian Development Bank, International Development Association, and UNICEF, but no effect for the Inter-American Development Bank and Global Fund. Based on the average marginal effects, we can say that recipients are 15% more likely to receive aid from the African Development Bank, 20% from the Asian Development Bank, 19% from International Development Association, and 4% from UNICEF. For donor allocation, the IMF program effect is statistically non-significant for all multilateral agencies we cover. This finding is at odds with the large IMF effect observed on aggregated multilaterals in Table 2, which suggests the result is driven by smaller multilateral donors not reported here.[17] Our allocation model explains between 49% (African Development Bank) and 92% (UNICEF and United Nations Development Programme) of the variance.

[Figure 6 about here]

Robustness checks on multilateral donors are presented in Table 5. For selection models, significant results are highly robust with the exception of UNICEF, for which the IMF coefficient turns negative in the augmented model. For allocation models, a non-significant benchmark finding for the United Nations Development Programme becomes negative on the System GMM specification. Aside from these, results are consistent with our base

specification on both selection and allocation models, notwithstanding the occasional non-significant effect swing.

[Table 5 about here]

5. DISCUSSION AND CONCLUSIONS

We have shown a heterogeneous relationship between IMF programs and aid selection and allocation to different sectors. On the one hand, aid commitments to debt-related relief (selection and allocation) and general budget support (selection) reveal a substantive and highly robust catalytic effect of Fund programs. On the other hand, contrary to claims by Fund staff (Clements et al., 2013), we find little evidence that aid allocation to sensitive social policy areas such as health and education are influenced by the presence of an IMF program. In addition, we have shown that not all donors are equally swayed by the IMF's lending decisions: the Fund's larger shareholders – who have more influence on the Fund's policies – appear to follow the organization into developing countries; donors with less power over the IMF do not appear to be as influenced by its lending decisions. For multilateral donors, the picture that emerges is less clear. On aggregate they exhibit strong IMF catalysis effects on both selection and allocation decisions, but across the individual donors we cover this relationship is only ever present on the selection decision.

Before discussing these findings, we note some limitations to our work. First, data coverage on disaggregated aid is limited. We did not examine sectoral aid data prior to 1995 as it suffers from substantial underreporting, and availability of observations for individual multilateral donors restricted analyses to only eight comparatively large organizations, which may behave differently from smaller organizations. Second, following previous quantitative

studies on IMF-related issues, we measured Fund involvement as a binary variable. It is possible that the pace, scope, and depth of Fund programs influence how they are interpreted by donors; but these aspects are lost in a dummy variable indicator on the existence of a Fund program (Murray & King, 2008). At present, a systematic and reliable resource is yet to be available to the research community (Arpac, Bird, & Mandilaras, 2008).[18] Third, we were unable to fully account for potential reverse causality concerns on the decision of whether or not to give aid to a recipient – but were able to overcome the issue on the decision of how much to allocate.

What do these findings mean for policy? In relation to aid flows, IMF programs are helpful for countries insofar as they can catalyze total aid and thus provide additional resources to governments during difficult periods of economic transformation. At a minimum, this suggests that such multiplier effects have to be factored in when designing program targets and conditions. Disregarding this dimension may lead to overly conservative fiscal estimates, which – in turn – affect the stringency of fiscal conditionality, the effects of which have been linked to a range of adverse economic and social consequences (Babb, 2005; Dreher, 2006; Przeworski & Vreeland, 2000; Vreeland, 2002). The Rwandan government, for instance, disagreed with the Fund in 2002 (and again in 2004) over fiscal deficit targets derived from overly cautious aid projections that limited policy options for financing larger anti-poverty expenditures (Goldsbrough, 2007). When the impasse was eventually overcome – with the view of the IMF largely prevailing – the higher aid flows predicted by the Rwandan government indeed materialized. Given the range of challenges aid recipients are facing, the IMF should carefully consider not hampering progress in achieving development targets.

Our results revealing a catalytic effect of the IMF for total aid flows cannot be treated as a rationale for enabling or legitimating 'mission creep' to areas that reduce policy space for borrowers and are not core to the IMF's mission (Babb & Buira, 2005; Chang 2006; Stiglitz,

2002). Crucially, we show that lending programs are not related to an important advertised benefit of IMF involvement in these areas: catalyzing additional social sector aid. On this front, it is an irony that the IMF commonly advises borrowing countries to focus on areas where they have a 'comparative advantage'; that is, economic activities better suited to their current endowments and perceived capabilities. We recommend the IMF follow its own advice and limit its activities to areas directly related to its mandate.

Our findings point to theoretical implications for the study of aid. Why do our results vary for different donors? The catalytic effect of IMF programs appears strongest for the Fund's large shareholders. One plausible explanation points to questions of control. The IMF is dominated by developed countries with the largest voting shares in the organization (Woods & Lombardi, 2006). That is to say, their voice matters more than others' and – to the extent they can control organizational outputs – it could be the case that IMF programs serve as a mirror image of the policies they value. Alternatively, given that major Fund shareholders are also larger donors, the finding could be a function of burdensome bureaucratic considerations. Organizations like USAID have large budgets with many projects in diverse areas, and therefore face greater decision-making burdens than small donors, such as New Zealand's NZAID. Fund programs may be relevant for large donors insofar as they serve as 'stamp of approval', where the presence of an IMF program serves as a higher authority legitimating aid allocation decisions. On the contrary, small donors have limited portfolios in specialized development fields, and can therefore evaluate on a more flexible and targeted basis.

Moving forward, political economy research can employ dyadic aid flow data to further explore the complex links between powerful states, international institutions, and the politics of aid. The internal workings of international institutions of high significance to aid recipients – like the World Bank and the IMF – have been characterized as a 'black box' that scholars have been unable to open (Babb, 2009). Future studies can elaborate on the interaction

between these institutions and donors. To this end, the recent changes in the IMF's transparency policy are particularly welcome and offer scholars an important source of information (IMF, 2013).

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Endnotes

[1] For example, on August 4, 2000, the Fund approved a three-year arrangement in Kenya for SDR 150 million (IMF, 2000a; 2000b). The program included a battery of governance reforms geared towards enhancing accountability and transparency, strengthening oversight bodies, and removing rent-seeking opportunities (IMF, 2000c). However, the program went permanently off-track within the first six months as a result of 'persistent governance failures and the slow pace of reforms' (IMF, 2003).

