MICHAEL BINDER
MARCEL BLUHM

On the Conditional Effects of IMF Loan Program Participation on Output Growth

Institute for Monetary and Financial Stability
GOETHE UNIVERSITY FRANKFURT AM MAIN

WORKING PAPER SERIES NO. 78 (2014)

Institute for Monetary and Financial Stability
Goethe University Frankfurt
House of Finance
Grüneburgplatz 1
D-60323 Frankfurt am Main
www.imfs-frankfurt.de | info@imfs-frankfurt.de

On the Conditional Effects of IMF Loan Program Participation on Output Growth*

Michael Binder
Goethe University Frankfurt

Marcel Bluhm
Wang Yanan Institute for Studies in Economics, Xiamen University and *Center for Financial Studies, Goethe University Frankfurt*

April 2014

Abstract

The empirical evidence currently available in the literature regarding the effects of a country's IMF program participation on its output growth is rather inconclusive. In this paper we propose and estimate a panel data sample selection model featuring state dependence. As in this model the output growth effects of program participation can be conditional on the realization of a state variable (conditional pooling), our framework may reconcile previous empirical evidence based on models without state-dependent effects. We find that the effects of IMF program participation on output growth vary systematically with an index reflecting a country's institutional record, and that output growth effects of program participation are significantly positive only if the program participation is coupled with sufficient improvement of the institutional record.

Keywords: Conditional Pooling, IMF Program Participation, Output Growth, Panel Sample Selection Models.
JEL Classification: O11, O19, C33.

*We are grateful for comments and suggestions from two conference discussants, Michel Beine and Jörg Breitung, as well as seminar and conference participants at Antwerp University, Bonn University, CESifo Munich, Shanghai Jiao Tong University, and Tuebingen University. Correspondence Address: Goethe University Frankfurt, House of Finance, Grueneburgplatz 1, 60323 Frankfurt am Main, Germany. E-Mail Addresses: mbinder@wiwi.uni-frankfurt.de and bluhm@xmu.edu.cn.

1 Introduction

The International Monetary Fund (IMF) began its operations in 1945, and was conceived as an independent international organization helping to promote macroeconomic and financial stability. In the 1970s the IMF expanded its role towards providing development assistance to countries that as a prerequisite for loan approval had to initiate economic and structural reforms as outlined by the IMF.[1] While the IMF has often been criticized for failures in carrying out such development assistance, in the wake of the global financial crisis and the European sovereign debt crisis, a number of calls have been made for an expanded role of the IMF. It is therefore of re-newed importance to have reliable quantitative evidence regarding the effects of a country's participation in IMF loan programs on its output growth.

To obtain such evidence, in this paper we consider the four types of loan arrangements involving policy conditions that the IMF has been offering: the Stand-by Arrangement (SBA), the Extended Fund Facility (EFF), the Structural Adjustment Facility (SAF), and the Enhanced Structural Adjustment Facility (ESAF), subsequently replaced by the Poverty Reduction and Growth Facility (PRGF).[2] Most of the IMF's assistance is provided through SBAs. Designed in 1952 to help countries with addressing short-term balance of payments problems, SBAs typically cover periods of one to two years. The EFF was set up in 1974 to help countries encountering long-term balance of payments problems that require fundamental economic reforms. EFF loan arrangements usually cover three to five years. The SAF has been used since 1986, and is designed to provide assistance for low-income countries for a period of three to five years. The ESAF differs only slightly from the SAF, but involves stricter conditionality criteria and higher loan amounts. The ESAF was used since 1986; after the East-Asian crisis this program was relabeled PRGF, as it was broadened to include poverty reduction and to grant gov-

[1] For a more detailed exposition, see, for example, Fritz-Krockow and Ramlogan (2007).

[2] An overview regarding conditionality in IMF loan programs is available under International Monetary Fund (2013a). Detailed information on the SBA and EFF is available under International Monetary Fund (2013c) and International Monetary Fund (2013b), respectively. Detailed information on the SAF, ESAF, and PRGF is available under International Monetary Fund (2004).

ernments larger scope in negotiating the policy conditions. Typically PRGF programs are pursued for up to four years. For all these conditional loan programs, the IMF assesses whether a country complies with the requirements imposed; if so, the country can draw on the loan funds in pre-specified intervals.[3]

The empirical evidence currently available in the literature regarding the effects of a country's participation in IMF loan programs on its output growth is rather inconclusive. Among the contributions to the literature to be reviewed later in this paper, Barro and Lee (2005), using political economy variables as instruments to overcome the endogeneity of a country's program participation in an output growth regression, find that IMF program participation has a negative effect on output growth. Vreeland (2003), using counterfactual analysis based on a sample selection set-up, also reports evidence that program participation leads to a reduction of output growth. In contrast, Dicks-Mireaux, Mecagni and Schadler (2000), despite using a similar methodological approach as Vreeland (2003), find positive output growth effects of IMF program participation.

In this paper we provide new insights regarding the effects of a country's IMF loan program participation on its output growth by constructing and estimating a *state-dependent* panel data sample selection model. As this model allows the output growth effects of IMF program participation to systematically vary with the model's conditioning state variable (which in this paper we take to be a measure of the institutional record of the country in question), our framework may reconcile previous empirical evidence based on models without state-dependent effects: When analyzing data samples that feature differing institutional records without explicitly accounting for state dependence of the output growth effects of IMF program participation, results may differ across samples. We argue in any case that capturing both sample se-

[3]For the empirical work in this paper we will not distinguish between the output growth effects of these four different loan arrangement schemes. While SBAs in contrast to the other schemes cover elements of structural reforms only to a limited extent, for example in the form of exchange rate and pricing policies, SBAs often precede one of the other schemes simply because "there has not [...] been enough time to assemble all the necessary elements of a comprehensive structural package" (Polak, 1991).

lection and state dependence is critical for properly measuring the effects of a country's IMF loan program participation on output growth. To cope with sample selection issues, we work with an equation system composed both of a program participation selection and an output growth (participation effects) equation; within this equation system, we account for the endogeneity of the program participation measure in the output growth equation using a two-step estimator. We capture country-specific effects using a fixed effects specification as in Semykina and Wooldridge (2010). To account for the state dependence of the output growth effects of IMF program participation, we use semi-parametric conditional pooling techniques as in Binder and Offermanns (2008) to condition the effects of participation in an IMF program on a country's institutional record. Our index variable measuring a country's institutional record is motivated by the World Bank's Country Policy and Institutional Assessment Index (CPIA), focussing on some key features of public sector governance, institutions, and social inclusion that when progressing sufficiently well may provide a basis for IMF loan program participation to result in positive output growth effects.

Using our novel econometric framework and a sample of annual data for 86 countries for the time period from 1975 to 2004, we compile evidence that the effects of IMF program participation on output growth vary systematically with our index of the institutional record, and that these effects are significantly positive only if IMF program participation is coupled with sufficient progress in the country's institutional record. Interestingly, we also find that if using the degree of program implementation rather than the index of the institutional record as the conditioning state variable of our model, the output growth effects remain insignificant at the five percent significance level even under full program implementation. This finding may be interpreted as supporting previous empirical work, including Harrigan, Wang, and El-Said (2005), Reynaud and Vauday (2008) and Dreher, Sturm, and Vreeland (2009) suggesting that both award and continuation of IMF lending for our sample period was significantly influenced by political (rather than economic) factors.

The remainder of this paper is structured as follows: Section 2 provides a review of the previous literature. Sections 3 describes our panel econometric framework discussing sample selection and endogeneity issues as well as our approach to modelling state dependence of the effects of IMF program participation. Section 4 describes the construction of the two conditioning state variables we consider to model the state dependence of the effects of IMF program participation on a country's output growth. Section 5 presents our empirical results. Finally, Section 6 concludes. Details concerning the data set we collected for this paper are described in two appendices at the end of the paper.

2 Review of Previous Literature

There are a number of notable contributions to the literature concerned with measuring the effects of a country's IMF loan program participation on output growth. Most of the contributions can be characterized as following one of three approaches: (i) the 'before-after'-approach, (ii) the 'with-without'-approach, and (iii) regression-based approaches.[4]

The 'before-after'-approach is based on the idea that, *ceteris paribus*, output growth that a country has experienced before/after entering an IMF loan program may be compared with output growth that the country experiences during participation in an IMF loan program. For example, Evrensel (2002) investigates the effects of IMF loan programs for a sample of 109 countries and the time period from 1971 to 1997 using lags of up to three years before and after program participation to conduct a 'before-after' analysis. Measuring the output growth effects of program participation using this framework, Evrensel (2002) finds that the evidence is inconclusive. Problematic from a methodological perspective is that the 'before-after' approach by construction for each instance of program participation uses few time-series observations only. It is thus rather unlikely that with this approach one will be able to filter out the range of common and country-specific features and occurrences that have bearing on the output growth effects of program participation.

[4]See also Vreeland (2003) and Dreher (2006) for a similar categorization of the literature.

Turning to the 'with-without' approach, it rests on the assumption that the relevant features of countries that participate in IMF loan programs are the same as those of countries not participating in IMF loan programs. For example, using matching methods, Hutchison (2004) analyzes the differences in output growth between countries participating and those not participating in IMF loan programs, for a panel of 25 countries and the time period from 1975 to 1997. Hutchison's (2004) results suggest that, once sample selection is controlled for using observed variables, participation in IMF loan programs has no adverse effects on output growth. However, Hutchison's (2004) matching methods do not take into account selection based on unobserved variables,[5] and so the results may still be subject to a sample selection bias. Using a related approach, Bordo and Schwartz (2000) compare the performance of 24 Asian and Latin-American countries for the time period from 1973 to 1999 and find that before the on-set of currency or banking crises, output growth declines yet more strongly in countries participating in IMF loan programs than in those that do not participate. Furthermore they find that countries not participating in IMF loan programs recover faster after these crises have ended.

The majority of contributions to the empirical literature analyzing the effects of IMF loan program participation on output growth employ regression-based approaches. Dicks-Mireaux, Mecagni, and Schadler (2000) perform a counterfactual analysis using a panel data set involving 74 countries for the time period from 1986 to 1991. Taking into account sample selection issues, they find significant, positive effects of IMF loan program participation on output growth. In contrast, Vreeland (2003) using a similar methodology for a panel of 79 countries during the time period from 1970 to 1990,[6] finds a negative impact of IMF program participation on output growth. Bordo and Schwartz (2000) beyond a 'with-without' approach based analysis also carry out a regression-based analysis. In this latter analysis they find negative but insignificant effects on output growth during the on-set of a currency or bank-

[5]See, for example, Heckman, Ichimura, and Todd (1998) for a distinction between selection based on observed variables versus selection based on unobserved variables.

[6]Vreeland (2003) also uses a larger data set, ranging from 1950 to 1990.

ing crisis, but positive and significant effects a year later. Hutchison and Noy (2003), distinguishing between IMF program approval and successful completion of IMF programs, analyze the effects of IMF program participation on output growth in a sample of 65 developing countries and the time period from 1975 to 1997. Using regression-based counterfactual analysis, Hutchison and Noy (2003) find that participation in IMF loan programs results in short-run output growth losses, though noting that these results appear entirely driven by the Latin-American countries in their sample. Finally, Barro and Lee (2005), using a set of political economy variables as instruments to correct for regressor endogeneity problems in a panel comprising 86 countries during the time period from 1975 to 2000, find that participation in IMF loan programs has a significant, negative effect on output growth (their study does not explicitly address sample selection issues, though).

