



# Stigma or Cushion? IMF Programs and Sovereign Creditworthiness

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## IMF Programs and Sovereign Creditworthiness

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**Abstract:** IMF programs are often considered to carry a “stigma” that triggers adverse market reactions. We show that such a negative IMF effect disappears when accounting for endogenous selection into programs. To proxy for a country's access to financial markets, we use credit ratings and investor assessments for 100 countries from 1988 to 2013. Our instrumental variable strategy exploits the differential effect of changes in IMF liquidity on loan allocation. We find that the IMF can “cushion” against falling creditworthiness, despite contractionary adjustments related to its programs. This positive signaling effect is also visible in monthly event-based specifications using country-times-year fixed effects. A text analysis of rating statements indicates a positive signal to investors if countries under IMF programs commit to economic reforms.

**Keywords:** International Monetary Fund, sovereign credit ratings, capital market access, creditworthiness, financial crises

**JEL Classification:** E44, F33, F34, G24

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## 1 Introduction

In the early 2000s, the International Monetary Fund (IMF) was widely considered to be in terminal decline (Dieter 2006). The demand for its loan programs at a record low, the IMF reduced the size of its staff and focused on its “surveillance” activities (Reinhart and Trebesch 2015). The 2008 global financial crisis and the ensuing sovereign debt crises, however, re-established the crucial role that the IMF plays for the global economy. With the IMF’s financial commitments reaching new all-time highs in 2010, pressing questions about the role and effectiveness of the “most powerful international institution in history” (Stone 2002, 1) re-emerge.<sup>1</sup>

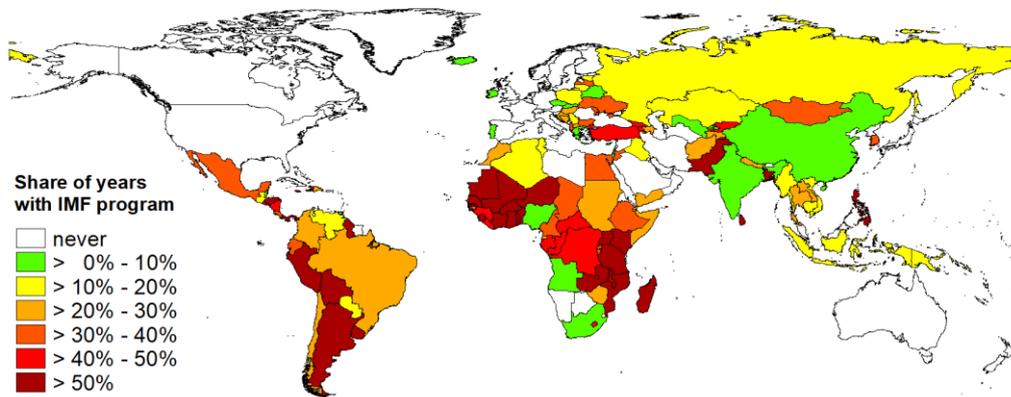
We take this resurgence of the IMF’s lending activities as a motivation to re-evaluate how successful the IMF is in achieving one of its core mandates, namely to help countries overcome balance-of-payments problems. As these problems usually manifest themselves in both the government and private companies facing severe limitations in access to foreign capital, we focus on restoring market and investor confidence as a key outcome to evaluate the IMF’s success. We consider this an urgent task for economists not only because of the IMF’s widespread engagement (see Figure 1) but also because the IMF’s effectiveness in this regard has recently been questioned in policy circles. Out of fear of a “stigma” associated with the use of Fund resources triggering adverse market reactions, countries are often hesitant to enter IMF programs and question their benefits (Andone and Scheubel 2017; IMF 2017). Probably not least due to the alleged decline of the IMF – but also because of the empirical challenges associated with assessing its effectiveness – economists so far have no clear answer to this.

We begin our analysis of this question by illustrating the problem of endogenous selection into IMF programs. To measure market confidence in a country’s creditworthiness, we use a large monthly panel data set of sovereign credit ratings from different US and Non-US agencies as well as assessments from professional investors. Combined with start dates of IMF programs, these data unambiguously indicate that countries typically sign IMF agreements while their creditworthiness is in severe decline. The fact that countries tend to experience economic crises and negative trends in their main economic fundamentals when IMF programs begin, results in a substantial negative selection effect that biases downwards any estimates of the IMF’s effect on creditworthiness (and related measures) that do not adequately account for this.

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<sup>1</sup> Arguably, the World Bank is of comparable importance, but with a different policy focus. For related research on the World Bank see Kersting and Kilby (2018).

Figure 1 – IMF Lending, 1973-2013



Note: Number in parentheses indicates share of years with an active IMF program in the 1973-2013 period.  
Source: Dreher (2006, updated)

We apply several empirical approaches to circumvent this endogeneity problem. Our main identification strategy is based on an instrumental variable (IV) that combines temporal variation in the IMF's liquidity with cross-sectional variation in a country's prior probability of participating in an IMF program (see also Lang 2016). The IMF's liquidity varies primarily because of an institutional rule that requires the IMF to review the financial contributions of its members ("quotas") every five years and as a consequence of large individual loan repayments. For identification, we exploit the fact that the IMF tends to expand its regular clientele in years in which its liquidity is higher, so that countries with an initially lower participation probability are more likely to receive a program in these years. The identifying assumption underlying this approach, which we explain in more detail in section 3, thus follows a difference-in-differences logic.

Using annualized panel data for a maximum of 100 countries over the 1987-2013 period, we find that the simple correlation of IMF programs with sovereign ratings is strongly negative. As one would expect in the presence of a downward bias, the OLS coefficient, while remaining negative, moves increasingly close to zero when conditioning step-by-step on country and year fixed effects as well as lagged macroeconomic and political controls. We then show that the remaining negative, statistically significant relationship turns positive and statistically insignificant when switching to the IV approach. This pattern emerges irrespective of whether we focus on ratings issued by Standard & Poor's, Moody's or Fitch, from non-US rating agencies based in Europe and Asia or when employing assessments by *Institutional Investors*,

which are based on surveys among professional investors and analysts at banks, money management and securities companies.

When turning to the mechanisms, we find that the absence of a significant aggregate effect masks important underlying dynamics. Our evidence suggests that the economic adjustments under IMF programs substantially reduce economic growth in the short run. Given that both official rating agency methods and empirical evidence show that ratings are directly (positively) influenced by GDP and growth, these contractionary effects would usually result in lower credit ratings. The fact that they are not affected suggests that IMF programs have a *positive signaling effect*. This signal (“seal of approval”) creates positive expectations about the country’s future policy path and *cushions* the drop in creditworthiness that countries undergoing such contractionary adjustments would usually suffer from.

We corroborate this result in three ways: First, specifications that ignore “bad control” problems reveal that when controlling for GDP dynamics, the conditional effect of IMF programs becomes substantially positive and statistically significant. IMF-induced GDP contractions, in contrast, do not seem to significantly affect credit ratings. Second, we use the credit ratings at a monthly frequency and information on the exact date of IMF agreements, and isolate variation within individual country-year observations with the help of country-times-year fixed effects. Event-based specifications then show that rating dynamics deteriorate before IMF agreements, but begin to improve in the month after the programs start. We argue that these immediate improvements cannot plausibly be attributed to the success of economic adjustments and political reforms but only to a positive *signaling* effect. Third, we conduct a systematic text analysis of statements about the IMF’s influence on sovereign credit ratings available on the news database *Dow Jones Factiva*. Out of 117 statements from rating agencies that mention the IMF, 84 indicate a positive influence of an active IMF program on their assessment while only one mentions a negative influence. A majority of these statements refer to the anticipated positive effects of policy reforms, implemented as part of the programs, on investor confidence.

In the remainder of this paper, we first examine theoretical expectations regarding potential mechanisms based on the existing literature in section 2. Section 3 presents our identification strategies and data. We report and discuss the empirical results in section 4. Section 5 concludes.

## 2 Potential Channels and Existing Literature

To increase creditworthiness, IMF programs need to increase investors' confidence in the "ability and willingness of an issuer [...] to meet its financial obligations in full and on time" (Standard and Poor's 2016; see also Panizza et al. 2009; Tomz and Wright 2007). We argue that it is helpful to differentiate between two main channels. First, we define *adjustment effects* as effects on ratings that are consequences of short-term changes in the country's economic and political fundamentals under IMF programs. Second, we consider *signaling effects* as changes in ratings caused by the signals about the country's expected future policy path that the presence of an IMF program sends to credit rating agencies and investors. As we build on this conceptual separation when empirically analyzing the channels driving the effects we find, we discuss theoretical considerations and existing evidence on both channels in the following.

### 2.1 Adjustment Effects

Consider *adjustment effects* first. A sovereign's creditworthiness as measured by credit ratings is most strongly influenced by the country's economic and political fundamentals. In the empirical literature on the determinants of ratings, gross domestic product (GDP) per capita, GDP growth, inflation, and external debt are found to be robust predictors (Afonso 2003; Cantor and Packer 1996; Fuchs and Gehring 2017; Hill, Brooks, and Faff 2010). Several political indicators like the political regime type, partisanship, and the rule of law have also been found to correlate with rating outcomes (Archer, Biglaiser, and DeRouen 2007). Together, these variables explain a large share of the variance in sovereign ratings. These results in the scholarly literature are in line with official rating manuals, which agencies publish to comply with regulatory standards.

The previous literature on the IMF examines several of these key determinants of creditworthiness as the outcomes of IMF programs (for reviews of this literature see Dreher and Lang 2016; Steinwand and Stone 2008). To the extent that IMF programs affect such outcomes, they influence creditworthiness via the *adjustment* channel. In terms of economic fundamentals, the focus of many such studies has been on economic growth. While some studies find a positive (Bas and Stone 2014) or insignificant (Atoyan and Conway 2006) relationship between IMF programs and growth, the majority of empirical studies suggest negative immediate effects (Barro and Lee 2005; Dreher 2006; Easterly 2005; Marchesi and Sirtori 2011; Przeworski and Vreeland 2000). Beyond growth, monetary stability, debt

management and the containment of external arrears are key goals of IMF programs (Kentikelenis, Stubbs, and King 2016). IMF programs are associated to reduced inflation and monetary growth, less risk of currency crises and banking crises, and improved market performance of banks (Dreher and Walter 2010; Papi, Presbitero, and Zazzaro 2015; Steinwand and Stone 2008).

In addition to these economic effects, IMF programs also appear to affect political outcomes. Several scholars link IMF programs to political instability and suggest that they increase the risk of civil war onset (Hartzell et al. 2010), coup d'états (Casper 2017), and government crises (Dreher and Gassebner 2012). One explanation for these politically destabilizing effects of IMF programs is that the burdens of economic adjustments under IMF programs are often distributed unequally (Lang 2016; Vreeland 2002).

In sum, the existing evidence suggests some positive adjustment effects regarding financial and monetary indicators, but mostly negative adjustments regarding reduced growth and political instability. It is thus an open empirical question as to whether the immediate implementation of adjustment policies resulting from IMF interventions leads to improvements or deteriorations in creditworthiness. Before we turn to testing this empirically, we distinguish these *adjustment* effects from *signaling* effects.

## 2.2 Signaling Effects

Sovereign credit ratings, as assessments of a future default probability, are based not only on information about a country's current economic and political performance, but also on expectations of the country's future development (Fuchs and Gehring 2017). As economic indicators like GDP and inflation are imperfect and noisy measures, it is rational for investors and rating agencies to use other signals to infer information and adapt their assessment. Any signal that gives an indication about the country's future policy path will influence this expectation. IMF programs can plausibly serve as such a signal.

On the one hand, they could function as a "seal of approval" (Polak 1991). The Fund itself claims that "IMF resources provide a *cushion* that eases the adjustment policies and reforms that a country must make to correct its balance of payments problem" (IMF 2016a, emphasis added). Accordingly, the provided liquidity is intended to enable a period of IMF-approved adjustments. In addition, the Fund can "lend credibility" (Stone 2002) to the announced reforms, and function as a commitment device to overcome time consistency problems (Dreher

2009).<sup>2</sup> To the extent that the IMF agrees to arrangements only if it approves of the country's policy agenda, its engagement also indicates reform quality (Dreher 2009; Marchesi and Thomas 1999). For these reasons, the Fund's engagement can positively affect expectations about the reforms' effects on sustainability and macroeconomic performance (Edwards 2006; Mody and Saravia 2006; Corsetti et al. 2006; Morris and Shin 2006).<sup>3</sup>

On the other hand, IMF programs may convey negative information (Andone and Scheubel 2017; Bas and Stone 2014; Ito 2012). If IMF programs are perceived as indicating that the country's financial problems are more severe than official indicators suggest, they can act as a negative signal. The IMF (2014) itself, for instance, is worried that countries under its loan programs carry a "stigma" (see also Reinhart and Trebesch 2015). Our background research and interviews at the IMF's headquarters with IMF staff revealed that in the recent past several countries indeed hesitated to sign Fund agreements out of fear of such a stigma.<sup>4</sup> In a recent statement on lending reforms the IMF (2017) states: "[a] key objective of the lending reform is to reduce the perceived stigma of borrowing from the IMF."

### 2.3 Issues with the Existing Evidence

Existing empirical studies linking IMF programs with creditworthiness have produced inconsistent results. We argue that issues with the proxies used as outcome variables and with accounting for selection bias are likely to be behind this inconsistency.<sup>5</sup>

A first set of studies examines the IMF's effect on inflow of different kinds of capital, mostly foreign direct investment (FDI). In an early review, Bird and Rowlands (2002) conclude that the empirical literature suggests that IMF programs *reduce* countries' access to capital markets. In the following, some studies found a negative effect (Bird and Rowlands 2009; Edwards 2006; Jensen 2004), insignificant results (Rowlands 2001) or evidence for a (conditionally) positive effect on FDI inflows (Bauer, Cruz, and Graham 2012; Biglaiser and DeRouen 2010; Woo 2013).

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<sup>2</sup> This conjecture is in line the literature on the effects of membership in international organizations more broadly (Dreher and Lang 2016). Membership in international organizations can improve borrowing conditions and increase inflows of foreign capital (Dreher, Mikosch, and Voigt 2015; Dreher and Voigt 2011; Gray 2009; 2013).

<sup>3</sup> An additional signaling effect of IMF programs discussed in the literature is the creditor moral hazard problem. The IMF could lead creditors to increase investments in government bonds of program countries because they anticipate IMF bailouts. Dreher's (2004, 20) literature survey concludes that there is "considerable evidence in favor of the hypothesis that the safety net provided by the IMF creates significant moral hazard with investors." We are not separately examining this aspect, as we are only interested in whether the IMF helps countries to restore creditworthiness, one way or the other.

<sup>4</sup> Multiple conversations with several IMF employees in the period between November 2016 and November 2017.

<sup>5</sup> Steinwand and Stone (2008) and Bauer et al. (2012) reach the same conclusion in their literature reviews. We refer the reader to these studies for a more detailed overview of this literature.

Jorra (2012) uses an indicator for sovereign default and finds an increased probability of default as a consequence of IMF lending. Another set of studies examines the IMF's effect on government bond spreads. Among these, Mody and Saravia (2006) and Eichengreen, Kletzer, and Mody (2006) find lower bond spreads in IMF program countries.<sup>6</sup> Chapman et al. (2015) report that implementing an IMF program is associated with higher bond spreads, but find that the size of the IMF loan, the extent of conditionality, and the political proximity of the program country to the United States all lead to important heterogeneities.

We argue that all of these measures come with important problems that can be avoided when using sovereign credit ratings as a proxy for creditworthiness. Compared to FDI, ratings are a more direct and precise proxy for creditworthiness. FDI flows are an indirect consequence of creditworthiness but are influenced by many other factors like economic openness and, in addition, capture only a fraction of total capital inflows. Compared to using defaults, which are very rare events, as a proxy, ratings provide a more fine-grained assessment and go beyond capturing only the extreme end of the wide spectrum of balance of payment problems. Compared to bond spreads, credit ratings are available for a larger set of countries and remain a reliable measure in times of crisis. Ratings provide a continuous measure of creditworthiness that, unlike bond spreads, is not directly influenced by changes in general market conditions such as shifts in demand for different asset classes (e.g., fixed income vs. equity) and risk categories (e.g., flight into quality), and bond supply effects. If governments under IMF programs adjust the supply of government bonds or when central banks acquire them, bond spreads convey a biased and inaccurate picture of how investors perceive the creditworthiness of a country. In addition, the liquidity of trading, which is crucial for the informational value of the market price, is often low for countries in crises. In sum, bond spreads are the least informative at the time when we are most interested in the information they convey. Ratings, on the other hand, are at all times easily comparable across countries and over time as they proxy for the same latent variable in each case. To the best of our knowledge, in this literature only Cho (2014) uses a measure that is related to credit ratings, and finds that assessments by *Institutional Investor* correlate positively with IMF programs in countries with left-wing governments.

