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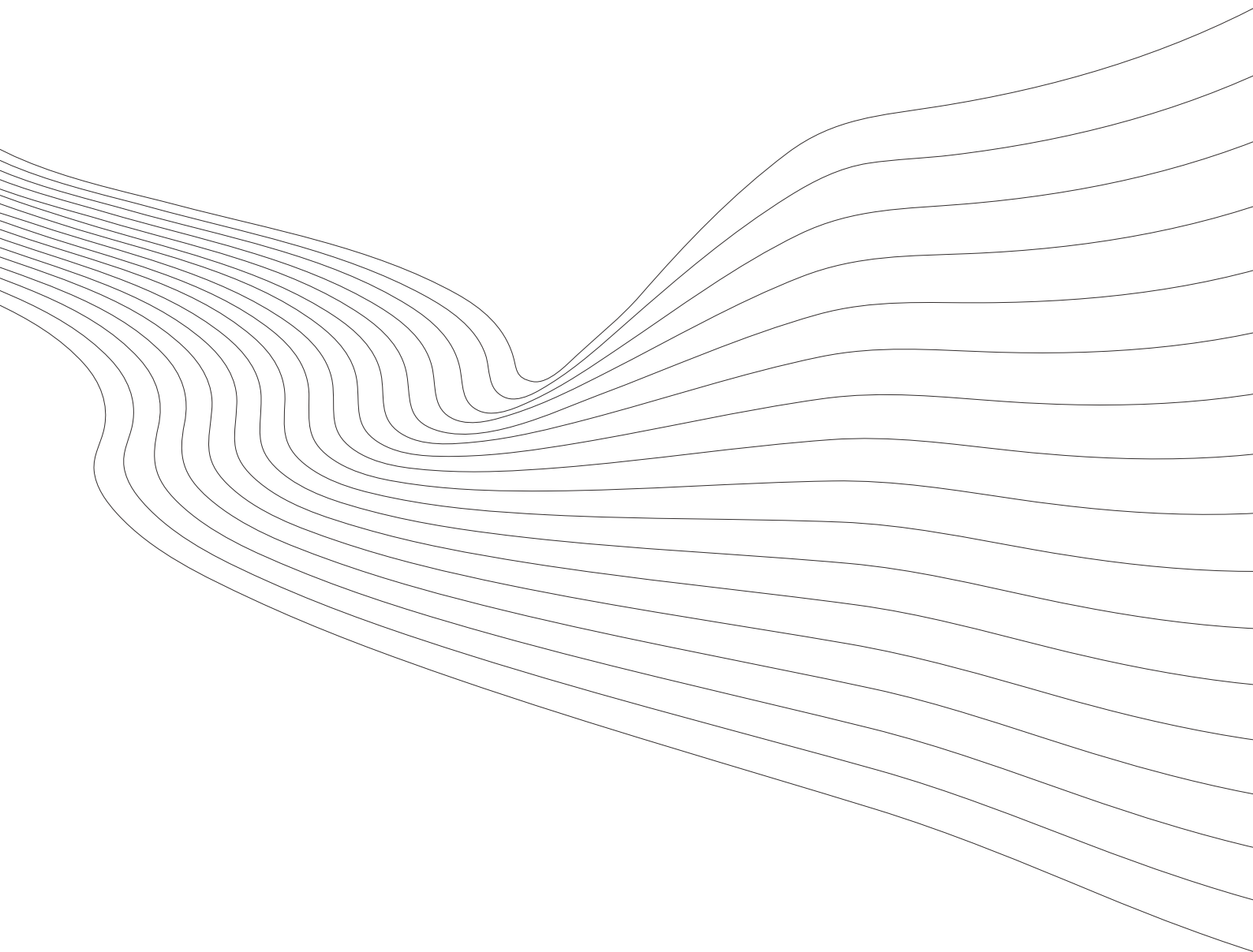
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# KOF Working Papers

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# Explaining IMF Lending Decisions after the Cold War<sup>\*</sup>

*Christoph Moser<sup>†</sup> and Jan-Egbert Sturm<sup>‡</sup>*

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## **Abstract**

This paper empirically investigates the economic and political factors that affect a country's likelihood to sign an arrangement with the IMF and the determinants of the financial size of such a program. Arguably the world and the global financial architecture underwent structural changes after the ending of Cold War and so did the role of the IMF. Hence, we update and extend the work of Sturm et al. (2005) by employing a panel model for 165 countries that focuses on the post-Cold War era, i.e., 1990–2009. Our results, based on extreme bounds analysis, suggest that some economic and political variables are robustly related to these two dimensions of IMF program decisions. Furthermore, we show that it is important to distinguish between concessional and non-concessional IMF loans.

Keywords: IMF, lending facilities, extreme bounds analysis.

JEL codes: O19, F33.

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## 1. Introduction

When the International Monetary Fund (IMF) saw the light of day in the mid-1940s, 29 IMF member countries signed the Articles of Agreement at first. International trade in goods, services and especially capital was limited as a consequence of the Great Depression and World War II. While one of the main objectives of the Fund has remained to help governments overcome temporary balance of payments problems, its role in the world economy has changed remarkably due to historical events of economic and political nature (see for instance Boughton, 2004). There have been different epochs in the history of the IMF, but – at least – two structural changes during the last 20 years are worth mentioning that initiated the latest era. First, the latest big influx of new IMF members was associated with the end of the Cold War and the collapse of communism. Within three years, membership increased from 152 countries to 172 at the beginning of the 1990s and the IMF started to review and adapt its organization. The IMF has now become a truly international financial institution with 187 member countries. Second, developing countries increasingly liberalized their capital accounts during the 1990s and the Latin American Debt Crisis was finally resolved at the end of the 1980s, leading to increased and renewed access to international capital markets for a number of emerging market economies. Both developments have affected the role of the IMF by changing the nature and resolution of financial crises and the size of IMF resources relative to private capital flows.

Most of the empirical literature on the determinants of IMF involvement uses data covering several decades of information, but fails to reflect these two structural changes. Furthermore, as noted by Sturm et al. (2005), a wide variety of economic variables has been suggested in the literature as determinants of IMF involvement, but generally empirical studies focus on a limited number of political variables (if any at all). We seek to reconcile these facts: Our study focuses on the post Cold War period and builds on a rich set of political and economic variables that also includes recently proposed variables for political proximity to major shareholders at the IMF and variables related to the exchange rate regime, the capital account side of IMF member countries and financial crises. The goal of this empirical analysis is to carefully examine which of these variables are really *robust* determinants of the likelihood that a country signs a new arrangement with the Fund and the amount agreed under this arrangement. By robust we mean that a specific economic or political variable should have a significant partial effect (largely) independent of the additional control variables chosen. The extreme bounds analysis (EBA) represents a fairly neutral means to check this form of

robustness and investigate the validity of existing findings in empirical research.<sup>4</sup> We employ an EBA in order to examine which variables robustly explain IMF involvement for a panel data set of 165 countries over the period 1990-2009. One of the advantages of focusing on the post Cold War period is that it is a relatively homogenous era in the history of the IMF. Except for Sturm et al. (2005) and Dreher et al. (2009) – focusing on a different sample period and without looking at the size of the program – an EBA has to the best of our knowledge not yet been used to check for the robustness of a relationship between IMF involvement and economic and political variables.

Our main results from the extreme bounds analysis suggest that a number of economic and political variables indeed play a prominent role in signing an IMF program and its size. These robust determinants of IMF involvement include among others past IMF involvement and lagged legislative and executive elections (on the political side) and the level of international reserves, real economic growth rates and currency crises (on the economic side).

We contribute to the empirical literature on the IMF in three ways: First, this is the first study that uses an EBA framework to examine the determinants of the size of IMF loans, a topic that has received surprisingly little attention in the literature. Second, we separately test for robust determinants of IMF involvement for non-concessional and concessional loans. This distinction is potentially crucial, since the demand for IMF loans and the supply of IMF loans might depend on the type of the facility. Our results confirm this conjecture. Hence, pooling of data on IMF programs can be problematic, since the determinants for non-concessional and concessional loans vary substantially. These differences in results are best exemplified by GDP per capita. Perhaps related to the Heavily Indebted Poor Countries (HIPC) initiative and the wave of severe currency crises in the second half of the 1990s, this variable in some specifications even significantly changes signs. Third, we update and extend the work of Sturm et al. (2005) and also provide a summary table with the most robust determinants of IMF participation by loan facility at the end of section 4. We hope that this list of variables serves as a useful guide for choosing control variables in future studies.

The remainder of the paper is organized as follows. Section 2 discusses the variables that we take into account on the basis of previous studies. Section 3 explains the modeling strategy

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<sup>4</sup> It is worth noting that our conclusions about the robustness of determinants of IMF participation are conditional on the empirical models chosen. While our extreme bound analyzes are based on estimators that are commonly used in the literature, it is beyond the scope of this paper to test for the robustness of these results to for instance other estimators or functional forms. We leave this for future research.

and section 4 contains the empirical results. The final section offers some concluding comments.

## **2. Economic and political determinants of IMF involvement**

We summarize all recent studies that we are aware of dealing with determinants of IMF program participation since 2005, using similar criteria as Sturm et al. (2005) who survey the literature up to 2005 (for further recent reviews, see for instance Steinwand and Stone, 2008; Bird, 2007; and Conway, 2006).<sup>5</sup> The empirical literature typically employs binary choice models (logit or probit) and defines IMF program involvement as a binary variable that takes the value of one if either i) a country participates in an IMF program in a given year, or ii) a country signs a new IMF arrangement in a given year.<sup>6</sup> In this study, we are interested in the latter case. While Appendix A summarizes both types of IMF program participation, we select those variables as our “core variables” that turned out to be most frequently used by other empirical studies in a similar setting as ours (i.e., with a dependent variable measuring the signing of new IMF arrangements and using data at an annual frequency) and that tended to be significant determinants of IMF involvement. Furthermore, we review the empirical literature on the size of IMF programs in Appendix B. Since this aspect of IMF involvement has not been studied by Sturm et al. (2005), we provide an overview of all studies that we have been able to find (and not only the most recent ones).

Based upon this screening of the literature, we have selected 15 economic variables for further empirical analysis. We discuss below, why they can be expected to be associated with IMF involvement, cite related recent studies and recall results from Sturm et al. (2005). We start with three economic variables that have most frequently been used in empirical studies on the determinants of IMF programs. Given their frequency, we include them in all our tested models below.

### *Core economic variables:*

- RESIMP (total reserves in months of imports): Countries with low levels of international reserves relative to imports are more likely to face balance of payments difficulties, are more vulnerable to speculative attacks and hence are more likely to

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<sup>5</sup> For a review of the older literature, see Bird (1995) and Knight and Santaella (1997).

<sup>6</sup> Beyond these two common definitions of IMF participation, Vreeland (2003) proposes to distinguish the initiation of an IMF participation spell from the continuation of such a spell.

request and receive IMF credit.<sup>7</sup> In Sturm et al. (2005), this variable was robustly negatively associated with signing an IMF program.

- GRGDP (real GDP growth): Countries experiencing relatively weak growth are more likely to face financial constraints and demand IMF credit. Furthermore, low growth rates worsen a country's ability-to-repay its sovereign debt. This variable was another robust explanatory variable with a negative sign in the extreme bounds analysis of Sturm et al. (2005).
- LGDPPC (GDP per capita, in logarithm): On the one hand, low-income countries may be more likely to seek concessional Fund assistance and among low-income countries poorer ones are more likely to sign concessional loans within the framework of the HIPC-initiative. On the other hand, more advanced developing countries with capital market access tend to be in need for non-concessional loans and within this group a number of relatively rich emerging markets like for instance South Korea or Brazil experienced severe currency crises during the 1990s, calling for short-term non-concessional IMF assistance. Hence, we expect that the sign of this coefficient depends on the type of IMF facility (positive/negative for non-concessional/concessional loans). For the overall sample Sturm et al. (2005) did not find that this variable was a robust explanatory variable for the initiation of an IMF program.

Of course, there are many other economic variables associated to the signing of new IMF arrangements. The following section summarizes the ones that we consider in our empirical analysis.

*Further economic variables:*

- INVGDP (investment as percentage of GDP): A low ratio of investment to GDP may indicate limited access to international capital markets, thereby making it more likely that a country requests Fund assistance. Investment was indeed another robust explanatory variable with negative sign in Sturm et al. (2005).

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<sup>7</sup> As an alternative we also experimented with total reserves scaled by total external debt. Both variables are highly correlated. To circumvent multicollinearity problems, we do not include both variables, but opt for RESIMP because it increases our sample. However, the qualitative conclusions are not affected by this choice.



- DEBTSERVEXP (debt service scaled to exports): A heavy debt burden relative to national income increases countries' need for external finance to service that debt.<sup>8</sup> For instance, Sturm et al. (2005) confirmed this prior.
- XDEBTGNI (external debt scaled to Gross National Income, GNI): First, a high debt ratio may reduce the creditworthiness of the country concerned and, hence, increase its demand for IMF credit. Second, so-called "highly-indebted poor countries" are only eligible for debt relief, if they maintain macroeconomic stability under a PRGF-supported program. Hence, we would expect a positive sign for especially non-concessional IMF programs.
- XBALGDP (external balance on goods and services scaled to GDP): One of the main objectives of the IMF is to assist countries to overcome their balance of payments woes (see Article I of the IMF Articles of Agreement). In this vein, a country that has a negative trade balance tends to need more financial resources and is more likely to receive IMF credit.<sup>9</sup>
- GLOBEC (economic globalization as measured by the KOF Index of Globalization): More globalized economies tend to be more prone to spill-over effects via trade or financial links and hence the likelihood that an IMF program is signed increases. On the other hand, economic isolation might more easily create an environment in which domestic crises can occur.<sup>10</sup>
- TOTADJGDP (terms of trade adjustment scaled by GDP): A worsening of a country's terms of trade is likely to weaken a country's external position, thereby increasing the likelihood that it needs to seek Fund assistance.