While some of these differences of findings in the available empirical literature may in part be driven by differences in methodology, the range of findings even on the basis of quite comparable regression-based settings suggests that some determinants of the output growth effects of IMF loan program participation vary across analyses. Therefore, in our analysis we will allow for state dependence of the output growth effects of IMF loan program participation.

3 Panel Data Models with Sample Selection and Censored Endogenous Variables

When using a regression framework to estimate the effects of IMF loan program participation on a country's output growth, two issues that need to be addressed are (i) endogeneity of the program participation measure in the output growth equation and (ii) sample selection. The first issue arises when explaining output growth with, *inter alia*, a country's participation in IMF loan programs, as one will need to distinguish whether a country's economic performance is causal for IMF program participation, or vice versa. The second issue arises when using non-randomly selected samples for model estimation, as then the fact that the output growth performance of countries that participate in IMF programs may systematically differ from that of those countries that do not participate needs to be addressed.[7] Countries tend to participate in IMF loan programs when they encounter economic problems and/or are in a situation of economic crisis, which implies that they are likely to experience an output growth process that is different from that of countries that do not turn to the IMF for assistance. It is thus sensible to analyze the output growth process of participating countries separately from the output growth process of non-participating countries, which in turn necessitates to correct for sample selection. As noted by Vella (1998), while sample selection has in the literature been commonly confronted in purely cross-sectional analyses, it is less frequently considered to be of concern in the estimation of panel models. This may in part be due to the perception that a panel model incorporating random or fixed effects will eliminate most forms of unobserved heterogeneity. However, consistency of the fixed effects estimator of a fixed effects panel data model not explicitly capturing the selection mechanism requires that the selection operates purely through the time-invariant country-specific terms, which appears to be rather unlikely.

In what follows, we describe our panel econometric framework to deal not only with the sample selection and endogeneity issues, building on work of Vella and Verbeek (1999), but also introducing state dependence in the spirit of Binder and Offermanns (2008). As noted in the Introduction, a setting involving state-dependent program participation effects has the potential to reconcile conflicting previous empirical evidence regarding the output growth effects of a country's IMF loan program participation.

Consider the following fixed effects panel sample selection model:

$$y_{it}^{*} = \mu_i + d_{it}\,\theta\,(w_{i,t-1}) + \mathbf{x}_{it}^{'}\,\boldsymbol{\beta} + e_{it} \tag{1}$$

[7] As is well known, the investigation of such sample selection effects was pioneered in empirical microeconomics by Heckman (1979).

("participation effects equation"),

$$d_{it}^{*} = \alpha_i + \mathbf{z}_{it}' \,\boldsymbol{\gamma} + v_{it} \tag{2}$$

("participation selection equation"), where

$$d_{it} = \begin{cases} d_{it}^{*} \text{ if } d_{it}^{*} > 0, \\ 0 \text{ otherwise,} \end{cases} \tag{3}$$

$$y_{it} = \begin{cases} y_{it}^{*} & \text{if } d_{it}^{*} > 0, \\ \tilde{\mu}_i + \tilde{\mathbf{x}}_{it}'\tilde{\boldsymbol{\beta}} + \tilde{e}_{it} & \text{if } d_{it}^{*} = 0, \end{cases} \tag{4}$$

$i = 1, 2, \ldots, N$, and $t = 1, 2, \ldots, T_i$, where y_{it}^{*} and d_{it}^{*} are latent endogenous variables for cross-sectional unit i at time t, with observed counterparts y_{it} (output growth – participation effects measure) and d_{it} (IMF loan-quota ratio – measure of participation intensity), μ_i, $\tilde{\mu}_i$, and α_i represent fixed effects, $\mathbf{x}_{it}$, $\tilde{\mathbf{x}}_{it}$, and $\mathbf{z}_{it}$ are control variable vectors of dimension $k_{\mathbf{x}} \times 1$, $k_{\tilde{\mathbf{x}}} \times 1$ and $k_{\mathbf{z}} \times 1$, $k_{\mathbf{z}} \geq k_{\mathbf{x}}$,[8] e_{it}, $\tilde{e}_{it}$, and v_{it} are *i.i.d.* error terms, and the effects of participation (d_{it}) on the participation effects measure (y_{it}) are conditional on the pre-determined state variable $w_{i,t-1}$.

Assumption (A1): *The conditioning polynomial* $\theta\left(w_{i,t-1}\right)$ *is given by*

$$\theta\left(w_{i,t-1}\right) = \sum_{q=0}^{p} \theta_q \; c_q\left(w_{i,t-1}\right), \tag{5}$$

where $c_{q+1}\left(w_{i,t-1}\right) = 2\; w_{i,t-1}\; c_q\left(w_{i,t-1}\right) - c_{q-1}\left(w_{i,t-1}\right)$, $q = 1, 2, \ldots, p$, $c_0\left(w_{i,t-1}\right) = 1$, *and* $c_1\left(w_{i,t-1}\right) = w_{i,t-1}$. *The Chebyshev polynomials we work with here belong to the class of orthogonal polynomials, and thus can address collinearity problems that could arise under* $p > 1$. *In what follows we will collect all coefficients on the right-hand side of Equation* (5) *in* $\boldsymbol{\theta}$, *with*

$$\boldsymbol{\theta} = \left(\theta_0, \theta_1, \ldots, \theta_p\right)'. \tag{6}$$

[8] Unlike Vella and Verbeek (1999) we wish to allow for a larger number of regressors in the participation selection equation than in the participation effects equation.

Remark (R1): *As the elements of* $\boldsymbol{\theta}$ *are assumed to be homogeneous, the participation effects are homogeneous conditional on* $w_{i,t-1}$ *(as well as on* μ_i *and* $\mathbf{x}_{it}$*), but are not unconditionally homogeneous ("conditional pooling", as in Binder and Offermanns* (2008)*). Through conditioning the coefficient that from an economic perspective is the key model coefficient (measuring the elasticity of* y_{it} *with respect to* d_{it}*), the model captures variation across cross-sectional units of this coefficient that continues to be present after accounting for fixed effects in* μ_i *and different realizations of regressors in* $\mathbf{x}_{it}$*. Thus,* $w_{i,t-1}$ *will typically reflect variables that are not part of* $\mathbf{x}_{it}$*, but rather represent additional features of the economic environment that affect the magnitude of the participation effects. The variable* $w_{i,t-1}$ *may therefore reflect regressors with limited intertemporal variation (but sizeable cross-country spread), allowing to capture the dependence of the participation effects on what are often called "soft factors".*

Remark (R2): *In contrast to the typical 'differences-in-differences' framework, we allow for* y_{it} *to be generated from a structurally different model in the case of non-participation as compared to the case of participation.*

Assumption (A2): *Invoking the Mundlak* (1978) *decomposition of fixed effects, the fixed effects* μ_i *in Equation* (1) *and* α_i *in Equation* (2) *can each be decomposed into a systematic component driven by observables* ($\mathbf{m}_i$)*, and a purely random component (*χ_i *for* μ_i*, and* r_i *for* α_i*) that is unobserved:*

$$\mu_i = \psi + \mathbf{m}_i' \,\boldsymbol{\kappa}_\mu + \chi_i, \qquad \chi_i \overset{iid}{\sim} N\left(0, \sigma_\chi^2\right), \tag{7}$$

and

$$\alpha_i = \zeta + \mathbf{m}_i' \,\boldsymbol{\kappa}_\alpha + r_i, \qquad r_i \overset{iid}{\sim} N\left(0, \sigma_r^2\right). \tag{8}$$

Remark (R3): *The fixed effects specification of Equations* (7) *and* (8) *has recently been considered in the context of panel sample selection models by Semykina and Wooldridge (2010); it obviously reduces to a random effects specification in the case where* $\mathbf{m}_i = \mathbf{0}$*. See, for example, Binder, Hsiao, and Pesaran (2005) for an unrestricted formulation of fixed effects within a linear* *dynamic panel data model.*

Under the conditional pooling specification of Equation (5), and the specification in Equations (7) and (8) of the model's fixed effects, the participation effects and participation selection equations can be re-written as

$$y_{it}^* = \psi + \mathbf{m}_i' \,\boldsymbol{\kappa}_\mu + \sum_{q=0}^{p} \; d_{it}\; c_q\left(w_{i,t-1}\right)\; \theta_q + \mathbf{x}_{it}^{'}\,\boldsymbol{\beta} + \epsilon_{it}, \tag{9}$$

with

$$\epsilon_{it} = \chi_i + e_{it}, \tag{10}$$

and

$$d_{it}^* = \zeta + \mathbf{m}_i' \,\boldsymbol{\kappa}_\alpha + \mathbf{z}_{it}' \,\boldsymbol{\gamma} + u_{it}, \tag{11}$$

with

$$u_{it} = r_i + v_{it}. \tag{12}$$

Assumption (A3): *The unobserved components χ_i and e_{it} in the participation effects equation, Equation* (9), *and r_i and v_{it} in the participation selection equation, Equation* (11), *are distributed as*

$$\left(\begin{array}{c} \chi_i\,\boldsymbol{\iota}_i + \mathbf{e}_i \\ r_i\,\boldsymbol{\iota}_i + \mathbf{v}_i \end{array}\right)\Bigg|_{\,\mathbf{w}_i,\,\mathbf{X}_i,\,\mathbf{Z}_i} \overset{iid}{\sim} N\left[\left(\begin{array}{c} \mathbf{0} \\ \mathbf{0} \end{array}\right), \left(\begin{array}{cc} \sigma_\chi^2\,\boldsymbol{\iota}_i\boldsymbol{\iota}_i' + \sigma_e^2\,\mathbf{I}_{T_i} & \sigma_{\chi r}\,\boldsymbol{\iota}_i\boldsymbol{\iota}_i' + \sigma_{ev}\,\mathbf{I}_{T_i} \\ \sigma_{\chi r}\,\boldsymbol{\iota}_i\boldsymbol{\iota}_i' + \sigma_{ev}\,\mathbf{I}_{T_i} & \sigma_r^2\,\boldsymbol{\iota}_i\boldsymbol{\iota}_i' + \sigma_v^2\,\mathbf{I}_{T_i} \end{array}\right)\right], \tag{13}$$

where

$$\mathbf{e}_i = \left(\begin{array}{cccc} e_{i1}, & e_{i2}, & \ldots, & e_{iT_i} \end{array}\right)', \quad \mathbf{v}_i = \left(\begin{array}{cccc} v_{i1}, & v_{i2}, & \ldots, & v_{iT_i} \end{array}\right)', \tag{14}$$

$$\mathbf{w}_i = \left(\begin{array}{cccc} w_{i0}, & w_{i1}, & \ldots, & w_{i,T_i-1} \end{array}\right)', \quad \mathbf{X}_i = \left(\begin{array}{cccc} \mathbf{x}_{i1}', & \mathbf{x}_{i2}', & \ldots, & \mathbf{x}_{iT_i}' \end{array}\right)', \tag{15}$$

$$\mathbf{Z}_i = \left(\begin{array}{cccc} \mathbf{z}_{i1}', & \mathbf{z}_{i2}', & \ldots, & \mathbf{z}_{iT_i}' \end{array}\right)', \tag{16}$$

$\boldsymbol{\iota}_i$ denotes a $T_i \times 1$ vector of ones, and $\mathbf{I}_{T_i}$ denotes an indentity matrix of dimension $T_i \times T_i$.

