

Marchesi, Silvia; Sabani, Laura; Dreher, Axel

**Working Paper**

## Read my lips: The role of information transmission in multilateral reform design

cege Discussion Papers, No. 86

**Provided in Cooperation with:**

Georg August University of Göttingen, Department of Economics

*Suggested Citation:* Marchesi, Silvia; Sabani, Laura; Dreher, Axel (2009) : Read my lips: The role of information transmission in multilateral reform design, cege Discussion Papers, No. 86, University of Göttingen, Center for European, Governance and Economic Development Research (cege), Göttingen

This Version is available at:

<https://hdl.handle.net/10419/32001>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

**Read my lips: the role of information  
transmission in multilateral reform design**

---

Silvia Marchesi

Laura Sabani

Axel Dreher

GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

# Read my lips: the role of information transmission in multilateral reform design\*

Silvia Marchesi

Università di Milano Bicocca and Centro Studi Luca D'Agliano

Laura Sabani

Università di Firenze

Axel Dreher

University of Goettingen; KOF Swiss Economic Institute; IZA and CESifo

June 2009

## Abstract

We focus on the role that the transmission of information between a multilateral (e.g., the IMF) and a country has for optimal (conditional) reform design. The main result is that the informational advantage of the country must be strictly greater than the advantage of the multilateral in order to increase a country's discretion in the choice of the policies to be implemented (country ownership). To the contrary, an increase in the conflict of interests between the multilateral and the country may lead the multilateral to leave more freedom in designing reforms, which is at odds to what is commonly argued. Our empirical results provide support to the idea that the IMF follows an optimal allocation rule of control rights over policies, leaving the recipient countries more freedom whenever their local knowledge appears to be crucial for designing more adequate reforms.

Keywords: IMF conditionality, delegation, communication, ownership, panel data.

JEL Classification: C23, D82, F33, N2.

---

\*A preliminary version of this paper was presented at the Workshop on Sovereign and Public Debt and Default (University of Warwick, 2008), ASSET meeting (EUI, 2008), Workshop on Political Economy (Silvaplana, 2008), Bank of Finland monthly research seminar (Helsinki, 2008), the Göttingen Workshop "International Economics" (2009), the Annual Meetings of the Political Economy of International Organizations (Ascona, 2008 and Geneva, 2009) and the European Public Choice Society Meeting (Athens, 2009). We would like to thank: Pascal Courty, Jakob de Haan, Francesco de Sinopoli, Federico Etro, Raquel Fernandez, Patrizio Tirelli, Julien Reynaud, Stephanie Rickard, Michele Santoni, Randall Stone, Tuomas Takalo, Otto Toivanen and Mark L.J. Wright for useful comments. Corresponding author: Silvia Marchesi, Dipartimento di Economia Politica, Piazza dell'Ateneo Nuovo 1, I-20126 Milano. Tel. +39 02 6448 3057; Fax. +39 02 6448 3085; E-mail: [silvia.marchesi@unimib.it](mailto:silvia.marchesi@unimib.it).

# 1 Introduction

In this paper we consider the role that multilateral institutions have in designing reform packages, focusing on how to improve the design and eventually the implementation of conditional reforms. Quite a few papers have argued that institutions, organizations, and policies are context-specific (e.g., Dixit, 2009; Rajan, 2008) or that bottom-up reforms are preferable to top-down changes (Easterly, 2006, 2008). According to some of these authors, multilaterals should base their recommended policy changes (conditions) on a good understanding of the structure and properties of the existing institutional, political and economic context. Tied up with these arguments there is also the idea that recipient countries should “own” the reforms, where such “ownership” is widely seen as crucial for the successful implementation of conditional programs.<sup>1</sup> Although it is clear that “ownership” could be improved by basing reform designs on context-specific knowledge, less is known on the specific mechanisms and on the circumstances under which such information should be transferred by recipient countries to multilateral institutions. In fact, countries’ local knowledge often consists of unverifiable information (or verifiable only at a cost). Hence, the quality of the reports (cheap talk messages) crucially depends on the conflict of interest faced by the sender (the recipient) and the receiver (the multilateral).

Conflicts of interest over desired policy may reflect various causes. Political economy mechanisms may explain why some governments may choose to follow policies deviating from the first-best (among others see Svensson, 2000), where this is especially true in programs with a structural orientation (Mussa and Savastano, 1999).<sup>2</sup> On that respect, the true value of a multilateral institution would lie in its ability to use its independence from local interests to improve policies (Rajan, 2008). However, the multilateral could also have a preferred reform agenda which deviates from the first-best policy from the point of view of a single country. In fact, being a multilateral, it should be concerned with the welfare of the rest of the world as well as with the welfare of the borrowing country. As a consequence, its “optimal” reform package should take into account the spillover effects of a country’s policy.