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<sup>6</sup> A different but related series of studies has looked at how government bond spreads react to IMF signals regarding the likelihood of future bailouts (see footnote 2). Some studies find evidence for such "creditor moral hazard" caused by the IMF (Dell'Ariccia, Schnabel, and Zettelmeyer 2006; Lee and Shin 2008). Other studies provide evidence against the argument (e.g., Noy 2008).

The second shortcoming in the literature summarized above is that most studies do not establish causality in a convincing way. As selection into IMF programs is clearly not random, endogeneity severely biases the estimates of analyses that do not account for this. Mody and Saravia (2006, 852), the most cited study in this field, state that due to the difficulty of modeling selection into IMF programs and finding a suitable instrument, “explicit consideration of the selection bias problem is not undertaken.” While Jorra (2012) uses an instrument, its underlying assumption that IMF programs are the only plausible channel that link a country’s political proximity to the United States and default events is unlikely to hold: A country’s economic condition is plausibly related to the political preferences of the country’s government via more direct channels.<sup>7</sup> Chapman et al. (2015) provide instruments for the extent of IMF conditionality and IMF loan size, but do not instrument the presence of an IMF program.

Most other studies in this literature address endogeneity by controlling for a range of observable factors. As we explain in more detail in the next section, this is unlikely to remove the entire bias and, in addition, often creates a bad control problem. In sum, the astonishing differences in empirical results are potentially also attributable to the lack of plausible identification strategies. The empirical approach we present in the following aims to augment the literature in these respects.

### **3 Data and Identification**

#### **3.1 Dependent Variable: Sovereign Credit Ratings**

Our main proxy to measure the creditworthiness of a country is its sovereign’s long-term foreign-currency rating. In addition to their aforementioned advantages over other measures used in the previous literature, sovereign ratings possess several additional features that make them good proxies for sovereign creditworthiness: First, Reinhart (2002) shows that ratings predict defaults. This makes them an informative measure of creditworthiness for countries with severe payment problems, an important feature for our research question. Second, previous studies have related ratings to changes in government bond spreads (Afonso, Furceri, and Gomes 2012). They thus indicate the terms at which a country can access

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<sup>7</sup> See Lang 2016 for a detailed evaluation of different empirical strategies that have been used in the literature on the IMF’s effects and the need for a new instrument. When we use political proximity to the United States as an IV in our sample we do not find the IV to be relevant enough in the first stage.

international capital markets. Third, many investors, in particular pension funds but also insurances and to some degree banks, are bound by internal regulations that restrict investments to investment-grade bonds. In addition to the information effect that bond assessments convey to investors, this “hard-wiring” is another reason why rating changes directly affect refinancing costs of governments. Fourth, ratings serve as a de-facto ceiling for the credit rating of private companies from the respective country (Borensztein, Cowan, and Valenzuela 2013), and hence also capture the private sector’s ease of access to foreign capital.

The main criteria applied to assess sovereign bonds are to a large degree comparable across agencies, but there are some differences (Fuchs and Gehring 2017). While our main estimations rely on ratings from Standard and Poor’s (S&P), which offers the broadest country coverage over the longest period, we also use ratings from Moody’s and Fitch to show that the existing differences across agencies do not drive the results.<sup>8</sup> Since the three major rating agencies are based in the US, and cultural distance between an agency and the sovereign it assesses can influence ratings (Fuchs and Gehring 2017), we also consider ratings from agencies based elsewhere: The variable *Ratings(Non-US)* captures the average of all major agencies outside the United States.<sup>9</sup> This included the Japanese agencies Japan Credit Rating (JCR) and Rating and Investment Information (R&I), as well as the German agency Feri, the Canadian Dominion Bond Rating Services (DBRS) and Capital Intelligence (CI) from Cyprus.

We use hand-collected information on sovereign ratings by most agencies from Bloomberg (see Appendix A, as well as Fuchs and Gehring, 2017 for details). Ratings published by Feri and Fitch are directly from the agencies. To analyze the dynamics around IMF program starts we use data at a monthly frequency. Our panel regressions at the yearly level use ratings at the end of the year. All ratings are translated to a 21-point scale, assigning the highest value for a “AAA” rating, while “C” and below translates into a value of one (see Appendix B).

### 3.2 Treatment Variable

The explanatory variable of interest (or “treatment” variable), *IMFprogram*, is an indicator that takes the value of one if country  $i$  was under an IMF program for at least five months in year  $t$  (as in Dreher 2006). Following the previous literature, our definition encompasses all IMF

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<sup>8</sup> S&P covers most high and middle-income countries. The IMF itself – jointly with the World Bank – rates the risk of debt distress under the so-called Debt Sustainability Framework (see Lang and Presbitero 2018).

<sup>9</sup> Fitch Rating is dual-headquartered in London, UK and New York, USA.

programs under any of the following facilities: Stand-By-Arrangements (SBA), the Extended Fund Facility (EFF), the Structural Adjustment Facility (SAF), or the Poverty Reduction and Growth Facility (PRGF). In alternative specifications, we also use the variable *IMFapproval*, which indicates only the year in which an IMF program was initially approved. To corroborate our arguments concerning biasing factors and channels, we also use an alternative monthly dataset in which we use information on the exact date an IMF program was approved. The latter we coded based on the IMF’s Monitoring of Fund Arrangements database (IMF 2016b).

### 3.3 Endogenous Selection into IMF Programs

We want to know whether the presence of an IMF program in year  $t$  in country  $i$  affects the country’s credit rating at the end of year  $t$ . The fundamental methodological issue with this question is that selection into IMF programs is obviously not random. On the contrary, “treated” countries typically experience an economic crisis when entering into a program, and the more severe the crisis is, the more likely it is that a country is under an IMF program. As a consequence, simple comparisons between treated and non-treated country-year observations will not yield causal effects but capture the negative bias resulting from omitted variables and reverse causality. The deteriorating economic conditions that make a country more likely to enter an IMF program negatively affect a country’s creditworthiness, and a country with lower creditworthiness is thus more likely to turn to the IMF. In the following, we show why controlling for selection-on-observables is insufficient and propose an alternative strategy.

To begin with, we use our monthly data on sovereign credit ratings and on the exact date that countries enter into an IMF arrangement to illustrate the problem graphically. Figure 2 plots the average behavior of credit ratings around *IMFapprovals*. Specifically, on the y-axis the figure depicts the unweighted average of the month-specific deviations from each country’s mean credit rating in the 1990–2013 period over all countries that received an IMF program at least once in this period.<sup>10</sup> For all countries, *month* on the x-axis is set to zero for the month in which the country’s first IMF program in the observation period started.

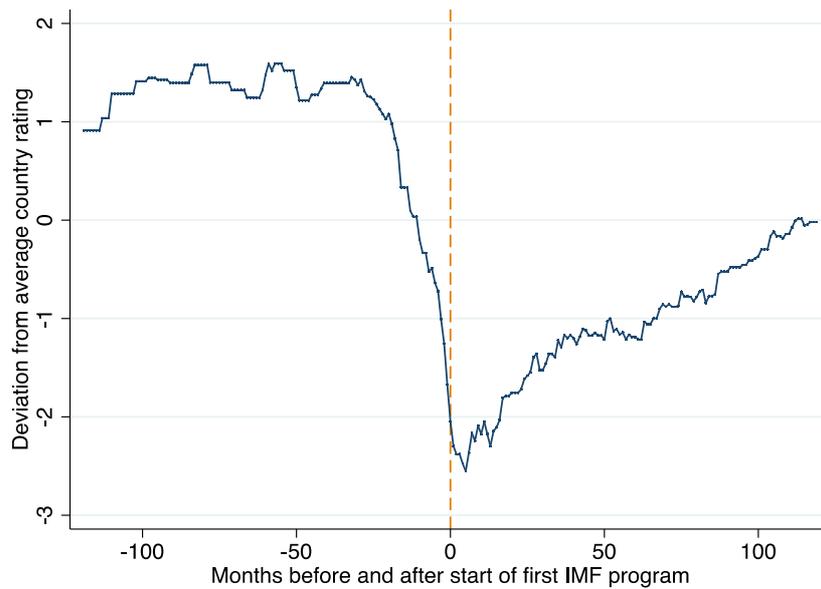
Several important observations are evident. First, credit ratings appear to capture balance-of-payment crises well. As one would expect, countries enter into IMF agreements several months after economic crises hit and creditworthiness collapses. On average, countries’ credit ratings deteriorate by about three notches in the approximately one and a half years preceding

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<sup>10</sup> Examining the deviation from the country mean is equivalent to using country fixed effects in a panel regression.

the IMF program's beginning. Second, IMF programs start at a low point, but creditworthiness continues to fall for several months thereafter. After about a year, ratings seem to begin recovering. Third, this recovery process is on average rather slow: It takes several years until creditworthiness is restored to pre-crisis levels. The figure also illustrates the problem of endogenous selection into the treatment. Credit ratings are at a low level and in an ongoing process of decline during the early months of IMF programs for reasons at least partly unrelated to the IMF program itself. Given that the average IMF program in our sample lasts for about four years (with a large variance), any simple regression of credit ratings on a variable indicating the start or the presence of an IMF program is biased by the fact that IMF programs typically start when ratings are already low and in further decline.

Figure 2 – Rating Dynamics Around Starts of IMF Programs



Note: The figure plots the unweighted mean across countries of the month-specific deviation from each country's average S&P credit rating in the 1990-2013 period on the y-axis. The number of months around the start of the country's first IMF program of this period is on the x-axis. Sample restricted to countries with at least one IMF program.

A basic model designed to estimate the effect of *IMFprogram* on *Rating* based on controlling for selection-on-observables looks like the following:

$$Rating_{i,t^*} = \beta IMFprogram_{i,t} + \mathbf{X}'_{i,t-1} \gamma + \delta_i + \theta_t + \varepsilon_{i,t} \quad (1)$$

In a regression equation of this type  $\mathbf{X}'$  is a vector of country-year specific observable control variables and  $\delta_i$  and  $\theta_t$  stand for country fixed effects and year fixed effects, which control for unobserved time-invariant country characteristics and for global shocks that affect all countries equally.  $\varepsilon_{i,t}$  is the i.i.d. error term and  $t^*$  indicates the value at the end of year  $t$ .

We expect that the bias introduced by endogenous selection into the program is reduced but not eliminated by fixed effects and controls variables. Formally:

$$E(IMFprogram_{i,t}\varepsilon_{i,t}) < E(IMFprogram_{i,t}\varepsilon_{i,t}|\delta_i, \theta_t) < E(IMFprogram_{i,t}\varepsilon_{i,t}|X', \delta_i, \theta_t) < 0 \quad (2)$$

It is natural to expect that fixed effects reduce the negative bias in this estimation: Global business cycles could affect both creditworthiness and the demand for IMF programs and, more importantly, typical IMF program countries tend to be economically weaker and thus less creditworthy because of time-invariant country characteristics. Furthermore, it is plausible that country-year specific control variables further reduce this bias because they make treatment and control groups comparable in terms of observables. Nevertheless, such an empirical strategy is insufficient and problematic for at least three reasons.

First, the available cross-country panel data on macroeconomic and political fundamentals are unlikely to capture all information that ratings agencies, national policy-makers, and IMF staff had available at the specific time decisions about creditworthiness and IMF participation were made. This includes information on context-specific and country-specific economic vulnerabilities or political events that rating agencies consider when assessing creditworthiness and that decision-makers in the IMF and in national governments take into account when deciding on starting or continuing IMF programs.

Second, even if all relevant economic and political fundamentals could be observed and measured at the country-year level, this would not necessarily solve the problem. Most of these indicators are available only at the yearly level – if they are available for a large panel at all – and ignore the crucial dynamics within a year that we highlight in Figure 2. Economic and political fundamentals in countries that enter IMF programs are likely to deteriorate quicker during the year. A focus on country-year specific means of observable controls would hence not be able to control for this unobserved heterogeneity between treatment and control group.

Third, many of the control variables that in this particular setting are needed to increase the comparability of treatment and control groups are “bad controls” because they are themselves plausible outcomes of the treatment. As discussed above, the literature suggests that ratings are a function of many of the same economic and political fundamentals that the IMF directly affects. If, for instance, IMF programs increased growth and rating agencies improved their credit assessment because of this, holding growth constant would prevent the regression from

attributing the positive effect of the IMF on creditworthiness via the growth channel. This problem is mitigated but not entirely solved by lagging these variables by one or two periods, because IMF programs last for multiple years and both ratings and fundamentals exhibit some persistence.<sup>11</sup>

In sum, estimation strategies that rely on controlling for selection on observables alone cannot adequately address the question at hand. Ideally, we would want a mechanism that randomly assigns countries that are on comparable trajectories to an IMF program. We approach such an ideal assignment mechanism by employing an instrumental variable (IV) that changes the likelihood that a particular country receives a program based on factors that are exogenous to the trajectory of this particular country.

### 3.4 Identification

Our instrumental variable strategy combines spatial and temporal variation via an interaction term. The IV is based on Lang (2016) and is defined as:

$$IV_{i,t} = IMFprobability_{i,t} \times \ln(IMFliquidity_t) \quad (3)$$

*IMFprobability* is a country's probability of having participated in an IMF program in the past, defined as the share of past years that a country was under an IMF program.<sup>12</sup> *IMFliquidity* denotes the IMF's time-varying liquidity ratio, defined as the organization's liquid resources divided by its liquid liabilities. It is a measure of the amount of liquid resources the Fund has available for its loan programs in a given year. The data are collected from individual IMF Annual Reports (1973-2013) and from the IMF International Financial Statistics.

The IV strategy builds on the finding that countries that have received IMF programs in the past are more likely to receive them in the present. Variables indicating past IMF participation like *IMFprobability* are thus strong predictors of present *IMFprogram* indicators (Berger, de Haan, and Sturm 2005; Bird, Hussain, and Joyce 2004). The literature explains this finding by pointing to "recidivism," political favoritism and staff incentives (Dreher and Lang 2016,

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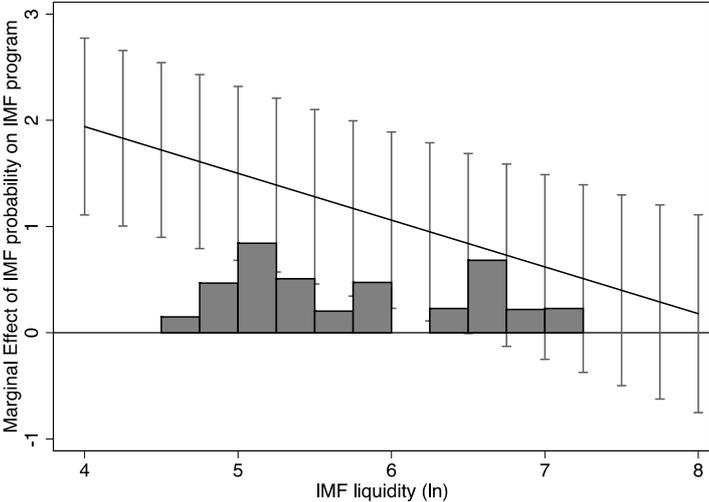
<sup>11</sup> Additionally, holding  $X'$  constant if IMF programs have an effect on the intermediate outcome  $X'$  creates the problem that treatment and control groups will differ in potential outcomes. The coefficient of the treatment will compare units that are identical in  $X'$  but differ in *IMFprogram*. If, however, the treatment affects  $X'$ , then potential outcomes of these units will automatically differ and this coefficient will not estimate a causal effect. For more details on this point see chapter 9 in Gelman and Hill (2007) or chapter 3.2.3 in Angrist and Pischke (2008).

<sup>12</sup> We start the count of years of past IMF participation in 1973 and thus 15 years before our observation period starts. This ensures that the variable does not fluctuate strongly from one year to the next for the early years of the sample and increases the plausibility of the exclusion restriction further because the value is determined by earlier periods.

Steinwand and Stone 2008). The more specific finding that we exploit for identification is that the influence of prior *IMFprobability* on present *IMFprogram* participation differs conditional on the year-specific extent of the IMF’s liquidity.