Remark (R4): *Even if* $\sigma_{\chi r} = 0$, *in general it will not hold that* $E\left(\epsilon_{it}\,|\,u_{it}\right) = 0$, *as* y_{it} *does not appear on the right-hand side of Equation* (11), *and Equation* (11) *in the terminology of the econometric literature on simultaneous equation models therefore is a reduced-form equation* (*implying that* $E\left(v_{it}\,|\,e_{it}\right) \neq 0$ *and that the elements of* $\mathbf{z}_{it}$ *cannot be a strict sub-set of the elements of* $\mathbf{x}_{it}$). *Also note that* d_{it} *on the right-hand side of the participation effects equations, Equations* (1) *and* (9), *is, of course, endogenous* ($E\left(e_{it}\,|\,d_{it}\right) \neq 0$).

Remark (R5): *The participation selection rule in Equation* (3) *implies a lower-limit censoring of* v_{it} *for those cross-sectional units for which* $d^*_{it} > 0$, *which in turn through the truncation rule in Equation* (4) *then implies restrictions on* e_{it} *also. This sample selection mechanism is a second reason why we have* $E\left(\epsilon_{it}\,|\,u_{it}\right) \neq 0$ *even if* $\sigma_{\chi r} = 0$.

Assumption (A4): *The correlation between* ϵ_{it} *and* u_{it} *conditional on* $\mathbf{Z}_i$ *and* $\mathbf{u}_i$, *where*

$$\mathbf{u}_i = \begin{pmatrix} u_{i1}, & u_{i2}, & \ldots, & u_{iT_i} \end{pmatrix}' = r_i\,\boldsymbol{\iota}_i + \mathbf{v}_i, \tag{17}$$

is captured through

$$E\left(\epsilon_{it}\,|\,\mathbf{Z}_i, \mathbf{u}_i\right) = E\left(\chi_i + e_{it}\,|\,\mathbf{Z}_i, u_{it}, \overline{u}_i\right), \tag{18}$$

where

$$\overline{u}_i = \frac{1}{T_i}\sum_{t=1}^{T_i} u_{it}. \tag{19}$$

Implication (I1):[9] *Under Assumptions* (**A3**) *and* (**A4**), *the correlation between* ϵ_{it} *and* u_{it} *is given by*

$$E\left(\epsilon_{it}\,|\,\mathbf{Z}_i, \mathbf{u}_i\right) = \tau_1\,u_{it} + \tau_{2i}\,\overline{u}_i, \tag{20}$$

[9] Detailed derivations are omitted here for space reasons and are available from the authors upon request.

where

$$\tau_1 = \frac{\sigma_{ev}}{\sigma_e^2}, \tag{21}$$

and

$$\tau_{2i} = T_i \frac{\sigma_{\chi r} - \frac{\sigma_{ev}\,\sigma_r^2}{\sigma_e^2}}{\sigma_v^2 + T_i\,\sigma_r^2}. \tag{22}$$

Implication (I2): *Under Assumptions* (**A1**) *to* (**A4**),[10] *consistent estimation of Equation* (9) *can be based on OLS estimation of the coefficients* ψ, κ_μ, $\boldsymbol{\theta}$, $\boldsymbol{\beta}$, $\widetilde{\tau}_1$, *and* $\widetilde{\tau}_2$ *in*

$$y_{it} = \psi + \mathbf{m}_i'\,\boldsymbol{\kappa}_\mu + \sum_{q=0}^{p} d_{it}\,c_q\left(w_{i,t-1}\right)\,\theta_q + \mathbf{x}_{it}^{'}\,\boldsymbol{\beta} + \widetilde{\tau}_1\,\widehat{u}_{it} + \widetilde{\tau}_2\,\widehat{\overline{u}}_i + \varepsilon_{it}, \tag{23}$$

where $\widehat{u}_{it}$ *and* $\widehat{\overline{u}}_i$ *denote estimates of* u_{it} *and* $\overline{u}_i$ *based on maximum likelihood estimation of the participation selection equation, Equation* (11), *and* ε_{it} *is defined as*

$$\varepsilon_{it} = \epsilon_{it} - E\left(\epsilon_{it}\,|\,\mathbf{Z}_i, \mathbf{u}_i\right), \tag{24}$$

that is, ε_{it} *is a disturbance term orthogonal to* $\mathbf{m}_i$, d_{it}, $\mathbf{x}_{it}$, $\widehat{u}_{it}$, *and* $\widehat{\overline{u}}_i$.

Remark (R6): *To implement OLS estimation of Equation* (23), *in a first step the participation selection equation, Equation* (11), *subject to the selection rule* in *Equation* (3), *needs to be estimated by maximum likelihood. The log likelihood function for this purpose is given by*

$$\log \mathfrak{L}_d\left(\boldsymbol{\varrho}_d\right) = \int \left[\sum_{i=1}^{N}\sum_{t=1}^{T_i} \log\Phi\left(-\frac{\mathbf{q}_{it}'\boldsymbol{\vartheta}}{\sigma_\nu}\right) 1_{(d_{it}=0)} + \log\phi\left(\frac{d_{it} - \mathbf{q}_{it}'\boldsymbol{\vartheta}}{\sigma_\nu}\right) 1_{(d_{it}>0)}\right]\,\phi\left(\frac{r_i}{\sigma_r}\right)\,dr_i, \tag{25}$$

[10]Assumptions (**A1**) to (**A4**) are sufficient, but not necessary, for Implication (**I2**) to hold. In particular, e_{it} need not be assumed to be intertemporally uncorrelated and homoskedastic for Implication (**I2**) to hold.

where

$$\boldsymbol{\varrho}_d = \left(\zeta \boldsymbol{\kappa}_\alpha', \boldsymbol{\gamma}', \sigma_r^2, \sigma_v^2\right)', \tag{26}$$

$$\mathbf{q}_{it}'\boldsymbol{\vartheta} = \zeta + \mathbf{m}_i' \, \boldsymbol{\kappa}_\alpha + \mathbf{z}_{it}' \, \boldsymbol{\gamma} + r_i, \tag{27}$$

ϕ denotes the standard normal probability distribution function, and Φ the standard normal cumulative density function. Based on the maximum likelihood estimates of $\boldsymbol{\varrho}_d$, the correction terms $\widehat{u}_{it}$ and $\widehat{\overline{u}}_i$ entering Equation (23) *can be obtained using*

$$\widehat{u}_{it} = \int \left(r_i + \widehat{v}_{it}^G\right) \, f\left(r_i \,|\, \mathbf{Z}_i, \mathbf{d}_i\right) \, dr_i, \tag{28}$$

where

$$\mathbf{d}_i = \begin{pmatrix} d_{i1}, & d_{i2}, & \ldots, & d_{iT_i} \end{pmatrix}', \tag{29}$$

and $\widehat{v}_{it}^G$ is the maximum likelihood estimate of v_{it}^G, with v_{it}^G in turn denoting the generalized residual of the participation selection equation (11),[11] *implicitly defined as*

$$\frac{\partial \log \mathfrak{L}_d\left(\boldsymbol{\varrho}_d\right)}{\partial\left(\zeta, \boldsymbol{\kappa}_\alpha', \boldsymbol{\gamma}'\right)'} = \sum_{i=1}^{N} \sum_{t=1}^{T_i} v_{it}^G \, \mathbf{q}_{it} = \mathbf{0}; \tag{30}$$

v_{it}^G is thus given by

$$v_{it}^G = \left(\frac{d_{it} - \mathbf{q}_{it}'\boldsymbol{\vartheta}}{\sigma_\nu}\right) 1_{(d_{it}>0)} - \left[\frac{\phi\left(\frac{\mathbf{q}_{it}'\boldsymbol{\vartheta}}{\sigma_\nu}\right)}{\Phi\left(-\frac{\mathbf{q}_{it}'\boldsymbol{\vartheta}}{\sigma_\nu}\right)}\right] 1_{(d_{it}=0)}. \tag{31}$$

[11] See Gourieroux, Monfort, Renault, and Trognon (1987) for a discussion of the type of generalized residuals we work with here.

It follows that $\widehat{u}_{it}$ can be estimated as

$$\widehat{u}_{it} = \int \left(\left\{ r_i + \left(\frac{d_{it} - \mathbf{q}_{it}' \widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu} \right) 1_{(d_{it}>0)} - \left[\frac{\phi\left(\frac{\mathbf{q}_{it}'\widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu}\right)}{\Phi\left(-\frac{\mathbf{q}_{it}'\widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu}\right)} \right] 1_{(d_{it}=0)} \right\} \cdot \frac{\left[\prod_{t=1}^{T} \Phi\left(-\frac{\mathbf{q}_{it}'\widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu}\right) 1_{(d_{it}=0)}\ \phi\left(\frac{d_{it}-\mathbf{q}_{it}'\widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu}\right) 1_{(d_{it}>0)} \right] \phi\left(\frac{r_i}{\widehat{\sigma}_r}\right)}{\int \left[\prod_{t=1}^{T} \Phi\left(-\frac{\mathbf{q}_{it}'\widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu}\right) 1_{(d_{it}=0)}\ \phi\left(\frac{d_{it}-\mathbf{q}_{it}'\widehat{\boldsymbol{\vartheta}}}{\widehat{\sigma}_\nu}\right) 1_{(d_{it}>0)} \right] \phi\left(\frac{r_i}{\widehat{\sigma}_r}\right)\, dr_i} \right) dr_i, \tag{32}$$

where $\widehat{\boldsymbol{\vartheta}}$, $\widehat{\sigma}_\nu$, and $\widehat{\sigma}_r$ denote the maximum likelihood estimates of $\boldsymbol{\vartheta}$, σ_ν, and σ_r based on maximizing the log likelihood function given by (25). *Having obtained estimates $\widehat{u}_{it}$ and $\widehat{\overline{u}}_i$ of u_{it} and $\overline{u}_i$, in a second step Equation* (23) *can be estimated by means of OLS regression of y_{it} on an intercept term, $\mathbf{m}_i$, $d_{it}\ c_q(w_{1i,t-1})$, $q = 1, 2, \ldots, p$, $\mathbf{x}_{it}$, $\widehat{u}_{it}$, and $\widehat{\overline{u}}_i$, $i = 1, 2, \ldots, N$, and $t = 1, 2, \ldots, T_i$.*

Implication (I3): *An alternative, asymptotically more efficient estimation procedure for the parameters of the participation effects equation is a conditional maximum likelihood estimator. Such conditional maximum likelihood estimation decomposes the joint probability distribution function of $\mathbf{y}_i$,*

$$\mathbf{y}_i = \begin{pmatrix} y_{i1}, & y_{i2}, & \ldots, & y_{iT_i} \end{pmatrix}', \tag{33}$$

and $\mathbf{d}_i$ as follows:

$$f\left(y_{it}, d_{it} \,|\, \mathbf{w}_i, \mathbf{X}_i, \mathbf{Z}_i; \boldsymbol{\varrho}_y, \boldsymbol{\varrho}_d\right) = f\left(y_{it}, \,|\, d_{it}, \mathbf{w}_i, \mathbf{X}_i, \mathbf{Z}_i; \boldsymbol{\varrho}_y, \boldsymbol{\varrho}_d\right)\ f\left(d_{it} \,|\, \mathbf{Z}_i; \boldsymbol{\varrho}_d\right), \tag{34}$$

with f generically denoting a probability distribution function, and where

$$\boldsymbol{\varrho}_y = \left(\psi, \boldsymbol{\kappa}_\mu', \boldsymbol{\theta}', \boldsymbol{\beta}', \sigma_\chi^2, \sigma_{\chi r}, \sigma_e^2, \sigma_{ev}\right)'. \tag{35}$$