[2] For instance, a three-year arrangement for Tanzania approved by the Fund on March 31, 2000 contained 181 conditions. Of these, 118 were quantitative floors and ceilings on macroeconomic indicators related to domestic credit, foreign reserves, budgetary expenditures, and external debts. The remaining 63 were more detailed and diverse 'structural' conditions, such as the following: 'Submit Public Finance Management Bill and Public Audit Bill to parliament' (IMF, 2000d); 'Remove 20 parastatal entities from government control' (IMF, 2000d); 'Ensure adequate funding for the preparation of a core set of macroeconomic statistics by the National Bureau of Statistics in the budget (IMF, 2001a); 'Establish a strategy and timetable for harmonizing local government taxes and levies (IMF, 2001b); 'Submit to parliament the draft law establishing the legal, regulatory, and supervisory framework for microfinance operations' (IMF, 2002).

[3] We excluded five additional DAC members from our analyses because data was unavailable prior to 2010, namely Czech Republic, Iceland, Poland, Slovenia, and Slovak Republic.

[4] United Nations 'programs', such as United Nations Development Programme and UNICEF, are distinct from its 'specialized agencies', which include the World Bank and the Fund itself. The latter are formally autonomous organizations.

[5] We categorize countries into five regions: Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, South-East Asia and the Pacific, and Sub-Saharan Africa

[6] We are indebted to an anonymous reviewer for this suggestion.

[7] The System GMM estimator is not suitable for our selection equation because it cannot be applied to a limited dependent variable. Furthermore, a two-stage probit model would require the endogenous regressor to be continuous, whereas ours is discrete (IMF program). In any case, we lack a valid external instrument.

[8] The 9% language commonality threshold is inherited from the data.

[9] Augmented variables are retrieved from the following sources: infant mortality rates, total reserves (% of total external debt), current account balance (% of gross domestic product), debt services (% of gross national income), and foreign direct investment inflows (% of GDP) from the World Bank's (2013) World Development Indicators; former colony of any Western powers since 1900 from Alesina and Dollar (2000); logged distance between capital cities and common language from CEPII's GeoDist dataset (Mayer & Zignago, 2011); and formal military defense pact from Correlates of War's Formal Interstate Alliance dataset (Gibler, 2009).

[10] System GMM estimations are no panacea and should be interpreted with caution. As Wilson (2011) stresses, despite its increasing usage in studies of aid allocation and effectiveness, GMM techniques for panel data were designed to estimate models with few

time periods and thousands of panels. The reduction in potential bias these models produce thus comes at a considerable loss in precision (i.e. very large standard errors). There are also concerns around instrument proliferation, particularly when the number of instruments approaches the number of cross-sections, thus making inferences unreliable (Fuchs et al., 2014; Roodman, 2009a). For these reasons, we maintain the OLS model as our preferred specification for aid allocation.

[11] However, System GMM may not account for general herding among donors based on unobserved factors (Frot & Santiso, 2011). If we fail to account for these unobserved factors, then their effects may be falsely attributed to IMF program catalysis effects. To rule out this possibility, we performed the following robustness check. We pre-dated the IMF dummy variable three years and excluded observations where a country was recorded as participating on an IMF program on both the pre-dated and original IMF dummy for a given year. If our original IMF dummy is capturing herding effects, we would expect our pre-dated IMF dummy to yield statistically significant positive effects (i.e., when an IMF program does not actually exist at that time). When we estimated the models, our pre-dated IMF dummy failed to reach standard thresholds of significance across almost all our models, indicating that our original IMF dummy is very unlikely to be capturing herding trends among donors (see Web Appendix).

[12] We do not include a lagged dependent variable in our base specification because it is known to introduce bias to OLS estimates in the presence of fixed effects (Nickell, 1981).

[13] Similarly, we do not report on recipient selection for total aid, total DAC bilateral aid, or total multilateral aid because every recipient receives some form of aid each year (i.e. there is no variation in the dependent variable).

[14] Average marginal effects are calculated using Stata's "margins" command with covariates fixed at their means.

[15] Since there is no easy interpretation for goodness-of-fit measures available for probit estimators, we do not report them. The Web Appendix makes available the pseudo r-squared for each donor model but these are not comparable across models because a different dependent variable is employed in each. Pseudo r-squared is only comparable across models when the dependent variable remains the same.

[16] Standard errors obtained in two-step System GMM estimation without the Windmeijer (2005) finite-sample correction are robust in theory but feature a known downward bias. Consequently, when we experimented with uncorrected robust standard errors, we yielded significant coefficients on virtually all variables for each donor. We characterize the Windmeijer standard errors as stringent because overwhelmingly we obtain non-significant results on both the IMF program dummy and on other control variables, despite the fact that effect sizes are generally consistent with our other specifications, where the thresholds for significance are reached. Our concerns on this matter are similar to some of those raised by Wilson (2011) and in Endnote 10.

[17] We do not investigate smaller multilateral donors because data is patchy and we lack a suitable number of observations. It is plausible that multilateral aid catalysis may be driven by smaller donors as they may have less capacity to conduct their own assessments and therefore take their signals from the IMF. We thank an anonymous reviewer for raising this point.

[18] As these authors discuss, the IMF's dataset on 'Monitoring of Fund Arrangements' (MONA) is unsatisfactory.

Table 1. Variable descriptions, data sources, and hypothesized effects for aid

Variable	Description	Source	Hypothesized impact on aid
Dependent variables			
Aid selection	Coded 1 if recipient country receives commitments of official development assistance in a given year, otherwise coded 0.	OECD, 2014a	
Aid allocation	Commitments of official development assistance in millions of constant US dollars, transformed into the natural logarithm.	OECD, 2014a	
Independent variables			
IMF program	Coded 1 if recipient country has an IMF-supported program in a given year, otherwise coded 0. The starting year is defined as the year in which the program was approved, provided this occurred in the first half of the year. If the approval date was in the second half of the year, the starting year is the following year. The end year is the year in which the program expired.	Clements, Gupta, & Nozaki, 2013	+
Recipient need			
GDP per capita	GDP per capita in international dollars based on purchasing power parity (PPP), transformed into the natural logarithm.	World Bank, 2013	-
Recipient merit			
GDP growth	Growth of GDP per capita as an annual percentage change.	World Bank, 2013	+
Democracy	Level of democracy on a scale ranging from 0, least democratic, to 10, most democratic. Indicator uses data combined from the Polity IV and Freedom House measures of democracy.	Teorell et al, 2013	+
Political terror	Levels of political violence and terror on a scale ranging from 1 to 5, where 1 is least political terror and 5 is most political terror	Gibney, Cornett, Wood, & Haschke, 2013	-
Donor self-interest			
UNSC member	Coded 1 if recipient country has been a temporary member of the United Nations Security Council in a given year, otherwise coded 0.	Dreher, Sturm & Vreeland, 2009	+
UNGA voting similarity (dyadic)	Voting similarity index between recipient and donor country on a scale ranging from 0 to 1, where 1 is perfect similarity and 0 is perfect difference.	Strezhnev & Voeten, 2013	+
Trade (dyadic)	Total exports and imports between recipient and donor country in millions of US dollars, transformed into the natural logarithm.	Barbieri & Keshk, 2012	+
Colony (dyadic – selection equation only)	Coded 1 if recipient country has been a colony of donor country since 1900, otherwise coded 0.	Alesina & Dollar, 2000	+
Additional controls			
War	Coded 1 if recipient country experiences a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 1000 battle-related deaths in a given year, otherwise coded 0.	UCDP/PRIO Armed Conflict Dataset - Themner & Wallensteen, 2012	+/-
Population	Total population, transformed into the natural logarithm.	World Bank, 2013	+