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<sup>8</sup> We have also experimented with total debt services scaled by gross national income. Given its high correlation with DEBTSERVEXP, we do not include this variable in our analysis. The qualitative conclusions are, however, not affected by this.

<sup>9</sup> As alternative we have also used the current account as percentage of GDP. The trade balance is available for a larger set of countries and is highly correlated with the current account balance. We opt for the trade balance in the results presented. The qualitative results are, however, not affected by this.

<sup>10</sup> The KOF globalization index can be downloaded from <http://www.kof.ethz.ch/globalisation> (cf. Dreher, 2006b).

- INFL (inflation): Countries experiencing high inflation are more likely in need of IMF credit. However, the willingness of the IMF to provide funds may be lower in case of high inflation.<sup>11</sup>
- DEFGDP (government budget deficit as percentage of GDP): High budget deficits might increase the necessity for adjustment and governments are more likely to turn to the Fund.
- STDEBTXDEBT (short-term debt scaled by total foreign debt): One of the main lessons from the Asian Crisis 1997/98 was that not only the level of indebtedness, but also its structure matters. A higher portion of short-term debt implies that the roll-over risk increases and, hence, a country's vulnerability to a financial crisis.
- PEG (fixed exchange rate): On the one hand, a credible fixed-exchange rate system can encourage international trade and investment. On the other hand, if the pegged exchange rate system is inconsistent with a government's current domestic policy, the likelihood of a speculative attack and a request for an IMF program increases. For instance, Bird and Rowlands (2009a) find evidence that fixed exchange rates are positively associated with the signing of IMF programs.<sup>12</sup>
- CURCRIS (currency crisis): A number of recent studies document that IMF program involvement become more likely during currency crises (e.g., Elekdag, 2008; Bird and Rowlands, 2009b; and Breen, 2010), where the IMF acts as a lender-of-last resort. We follow Frankel and Rose (1996) and Laeven and Valencia (2008) by defining a currency crisis as a nominal depreciation of the currency of at least 30 percent that is also at least a 10 percent increase in the rate of depreciation compared to the year before.
- FINOPEN (de jure measure for financial openness): Many emerging markets liberalized their capital accounts in the 1990s, which not only allowed them to better tap international capital markets, but also tended to be associated with a higher probability of financial crises (if the reforms were not accompanied by adequate

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<sup>11</sup> Note that the inflation rate is highly correlated with the lending interest rate in a particular country ( $\rho=0.77$ ). For that reason, we opt to keep country-specific interest rate variables out of the analysis. To reduce the influence of potentially outlying observations this variable is rescaled using the formula  $x/(1+x)$ . For instance, Dreher et al. (2010) use this data transformation.

<sup>12</sup> Trudel (2005) finds no direct effect of a fixed exchange rate on the likelihood of entering into an IMF program, but documents an indirect effect by showing that the dwindling of international reserves only in combination with a fixed exchange rate increases IMF participation.

financial supervision). We draw on an indicator of capital account openness that was first introduced by Chinn and Ito (2006). Higher values of the index indicate that a country is more open to cross-border capital transactions.<sup>13</sup>

To mitigate possible endogeneity problems with the above economic variables, we enter all of them with a one period lag in our models.

There is a growing consensus in the literature that the decision to sign an IMF program is not only determined by economic but also by political considerations. But while the literature has suggested various political factors that may influence the decision-making process on IMF loans, there is little agreement on which political variables to include. For instance Dreher et al. (2009) and Reynaud and Vauday (2009) offer interesting new insights in the use of IMF facilities by exploring the exogenous variation in temporary UN Security Council membership and by gauging the geopolitical importance of the countries turning to the IMF.

From our literature research we conclude that one political variable stands out of the numerous political variables tested in recent studies in terms of frequency used and its explanatory power. Therefore, we include this variable in each of our models and consider an additional 14 political variables in our robustness analysis.<sup>14</sup>

*Core political variable:*

- UNDERIMF5MA (years under IMF – last 5 years, moving average): Once countries turned to the IMF, there is marked persistence in IMF involvement, which is at odds with the original IMF goal to provide temporary balance of payment support to member countries. To capture this, we follow Przeworski and Vreeland (2000) using the lag of a five-years moving average of a dummy indicating whether or not a country was under an arrangement.<sup>15</sup> The extreme bounds analysis performed by Sturm et al. (2005) found robust evidence for such persistence in IMF programs.

*Further political variables:*

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<sup>13</sup> On the homepage of Menzie Chinn ([http://web.pdx.edu/~ito/Chinn-Ito\\_website.htm](http://web.pdx.edu/~ito/Chinn-Ito_website.htm)), an update version of the data set of Chinn and Ito (2006) is available.

<sup>14</sup> To cope with multicollinearity, for four groups of political variables, we only incorporate the first principal component or averages in the EBA. Hence, we implicitly cover 24 political variables in our analyzes.

<sup>15</sup> Some recent studies seek to empirically explain the duration and recidivism in IMF programs (see for instance Bird et al, 2004; Joyce, 2005 and Conway, 2007). This dimension has not been subject to an extreme bounds analysis yet. We leave this for future research.

- LAGEXELEC/LAGLEGELEC (lagged elections for the executive and legislative, respectively): Przeworski and Vreeland (2000) argue that governments are more likely to enter an arrangement right after an election, hoping that any potential negative connotation with the program will be forgotten by the time voters turn to the polls again, i.e., the next election.
- LEADEXELEC/LEADLEGELEC (lead in elections for the executive and legislative, respectively): While various safeguards against the misuse of IMF resources are routinely incorporated into IMF lending programs, Dreher and Vaubel (2004) suggest that the availability of IMF credit might indirectly help to finance electoral campaigns. They find that net credit supplied by the IMF is generally higher before elections.
- POLINSTAB (political instability): Political instability is measured by the first principal component of the number of political assassinations, revolutions, guerrilla problems, government crises and the instability within the government as measured by the percent of veto players who drop from the government in any given year.<sup>16</sup> On the one hand, the possibility of blaming the IMF for the necessary adjustment policies may be an incentive to resort to the Fund. On the other hand, the political costs to negotiate an IMF program might be higher in unstable countries.<sup>17</sup> The results from Sturm et al. (2005) suggest that government instability is negatively associated with signing an IMF arrangement.
- SOCUNREST (social unrest): Social unrest is measured by the first principal component of the number of demonstrations, strikes and riots – prior to the signing of an IMF arrangement. In general, the decision to involve the IMF crucially depends on governments' assessment of the political costs that may result from the adjustment policies.
- LIBERAL (Freedom House index): We use the average of the political rights index and the civil liberties index of Freedom House. Such a political rights index could be positively or negatively associated with the Fund's involvement. Autocratic regimes

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<sup>16</sup> Given the conceptual similarity and to circumvent multicollinearity problems we use principal components analysis here. This is a statistical technique used for data reduction. The leading eigenvectors from the eigen decomposition of the correlation matrix of the variables describe a series of uncorrelated linear combinations of the variables that contain most of the variance. The first principal component accounts for as much of the variability in the data as possible and is therefore taken to represent political instability.

<sup>17</sup> Dreher and Gassebner (2007) provide evidence that IMF and World Bank involvement increases the likelihood of a government crisis.

might be more inclined to turn to the IMF, since the perceived political costs are lower. But less democratic regimes also do not necessarily “need” the IMF as a scapegoat to pursue potential reforms.<sup>18</sup>

- GLOBPOL (political globalization as measured by the KOF Index of Globalization). Countries which are more integrated in the world politics might have better access to IMF credits.<sup>19</sup>
- ICRG (quality of government indicator as measured by the International Country Risk Guide): We employ the mean value of the ICRG variables “Corruption,” “Law and Order” and “Bureaucracy Quality” in our study, whereby higher values mean higher quality of government. Starting from the mid-1990s several international financial institutions started to act decisively against corruption. Hence, we expect lower quality of government to be negatively associated with IMF involvement.
- UNSC (temporary membership on the UN Security Council): Dreher et al. (2009) show that temporary membership on the UN Security Council increases the likelihood of these countries in receiving IMF support.
- RELSIZE (share in world GDP): This represents a rather crude proxy variable for the systematic or geopolitical importance of a country in the world economy. If size indeed matters for the IMF, then we would expect a positive sign on this coefficient.<sup>20</sup>
- TRADEUS (share of a country’s bilateral trade with the United States relative to the country’s GDP): This measure proxies for political and economic proximity to the United States. Since the United States are the only sovereign country that holds a veto power at the IMF, proximity to the U.S. might increase the likelihood of receiving IMF credit (see, e.g., Barro and Lee, 2005).<sup>21</sup>
- VOTEINLINEUSA (vote in line with the United States): This variable captures how often countries do vote in line with the United States in the United Nations General

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<sup>18</sup> We have also experimented with the index of executive competitiveness. This variable is, however, highly correlated with our democracy measure and therefore omitted from the analysis.

<sup>19</sup> See footnote 10.

<sup>20</sup> For a more sophisticated approach to geopolitical importance, see for instance Reynaud and Vauday (2009).

<sup>21</sup> Another potential variable that proxies for political interest is the bank exposure of the United States or the G5 in a given country as recorded by the Bank of International Settlements (see for instance Oatley and Yackee, 2004; Broz and Hawes, 2006; Copelovitch, 2010). The results from Breen (2010) indicate that the effects of bilateral trade and bank exposure on IMF program participation are very similar.

Assembly. Once more, this can be seen as a proxy variable for political proximity. We follow the definition of Thacker (1999) and code votes in agreement with the United States as 1, votes in disagreement as 0, and abstentions or absences as 0.5. These are subsequently averaged over a year.

One important pillar of our dataset consists of information about the timing and nature of IMF lending arrangements. From the IMF website, we gather information on a) the year in which an arrangement has been signed and b) the agreed amount of money to be lent by the IMF during the arrangement. Appendix C gives the summary statistics of all variables employed.

### 3. Modeling approach

To examine the sensitivity of the individual variables on signing an IMF arrangement and its financial size, we apply (variants of) extreme bounds analysis, as suggested by Leamer (1983) and Levine and Renelt (1992). This approach has been widely used in the economic growth literature. The central difficulty in this research – which also applies to the research topic of the present paper – is that several different models may all seem reasonable given the data but yield different conclusions about the parameters of interest. Equations of the following general form are estimated:

$$(1) \quad Y = \alpha M + \beta F + \gamma Z + u,$$

where  $Y$  is the dependent variable;  $M$  is a vector of ‘standard’ explanatory variables;  $F$  is the variable of interest;  $Z$  is a vector of up to three possible additional explanatory variables, which the literature suggests may be related to the dependent variable; and  $u$  is an error term. The extreme bounds test for variable  $F$  states that if the lower extreme bound for  $\beta$  – the lowest value for  $\beta$  minus two standard deviations – is negative, and the upper extreme bound for  $\beta$  – the highest value for  $\beta$  plus two standard deviations – is positive, the variable  $F$  is not robustly related to  $Y$ .

As argued by Temple (2000), it is rare in empirical research that we can say with certainty that one model dominates all other possibilities in all dimensions. In these circumstances, it makes sense to provide information about how sensitive the findings are to alternative modeling choices. Extreme bounds analysis (EBA) provides a relatively simple means of doing exactly this. Still, the approach has been criticized in the literature. Sala-i-Martin (1997) argues that the test applied poses too rigid a threshold in most cases. Assuming that the distribution of  $\beta$  has at least some positive and some negative support, the estimated

coefficient changes signs if enough different specifications are considered. We therefore report not just the extreme bounds, but also the percentage of the regressions in which the coefficient of the variable  $F$  is significantly different from zero at the 10 percent level. Moreover, instead of analyzing just the extreme bounds of the estimates of the coefficient of a particular variable, we follow Sala-i-Martin's (1997) suggestion to analyze the entire distribution. Following this suggestion, we not only report the unweighted parameter estimate of  $\beta$  and its standard deviation, but also the unweighted cumulative distribution function (CDF(0)), that is, the fraction of the cumulative distribution function lying on one side of zero.<sup>22</sup>

#### 4. Results

The main results of the extreme bounds analysis are summarized in Table 1 to Table 5. As discussed earlier, our choice of the economic and political “core variables” that enter the  $M$ -vector is driven by the recent related empirical literature. Given these core variables, our dataset includes annual data for 165 member countries over the period 1990 to 2009. Our empirical results are structured along two main lines: First, we distinguish between two different dependent variables. On the one hand, we look for robust determinants of signing of an IMF arrangement by estimating pooled logit models (for comparability with many studies) and alternatively conditional fixed effects logit models. On the other hand, we analyze the robust determinants of IMF loan size. Following important contributions in this strand of literature, we use a Tobit estimator. Second, we investigate, whether the determinants of non-concessional and concessional IMF loans are the same. Non-concessional loans are Standby Arrangements (SBAs), Extended Fund Facilities (EFFs) and Flexible Credit Lines (FCLs) and concessional loans consist of the Extended Credit Facility (ECF – formerly PRGF, poverty reduction and growth facility), the Exogenous Shock Facility (ESF) and the Structural

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<sup>22</sup> Sala-i-Martin (1997) proposes using the (integrated) likelihood to construct a weighted CDF(0). However, the varying number of observations in the regressions due to missing observations in some of the variables poses a problem. Sturm and de Haan (2001) show that this goodness of fit measure may not be a good indicator of the probability that a model is the true model, and the weights constructed in this way are not equivariant to linear transformations in the dependent variable. Hence, changing scales result in rather different outcomes and conclusions. We thus restrict our attention to the unweighted version. Furthermore, for technical reasons – in particular our unbalanced panel setup – we are unable to use extensions of this approach, like Bayesian Averaging of Classical Estimates (BACE), as introduced by Sala-i-Martin et al. (2004), or Bayesian Modeling Averaging (BMA).