Specifically, in years with relatively low levels of *IMFliquidity*, programs tend to go to countries that have received more programs in the past. Then, *IMFprobability* is a strong predictor of *IMFprogram*. But a country’s IMF participation history is a weaker predictor of a present *IMFprogram* in years in which the IMF’s liquidity is high. A plausible explanation for this pattern is that in high liquidity years, the IMF can be more generous and has an increased incentive to look for additional program countries beyond its more regular clientele. The public choice literature on international organizations emphasizes that IMF staff faces bureaucratic incentives to expand their field of activity.<sup>13</sup> These incentives as well as the financial opportunities to do so are particularly strong when liquidity is high. In line with this, we find that in these years the IMF is more likely to give programs to countries that otherwise receive them less often. A country’s IMF participation history is then a weaker predictor of *IMFprogram*. Figure 3 illustrates this relationship by plotting the marginal effects of *IMFprobability* on *IMFprogram* conditional on the level of *IMFliquidity*.

Figure 3 – Illustrating the First Stage Effect



Note: The figure plots the marginal effects of *IMFprobability* on *IMFprogram* for varying levels of *IMFliquidity* (along with 95% confidence intervals). It corresponds to the first-stage regression of our baseline IV regression, as reported below in column 6 of Table 1.

<sup>13</sup> This literature (surveyed in Dreher and Lang 2016) argues that international bureaucrats face incentives to increase their budgets, remits, staff, relevance, and political influence and thereby contribute to the expansion of IOs in size, power and responsibilities in an increasing number of countries. Anecdotal evidence we gathered in personal conversations with IMF staff support this view. Inside the IMF, there is a certain concern to lose relevance when the IMF’s resources are unused. Several staff members described attempts to make loans more attractive in recent, high liquidity years (conversations in Washington, D.C., between November 2016 and November 2017).

We run two-stage least squares (2SLS) panel regressions over an unbalanced sample of 100 countries in the 1988–2013 period. This gives us the first and second stage equation:

$$IMFprogram_{i,t} = \alpha_1 IV_{i,t} + \alpha_2 IMFprobability_{i,t} + \delta_i + \tau_t + u_{i,t} \quad (4)$$

$$Rating_{i,t*} = \beta_1 \widehat{IMFprogram}_{i,t} + \beta_2 IMFprobability_{i,t} + \delta_i + \tau_t + \varepsilon_{i,t} \quad (5)$$

These regressions control for the initial, pre-determined *IMFprobability* in both stages while year fixed effects absorb the level effect of *IMFliquidity*. Hence, for identification we only need to assume the exogeneity of the interaction term conditional on its two constituent terms.

$$E(\varepsilon_{i,t} IMFprobability_{i,t} IMFliquidity_t \mid IMFprobability_{i,t}, IMFliquidity_t) = 0 \quad (6)$$

This IV strategy follows a difference-in-differences logic as in Nunn and Qian (2014) or Temple and Van de Sijpe (2017), and is similar to shift-share or Bartik instruments (Goldsmith-Pinkham et al. 2018). In our case, for the exclusion restriction to be violated, omitted variables would have to be correlated with the year-specific IMF liquidity *and* affect creditworthiness *differently* in countries with *different* levels of IMF probability.<sup>14</sup> This conditional relationship is highly unlikely because, first, the main sources of variation in the IMF’s liquidity ratio are very distant to events in individual country-years. Second, even if unobserved determinants of creditworthiness were correlated with the overall IMF liquidity ratio, then their effect on country-year specific creditworthiness would, in addition, have to vary depending on the country-year specific level of *IMFprobability*. Nevertheless, skeptical readers may worry that such a relationship exists and violates the common trend assumption. In the following, we offer both theoretical arguments and empirical evidence to counter such worries.

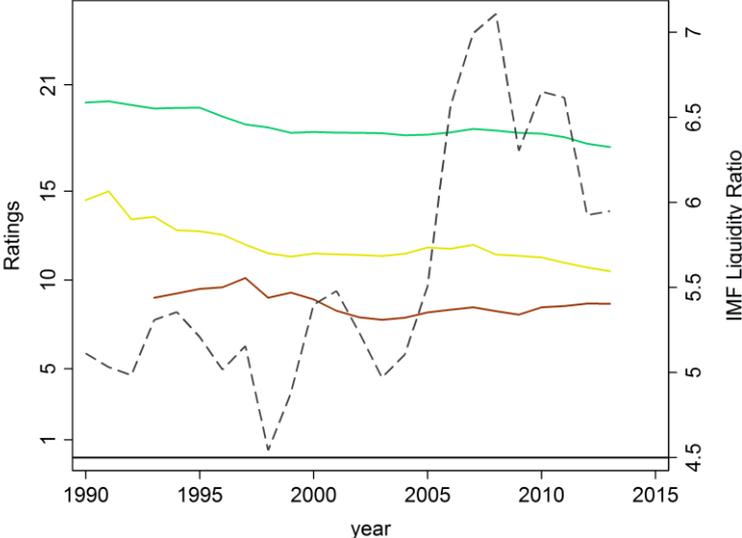
First, note that the main sources of variation in the IMF’s liquidity ratio is an institutional rule in the IMF’s Articles of Agreement that requires the Fund to review the quota subscriptions of its members every five years. Following quota reviews that propose increases, members commit more resources leading to an increase in the Fund’s liquid resources. The timing of the subsequent spikes in liquidity, which emerge several years after the review, is thus plausibly exogenous to creditworthiness dynamics in individual countries. The second source of variation in the liquidity ratio are repayments of extraordinarily large, individual loans. While the vast majority of individual repayments are too small to significantly affect the IMF’s overall liquidity, some repayments of large loans of economically large countries can make a

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<sup>14</sup> Note that a global trend that correlates with the IMF’s liquidity and with global rating trends does not threaten the exclusion restriction.

noticeable difference for the IMF’s liquid liabilities. However, the timing of these transactions is agreed upon years in advance. We consider it implausible that the predetermined repayment schedule the Fund develops with a small number of economically large program countries is associated with individual future creditworthiness dynamics in other countries.<sup>15</sup> Furthermore, our results are robust to omitting the cases with large repayments and to using liquid resources without dividing by liquid liabilities.

Figure 4 – The IMF’s Liquidity Ratio and Trends in Credit Ratings



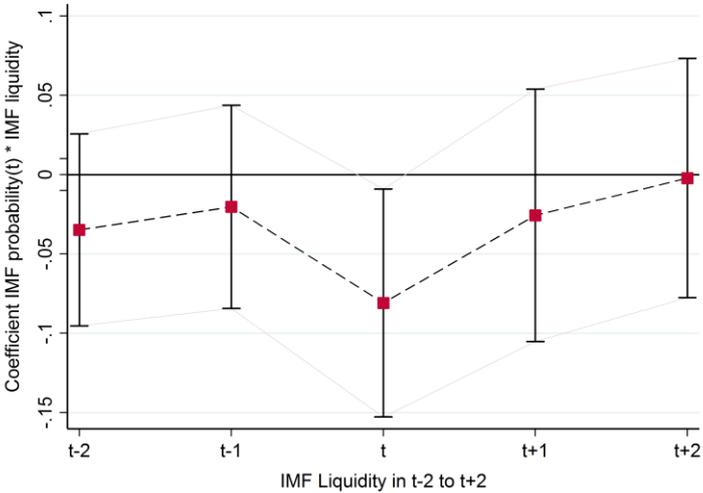
Note: The dashed line is the time series of the IMF’s liquidity ratio. In addition, the figure plots mean credit ratings in the group of countries that never receive a program (upper line, green), that have a low probability of receiving a program (middle line, yellow, below 85<sup>th</sup> percentile), and a high probability (red, above 85<sup>th</sup> percentile). Results are similar when using other cutoff percentiles.

A recent paper by Christian and Barrett (2017) highlights potential problems with interaction instruments combining cross-sectional and temporal variation. These can arise if a long-run trend in the time-series dominates year-on-year variation and this long-run trend overlaps with a trend in the outcome in low or high probability countries. This is why for Figure 4 we separate countries into three groups: those that never have an IMF program, those with a low probability of having one, and those with a high probability. The figure shows no apparent overlap in long-run trends in any of these groups with the *IMFliquidity* time series. Generally, *IMFliquidity* exhibits substantial year-on-year variation. We also find no correlations with global economic trends like global GDP growth ( $r = -.14$ ) or the number of systemic banking

<sup>15</sup>For the sake of completeness, note that there are two additional minor sources of variation in the IMF’s liquidity ratio. Liquid resources can also vary if the Fund changes the basket of currencies that it considers “usable.” The liquid liabilities’ second source of variation is the Fund’s borrowing from its members. While total borrowing by the Fund is zero in many years, its average share of the liquid liabilities is approximately 15%.

crises ( $r = -.03$ ). To further rule out that these global trends interact with a country’s IMF participation history in a way that threatens the exclusion restriction, we also interact them with *IMFprobability* and add these interactions as control variables in robustness tests. To demonstrate that the year-on-year variation in *IMFliquidity* rather than a long-run trend drives the first-stage effect, we examine a first-stage specification for which we interact *IMFprobability* with different leads and lags of *IMFliquidity*. Figure 5 shows that there are no signs of a worrying significant pre-trend. The most negative coefficient, and the only statistically significant one, is the interaction of the probability with the liquidity in the same year. The relationship is smaller and statistically insignificant in the subsequent years.

Figure 5 – Effect of Probability (t) with Leads and Lags of IMF Liquidity on IMF program



Note: The dependent variable is whether country *i* had an IMF program in *t*. The figure plots first-stage coefficients (along with 95% confidence intervals) of the interaction of *IMFprobability* in *t* with *IMFliquidity* in *t-2*, *t-1*, *t*, *t+1*, *t+2*.

Another recent paper by Goldsmith-Pinkham et al. (2018) shows that it is important when using Bartik instruments to examine to what degree the first stage is driven by outliers in the cross-section or time-series. While our approach is somewhat different to a standard Bartik instrument, we address this point in section 4.3 and show that the first stage is not driven by individual observations, by omitting potentially atypical observations and analyzing partial leverage plots. This highlights that there is a large number of “compliers,” and that the changes in the IMF’s liquidity affect the likelihood of receiving a program for a wide range of countries and years.

## 4 Results

### 4.1 Baseline

We begin by looking at the simple correlation between the treatment variable, *IMFprogram*, and the S&P credit rating as the outcome. Column 1 in Table 1 shows that the correlation is negative with a large coefficient of -6.256. The subsequent specifications support the conjecture of a large downward bias in the coefficient when not accounting for endogenous selection into IMF programs. Conditioning on country fixed effects in column 2, plausibly eliminating an important part of this bias, drastically decreases the point estimate in absolute terms to -1.422. This shows that the unconditional correlation in column 1 largely picks up time-invariant differences between countries. Global time trends that affect both credit ratings and countries' likelihood of receiving an IMF loan, in contrast, have no substantial impact in this setting. We net these out by additionally including year fixed effects in column 3 and find that the coefficient of interest changes only marginally.<sup>16</sup>

Before adding control variables, we restrain the sample to those countries for which all control variables are available in column 4. This barely affects the coefficient, showing that sample selection depending on the availability of control variables is not a concern. The fifth specification then adds a comprehensive set of country-year specific economic and political controls (following Fuchs and Gehring 2017, see Appendix D for details). The aim is to condition on the initial state in which countries enter into an IMF program, and further reduce the (negative) selection bias. As IMF programs on average last about four years, we lag the variables by five years to mitigate bad control concerns. Consistent with the hypothesized negative selection bias, the coefficient of interest decreases in absolute terms, but remains negative and statistically significant at the one percent level. Thus, when approaching the selection problem via conditioning on observables, we would still conclude that IMF programs have an economically small, yet statistically significant, negative effect on creditworthiness. Nevertheless, as we argue above, this coefficient is likely biased because of this approach's inability to address selection on unobservables like dynamics during the year and because of the potential bad control problem in creates.

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<sup>16</sup> This also suggests that it is unlikely that such time trends threaten the exclusion restriction underlying the subsequent IV estimations.

Table 1 – Baseline

Estimation Method	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	IV (6)
IMF program	-6.256 [0.525] {0.000}	-1.422 [0.282] {0.000}	-1.311 [0.300] {0.000}	-1.315 [0.359] {0.000}	-1.011 [0.252] {0.000}	0.404 [0.885] {0.648}
Country FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes
Controls (t-5)	No	No	No	No	Yes	No
Observations	2047	2047	2047	1294	1294	2045
Adjusted R-squared	0.206	0.082	0.116	0.130	0.280	

### First Stage Results

IMF liquidity × IMF probability	-0.458 [0.076] {0.000}
IMF probability	3.721 [0.581] {0.000}
K-P underidentification LM-statistic	16.091
K-P underidentification p-value	0.000
K-P weak identification F-statistic	35.923

Notes: The dependent variable is the country's long-term foreign-currency rating by Standard and Poor's. Standard errors clustered at the country level are displayed in brackets, p-values in curly brackets. Appendix D provides a comprehensive list of all economic and political controls added in column 5.

The next step implements our instrumental variable approach. The first stage, reported in the bottom panel of the table, shows that the interaction term is negative and statistically significant at the one percent level. This indicates that in high liquidity years, the potential program country's participation history in IMF programs is indeed a less important predictor of receiving a program. The IV passes the underidentification test with a p-value of less than 0.001, and the Kleibergen-Paap (K-P) F-statistic testing for weak identification is about 35 and thus well above the rule of thumb of 10, as well as above the more conservative threshold of 16.66 proposed by Stock and Yogo (2005).

The second stage of this regression shows that the coefficient of interest now turns substantially more positive, with a value of 0.404. Hence, the point estimates move exactly as one would expect in the presence of negative selection bias, which was only partly captured by fixed effects and conditioning on observables. Overall, we thus find no evidence for a negative IMF program effect on a country's creditworthiness; if anything, the point estimate indicates a small positive, yet statistically insignificant, relationship. The relatively large standard error suggests that this insignificant aggregate effect masks large heterogeneities between IMF programs and the ways they affect creditworthiness. For that reason, we continue with examining the underlying channels.

#### **4.2 Channels: Adjustment vs. Signaling**

Our theoretical considerations discussed above distinguish two channels how IMF interventions can influence creditworthiness. First, as IMF programs often lead to far-reaching economic reforms they can influence a country's creditworthiness via the implementation of immediate *adjustments*. In the previous literature, IMF programs were associated with improvements in certain economic fundamentals, but also with political instability and lower growth rates. Second, an IMF program is also a *signal* that can affect expectations. Independent of its actual economic effects, the mere presence of the IMF conveys information about the country's future policy path to those assessing its creditworthiness.

To differentiate between these two channels, we begin by investigating the short-term adjustment effects of an IMF program on the most important economic factors determining creditworthiness in our sample. We focus on GDP, inflation, the change in government debt and the current account balance, as in the rating literature these are cited as the most important

predictors of sovereign credit ratings (Archer, Biglaiser, and DeRouen 2007; Cantor and Packer 1996; Hill, Brooks, and Faff 2010).<sup>17</sup>

*Table 2 – Channels*

Dependent Variable:	GDP Growth	Inflation	Change in Public Debt	Current Account Balance
	(1)	(2)	(3)	(4)
IMF program	-4.187 [1.292] {0.001}	0.067 [0.044] {0.129}	1.776 [2.265] {0.433}	4.187 [3.432] {0.223}
Observations	2032	1796	1840	1808
K-P underid. LM	16.098	15.983	16.397	16.637
K-P underid. p	0.000	0.000	0.000	0.000
K-P weak id. F	35.898	35.383	37.598	38.032

Note: Results are based on the baseline IV regression (Table 1, column 6), but with other dependent variables. Standard errors clustered at the country level in brackets, p-values in curly brackets.

Table 2 shows the results based on the baseline IV specification when the outcome variable is substituted with these variables. For inflation, changes in government spending, and the current account balance, the estimates are statistically insignificant. There is, however, a negative effect on growth rates of GDP in the short-run. In this sample, IMF programs induce growth rates that are about four percentage points lower compared to the counterfactual.<sup>18</sup> In the average IMF program country (where growth rates fluctuate more than in countries that never receive IMF programs) this is equivalent to about one standard deviation. It is thus a large, albeit not unrealistically large effect considering previous results in the literature on this relationship (Barro and Lee 2005, Dreher 2006). Considering also the substantial extent of budget cuts, tax increases and other measures with potentially short-run contractionary consequences that IMF programs typically entail.