Table 2. IMF program effect on aid commitments, by sector and total

	Sector Selection 1995-2009			Sector Allocation 1995-2009								Total Allocation 1986-2009		
	General Budget Support	Debt-Related	Humanitarian	Education	Health	Infrastructure	Production	Multisector	General Budget Support	Debt-Related	Humanitarian	Total Multilateral	Total DAC	Total
L.IMF program	0.871***	1.025***	0.364**	0.114	-0.01	0.235*	0.223***	0.173**	0.231	0.699***	-0.064	0.281***	0.152***	0.173***
	[0.114]	[0.152]	[0.174]	[0.091]	[0.088]	[0.120]	[0.082]	[0.080]	[0.228]	[0.198]	[0.116]	[0.062]	[0.048]	[0.047]
L.GDP per capita	-0.675***	-0.578***	-0.687***	0.435	-0.204	-0.635	-0.494	-0.454	0.343	-1.129	-1.431***	-0.559***	-0.19	-0.333**
	[0.106]	[0.158]	[0.116]	[0.290]	[0.319]	[0.484]	[0.328]	[0.375]	[0.898]	[0.851]	[0.446]	[0.158]	[0.162]	[0.157]
L.GDP per capita growth	0.008	0.017**	-0.007	0.018***	0.005	0.012	0.008	-0.002	0.008	-0.002	0.004	0.011**	0.009***	0.009***
	[0.008]	[0.008]	[0.007]	[0.006]	[0.005]	[0.008]	[0.007]	[0.005]	[0.014]	[0.014]	[0.007]	[0.005]	[0.003]	[0.003]
L.Democracy	0.095***	0.034	0.084**	0.066*	0.078	0.235***	0.151***	0.059	-0.221	0.096	-0.046	0.079***	0.065***	0.070***
	[0.028]	[0.043]	[0.042]	[0.038]	[0.049]	[0.066]	[0.056]	[0.049]	[0.159]	[0.106]	[0.062]	[0.022]	[0.021]	[0.019]
L.Political terror	-0.009	0.017	0.235**	-0.006	0.007	-0.180*	-0.152**	-0.097	-0.13	0.05	0.278***	-0.016	-0.043	-0.017
	[0.071]	[0.099]	[0.098]	[0.066]	[0.069]	[0.098]	[0.059]	[0.060]	[0.177]	[0.150]	[0.101]	[0.035]	[0.035]	[0.029]
L.UNSC member	-0.234	0.160	-0.055	-0.036	-0.13	0.046	-0.106	-0.025	-0.69	0.104	0.021	-0.08	-0.028	-0.046
	[0.147]	[0.188]	[0.215]	[0.098]	[0.151]	[0.216]	[0.168]	[0.092]	[0.505]	[0.215]	[0.219]	[0.083]	[0.062]	[0.082]
L.Population	-0.022	0.044	0.272***	-0.71	1.348	0.886	-0.157	0.652	2.674	4.364	2.038	-2.451***	-0.396	-1.418***
	[0.045]	[0.050]	[0.055]	[1.170]	[1.196]	[1.199]	[0.981]	[1.135]	[1.852]	[2.903]	[1.803]	[0.604]	[0.455]	[0.503]
L.War	-0.103	0.168	Omitted	-0.061	0.048	-0.315	-0.284	-0.019	0.388	-0.558	0.21	-0.032	-0.01	-0.016
	[0.182]	[0.264]	[Omitted]	[0.225]	[0.222]	[0.256]	[0.252]	[0.288]	[0.436]	[0.431]	[0.217]	[0.112]	[0.139]	[0.132]
Constant	4.787***	1.561	1.980	26.658	-4.194	9.542	25.432	10.449	-28.722	-50.749	-7.955	64.887***	29.970***	48.126***
	[1.178]	[1.647]	[1.480]	[19.728]	[21.009]	[21.255]	[16.630]	[20.467]	[33.604]	[49.002]	[32.235]	[10.527]	[8.029]	[8.851]
Region / Country dummies	Yes/No	Yes/No	Yes/No	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1776	1776	1776	1768	1701	1700	1740	1767	875	984	1566	2775	2812	2821
Inclusiveness	0.493	0.554	0.882	0.995	0.958	0.957	0.980	0.995	0.493	0.554	0.882	0.984	0.997	1.000
R-squared	.	.	.	0.734	0.717	0.659	0.696	0.740	0.536	0.594	0.691	0.755	0.859	0.843

Notes: Selection models are estimated by Probit. Allocation models are estimated by Ordinary Least Squares. Inclusiveness refers to the share of recipient-years with aid commitments out of total recipient-years. Selection models are not presented for education, health, infrastructure, production, and multisector or for total aid because more than 90 percent of country-years are selected (inc>90%). In humanitarian selection, occurrence of war predicts success perfectly, so the variable is omitted and 96 observations are not used. Omitting variables in perfectly predicted observations has no effect on the likelihood or estimates of the remaining coefficients and increases the numerical stability of the optimization process.
Cluster robust standard errors in brackets. * p<0.10 ** p<0.05, *** p<0.01.