This difference in objectives and the existence of informational asymmetries justifies the use of a principal-agent model to analytically represent the relationship that the multilateral (the principal) establishes with the recipient government (the agent). Therefore, it is in this context that communication between the recipient and the multilateral should be analyzed. Specifically, in order to be able to screen among a range of programs the one which is best tailored to the type of recipient, the multilateral needs to have some country-specific information which is privately owned by the government (i.e., its local knowledge). However, whenever the multilateral and the government’s interests differ, the multilateral will expect the recipient to transmit its information distorted by a “bias,” and it will try to correct for it. If the country’s authorities are not naïve, they will anticipate this and they will use communication strategically (Crawford and Sobel, 1982). Thus, agency problems have the indirect negative effect of preventing full communication between the agent and the principal.<sup>3</sup>

In this paper, by explicitly relating the quality of the supplied information to the misalignment of interests between the recipient and the multilateral, we compare two types of incentive schemes (delegation vs. centralization) relative to the quality of the transmit-

---

<sup>1</sup>For example, Drazen (2001) discusses ownership in the specific case of International Monetary Fund (IMF) lending.

<sup>2</sup>The empirical evidence indicates that the implementation of structural conditionality is inferior to macroeconomic conditionality, especially in countries with strong interest groups (e.g., Ivanova et al., 2005 and Nsouli et al., 2005). Vreeland (2006) provides a comprehensive overview.

<sup>3</sup>For example, during the East Asian crisis, the Thai authorities refused to share their confidential data on local banks showing the extent of nonperforming loans (see Blustein, 2003).

ted information and hence to the quality (or quantity) of the implemented reforms. Even though our analysis could be easily applied to many types of multilateral reform programs (e.g., multilateral aid conditionality, WTO conditionality, European Union conditionality), we have chosen to focus on the IMF for two reasons.<sup>4</sup> In the first place, since the East Asian Crises at the end of the nineties, there has been a growing debate on the reform of IMF conditionality and, more specifically, it has been explicitly argued that ownership of reforms should be enhanced in its conditional programs. The second reason is that the existing data on the characteristics of IMF programs (i.e., the number and areas covered by IMF conditions) are crucial in order to test our theoretical model empirically, and no comparable data exist for other organizations.

In our setting we define as “centralization” an incentive scheme in which control rights over policies are allocated to the IMF (policy-based conditionality). On the contrary, we define as “delegation” an incentive scheme in which the borrowing country is left with considerable freedom to devise its own details of actions, to be ultimately judged by their outcomes (outcome-based conditionality).<sup>5</sup> The issue of delegation versus centralization is enriched by the fact that the principal (the IMF) owns some private information as well. Mutual communication then is important because the Fund owns skills and information (i.e., its analytical and cross-country knowledge) which are useful to process the country’s local information in order to design the “optimal” reform package. Thus, our analytical setting is one of two-sided incomplete information.

We consider a situation in which the recipient government is biased in favor of the “status quo,” whereas the IMF is biased in favor of more (or deeper) reforms relative to what is preferred by the recipient. In both the delegation and the centralization scheme, such misalignment of interests prevents full communication. Namely, in the delegation scheme, while the government’s local knowledge will be fully utilized in the design of the reform package, the IMF’s information will only be partially exploited. Moreover, the size of the implemented reform package will be smaller than optimal, because of the government’s “status quo” bias. On the other hand, in the centralization scheme, the IMF’s knowledge will be fully utilized and the “status quo” bias will be avoided, but the design of the reform package will only partially exploit the country’s local knowledge. Therefore, the optimal allocation of control rights over policies will depend on the relative importance of the two parties’ information and on the size of the agency bias, which simultaneously affects the amount of the information transmitted and the implemented reforms.

Our main findings are then as follows. For a given agency bias, the informational advantage of the government must be strictly greater than the advantage of the IMF for the delegation scheme to be optimal. Thus, such result is less supportive of a “delegation” scheme, as compared to the standard results of cheap talk models when only one player owns some private information. The implication is that increasing “ownership,” that is leaving more freedom to recipient countries in designing reforms, does not necessarily increase the quality of the adjustment programs, contrary to what is commonly argued. As the effect of the agency bias is concerned, the intuition suggests that an increase in the conflict of interests between the IMF and the government would lead towards

---

<sup>4</sup>Conditional reforms could also be recommended by bilateral institutions. The reason why we focus on multilaterals is simply because their objective function could be more general.

<sup>5</sup>The term conditionality has traditionally encompassed two categories: the policy actions a member country needs to take to continue the arrangement and the economic outcomes which the country is required to achieve. In reality such distinction between actions and outcomes is not as neat as in theory, and more realistically we could think that “actions” and “outcomes” are specified in both delegation and centralization schemes. In the case of delegation, however, actions will be less detailed and the range of outcomes will be broader. Furthermore, the IMF could be directly concerned about the means as well as the ends; then the actions may logically fall into the outcomes category (Dixit, 2000).

”centralization.” However, this quite intuitive argument overlooks that the agency bias does influence the quality of communication as well. Specifically, since an increase in the bias reduces the amount of information transferred by the government to the multilateral institution in the centralization regime, the IMF’s incentives to delegate may increase. Therefore, it is not obvious that an increase in the misalignment of interests between the IMF and recipient countries should lead to centralization. In particular, an increase in the agency bias can lead to more “delegation” when the local knowledge is crucial for designing more adequate and effective policy reforms.