The first step of this conditional maximum likelihood estimation again involves maximum likelihood estimation of the participation selection equation; recall that the log likelihood function corresponding to $f\left(d_{it} \,|\, \mathbf{Z}_i; \boldsymbol{\varrho}_d\right)$ is given *by Equation* (25). *Denoting the resultant estimates of* $\boldsymbol{\varrho}_d$ *by* $\widehat{\boldsymbol{\varrho}}_d$*, in a second step for this conditional maximum likelihood estimation of the parameters of the participation effects equation, the conditional log likelihood function*

$$\log \mathfrak{L}_{y|d}\left(\boldsymbol{\varrho}_y, \widehat{\boldsymbol{\varrho}}_d\right) = \sum_{i=1}^{N}\sum_{t=1}^{T_i} \log\left\{\frac{1}{\sqrt{2\pi\sigma_\varepsilon^2}}\exp\left[-\frac{1}{2}\frac{\varepsilon_{it}^2}{\sigma_\varepsilon^2}\right]\right\}, \tag{36}$$

with

$$\varepsilon_{it} = y_{it}^* - \psi - \mathbf{m}_i' \,\boldsymbol{\kappa}_\mu - \sum_{q=0}^{p} \, d_{it} \, c_q\left(w_{i,t-1}\right) \, \theta_q - \mathbf{x}_{it}^{'} \,\boldsymbol{\beta} - \tau_1 \, \widehat{u}_{it} - \tau_2 \, \widehat{\overline{u}}_i, \tag{37}$$

needs to be maximized with respect to $\widetilde{\boldsymbol{\varrho}}_y$,

$$\widetilde{\boldsymbol{\varrho}}_y = \left(\psi, \boldsymbol{\kappa}_\mu', \boldsymbol{\theta}', \boldsymbol{\beta}', \tau_1, \tau_2, \sigma_\varepsilon^2\right)'. \tag{38}$$

Remark (R7): *Semykina and Wooldridge (2010) provide a different two-step estimation and inference procedure for a panel model with a Probit specification of the selection mechanism than we propose in this section for a panel model with a Tobit specification of the selection mechanism. For our data set, the procedure we outline here appears to be more robust to the selection of variables in* $\boldsymbol{m}_i$ *than the Semykina and Wooldridge (2010) procedure. A systematic comparison of our procedure with that of Semykina and Wooldridge (2010) would be interesting to pursue but is beyond the scope of this paper.*

4 State Variables

Under our conditional pooling approach (some of) the model coefficients are a function of a conditioning state variable. According to the IMF, "[c]onditionality refers to policies and actions that a borrowing member agrees to carry out as a condition for the use of IMF resources. The purpose of conditionality is to ensure assistance to members [...] in a manner that [...] establishes adequate safeguards for the temporary use of the IMF's resources."[12] Structural conditionality may in particular involve proposals for changes in policy processes and for institutional reforms.[13] In line with this, the IMF is arguing that "the implementation of IMF-supported programs depends to a significant extent on the domestic political and institutional environment".[14] By fostering the institutional record, the IMF in effect acknowledges that efficient outcomes in market-oriented economies are most likely to occur when the non-market institutions are functioning well. Similarly, the World Bank uses its CPIA to assess "the conduciveness of a country's policy and institutional framework to poverty reduction, sustainable growth, and the effective use of development assistance."[15] The CPIA is based on 16 criteria which are grouped into four categories, namely economic management, structural policies, policies for social inclusion and equity, as well as public sector management and institutions.[16] To capture a relatively broad range of aspects of institutional quality, we construct for this paper an index incorporating measures of bureaucracy quality, absence of corruption, educational attainment, law and order, government stability, absence of ethnic tensions and internal conflicts, and health (life expectancy).[17] The index is constructed on the basis of the mean of the i-th country's index elements relative to the mean of the same index elements for a base-country year (the United States in 2000):

$$index_{it} = \frac{\sum_{s=1}^{m} \ s\text{-}th \ variable_{it}}{\sum_{s=1}^{m} \ s\text{-}th \ variable_{\textit{base-country, base-year}}}, \tag{39}$$

where m denotes the number of variables that enter into the construction of the index. To be able to calculate this index, we replace missing observations using interpolated values. If for, say, country i a time series is missing en-

[12]See Fritz-Krockow and Ramlogan (2007), p. 25.

[13]See Nsouli, Atoyan, and Mourmouras (2006).

[14]See International Monetary Fund (2006).

[15]Independent Evaluation Group (2009), p. ix.

[16]For a detailed overview see World Bank (2009).

[17]Note that the CPIA is only available for a subset of countries in our panel data set. We therefore construct an index of countries' institutional records in the spririt of the World Bank's CPIA. A listing including a description of all variables used for construction of our index is given in Appendix A.

tirely, we proxy it via a 'rank-matching' procedure: For each time period for country i, first a preliminary index is calculated on the basis of Equation (39) involving only those variables that are actually available for country i. We then also calculate the same preliminary index for all other countries for time period t, excluding those variables that are completely missing for country i. Using these preliminary indices, we then calculate the period t relative rank (that is, $\frac{rank_{it}}{number\ of\ countries_t}$) of the preliminary index value of country i among the set of all countries that can be considered for the preliminary index values in period t. We then proxy for time period t the variable in country i that is missing with that value of this variable for which the period t relative rank is closest to the relative rank calculated for country i's preliminary index for period t. Finally, we impute values of those variables for which there are no observations either at the beginning or at the end of the series using the percentage changes of, again, a preliminary index that contains only those variables that are available. At this point then for each country we have a balanced set of variables that can be used to calculate the index as outlined in Equation (39).

Our approach to index calculation ensures that there are no mean shifts in the country's index values if the time series for some variable begins later or ends earlier than the time series for some other variables for that country. Our approach furthermore preserves all the information about the variation in the time series we exploit. It should be noted that due to the imputation procedure it is possible that an index value may become larger than one.[18]

As an alternative conditioning state variable, we also consider the loans-drawn-to-agreed ratio. In practice, the IMF only disburses installments of funds agreed to in the loan program if the country advances specific reforms, that is, complies with conditionality of the loan program. Hence, one way to model compliance with conditionality would be to consider the ratio of loans actually drawn relative to loans originally agreed upon.[19] Provided that

[18] In Section 5 below, we also report regression results using the sub-sample of observations that does not require any imputation for construction of the index of the institutional record. As discussed in more detail there, our main results are not affected by the choice as to whether to use the institutional record series with or without imputation.

[19] This measure was initially suggested as a proxy for compliance with conditionality

the IMF consistently disburses funds only to countries that are sufficiently successful in advancing economic reforms, the loans-drawn-to-agreed ratio should be a useful proxy as to whether a country is successful in implementing the economic reforms advocated by the IMF.

5 Empirical Results

We begin by discussing empirical results obtained by means of considering the sample selection panel model of Section 3, but without state dependence of effects. The set of regressors for all equations was chosen on the basis of the Akaike Information Criterion (AIC). The AIC turned out to always select a fixed effects specification, in line with F-test results on the significance of the Mundlak variables, $\boldsymbol{m}_i$. Potential candidates for the Mundlak variables were a country's fertility rate, freedom of the press, freedom status of society, economic proximity to the U.S. and economic proximity to major Europe. Potential candidate variables for $\boldsymbol{z}_{it}$ and $\boldsymbol{x}_{it}$ were a country's cumulative number of years in IMF loan programs,[20] quota share at the IMF, staff share at the IMF, political proximity to the U.S., political proximity to major Europe, reserve position, current account position, trade openness, democracy index, investment share of gross domestic product (GDP), government share of GDP, and inflation. A description of all variables used can be found in Appendix A.

The participation selection equation, Equation (11), is a fixed effects Tobit model, as the loan-quota ratio, which contains country years with and without participation in IMF loan programs, is left-censored at zero.[21] As

by Killick (1995).

[20] To allow for separate identification of the participation selection and participation effects equations, the cumulative number of years in IMF loan programs was only considered as a regressor in the participation selection equation.

[21] The IMF loan-quota ratio captures the average, on a monthly basis, of funds agreed upon in all loan programs (SBA, EFF, SAF, ESAF/PRGF), divided by the country's quota at the IMF. Note that Dreher (2006) only covers those arrangements that have been active for at least five months in a given calendar year. Our results do not change if we adjust the loan-quota ratio accordingly. Similar to Vreeland (2003), we consider consecutive agreements with the IMF as being part of the same spell, since governments most of the time have several consecutive agreements with the IMF.

Independent Variables	**Marginal Effects**
Investment Share	-2.574^{***} [3.550]
Inflation	-0.028^{***} [2.716]
Reserves	0.007 [0.043]
Government Share	0.647 [1.303]
Openness	-0.068 [0.526]
Democracy Index	-0.027^{*} [1.889]
Number of Years under IMF Programs	0.014^{***} [2.744]
Mean Political Proximity to U.S.	0.094 [1.609]
Mean Fertility Rate	0.621^{*} [1.801]
Mean Economic Proximity to Major Europe	-0.203^{**} [2.540]
Number of Observations	1478

Note: Estimation results are obtained by estimating Equation (11), augmented with the Mundlak variables capturing fixed effects: $d^*_{it} = \zeta + \mathbf{m}'_i\ \boldsymbol{\kappa}_\alpha + \mathbf{z}'_{it}\ \boldsymbol{\gamma} + u_{it}$, where the dependent variable is the loan-quota ratio. The F-test of joint significance of the Mundlak variables is significant at the five percent significance level. The McFadden Pseudo R-squared for the regression equals 0.02. t-statistics are displayed in square brackets underneath the coefficient estimates. A '*' indicates significance at the ten percent level, a '**' indicates significance at the five percent level and a '***' indicates significance at the one percent level. The regression uses annual data, the sample extends from 1975 to 2004 and the number of countries considered is 65. The intercept term is not displayed. All marginal effects are calculated at the independent variables' means and the unobserved heterogeneity at its unconditional mean. A description of all variables used is provided in Appendix A.

Table 1: Regression Results for the Participation Selection Equation

can be seen from Table 1, the estimated coefficients on the investment share, inflation, democracy index, and economic proximity to major Europe are significantly negative. If the investment share or inflation decline by one percentage point, then the ratio of IMF lending to a country's IMF quota increases by 2.574 or 0.028 percentage points, respectively.[22] Our finding for

[22]Note that differentiating the latent variable (denoted here generically as y^*) with respect to one of the independent variables (denoted here generically as x, entering into the Tobit model with a coefficient of β), we of course have

$$\frac{\partial E(y^*|x)}{\partial x} = \beta.$$

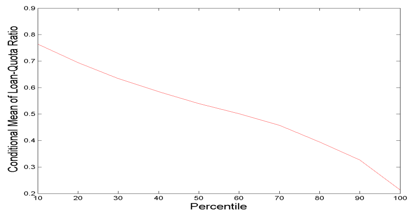
the effect of the investment share is qualitatively similar to that in Przeworski and Vreeland (2000).[23] If the measures for democracy, or economic proximity to major Europe increase by one unit or one percentage point, respectively, then the loan-quota ratio decreases by 2.7, or 0.203 percentage points, respectively. Note that the effect of economic proximity to major Europe in our estimation is larger than in Barro and Lee (2005), who find no significant effect in a Tobit regression of the loan-GDP ratio on economic proximity to major Europe. The effect of years a country has been under IMF loan programs, and of a country's fertility rate in Table 1 are significantly positive. If the number of years under IMF program participation increases by one year, then the loan-quota ratio increases by 1.4 percentage points. This effect is qualitatively similar to Przeworski and Vreeland (2000), who also find that the number of years under IMF loan program participation increases the probability to enter into IMF loan agreements. If a country's fertility rate increases by one percentage point, then the loan-quota ratio increases by 0.621 percentage points.