Table 3. Robustness checks, by sector and total aid commitments

	Education	Health	Infrastructure	Production	Multisector	General Budget Support	Debt-Related	Humanitarian	Total Multilateral	Total DAC	Total
Selection model: base (Probit)	.	.	.	.	.	0.871***	1.025***	0.364**	.	.	.
	.	.	.	.	.	[0.114]	[0.152]	[0.174]	.	.	.
Selection model: augmented	.	.	.	.	.	0.757***	0.948***	0.428**	.	.	.
	.	.	.	.	.	[0.110]	[0.156]	[0.182]	.	.	.
Selection model: Heckman	.	.	.	.	.	0.871***	1.026***	0.365**	.	.	.
	.	.	.	.	.	[0.114]	[0.153]	[0.174]	.	.	.
Allocation model: base (Fixed Effects OLS)	0.114	-0.010	0.235*	0.223***	0.173**	0.231	0.699***	-0.064	0.281***	0.152***	0.173***
	[0.091]	[0.088]	[0.120]	[0.082]	[0.080]	[0.228]	[0.198]	[0.116]	[0.062]	[0.048]	[0.047]
Allocation model: augmented	0.085	0.021	0.190	0.198**	0.102	0.206	0.593***	-0.074	0.224***	0.064	0.109***
	[0.096]	[0.096]	[0.134]	[0.084]	[0.086]	[0.252]	[0.203]	[0.131]	[0.059]	[0.039]	[0.039]
Allocation model: System GMM	-0.041	-0.182	-0.142	-0.012	-0.037	0.696	0.789*	-0.222	0.311***	0.144	0.142**
	[0.106]	[0.120]	[0.154]	[0.114]	[0.136]	[0.555]	[0.423]	[0.191]	[0.093]	[0.089]	[0.062]
Allocation model: Heckman	0.116	-0.010	0.240**	0.220***	0.173**	0.250	0.680***	-0.060	.	.	.
	[0.087]	[0.084]	[0.115]	[0.079]	[0.076]	[0.213]	[0.211]	[0.110]	.	.	.

Notes: Reported are the estimated coefficients for the lagged IMF program dummy in various equations. IMF coefficients for selection models are not presented for education, health, infrastructure, production, and multisector or for total multilateral, total DAC, and total aid because more than 90 percent of country-years are selected (inc>90%). Heckman model failed to converge for total multilateral, total DAC, and total aid. System GMM results are based on Roodman's (2009b) two-step estimator in Stata, correcting the standard errors using the Windmeijer (2005) finite-sample correction. Lagged dependent variables, IMF program dummies, GDP per capita, and GDP per capita growth are treated as endogenous in the System GMM specifications; and all equations pass the Arellano-Bond AR(2) test and Hansen's overidentification test. For all other models, robust standard errors clustered by country are reported.
Standard errors in brackets. * p<0.10 ** p<0.05, *** p<0.01.

Table 4. Robustness checks, by bilateral aid commitments

	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany
Selection model: base (Probit)	-0.261***	0.105	0.405***	0.463***	0.206**	0.051	.	.
	[0.100]	[0.139]	[0.153]	[0.136]	[0.097]	[0.101]	.	.
Selection model: augmented	-0.089	0.139	0.501***	0.123	0.186*	0.127	.	.
	[0.112]	[0.155]	[0.157]	[0.137]	[0.101]	[0.103]	.	.
Selection model: Heckman	-0.259**	0.116	0.405***	0.460***	0.207**	0.052	.	.
	[0.101]	[0.139]	[0.153]	[0.139]	[0.097]	[0.101]	.	.
Allocation model: base (Fixed Effects OLS)	0.102	-0.021	-0.086	0.166*	0.078	0.138	0.112**	0.140**
	[0.122]	[0.093]	[0.094]	[0.085]	[0.124]	[0.111]	[0.052]	[0.065]
Allocation model: augmented	0.017	-0.112	-0.182*	0.099	-0.050	0.075	0.036	-0.018
	[0.123]	[0.108]	[0.105]	[0.087]	[0.127]	[0.124]	[0.051]	[0.062]
Allocation model: System GMM	-0.855	0.053	-0.093	0.177	-0.280	0.184	0.084	0.166*
	[0.523]	[0.240]	[0.211]	[0.202]	[0.663]	[0.340]	[0.132]	[0.098]
Allocation model: Heckman	0.092	-0.029	-0.076	0.168**	0.105	0.148	0.113**	0.134**
	[0.112]	[0.091]	[0.090]	[0.083]	[0.117]	[0.106]	[0.050]	[0.063]
	Greece	Ireland	Italy	Japan	Korea	Luxembourg	Netherlands	New Zealand
Selection model: base (Probit)	0.041	0.014	0.543***	.	0.127	0.066	0.112	-0.111
	[0.117]	[0.146]	[0.124]	.	[0.142]	[0.148]	[0.098]	[0.150]
Selection model: augmented	0.024	0.014	0.413***	.	0.034	-0.070	0.168	-0.065
	[0.125]	[0.150]	[0.122]	.	[0.141]	[0.154]	[0.105]	[0.173]
Selection model: Heckman	0.034	0.015	0.544***	.	0.163	-0.070	0.102	-0.111
	[0.117]	[0.146]	[0.124]	.	[0.126]	[0.121]	[0.099]	[0.150]
Allocation model: base (Fixed Effects OLS)	0.025	-0.080	0.198**	0.503***	-0.109	-0.207**	0.256**	0.121
	[0.129]	[0.097]	[0.093]	[0.103]	[0.104]	[0.104]	[0.106]	[0.100]
Allocation model: augmented	-0.106	-0.161	0.100	0.325***	-0.036	-0.221**	0.177	0.166
	[0.146]	[0.108]	[0.107]	[0.095]	[0.125]	[0.108]	[0.114]	[0.105]
Allocation model: System GMM	-0.199	-0.317	0.099	0.301**	-0.485**	-0.394	-0.379	-0.291
	[0.490]	[0.292]	[0.290]	[0.141]	[0.245]	[0.420]	[0.376]	[0.439]

Allocation model: Heckman	0.035	-0.080	0.206**	0.450***	-0.121	-0.219*	0.231**	0.120
	[0.120]	[0.090]	[0.093]	[0.096]	[0.108]	[0.131]	[0.104]	[0.092]
	Norway	Portugal	Spain	Sweden	Switzerland	United Kingdom	United States	
Selection model: base (Probit)	0.187*	-0.062	0.294**	0.236**	0.396*	0.121	0.397**	
	[0.102]	[0.116]	[0.147]	[0.107]	[0.239]	[0.145]	[0.176]	
Selection model: augmented	0.204**	0.084	0.063	0.281**	0.087	-0.120	0.527***	
	[0.103]	[0.141]	[0.142]	[0.112]	[0.269]	[0.136]	[0.197]	
Selection model: Heckman	0.185*	-0.057	0.294**	0.237**	0.398*	0.123	0.391**	
	[0.102]	[0.116]	[0.147]	[0.106]	[0.241]	[0.144]	[0.177]	
Allocation model: base (Fixed Effects OLS)	-0.027	0.010	0.106	0.104	0.050	0.137	0.294***	
	[0.095]	[0.255]	[0.114]	[0.115]	[0.152]	[0.092]	[0.098]	
Allocation model: augmented	-0.105	-0.268	0.118	0.108	-0.038	0.108	0.178*	
	[0.101]	[0.275]	[0.122]	[0.125]	[0.153]	[0.100]	[0.095]	
Allocation model: System GMM	-0.431	.	-0.281	-0.234	-0.023	0.012	0.258	
	[0.299]	.	[0.263]	[0.290]	[0.316]	[0.256]	[0.171]	
Allocation model: Heckman	-0.015	0.008	0.105	0.130	0.053	0.136	0.299***	
	[0.091]	[0.226]	[0.108]	[0.111]	[0.137]	[0.088]	[0.096]	