<sup>17</sup> Note that we can replicate the explanatory power of these variables in our sample. We find significant associations with S&P ratings for all variables except the change in government debt. In a simple OLS regression of S&P ratings the variables explain 75 percent of the variance. In an analogous fixed-effects regression the within-R2 equals .31 while the overall-R2 equals .74. Interestingly, most of the variation is explained by the variables indicating level and growth rate of GDP: These two variables alone explain 71 percent of the variation in an OLS rating regression and 27 percent of the within-country variation in a fixed-effects regression.

<sup>18</sup> Note that IMF programs last for multiple years, and thus most of the country-year observations with an active program are years in which IMF programs were already active in the year(s) before. The estimates, thus, also includes lagged effects of previous program years.

Many program countries feature a large public sector, whose size IMF conditions often reduce (Rickard and Caraway 2018). IMF staff recently argued that the IMF underestimated the size of the fiscal multiplier in past crises and thus projected smaller negative effects of fiscal austerity on GDP than those that eventually materialized (Blanchard and Leigh 2013). Many program countries also rely on debt-financed growth in the years before they start IMF programs, and cannot maintain such growth under a program as the IMF often sets limits on new debt (Kentikelenis, Stubbs, and King 2016).

To sum up, the economic adjustments that crisis countries under IMF programs typically implement lead to lower growth and no statistically significant short-term improvements in the other major predictors of creditworthiness.

Credit ratings are a direct function of changes in GDP (as is stated in the official manuals of all agencies), which is why rating agencies normally respond to such sharp growth reductions by lowering their assessments of creditworthiness.<sup>19</sup> Against this backdrop, it is remarkable that the coefficient on IMF programs in the creditworthiness regressions is not negative. This suggests that IMF programs cause negative economic *adjustments* that would usually lead to declining creditworthiness, but also convey a positive *signaling* effect that prevents this decline. The result is an aggregate null effect. IMF programs appear to function as a “seal of approval” that helps program countries to maintain their level of creditworthiness despite contractionary adjustments.

Ideally, we would want to estimate this signaling effect by netting out the effect of IMF-induced economic adjustments. The results in Table 2 show that IMF programs reduce GDP growth. As growth itself also is a strong predictor of ratings, it is an intermediate outcome affected by the treatment. In a potential outcome framework, we cannot, however, estimate the exact effect size and significance of a particular channel. Adding GDP growth to the same equation does not necessarily yield the conditional causal effect of *IMF program*.<sup>20</sup> Nonetheless, under the assumption that a potential “bad control” bias is sufficiently small, the change in the estimated treatment effect can be informative about the role that signaling plays beyond immediate economic adjustments.

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<sup>19</sup> According to the manual published by Standard & Poor’s a credit rating can be best understood as a scoring model. There is an economic and a political dimension, which are each composed of different factors. For each factor the country gets assigned a grade, and the factors are summed up to a grade for the given dimension.

<sup>20</sup> See the identification section, Gelman and Hill (2007), as well as Angrist and Pischke (2008).

To examine the role of signaling, we employ two different strategies in Table 3. First, we add *GDP per capita* and *GDP contraction*<sup>21</sup> as control variables to the baseline IV regression. Compared to the baseline specification in column 1, the point estimate turns substantially larger and statistically significant with a p-value of 0.052 (column 2). The coefficient becomes only slightly larger (with p=0.017) when adding the additional channels from Table 2, suggesting that GDP is indeed a main mechanism. This would indicate that the positive signal the IMF conveys corresponds to an improvement of about two rating notches, e.g. from CCC+ to B.

Table 3 – Adjustment vs. Signaling

	(1)	(2)	(3)	(4)	(5)
IMF program (t)	0.328	1.675	2.111		
	[0.879]	[0.862]	[0.883]		
	{0.709}	{0.052}	{0.017}		
GDP contraction (t)		-0.115	-0.112		
		[0.028]	[0.030]		
		{0.000}	{0.000}		
GDP per capita (ln) (t)		6.790	6.865		
		[1.225]	[1.322]		
		{0.000}	{0.000}		
GDP contraction, IMF induced (t)				0.080	0.016
				[0.216]	[0.147]
				{0.712}	{0.911}
GDP contraction, residual of IMF induced (t)					-0.122
					[0.022]
					{0.000}
Country and Year FE	Yes	Yes	Yes	Yes	Yes
Additional Channels (t)	No	No	Yes	No	No
Observations	2016	2016	1726	2016	2016
K-P underid. LM	16.060	13.314	11.814	7.493	7.493
K-P underid. p	0.000	0.000	0.001	0.006	0.006
K-P weak id. F	35.755	26.698	23.709	11.326	11.326

Notes: The dependent variable is the country's long-term foreign-currency rating by S&P. In columns 1-2, IMF program is instrumented by *IV*; in column 3-4, GDP contraction is instrumented by *IV*. Standard errors clustered at the country level are displayed in brackets, p-values in curly brackets. "Additional channels" include the variables inflation, change in government debt, and current account balance from Table 2.

Second, we use the IV directly as an instrument for IMF induced GDP contractions. As the IV affects IMF programs and programs affect growth, this approach isolates the variation in GDP

<sup>21</sup> We use the variable *GDP contraction*, the additive inverse of *GDP growth*, to simplify the interpretation of results.

growth that is due to IMF programs. Column 4 shows that such contractions have a small and insignificant effect on credit ratings. In column 5, we additionally include the first stage residuals; they capture the variation in *GDP contractions* that is not explained by the IV and thus *not* induced by IMF programs. These residuals are associated with significantly lower ratings. In contrast, the IMF induced GDP contraction remains small and insignificant. While GDP contractions directly map onto ratings in normal times, the finding that GDP contractions under IMF programs have no such effect is consistent with a positive signaling effect.

In sum, these three pieces of evidence point towards a positive signaling effect. First, IMF programs reduce contemporary growth rates, which usually leads to rating downgrades. The fact that the net effect of IMF programs on ratings is slightly positive and statistically insignificant suggests that programs have some kind of additional, positive effect on creditworthiness assessments. Second, and in line with this, we find that economic contractions caused by the IMF do not lead to a decline in creditworthiness. As long as growth reductions occur under an IMF program, investors are more likely to regard them as part of a positive adjustment process. Third, and further supporting this, IMF programs are related to improvements in creditworthiness when conditioning on those short-term economic contractions.

Albeit imperfect, all of these results are consistent with a positive signal conveyed by the IMF's presence. To expand on these IV estimations, the next section uses a monthly event-based specification as an alternative approach to more directly examine signaling effects.

### **4.3 Event-based Evidence on Signaling Using Monthly Data**

So far, we have used data at the yearly level, because information on the IMF's liquidity ratio, which was needed for the construction of the IV, is only available on an annual basis. For both credit ratings and IMF programs, however, we were able to collect data at a finer-grained level. The variation of these higher-frequency data allows us to apply an alternative method, which – like our IV approach – is able to control for selection on unobservables. The identifying assumption it is based on, however, is completely different.

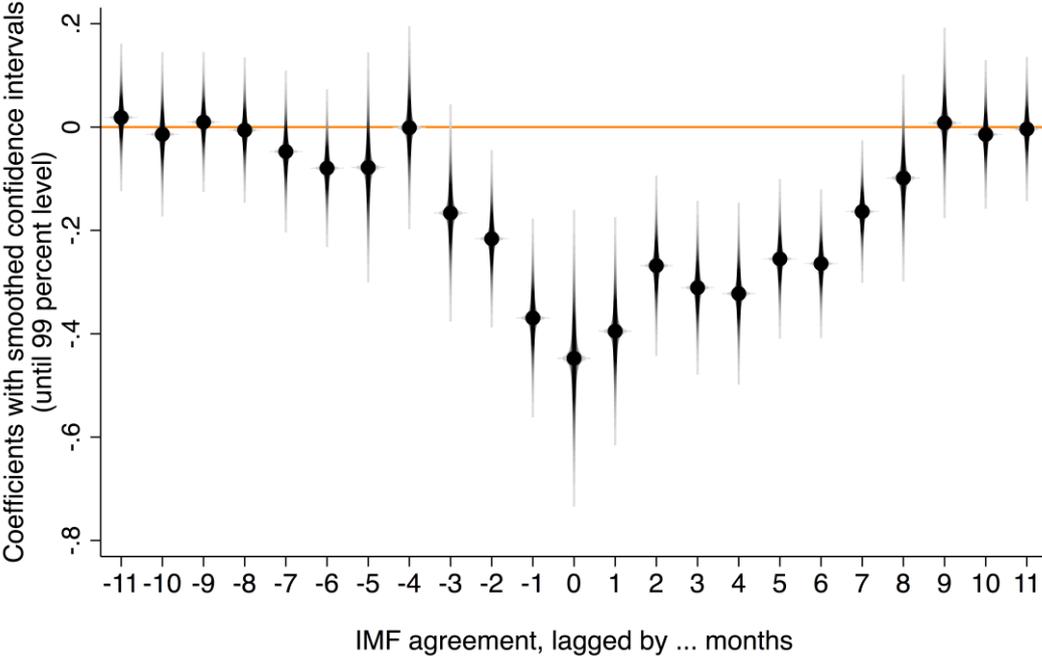
In these regressions, which are based on data at the monthly level, our dependent variable is the S&P rating at the end of month  $m$ . The treatment variable is the country-month specific variable  $IMFagreement_{i,m}$ , indicating the month in which an IMF program was agreed upon.

We employ an event-time specification and add  $IMFagreement_{i,m}$ , as well as 11 lags (indicated by  $l$ ) and leads (indicated by  $-l$ ) of it. The monthly frequency of these data allows us to include month fixed effects ( $\mu_m$ ) and, crucially, country-times-year fixed effects (denoted as  $\theta_{i,t}$ ). This means that in the most conservative specification based on these data we estimate:

$$Rating_{i,m} = \sum_{r=-11}^{11} \beta_r IMFagreement_{i,m-l} + \theta_{i,t} + \mu_m + \varepsilon_{i,m} \quad (7)$$

Conceptually, the demeaning implemented by this fixed effect estimator is equivalent to controlling for all potentially biasing factors at the country-year level. The only variation that remains are the dynamics within country-years and we thus compare ratings in different months within the same country-year observation. Accordingly, the coefficients  $\beta_r$  estimate the extent to which the rating in the months around the start of an IMF program deviated from the mean rating of country  $i$  in year  $t$ .

Figure 6 – Event-based Identification



Note: The figure plots the coefficients of different lags and leads of *IMF agreement* in a regression of monthly S&P ratings. See regression equation 8.

Figure 6 illustrates the results of this regression by plotting all coefficients  $\beta_r$  and smoothed confidence intervals until the 99 percent level.<sup>22</sup> We discuss these coefficients in ‘chronological’

<sup>22</sup> The regression output is reported in Table 8 in Appendix G. In this table, before we turn to the results of the regression specified in equation 8, we first run the regression with alternative, less conservative sets of fixed effects. These results show that the point estimates become more positive, the more biasing variation we reduce by adding

order. First, in the period between eleven months and four months before the start of an IMF program no significant deviation from the country-year mean rating is visible. Then, starting three months before the agreement, a negative pre-trend is visible. It is interesting that this negative pre-trend is statistically significant even though all variation between treated and non-treated country-years is eliminated. Countries whose creditworthiness collapses during the year are thus more likely to receive an IMF program within the next three months. This shows that, even if all country-year specific characteristics are held constant, the mean trajectory of treated countries before the treatment start exhibits negative dynamics, which make the agreement more likely but are not caused by it.

Nevertheless, the regression yields an interesting pattern at the time of the treatment start. The most negative point estimate for  $\beta_r$  appears in the month in which the IMF agreement is approved (i.e., for  $l = 0$ ). As soon as the program starts, the point estimates increase (for  $l > 0$ ) and increasingly move to zero. The trend of decreasing credit ratings goes into reverse exactly when the IMF program starts.<sup>23</sup> Eight months after program approval ( $l = 8$ ) the negative deviation from the mean rating of the year is no longer statistically significant.

What does this pattern tell us? First, the negative pre-trend shows that the timing of IMF agreements within a given country-year observation is not random; IMF programs typically start at a low point. Second, while this negative pre-trend negatively biases the absolute values of the coefficient estimates for the variables indicating the (post-)treatment period, they start increasing in relative terms as soon as the IMF program starts. Even though IMF programs are thus endogenously timed in spite of all country-year-specific variation being netted out, it would be an improbable coincidence to observe that the trend reversal happens exactly after the treatment starts if the treatment itself did not have any impact. As in the IV regressions, the evidence is thus not consistent with a “stigma” effect. On the contrary, interpreted in concert with the above estimates on the country-year level these specifications suggest that IMF programs succeed in “cushioning” against further deteriorations in sovereign creditworthiness. As changes in economic fundamentals (*adjustment* effects) do not take effect

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more fixed effects. Note that the idea behind plotting smoothed confidence intervals is to visualize statistical uncertainty without setting arbitrary thresholds for  $p$ -values. (This is analogous to our choice in the main tables to not report statistical significance by means of ‘significance stars’ for certain  $p$ -value thresholds, but by directly reporting  $p$ -values.)

<sup>23</sup> Note that our background research suggests that agencies take on average one month to update their ratings.

within such a short time period, the trend reversal can be best thought of as a *signaling* effect attributed to the IMF intervention.

To scrutinize this interpretation and better understand the signal that the IMF's presence conveys, the subsequent section analyzes the statements that rating agencies issue when explaining their decisions. Furthermore, remember that our main IV estimate is centered around zero, but with a substantial degree of uncertainty. A plausible reason is that IMF programs are not homogenous treatments and differ substantially between countries (Stone 2008). Hence, the text analysis can also shed light on the circumstances under which IMF programs are perceived as a positive signal.

#### 4.4 Text Analysis

The econometric results of the previous sections suggest that IMF programs send a positive signal to the agencies assessing a country's creditworthiness. To see whether this is reflected in the agencies' reasoning, we evaluate rating statements that are issued when a rating or its outlook are changed. We use the *Dow Jones Factiva* database for this assessment.

Initially, we study these statements in an exploratory way. (See Appendix H for details and a list of exemplary statements.) It becomes evident that rating agencies indeed often link the IMF's presence to *positive expectations*. We find many statements in which they state that they expect that the IMF program will help the country in the near future. Examples include statements like: "[w]e think the new IMF program [...] will help in addressing fiscal and external imbalances" (S&P on Ghana in 2015), or "the International Monetary Fund program will serve as a policy anchor for fiscal consolidation" (S&P on Albania in 2014).

Furthermore, we noticed that several of these statements emphasize the IMF's role in helping countries to overcome short-term liquidity problems; others emphasize the increased likelihood of successful reform implementation. For example, with regard to Sri Lanka, Moody's stated in 2016: "the IMF program will alleviate Sri Lanka's external liquidity pressures." For Egypt the same agency in the same year expected the IMF program to "support the implementation of fiscal and economic reforms." We find many more such examples in which the liquidity aspect and/or the reform aspect of IMF programs is emphasized.

Based on this initial inspection, we then conduct a more systematic analysis. We extract all available articles on *Factiva* using all combinations of the search terms "IMF/International

Monetary Fund,” “rating,” “program,” “reform,” in English or German and in the industry category “Rating Agency.” We then use a *Python* script to extract the paragraphs before and after statements mention the IMF. This approach yields 117 statements. Two research assistants then coded these statements following a pre-defined codebook (see Appendix I for details). The aim of this coding was, first, to distinguish negative, neutral/mixed and positive associations between IMF programs and changes in credit ratings. Second, it also aimed to differentiate between texts mentioning the liquidity aspect of IMF programs, the reform aspect, or both. The codebook was designed to be conservative in the sense of biasing against findings in support of our priors resulting from the econometric analysis: in case of doubt about the association between IMF programs and the rating, the statement was categorized as “no clear association with rating.” If it was not obvious whether the statement relates to liquidity or reform aspects of IMF programs, it was put in a residual category.