Figure 1 displays the conditional mean of the dependent variable from Table 1, the loan-quota ratio, against the percentile ranges of the significant explanatory variables.[24] The figure provides evidence that measuring the variation of the loan-quota ratio across the percentile ranges of the significant explanatory variables, the investment share, the number of years under IMF programs, and the mean economic proximity to major Europe feature the biggest effects on a country's loan-quota ratio. For the political economy variable "economic proximity to major Europe" this finding supports those of Harrigan, Wang, and El-Said (2005), Reynaud and Vauday (2008), and Dreher, Sturm, and Vreeland (2009), suggesting that IMF lending may be

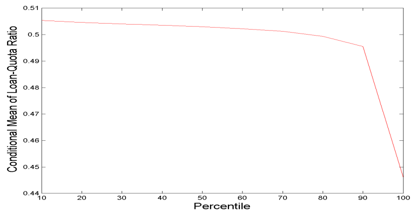
The marginal effect for the observed dependent variable needs to be corrected for censoring, multiplying β with the probability that the loan-quota ratio is strictly positive. All reported effects are average marginal effects evaluated at the independent variables' means.

[23]Przeworski and Vreeland (2000) estimate the probability of entering and/or remaining in an IMF loan program within the framework of a Probit model.

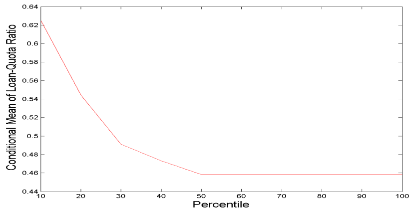
[24]The conditional means are computed on the basis of the fixed effects Tobit model from Table 1 and involve evaluation of any regressor not displayed on the horizontal axis, including the unobserved heterogeneity, at its unconditional mean.



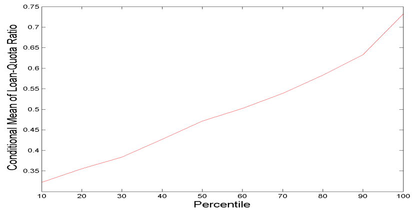
(a) Investment Share



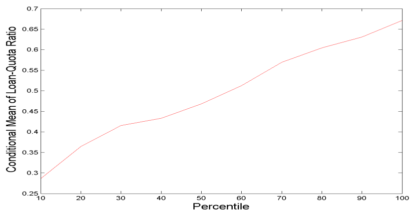
(b) Inflation



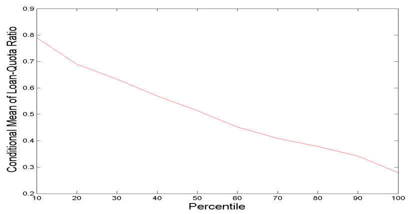
(c) Democracy



(d) Number of Years Under IMF programs



(e) Mean Fertility Rate



(f) Mean Economic Proximity to Major Europe

Figure 1: Conditional Mean of Loan-Quota Ratio over Percentiles of Significant Explanatory Variables

influenced by geo-political considerations.

While these results are interesting by themselves, estimation of the participation selection equation serves further purposes: As described in Section 3, the residual obtained from estimation of the participation selection equation can be used to generate correction terms that correct for endogenous sample selection when estimating the effects of the loan-quota ratio on the output growth of countries participating in IMF loan programs. Table 2 displays our estimation results for the fixed effects participation effects model (Equation (9)) of Section 3 without state dependence, using the growth rate of real GDP per capita as the dependent variable and the IMF loan-quota ratio, as well as a set of further explanatory variables, selected as discussed at the beginning of this section, as independent variables.[25] The estimated coefficient on the investment share is significantly positive. An increase of the investment share by one percentage point increases a country's percentage growth rate of real GDP per capita by 0.09 percentage points. This effect is larger than in Dreher (2006), who does not find it to be significantly different from zero. The coefficients on inflation and the mean of a country's fertility rate are significantly negative. An increase of inflation by one percentage point and an increase of the mean fertility rate by one point lead to a decrease of the real GDP per capita growth rate by 0.003 and 0.035 percentage points, respectively. Both effects are qualitatively similar and roughly of the same magnitude as in Dreher (2006).

Independent Variables	**Marginal Effects**
Loan-Quota Ratio	0.004 [1.083]
Investment Share	0.090 ** [1.962]
Inflation	−0.003 *** [4.488]
Reserves	0.017 [1.300]
Mean Fertility Rate	−0.035 ** [2.315]
Number of Observations	849

Note: Estimation results are obtained by estimating Equation (9), augmented with the Mundlak variables to capture fixed effects, however, without state dependence: $y_{it} = \psi + \mathbf{m}_i' \, \boldsymbol{\kappa}_\mu + d_{it}' \, \boldsymbol{\theta} + \mathbf{x}_{it}' \, \boldsymbol{\beta} + \tilde{\tau}_1 \, \hat{u}_{it} + \tilde{\tau}_2 \, \hat{\hat{u}}_i + \varepsilon_{it}$, where the dependent variable is the percentage growth rate of real GDP per capita. The adjusted R-squared for the regression equals 0.041. t-statistics are displayed in square brackets underneath the coefficient estimates. A '*' indicates significance at the 10 percent level, a '**' indicates significance at the five percent level and a '***' indicates significance at the one percent level. The regression uses annual data, the sample extends from 1975 to 2004 and the number of countries considered is 68. A description of all variables used is provided in Appendix A.

Table 2: Regression Results for the Participation Effects Equation

Two further issues are worth noting: First, τ_1 (not displayed in the table) is significant at the ten percent level, providing evidence that a sample selection mechanism is present. Second, the coefficient on the loan-quota ratio

[25]All standard errors reported in the following tables are corrected for first-step sampling uncertainty affecting second-step inference.

is positive but not significant.[26]

To examine whether this finding may stem from the output growth effects of IMF loan program participation being state dependent and estimates ignoring such state dependence being subject to a heterogeneity bias, in our next step of analysis we condition the effects of the loan-quota ratio on output growth on a country's institutional record, which, as discussed in Section 4, may serve as a useful proxy for measuring state dependence of effects. Since structural conditionality is measured in changes by the IMF, we include the index measuring the institutional record in percentage changes. We also re-emphasize that the measurement of the conditioning state variable is as a pre-determined variable, so that no endogeneity issues arise on that count.

Table 3 displays results when using Chebyshev polynomials of order one and the (progress in the) institutional record as conditioning state variable.[27]

Conditioning the effect of the loan-quota ratio on the (progress in the) institutional record leads to the output growth effects becoming significant: improving on the index of the institutional record by one percentage point raises the impact of IMF loan program participation on output growth by 0.049 percentage points. Note that the estimated coefficient increases systematically with the magnitude of the index of the institutional record and that significance varies across the range of this conditioning state variable. Figure 2 displays the coefficient on the loan-quota ratio conditional on the institutional record (red line) as well as the one and two standard deviation error bands for these effects (green and blue line, respectively). If the progress in the institutional record exceeds 0.12, the effect of IMF loan program participation on output growth turns significantly positive at the five percent level.

Table 4 provides further insight regarding the contributions of the various

[26]When estimating the participation effects equation without the sample selection correction terms (which we can do for a total of 938 observations), then the coefficient on the loan-quota ratio has negative sign (-0.003), with a t-statistic of -1.522.

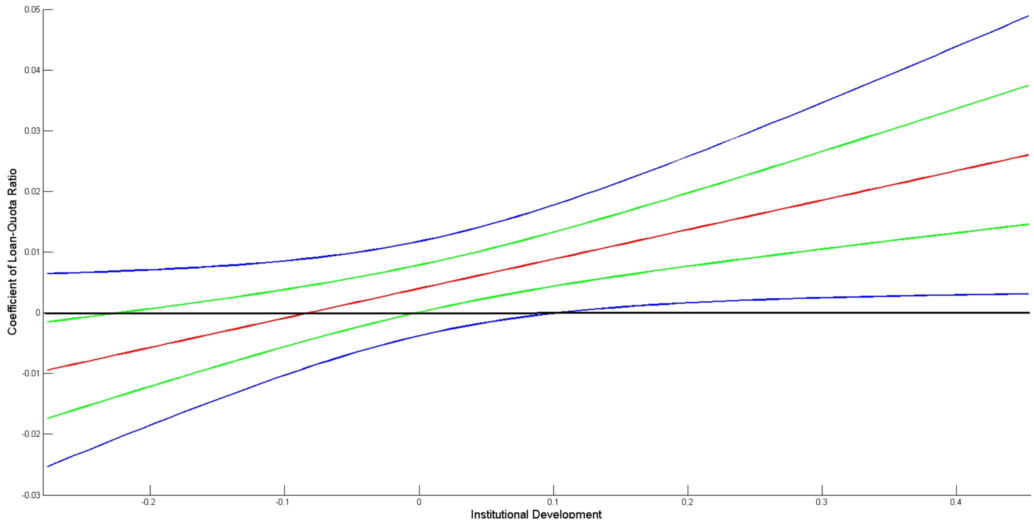
[27]Model selection on the basis of the AIC criterion gave preference to the model with state dependence, but did not yield evidence in favor of Chebyshev polynomials of order higher than one. Note that the number of observations we can use when allowing for state dependence is lower than for the model estimation in Table 1, as the institutional record of countries is only available for a subset of the countries.

Independent Variables	**Marginal Effects**
Loan-Quota Ratio	0.004 [1.024]
*Loan-Quota Ratio * Institutional Record*	0.049 ** [2.002]
Institutional Record	0.015 [0.332]
Investment Share	0.070 [0.865]
Inflation	−0.003 *** [4.257]
Democracy	0.002 [1.059]
Mean Fertility Rate	−0.038 ** [2.070]
Number of Observations	773

Note: Estimation results are obtained by estimating Equation (9), augmented with the Mundlak variables to capture fixed effects: $y_{it} = \psi + \mathbf{m}_i' \, \boldsymbol{\kappa}_\mu + \sum_{q=0}^{p} \, d_{it} \, c_q \left(w_{i,t-1}\right) \, \theta_q + \mathbf{x}_{it}' \, \boldsymbol{\beta} + \widetilde{\tau}_1 \, \widehat{u}_{it} + \widetilde{\tau}_2 \, \widehat{\widehat{u}}_i + \varepsilon_{it}$, where the dependent variable is the growth rate of real GDP per capita and w_{it} is a country's institutional record. The adjusted R-squared for the regression equals 0.053. t-statistics are displayed in square brackets underneath the coefficient estimates. A '*' indicates significance at the ten percent level, a '**' indicates significance at the five percent level and a '***' indicates significance at the one percent level. The regression uses annual data, the sample extends from 1975 to 2004 and the number of countries considered is 60. A description of all variables used is provided in Appendix A.

Table 3: Regression Results for the Participation Effects Equation with a Country's Institutional Record as Conditioning Variable

regressors to a country's real GDP per capita growth net of fixed effects, as implied by the state-dependent model of Table 3. To quantify the output growth effects of the various regressors in absolute and relative form, Table 4 displays both the average as well as the percentage contributions of the explanatory variables to output growth net of time-invariant terms. The mean output growth effect of the loan-quota ratio is qualitatively similar to that in Dicks-Mireaux, Mecagni, and Schadler (2000), in that participation in IMF loan programs leads to significantly positive output growth effects. However, according to our findings this is true only conditional on sufficient progress in the institutional record, which occurs for sufficiently many countries participating in IMF loan programs for the mean output growth effect to be positive. The overall contribution of the loan-quota ratio to real GDP per capita growth net of individual-specific effects is equal to 22 percent. Investment share and democracy index contribute 35 percent and 48 percent



Note: The figure displays the coefficient on the loan-quota ratio conditional on the institutional record (red line) as well as the one and two standard deviation error bands (green and blue line, respectively).