Adjustment Facility (SAF). All our models include time-fixed effects and standard errors are clustered at the country-level.<sup>23</sup>

#### 4.1. The determinants of signing an IMF arrangement

Our first dependent variable concerns the signing of an IMF arrangement. We define a binary variable equal to one, if a country signs a new IMF arrangement in a given year and zero otherwise.

[Insert Table 1 about here]

Table 1 provides the results of an extreme bounds analysis for two different regression models. The results for the pooled logit model are reported on the left hand side and the results for the conditional (country fixed effects) logit model on the right hand side of this table.<sup>24</sup> The first and second column in each block of results refers to the average beta coefficient (*Avg. Beta*) and the average standard error (*Avg. Std. Err.*), respectively. Then, the third column reports the percentage of the regressions in which the coefficient on the variable of interest differs significantly from zero at a 5 percent level (*% Sign.*). Our main attention is on column four that shows the unweighted cumulative distribution function (*CDF(0)*). If an explanatory variable has a *CDF(0)* of at least 0.95, we regard this variable as a robust determinant of IMF involvement. Furthermore, columns five and six report the lower and upper bounds for the coefficients. Finally, columns seven and eight document the number of regressions (*Comb.*) run for testing each variable and the average number of observations for each regression (*Avg. Obs.*).

The EBA for the conditional (country fixed effects) logit model shows that three out of the four variables of the *M*-vector prove to be robust in the sense that their *CDF(0)* is at least 0.95. To be more precise, lower import coverage and lower real economic growth rates are associated with a higher likelihood of signing an IMF arrangement. Furthermore, past IMF involvement conditional on having had any IMF arrangement during the sample period reduces the probability of an IMF deal. This is an interesting result, since it constitutes one of

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<sup>23</sup> The only exception is the conditional fixed effects logit model for which do not report clustered standard errors. Note that the time-fixed effects control for variables like the LIBOR (London Interbank Offered Rate) or the number of countries that are under an IMF program in a given year.

<sup>24</sup> Note that the conditional fixed effects logit estimator as proposed by Chamberlain (1980) is a conditional maximum likelihood estimator based on a log density for country *i* that conditions on the total number of signed IMF programs equal to 1 for a given country *i* over time. Since it is not possible to condition on those countries that either never signed an IMF program or those that signed one in every single year, these observations are lost. The sum of outcomes varies between 0 and 8 in our sample, whereby 63 countries never signed an IMF program during the sample period.



the main differences between the pooled logit and the conditional fixed effects logit. In fact, the EBA for the pooled logit finds past IMF involvement to be robustly and positively associated with signing a new IMF arrangement. Hence, if we do not condition on the fact that a country has signed at least one IMF program during the sample period – which is highly correlated with past IMF involvement<sup>25</sup> – we observe the persistence in this latter variable. However, once we condition on the number of IMF arrangements, the results show that having recently signed an arrangement reduces signing one this year. Other than that, many of the results are pretty similar. For both types of logit models we find that currency crises, lagged elections for the executive and legislature and more autocratic countries are more likely to turn to the IMF and sign a new deal. Beyond these considerable similarities, we additionally find that a higher debt servicing burden and increased political globalization increases the probability of an IMF program for the pooled logit model.

There are five important takeaways from this first table: First, the EBA shows that a number of economic and political variables turn out to be robust in explaining IMF involvement. Second, if we compare the baseline results from this EBA with the results from Sturm et al. (2005), we see that the investment rate and government instability no longer robustly explain IMF involvement. Third, there are a number of new variables that we test for in this EBA that were not considered in Sturm et al. (2005) and that either were used in other studies or are expected to reflect the structural breaks in the international financial architecture and the role of the IMF in the 1990s. Thereby, the economic variable that measures currency crises is the only new robust explanatory variable. As expected, in times of financial turmoil countries tend to turn to the IMF more often (and the IMF is more inclined to provide assistance). To foreshadow some of the further results, currency crises indeed prove to be one of the most robust explanatory variables for IMF involvement after 1989. Fourth, lagged executive and legislative elections prove to be one of the most robust political variables that are positively associated with signing a new IMF arrangement. Finally, another very robust political variable for the pooled IMF programs indicates that more autocratic countries are more inclined to sign an IMF arrangement.

Next, we investigate, whether the determinants of signing an IMF program depend on the type of facility, distinguishing between non-concessional and concessional loans. Table 2 reports the EBA results separately for these two groups, estimated with country fixed effects.

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<sup>25</sup> An alternative measure for past IMF participation is a dummy variable that takes the value of one if a country has been under an IMF arrangement in the past and zero otherwise.

[Insert Table 2 about here]

We opt for this estimator, since the results are reasonably similar in Table 1 and one of the strengths of this estimator is to control for unobserved time-invariant country characteristics that might be correlated with the decision to sign a new IMF program. Turning to the determinants of non-concessional loans first, we find that many of the robust explanatory variables for the overall sample are relevant here as well. Signing a non-concessional loan is robustly and negatively associated with past IMF participation, real economic growth rates and becomes more likely for more autocratic countries and in the year after legislative election. Furthermore, chances of a new IMF deal clearly increase with the occurrence of a currency crisis. This pattern seems to characterize a number of emerging market crises in the 1990s: When a strong depreciation or devaluation of the exchange rate occurs – for instance forced by speculative attacks – the affected country turns to the IMF for assistance.

In contrast to the non-concessional loans, we find relatively few variables that can robustly explain the signing of concessional IMF loans. But one economic and one political core variable turn out to be robustly and negatively associated with IMF involvement, namely past IMF programs and the ratio of international reserves to imports. Beyond that, only one further variable can robustly explain concessional IMF facilities: a legislative election in the year prior to the concessional IMF loan. To sum up, while our EBA results detect a few robust explanatory variables for non-concessional loans, the usual suspects for IMF involvement are only of limited help in explaining the signing of concessional loans.

Before turning to our second dependent variable it is worth examining the most robust explanatory variables jointly in a “normal” regression setting. We can give two different interpretations to this exercise. While the EBA tests for a large number of different combinations of variables, here we only report a limited number of combinations. In this sense, we demand less from the incorporated variables. But since we include up to 10 variables as compared to five to seven variables in our extreme bounds analyzes, these regressions are in a sense also more demanding to the variables. In Table 3, we report on the left hand side the four core variables of our M-vector and on the right hand side extended models that include those further economic and political variables that showed to be robust explanatory variables in the extreme bounds analyzes.

[Insert Table 3 about here]

The first column in Table 3 shows the pooled logit results for the M-vector. Three out of four variables are significant and all have the expected signs, which is in line with many other

studies surveyed in the Appendix A. Columns (2) to (4) use the conditional fixed effects logit estimator for the overall sample, non-concessional loans and concessional loans, yielding similar results for the core economic and political variables.<sup>26</sup> In columns (5) to (8) we augment the baseline regressions with those variables that turned out to be robust in the EBA. If robust in the EBA then most of these additional variables prove to be significant in this specific combination of variables as well. The only exception is lagged executive elections. Finally, the lagged GDP per capita variable proves to be the least robust variable in these specifications.

*4.2. The determinants of IMF agreed upon loan size*

Our second dependent variable is defined as the amount of IMF credit a country and the IMF agree upon in the year a new IMF arrangement is signed. This IMF loan size variable is scaled by a country’s IMF quota and takes the value of zero, if no new arrangement is signed.<sup>27</sup> We start by investigating the determinants of IMF loan size for all IMF programs in Table 4.

[Insert Table 4 about here]

Two out of the four core variables are robust determinants of IMF loan size according to the extreme bounds analysis. Past IMF involvement is positively associated with the amount of the IMF facility and negative real economic growth tends to increase the loan size. Furthermore, a country’s indebtedness as measured by its debt servicing capacity (the debt servicing ratio) and currency crises also increase the IMF loan size. Turning to the political variables, IMF facilities tend to be higher in the year after an election (executive and legislative), but not in the year before an election. This could be seen as evidence that the Fund is more hesitant to provide lending before elections in order to not fuel potential political business cycles or incumbent governments simply fear the political costs of an IMF involvement shortly before an election. Finally, there are further robust political variables: countries that are more politically integrated (KOF political globalization index) and those countries with a more stable government (political instability) are positively linked to IMF loan size. To conclude, many of the robust explanatory variables for signing a new IMF program (pooled logit) are also robust determinants for the IMF program size (pooled Tobit),

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<sup>26</sup> Note that the observations on non-concessional (3) and concessional loans (4) for the conditional fixed effects logit estimator do not add up to the overall number of observations (2), because some countries receive a non-concessional and a concessional loan during our sample period.

<sup>27</sup> South Korea and Turkey have signed the biggest IMF arrangements in our sample period.

even though the political dimension apparently plays a bigger role, when it comes down to the size of the IMF program.

In the next step, we are once more interested whether the economic and political determinants are different depending on the type of IMF facility. Table 5 allows for a comparison between the EBA for non-concessional loans (on the left side) and concessional loans (on the right side).

[Insert Table 5 about here]

The examination of the four core variables already documents two interesting differences. While past IMF involvement tends to lead to higher IMF facilities for non-concessional loans, this coefficient for concessional loans is negative. Such differences can be also found, when we look at the impact of GDP per capita on IMF loan size. There is robust evidence that poorer countries sign IMF deals for concessional loans that guarantee more financial assistance, but richer countries are more inclined to sign a new non-concessional loan. The last result highlights an important difference in the outcome between non-concessional and concessional loans. Finally, real economic growth is negatively associated with IMF loan size for non-concessional loans and low international reserves are a robust explanatory variable for concessional loan size.

The differences between these two facilities are also reflected in the other economic variables. While non-concessional loan size can be robustly explained after the Cold War by debt-servicing and the occurrence of currency crises, concessional loans are well explained by a low ratio of short-term debt to GDP. The last result can be explained by the fact that poorer countries tend to have only limited access to international capital markets. Hence, if such a country faces severe re-financing problems, one might expect for these countries that international loans are withdrawn altogether rather than the maturity of loans is decreased.

Turning to the results for political variables, concessional loans can be robustly and negatively associated with the geopolitical importance as proxied by a country's relative economic size and lagged legislative elections. The latter variable is also the only robust political factor in explaining non-concessional loan size. Furthermore, these IMF facilities tend to be larger after an executive election, with rising political instability and social unrest, with lower government quality and with a higher score in the KOF index of political globalization. All in all, our results from the EBAs based on Tobit regressions corroborate our earlier finding that only one "new" variable as compared to the study of Sturm et al. (2005) turns out to be a very robust explanatory variable for the IMF loan size: currency crises.

We conclude our analysis by having a look at some “classical” regression results. Table 6 displays the pooled Tobit results for the base model (on the left side) and the extended model (on the right side) that additionally includes some further robust explanatory variables from the EBAs.

[Insert Table 6 about here]

In the base model, all four core variables are significant explanatory variables for IMF loan size. The distinction between non-concessional and concessional loans in column (2) and column (3) is again important and the same coefficients are relevant in both the pooled Tobit and in the EBA. With respect to the augmented Tobit regressions that include nine independent variables, it is worth mentioning that once more the partial effect of the lagged election of the legislature apparently dominates the lagged election of the executive, when both variables are tested for in the same specification.

In future studies of IMF participation, researchers should be guided, of course, by the specific theory being tested when they choose what control variables to include. But our study suggests that there are certain variables that are too important to be ignored as potential determinants. Table 7 provides a summary of the most robust determinants of IMF lending activities.

[Insert 7 about here]

## 5. Concluding comments

The public and academic debate about the activity of the International Monetary Fund has once more regained momentum during the late 1990s and the beginning of the new century. A wide range of political and economic variables have been proposed in a number of empirical studies. The goal of our paper is a modest and an important one at the same time. This paper empirically investigates the *robust* economic and political factors that affect a country’s likelihood to sign an arrangement with the IMF and the determinants of the financial size of such a program. By robust we mean that economic and political variables should have a significant partial effect (largely) independent of additional control variables chosen. The extreme bounds analysis (EBA) exactly fulfills this requirement. Hence, we update and extend the work of Sturm et al. (2005) by employing a panel model for 165 countries that focuses on the post-Cold War era, i.e., 1990–2009. Important structural changes at the beginning of the 1990s that affected the global financial architecture and the role of the IMF

alike called for a thorough examination of robust political and economic determinants of IMF involvement.

Our results, based on extreme bounds analysis, suggest that some of the most important economic and political explanatory variables of IMF program participation are past IMF involvement, lagged legislative and executive elections and – to a smaller extent – a proxy for how autocratic a country is (on the political side) and the level of international reserves, real economic growth rates and currency crises (on the economic side).