An immediate empirical implication of the model would be to investigate the scope of conditionality in relation to information transmission problems. In this context, a “narrower” conditionality could be considered as a proxy for a greater degree of “delegation.” We will define conditionality to be “narrower” when the number of program conditions are relatively small. We thus investigate the determinants of the number of conditions in IMF programs over the period 1992-2005. Our sample comprises a maximum of 221 programs from 68 countries, depending on the control variables we include. Controlling for countries’ characteristics, their economic performance, and for the IMF’s political motivations, we find that the number of conditions increases with the importance of the IMF’s information and decreases with the relevance of the countries’ information. Specifically, more open countries obtain more conditions because the importance of the IMF’s knowledge is greater. Less transparent countries and countries with a greater social complexity receive fewer conditions, as in this case the importance of their local knowledge increases. As the effects of the agency bias are concerned, the evidence we find is blurred, as expected. Overall, our empirical results confirm that the IMF follows an allocation rule of control rights over policies which leaves more freedom to recipient countries whenever their local knowledge is particularly relevant in shaping conditions.

The paper is organized as follows. Section 2 briefly describes the related literature; the model is developed in Section 3; Section 4 discusses the equilibrium in the centralization and in the delegation case; Section 5 analyzes the optimal allocation of control rights by comparing the two incentive schemes; Section 6 describes the empirical model, while the results are discussed in Section 7; Section 8 presents a test for robustness and finally Section 9 contains some concluding remarks.

## 2 Related literature

This paper is related to three strands of literature. The first is the literature on strategic information transmission which is built on the seminal paper by Crawford and Sobel (1982). Specifically, Dessein (2002) claims that an (uninformed) principal may rationally decide to grant formal decision rights (i.e., delegate) to an agent who is better informed but has different objectives. He shows that to the extent that a principal cannot verify the claims of a better informed agent, he is in general better off delegating decision rights to the agent, in order to avoid the noisy communication and hence the associated loss of information. In his model, in the trade-off between the loss of control under delegation, and the loss of information under centralization, delegation always dominates centralization unless the agency bias is so large to make communication uninformative.<sup>6</sup> This means that whenever the decision is centralized there won’t be any informative communication between the principal and the agent, and the principal will decide without any participation of the agent.

---

<sup>6</sup>Aghion and Tirole (1997) modeled an incentive based rationale for delegation, too. However, while their focus is on the impact of the allocation of authority on the information structure (which needs to be produced), Dessein (2002), and this paper as well, take the information structure as given and investigate how the allocation of authority improves the use of private information.

Harris and Raviv (2005, 2008) build on Dessein (2002) but assume that both the principal and the agent own some private information relevant for the decision. This assumption allows the authors to derive quite different results. Namely, they show that even under centralization the agent plays a role by communicating some of his private information to the principal. Thus, they provide a rationale for centralization also in terms of information transmission. Our theoretical model builds on Harris and Raviv (2005) inasmuch as it considers the existence of a two-sided incomplete information agency relationship between the multilateral and the borrowing government.

The second stream of literature, to which we connect, is related to the role of multilateral institutions in designing development reforms. For example Dixit (2009), Easterly (2008) and Rajan (2008) claim that how to design viable reforms crucially depends on the political details of a country's situation. According to Dixit (2009), case studies and theory give some general principles which should be combined with context-specific knowledge to get feasible reforms. In turn, Rajan (2008) argues that not only should multilateral institutions advise on what would be good in an ideal world, but they should also offer second-best solutions that utilize the knowledge of the authorities in that country in formulating feasible reforms. None of these papers, however, has modeled the transmission of information in the specific context of a principal-agent relationship, such as the one between a multilateral institution and recipient countries. A principal-agent framework is employed by Khan and Sharma (2001) and Ivanova (2006) to analyze the role of outcome-based conditionality in improving ownership and, in this way, the implementation of reforms. However, they do not tackle the problem of information transmission.

Finally, the third strand of literature our paper is related to is empirical. Ivanova et al. (2005), Gould (2003), Dreher et al. (2006), Dreher and Jensen (2007), Stone (2008) and Copelovitch (2009) investigate empirically what explains patterns of variation in the terms (number of conditions or number of areas covered by conditions) of IMF loans. The main interest in all these papers is to determine the role that political motivations, as compared to economic ones, have in determining the characteristics of Fund programs. In particular, Stone (2008) and Copelovich (2009) look at the determination of IMF conditions as the result of a bargaining game in which political variables contribute to determine the bargaining strength of the two parties. In this paper we also assume that variables different from technocratic ones play a strong role in determining conditionality, but with respect to the previous contributions, we argue that the two parties' bargaining power could also be affected by the relative importance of their private information.

Our paper's contribution is twofold. First, we analyze theoretically the transmission of information in the design of IMF-supported programs, where the IMF is meant to represent the behavior of a multilateral. Although there is a large agency literature in corporate finance dealing with communication issues, it is the first time that such issues are studied in the context of conditional reform programs. We also contribute to the literature in the empirical part. Even though the "scope" (i.e. the degree of "intrusiveness") of conditionality has been investigated in a number of previous studies, it is the first time that the degree of "stringency" of conditionality is related to the difficulty of sharing private information between the Fund and the recipient country.

### 3 The model

The model is a three stage game between two agents: the IMF (the principal) and a recipient country's government (the agent). Both are assumed to be risk neutral. The IMF and a country's government must take a decision about an adjustment program denoted by  $s$ .