Figure 2: Effect of Program Participation Conditional on a Country's Progress in the Institutional Record

Variables	Mean Effect	Contr. in percent
Loan-Quota Ratio	0.004	20
Loan-Quota Ratio * Instit. Record	0.000	2
Instit. Record	0.000	1
Investment Share	0.007	35
Inflation	−0.001	− 6
Democracy	0.010	48

Note: The mean effect is obtained by multiplying the coefficient estimates from Table 3 with the respective variables' sample mean.

Table 4: Growth Accounting with a Country's Institutional Record as Conditioning Variable

Country years	Actual [a)]	Predicted[b)]	Predicted[c)]	Predicted[d)]
Particip.	0.52%	0.52%	0.05%	1.43%
Non-Particip.	1.53%	—	2.08%	1.53%

a) Actual average growth.

b) Coefficient estimates used to compute the counterfactual are taken from the model specification involving only country years with participation in IMF loan programs.

c) Coefficient estimates used to compute the counterfactual are taken from the model specification involving only country years with participation in IMF loan programs. The independent variable loan-quota ratio is always set to zero.

d) Coefficient estimates used to compute the counterfactual are taken from the model specification involving only country years without participation in IMF loan programs.

Table 5: Counterfactual Analysis with Institutional Record as Conditioning Variable

to output growth, respectively.

We next turn our focus to analyses of counterfactuals and intertemporal output growth effects of IMF loan programs. To provide further intuitively accessible measures of the magnitude of the effect of IMF program participation on output growth, Table 5 displays counterfactual analyses based on the estimation results of Table 3. Table 5 reports that during their participation in IMF loan programs, our sample of countries had on average a real GDP per capita growth rate of 0.52 percent. The predicted output growth rate using the coefficient estimates from the sample only featuring country years involving loan program participation of course equals this 0.52 percent, while the output growth rate predicted on the basis of the same coefficient estimates, but counterfactually setting the loan-quota ratio to zero, is equal to 0.05%. Furthermore, the predicted output growth rate using the coefficient estimates from the sample only featuring country years not involving loan program participation amounts to 1.43 percent. Non-participating countries actually had on average a real per capita GDP growth rate of 1.53 percent. The predicted output growth rate using the coefficient estimates from the sample featuring only country years not under loan program participation of course amounts to 1.53 percent, while the predicted output growth rate using the coefficient estimates from the sample featuring only country years under loan program participation, but counterfactually setting the loan-quota ratio always to zero, amounts to 2.08 percent.

Three points are worth highlighting in discussing these counterfactuals. First, country years under IMF loan participation tend to be times of economic crises. Output growth during years of participation in IMF loan programs is on average about one percent lower than during years of non-participation. For this reason, it is imperative to properly capture the direction of causation in growth regressions involving IMF loan programs. Second, countries in an economic crisis are, on average, better off when turning to the IMF and participating in IMF loan programs. The annual percentage gain amounts to $(0.52 - 0.05)$ percent $= 0.47$ percent real per capita GDP growth per year. This finding of ours contrasts with the counterfactual analyses in Przeworski and Vreeland (2000), who in a model without state dependent effects find that participation in IMF loan programs lowers annual output growth by 1.53 percent. Our analysis suggests that it is imperative for a country to improve upon its institutional record if it is to strengthen its output growth from participation in IMF loan programs. Third, when predicting output growth of country years involving participation in IMF loan programs using coefficient estimates from the sample only featuring country years without IMF loan program participation the predicted output growth rate of of 1.43 percent is almost three times as high as the actual average growth rate of 0.52 percent. Furthermore, predicting the average output growth rate of country years not involving IMF loan program participation on the basis of the sample only featuring country years involving IMF loan program participation, but setting the loan-quota ratio to zero, the prediction at 2.08 percent rather implausibly exceeds the actual average output growth rate of country years not involving IMF loan program participation by 0.55 percent. Our counterfactuals thus appear to further support our estimation strategy depicting countries entering IMF loan programs in times of crises as having fundamentally different output growth regimes as compared to those countries that do not.

To learn more about the dynamic effects of IMF loan program participation on a country's output growth when conditioning the output growth effects on the (progress in the) country's institutional record, we finally turn to estimating the output growth rate effects that can be attributed to IMF loan program participation in year t for growth between periods $t-1$ and $t-1+i$ also for $i = 1, 2, ..., 5$, .[28] Figure 3 displays the intertemporal effects based on the AIC-optimal specification of the fixed effects sample selection model with the progress in institutional record as conditioning state variable for $i = 1, 2, ..., 5$ and for comparison once more also for $i = 0$. Table 6 dis-

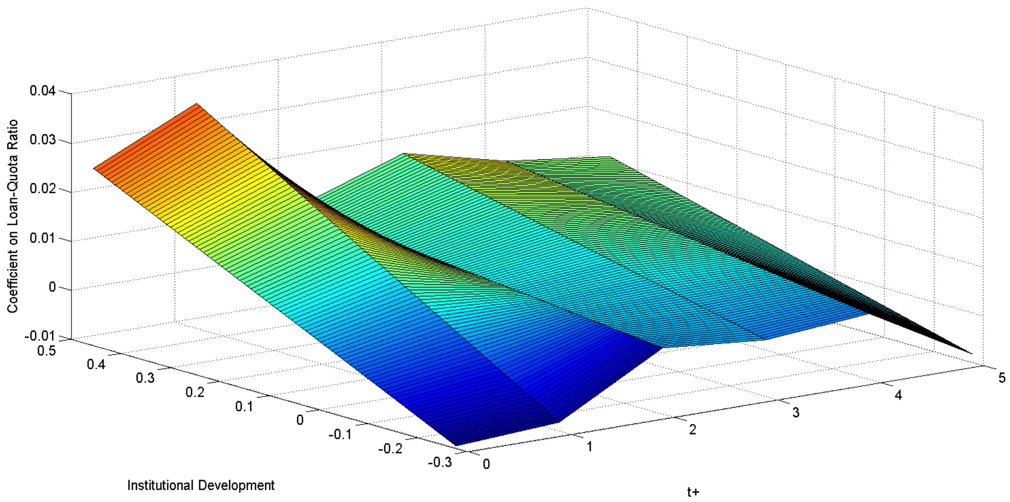


Figure 3: Effect of Program Participation in an Intertemporal Perspective with the Progress in Institutional Quality as Conditioning Variable

plays the corresponding coefficients and their significance levels for all time periods. The output growth effects of participation in IMF loan programs are significant for up to one year after participation in an IMF loan program. All intertemporal output growth effects of participation in IMF loan programs are more favorable if a country improves on its institutional record.

To investigate robustness of our overall results concerning the conditional effects of IMF loan program participation, we considered the following sets of model re-specifications: First, we chose a narrower definition of the institutional record, removing the variables capturing health and human capital from our index. Second, we narrowed our data set to capture only observa-

[28]It is beyond the scope of the current paper to go beyond the Vella (1998) inspired sample selection framework and render both the participation selection and participation effects equations dynamic.

Dep. Variable	Loan-Quota Ratio	Loan-Quota Ratio*Instit. Rec.
$\frac{y_t - y_{t-1}}{y_t}$	0.004 [1.024]	0.049** [2.002]
$\frac{y_{t+1} - y_{t-1}}{y_{t+1}}$	0.008 [0.981]	0.060* [1.737]
$\frac{y_{t+2} - y_{t-1}}{y_{t+2}}$	0.006 [0.401]	0.110 [0.265]
$\frac{y_{t+3} - y_{t-1}}{y_{t+3}}$	0.008 [0.372]	0.023 [0.294]
$\frac{y_{t+4} - y_{t-1}}{y_{t+4}}$	0.007 [0.265]	0.014 [0.165]
$\frac{y_{t+5} - y_{t-1}}{y_{t+5}}$	−0.001 [0.028]	0.026 [0.333]

Note: t-statistics are displayed in square brackets. A '*' indicates significance at the ten percent level and a '**' indicates significance at the five percent level.

Table 6: Effect of Program Participation in an Intertemporal Perspective with Institutional Record as Conditioning State Variable

tions between 1986 and 2004, as then the index of the institutional record does not involve imputation for some of the observations anymore.[29] Third, we chose different lag specifications for our conditioning state variable and the set of linear regressors. Under all model re-specifications our core empirical findings remain qualitatively similar both in terms of coefficient estimate sign and significance, that is, countries participating in IMF loan programs can expect increases in output growth rates from loan program participation if they sufficiently improve upon their institutional record.[30]

Finally, to check on whether our conditioning state variable "institutional record" could be replaced by a readily available IMF-internal variable, we condition the output growth effects of changes in the loan-quota ratio on the loans-drawn-to-agreed ratio, which was also discussed as a potential conditioning state variable in Section 4. Table 7 provides our estimation results for the participation effects equation when using Chebyshev polynomials of order one and the loans-drawn-to-agreed ratio as capturing state dependence. Conditioning the output growth effects of changes in the loan-quota ratio on the loans-drawn-to-agreed ratio proxy for compliance with IMF condi-

[29] Some of the variables used for setting up the index of the institutional record are only available from 1986 onwards and were imputed for the index prior to 1986. See Section 4 for further details on our imputation procedure.

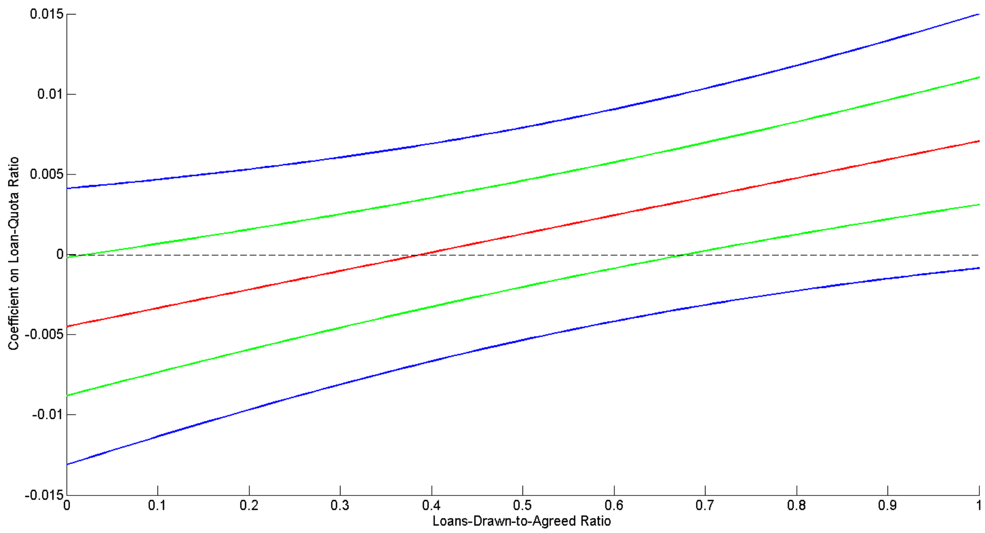
[30] Details of all robustness check results are available upon request from the authors.