This study contributes to the literature in three ways: First, the determinants of the signing of IMF arrangements and the size of such loans are examined and largely comparable (when we compare the results from the pooled logit and Tobit results), even though political factors tend to matter more for the size of the loan than for its signature. Second, we document that the pooling of non-concessional and concessional loans can be problematic, since the determinants vary substantially by facility type. These differences in results are best exemplified by GDP per capita. Perhaps related to the Heavily Indebted Poor Countries (HIPC) initiative and the wave of severe currency crises in the second half of the 1990s, this variable in some specifications even significantly changes signs. Third, we offer a summary of the most robust political and economic determinants of IMF participation by loan facility (Table 7). We hope that this list of variables serves as a useful guide for choosing control variables in future studies.

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## **Tables**

**Table 1: Economic and political determinants of signing of IMF programs (EBA - logit and conditional fixed effects logit)**

| Variable                                   | Avg.    | Avg.    | %Sign. | CDF(0) | Lower | Upper | Avg. | Avg.   | %Sign.  | CDF(0) | Lower  | Upper | Avg.   |       |       |      |
|--|---------|---------|--------|--------|-------|-------|------|--|---------|--------|--------|-------|--------|-------|-------|------|
|  | Beta    | Std.Err |        |        | Bound | Bound |      |  |         |        | Bound  | Bound |        | Bound | Bound |      |
| <b>Logit - Base model</b>                  |         |         |        |        |       |       |      | <b>Conditional Fixed Effects Logit - Base model</b>                  |         |        |        |       |        |       |       |      |
| underimf5ma                                | 1.8004  | 0.4147  | 97.5%  | 1.00   | -0.64 | 4.71  | 2625 | 1797   | -2.3860 | 0.5587 | 100.0% | 1.00  | -6.55  | -0.58 | 2569  | 1191 |
| resimpl                                    | -0.0515 | 0.0397  | 25.3%  | 0.88   | -0.22 | 0.14  | 2625 | 1797   | -0.1312 | 0.0670 | 73.3%  | 0.96  | -0.44  | 0.43  | 2569  | 1191 |
| grgdp1                                     | -0.0575 | 0.0176  | 99.3%  | 1.00   | -0.17 | 0.02  | 2625 | 1797   | -0.0389 | 0.0182 | 78.8%  | 0.96  | -0.19  | 0.04  | 2569  | 1191 |
| lgdppc1                                    | -0.2067 | 0.0735  | 68.0%  | 0.83   | -0.77 | 0.42  | 2625 | 1797   | -0.8383 | 0.9206 | 17.7%  | 0.82  | -7.08  | 6.67  | 2569  | 1191 |
| <b>Logit – Further economic variables</b>  |         |         |        |        |       |       |      | <b>Conditional Fixed Effects Logit – Further economic variables</b>  |         |        |        |       |        |       |       |      |
| invgdp1                                    | 0.0025  | 0.0107  | 0.6%   | 0.61   | -0.10 | 0.05  | 2324 | 1721   | 0.0135  | 0.0203 | 3.1%   | 0.73  | -0.15  | 0.19  | 2197  | 1128 |
| debtserverp1                               | 0.0092  | 0.0050  | 62.6%  | 0.95   | -0.02 | 0.04  | 2324 | 1374   | 0.0010  | 0.0079 | 0.0%   | 0.55  | -0.03  | 0.06  | 2245  | 1120 |
| xdebtgn1                                   | 0.0010  | 0.0006  | 64.8%  | 0.93   | 0.00  | 0.01  | 2324 | 1372   | 0.0001  | 0.0015 | 0.0%   | 0.52  | -0.02  | 0.01  | 2281  | 1122 |
| xbalgrp1                                   | -0.0070 | 0.0048  | 39.8%  | 0.88   | -0.05 | 0.02  | 2324 | 1759   | -0.0020 | 0.0142 | 0.5%   | 0.52  | -0.19  | 0.07  | 2277  | 1168 |
| globec1                                    | -0.0057 | 0.0071  | 3.4%   | 0.77   | -0.04 | 0.03  | 2324 | 1594   | 0.0118  | 0.0203 | 2.3%   | 0.72  | -0.17  | 0.11  | 2324  | 1091 |
| totadjgdp1                                 | -0.0082 | 0.0101  | 8.5%   | 0.71   | -0.10 | 0.05  | 2324 | 1571   | -0.0318 | 0.0219 | 46.8%  | 0.83  | -0.29  | 0.08  | 2289  | 1070 |
| infl1sc                                    | 0.0099  | 0.0053  | 60.8%  | 0.93   | -0.02 | 0.03  | 2324 | 1685   | -0.0112 | 0.0074 | 29.3%  | 0.91  | -0.06  | 0.01  | 2270  | 1112 |
| defgdp1                                    | 0.0106  | 0.0267  | 1.2%   | 0.63   | -0.09 | 0.17  | 2324 | 849  | 0.0021  | 0.0441 | 0.0%   | 0.50  | -0.20  | 0.26  | 2308  | 473  |
| stdebtdeb1                                 | -0.0040 | 0.0079  | 0.2%   | 0.68   | -0.03 | 0.03  | 2324 | 1375   | -0.0192 | 0.0128 | 42.6%  | 0.92  | -0.11  | 0.04  | 2275  | 1124 |
| peg  | -0.0206 | 0.1753  | 1.4%   | 0.52   | -1.51 | 0.79  | 2324 | 1620   | 0.2547  | 0.3832 | 0.0%   | 0.75  | -1.61  | 1.93  | 2324  | 1076 |
| curcris                                    | 0.9885  | 0.2690  | 100.0% | 1.00   | -0.11 | 2.74  | 2324 | 1760   | 0.7829  | 0.2863 | 99.9%  | 0.99  | -0.19  | 3.31  | 2285  | 1158 |
| finopen                                    | 0.0472  | 0.0644  | 14.4%  | 0.71   | -0.19 | 0.47  | 2324 | 1687   | -0.1145 | 0.1175 | 9.5%   | 0.83  | -0.69  | 0.59  | 2324  | 1106 |
| <b>Logit – Further political variables</b> |         |         |        |        |       |       |      | <b>Conditional Fixed Effects Logit – Further political variables</b> |         |        |        |       |        |       |       |      |
| leadexelec                                 | 0.1236  | 0.2243  | 1.2%   | 0.70   | -1.05 | 0.92  | 2324 | 1744   | -0.0901 | 0.2312 | 0.0%   | 0.63  | -1.88  | 0.99  | 2279  | 1164 |
| lagexelec                                  | 0.6813  | 0.2307  | 94.6%  | 0.99   | -0.35 | 1.63  | 2324 | 1743   | 0.4617  | 0.2153 | 85.2%  | 0.95  | -0.59  | 1.82  | 2278  | 1166 |
| leadlegelec                                | 0.0078  | 0.1913  | 0.0%   | 0.52   | -0.89 | 1.06  | 2324 | 1744   | -0.0998 | 0.1949 | 0.0%   | 0.69  | -0.85  | 1.48  | 2279  | 1164 |
| laglegelec                                 | 0.7665  | 0.1888  | 99.3%  | 1.00   | -0.27 | 1.48  | 2324 | 1743   | 0.6584  | 0.1799 | 96.3%  | 0.99  | -0.78  | 1.27  | 2269  | 1166 |
| polinstab                                  | 0.0569  | 0.0585  | 13.4%  | 0.79   | -0.21 | 0.35  | 2324 | 1117   | 0.0561  | 0.0860 | 0.0%   | 0.73  | -0.30  | 0.45  | 2324  | 726  |
| socunrest1                                 | 0.0849  | 0.0622  | 25.3%  | 0.90   | -0.15 | 0.30  | 2324 | 1406   | 0.0872  | 0.0682 | 12.9%  | 0.89  | -0.16  | 0.30  | 2324  | 908  |
| liberal                                    | -0.1095 | 0.0564  | 73.2%  | 0.96   | -0.52 | 0.11  | 2324 | 1766   | -0.3294 | 0.1323 | 97.3%  | 0.99  | -1.18  | 0.23  | 2271  | 1170 |
| globpol                                    | 0.0100  | 0.0048  | 70.6%  | 0.95   | -0.02 | 0.03  | 2324 | 1666   | 0.0215  | 0.0142 | 58.4%  | 0.91  | -0.11  | 0.09  | 2324  | 1104 |
| icrg                                       | -1.7156 | 0.6874  | 67.4%  | 0.89   | -6.34 | 1.76  | 2324 | 1464   | 0.7178  | 1.2227 | 0.0%   | 0.72  | -5.06  | 6.90  | 2299  | 992  |
| unsc                                       | -0.1861 | 0.3095  | 5.4%   | 0.68   | -1.67 | 1.07  | 2324 | 1684   | -0.1799 | 0.3547 | 10.9%  | 0.64  | -1.86  | 1.46  | 2018  | 1108 |
| relsize1                                   | -0.1964 | 0.1805  | 40.7%  | 0.80   | -1.34 | 0.76  | 2324 | 1769   | 0.7251  | 0.9544 | 0.0%   | 0.76  | -2.51  | 5.44  | 2281  | 1176 |
| tradeus                                    | -0.5304 | 0.8701  | 12.9%  | 0.65   | -5.85 | 4.02  | 2324 | 1694   | 0.7924  | 1.9440 | 1.8%   | 0.62  | -8.69  | 32.59 | 2237  | 1141 |
| voteinlineusa                              | 1.4308  | 0.7672  | 38.1%  | 0.87   | -3.07 | 5.83  | 2324 | 1759   | 1.9551  | 1.8428 | 11.3%  | 0.80  | -10.81 | 18.16 | 2301  | 1174 |

Note: Extreme bound analysis (EBA) are based on (conditional fixed effects) logit regressions with time fixed effects. Standard errors for the logit regressions are clustered. No distinction is made between concessional and non-concessional loans.

**Table 2: Economic and political determinants of signing of IMF programs non-concessional/concessional IMF programs (EBA - conditional fixed effects logit)**