The recipient country’s welfare is measured by  $Y(s)$  (i.e., the country’s national income), which is a function of the adjustment program  $s$ . The adjustment program which maximizes  $Y(s)$ , denoted by  $s^*$ , is assumed to be determined by two stochastic factors  $\tilde{a}$  and  $\tilde{p}$ . We also assume that the Fund and the borrowing government privately observe  $\tilde{p}$  and  $\tilde{a}$  respectively, and that:

$$s^* = a + p \tag{1}$$

We interpret  $s^*$  as the number and/or the depth of the adjustment policies required to cover the output gap.  $s^*$  is determined by the sum of the two signals  $a$  and  $p$  which implies that the two agents need to truthfully communicate for a program to be optimally designed.  $Y(s)$  is assumed to monotonically decrease with the distance between the adjustment program  $s$ , which is actually implemented, and the program  $s^*$ . More specifically, we assume:

$$Y(s) = Yo - (s - s^*)^2$$

where  $Yo$  is potential output.<sup>7</sup>

### 3.1 Information

The stochastic variable  $\tilde{a}$ , whose support is in  $[0, A]$ , is observed only by the government.  $\tilde{a}$  represents the local knowledge, including both information about the state of the country’s economy and sociopolitical information about the preferences and the agenda of the government and of the relevant national constituencies. Therefore, information on  $\tilde{a}$  is important to measure what is called a country’s “institutional capacity” to perform reforms (Drazen and Isard, 2004). The government’s superior information over  $\tilde{a}$  can be seen as deriving from its greater proximity to the “business environment,” relative to the IMF officials. Such type of information is assumed to be soft, that is it cannot be certified or “proved.”

The Fund privately observes the random variable  $\tilde{p}$ , whose support is in  $[0, P]$ . Its informational advantage, relative to the government, derives from cross-country knowledge it accumulates during its activities (surveillance, technical assistance, lending). Such knowledge allows it to better understand the links between policies and economic outcomes, building on the analysis of what has worked elsewhere. Moreover, through its multilateral surveillance activity, the IMF is able to take into account the global economic conditions in the choice of the recipient country’s adjustment program.

In order to determine the program which maximizes the recipient country’s output, the IMF and the borrowing government need to combine their private knowledge. We assume that the variables  $\tilde{a}$  and  $\tilde{p}$  are independent, with  $\tilde{a}$  uniformly distributed on  $[0, A]$  and  $\tilde{p}$  uniformly distributed on  $[0, P]$ .<sup>8</sup> The larger is  $A$ , the larger the informational advantage of the borrowing government over the IMF with respect to  $\tilde{a}$ . Likewise, the larger is  $P$ , the larger the informational advantage of the IMF over the government with respect to  $\tilde{p}$ .

---

<sup>7</sup>From here on, we assume quadratic loss functions for analytical tractability.

<sup>8</sup>Uniform distributions are assumed for analytical tractability.



## 3.2 Objective functions

### 3.2.1 IMF

The IMF is assumed to be a benevolent multilateral institution. It aims at reducing economic policy distortions in the recipient country by offering economic assistance contingent on the adoption of distortion-lowering policies. Such objective is strengthened and complemented by the desire to reduce the negative effects (or to increase the positive effects) of domestic policies on global output, due to potential spillovers.<sup>9</sup> Formally, the program preferred by the IMF maximizes the following objective function, that is:

$$\underset{s}{\text{Max}} U^{IMF} = Y(s) + \gamma Y^{RW}(s), \quad (2)$$

where  $Y$  and  $Y^{RW}$  measure the borrowing country and the Rest of the World output, respectively. They both depend on the country's adjustment program  $s$ .<sup>10</sup> The parameter  $\gamma$  ( $0 \leq \gamma \leq 1$ ) denotes the importance of spillover effects. Specifically, if the recipient country is big,  $\gamma$  will tend to 1, while for very small countries  $\gamma$  will be close to 0, denoting the absence of any spillover effect.

Let  $s_{IMF}^*$  denote the program which maximizes (2). We assume that the optimal program for the IMF differs from the program which maximizes a country's national output by a constant  $\gamma e$  with  $e > 0$ , which captures the relevance of spillover effects. Formally:

$$s_{IMF}^* = a + p + \gamma e = s^* + \gamma e.$$

This implies that the IMF is biased in favor of more (or deeper) reforms relative to the level which would maximize the recipient country's output. When  $\gamma = 0$  (absence of spillover effects),  $s_{IMF}^* = s^*$ .<sup>11</sup>

$U^{IMF}$  monotonically decreases with the distance between the adjustment program  $s$ , which is actually implemented, and the IMF's preferred program  $s_{IMF}^*$ , that is:

$$U^{IMF} = U_0^{IMF} - (s - s_{IMF}^*)^2, \quad (3)$$

where  $U_0^{IMF} = U^{IMF}(s_{IMF}^*)$ .

### 3.2.2 Government

The borrowing government is concerned about its national income, but its choice is constrained by the influence of some interest groups, which may benefit from structural

---

<sup>9</sup>The rapid increase in trade and cross-border capital flows in recent years has tied countries more closely together. Moreover, greater economic integration implies that a greater policy dialogue among countries will become necessary and multilateral institutions would be an ideal context for such a dialogue to take place (Rajan, 2008).

<sup>10</sup>Here the policies in the rest of the world are taken as given, namely we do not consider strategic interactions among countries.