Independent Variables	Marginal Effects
Loan-Quota Ratio	-0.005 [1.046]
*Loan-Quota Ratio * Drawn Ratio*	0.012** [2.333]
Investment Share	0.070 [1.642]
Inflation	−0.003*** [4.241]
Reserves	0.021 [1.591]
Current Account	−0.046 [1.272]
Mean of Fertility Rate	−0.045*** [3.144]
Number of Observations:	849

Note: Estimation results are obtained by estimating Equation (9), augmented with the Mundlak variables to capture fixed effects: $y_{it} = \psi + \mathbf{m}_i' \, \boldsymbol{\kappa}_\mu + \sum_{q=0}^{p} d_{it} \; c_q \left(w_{i,t-1}\right) \; \theta_q + \mathbf{x}_{it}' \; \boldsymbol{\beta} + \widetilde{\tau}_1 \; \widehat{u}_{it} + \widetilde{\tau}_2 \; \widehat{\overline{u}}_i + \varepsilon_{it}$, where the dependent variable is the percentage growth rate of real GDP per capita and w_{it} is the degree of program implementation. The conditioning variable, loans-drawn-to-agreed-ratio, has been used as a separate control variable (not displayed) and as such is not significant. The adjusted R-squared for the regression equals 0.053. t-statistics are displayed in square brackets underneath the coefficient estimates. A '*' indicates significance at the ten percent level, a '**' indicates significance at the five percent level and a '***' indicates significance at the one percent level. The regression uses annual data, the sample extends from 1975 to 2004 and the number of countries considered is 68. A description of all variables used is provided in Appendix A.

Table 7: Regression Results for the Participation Effects Equation with the Actual Degree of Program Implementation as Conditioning Variable

tionality yields the following results: If a country participating in IMF loan programs were not able to draw any loans at all, the effect of a one percent increase in the loan eligibility is a reduction of the growth rate of real GDP per capita by 0.005 percent. However, the higher the loans-drawn-to-agreed ratio, the smaller in absolute terms the negative output growth effect of the changes in the loan-quota ratio. If the loans-drawn-to-agreed ratio exceeds 42 percent, then the output growth effect of IMF program participation turns positive. Note that this ratio is sizeably smaller than in Killick (1995), who suggests a threshold value for successful IMF program implementation of 80 percent, arguing on the basis of loan program survey data (for the time period from 1980 to 1992) that this threshold is closely associated with successful program implementation. If all funds originally agreed upon are drawn and



Note: The figure displays the coefficient on the loan-quota ratio conditional on the loans-drawn-to-agreed ratio (red line) as well as the one and two standard deviation error bands (green and blue line, respectively).

Figure 4: Effect of Program Participation Conditional on Actual Degree of Program Implementation

there is in this sense full compliance with IMF conditionality, then an increase of the loan-quota ratio by one percentage point leads to an increase of real GDP per capita growth by 0.007 percent. These results at first sight would seem to be in line with arguments stressing that compliance with conditionality as measured by the loans-drawn-to-agreed ratio is important for the success of IMF loan programs. However, as apparent from Figure 4, that plots the coefficient on the loan-quota ratio conditional on the loans-drawn-to-agreed ratio (red curve) with the one standard deviation (green) and two standard deviation (blue) bands, the results are not significant at the five percent level. In light of the previous empirical findings of Harrigan, Wang, and El-Said (2005), Reynaud and Vauday (2008), and Dreher, Sturm, and Vreeland (2009), who adduce evidence that selection into and continued participation in IMF loan programs is significantly influenced by geo-political considerations, one possible interpretation of the weak and insignificant output growth effects of IMF loan program participation when considering the loans-drawn-to-agreed ratio as conditioning state variable is that increases in the loans-drawn-to-agreed ratio may not always reflect sufficient progress on the conduciveness of a country's policy and institutional framework for sustained output growth, but may rather be reflective of geo-political factors. It is beyond the scope of this paper, though, to further probe the issue as to whether IMF-internal loan program conditionality during our sample period may not have been as effective as desired on economic grounds.

6 Conclusion

Through modelling state dependence of the output growth effects of IMF loan program participation, in this paper we have worked on shedding light on what appears to be a major reason as to why previous empirical studies have arrived at mixed findings, ranging from positive to zero to negative output growth effects from IMF loan program participation. Allowing the effects of IMF loan program participation to vary systematically with an index reflecting a country's institutional record, we find that there are significant and positive effects of IMF loan program participation on a country's output growth only if the program participation is coupled with sufficient improvement of the institutional record. Using our conditional pooling approach with the degree of program implementation rather than progress in the institutional record as the conditioning state variable, the evidence that IMF loan program participation induces positive output growth effects is weak and insignificant. This suggests that it is crucial how a country complements participation in IMF loan programs with policy and institutional reforms, facilitating sustained output growth. For our sample period, a sizeable fraction of countries participating in IMF loan programs based on our index of the institutional record has been able to institute such reforms, though reform success was not necessarily tied to the loans-drawn-to-agreed ratio.

With regards to the magnitude of the output growth effects conditional on the institutional record, our growth accounting calculations provide evidence that IMF loan program participation can have a sizeable impact, at more than half of the direct effects of investment in physical capital.

Our counterfactual analysis makes the case that countries participating in IMF loan programs would on average have had lower output growth had they not participated in IMF loan programs. The stronger preceding improvements of the institutional record, the higher the potential gains from participation in IMF loan programs. We also find that output growth effects of IMF loan program participation are significant for up to one year after program participation.

In light of the results of our analysis, countries that decide to turn to the IMF for funding appear well advised to make every effort to improve their institutional record, above and beyond ensuring compliance with conditionality to the point that the loans-drawn-to-agreed ratio reaches targeted levels. We will leave it to future research to investigate to what extent recent changes in IMF conditionality may have more closely aligned increases in the loans-drawn-to-agreed ratio with improvements of a country's institutional record.

References

Barro, R.J. and J.W. Lee (2005): IMF Programs: Who is Chosen and What Are the Effects?, *Journal of Monetary Economics*, 52, 1245–1269.

Binder, M., C. Hsiao, and H.M. Pesaran (2005): Estimation And Inference In Short Panel Vector Autoregressions With Unit Roots And Cointegration, *Econometric Theory*, 21, 795–837.

Binder, M. and C. Offermanns (2008): International Investment Positions and Exchange Rate Dynamics: A Dynamic Panel Analysis, *CESifo Working Paper Series No. 2095*.

Bordo, M. and A.J. Schwartz (2000): Measuring Real Economic Effects of Bailouts: Historical Perspectives on How Countries in Financial Distress Have Fared With And Without Bailouts, *Carnegie-Rochester Conference Series on Public Policy*, 53, 81–167.

Dicks-Mireaux, L., M. Mecagni, and S. Schadler (2000): Evaluating the Effect of IMF Lending to Low-Income Countries, *Journal of Development Economics*, 61, 495–526.

Dreher, A. (2006): IMF and Economic Growth: The Effects of Programs, Loans, and Compliance with Conditionality, *World Development*, 34, 769–788.

Dreher, A., J. Sturm, and J. Vreeland (2009): Global Horse Trading: IMF Loans for Votes in the United Nations Security Council, *European Economic Review*, 53, 742–757.

Evrensel, A.Y. (2002): Effectiveness of IMF-Supported Stabilization Programs in Developing Countries, *Journal of International Money and Finance*, 21, 565–587.

Fritz-Krockow, B. and P. Ramlogan (2007): *International Monetary Fund Handbook*, Washington D.C.: IMF Press.

Gourieroux, C., A. Monfort, E. Renault, and A. Trognon (1987): Generalised Residuals, *Journal of Econometrics*, 34, 5–32.

Harrigan, J., C. Wang, and H. El-Said (2005): The Economic and Politics Determinants of IMF and World Bank Lending in the Middle East and North Africa, *World Development*, 34, 247–270.

Heckman, J. (1979): Sample Selection Bias as a Specification Error, *Econometrica*, 47, 153–161.

Heckman, J., H. Ichimura, and P. Todd (1998): Matching as an Econometric Evaluation Estimator, *Review of Economic Studies*, 65, 261–294.

Hutchison, M. (2004): Selection Bias and Output Costs of IMF Programs, *Mimeo University of California - Santa Cruz*.

Hutchison, M. and I. Noy (2003): Macroeconomic Effects of IMF-Sponsored Programs in Latin America: Output Costs, Program Recidivism and the Vicious Cycle of Failed Stabilizations, *Journal of International Money and Finance*, 22.

Independent Evaluation Group (2009): The World Bank's Country Policy and Institutional Assessment, *http://siteresources.worldbank.org/EXTCPIA/Resources/cpia_full.pdf*.

International Monetary Fund (2004): Factsheet on Enhanced Structural Adjustment facility, *http://www.imf.org/external/np/exr/facts/esaf.htm*, Accessed on 9 November 2013.

International Monetary Fund (2006): IMF-Supported Programs - Recent Staff Research, *Issues Paper for an Evaluation by the Independent Evaluation Office of the IMF*, xiii.

International Monetary Fund (2013a): Factsheet on Conditionality, *http://www.imf.org/external/np/exr/facts/pdf/conditio.pdf*, Accessed on 9 November 2013.

International Monetary Fund (2013b): Factsheet on Extended Fund Facility, *http://www.imf.org/external/np/exr/facts/pdf/eff.pdf*, Accessed on 9 November 2013.

International Monetary Fund (2013c): Factsheet on Stand-By Arrangement, *http://www.imf.org/external/np/exr/facts/pdf/sba.pdf*, Accessed on 9 November 2013.

Killick, T. (1995): *IMF Programmes in Developing Countries: Design and Impact*, London: Routledge.

Nsouli, S.N., R. Atoyan, and A. Mourmouras (2006): Institutions, Program Implementation, and Macroeconomic Performance, in A. Mody and A. Rebucci (Eds.): *IMF-Supported Programs - Recent Staff Research*, Washington D.C.: IMF Press.

Polak, J.J. (1991): The Changing Nature of IMF Conditionality, *OECD Development Centre Working Paper*, 41.

Przeworski, A. and J.R. Vreeland (2000): The effect of IMF programs on economic growth, *Journal of Development Economics*, 62, 385–421.

Reynaud, J. and J. Vauday (2008): IMF Lending and Geopolitics, *ECB Working Paper*, 965.

Semykina, A. and J.M. Wooldridge (2010): Estimating Panel Data Models in the Presence of Endogeneity and Selection, *Journal of Econometrics*, 157, 375–380.

Vella, F. (1998): Estimating Models with Sample Selection Bias: a Survey, *Journal of Human Resources*, 33, 127–169.

Vella, F. and M. Verbeek (1999): Two-Step Estimation of Panel Data Models with Censored Endogeneous Variables and Selection Bias, *Journal of Econometrics*, 90, 239–263.

Vreeland, J.R. (2003): *The IMF and Economic Development*, New York: Cambridge University Press.

World Bank (2009): Country Policy and Institutional Assessment, *http://go.worldbank.org/EEAIU81ZG0*.