| <i>Variable</i>   | <i>Avg. Beta</i> | <i>Avg. Std.Err</i> | <i>%Sign.</i> | <i>CDF(0)</i> | <i>Lower Bound</i> | <i>Upper Bound</i> | <i>Comb.</i> | <i>Avg. Obs.</i>  | <i>Avg. Beta</i> | <i>Avg. Std.Err</i> | <i>%Sign.</i> | <i>CDF(0)</i> | <i>Lower Bound</i> | <i>Upper Bound</i> | <i>Comb.</i> | <i>Avg. Obs.</i> |
|---|------------------|---------------------|---------------|---------------|--------------------|--------------------|--------------|---|------------------|---------------------|---------------|---------------|--------------------|--------------------|--------------|------------------|
| <b>Non-concessional loans - Base model</b>                  |                  |                     |               |               |                    |                    |              | <b>Concessional loans - Base model</b>                  |                  |                     |               |               |                    |                    |              |                  |
| underimf5ma   | -1.2036          | 0.6518              | 59.7%         | 0.95          | -5.94              | 0.89               | 2460         | 805   | -5.6327          | 1.2444              | 100.0%        | 1.00          | -24.39             | 2.56               | 2622         | 615              |
| resimpl   | -0.1229          | 0.0870              | 48.9%         | 0.89          | -0.45              | 0.57               | 2460         | 805   | -0.2514          | 0.1314              | 69.9%         | 0.95          | -3.57              | 0.81               | 2622         | 615              |
| grgdp1  | -0.0615          | 0.0246              | 90.1%         | 0.98          | -0.22              | 0.06               | 2460         | 805   | -0.0258          | 0.0298              | 8.1%          | 0.74          | -0.47              | 0.27               | 2622         | 615              |
| lgdppc1   | 0.0827           | 1.3030              | 0.0%          | 0.51          | -8.01              | 8.72               | 2460         | 805   | -0.8929          | 1.5359              | 0.2%          | 0.74          | -26.46             | 31.18              | 2622         | 615              |
| <b>Non-concessional loans – Further economic variables</b>  |                  |                     |               |               |                    |                    |              | <b>Concessional loans – Further economic variables</b>  |                  |                     |               |               |                    |                    |              |                  |
| invgdp1   | -0.0222          | 0.0329              | 9.1%          | 0.75          | -0.21              | 0.28               | 2186         | 765   | 0.0192           | 0.0284              | 9.0%          | 0.76          | -0.39              | 0.49               | 2324         | 595              |
| debtservepl   | 0.0082           | 0.0104              | 0.0%          | 0.79          | -0.05              | 0.06               | 2186         | 747   | 0.0116           | 0.0146              | 3.6%          | 0.68          | -0.08              | 0.81               | 2323         | 603              |
| xdebtgnl  | 0.0031           | 0.0035              | 0.0%          | 0.81          | -0.02              | 0.02               | 2186         | 746   | -0.0003          | 0.0022              | 0.5%          | 0.57          | -0.06              | 0.09               | 2324         | 603              |
| xbalgcdp1   | -0.0206          | 0.0207              | 11.3%         | 0.80          | -0.34              | 0.07               | 2187         | 791   | 0.0132           | 0.0215              | 1.9%          | 0.67          | -0.19              | 0.73               | 2324         | 603              |
| globec1   | 0.0140           | 0.0265              | 0.0%          | 0.70          | -0.25              | 0.16               | 2324         | 756   | 0.0331           | 0.0366              | 7.0%          | 0.82          | -0.56              | 0.70               | 2324         | 538              |
| totadjgdp1  | -0.0514          | 0.0349              | 34.7%         | 0.92          | -0.31              | 0.11               | 2187         | 735   | -0.0315          | 0.0317              | 4.1%          | 0.71          | -2.79              | 0.48               | 2324         | 532              |
| infl1sc   | -0.0153          | 0.0087              | 53.0%         | 0.94          | -0.06              | 0.02               | 2180         | 759   | -0.0057          | 0.0192              | 0.0%          | 0.69          | -0.22              | 0.93               | 2320         | 555              |
| defgdp1   | 0.0491           | 0.0524              | 3.2%          | 0.81          | -0.25              | 0.28               | 2300         | 367   | -0.0384          | 0.0834              | 0.0%          | 0.75          | -0.99              | 1.68               | 2315         | 177              |
| stdebtxdebt1  | -0.0099          | 0.0149              | 0.7%          | 0.73          | -0.10              | 0.05               | 2186         | 747   | -0.0510          | 0.0378              | 18.5%         | 0.87          | -0.77              | 0.22               | 2324         | 604              |
| peg   | 0.7798           | 0.4391              | 76.2%         | 0.94          | -2.E+00            | 3.E+00             | 2324         | 736   | -3.0020          | 700.02              | 32.5%         | 0.87          | -2.E+06            | 2.E+06             | 2300         | 537              |
| curcris   | 1.4232           | 0.3725              | 100.0%        | 1.00          | 0.11               | 4.02               | 2186         | 779   | -0.3899          | 0.5704              | 0.0%          | 0.73          | -5.26              | 5.13               | 2324         | 605              |
| finopen   | -0.0525          | 0.1493              | 0.6%          | 0.63          | -0.90              | 0.79               | 2324         | 728   | -0.1801          | 0.2267              | 0.4%          | 0.76          | -5.87              | 1.61               | 2324         | 581              |
| <b>Non-concessional loans – Further political variables</b> |                  |                     |               |               |                    |                    |              | <b>Concessional loans – Further political variables</b> |                  |                     |               |               |                    |                    |              |                  |
| leadexelec  | -0.1271          | 0.3091              | 0.2%          | 0.63          | -1.95              | 0.98               | 2187         | 785   | -0.0350          | 0.3672              | 0.0%          | 0.54          | -6.00              | 3.76               | 2324         | 600              |
| lagexelec   | 0.4627           | 0.2869              | 55.8%         | 0.93          | -1.00              | 1.78               | 2179         | 787   | 0.4395           | 0.3577              | 26.1%         | 0.85          | -1.52              | 13.31              | 2319         | 600              |
| leadlegelec   | -0.0573          | 0.2510              | 0.0%          | 0.59          | -1.08              | 1.46               | 2186         | 786   | -0.0985          | 0.3256              | 0.0%          | 0.64          | -1.93              | 6.21               | 2324         | 600              |
| laglegelec  | 0.4854           | 0.2309              | 87.6%         | 0.97          | -0.53              | 1.53               | 2179         | 787   | 0.8172           | 0.2990              | 88.6%         | 0.97          | -3.72              | 4.49               | 2322         | 600              |
| polinstab   | 0.0773           | 0.0929              | 0.0%          | 0.79          | -0.32              | 0.49               | 2324         | 481   | -0.2094          | 0.3602              | 0.0%          | 0.72          | -11.92             | 3.15               | 2323         | 372              |
| socunrest1  | 0.0779           | 0.0809              | 1.8%          | 0.82          | -0.22              | 0.32               | 2324         | 618   | 0.0759           | 0.1438              | 0.0%          | 0.71          | -0.89              | 1.26               | 2323         | 447              |
| liberal   | -0.5018          | 0.1921              | 97.9%         | 0.99          | -1.72              | 0.28               | 2186         | 793   | -0.0254          | 0.2084              | 0.0%          | 0.59          | -3.59              | 1.51               | 2324         | 605              |
| globpol   | 0.0046           | 0.0181              | 0.0%          | 0.61          | -0.12              | 0.08               | 2324         | 746   | 0.0278           | 0.0261              | 4.4%          | 0.82          | -0.42              | 0.95               | 2324         | 572              |
| icrg  | 0.7876           | 1.4917              | 0.0%          | 0.69          | -5.50              | 7.55               | 2186         | 691   | 0.3465           | 2.6855              | 0.0%          | 0.53          | -41.12             | 62.78              | 2324         | 460              |
| unsc  | -0.0828          | 0.4196              | 0.0%          | 0.56          | -1.68              | 1.66               | 1481         | 696   | -0.6620          | 0.7421              | 0.2%          | 0.79          | -9.77              | 3.80               | 2324         | 596              |
| relsize1  | 1.3256           | 1.0147              | 17.9%         | 0.89          | -2.24              | 6.38               | 2180         | 794   | -8.4482          | 26.629              | 0.1%          | 0.63          | -205.00            | 333.91             | 2320         | 606              |
| tradeus   | 2.3416           | 2.4976              | 8.4%          | 0.75          | -7.5               | 35.30              | 2177         | 775   | -6.2087          | 5.2514              | 10.2%         | 0.57          | -1'033.2           | 200.76             | 2324         | 578              |
| voteinlineusa   | 1.9550           | 2.7406              | 11.8%         | 0.68          | -15.77             | 21.28              | 2187         | 792   | 0.9388           | 2.6998              | 0.0%          | 0.59          | -57.02             | 58.74              | 2324         | 605              |

Note: Extreme bound analysis (EBA) are based on (conditional fixed effects) logit regressions with time fixed effects. Standard errors for the logit regressions are clustered. Concessional and non-concessional loans are estimated separately.

**Table 3: Economic and political determinants of signing of IMF programs (logit and conditional fixed effects logit)**

| Variable     | Panel A: Base model    |                        |                        |                        | Panel B: Extended model |                        |                       |                        |
|--------------|------------------------|------------------------|------------------------|------------------------|-------------------------|------------------------|-----------------------|------------------------|
|              | Logit                  | Logit (fe)             | Logit (fe)             | Logit (fe)             | Logit                   | Logit (fe)             | Logit (fe)            | Logit (fe)             |
|              | all programs           | all programs           | non-concess.           | concessional           | all programs            | all programs           | non-concess.          | concessional           |
|              | (1)                    | (2)                    | (3)                    | (4)                    | (5)                     | (6)                    | (7)                   | (8)                    |
| underimf5ma  | 2.1717***<br>(0.3762)  | -1.9719***<br>(0.4468) | -0.7226<br>(0.5231)    | -4.8511***<br>(0.9179) | 0.9337*<br>(0.3790)     | -2.0679***<br>(0.4696) | -0.9054<br>(0.5638)   | -4.9584***<br>(0.9496) |
| resimpl      | -0.0558<br>(0.0344)    | -0.1602**<br>(0.0524)  | -0.1876**<br>(0.0707)  | -0.1665*<br>(0.0845)   | -0.0901*<br>(0.0375)    | -0.1295*<br>(0.0546)   | -0.1075<br>(0.0755)   | -0.1660<br>(0.0870)    |
| grgdp1       | -0.0539***<br>(0.0155) | -0.0318*<br>(0.0138)   | -0.0657***<br>(0.0193) | -0.0041<br>(0.0194)    | -0.0414*<br>(0.0162)    | -0.0173<br>(0.0147)    | -0.0522*<br>(0.0216)  | 0.0019<br>(0.0213)     |
| lgdppc1      | -0.3346***<br>(0.0527) | -0.9209<br>(0.6110)    | 0.6945<br>(0.8794)     | -1.1778<br>(0.8919)    | -0.1002<br>(0.0763)     | -1.2120<br>(0.6590)    | 0.1553<br>(1.0256)    | -1.2484<br>(0.9050)    |
| curcris      |                        |                        |                        |                        | 0.7653***<br>(0.2227)   | 0.6161*<br>(0.2448)    | 1.2746***<br>(0.3173) | -0.4723<br>(0.4419)    |
| lagexelec    |                        |                        |                        |                        | 0.1720<br>(0.2200)      | 0.0351<br>(0.2092)     | 0.1019<br>(0.2912)    | -0.1894<br>(0.3178)    |
| laglegelec   |                        |                        |                        |                        | 0.6212***<br>(0.1791)   | 0.6056***<br>(0.1711)  | 0.3792<br>(0.2282)    | 0.9529***<br>(0.2616)  |
| liberal      |                        |                        |                        |                        | -0.1107*<br>(0.0499)    | -0.2474*<br>(0.1066)   | -0.3932*<br>(0.1632)  | -0.0119<br>(0.1536)    |
| debtservexp1 |                        |                        |                        |                        | 0.0062*<br>(0.0038)     |                        |                       |                        |
| globpol      |                        |                        |                        |                        | 0.0105*<br>(0.0046)     |                        |                       |                        |
| No. of obs.  | 2753                   | 1683                   | 1162                   | 877                    | 1608                    | 1359                   | 914                   | 700                    |
| Pseudo R2    | 0.11                   | 0.08                   | 0.12                   | 0.10                   | 0.08                    | 0.10                   | 0.15                  | 0.13                   |

Notes: \*\*\*, \*\*, \* represents a significant coefficient at the 1, 5 and 10 percent level, respectively.

**Table 4: Economic and political determinants of IMF programs' size (EBA - Tobit)**

| <i>Variable</i>                    | <i>Avg. Beta</i> | <i>Avg. Std.Err</i> | <i>%Sign.</i> | <i>CDF(0)</i> | <i>Lower Bound</i> | <i>Upper Bound</i> | <i>Comb.</i> | <i>Avg. Obs.</i> |
|------------------------------------|------------------|---------------------|---------------|---------------|--------------------|--------------------|--------------|------------------|
| <b>Base model</b>                  |                  |                     |               |               |                    |                    |              |                  |
| underimf5ma                        | 312.896          | 97.5134             | 95.7%         | 0.99          | -135.90            | 942.10             | 2625         | 1798             |
| resimpl                            | -6.9080          | 6.1944              | 21.0%         | 0.84          | -36.75             | 22.68              | 2625         | 1798             |
| grgdp1                             | -9.4807          | 3.2663              | 99.4%         | 1.00          | -32.45             | 6.19               | 2625         | 1798             |
| lgdppc1                            | -26.1043         | 14.3114             | 63.8%         | 0.74          | -188.20            | 92.12              | 2625         | 1798             |
| <b>Further economic variables</b>  |                  |                     |               |               |                    |                    |              |                  |
| invgdp1                            | 0.9188           | 2.0060              | 0.9%          | 0.64          | -14.23             | 21.88              | 2324         | 1721             |
| debtserverp1                       | 3.5269           | 1.2793              | 98.3%         | 0.99          | -1.48              | 10.96              | 2324         | 1374             |
| xdebtgni1                          | 0.1629           | 0.0970              | 62.6%         | 0.92          | -0.52              | 1.86               | 2324         | 1372             |
| xbalgrp1                           | -1.2722          | 0.8648              | 40.2%         | 0.88          | -13.80             | 2.44               | 2324         | 1759             |
| globec1                            | -1.6975          | 1.4214              | 23.0%         | 0.82          | -12.57             | 3.89               | 2324         | 1594             |
| totadjgdp1                         | -0.7626          | 1.4638              | 1.5%          | 0.63          | -10.80             | 7.75               | 2324         | 1571             |
| infl1sc                            | 1.9119           | 1.1254              | 52.2%         | 0.92          | -2.98              | 7.21               | 2324         | 1685             |
| defgdp1                            | -1.6479          | 4.3041              | 0.6%          | 0.62          | -22.81             | 13.95              | 2324         | 850              |
| stdebtxdebt1                       | -0.1062          | 1.0830              | 0.0%          | 0.54          | -4.1               | 4.38               | 2324         | 1375             |
| peg                                | -20.830          | 32.262              | 0.2%          | 0.67          | -276.95            | 117.63             | 2324         | 1620             |
| curcris                            | 157.311          | 51.343              | 100.0%        | 1.00          | -19.73             | 619.67             | 2324         | 1760             |
| finopen                            | -3.818           | 13.424              | 2.4%          | 0.57          | -61.05             | 60.25              | 2324         | 1687             |
| <b>Further political variables</b> |                  |                     |               |               |                    |                    |              |                  |
| leadexelec                         | 10.5285          | 34.4238             | 0.3%          | 0.62          | -181.58            | 175.02             | 2324         | 1744             |
| lagexelec                          | 93.8212          | 36.5669             | 89.4%         | 0.98          | -95.50             | 362.89             | 2324         | 1744             |
| leadlegelec                        | -9.1429          | 30.5668             | 0.0%          | 0.60          | -206.10            | 146.64             | 2324         | 1744             |
| laglegelec                         | 116.644          | 40.275              | 95.2%         | 0.99          | -81.05             | 402.64             | 2324         | 1744             |
| polinstab                          | 21.7276          | 10.6462             | 77.3%         | 0.96          | -14.83             | 61.68              | 2324         | 1117             |
| socunrest1                         | 12.4275          | 7.4004              | 52.8%         | 0.93          | -15.42             | 40.06              | 2324         | 1406             |
| liberal                            | -10.1901         | 10.2782             | 10.5%         | 0.80          | -105.79            | 25.25              | 2324         | 1767             |
| globpol                            | 2.1836           | 1.0349              | 87.2%         | 0.98          | -1.45              | 6.85               | 2324         | 1666             |
| icrg                               | -404.931         | 165.761             | 68.9%         | 0.94          | -1'679.2           | 248.97             | 2324         | 1464             |
| unsc                               | 26.820           | 63.105              | 0.2%          | 0.58          | -226.59            | 448.90             | 2324         | 1685             |
| relsize1                           | 12.864           | 22.200              | 14.6%         | 0.56          | -90.07             | 257.30             | 2324         | 1769             |
| tradeus                            | -108.836         | 147.656             | 15.9%         | 0.70          | -824.88            | 535.69             | 2324         | 1694             |
| voteinlineusa                      | 161.000          | 138.887             | 32.7%         | 0.75          | -561.58            | 1'082.7            | 2324         | 1760             |

Note: Results are based on tobit regressions with clustered standard errors and time fixed effects. No distinction is made between concessional and non-concessional loans.