<sup>11</sup>As we assume a benevolent institution, we do not consider the IMF's concern for its private interests (*bureaucratic bias*, e.g., Vaubel, 1986, 2006) nor for the interests of some "special" shareholders (*political pressures*, e.g., Dreher et al., 2006). However, in a slightly modified framework,  $\gamma e$  could also stand for an IMF's *bureaucratic bias* or the influence of *political pressures*.

distortions (e.g., Drazen, 2001).<sup>12</sup> To formalize this argument, we assume that the government maximizes the following objective function:

$$\underset{s}{Max}U^G = Y(s) + \theta C(s), \quad (4)$$

where  $C$  are contributions from special interests groups. We assume that  $C$  decreases with  $s$ , that is with the number and/or the depth of the distortion lowering policies. The parameter  $\theta$  ( $0 \leq \theta \leq 1$ ) denotes the importance of lobbies. Specifically, if lobbies are very powerful  $\theta$  will tend to 1, while if they are weak  $\theta$  will be close to 0. Let  $s_G^*$  denote the adjustment program which is preferred by the government. We assume:  $s_G^* = s^* - \theta b$ , with  $b > 0$ .

By interpreting  $s^*$  as the number and/or the depth of the adjustment policies required to cover the output gap, the government is assumed to have a bias, other things equal, for the maintenance of the *status quo*. The higher  $\theta$  is, the stronger such bias will be.

The borrowing government's utility  $U^G$  monotonically decreases with the distance between the adjustment program  $s$ , which is actually implemented, and its preferred program  $s_G^*$ . This implies that:

$$U^G = U_0^G - (s - s_G^*)^2, \quad (5)$$

where  $U_0^G = U^G(s_G^*)$ .

### 3.3 The agency problem

The difference between  $s_{IMF}^*$  and  $s_G^*$  represents the extent of the agency problem between the Fund and the borrowing government. Specifically:

$$s_{IMF}^* - s_G^* = \gamma e + \theta b = B,$$

where  $\theta b$  captures the government's *status quo* bias, due to domestic lobbies' pressures, and  $\gamma e$  captures the extent of the divergence between the Fund and the government objectives related to the existence of some externalities in the government's policy choices.<sup>13</sup>

We should note that in our setting, unlike in the standard principal-agent model, the preferences of the countries' authorities and of the IMF are, to some extent, aligned. In fact, both the government and the IMF do care about the effects of the adjustment program on national output, and when  $\theta = \gamma = 0$ , their interests coincide.

Finally it is worth noting that in the model we do not question the recipient country's ability to repay the IMF loan and we do not model the choice of the loan size. These assumptions are indeed strong but they allow us to focus on the issue of information transmission and on its implications for the choice of centralization vs. delegation. In other words, we neglect the IMF's role as a lender to emphasize its role as an advisor. Indeed, in the last decade, the IMF has become more and more involved in promoting growth and economic stability by designing economic reforms.<sup>14</sup>

<sup>12</sup>More generally, conflicts of interest over desired policy may reflect various causes. There may simply be ideological differences over what is the best way to achieve the same goal. Alternatively, simple uncertainty regarding the distribution of gains and losses from reforms may make governments fail to adopt policies considered to be efficiency-enhancing (e.g., Fernandez and Rodrik, 1991).

<sup>13</sup>National governments do not generally internalize the impact of their policy actions on their neighboring countries (like, for example, tariffs, subsidies, and other trade protection policies). Therefore, the IMF's multilateral orientation may generate some conflicts of interest with the recipient governments (Mayer and Mourmouras, 2008).

<sup>14</sup>The recent events of the global crisis has again turned the light on the lending activity of the IMF.

### 3.4 Timing

The sequence of events is assumed to be the following. First, the IMF decides whether or not to delegate to the government the control over the choice of the adjustment program. Next, the government learns  $\tilde{a}$  and the IMF learns  $\tilde{p}$ . If authority has been delegated, the government asks the IMF for technical advice and then chooses the program, while, if authority has not been delegated, the IMF asks the country for advice and then chooses the program. Finally, the government implements the program and outcomes realize.<sup>15</sup>

## 4 Centralization versus Delegation

In our model the IMF has two instruments to use the local knowledge of the recipient government: delegation and centralization.<sup>16</sup>

By “delegation,” we refer to an incentive (or “lending”) scheme in which the IMF delegates to the recipient government the choice of the adjustment program, which implies that the government can choose autonomously the policies to be implemented. We assume that in designing the program the government asks the IMF’s advice at the negotiation stage, but then it decides the structure of the program without the IMF’s approval. In this stage the IMF decides how much of its private information it communicates to the recipient country. In this lending scheme, the IMF does not engage in monitoring country’s policy actions; rather it subordinates the continuation of the disbursements to the achievement of some pre-determined outcomes. We will show that delegation will result in an under-utilization of the Fund’s information and in a suboptimal adjustment program due to the agency bias.<sup>17</sup>

By “centralization,” instead, we refer to an incentive (or “lending”) scheme in which the IMF fully controls the design of the adjustment program and tries to exploit the government’s private information by asking for its advice at the negotiation stage. Symmetrically to the delegation case, it is in this stage that the recipient government decides how much of its private information it communicates to the Fund. Then, the Fund chooses the adjustment policies and the government implements them. The IMF monitors the economic reforms (policy actions) and it subordinates the continuation of the agreement to the country’s compliance with the program. Centralization avoids the agency bias, as we assume that the Fund fully controls policy actions, but it will induce under-utilization of the government’s private information.<sup>18</sup>

---

<sup>15</sup> Assuming that the IMF chooses the lending scheme only after observing its private information would not qualitatively change the results. It is possible to show that there exists a cut-off level of  $\bar{p}$  such that for  $p < \bar{p}$  delegation is chosen with probability one. Indeed, the smaller is  $p$  the more aligned the IMF and the government’s incentives are.