Appendix A: Description of Variables

Variables	Source
Real GDP per capita: International Dollar in 2000 Constant Prices, thousand dollars.	Penn World Tables 6.2
Openness in constant prices: Percentage in 2000 constant prices.	Penn World Tables 6.2
Government share of real GDP: Percentage in 2000 Constant prices.	Penn World Tables 6.2
Investment share of real GDP: Percentage in 2000 Constant prices.	Penn World Tables 6.2
Total reserves in months of imports: Amount of reserves in terms of the number of months of imports of goods and services which can be paid.	World Development Indicators 2006 CD-ROM
Inflation: Annual percentage change of the consumer price index.	World Development Indicators 2006 CD-ROM
Life expectancy at birth: Expresses the number of years a newborn can be expected to live if prevailing patterns of mortality at the time of its birth are same throughout its life.	World Development Indicators 2006 CD-ROM
Fertility rate: Number of children that are born to a woman if she lives to the end of her childbearing years and bears children in accordance with current age-specific fertility rates.	World Development Indicators 2006 CD-ROM
Economic proximity to major Europe: Bilateral trade with major Europe, expressed as a ratio to GDP.	Barro and Lee (2005)
Political proximity to major Europe: Fraction of UN votes along with major Europe.	Barro and Lee (2005)
Democracy index: Based of the Legal Index of Electoral Competitiveness (LIEC); Codified with 1 if it has a value of 6 or larger which is the threshold for democratic systems.	World Bank Political Institutions Dataset
Quota: Countries' quota in millions of standard drawing rights (SDR).	International Financial Statistics
Loan-quota ratio: Sum of all current IMF loans a country is eligible to as a share of its quota at the IMF.	International Financial Statistics and own calculation
Loans-drawn-to-agreed ratio: The amount of all IMF loan program funds a country actually draws expressed as a share of the original amount agreed upon with the IMF.	International Financial Statistics and own calculations
Government Stability: Assesses the government's ability to carry out its declared program(s), and its ability to stay in office.	International Country Risk Guide
Internal Conflict: Assesses the political violence in the country and its actual or potential impact on governance.	International Country Risk Guide
Corruption: Assesses corruption within the political system.	International Country Risk Guide
Law and Order: Assesses the strength and impartiality of the legal system as well as the popular observance of the law.	International Country Risk Guide
Ethnic Tensions: Assesses the degree of tension within a country attributable to racial, nationality, or language divisions.	International Country Risk Guide
Bureaucracy Quality: Assesses the institutional strength and quality of the bureaucracy.	International Country Risk Guide
Educational attainment: Total population aged 15 and over, average years of school.	Worldbank
Institutional Index: Set up from the variables educational attainment, life expectancy, government stability, bureaucracy quality, corruption, law and order, ethnic tensions and internal conflict	International Country Risk Guide and own calculations
Freedom Status: Assesses political rights and civil liberties in a country.	Freedom House
Freedom of the Press: Assesses the degree of freedom of the press in a country.	Freedom House

Appendix B: Countries Contained in Data Set[31]

Country	Start : end of sample	Years with Program Participation	Country	Start : end of sample	Years with Program Participation
Algeria	1977:1991	1989:1991	**Liberia**	1979:1987	1979:1985
Argentina	1976:2004	1976:1978; 1983:2004	**Madagascar**	1975:2003	1977:1978; 1980:1992; 1996:2003
Australia	1975:2004	%	**Malawi**	1981:2002	1981:1986; 1988:2002
Austria	1975:2004	%	**Malaysia**	1975:2003	%
Bangladesh	1987:2003	1987:1993; 2003:2003	**Mali**	1989:2003	1989:2003
Belgium	1975:2001	%	**Mexico**	1979:2004	1979:1979; 1983:1993; 1995:1997; 1999:2000
Bolivia	1976:2003	1980:1980; 1986:2003	**Morocco**	1975:2003	1980:1993
Botswana	1976:2003	%	**Mozambique**	1988:2003	1988:2003
Brazil	1981:2003	1983:1986; 1988:1990; 1992:1993; 1998:2003	**Namibia**	2003:2003	%
Burkina Faso	1975:2001	1991:2001	**Netherlands**	1975:2004	%
Cameroon	1977:1995	1988:1992; 1994:1995	**New Zealand**	1975:2004	%
Canada	1975:2004	%	**Nicaragua**	1977:2004	1979:1979; 1991:2004
Chile	1975:2004	1975:1976; 1983:1990	**Niger**	1975:2003	1983:1991; 1994:2003
Colombia	1975:2003	1999:2003	**Nigeria**	1977:2004	1987:1987; 1989:1992; 2000:2001
Congo, Rep.	1986:2003	1986:1988;1990:1992; 1994:1999	**Norway**	1975:2004	%
Costa Rica	1977:2004	1977:1977; 1980:1983; 1985:1997	**Pakistan**	1976:2004	1977:1978; 1980:1983; 1988:1991; 1993:2004
Cote d'Ivoire	1975:2003	1981:1992; 1994:2003	**Panama**	1977:2003	1977:1987; 1992:2002
Cyprus	1976:2004	1980:1981	**Papua New Guinea**	1976:2001	1990:1992; 1995:1997; 2000:2001
Denmark	1975:2004	%	**Paraguay**	1975:2003	2003:2003
Dominican Republic	1975:2003	1983:1986; 1991:1994; 2003:2003	**Peru**	1977:2003	1977:1980; 1982:1985; 1993:2003
Ecuador	1976:2004	1983:1992; 1994:1995; 2000:2001; 2003:2004	**Philippines**	1977:2004	1977:1981; 1983:2000
Egypt, Arab Rep.	1977:2003	1977:1981; 1987:1988; 1991:1998	**Portugal**	1976:2004	1977:1979; 1983:1985
El Salvador	1976:2003	1980:1983; 1990:2000	**Senegal**	1975:2003	1979:1992; 1994:2003
Finland	1975:2004	1975:1976	**Sierra Leone**	1977:2003	1977:1982; 1984:1989; 1994:1998; 2001:2003
France	1975:2004	%	**Singapore**	1975:2004	%
Gambia, The	1978:1997	1978:1980; 1982:1991	**South Africa**	1975:2004	1976:1977; 1982:1983
Germany	1992:2004	%	**Spain**	1975:2004	1978:1979
Ghana	1975:2003	1979:1979; 1983:1992; 1995:2003	**Sri Lanka**	1975:2003	1975:1975; 1977:1981; 1983:1984; 1988:1995; 2001:2003
Greece	1976:2004	%	**Sudan**	1977:2003	1979:1985
Guatemala	1977:2003	1981:1984; 1988:1990; 1992:1994; 2002:2003	**Sweden**	1975:2004	%
Guinea-Bissau	1988:2003	1988:1990; 1995:1998; 2000:2003	**Syrian Arab Rep.**	1977:1988	%
Haiti	1975:2000	1975:1990; 1995:1999	**Thailand**	1975:2003	1978:1979; 1981:1983; 1985:1986; 1997:2000
Honduras	1975:2004	1979:1983; 1990:1997; 1999:2002; 2004:2004	**Togo**	1975:2003	1979:1998
India	1975:2003	1981:1984; 1991:1993	**Trinidad and Tobago**	1975:2003	1989:1991
Indonesia	1981:2004	1997:2003	**Tunisia**	1984:2004	1986:1992
Ireland	1975:2004	%	**Turkey**	1975:2004	1978:1985; 1994:1996; 1999:2004
Israel	1975:2004	1975:1977	**Uganda**	1981:2003	1981:1984; 1987:2003
Italy	1975:2004	1975:1975; 1977:1978	**United Kingdom**	1975:2004	1975:1978
Jamaica	1976:2003	1977:1996	**United States**	1975:2004	%
Japan	1977:2004	%	**Uruguay**	1978:2004	1978:1987; 1990:1993; 1996:2004
Jordan	1975:2003	1989:1990; 1992:2003	**Venezuela, RB**	1975:2004	1989:1993; 1996:1997
Kenya	1975:2003	1975:1986; 1988:1994; 1996:2003	**Zambia**	1986:2000	1986:1987,1995:2000
Korea, Rep.	1976:2004	1976:1977; 1980:1987; 1997:2000	**Zimbabwe**	1980:1994	1981:1984; 1992:1994

[31] Major oil exporting countries and centrally planned economies have been excluded.

IMFS WORKING PAPER SERIES

Recent Issues

77 / 2014	Helmut Siekmann	Zur Offenlegung der Bezüge von Sparkassenführungskräften im Internet
76 / 2013	Y. Emily Yoo	Financial Regulation and Supervision Across Business Lines in the United States – Financial Holding Companies post Gramm-Leach-Bliley Act
75 / 2013	Athanasios Orphanides	Is Monetary Policy Overburdened?
74 / 2013	Tilman Bletzinger Volker Wieland	Estimating the European Central Bank's "Extended Period of Time"
73 / 2013	Tobias H. Tröger	The Single Supervisory Mechanism – Panacea or Quack Banking Regulation?
72 / 2013	Matthias Burgert Sebastian Schmidt	Dealing with a Liquidity Trap when Government Debt Matters: Optimal Time-Consistent Monetary and Fiscal Policy
71 / 2013	Helmut Siekmann Volker Wieland	The European Central Bank's Outright Monetary Transactions and the Federal Constitutional Court of Germany (publ. partially as "The question before the court", in: Economist, 18. June 2013)
70 / 2013	Elena Afanasyeva	Atypical Behavior of Credit: Evidence from a Monetary VAR
69 / 2013	Tobias H. Tröger	Konzernverantwortung in der aufsichtsunterworfenen Finanzbranche (publ. in: ZHR 2013, S. 475-517)
68 / 2013	John F. Cogan John B. Taylor Volker Wieland Maik Wolters	Fiscal Consolidation Strategy: An Update for the Budget Reform Proposal of March 2013
67 / 2012	Otmar Issing Volker Wieland	Monetary Theory and Monetary Policy: Reflections on the Development over the last 150 Years
66 / 2012	John B. Taylor Volker Wieland	Surprising Comparative Properties of Monetary Models: Results from a new Model Database
65 / 2012	Helmut Siekmann	Missachtung rechtlicher Vorgaben des AEUV durch die Mitgliedstaaten und die EZB in der Schuldenkrise (publ. in: Thomas M.J. Möller und Franz-Christoph Zeitler (Hrsg.), Europa als Rechtsgemeinschaft – Währungsunion und

		Schuldenkrise, Tübingen, 2013, S. 97-154)
64 / 2012	Helmut Siekmann	Die Legende von der verfassungsrechtlichen Sonderstellung des "anonymen” Kapitaleigentums (publ. in: Der grundrechtsgeprägte Verfassungsstaat, Festschrift für Klaus Stern zum 80. Geburtstag, herausgegeben von Michael Sachs und Helmut Siekmann, Berlin, 2012, S. 1527-1541)
63 / 2012	Guenter W. Beck Kirstin Hubrich Massimiliano Marcellino	On the Importance of Sectoral and Regional Shocks for Price Setting
62 / 2012	Volker Wieland Maik H. Wolters	Forecasting and Policy Making
61 / 2012	John F. Cogan John B. Taylor Volker Wieland Maik H. Wolters	Fiscal Consolidation Strategy (publ. in: Journal of Economic Dynamics and Control, Vol. 37 Issue 2 (February), pp. 404-21)
60 / 2012	Peter Tillmann Maik H. Wolters	The Changing Dynamics of US Inflation Persistence: A Quantile Regression Approach
59 / 2012	Maik H. Wolters	Evaluating Point and Density Forecasts of DSGE Models
58 / 2012	Peter Tillmann	Capital Inflows and Asset Prices: Evidence from Emerging Asia
57 / 2012	Athanasios Orphanides Volker Wieland	Complexity and Monetary Policy (publ. in: Federal Reserve Bank of St. Louis Review, July/August 2008, 90(4), pp. 307-24)
56 / 2012	Fabio Verona Manuel M.F. Martins Inês Drumond	(Un)anticipated Monetary Policy in a DSGE Model with a Shadow Banking System
55 / 2012	Fabio Verona	Lumpy Investment in Sticky Information General Equilibrium
54 / 2012	Tobias H. Tröger	Organizational Choices of Banks and the Effective Supervision of Transnational Financial Institutions (publ. in: Texas International Law Journal, Band 48 Nr. 2, April 2013)
53 / 2012	Sebastian Schmidt	Optimal Monetary and Fiscal Policy with a Zero Bound on Nominal Interest Rates