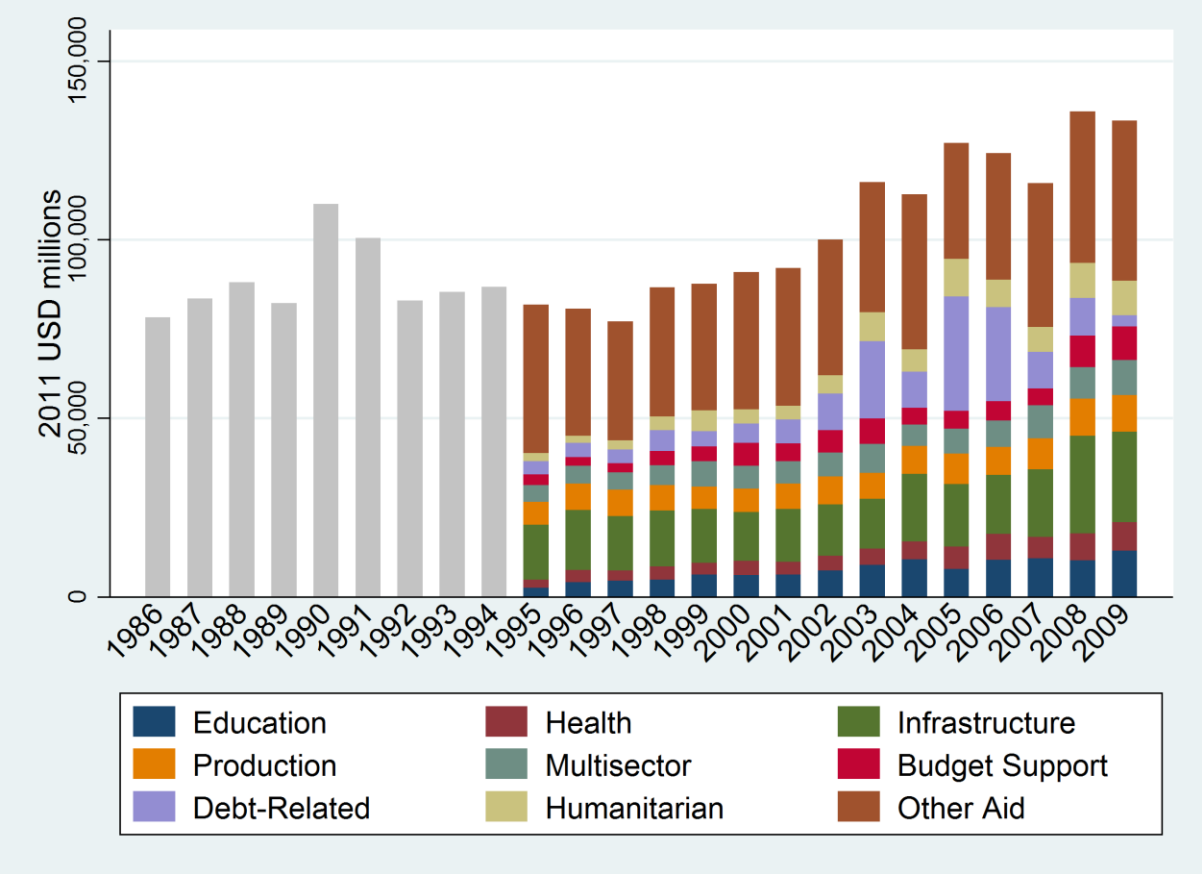
Notes: Reported are the estimated coefficients for the lagged IMF program dummy in various equations. IMF coefficients for selection models are not presented for France, Germany, and Japan because more than 90 percent of country-years are selected (inc>90%). System GMM results are based on Roodman's (2009b) two-step estimator in Stata, correcting the standard errors using the Windmeijer (2005) finite-sample correction. Lagged dependent variables, IMF program dummies, GDP per capita, and GDP per capita growth are treated as endogenous in the System GMM specifications; and all equations pass the Arellano-Bond AR(2) test and Hansen's overidentification test. The IMF coefficient on Portugal for System GMM is not reported due to the small-sample problem acknowledged by Roodman (2009a) when including numerous instruments. For all other models, robust standard errors clustered by country are reported.
Standard errors in brackets. * p<0.10 ** p<0.05, *** p<0.01.

Table 5. Robustness checks, by multilateral aid commitments

	African Development Bank	Asian Development Bank	Inter-American Development Bank	European Union Institutions	International Development Association	UNICEF	United Nations Development Programme	Global Fund
Selection model: base (Probit)	0.624***	1.036***	0.175	.	0.832***	0.727**	.	0.027
	[0.127]	[0.210]	[0.206]	.	[0.122]	[0.340]	.	[0.110]
Selection model: augmented	0.343***	0.878***	-0.031	.	0.737***	-1.099**	.	0.050
	[0.118]	[0.244]	[0.189]	.	[0.127]	[0.458]	.	[0.118]
Selection model: Heckman	0.622***	1.020***	0.237	.	0.836***	0.722**	.	0.021
	[0.127]	[0.206]	[0.230]	.	[0.123]	[0.343]	.	[0.112]
Allocation model: base (Fixed Effects OLS)	0.111	0.101	-0.067	0.103	-0.051	-0.038	0.010	0.033
	[0.130]	[0.201]	[0.168]	[0.079]	[0.088]	[0.036]	[0.049]	[0.139]
Allocation model: System GMM	.	.	.	-0.051	-0.273	-0.064	-0.164**	.
	.	.	.	[0.210]	[0.729]	[0.066]	[0.074]	.
Allocation model: augmented	0.066	0.229	-0.082	0.044	0.023	-0.026	0.026	0.077
	[0.163]	[0.216]	[0.207]	[0.092]	[0.083]	[0.036]	[0.055]	[0.156]
Allocation model: Heckman	0.156	0.201	-0.065	0.112	0.024	-0.038	0.015	0.047
	[0.136]	[0.172]	[0.158]	[0.077]	[0.084]	[0.034]	[0.044]	[0.121]