Figure 7 – Text Analysis of Rating Statements

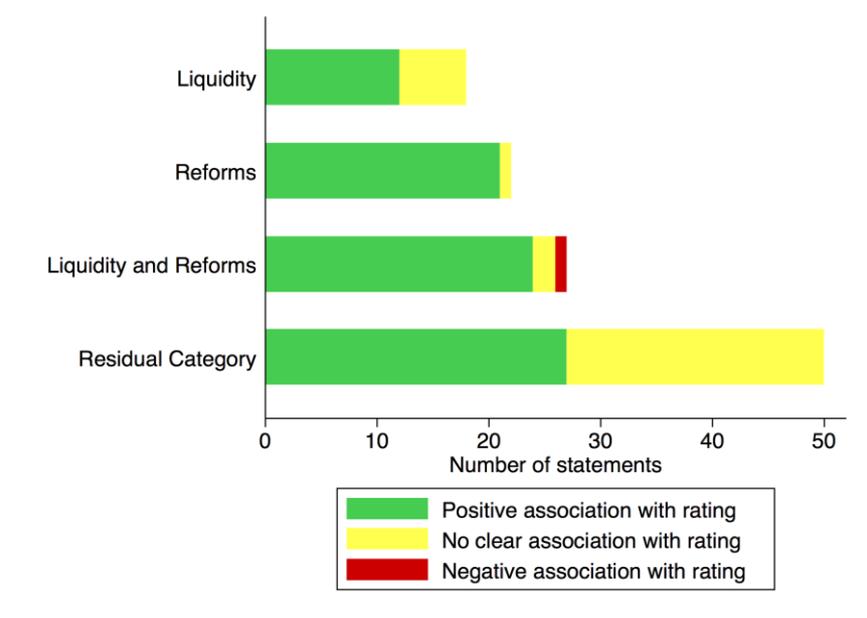


Figure 7 graphically illustrates the results of this exercise. The first and most noticeable finding is that the vast majority of statements attribute a positive effect to IMF programs. Of 117 statements, only one statement notes that the IMF’s presence negatively influences the rating. For 32 statements it was not possible to conclusively determine whether the agency considered the IMF program to have a positive or a negative effect on the rating. The second finding is that rating agencies often link the reforms expected to materialize under IMF programs to

positive trends in credit ratings. There thus seems to be more to IMF programs for credit agencies than just the temporary increase in liquidity they come with. It is also apparent that the statements about “reforms” or “reforms and liquidity” are with very few exceptions positive. Statements concerning liquidity are slightly more mixed, and the residual category, quite naturally, captures a number of neutral statements in which no clear association could be noted. The expectation of successful reforms thus appears to be a significant part of the IMF’s positive signaling effect on creditworthiness assessments.

Overall, the text analysis is in line with the results of the econometric analysis and exemplary statements like the following illustrate the effect we find: “We view the risk of another default in the next two to three years as diminished due to the Ukrainian authorities’ commitment to the reforms set out in the International Monetary Fund (IMF) program.” S&P made this statement in October 2015 during a period of substantial GDP contraction under multiple consecutive IMF programs in Ukraine: The country’s growth rate stood at -6.6 percent in 2014 and at -9.8 percent in 2015. Nevertheless, S&P improved its credit rating because it expected reforms under IMF programs to enhance sovereign creditworthiness.

Our results in their entirety suggest that this piece of anecdotal evidence is accurately representative of a general pattern: IMF programs, rather than coming with a *stigma*, arouse expectations of successful reform implementation and thereby send a positive signal that, despite substantial economic contractions under IMF programs, *cushions* assessments of sovereign creditworthiness.

#### **4.5 Robustness**

This section assesses the robustness of the prior estimations, focusing on the baseline instrumental variable results presented in Section 4.1. As a first step, we use alternative outcome variables. Analysts at S&P might have a particular view on the effect of IMF programs that is not generally shared by other analysts and investors. This is why in this section we substitute the S&P ratings with ratings from other agencies and with assessments from professional investors. First, we take the ratings by Moody’s and Fitch, the other two major agencies of the “Big Three.” Although the credit rating of these three agencies are highly correlated, there are some differences (especially in times of crisis) and we want to be sure that these are not driving our results. Second, as cultural proximity of analysts to rated countries

has been shown to affect country ratings (Fuchs and Gehring 2017), we also look at non-US rating agencies as their analysts come from a different cultural background. Analysts at the US-based “Big Three” and at the IMF often have similar educational or professional backgrounds (or have worked for the respective other institution), and might thus share a common ideological mindset that need not represent general investor sentiment.

Third, even though we argue that sovereign credit ratings are the most useful measure of a country’s creditworthiness for our research question, it would be reassuring if the results hold for alternative measures. While ratings are hard-wired into investment decisions, regulations and company charters, they are officially marketed as mere opinions. Investors with “skin in the game” could deviate from them in cases where they are not bound by regulation. As credit agencies have been blamed for being either too harsh or too reluctant to change ratings in crisis periods, investors might come to different assessments. This is why we digitize and use assessments collected by *Institutional Investor* as an alternative measure of creditworthiness. These are based on surveys among investors and analysts at banks, money management and securities companies, and should also not be affected by bond supply side shocks. We managed to collect data from 1987 onwards covering up to 181 countries (see Appendix C for details).

Table 4 presents the regressions that use these four different measures as outcome variables. Panel A of the table replicates the OLS specification with controls (as in column 5 of Table 3) and Panel B replicates the baseline IV regression (as in column 6 of Table 3). In all four OLS specifications, the coefficients of interest are negative and statistically significant. The point estimates for Fitch is comparable to S&P, the ones for Moody’s and the non-US agencies are a bit more negative. For interpreting the regression results of Institutional Investor assessments note that these ratings range from 0 to 100 rather than from 0 to 21. When adjusting for these different scales, the magnitude of the coefficient in this regression (-2.57) is thus similar to the coefficients for rating agencies and lies between the results for S&P and Moody’s. As before, the conditional correlation between IMF programs and measures of sovereign creditworthiness is significantly negative. When turning to the IV approach, the estimates again turn positive and statistically insignificant. This result emerges in all four specifications. Hence, irrespective of how we measure sovereign creditworthiness, we observe the same pattern as before: The negative association between IMF programs and creditworthiness

disappears when applying an approach that is able to control for selection on unobservables. Contrary to widespread views in parts of the existing correlational literature and especially in policy circles, we find no evidence for a negative effect on creditworthiness or a “stigma” associated with IMF programs.

Table 4 – Other Assessments of Creditworthiness

Dependent variable is rating/assessment by:	Moody’s	Fitch	Non-US Agencies	Institutional Investor
Panel A: OLS regressions with controls				
	(1)	(2)	(3)	(4)
IMF program	-1.420 [0.308] {0.000}	-0.890 [0.284] {0.002}	-1.386 [0.389] {0.000}	-3.547 [0.832] {0.000}
Panel B: IV regressions without controls				
	(5)	(6)	(7)	(8)
IMF program	1.539 [1.357] {0.257}	0.494 [1.256] {0.694}	0.320 [0.908] {0.724}	0.063 [4.182] {0.988}
<i>First stage diagnostics:</i>				
K-P underid. LM	12.588	14.771	14.032	24.923
K-P underid. p	0.000	0.000	0.000	0.000
K-P weak id. F	31.067	26.761	38.026	40.899
Observations	1210	1127	855	1912

Notes: Standard errors clustered at the country level are displayed in brackets, p-values in curly brackets. Appendix D lists a comprehensive list of all economic and political controls.

In a series of additional tests, we further test the robustness of the baseline specification. First, we want to address potential concerns regarding any of the two constituent terms forming our interaction instrument and aim to enhance the plausibility of the exclusion restriction. Second, we test whether our findings are driven by certain time periods or particular countries. Third, we apply an alternative definition of our treatment variable. Fourth, we run placebo tests challenging our identifying assumption. We report the results of these analyses in Appendix F and describe them below.

With regard to the first component of the instrumental variable, *IMFprobability*, we take as an alternative a time-invariant, country-specific measure instead of the cumulative, time-variant probability. This makes *IMFprobability* multicollinear with the year fixed effects. Taking all

observations in the sample period into account considers observations from periods  $t+1$ ,  $t+2$ , ... to compute the probability in  $t$ , and thus uses information from the future to explain the present (see Nunn and Qian 2014). Although we regard this as conceptually problematic, column 1 in Table 4 shows that the estimates are virtually unchanged by this modification. The interaction term in the first stage is of almost the exact same size, showing that the relationship we exploit for identification does not depend on how a country's probability of participating in IMF programs is defined. The significance of the IV, the K-P F-statistic, and the second stage point estimate are also very similar, as compared to the baseline.

Regarding the second component of the instrument, some readers might, as discussed above, question the exogeneity of the IMF's liquidity ratio. Even though individual countries in general are unable to significantly influence the IMF's liquidity, a few countries in the sample repaid extraordinarily large tranches of extraordinarily large IMF loans in some years. While the repayment schedule of Fund resources is usually developed years in advance, we still want to exclude the possibility that such events could lead to a correlation between the liquidity and country-year specific economic fundamentals unrelated to the presence of an IMF program. While this would only threaten the exclusion restriction if this relationship depended on the country's level of *IMFprobability* we still want to be cautious and exclude the country-year observations that could significantly influence the IMF's liquidity. Column 2 excludes the top five percent of country-year observations with the largest "repurchases" of IMF loans and column 3 excludes all observations from countries in which such relatively large repurchases have taken place. Neither of these regressions yields substantially different results, indicating that individual repurchases in general – including the extraordinarily large ones – do not threaten the exclusion restriction.<sup>24</sup>

Even if we accept the IMF's liquidity as being plausibly exogenous, the exclusion restriction would be violated if other global trends correlate with it and also affect countries' creditworthiness with different past probabilities of receiving a program in a heterogeneous way. We consider such a relationship unlikely in particular because we find no time trends in credit ratings across countries with different levels of IMF probabilities that are correlated with the IMF's liquidity.<sup>25</sup> There is also no evidence of a correlation between relevant global trends

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<sup>24</sup> Using only the amount of the IMF's liquid resources (and thus only the numerator of the liquidity ratio) as the second component of the IV instrument also yields a very similar result.

<sup>25</sup> See the above discussion in section 3.4 and Figure 4.

such as global growth rates or the number of crises and the IMF liquidity ratio. To still examine this potential threat further, we interact global GDP growth and the number of banking crises with the country-specific probability and include these terms as control variables in column 4. The fact that neither the relevance of the IV in the first stage nor the F-statistics are affected, provides support for our approach. The result that the point estimate in the second stage barely changes further indicates that violations of the exclusion restriction are unlikely.

In regards to the concern that atypical countries or periods could drive the results, column 5 omits the years following the global financial crisis (GFC) and column 6 excludes all countries that were members of the Eurozone in year  $t$ . Arguably, the IMF programs that were implemented in Eurozone countries in the aftermath of the GFC were atypical. First, the IMF designed them jointly with European Union (EU) institutions. Second, default risks in Eurozone countries are potentially assessed differently than in other countries because signals from EU institutions and other EU member states will be taken into account. As columns 5 and 6 show, these restrictions to our sample do not significantly affect our results. The coefficient on *IMFprogram* is again positive and statistically insignificant. In addition to that, the partial-leverage plots of the first stage, the second stage and the reduced-form regression (Figures 8-10 in Appendix F) do not suggest that outliers, or individual countries or years drive the results (see Goldsmith-Pinkham et al. 2018).

Next, we redefine our treatment variable and use the binary variable *IMFapproval* as an alternative in column 7. This variable indicates only the year in which an agreement with the IMF was reached and is set to zero for all other years, including the years during which an IMF program was still in place. Again, we observe a significantly negative OLS coefficient (not shown), which turns positive and insignificant when accounting for endogeneity via our IV strategy (column 7). This is important in two ways. First, it is reassuring that our IV approach also works for the approval of programs. Second, this allows us to compare the IV-based country-year level results more directly with the following results. These are based on an alternative dataset and an alternative identification strategy (subsequent section).

Last, we run simulations with 1000 repetitions where we randomly assign either (i) the liquidity across years or (ii) the probability across countries in the first stage as placebo tests, as suggested by Christian and Barrett (2017). The coefficients that these placebo tests yield are

close to normally distributed around zero, further supporting that our specification does not pick up any spurious trends (see Figures 11 and 12 in Appendix F).

## 5 Conclusion

As the international lender of last resort, the IMF's main objective is to help countries resolve their balance-of-payments problems. Its loan programs need to restore the creditworthiness of countries with severely limited access to external financial resources. In light of the IMF's resurgence as the most important multilateral actor in the global financial system, this study re-investigates the IMF's effectiveness in achieving this key goal with new data and new identification strategies.

As we show, the fear that IMF programs carry a negative *stigma* can be explained by the endogenous selection of countries with already deteriorating economic conditions into programs. Our results paint an alternative, more nuanced, picture. The presence of the IMF does not generally affect the creditworthiness of the program country in a negative way. Although adjustments under IMF programs are often contractionary, the positive signal that the program conveys prevents creditworthiness assessments from deteriorating. IMF programs, thus, provide a *cushion* that allows program countries a transition period in which they can implement potentially contractionary reforms without having to fear further rating downgrades.

Our results remain silent about the long-term benefits of reforms under IMF programs. First, the successful implementation of reforms that provide a sustainable solution to the country's underlying problems comes with many obstacles along the way. The fact that the IMF's engagement sends a positive signal to financial markets that provides countries with important time and maneuvering room to overcome crises. This, however, is only a precondition, not a guarantee for success.

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## 7 Appendices

### Appendix A: Construction of the Sovereign Ratings Database

The description of how the sovereign rating database was constructed is in most parts identical to the part in the online appendix of Fuchs and Gehring (2017), but reprinted here for the reader's convenience. Fuchs and Gehring also provide more details about the ratings and the individual agencies.

Data on sovereign ratings assigned by CI, Dagong, DBRS, JCR, Moody's, R&I, and S&P have been obtained from Bloomberg. Hence, everybody with access to Bloomberg can replicate the dataset easily. We downloaded the data in late September 2012 in the Princeton University Library and updated all information on June 28, 2013.<sup>26</sup>

The approach was the following:

(1) To access the data, we logged on to a Bloomberg terminal and typed "CSDR." The variables selected are *Foreign Long Term* for CI, *FC LT Sovereign Ratings* for Dagong, *Foreign Currency LT Debt* for DBRS, JCR, Moody's and S&P, and *Foreign Curr Issuer Rtg* for R&I. We followed Bloomberg and collected Moody's foreign currency issuer rating if Moody's had not assigned a foreign-currency debt rating to a country. We took screenshots for each page displaying sovereign ratings.

(2) Using these screenshots, two student assistants entered the letter-ratings into a database. The double-coding was used to identify and correct typing errors.

(3) The three-letter ratings were translated to numerical values according to the 21-point scale presented in Appendix B.

(4) We checked the data for potential errors, for example by examining rating changes by more than two steps. Two obvious mistakes in the R&I data from Bloomberg have been corrected after e-mail correspondence with the agency's chief analyst: (i) India received a "BBB+" rating on 15 June 1998, and a "BBB" rating on 18 November 1998, 20 December 1999, and 30 January 2001, (ii) Ukraine received an "BB-" rating on 18 July 1998, a "B" rating on 28 August 1998, and a "B-" rating on 28 September 1999.

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<sup>26</sup>The ratings from Feri and Fitch have been obtained from the companies directly.

## Appendix B: Translation of Sovereign Ratings into Numerical Values

Table 5 – Translation of Sovereign Ratings into Numerical Values

CI CYP (KWT)	Dagong CHN	DBRS CAN	Feri DEU	Fitch USA (FRA)	Moody's USA	JCR JPN	R&I JPN	S&P USA	Numerical scale
AAA	AAA	AAA	AAA	AAA	Aaa	AAA	AAA	AAA	21
AA+	AA+	AAH	AA+	AA+	Aa1	AA+	AA+	AA+	20
AA	AA	AA	AA	AA	Aa2	AA	AA	AA	19
AA-	AA-	AAL	AA-	AA-	Aa3	AA-	AA-	AA-	18
A+	A+	AH	A+	A+	A1	A+	A+	A+	17
A	A	A	A	A	A2	A	A	A	16
A-	A-	AL	A-	A-	A3	A-	A-	A-	15
BBB+	BBB+	BBBH	BBB+	BBB+	Baa1	BBB+	BBB+	BBB+	14
BBB	BBB	BBB	BBB	BBB	Baa2	BBB	BBB	BBB	13
BBB-	BBB-	BBBL	BBB-	BBB-	Baa3	BBB-	BBB-	BBB-	12
BB+	BB+	BBH	BB+	BB+	Ba1	BB+	BB+	BB+	11
BB	BB	BB	BB	BB	Ba2	BB	BB	BB	10
BB-	BB-	BBL	BB-	BB-	Ba3	BB-	BB-	BB-	9
B+	B+	BH	B+	B+	B1	B+	B+	B+	8
B	B	B	B	B	B2	B	B	B	7
B-	B-	BL	B-	B-	B3	B-	B-	B-	6
CCC+	CCC+	CCCH	CCC+	CCC+	Caa1	CCC+	CCC+	CCC+	5
CCC	CCC	CCC	CCC	CCC	Caa2	CCC	CCC	CCC	4
CCC-	CCC-	CCCL	CCC-	CCC-	Caa3	CCC-	CCC-	CCC-	3
CC	CC	CC	CC	CC	Ca	CC	CC	CC	2
C	C	C		C	C	C		C	1
DDD				DDD		DDD		SD	1
DD				DD		DD			1
D	D	D	D	D		D	D	D	1
				RD		RD			1

Sources: Rating scales from company webpages, except DBRS and Feri. DBRS and Feri scales were obtained from the agencies via personal e-mail communication.