<sup>16</sup> We assume that the two parties cannot commit to a decision rule that is not ex-post optimal for the decision maker. This implies that they cannot commit to an incentive-compatible decision rule in which the Revelation Principle applies. Hence, the principal (the Fund) cannot use a standard mechanism to elicit the private information of the agent. However, she can commit to transfer decision-making authority to the agent.

<sup>17</sup> While in principle the IMF might control for the government’s bias by the threat of interrupting the disbursements in case of non-compliance with the pre-determined outcomes, we are implicitly assuming that such incentive scheme does not manage to eliminate completely the agency problem. There are many reasons why the IMF’s threat of program interruption cannot be credible. For a discussion on this see Marchesi and Sabani (2007a).

<sup>18</sup> This is a strong assumption. We are assuming that when the IMF chooses and monitors the adjustment policies, its monitoring technology is fully efficient, which is at odds with reality (e.g., Marchesi and

In the following sections, we will study both lending schemes separately.

## 4.1 Delegation

We start by examining the delegation case. First, we introduce some notation. Let  $t \in [0, P]$  denote the message that the IMF sends to the government when asked to give its technical advice. Let  $q(t|p)$  denote the density function that the IMF sends message  $t$  when it has observed  $p$ . This is the reporting rule chosen by the IMF. Further, let  $g(p|t)$  denote the density function that the IMF's private information is  $p$ , when the government observes message  $t$ . Finally, let  $s(a, t)$  be the government's action rule depending on the IMF's message  $t$  and on its private information  $a$ . A Perfect Bayesian Nash Equilibrium for this communication game is defined as follows:

**Definition 1** *A Perfect Bayesian Nash Equilibrium of the communication game consists in a family of reporting rule  $q(t|p)$  and an action rule for the government  $s(a, t)$  such that:*

1) for each  $p \in [0, P]$ ,  $\int_R q(t|p) dt = 1$ , where the Borel set  $R$  is the set of all possible signals  $t$ . If  $t^*$  is in the support of  $q(t|p)$ ,  $t^*$  is such that:  $t^* = \arg \min \int_0^A [s(a, t) - s_{IMF}^*]^2 f(a) da$

2) for each  $t$ ,  $s(a, t)$  solves:

$$\min \int_0^P [s(a, t) - s_G^*]^2 g(p|t) dp$$

where  $g(p|t) = \frac{q(t|p)f(p)}{\int_0^P q(t|\theta)f(\theta)d\theta}$

Condition (1) says that the reporting rule  $q(t|p)$ , chosen by the IMF, minimizes the IMF's expected loss, given the government's action rule  $s(a, t)$ . In other words, the equilibrium reporting rule  $q(t|p)$  induces the government to choose an adjustment program  $s(a, t)$ , which minimizes the expected loss of the IMF. Condition (2) says that the government responds optimally to each IMF report  $t$ . The government uses Bayes' rule to update its prior on  $p$ , given the IMF's reporting strategy and the signal received. Namely, given the IMF report  $t$  and the posterior density function of  $p$  given  $t$  ( $g(p|t)$ ),  $s(a, t)$  minimizes the government's expected loss.

The government's equilibrium choice of adjustment program creates some endogenous signaling costs for the IMF, which allow for equilibria with partial sorting. Indeed, the model has multiple equilibria which are all "partition" equilibria, in which the IMF introduces some noise in the information transmitted by simply not discriminating as finely as possible among the different states of nature it is capable to distinguish.<sup>19</sup> Moreover, it is possible to show that there exists a finite upper bound  $N(B, P)$  on the number of sub-intervals of the equilibrium partitions and that there exists at least one equilibrium for each partition from  $N = 1$  (uninformative equilibrium) to  $N = N(B, P)$  (most informative equilibrium).

---

Sabani, 2007b). However, what is actually crucial for the model is the fact that monitoring the policy actions reduces the bias with respect to the case in which the IMF simply monitors the final outcomes, which seems quite plausible.

<sup>19</sup>See Lemma 1 in Crawford and Sobel (1982).

Let  $p(N) = p_0(N), p_1(N), \dots, p_N(N)$  denote a partition of  $[0, P]$ , where  $p_0(N) < p_1(N) < \dots < p_N(N)$ . The following proposition characterizes the relevant equilibrium for the communication game.