**Table 5: Economic and political determinants of non-concessional/concessional IMF programs' size (EBA - Tobit)**

| Variable  | Avg.     | Avg.    | %Sign. | CDF(0) | Lower    | Upper    | Avg. | Avg.  | %Sign.   | CDF(0)   | Lower | Upper | Avg.      |          |       |       |
|---|----------|---------|--------|--------|----------|----------|------|---|----------|----------|-------|-------|-----------|----------|-------|-------|
|   | Beta     | Std.Err |        |        | Bound    | Bound    |      |   |          |          | Bound | Bound |           | Bound    | Bound | Bound |
| <b>Non-concessional loans - Base model</b>                  |          |         |        |        |          |          |      | <b>Concessional loans - Base model</b>                  |          |          |       |       |           |          |       |       |
| underimf5ma   | 585.898  | 151.642 | 99.8%  | 1.00   | -74.07   | 1'530.7  | 2625 | 1695  | -49.287  | 94.304   | 27.8% | 0.82  | -172'767  | 173'006  | 2604  | 1644  |
| resimpl   | -0.9782  | 8.3159  | 0.9%   | 0.54   | -41.60   | 47.42    | 2625 | 1695  | -16.1844 | 5.9439   | 98.9% | 1.00  | -4'757.18 | 4'708.08 | 2604  | 1644  |
| grgdpl  | -15.5352 | 4.9124  | 97.8%  | 1.00   | -38.31   | 10.19    | 2625 | 1695  | -1.6851  | 1.5610   | 22.0% | 0.80  | -295.72   | 289.74   | 2604  | 1644  |
| lgdppc1   | 62.3912  | 27.1504 | 62.2%  | 0.89   | -119.84  | 287.69   | 2625 | 1695  | -75.6246 | 15.9812  | 99.8% | 1.00  | -26'995.1 | 26'935.4 | 2604  | 1644  |
| <b>Non-concessional loans – Further economic variables</b>  |          |         |        |        |          |          |      | <b>Concessional loans – Further economic variables</b>  |          |          |       |       |           |          |       |       |
| invgdpl   | 0.2874   | 3.4043  | 1.9%   | 0.53   | -19.11   | 27.67    | 2324 | 1621  | 1.9841   | 3.1558   | 74.9% | 0.94  | -3'547.15 | 3'556.61 | 2313  | 1575  |
| debtsexp1   | 4.4507   | 1.6186  | 97.4%  | 0.99   | -1.88    | 13.02    | 2324 | 1273  | 0.2771   | 0.6714   | 1.6%  | 0.63  | -176.09   | 181.67   | 2324  | 1231  |
| xdebtgn1  | 0.0037   | 0.1816  | 1.6%   | 0.54   | -1.67    | 2.29     | 2324 | 1271  | 0.1310   | 0.1517   | 55.2% | 0.93  | -330.29   | 331.60   | 2324  | 1230  |
| xbalgdp1  | -0.8792  | 1.5468  | 3.1%   | 0.69   | -15.80   | 7.10     | 2324 | 1658  | -1.1595  | 1.3903   | 58.0% | 0.92  | -1'814.32 | 1'810.03 | 2324  | 1611  |
| globec1   | -3.1835  | 2.3767  | 30.9%  | 0.85   | -19.52   | 4.87     | 2324 | 1501  | 0.4550   | 1.6428   | 3.5%  | 0.71  | -1'451.27 | 1'448.91 | 2324  | 1449  |
| totadjgdp1  | -2.3004  | 2.9218  | 7.4%   | 0.75   | -19.61   | 11.43    | 2324 | 1479  | -0.7754  | 2.9500   | 10.0% | 0.70  | -7'752.92 | 7'746.73 | 2310  | 1425  |
| infl1sc   | 2.8778   | 1.5400  | 58.3%  | 0.92   | -3.63    | 10.43    | 2324 | 1591  | -0.8646  | 1.3524   | 27.3% | 0.82  | -2'122.46 | 2'125.80 | 2311  | 1537  |
| defgdpl   | 1.1487   | 5.8566  | 0.8%   | 0.58   | -25.55   | 26.48    | 2324 | 815   | 5.2668   | 27.9940  | 49.4% | 0.81  | -28'995.4 | 29'008.3 | 2323  | 764   |
| stdebtdeb1  | 1.6267   | 1.3262  | 15.5%  | 0.87   | -3.30    | 7.32     | 2324 | 1274  | -2.9785  | 1.0945   | 96.6% | 0.99  | -9.69     | 1.31     | 2324  | 1232  |
| peg   | -23.4499 | 52.1845 | 0.0%   | 0.62   | -335.04  | 161.45   | 2324 | 1530  | -15.7161 | 43.3879  | 4.5%  | 0.73  | -31'481.0 | 31'364.6 | 2324  | 1479  |
| curcris   | 282.331  | 74.3564 | 100.0% | 1.00   | -2.77    | 785.37   | 2324 | 1659  | -16.502  | 35.3865  | 3.5%  | 0.66  | -3'242.40 | 3'191.79 | 2324  | 1614  |
| finopen   | -13.1951 | 23.2091 | 0.4%   | 0.64   | -108.87  | 81.98    | 2324 | 1590  | 7.9930   | 31.8294  | 30.1% | 0.87  | -80'809.4 | 80'797.2 | 2324  | 1554  |
| <b>Non-concessional loans – Further political variables</b> |          |         |        |        |          |          |      | <b>Concessional loans – Further political variables</b> |          |          |       |       |           |          |       |       |
| leadexelec  | 6.5532   | 46.9338 | 2.7%   | 0.55   | -271.96  | 199.45   | 2324 | 1643  | 7.1180   | 36.3848  | 6.3%  | 0.61  | -16'877.2 | 16'935.3 | 2324  | 1597  |
| lagexelec   | 123.418  | 49.2904 | 92.9%  | 0.98   | -132.86  | 425.67   | 2324 | 1643  | 41.774   | 113.3319 | 59.6% | 0.91  | -345'830  | 345'995  | 2313  | 1593  |
| leadlegelec   | -11.4333 | 42.3702 | 0.0%   | 0.60   | -272.08  | 171.56   | 2324 | 1643  | -8.4860  | 23.3311  | 4.7%  | 0.64  | -9'600.65 | 9'598.14 | 2324  | 1597  |
| laglegelec  | 124.492  | 54.7486 | 87.9%  | 0.98   | -119.89  | 472.80   | 2324 | 1643  | 67.991   | 33.0218  | 98.6% | 1.00  | -21'862.8 | 22'023.2 | 2313  | 1593  |
| polinstab   | 38.9037  | 11.9713 | 100.0% | 1.00   | -5.24    | 94.51    | 2324 | 1048  | -19.1062 | 10.8727  | 68.0% | 0.92  | -981.78   | 964.23   | 2324  | 1005  |
| socunrest1  | 22.3892  | 9.9333  | 86.8%  | 0.97   | -14.81   | 62.07    | 2324 | 1324  | 6.8068   | 6.7728   | 15.1% | 0.82  | -2'380.79 | 2'406.05 | 2324  | 1270  |
| liberal   | -5.6313  | 16.7856 | 1.8%   | 0.59   | -141.32  | 58.25    | 2324 | 1665  | -6.3765  | 20.1787  | 49.9% | 0.86  | -20'006   | 20'081   | 2324  | 1618  |
| globpol   | 3.5610   | 1.6864  | 83.6%  | 0.97   | -1.87    | 12.36    | 2324 | 1568  | 0.0929   | 1.0106   | 8.1%  | 0.55  | -887.04   | 887.12   | 2324  | 1521  |
| icrg  | -703.877 | 271.200 | 69.3%  | 0.96   | -2'337.3 | 320.30   | 2324 | 1386  | 2.329    | 200.947  | 7.6%  | 0.54  | -211'999  | 211'477  | 2324  | 1333  |
| unsc  | 46.0593  | 79.7384 | 0.0%   | 0.63   | -229.49  | 554.74   | 2324 | 1586  | -24.0813 | 45.4808  | 7.8%  | 0.66  | -2'289.93 | 2'392.60 | 2324  | 1542  |
| relsize1  | 13.771   | 26.025  | 54.8%  | 0.60   | -99.8    | 306.09   | 2324 | 1667  | -311.183 | 254.629  | 51.0% | 0.95  | -184'622  | 183'669  | 2323  | 1621  |
| tradeus   | -150.401 | 207.497 | 28.8%  | 0.66   | -1'201.4 | 795.58   | 2324 | 1596  | 33.016   | 349.602  | 7.4%  | 0.64  | -670'106  | 669'509  | 2324  | 1549  |
| voteinlineusa   | 66.871   | 216.882 | 30.4%  | 0.51   | -1'149.2 | 1'371.05 | 2324 | 1658  | 138.952  | 264.247  | 66.9% | 0.89  | -753'039  | 752'938  | 2324  | 1611  |

Note: Extreme bound analysis (EBA) are based on tobit regressions with clustered standard errors and time fixed effects. Concessional and non-concessional loans are estimated separately.

**Table 6: Economic and political determinants of IMF programs' size (Tobit)**

| Variable    | Panel A: Base model       |                           |                         | Panel B: Extended model |                          |                         |
|-------------|---------------------------|---------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
|             | all programs<br>(1)       | non-concess.<br>(2)       | concessional<br>(3)     | all programs<br>(4)     | non-concess.<br>(5)      | concessional<br>(6)     |
| underimf5ma | 463.5977***<br>(108.0944) | 883.7835***<br>(171.5551) | -30.0621<br>(43.7099)   | 100.0093*<br>(53.9511)  | 207.1867**<br>(79.0971)  | -61.7040<br>(45.8595)   |
| resimpl     | -9.6892<br>(6.4857)       | -1.7782<br>(8.6844)       | -15.9875***<br>(4.2347) | -11.2789*<br>(5.1040)   | -12.1692<br>(8.6337)     | -15.0053***<br>(4.3391) |
| grgdpl      | -9.7400**<br>(2.9900)     | -17.9269***<br>(4.5700)   | -1.0287<br>(1.3265)     | -6.0047*<br>(2.6016)    | -11.7394**<br>(4.1148)   | -0.4268<br>(1.3117)     |
| lgdppc1     | -59.4473***<br>(12.4866)  | 19.2611<br>(19.1699)      | -84.3246***<br>(8.3046) | 6.4733<br>(9.9022)      | 106.9349***<br>(27.5382) | -72.1570***<br>(8.9816) |
| debtsexp1   |                           |                           |                         | 2.7740**<br>(1.0463)    | 3.2864*<br>(1.3791)      | 0.1108<br>(0.4885)      |
| curcris     |                           |                           |                         | 85.1518**<br>(31.1132)  | 160.9079***<br>(41.2452) | -22.3772<br>(32.3920)   |
| lagexelec   |                           |                           |                         | 10.1508<br>(27.1283)    | 26.6723<br>(33.0880)     | -1.2868<br>(27.7164)    |
| laglegelec  |                           |                           |                         | 76.5032**<br>(23.6788)  | 58.1691*<br>(31.2711)    | 67.3587**<br>(21.3861)  |
| globalpol   |                           |                           |                         | 1.5997*<br>(0.7563)     | 2.8442*<br>(1.3522)      | -0.0715<br>(0.4808)     |
| No. of obs. | 2753                      | 2615                      | 2560                    | 1608                    | 1485                     | 1449                    |
| Uncensored  | 331                       | 193                       | 138                     | 282                     | 159                      | 123                     |
| Pseudo R2   | 0.03                      | 0.04                      | 0.10                    | 0.03                    | 0.07                     | 0.06                    |

Notes: \*\*\*, \*\*, \* represents a significant coefficient at the 1, 5 and 10 percent level, respectively.



**Table 7: Summary of most robust determinants of IMF participation after the Cold War**

| <b>Panel A: Signing of IMF Programs (Conditional fixed effects logit)</b> |                     |                               |                           |
|---|---------------------|-------------------------------|---------------------------|
| Variables   | Pooled IMF Programs | Non-concessional IMF Programs | Concessional IMF Programs |
| Past IMF participation  | -                   | -                             | -                         |
| International reserves  | -                   |                               | -                         |
| GDP growth (real)   | -                   | -                             |                           |
| Currency crisis   | +                   | +                             |                           |
| Elections (executive, lagged)   | +                   |                               |                           |
| Elections (legislative, lagged)   | +                   | +                             | +                         |
| Liberal   | -                   | -                             |                           |

| <b>Panel B: Loan Size of IMF Programs (Tobit)</b> |                     |                               |                           |
|---|---------------------|-------------------------------|---------------------------|
| Variables   | Pooled IMF Programs | Non-concessional IMF Programs | Concessional IMF Programs |
| Past IMF participation                            | +                   | +                             |                           |
| International reserves                            |                     |                               | -                         |
| GDP growth (real)                                 | -                   | -                             |                           |
| GDP per capita (real)                             |                     |                               | -                         |
| Debt servicing                                    | +                   | +                             |                           |
| Short-term debt                                   |                     |                               | -                         |
| Currency crisis                                   | +                   | +                             |                           |
| Elections (executive, lagged)                     | +                   | +                             |                           |
| Elections (legislative, lagged)                   | +                   | +                             | +                         |
| Political instability                             | +                   | +                             |                           |
| Social unrest                                     |                     | +                             |                           |
| Political globalization (KOF)                     | +                   | +                             |                           |
| Government quality (ICRG)                         |                     | -                             |                           |
| Geopolitical importance                           |                     |                               | -                         |

Notes: If an explanatory variable never has a CDF(0) above 0.95 within a given panel, it is not displayed here.