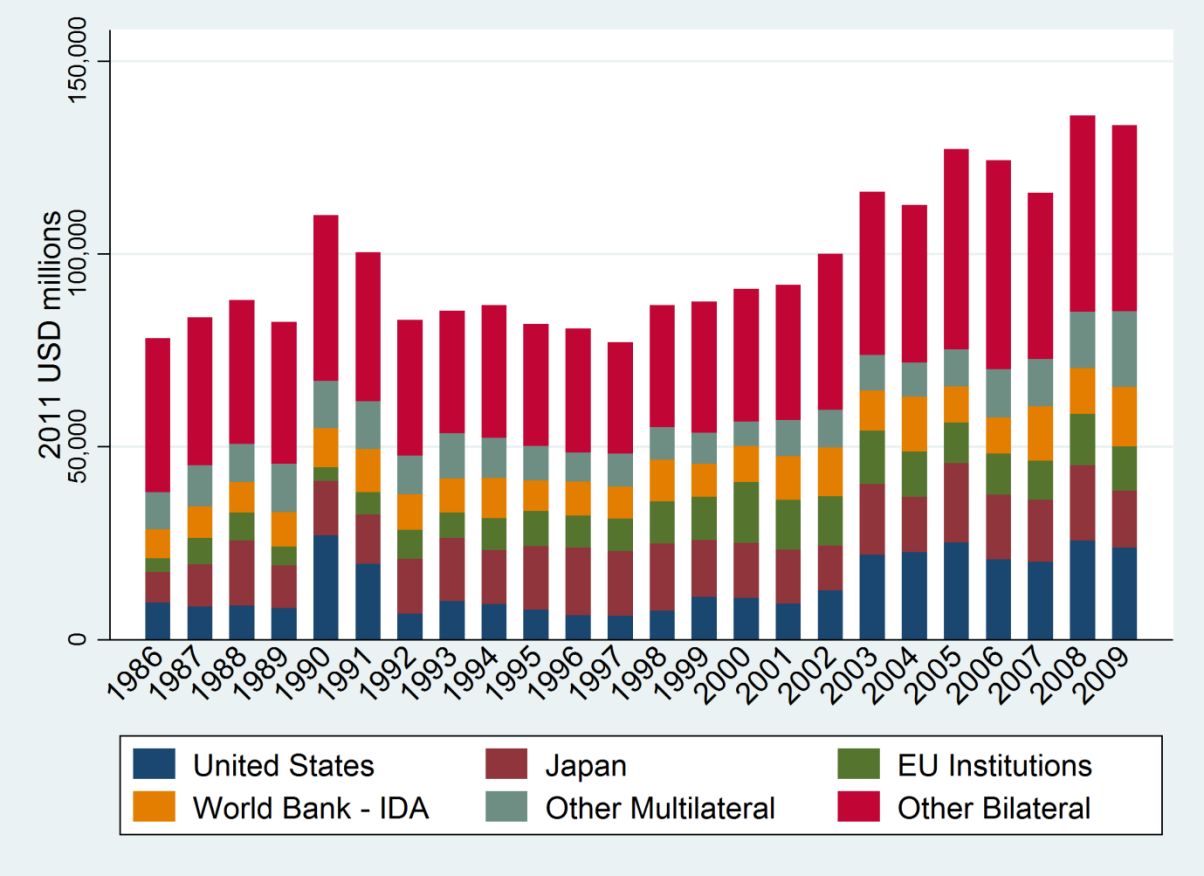
Notes: Reported are the estimated coefficients for the lagged IMF program dummy in various equations. IMF coefficients for selection models are not presented for European Union Institutions and United Nations Development Programme because more than 90 percent of country-years are selected (inc>90%). System GMM results are based on Roodman's (2009b) two-step estimator in Stata, correcting the standard errors using the Windmeijer (2005) finite-sample correction. Lagged dependent variables, IMF program dummies, GDP per capita, and GDP per capita growth are treated as endogenous in the System GMM specifications; and all equations pass the Arellano-Bond AR(2) test and Hansen's overidentification test. The IMF coefficients on African Development Bank, Asian Development Bank, Inter-American Development Bank, and Global Fund for System GMM are not reported due to the small-sample problem acknowledged by Roodman (2009a) when including numerous instruments. For all other models, robust standard errors clustered by country are reported.
Standard errors in brackets. * p<0.10 ** p<0.05, *** p<0.01.

Figure 1. Aid commitments by sector



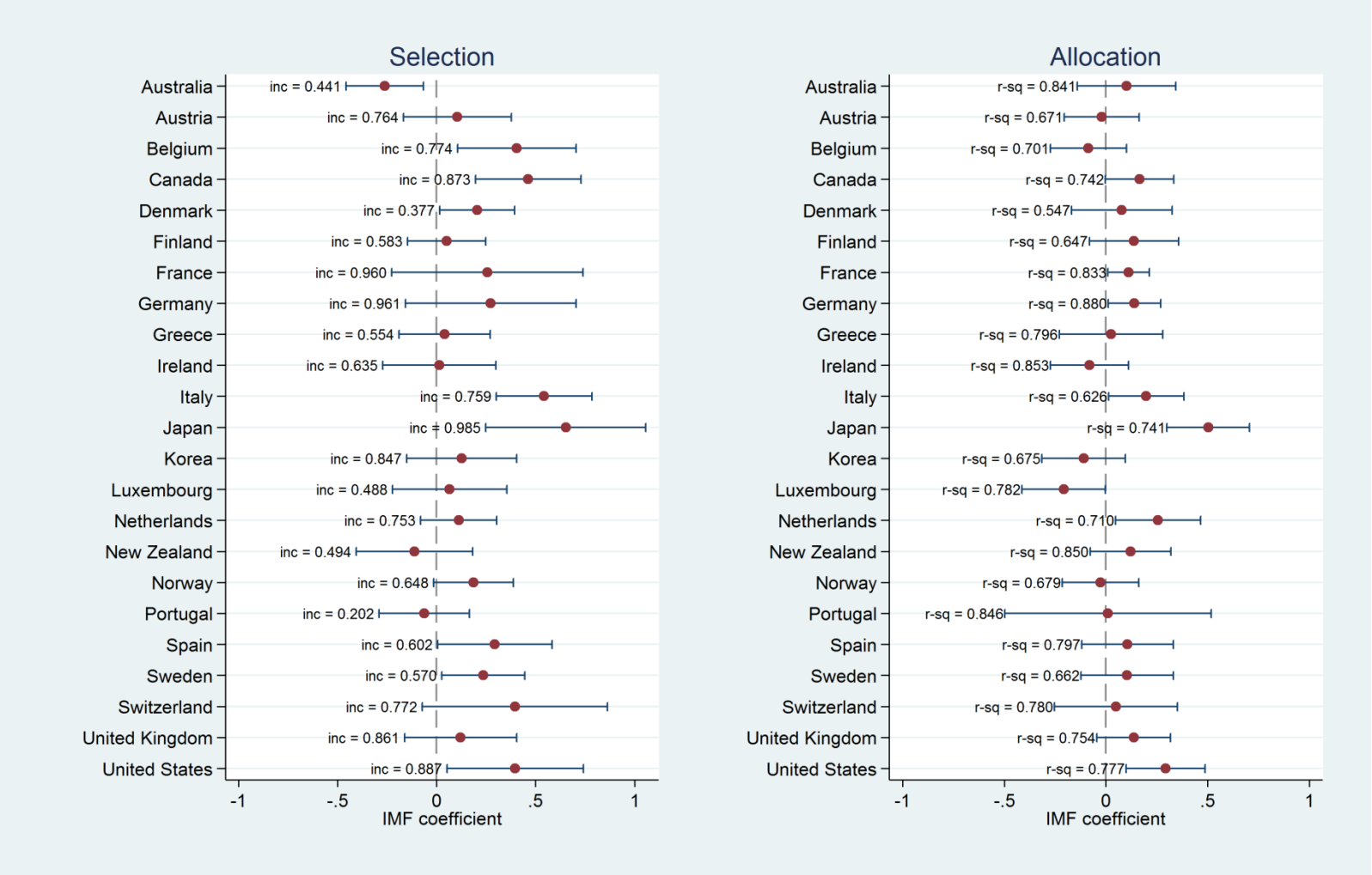
Source: OECD (2014a).
Notes: Aid commitments disaggregated by sector suffer from underreporting prior to 1995 so are not reported here.