**Appendix C: Institutional Investor Data**

We use data from Institutional Investor as an alternative assessment of a country’s creditworthiness. Regarding the methodology, the company states that “Institutional Investor’s Country Credit ratings are based on information provided by senior economists and sovereign-risk analysts at leading global banks and money management and securities firms. The respondents have graded each country on a scale of zero to 100, with 100 representing the least likelihood of default. We weighted participants’ responses according to their institutions’ global exposure. Names of respondents are kept strictly confidential.”

The access to the individual reports is easy for subscribers, or to those with access to a data provider like “EBSCOhost.” To access the data, a reader interested in replication or extending this study can go to <http://www.institutionalinvestor.com>, select “Research + Rankings” and then “Country Credit”. For most years there exist two reports, one for March and one for September.

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**Institutional Investor**

Investors • Asset Management • Banking + Capital Markets • Research + Rankings • BI

in t f g+ p n

Premium Research + Rankings data is accessible by subscribers only. Click here for more information.

ALL RANKINGS: GLOBAL RANKINGS

Select one of the following rankings to view its current leaders:

- Country Credit - March
- Country Credit - September
- Global Research Leaders: Year to Date
- Top Global Research Firm of the Year
- The World’s Best Hotels
- The World’s Largest Custodians
- The World’s Biggest Sovereign Wealth Funds

Jump to a ranking:

For older ratings, the reports look as follows:

**The beat goes on**  
 Shapiro, Harvey D  
*Institutional Investor*; Mar 1996; 30, 3; ABI/INFORM Collection  
 pg. 135

**COUNTRY  
CREDIT**

# The beat goes on

**A**mid broadly positive reviews from international bankers everywhere, a new leader has emerged in *Institutional Investor's* exclusive semiannual rating of sovereign creditworthiness. One banker surveyed suggests that "nostalgia for the deutsche mark, a currency that may soon disappear," helped push Germany's rating up slightly just as Switzerland slipped a bit, easing the Federal Republic into a tie for the No. 1 position. Germany goes to the head of the

Germany moves up as global optimism continues to nudge sovereign creditworthiness higher.

By Harvey D. Shapiro

every financier's favorite part of the world, actually had a small dip in its rating. In fact, there is a good deal of divergence in the views of respondents regarding individual countries, but the consensus is, decidedly, "Onward and upward." The reason is clear, says one British banker: "The economic outlook for the world is reasonably favorable, but the biggest changes are political. A lot of potential theaters of war are being changed by peace processes. This includes southern Africa and the Middle East."

INSTITUTIONAL INVESTOR'S 1996 COUNTRY CREDIT RATINGS											
Rank			Institutional Investor credit rating			Rank			Institutional Investor credit rating		
Sept. 1995	March 1996	Country	Investor credit rating	Six-month change	One-year change	Sept. 1995	March 1996	Country	Investor credit rating	Six-month change	One-year change
3	1*	Germany	91.5	0.6	0.9	72	70	Vietnam	30.3	0.8	2.7
1		Switzerland	91.5	-0.7	-1.0	65	71	Venezuela	30.1	-1.3	-3.0
2	3	Japan	91.0	-0.6	-0.9	73	72	Swaziland	30.0	0.8	1.5
4	4	United States	90.9	0.2	0.5	70	73	Libya	29.9	-0.1	-0.6
5	5	Netherlands	89.2	-0.1	0.2	68	74	Pakistan	29.5	-1.2	-0.6
6	6	France	88.4	-0.7	-0.6	74	75	Ghana	29.2	0.1	0.0
7	7	United Kingdom	88.2	0.4	0.5	79	76	Estonia	28.9	2.6	3.5
8	8	Luxembourg	85.9	0.4	0.5	76	77	Panama	27.9	1.5	2.2
9	9	Austria	85.7	-0.5	-0.5	78	78	Jamaica	27.7	1.4	2.5
10	10	Singapore	82.8	-1.2	-0.2	80	79	Peru	27.2	1.4	3.5
11	11	Norway	82.0	0.4	1.7	77	80	Kenya	26.9	0.5	2.0
13	12	Denmark	80.3	0.4	1.0	81	81**	Bangladesh	26.5	0.9	1.7
12	13	Canada	79.9	-0.4	-0.3	83	82**	Lebanon	26.5	1.2	1.6
15	14	Belgium	79.5	0.3	0.9	88	83	Seychelles	25.8	1.5	2.1
14	15	Taiwan	78.9	-1.0	-0.8	84	84	Ecuador	25.7	0.6	0.7
18	16	Ireland	74.4	1.0	2.1	82	85	Gabon	25.1	-0.2	-0.7
16	17	Sweden	74.3	0.2	-0.1	89	86	Latvia	24.7	1.3	2.1
17	18	Spain	73.2	-0.5	-0.5	87	87	Syria	24.6	0.0	-0.3
21	19	Finland	72.2	0.8	2.2	84	88	Nepal	23.9	-1.2	-0.5
19	20**	Italy	72.0	-0.3	-0.4	90	89	Lithuania	23.8	0.9	2.1
20	21**	South Korea	72.0	-0.2	0.6	93	90	Bolivia	23.7	1.3	1.2
22	22	Australia	71.0	-0.2	0.1	86	91	Iran	23.6	-1.2	-1.9
23	24	New Zealand	70.3	0.9	2.1	94	92	Bulgaria	23.1	0.9	1.2
25	24	Portugal	68.8	0.4	1.5	92	93	Dominican Republic	23.0	0.4	-0.1
24	25	Malaysia	68.4	-0.7	-0.2			Guatemala	22.4	0.3	0.5
26	26	Hong Kong	65.4	-1.6	-1.6	95	94	Algeria	21.5	-1.3	-2.0
27	27	Thailand	63.4	-0.4	-0.1	91	95**	Senegal	21.5	-0.1	-0.1
28	28	Malta	62.3	0.5	1.3	96	96**	Croatia	21.4	2.9	4.3
29	29	United Arab Emirates	60.8	0.0	0.3	102	97	El Salvador	20.6	0.5	1.9
30	30	Czech Republic	60.1	1.7	4.3	97	98	Russia	19.9	0.5	0.4
32	31	Chile	59.2	1.8	3.6	100	100	Malawi	19.8	0.7	1.0
31	32	Iceland	58.3	0.7	1.4	99	101	Kazakhstan	19.2	-0.1	0.5
33	33	China	56.4	-0.6	-1.2	105	102	Myanmar	18.9	1.6	2.4
35	34	Cyprus	56.0	1.7	3.4	101	103	Cameroon	18.5	-0.2	-0.7
34	35	Saudi Arabia	55.1	-0.2	-0.7	108	104	Tanzania	17.7	1.0	2.2
37	36	Kuwait	54.1	0.7	1.4	109	105	Honduras	17.3	1.4	1.8
36	37	Oman	53.8	-0.2	-0.1	104	106				

For the newer years, the accessible files look like the following example.

(\*\*) Sept. 2004 to March 2005.  
**INSTITUTIONAL INVESTOR'S MARCH 2005 COUNTRY CREDIT RATINGS**  
 Legend for Chart:

A - Rank Sept. 2004  
 B - Rank March 2005  
 C - Country  
 D - Institutional Investor credit rating  
 E - Six-month change  
 F - One-year change

A	B	C	D	E	F
1	1	Switzerland	94.5	-0.7	-0.7
4	2	Norway	93.7	0.0	-0.3
2	3	Luxembourg	92.8	-1.1	-2.0
11	4(*)	Finland	92.7	0.4	0.4
5	5(*)	U.K.	92.7	-0.9	-1.3
3	6	U.S.	92.4	-1.3	-1.6
8	7	France	92.2	-0.5	-1.1
6	8	Denmark	92.1	-0.9	-0.3
7	9	Netherlands	92.0	-0.9	-1.9

In each year, we use the country assessments as of September. Only in three years we had to revert to using the assessment as of March as the September value was not available. We then import the values into STATA, merge them with country codes and add them to the rest of our data. The ratings range is between 0 and 100, with 100 expressing the highest confidence on behalf of the experts.

## **Appendix D: Control Variables**

As discussed in the main text, we add an extensive set of control variables to some – but not the main – regressions. For this control vector, we build on and combine the sets of explanatory variables employed in Cantor and Packer (1996), Archer et al. (2007) and Hill et al. (2010) to control for the country-specific economic and political factors that should capture countries' ability and willingness to repay their debts.

We therefore add the following variables: the natural logarithm of GDP per capita, the annual GDP growth rate and its square, the inflation rate, the rents from natural resources (over GDP), the log of population, the debt to GDP ratio, the annual change in government debt (over GDP), trade (over GDP), the current account balance (over GDP), external debt (over GDP), the two variables indicating whether the country defaulted ever or within the previous five years, the quality of the rule of law, the degree of democracy (Polity IV), whether an election took place, the number of the government's years in office, the ruling party's political ideology, whether the country was affected by an internal or an external conflict, whether the military played an active role in politics, and an indicator for membership in the Eurozone (see also Fuchs and Gehring 2017).

We also include variables that the literature identified as correlates of IMF programs. Some of them are part of the above list. The variables we include in addition are the occurrence of a systemic banking crisis, the exposure of foreign banks to the country, investment (over GDP), and the similarity of voting with the United States in the United Nations General Assembly (Copelovitch 2010; Moser and Sturm 2011; Sturm, Berger, and de Haan 2005). These variables are taken from the World Bank's World Development Indicators (WDI), the IMF (Laeven and Valencia 2012), the Database of Political Institutions (Beck et al. 2001), the Polity IV Project (Marshall, Jaggers, and Gurr 2011), and the International Country Risk Guide (ICRG), the Bank for International Settlement (BIS), and Bailey et al. (2017).

Descriptive statistics for all these control variables can be found below, in Appendix E.

## Appendix E: Variables

Table 6 – Descriptive Statistics

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Rating S&P	1350	13.58	4.99	1.00	21.00
Rating Moody's	1142	14.13	4.98	1.00	21.00
Rating Fitch	1077	14.15	4.98	1.00	21.00
Rating Non-US	847	15.49	4.31	4.00	21.00
Institutional Investor	1335	59.09	21.55	10.50	96.40
IMF program	1350	0.21	0.40	0.00	1.00
IMF agreement	1350	0.08	0.28	0.00	1.00
IMF probability	1350	0.21	0.23	0.00	0.89
GDP/capita (ln)	1349	8.80	1.37	5.69	11.38
GDP growth	1350	3.89	3.75	-17.95	17.51
Inflation	1349	0.06	0.07	-0.05	0.95
Natural resource rents (% GDP)	1350	7.27	12.03	0.00	64.80
Population (ln)	1350	16.62	1.61	12.96	21.02
Debt (% GDP)	1349	48.45	30.41	0.00	238.03
Change in Government Debt (% GDP)	1349	3.16	10.74	-115.42	102.29
Default history (indicator)	1350	0.34	0.48	0.00	1.00
Default in last 5 years (indicator)	1350	0.07	0.25	0.00	1.00
Trade openness	1339	88.00	57.78	14.93	562.06
Current Account Balance (% GDP)	1345	-0.26	8.25	-44.21	44.62
External Debt (% GDP)	1349	21.90	28.31	0.00	189.48
Law and Order	1350	4.14	1.29	1.00	6.00
Democracy (Polity IV)	1348	6.16	5.57	-10.00	10.00
Election	1350	0.22	0.41	0.00	1.00
Honeymoon	1349	5.78	6.80	1.00	46.00
Left government	1350	0.31	0.46	0.00	1.00
Absence of Internal Conflict (ICRG)	1350	9.72	1.62	3.42	12.00
Absence of External Conflict (ICRG)	1350	10.36	1.22	5.17	12.00
Absence of military in politics	1350	4.45	1.44	0.00	6.00
Euro area (indicator)	1350	0.13	0.34	0.00	1.00
Investment (% GDP)	1347	24.01	6.37	8.27	58.15
Systemic Banking Crisis	1261	0.13	0.34	0.00	1.00
Foreign bank exposure	1350	217.92	625.79	0.008	6491.18
UNGA voting	1350	0.20	0.91	-1.66	2.89
Global GDP growth*	1350	0.03	0.02	-0.02	0.08

\*Interacted with IMF Probability in the regressions.

Note: Based on the sample used for specification 7 in Table 1.

## Appendix F: Results of Robustness Regressions Described in Section 4.3

Table 7 – Various Robustness Tests

	constant probability	excluding large repurchases	excluding countries with largest repurchases	controlling for global trends interacted with IMF probability	excluding GFC	excluding Eurozone	IMF agreements
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IMF program/ IMF agreement	0.228 [0.766] {0.766}	0.338 [0.844] {0.689}	0.404 [0.774] {0.602}	0.648 [0.834] {0.437}	0.368 [0.871] {0.673}	1.085 [0.907] {0.232}	2.205 [1.838] {0.230}
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2045	2004	1812	1767	1326	1840	1840
K-P underid. (LM)	17.412	15.569	12.077	16.114	17.573	15.866	16.453
K-P underid. (p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K-P weak id. (F)	36.810	36.301	32.441	40.727	34.260	36.002	36.379
<b>First stage</b>							
IMF probability		3.604 [0.567] {0.000}	3.933 [0.681] {0.000}	3.358 [0.616] {0.000}	3.947 [0.645] {0.000}	3.415 [0.571] {0.000}	0.534 [0.295] {0.070}
IMF probability x IMF liquidity	-0.513 [0.085] {0.000}	-0.472 [0.078] {0.000}	-0.514 [0.090] {0.000}	-0.480 [0.075] {0.000}	-0.466 [0.080] {0.000}	-0.455 [0.076] {0.000}	-0.224 [0.037] {0.000}

Notes: The dependent variable is a country rating from S&P measured on a 21-point scale. Standard errors clustered at the country level are displayed in brackets, p-values in curly brackets. The sample contains up to 100 countries and covers the 1992 to 2013 period. GFC refers to the years 2009-2013. All regressions include country and year fixed effects, as well as the economic and political control variables in t-1.