**Appendix A: Summary of studies on the determinants of IMF program participation since 2005**

| Study               | Type of model   | Definition of dependent variable   | Economic variables included   | Effect | Political variables included                    | Effect |
|---------------------|---|--|-------------------------------|--------|---|--------|
| Sturm et al. (2005) | Extreme Bounds Analysis on Probit model for IMF programs; 118 countries; 1971-2000 using yearly data. | Binary variable of one, if a country signs an IMF agreement in a given year. | International reserves        | -      | Past IMF program (5 years)                      | +      |
|                     |   |  | GDP growth (real, p.c.)       | -      | Number of countries currently under IMF program | 0      |
|                     |   |  | Debt service to exports       | +      | Election year executive                         | 0      |
|                     |   |  | Current account to GDP        | 0      | Election year legislative                       | 0      |
|                     |   |  | External debt to GDP          | 0      | Election year executive (lagged)                | -      |
|                     |   |  | GDP per capita                | 0      | Election year legislative (lagged)              | -      |
|                     |   |  | Inflation (in logarithm)      | 0      | Election year executive (lead)                  | 0      |
|                     |   |  | Nominal exchange rate growth  | 0      | Election year legislative (lead)                | 0      |
|                     |   |  | Budget deficit to GDP         | 0      | Assassinations                                  | 0      |
|                     |   |  | Terms of trade growth rate    | 0      | Revolutions                                     | 0      |
|                     |   |  | Investment to GDP             | -      | Guerrilla problems                              | 0      |
|                     |   |  | LIBOR                         | 0      | Government crisis                               | 0      |
|                     |   |  | Government expenditure to GDP | 0      | Government instability                          | -      |
|                     |   |  |                               |        | Demonstrations                                  | 0      |
|                     |   |  |                               |        | Strikes   | 0      |
|                     |   |  |                               |        | Riots   | 0      |
|                     |   |  |                               |        | Competitiveness, index                          | 0      |
|                     |   |  |                               |        | Bank exposure (U.S.)                            | 0      |
|                     |   |  |                               |        | Intensity of trade (U.S.)                       | 0      |
|                     |   |  |                               |        | Asia dummy variable                             | 0      |
|                     |   |  |                               |        | OECD dummy variable                             | 0      |
|                     |   |  |                               |        | Africa dummy variable                           | 0      |
|                     |   |  |                               |        | Liberal, index                                  | 0      |
|                     |   |  |                               |        | Corruption                                      | 0      |
|                     |   |  |                               |        | Rule of law                                     | 0      |
|                     |   |  |                               |        | Repudiation                                     | 0      |
|                     |   |  |                               |        | Quality of bureaucracy                          | 0      |
|                     |   | Relative size  | 0                             |        |   |        |
|                     |   | IMF quota  | 0                             |        |   |        |
|                     |   | Ethnic fractionalization   | -                             |        |   |        |
|                     |   | Special interests  | 0                             |        |   |        |
|                     |   | Political cohesion   | 0                             |        |   |        |

|                              |   |   |   |  |  |                            |
|------------------------------|---|---|---|--|--|----------------------------|
| Barro and Lee (2005)         | Probit model for short-term IMF programs (SBA and EFF); 130 countries; 1975-1999 using five-year intervals.                 | Binary variable of one, if a new IMF loan program approved in any year of the 5-year period   | GDP growth (p.c.)<br>International reserves<br>GDP per capita<br>GDP per capita squared<br>GDP (in logarithm)<br>GDP (in logarithm) squared<br>OECD dummy   | -<br>-<br>+<br>-<br>+<br>-<br>0  | IMF quota (in logarithm)<br>IMF staff (in logarithm)<br>Political proximity (U.S.)<br>Political proximity (EU)<br>Intensity of trade (U.S.)<br>Intensity of trade (EU) | 0<br>+<br>+<br>0<br>+<br>0 |
| Veiga (2005)                 | Logit model for IMF programs (SBA, EFF, SAF, ESAF, PRGF); 10 countries with high inflation; 1957-1999 using quarterly data. | Binary variable of one, if a country participates in an IMF arrangement in the present or previous quarter of a current inflation spell.          | Amount drawn to amount agreed<br>Disbursements to reserves<br>Inflation (in logarithm)<br>Fiscal balance to GDP<br>GDP growth (real, yoy)<br>International reserves   | 0<br>0<br>+<br>0<br>+<br>0   | IMF program (lagged)<br>Fragmentation of political system (lower level dummies)  | 0<br>+                     |
| Andersen et al. (2006)       | Logit model for short-term IMF programs (SBA and EFF); 102 countries; 1995-2000 using yearly data.                          | Binary variable of one, if a new IMF program is signed in a given year.   | GNP per capita<br>Balance of payments<br>$\Delta$ Balance of payments<br>BoP per capita<br>$\Delta$ BoP per capita<br>Current account<br>$\Delta$ Current account<br>Current account to GNP<br>$\Delta$ Current account to GNP<br>Debt<br>$\Delta$ Debt<br>Debt to GNP<br>$\Delta$ Debt to GNP<br>Debt per capita<br>$\Delta$ Debt per capita<br>Interest payments to GNP<br>$\Delta$ Interest payments to GNP<br>International reserves to debt<br>$\Delta$ International reserves to debt<br>Asian crisis dummy | 0<br>-<br>-<br>0<br>0<br>0<br>+<br>0<br>-<br>+<br>0<br>-<br>0<br>0<br>0<br>+<br>0<br>0<br>0<br>0<br>-<br>- | Political proximity to U.S. (key votes in UN General Assembly)<br>Bliss point  | +<br>-                     |
| Dreher (2006a)               | OLS model for short-term IMF programs (SBA and EFF); 98 countries; 1970-2000 using five-year intervals.                     | 5-year average of yearly dummies that take the value of one if there has been an SBA or EFF facility drawn in a given year for at least 5 months. | Short-term debt to total debt<br>Total debt service to GDP  | -<br>+   | Democracy, index   | -                          |
| Nooruddin and Simmons (2006) | Linear Probability model for IMF programs (SBA, EFF, SAF, ESAF); 130 countries; 1980-2000 using yearly data.                | Binary variable of one, if the country participates in an IMF program (Vreeland, 2003).   | GDP growth<br>Current account to GDP<br>Budget balance to GDP<br>GDP per capita   | -<br>-<br>0<br>-   | Past IMF program<br>Democracy, index   | +<br>0                     |

|                           |   |   |  |   |  |                       |
|---------------------------|---|---|--|---|--|-----------------------|
| Eichengreen et al. (2006) | Probit model for IMF programs; 24 emerging countries with significant access to international capital markets; 1980-2003 using yearly data.           | Binary variable of one for the first two years of a new IMF program.        | GDP growth (real)<br>Trade Balance to GDP<br>Debt servicing to exports<br>Domestic credit to GDP<br>Δ Domestic credit to GDP<br>Foreign debt to GDP<br>Δ Foreign debt to GDP<br>International reserves<br>Short-term debt to reserves<br>Fixed exchange rate<br>Limited flexible exchange rate | +<br>+<br>+<br>-<br>-<br>+<br>0<br>0<br>-<br>+<br>0 | Political proximity to U.S. (UN General Assembly voting)<br>Bank exposure (U.S.)<br>Exports (G3)   | -<br>0<br>0           |
| Harrigan et al. (2006)    | Probit model for IMF programs (SAF, ESAF and PRGF); 11 Middle East and North Africa (MENA) countries; 1975-2000 using yearly data.                    | Binary variable of one, if country signs an IMF agreement in a given year.  | GDP per capita<br>GDP growth<br>Current account to GDP<br>Debt service to exports<br>Short-term debt to total debt<br>Δ Net reserves to GDP  | 0<br>0<br>0<br>+<br>-<br>0                          | Democracy<br>Election year legislative<br>Election year legislative (past)<br>Election year legislative (future)<br>Peace treaty with Israel | -<br>0<br>0<br>+<br>+ |
| Cerutti (2007)            | Probit model for short-term IMF programs (SBA and EFF); 59 countries (non-PRGF-eligible developing countries); 1982-2005 using quarterly data.        | Binary variable of one in the first quarter of a new IMF “drawing” program. | Net international reserves<br>Current account<br>GDP growth (real)<br>Inflation<br>Real exchange rate<br>Government deficit<br>IMF quota<br>IMF liquidity<br>LIBOR (real)<br>World GDP growth (real)   | -<br>0<br>-<br>+<br>0<br>0<br>0<br>0<br>+<br>-      | Past IMF program (2 years)   | +                     |
| Elekdag (2008)            | Panel Probit model (random effects) for short-term IMF programs (SBA); 169 countries; 1970-2004 using yearly data.                                    | Binary variable of one, if SBA facility is approved in a given year.        | Oil price (real)<br>U.S. Short-term interest rate (real)<br>World GDP (real, dev. trend)<br>GDP growth (real)<br>International reserves<br>Exchange rate depreciation  | +<br>+<br>0<br>-<br>-<br>-                          |  |                       |
| Bal Gündüz (2009)         | Panel Probit model (random effects) for IMF programs (SBA, SAF/ESAF/PRGF augmentations and CFF); 55 low-income countries; 1980-2004 using yearly data | Binary variable of one, if a new IMF program is approved.                   | Current account to GDP<br>International reserves<br>Exchange rate depreciation<br>Government balance to GDP<br>GDP growth (real)<br>Δ Terms-of-Trade<br>Oil price (change, 2 years)<br>World trade (cyclical)  | -<br>-<br>+<br>0<br>-<br>-<br>+<br>-                | Debt restructuring (Paris Club)  | +                     |

|                           |   |  |  |   |   |                                  |
|---------------------------|---|--|--|---|---|----------------------------------|
| Bird and Rowlands (2009a) | Probit model for IMF programs (SBA and SAF/ESAF/PRGF); emerging and developing countries; 1974-2000 using yearly data.  | Binary variable of one, if a new IMF program is signed in a given year.                          | GDP growth<br>Current account to GDP<br>Δ International reserves<br>Real depreciation (3 years)<br>Debt service to exports<br>Capital account restrictions<br>Fixed exchange rate<br>Freely floating exchange rate<br>Freely falling exchange rate   | -<br>0<br>-<br>0<br>+<br>0<br>+<br>0<br>+   | Debt rescheduling<br>Future debt rescheduling<br>Past IMF program (2 years)                                     | -<br>+<br>+                      |
| Bird and Rowlands (2009b) | Probit model for IMF programs (SBA, EFF, SAF, ESAF/PRGF); 88 low and middle-income countries; 1977-2000 using yearly data.  | Binary variable of one, if a new IMF program is signed in a given year.                          | GNP per capita<br>GDP growth<br>International reserves<br>Δ International reserves<br>Current account to GDP<br>Δ Current account to GDP<br>Real exchange rate depreciation<br>Debt service to exports<br>Δ Debt service to exports<br>Public external debt to GDP<br>Debt rescheduling<br>Past debt rescheduling (2 years)<br>Inflation<br>Fixed exchange rate<br>Flexible exchange rate<br>Market pressure index | 0<br>-<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>+ | Past IMF program (2 years)  | +                                |
| Pop-Eleches (2009)        | Panel Logit model (random effects) for IMF programs; 47 countries (three subsamples: Latin America 1982-1989; Latin America 1990-2001; Eastern Europe 1990-2001); 1982-2001 using quarterly data. | Binary variable of one, if a new IMF program is signed in a given quarter.                       | Foreign debt<br>International reserves<br>Interest payments to GNI<br>Inflation<br>GDP per capita  | 0/+/0<br>-/0/-<br>+/0/0<br>+/0/+<br>0/0/0   | Government orientation<br>Quality of bureaucracy<br>Political regime<br>Past IMF program (fraction last 5 year) | -/0/0<br>0/0/+<br>0/0/0<br>+/0/0 |
| Dreher et al. (2009)      | Logit model for IMF programs (SBA, EFF, SAF, ESAF/PRGF); 197 countries; 1951-2004 using yearly data.  | Binary variable of one, if a country participates in an IMF program during part of a given year. | GDP per capita (real)<br>Investment to GDP<br>Debt service to GDP<br>Budget surplus to GDP   | -<br>-<br>+<br>+  | UN Security Council membership (temporary)<br>Past IMF program<br>Checks and Balances                           | +<br>+<br>+                      |

|                               |  |  |   |  |   |  |
|-------------------------------|--|--|---|--|---|--|
| Copelovitch (2010)            | Logit model for non-concessional IMF programs (SBA, EFF and SRF); 47 countries; 1984-2003 using yearly data.   | Binary variable of one, if a country receives an IMF loan in a given year. | GDP (in logarithm)<br>GDP per capita (in logarithm)<br>GDP growth<br>Current account to GDP<br>External debt to GDP<br>Debt service to exports<br>Short-term debt to reserves (in logarithm)<br>Currency crisis dummy<br>Number of currency crises<br>LIBOR | 0<br>0<br>-<br>-<br>0<br>0<br>+<br>0<br>+<br>0 | Bank exposure (G5)<br>Variation bank exposure (G5)<br>Bank exposure (U.S.)<br>Bank exposure (UK)<br>Bank exposure (Japan)<br>Bank exposure (Germany)<br>Bank exposure (France)<br>S-score (G5)<br>Variation S-score (G5)<br>Years since last IMF loan<br>Veto players (in logarithm)<br>IMF liquidity ratio<br>IMF quota review | 0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
| Biglaiser and De Rouen (2010) | Selection equation of a treatment effects regression model for IMF programs (four subgroups: All, SBA, EFF and PRGF); 126 developing countries; 1980-2003 using yearly data. | Binary variable of one, if a country participates in an IMF program.       | Inflation (in logarithm)<br>GDP per capita (in logarithm)<br>International reserves<br>Budget balance   | 0/-/0/+<br>-/+/0/+<br>-/-/0/0<br>0/0/0/0       |   |  |
| Breen (2010)                  | Probit model for IMF programs (SBA, EFF, SAF/ESAF/PRGF); 159 countries; 1983-2006 using yearly data.   | Binary variable of one, if a new IMF program is approved in a given year.  | International reserves<br>Current account to GDP<br>External debt to GDP<br>Debt service to GDP<br>GDP growth<br>GDP per capita (in logarithm)<br>Financial crisis  | -<br>0<br>0<br>0<br>-<br>0<br>+                | Bank exposure (G5) (in logarithm)<br>IMF quota review<br>IMF delegation index<br>U.S. military aid<br>System transition (exclusion restriction)   | +<br>0<br>0<br>0<br>+                                    |