Figure 2. Aid commitments by donor



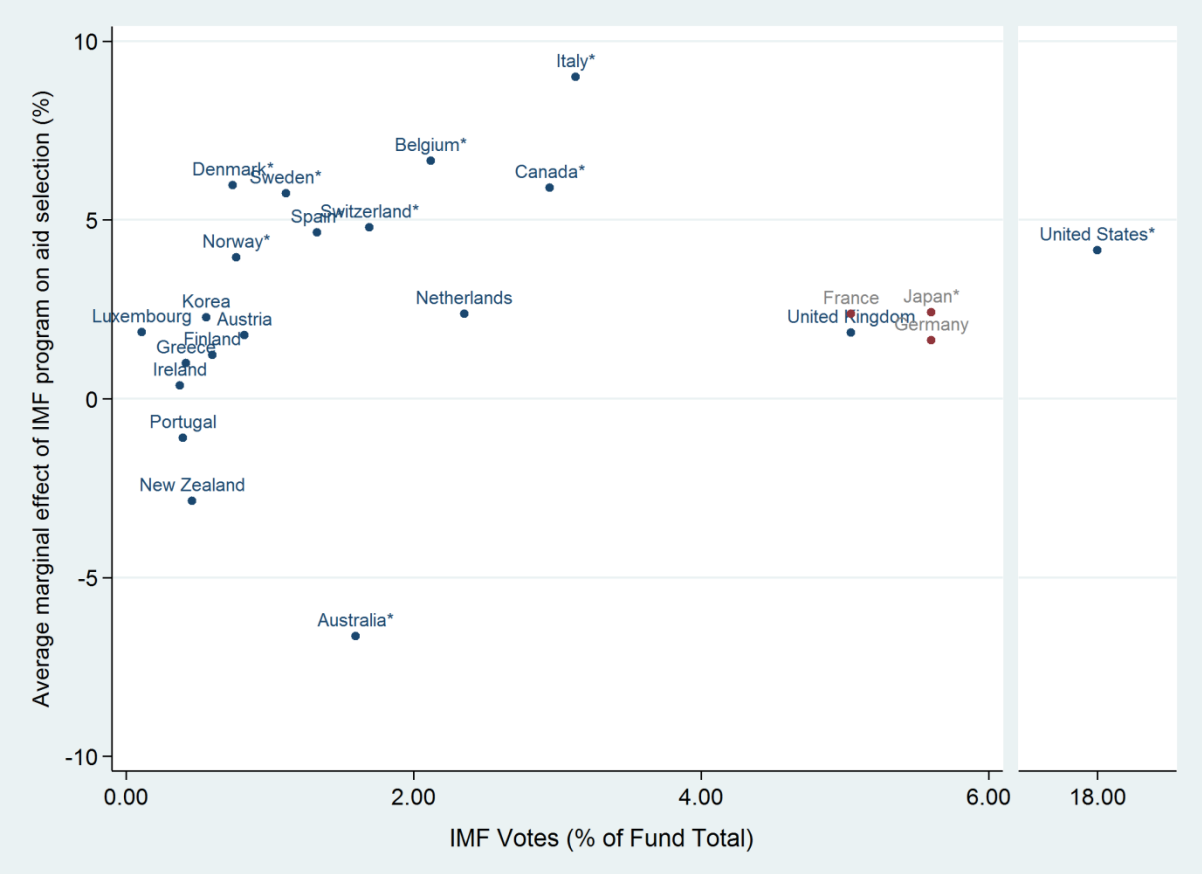
Source: OECD (2014a).