Figure 8 – Partial Leverage Plot: First Stage

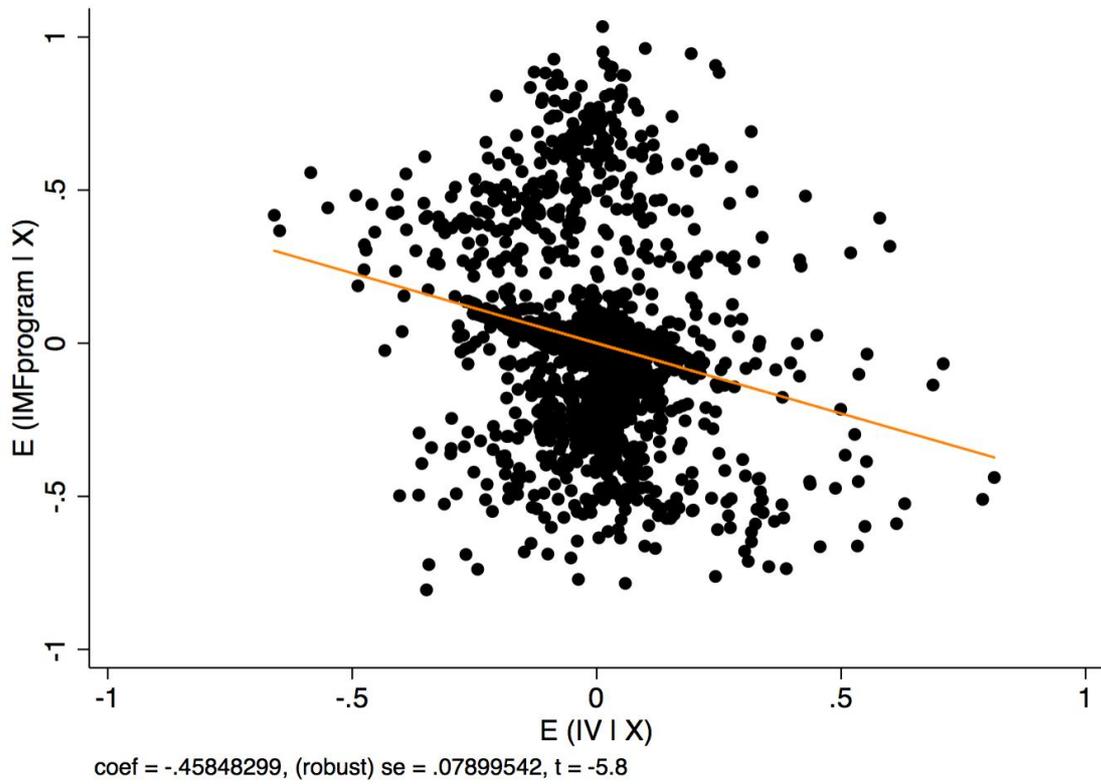


Figure 9 – Partial Leverage Plot: Second Stage

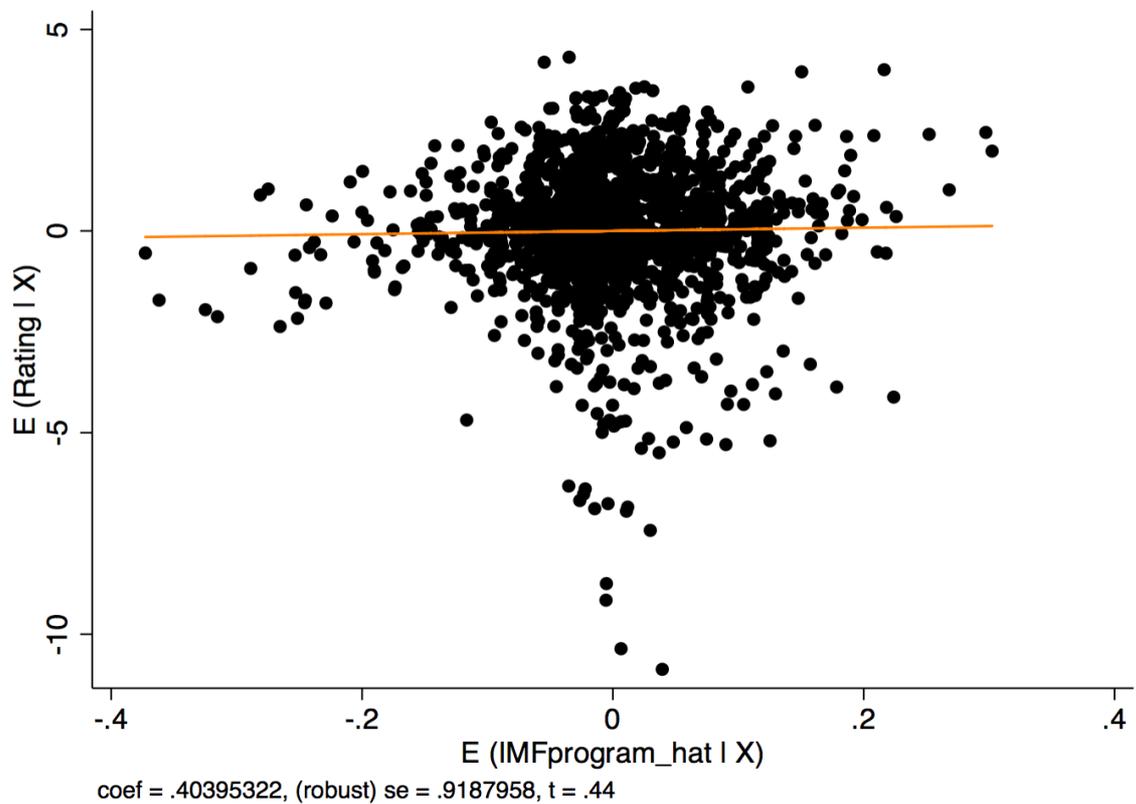
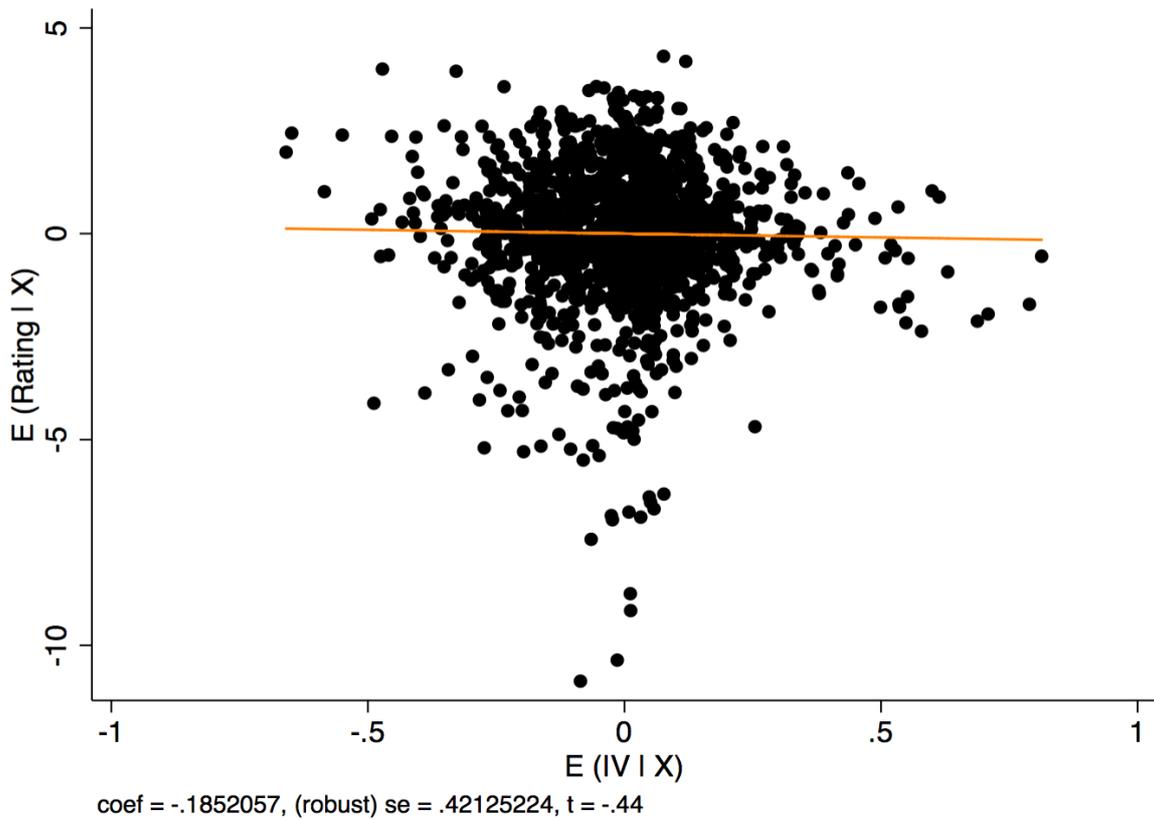


Figure 10 – Partial Leverage Plot: Reduced Form



Note: Figures 8-10 are partial leverage plots (or “added variable plots”) of the first stage regression, the second stage regression, and the reduced form regression, respectively. They show that the first stage effect that we exploit for identification is not driven by outliers. Instead, the variable seems to pick up a general pattern, for which there are many “compliers.” Furthermore, neither the second stage, nor the reduced form seem to be plagued by individual influential observations.

Figure 11 – Placebo Test 1

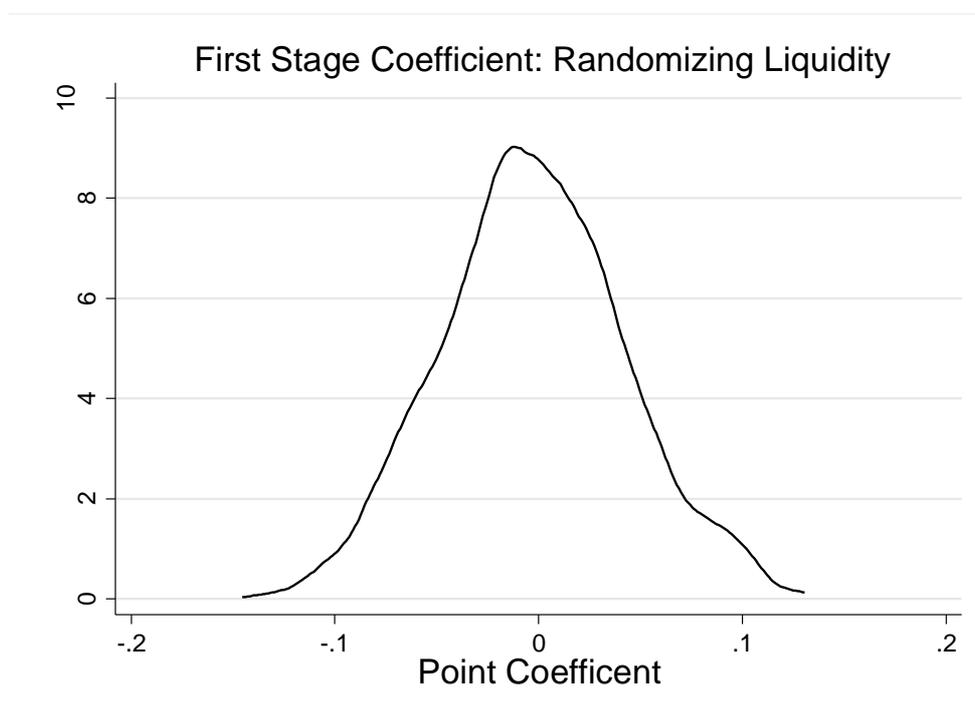
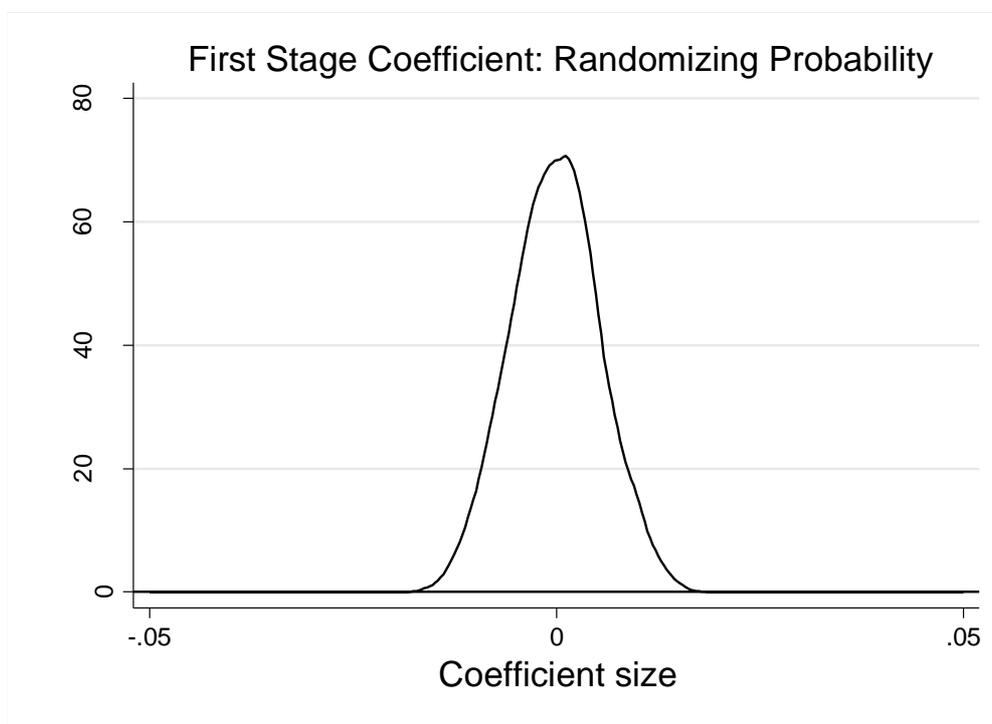


Figure 12 – Placebo Test 2



Note: These graphs plot the distribution of 1000 coefficients that result from 1000 first-stage placebo regressions. In these regressions we randomize the two constituent terms of the IV by a) attributing values of IMFliquidity to random years and b) values of IMFprobability to random countries. As can be seen, these coefficients are approximately normally distributed around zero and are far from the value that the actual first-stage regression yields.

## Appendix G: Event-Based Identification

Table 8 – Regression Results of the Event-based Identification

	(1)	(2)	(3)	(4)
IMF start (t+11)	-4.289***	-0.324*	0.021	0.019
IMF start (t+10)	-4.372***	-0.433**	-0.014	-0.014
IMF start (t+9)	-4.335***	-0.457**	0.004	0.010
IMF start (t+8)	-4.338***	-0.449**	-0.007	-0.006
IMF start (t+7)	-4.459***	-0.516**	-0.055	-0.047
IMF start (t+6)	-4.516***	-0.528**	-0.088	-0.079
IMF start (t+5)	-4.565***	-0.576***	-0.092	-0.078
IMF start (t+4)	-4.560***	-0.593***	-0.013	-0.001
IMF start (t+3)	-4.738***	-0.713***	-0.172*	-0.166*
IMF start (t+2)	-4.839***	-0.745***	-0.236***	-0.216**
IMF start (t+1)	-5.003***	-0.883***	-0.392***	-0.369***
IMF start	-5.023***	-0.933***	-0.470***	-0.447***
IMF start (t-1)	-5.067***	-0.970***	-0.415***	-0.395***
IMF start (t-2)	-5.102***	-1.023***	-0.275***	-0.268***
IMF start (t-3)	-5.070***	-1.017***	-0.313***	-0.311***
IMF start (t-4)	-4.927***	-0.987***	-0.322***	-0.322***
IMF start (t-5)	-4.945***	-1.007***	-0.260***	-0.255***
IMF start (t-6)	-4.916***	-1.000***	-0.277***	-0.264***
IMF start (t-7)	-4.789***	-0.910***	-0.181***	-0.163**
IMF start (t-8)	-4.747***	-0.925***	-0.119	-0.099
IMF start (t-9)	-4.675***	-0.870***	-0.018	0.008
IMF start (t-10)	-4.686***	-0.915***	-0.042	-0.014
IMF start (t-11)	-4.664***	-0.892***	-0.027	-0.004
Constant	14.084***			
Country FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Country x Year FE	No	No	Yes	Yes
Month FE	No	No	No	Yes
Observations	25625	25625	25574	25574
Adjusted R-squared	0.077	0.917	0.995	0.995

Notes: OLS-FE regressions. The dependent variable is the S&P rating at the end of month  $t$ ; standard errors not shown. Figure 3.5 is based on the regression in column 4. Significance levels \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

## **Appendix H: Exploratory Analysis of Statements by Rating Agencies**

In a first step, we conduct an exploratory analysis about the availability of statements on *Factiva*, a commercial database for press articles as well as corporate and business information owned by Dow Jones & Company, and the LexisNexis search engine. We searched for articles containing statements of rating agencies concerning the up- or downgrading of sovereigns based on the (potential) interference of the IMF, using the following search terms independently or in combination with each other: *IMF*, *Sovereign*, *Rating Agency*, *Rating*, *Development*. The statements listed below contain decisions of the three major rating agencies *Standard & Poor's*, *Moody's*, and *Fitch*. Overall, the exploratory search process yielded statements for 14 different countries (in Africa, Asia and Eastern Europe) in the years between 1999 and 2016. In the following, we list statements starting with decisions from Standard & Poor's, the agency of primary interest, followed by the ones from Moody's and those from Fitch. Countries are ordered alphabetically and ascending in years.

Based on this exploratory analysis, which makes no claim of being exhaustive, we designed our systematic text analysis described in more detail after the following statements.

***Standard and Poor's:***

**Albania, 2014**

"We revised the outlook to stable because we think that the recently concluded *International Monetary Fund programme* will serve as a *policy anchor for fiscal consolidation* and support the sustainability of Albania's high government debt," S&P's said."

Source: Balkan Insights, <http://www.balkaninsight.com/en/article/standard-and-poor-s-upgrade-albania-s-rating>

**Angola, 2011**

"Standard & Poor's (S&P) has raised Angola's sovereign risk rating to BB-, citing [...] the *IMF-recommended fiscal and monetary reforms*, which are expected to help mitigate the downside risks to over-dependence on the hydrocarbon sector."

Source: IHS Global Insight Daily Analysis, accessed via Factiva, 08.06.2017

**Bosnia and Herzegovina, 2016**

"The *IMF arrangement* will also provide the *fiscal space for needed reforms and infrastructure investments*. [...] it will *anchor fiscal discipline* for the authorities and aim to improve revenue collection and the efficiency of government spending."