**Proposition 1** *Suppose  $B (= \gamma e + \theta b)$  is such that  $U^{IMF}$  is different from  $U^G$  for all  $p$ . Then there exists a positive integer  $N(B, P)$  such that for each  $N$  with  $1 \leq N \leq N(B, P)$ , there exists at least one equilibrium  $(q(t|p); s(a, t))$ , where  $q(t|p)$  is uniform, supported on  $[p_i, p_{i+1}]$ , and  $s(a, t) = a + \frac{p_i + p_{i+1}}{2} - \theta b$  if  $p \in [p_i, p_{i+1}]$ . Moreover:*

$$(i) \int_0^A \left[ a + \left( \frac{p_i + p_{i+1}}{2} \right) - (a + p_i) - B \right]^2 f(a) da = \int_0^A \left[ (a + p_i) - \left[ a + \left( \frac{p_{i-1} + p_i}{2} \right) \right] + B \right]^2 f(a) da$$

$$(ii) p_0 = 0; p_N = P$$

**Proof.** The proof follows directly from Theorem 1 in Crawford and Sobel (1982). ■

(i) is an ‘‘arbitrage’’ condition which says that for states of nature that fall on the boundaries of two intervals the IMF must be indifferent between the actions  $(s(a, t))$  on these two intervals. (i) defines a second order linear differential equation on  $p_i$ , while (ii) specifies its initial and terminal conditions. Since the IMF is not informed on the true value of  $a$ , when choosing  $t$ , it will take the expected value of  $a$ , that is  $\frac{A}{2}$ . The arbitrage condition (i) then specializes to:

$$A/2 + \left( \frac{p_{i+1} + p_i}{2} \right) - (A/2 + p_i) - B = A/2 + p_i - \left[ A/2 + \left( \frac{p_{i-1} + p_i}{2} \right) \right] + B$$

$$(i = 1, \dots, N - 1), \quad (6)$$

from which it is easily obtained

$$p_{i+1} = 2p_i - p_{i-1} + 4B. \quad (7)$$

This second order linear difference equation has a class of solutions parameterized by  $p_1$  (given  $p_0 = 0$ ):

$$p_i = ip_1 + 2i(i - 1)B, \quad (i = 1, \dots, N - 1).$$

Given that  $p_N = P$  we have:

$$p_1 = \frac{P - 2N(N - 1)B}{N},$$

from which, using (7) and substituting for the value of  $p_1$ , we get:

$$p_i = \frac{iP}{N} - 2i(N - i)B, \quad (i = 1, \dots, N). \quad (8)$$

From (8) it is easily obtained :

$$p_i - p_{i-1} = \frac{P}{N} + 2(2i - N - 1)B. \quad (9)$$

The width of the interval increases by  $4B$  for each increase in  $i$ . Intuitively, anticipating that the IMF is biased towards larger values of  $s$ , relative to the government, the latter considers the IMF more reliable when it reports small values of  $p$ . This implies that the smaller is the value of  $p$ , the more credible is the IMF and thus the more information is transmitted.

By imposing the condition  $p_1 \geq 0$ ,  $N(B, P)$  is the largest positive integer  $N$  such that:

$$P - 2N(N - 1)B \geq 0,$$

which is given by:

$$N(B, P) = \left\langle -\frac{1}{2} + \frac{1}{2} \left[ 1 + \frac{2P}{B} \right]^{\frac{1}{2}} \right\rangle,$$

where  $\langle v \rangle$  denotes the smallest integer greater than or equal to  $v$ .<sup>20</sup>

$N(B, P)$  denotes the (maximum) precision of the information transmitted by the Fund, which is decreasing with the bias  $B$  and is increasing with the length of the support of  $p$  (i.e., the IMF's informational advantage).<sup>21</sup> Specifically, for any given  $P$ , the precision of the information transmitted by the Fund decreases with the relevance of the bias  $B$ . On the contrary, for any given  $B$ , the IMF's incentive in not excessively distorting the information transmitted rises with the IMF's informational advantage  $P$ . That is, it increases with the relevance of the IMF's private information in designing the program. The intuition for the last result basically depends on the fact that when the IMF's information is especially relevant, the costs of a non-informative report might outweigh the benefits of a "noisy" communication, even taking into account the agency bias.

In the delegation game, using (9), the IMF's ex ante expected loss ( $L^D$ ) for the equilibrium of size  $N$  is given by:

$$\begin{aligned} L^D(N, B, P) &= \frac{1}{P} \sum_{i=1}^N \int_{p_{i-1}}^{p_i} \left[ \left( \frac{p_{i-1} + p_i}{2} - p - B \right) \right]^2 dp = B^2 + \sum_{i=1}^N \frac{(p_i - p_{i-1})^2}{12} = \\ &= B^2 + \frac{1}{12} \sum_{i=1}^N \left[ \frac{P}{N} + 2(2i - N - 1)B \right]^2 = B^2 + \sigma_p^2, \end{aligned}$$

where  $\sigma_p^2$  denotes the residual variance of  $p$  the government expects to have before being reported the equilibrium signal  $t$  by the Fund. Crawford and Sobel (1982) show that this is equal to:

$$\sigma_p^2 = \frac{P^2}{12N^2} + \frac{B^2(N^2 - 1)}{3}, \quad (10)$$

where  $\sigma_p^2$  is decreasing with  $N$ . More precisely, if  $N = 1$ , there is no communication and  $\sigma_p^2$  is at a maximum, while if  $N = N(B, P)$ ,  $\sigma_p^2$  is at a minimum.<sup>22</sup>

It is possible to show that, given  $B$ , also the government's expected loss decreases with  $\sigma_p^2$ .<sup>23</sup> Therefore, since both players' ex ante expected loss is decreasing with the residual variance of  $p$ , Crawford and Sobel assume that both agents coordinate on  $N(B, P)$ , which is thus a focal equilibrium.