Figure 3. IMF program effect on aid commitments, by bilateral donor



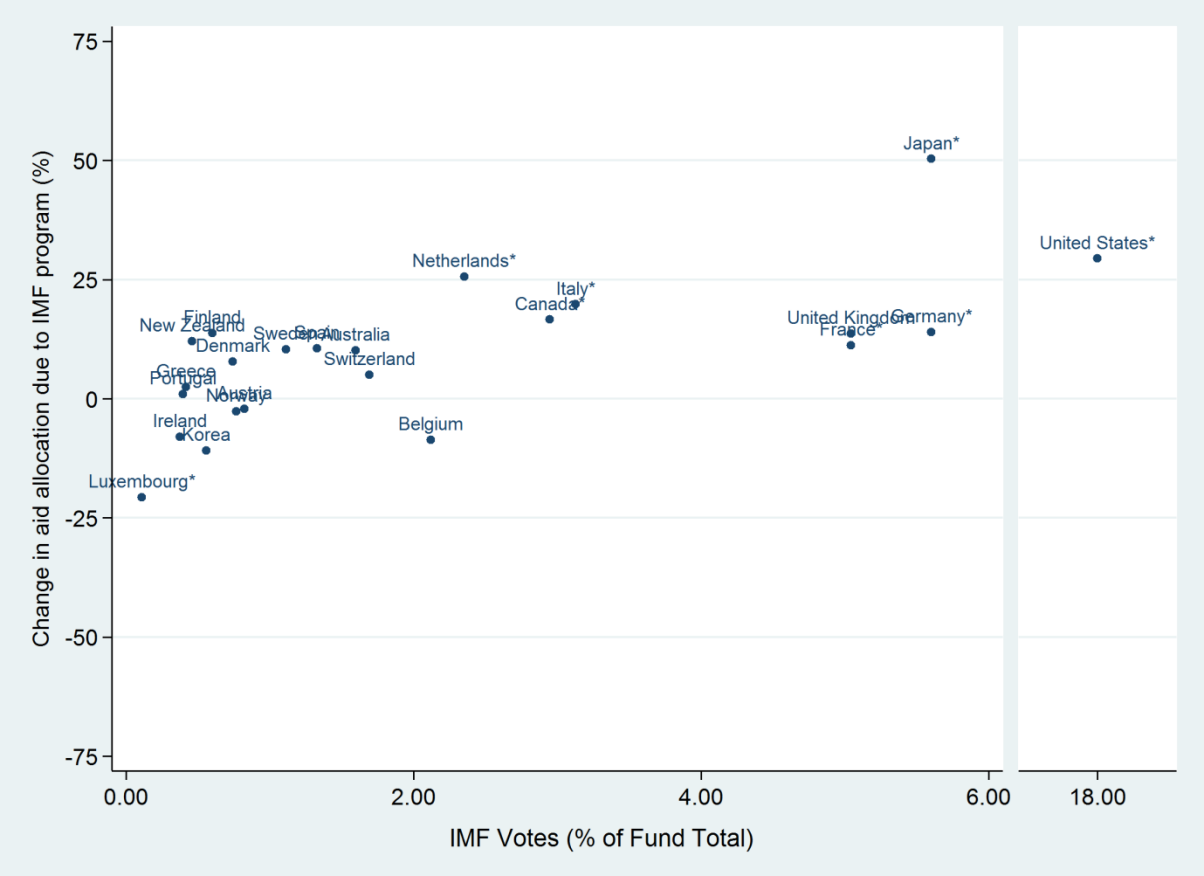
Notes: Error bars are 95% confidence intervals based on robust standard errors clustered by country to reflect non-independence of sampling. Inclusiveness ("inc") refers to the share of recipient-years with aid commitments out of total recipient-years. Plots include years 1986-2006 for Germany, 1996-2009 for Greece, Ireland, and Luxembourg, 1995-2009 for Korea, 1998-2009 for New Zealand, 1991-2009 for Portugal, 1992-2009 for Spain, 2002-2009 for Switzerland, and 1986-2009 for all others.

Figure 4. IMF selection for aid flows vs IMF votes, by bilateral donor



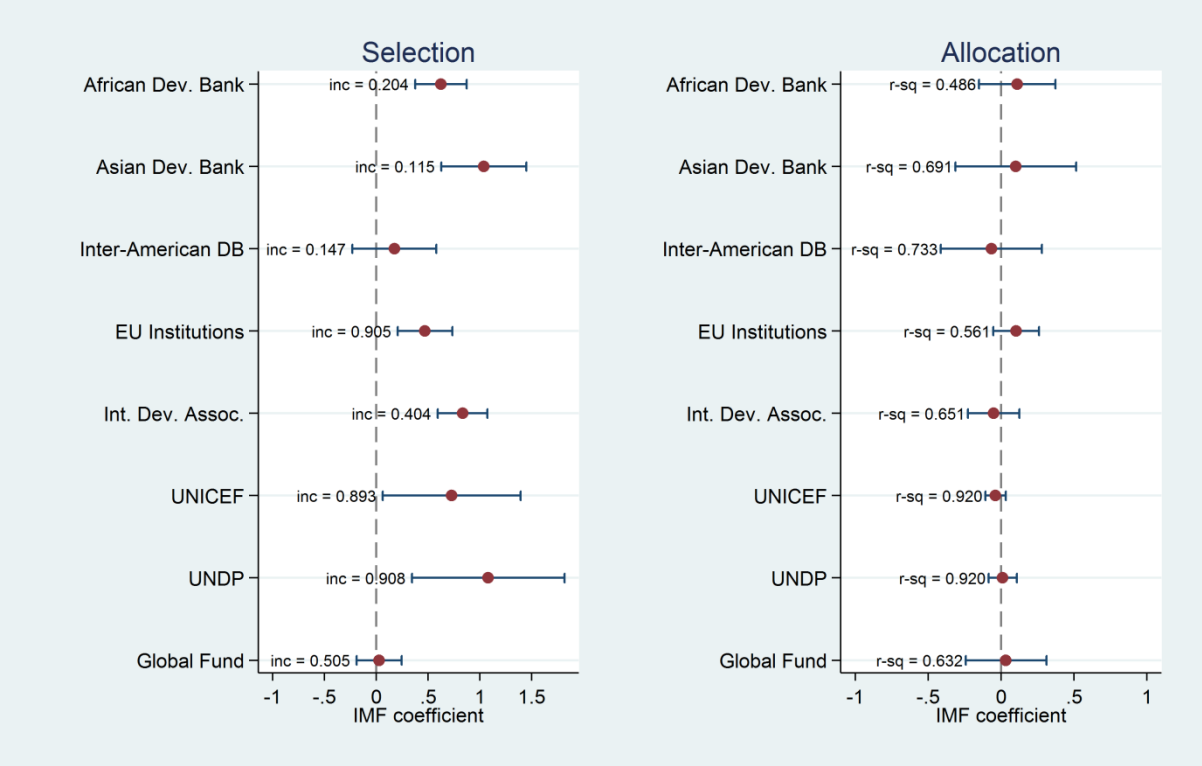
Notes: * significant at p<0.10; Germany, France, and Japan exceed inclusiveness threshold of inc>90%

Figure 5. IMF allocation (OLS fixed effects) for aid flows vs IMF votes, by bilateral donor



Notes: * significant at p<0.10

Figure 6. IMF program effect on aid commitments, by multilateral donor



Notes: Error bars are 95% confidence intervals based on robust standard errors clustered by country to reflect non-independence of sampling. Inclusiveness ("inc") refers to the share of recipient-years with aid commitments out of total recipient-years. Plots include years 2000-2009 for UNICEF, 2004-2009 for United Nations Development Programme, 2003-2009 for Global Fund, and 1986-2009 for all others.