Note: +/- represent significant positive and negative coefficients in the respective studies. 0 stands for an insignificant coefficient. Whenever possible, we seek to summarize the “preferred” specification of the respective study. The variable international reserves is measured as international reserves in months of imports if not otherwise indicated. Most authors incorporate the independent variables with a lag of one period in order to mitigate potential endogeneity concerns. Δ represents a year-to-year change.

## Appendix B: Summary of studies on the determinants of IMF loan size

| Study                    | Type of model   | Definition of dependent variable                           | Economic variables included   | Effect                                       | Political variables included  | Effect                          |
|--------------------------|---|--|---|--|---|---------------------------------|
| Bird and Orme (1981)     | OLS model for IMF programs; 31 countries in the year 1976.  | Amount of IMF loan (in SDR) for a country in a given year. | Current account to trade<br>Debt service ratio<br>Inflation<br>GNP per capita<br>Imports<br>International reserves<br>Eurocurrency credits to imports     | +<br>0<br>+<br>-<br>+<br>0<br>+              |   |                                 |
| Cornelius (1987)         | OLS models for IMF programs; 11 sub-Saharan African countries; two subsamples: 1975-1977 and 1981-1983 using yearly data.   | Amount of IMF loan (in SDR) for a country in a given year. | Current account<br>Debt service ratio<br>Inflation<br>GNP per capita<br>Imports<br>International Reserves<br>Foreign borrowing                            | 0/0<br>+/+<br>0/0<br>-/<br>+/+<br>-/0<br>-/0 |   |                                 |
| Oatley and Yackee (2004) | OLS model for IMF programs (SBA and EFF; only for positive values of loan size); 61 countries; 1986-1998 using yearly data. | Amount of IMF loan (in SDR) in a given year.               | GNP<br>Foreign debt<br>Current account<br>Debt service<br>Dummy stand-by arrangement  | +<br>0<br>0<br>0<br>-                        | Bank exposure (U.S.)<br>Bank exposure (Britain)<br>Bank exposure (Japan)<br>Political regime<br>Political proximity to US (UN GA voting)<br>Military aid (U.S.)<br>Dummy Cold War<br>Cold War * UN vote | +<br>0<br>0<br>+<br>+<br>+<br>- |
| Barro and Lee (2005)     | Tobit models for short-term IMF programs (SBA and EFF); 130 countries; 1975-1999 using five-year intervals.                 | Average IMF loan program to GDP over 5-year period.        | GDP growth (p.c.)<br>International reserves<br>GDP per capita<br>GDP per capita squared<br>GDP (in logarithm)<br>GDP (in logarithm) squared<br>OECD dummy | -<br>-<br>+<br>-<br>+<br>-<br>0              | IMF quota (in logarithm)<br>IMF staff (in logarithm)<br>Political proximity (U.S.)<br>Political proximity (EU)<br>Intensity of trade (U.S.)<br>Intensity of trade (EU)                                  | +<br>+<br>0<br>+<br>+<br>0      |
| Dreher (2006a)           | OLS model for short-term IMF programs (SBA and EFF); 98 countries; 1970-2000 using five-year intervals.                     | 5-year average of disbursed loans to GDP.                  | LIBOR   | +  | Political stability<br>Government special interest<br>Rule of law   | +<br>-<br>+                     |

|                           |  |   |   |   |  |  |
|---------------------------|--|---|---|---|--|--|
| Pop-Eleches (2009)        | OLS model for IMF programs (only for positive values of loan size); 47 countries (three subsamples: Latin America 1982-1989; Latin America 1990-2001; Eastern Europe 1990-2001); 1982-2001 using quarterly data. | Amount of an IMF loan relative to a country's IMF quota (annualized). | Foreign debt<br>International reserves<br>Interest payments to GNI<br>Inflation<br>GDP per capita   | + / + / +<br>0 / 0 / -<br>0 / - / 0<br>- / 0 / +<br>0 / 0 / 0 | Government orientation<br>Quality of bureaucracy<br>Political regime<br>Past IMF program (fraction last 5 year)  | 0 / + / 0<br>0 / - / 0<br>0 / 0 / +<br>0 / 0 / 0                   |
| Reynaud and Vauday (2009) | Tobit models for IMF programs (SBA and EFF; PRGF); 107 developing and emerging countries; 1990-2003 using yearly data.   | Amount of a new IMF loan relative to a country's IMF quota.           | GDP growth (real)<br>GDP per capita (in logarithm)<br>International reserves<br>Total debt service to exports   | -<br>+<br>-<br>+  | Geopolitical factors   | +  |
| Copelovitch (2010)        | OLS model for non-concessional IMF programs (SBA, EFF and SRF); 47 countries; 1984-2003 using yearly data.   | Amount of a new IMF loan relative to a country's IMF quota.           | GDP (in logarithm)<br>GDP per capita (in logarithm)<br>GDP growth<br>Current account to GDP<br>External debt to GDP<br>Debt service to exports<br>Short-term debt to reserves (in logarithm)<br>Currency crisis dummy<br>Number of currency crises<br>LIBOR | +<br>-<br>0<br>0<br>0<br>+<br>0<br>+<br>0<br>0                | Bank exposure (G5)<br>Variation bank exposure (G5)<br>Bank exposure (U.S.)<br>Bank exposure (UK)<br>Bank exposure (Japan)<br>Bank exposure (Germany)<br>Bank exposure (France)<br>S-score (G5)<br>Variation S-score (G5)<br>Past IMF program<br>Veto players (in logarithm)<br>IMF liquidity ratio<br>IMF quota review<br>Propensity score | 0<br>-<br>+<br>0<br>0<br>+<br>+<br>0<br>0<br>-<br>0<br>0<br>0<br>0 |
| Breen (2010)              | Heckman selection model for IMF programs (SBA, EFF, SAF/ESAF/PRGF); 159 countries; 1983-2006 using yearly data.  | Amount of IMF loan relative to a country's IMF quota.                 | International reserves<br>Current account to GDP<br>External debt to GDP<br>Debt service to GDP<br>GDP growth<br>GDP per capita (in logarithm)<br>Financial crisis  | -<br>0<br>0<br>0<br>-<br>0<br>+                               | Bank exposure (G5) (in logarithm)<br>IMF quota review<br>IMF delegation index<br>U.S. military aid   | +<br>0<br>0<br>0<br>0<br>0<br>0                                    |
| Binder and Bluhm (2010)   | Panel Tobit model (random effects augmented with Mundlak variables) for IMF programs (SBA, EFF, SAF, ESAF/PRGF); 68 countries; 1975-2005 using yearly data.  | Amount of (all) IMF loan(s) relative to a country's IMF quota.        | Investment to GDP<br>Inflation<br>International reserves<br>Government share to GDP<br>Current account to GDP<br>Openness   | -<br>-<br>0<br>0<br>0<br>0                                    | Democracy, index<br>Years under IMF program<br>Fertility rate (mean)<br>Intensity of trade (Europe) (mean)   | -<br>+<br>+<br>-   |

Note: +/- represent significant positive and negative coefficients in the respective studies. 0 stands for an insignificant coefficient. Whenever possible, we seek to summarize the "preferred" specification of the respective study. The variable international reserves is measured as international reserves in months of imports if not otherwise indicated. Most authors incorporate the independent variables with a lag of one period in order to mitigate potential endogeneity concerns. Δ represents a year-to-year change.



## Appendix C: Summary Statistics

| <i>Variable</i>                    | <i>Obs.</i> | <i>Mean</i> | <i>Std. Dev.</i> | <i>Min.</i> | <i>Max.</i> |
|------------------------------------|-------------|-------------|------------------|-------------|-------------|
| <b>Dependent variables</b>         |             |             |                  |             |             |
| Signing (all)                      | 3700        | 0.1122      | 0.3156           | 0.0000      | 1.0000      |
| Signing (non-conc.)                | 3700        | 0.0641      | 0.2449           | 0.0000      | 1.0000      |
| Signing (conc.)                    | 3700        | 0.0481      | 0.2140           | 0.0000      | 1.0000      |
| Size (all)                         | 3700        | 15.7624     | 97.3621          | 0.0000      | 3182.841    |
| Size (non-conc.)                   | 3522        | 11.8763     | 96.9263          | 0.0000      | 3182.841    |
| Size (conc.)                       | 3463        | 4.7626      | 25.9396          | 0.0000      | 700.0000    |
| <b>Base Model</b>                  |             |             |                  |             |             |
| underimf5ma                        | 3700        | 0.1161      | 0.1707           | 0.0000      | 1.0000      |
| resimp1                            | 2849        | 3.6050      | 3.1507           | 0.0022      | 43.6915     |
| grgdp1                             | 3498        | 3.5953      | 6.6509           | -51.0309    | 106.2798    |
| lgdppc1                            | 3443        | 7.5489      | 1.5646           | 4.1309      | 10.9365     |
| <b>Further economic variables</b>  |             |             |                  |             |             |
| invgdp1                            | 3184        | 21.9191     | 8.6505           | -23.7626    | 113.5779    |
| debtservep1                        | 1984        | 15.1844     | 13.6285          | 0.0226      | 152.2670    |
| xdebtgni1                          | 2240        | 79.4170     | 89.6522          | 0.1437      | 1209.3030   |
| xbalgrp1                           | 3325        | -6.5101     | 16.9839          | -135.6007   | 53.6586     |
| globec1                            | 2479        | 55.8736     | 17.9050          | 10.4721     | 98.7163     |
| totadjgdp1                         | 2736        | 0.3818      | 9.2123           | -57.2151    | 148.1556    |
| infl1sc                            | 3046        | 9.9287      | 15.1371          | -16.0704    | 99.5920     |
| defgdp1                            | 1336        | 1.5565      | 7.8145           | -40.4263    | 203.7191    |
| stdebtdeb1                         | 2188        | 12.5903     | 12.4755          | 0.0000      | 85.0791     |
| peg                                | 2816        | 0.3817      | 0.4859           | 0.0000      | 1.0000      |
| curcris                            | 3275        | 0.0577      | 0.2332           | 0.0000      | 1.0000      |
| finopen                            | 2950        | 0.2471      | 1.5673           | -1.8081     | 2.5408      |
| <b>Further political variables</b> |             |             |                  |             |             |
| leadexelec                         | 3190        | 0.1028      | 0.3038           | 0.0000      | 1.0000      |
| lagexelec                          | 3313        | 0.1035      | 0.3047           | 0.0000      | 1.0000      |
| leadlegelec                        | 3189        | 0.2114      | 0.4083           | 0.0000      | 1.0000      |
| laglegelec                         | 3312        | 0.2147      | 0.4107           | 0.0000      | 1.0000      |
| polinstab                          | 1701        | 0.0032      | 1.3632           | -0.6774     | 13.4223     |
| socunrest1                         | 2393        | -0.0481     | 1.1322           | -0.4916     | 16.4803     |
| liberal                            | 3413        | 3.5387      | 1.9791           | 1.0000      | 7.0000      |
| globpol                            | 3098        | 56.2411     | 23.2876          | 1.5588      | 98.7830     |
| icrg                               | 2478        | 0.5588      | 0.2200           | 0.0417      | 1.0000      |
| unsc                               | 3156        | 0.0567      | 0.2313           | 0.0000      | 1.0000      |
| relsize1                           | 3520        | 0.5572      | 2.4466           | 0.0001      | 31.7090     |
| tradeus                            | 2994        | 0.0923      | 0.1186           | 0.1186      | 1.5142      |
| voteinlineusa                      | 3377        | 0.3317      | 0.1629           | 0.0000      | 1.0000      |