Source: S&P, [http://www.standardandpoors.com/en\\_US/web/guest/article/-/view/type/HTML/id/1707896](http://www.standardandpoors.com/en_US/web/guest/article/-/view/type/HTML/id/1707896)

**Ghana, 2015**

"We think the new *International Monetary Fund (IMF) program* [...] will help in addressing *fiscal and external imbalances* [...]"

Source: S&P according to African Markets, <https://www.african-markets.com/en/news/west-africa/ghana/s-p-ghana-b-b-ratings-affirmed-on-new-imf-program-outlook-remains-stable>

### **Sri Lanka, 2009**

"[...] (S&P) revised the outlook on its "B" long-term foreign currency rating for Sri Lanka to positive yesterday. The move reflects the country's improved external liquidity position owing to the new International Monetary Fund (IMF) standby loan agreement of US\$2.6 billion. [...]. The *stringent macro-economic consolidation conditions attached to the programme should force the government to reduce its fiscal deficit [...]. The central bank's commitment under the programme to a strict monetary policy including a reduction of advances to the government and a flexible exchange rate should also have a positive effect on Sri Lanka's medium-term sovereign risk.*"

Source: IHS Global Insight Daily Analysis, accessed via Factiva, 08.06.2017

### **Ukraine, 2015**

"We view the risk of another default in the next two to three years as diminished due to the *Ukrainian authorities' commitment to the reforms set out in the International Monetary Fund (IMF) program,*" S&P analysts including Frank Gill said in the report."

Source: Bloomberg, <https://www.bloomberg.com/news/articles/2015-10-19/ukraine-rating-raised-to-b-by-s-p-on-debt-exchange-reform-plan>

### **Moody's:**

Indonesia, 2002

"Moody's Investors Service changed the outlook [...] to positive from stable. The rating agency cited Indonesia's recent Paris Club memorandum of understanding and the country's *improved relationships with other foreign creditors, including the IMF, as bettering the country's liquidity position* in the coming two years. [...] Going forward, upward movement in the ratings will depend on, among other things, continued political stability, progress in disposing of IBRA assets, fiscal performance, and *the ability of the government to continue to meet the targets under its IMF program* and maintain good relations with foreign creditors generally. Moody's said that the positive outlook reflects progress made so far, but that *continued reforms were necessary to lift Indonesia's economic performance and improve investor confidence.*"

Source: Moody's Investor Service Press Release, accessed via Factiva, 08.06.2017

### **Pakistan, 2015**

“Credit rating agency Moody’s has changed the outlook on Pakistan’s sovereign rating to Positive from Stable, affirming the rating itself at Caa1 [...]. The decision to change the outlook was prompted by Pakistan’s improving liquidity position, the *government’s continued efforts towards fiscal consolidation, and the steady progress with structural reforms under the International Monetary Fund (IMF)’s programme*. Pakistan’s external liquidity position has improved substantially in the past 12 months [...], supported by the narrowing current-account deficit, ongoing disbursements from the IMF, [...]. Meanwhile, fiscal discipline has also improved, as budget deficit and the government domestic borrowing have been gradually reduced. *On the structural reforms front, the agency pointed to the country’s successful completion of a number of IMF structural benchmarks, including those on the fiscal and debt management front and energy sector reforms.*”

Source: IHS Global Insight Daily Analysis, accessed via Factiva, 08.06.2017

### **Egypt, 2016**

“Importantly, the rating agency views the staff-level agreement with the IMF which was announced on 11 August 2016 as credit-positive, because it will help alleviate some of Egypt’s external liquidity pressures. Under the Extended Fund Facility (EFF) Egypt would gain access to about \$12 billion of external funding through the IMF. The agreement is subject to approval by the IMF’s Executive Board, which Moody’s expects within 6-8 weeks. In Moody’s view, the agreement reached with the IMF is also important because it will unlock external funding from other multilateral and bilateral sources, and support the implementation of fiscal and economic reforms. These include the long-delayed introduction of a value-added tax and moves to a more flexible exchange rate regime.”

Source: Moody’s, [https://www.moody.com/research/Moodys-affirms-Egypt-B3-rating-outlook-stable--PR\\_352656](https://www.moody.com/research/Moodys-affirms-Egypt-B3-rating-outlook-stable--PR_352656)

### **Rwanda, 2016**

“Moody's assigned Rwanda first-time local and foreign-currency issuer ratings of B2 last week, and gave the country a Stable outlook. [...] In Moody's view, a Stable outlook for Rwanda's sovereign credit is justified given access to USD204 million from the *International Monetary Fund (IMF) under the country's 18-month Standard Credit Facility (SCF) arrangement*. Additionally, it sees the government's policy implementation track record as strong, and *expects improvements in both its fiscal and external positions to materialise over the medium term.*”

Source: IHS Global Insight Daily Analysis, accessed via Factiva, 08.06.2017

### **Sri Lanka, 2016**

“Therefore, in Moody's view, while the *IMF program* will alleviate Sri Lanka's external liquidity pressures, a more durable improvement in the macro-economic and balance of payments pressures will depend on the extent to which authorities can durably reverse the ongoing fiscal deterioration while improving Sri Lanka's international competitiveness and attractiveness to foreign investors. The study underpins *Moody's view that effective policy implementation determines the extent to which a country reaps the benefits of an IMF program.*”

Source: Moody's, [https://www.moody's.com/research/Moodys-Sri-Lankas-benefits-from-its-IMF-program-depend-on--PR\\_350166](https://www.moody's.com/research/Moodys-Sri-Lankas-benefits-from-its-IMF-program-depend-on--PR_350166)

### **Ukraine, 2015**

“The decision to upgrade the sovereign rating of Ukraine's government to Caa3 is based on the following key drivers: [...] 2. *Progress in political and economic reform under the auspices of the IMF-led programme, supporting a rebalancing of the economy and a meaningful reduction in public and external financial deficits.*”

Source: Moody's, [https://www.moody's.com/research/Moodys-upgrades-Ukraines-sovereign-rating-to-Caa3-outlook-stable--PR\\_336283](https://www.moody's.com/research/Moodys-upgrades-Ukraines-sovereign-rating-to-Caa3-outlook-stable--PR_336283)

**Fitch:**

**Benin, 2004**

*“Fitch stated that successive IMF reform programmes have led to macro-economic stabilisation, including a reduction in the budget deficit and a stabilisation of the government’s debt burden through tight fiscal policies.”*

Source: World Markets Research Centre Daily Analysis, accessed via Factiva, 08.06.2017

**Ghana, 2005**

*“Fitch Ratings has upgraded Ghana's long-term foreign and local currency rating [...] The International Monetary Fund (IMF)/World Bank supported Poverty Reduction Strategy will be supported with higher aid funding, which should improve public investment, counteract a projected current-account deterioration and improve international reserves.”*

Source: World Markets Research Centre Daily Analysis, accessed via Factiva, 08.06.2017

## Appendix I: Systematic Analysis of Statements by Rating Agencies

Based on the exploratory analysis, we selected FACTIVA as the more suitable database for a systematic analysis. In particular the feature to select an industry class improved the matching rate between search terms and statements significantly. Our final systematic approach was to

- 1.) **Open the database and login (library access or account is required).**
- 2.) **Issue search queries:**
  - “program” within three words distance to “IMF or International Monetary Fund”, Industry: Rating Agency, Language: English or German
  - “liquidity” within three words distance to “IMF or International Monetary Fund”, Industry: Rating Agency, Language: English or German
  - “reform” within three words distance to “IMF or International Monetary Fund”, Industry: Rating Agency, Language: English or German
  - “program,” “IMF or International Monetary Fund” and “rating” within a ten word corridor, Industry: All, Language: English or German
- 3.) **Manually skim over all statements and delete obviously false matches.**
- 4.) **Pool all remaining text in one text file.**
- 5.) Relevant text is often embedded in larger bodies of text irrelevant to our purpose. **Thus, we run a python script (see below) that searches the text for “IMF” or “International Monetary Fund” and extracts ten lines of text buffer prior and subsequent to a hit.** Moreover, we used regularities in text structure to extract the according publisher and date. Selecting the size of the buffer one faces a trade-off between reducing the volume of text and cutting potentially relevant information. A ten line buffer is a conservative choice towards minimizing the loss of information.
- 6.) Because these are still relatively large chunks of texts, we **manually read the remaining texts and delete irrelevant relevant parts**, and then copy the rest of the text and additional information (name of rating agency and country) to excel. If duplicates appear they are deleted. This left us with 126 statements.

We then developed the following codebook. Two student assistants were equipped with this codebook and went through all statements. In case of deviations in opinion, we always choose the choice biasing against our priors, i.e. the effects we hypothesize. Accordingly, in case of deviating opinions statements are grouped as “liquidity and reforms” instead of “reforms only” and are grouped as “mixed/neutral/negative” based on the more negative of two assessments.

### Positive-Negative Dimension:

*Positive* = 1 iff the statement in question includes remarks which **indicate** that the IMF is seen in a positive light by the rating agency. Assumes background knowledge about basic economic processes and implications of measures for economy.

- **Indicators for IMF being seen in positive light by rating agency:**

- *Citing **actual** or **possible** implementation or continuation of an IMF program or measure or **actual** or **possible** positive developments due to an IMF program or measure as a reason for an **actual** or **possible** positive rating. Conversely, citing **actual** or **possible** lack of implementation or discontinuation of an IMF program or measure as a reason for an **actual** or **possible** negative rating.*

- ➔ **Example for actual continuation of program as reason for actual positive rating:** ID5: "The ratings firm cited the country's improved performance under the European Union-International Monetary Fund program, falling near-term liquidity risk and a better fiscal track record for its upgrade"

- ➔ **Example for possible discontinuation of/ compliance problems with program as reason for possible negative rating:** ID10: "Greece's ratings could also be lowered for reasons unrelated to the proposed ESM, if the Greek government's ability to comply with the program is undermined by domestic political opposition or materially weakens for other reasons, increasing the likelihood of failure to fully comply with the IMF/EU program."

- ➔ **Example for possible discontinuation of program as reason for actual negative rating:** ID69: "The outlook is negative, reflecting what we view as ongoing social and political risks associated with deleveraging efforts by Portugal's highly indebted private and public sectors, as well as financing uncertainties related to Portugal's exit from the EU/IMF program, expected in May 2014. We believe this is symptomatic of diminishing political backing for further fiscal and structural reforms. The Constitutional Court's deliberations over further fiscal measures could coincide with Portugal's planned EU/IMF program exit in the second quarter of 2014."

- ➔ **Example for actual implementation of program as reason for possible positive rating:** ID20: "Turkey's economy has been improving and a continuation of the current positive trend could lead to higher credit ratings for the country, according to the general manager of Moody's Interbank Credit Service's regional Middle East office. [...] "We see lower inflation, the fiscal deficit relatively under control and the International Monetary Fund (IMF) targets seem to be achievable," he said. The IMF is helping Turkey through a stabilization package that sets macroeconomic targets and provides aid in return. [...] In Turkey, programs have been suggested by the IMF that are aimed at lifting its economy out of the debt trap and making it into a debt paying machine. "The IMF provides financing to Turkey through a macro-economic stabilization program. The program calls for the government to take certain actions to correct the macro-economic imbalances. These imbalances include various fiscal and economic reforms that would lead to improvement in the macro-economic conditions."

- Citing **actual** or **possible** implementation or continuation of an IMF program or measure as a factor for **actual** or **possible** positive economic developments in the country. Conversely, citing **actual** or **possible** lack of implementation or discontinuation of an IMF program or measure as a factor for **actual** or **possible** negative economic developments the country.
  - ➔ **Example for actual implementation/ compliance with program as factor for actual positive developments:** ID121: “As a result of the Chuan's cabinet's decisive policy to comply with the IMF program together with the disbursement of US\$10.282 billion as of March 30, 1998 out of the IMF rescue package for US\$17.2 billion, the present market situation is relatively stable and the market confidence seems to be recovered to some extent. (...)”
- Use of terms such as “successful completion” when talking about an IMF-program or measure.
  - ➔ **Example:** ID79: “Such political developments allowed to strengthen the fiscal management stability. The Latvian government also in late 2011 successfully completed the international assistance program with the European Commission and the International Monetary Fund (IMF), said the agency.”

*Negative* = 1 iff the statement in question includes remarks which **indicate** that the IMF is seen in a negative light by the rating agency. Assumes background knowledge about basic economic processes and implications of measures for economy

- **Indicators for IMF being seen in negative light by rating agency:**

- Citing application for or implementation of IMF program or measures as a reason for an actual or possible downgrading
  - ➔ No examples
- Citing application or implementation of IMF program or measures as a reason to keep outlook at negative
  - ➔ **Example:** ID74 “Moody's Investors Service has today confirmed Egypt's B2 government bond ratings and maintained the rating outlook at negative. [...] The key drivers of today's confirmation of Egypt's B2 sovereign rating and negative outlook are: [...]4) The formal request by the new Egyptian government for IMF support”

*Positive* =0 and *Negative* =0 iff the statement in question neither includes remarks which indicate that the IMF is seen in a positive nor remarks which indicate that the IMF is seen in a negative light by the rating agency, or status of remark (positive/negative) is unclear.

- *Purely descriptive statements about IMF without evaluative content*
  - ➔ **Example:** ID59 “Pakistan is also moving forward on structural reforms under its program with the International Monetary Fund (IMF). These reforms focus primarily on fiscal consolidation, debt management, and addressing structural constraints in the energy sector.”
- *Statements with not enough context to conclude status (e.g. because it is unclear if rating has changed in any way)*
  - ➔ **Example** ID93: ““However, policy adjustments and financial support under an 18-month IMF program agreed in April 2009 support a stable rating outlook,” says Byrne.”

### **Liquidity-Reform Dimension:**

*Liquidity Only* = 1 iff the only feature addressed by the rating agency in their remarks in connection with the IMF is the liquidity of the country that is being rated (regardless of whether IMF is seen as donor or whether there might be consequences for liquidity resulting from e.g. implementation of IMF-program).<sup>27</sup>

- **Verbal indicators taken to address liquidity in statements about IMF:**

- *“financial assistance”*
- *“program to relieve the financial burden”*
- *“(future) disbursements”*
- *“financial support from the IMF”, etc.*

➔ **Example:** ID8 “(...) In our view, such improvements could be brought about by a positive conclusion to the negotiations with Gazprom on Ukraine's gas contract and/or a resumption of disbursements under Ukraine's IMF program,” the press release reads.”

*Reform Only* = 1 iff the only feature addressed by the rating agency in their remarks in connection with the IMF are reforms for the country that is being rated (regardless of whether IMF is seen as the one demanding reforms or the source of further IMF-unrelated reforms)<sup>28</sup>.

- **Verbal indicators taken to address reform in statements about IMF:**

- *“technical assistance”*
- *“(…) bolstering its institutional framework”*
- *“policy measures”*
- *“IMF assisted economic reform program”, etc.*

➔ **Example:** ID3 “(...) Moody's report explains that the Solomon Islands successfully graduated from an IMF program in 2016, with progress in bolstering its institutional framework.”

*Reform and Liquidity* = 1 iff the rating agency addresses both reforms and liquidity in their remarks in connection with the IMF (regardless of whether IMF is seen as the one demanding the reforms or the source of further IMF-unrelated reforms and regardless of whether IMF is seen as donor or whether there might be consequences for liquidity resulting from e.g. implementation of IMF-program).

➔ **Example:** ID2 “(...) The new IMF credit facilities (an Extended Credit Facility and an Extended Fund Facility (ECF/EFF)) approved in November unleashed official lending that had been withheld for more than a year. The second driver for stabilizing the outlook relates to the adoption of key structural reforms both in connection with the IMF program and in technical consultation with the IMF and other multilateral lenders and donors. (...)”

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<sup>27</sup> If there are consequences resulting from IMF-related liquidity, then statement is coded as 1. However, if statement only addresses circumstances or conditions which led to IMF-measures with regard to liquidity, statement is coded as 0.

<sup>28</sup> If there are consequences resulting from IMF-related reforms, then statement is coded as 1. However, if statement only addresses circumstances or conditions which led to IMF-measures with regard to reform, statement is coded as 0.

*Liquidity Only* = 0, *Reform Only* = 0 and *Reform and Liquidity* = 0 iff either the rating agency neither addresses liquidity, nor reform nor both in their remarks about the IMF, or status of statement is unclear.

- *Use of the expressions "IMF program" or "IMF agreements" (or synonymous expressions) with no further specification with regard to what the program or agreement is about*

➔ **Example:** ID13 "(...) Under this scenario, the government can get the International Monetary Fund's program "back on track" and there is a strong prospect of positive ratings action, said Edward Parker, a senior Fitch analyst."