Now we can prove the following Lemma.

---

<sup>20</sup>Note that  $-\frac{1}{2} + \frac{1}{2} \left[ 1 + \frac{P}{B} \right]^{\frac{1}{2}}$  is the positive root of  $2N(N - 1)B - P = 0$  minus one.

<sup>21</sup>Specifically, the closer  $B$  approaches zero, the more nearly agents' interests coincide, and the more information is communicated, i.e. the "finer" partition equilibria can be.

<sup>22</sup>It is easy to verify that when  $N = 1$  (uninformative partition) the residual variance  $\sigma_p^2$  is equal to the total variance  $\frac{P^2}{12}$ . To the contrary, for a given  $N$ , the residual variance increases with  $B$ . Indeed, when  $B = 0$ , the residual variance is equal to  $\frac{P^2}{12N^2}$ , which is smaller than the total variance, for  $N > 1$ .

<sup>23</sup>This result depends on the hypothesis of quadratic objective functions.

**Lemma 1** *Given the agency bias  $B$ , in the focal equilibrium the IMF's ex ante expected loss  $L^D(N, B, P)$  is continuous and increasing in  $P$ .*

**Proof.** See Appendix ■

Lemma 1 shows that under delegation the IMF sends a “noisy” signal to the government in order to “align” the program chosen by the government to the one the IMF prefers. Since, in this case, the IMF’s private information is under-utilized, given the agency bias, the Fund’s expected loss increases with  $P$ , that is with the relevance of its informational advantage.

## 4.2 Centralization

In the “centralization game” the situation is entirely symmetric to the “delegation game.” In the case of centralization, the IMF is supposed to choose the adjustment program  $s$ , knowing  $p$  and after having negotiated with the government the design of the program. In the negotiation phase IMF officials must persuade the government to share country-specific information (data on both economic and sociopolitical issues) in order to better screen among possible adjustment programs. As before, the government’s report  $r$  is determined by a partition  $\{a_i\}$  of  $[0, A]$ . Again, it is possible to define a reporting rule  $q(r|a)$  and a posterior belief  $g(a|r) = \frac{q(r|a)f(a)}{\int_0^A q(r|\theta)f(\theta)d(\theta)}$  such that, given the report  $r \in [a_i, a_{i+1}]$ , the IMF’s expected value of  $a$  is  $\frac{a_i + a_{i+1}}{2}$  (posterior mean of the random variable  $\tilde{a}$ , given  $r$ ). The IMF will thus eventually implement the following program:

$$s(p, r) = \frac{a_i + a_{i+1}}{2} + p + \gamma e \quad \text{if } r \in [a_i, a_{i+1}] \quad (i = 1, \dots, N - 1).$$

The arbitrage condition (i) in Definition 1 then specializes to:

$$P/2 + \left(\frac{a_{i+1} + a_i}{2}\right) - (P/2 + a_i) + B = [P/2 + a_i] - \left[P/2 + \left(\frac{a_{i-1} + a_i}{2}\right)\right] - B$$

$$(i = 1, \dots, N - 1), \quad (11)$$

where, solving for  $a_{i+1}$ , we obtain:

$$a_{i+1} = 2a_i - a_{i-1} - 4B, \quad (i = 1, \dots, N - 1). \quad (12)$$

This second order linear difference equation has a class of solutions parameterized by  $a_{N-1}$  (given  $a_N = A$ ):

$$a_{N-i} = ia_{N-1} - (i-1)A - 2i(i-1)B \quad (i = 1, \dots, N). \quad (13)$$

Since  $a_0 = 0$  for  $i = N$  we have:

$$a_{N-1} = \frac{N-1}{N}A + 2(N-1)B. \quad (14)$$

Substituting (14) in (13), it is easy to derive:

$$a_{N-i} - a_{N-(i-1)} = \frac{A}{N} - 2(2i - N - 1)B.$$

Note that the width of the interval decreases by  $4B$  for each increase in  $i$ . Namely, the larger is the observed value of  $a$ , the more information is actually communicated by the government. Intuitively, anticipating that the government is biased towards smaller values of  $s$ , relative to the IMF, the IMF considers the government to be more reliable when it reports large  $r$ .

Imposing in (14) the condition  $a_{N-1} \leq A$ ,  $N(B, A)$  is the largest positive integer  $N$  such that:

$$\frac{N-1}{N}A + 2(N-1)B = A,$$

which is given by:

$$N(B, A) = \left\langle -\frac{1}{2} + \frac{1}{2} \left[ 1 + \frac{2A}{B} \right]^{\frac{1}{2}} \right\rangle,$$

where  $\langle v \rangle$  denotes the smallest integer greater than or equal to  $v$ .<sup>24</sup>

It is easily verified that  $v$  is a continuous and decreasing function of  $B$  and a continuous and increasing function of  $A$ .  $N(B, A)$  denotes the maximum precision of the government's information transmission. It is increasing with the length of the support of  $a$  (government's informational advantage) and decreasing with the agency bias  $B$ .

As before the intuition for this result basically depends on the government's incentive to avoid excessive distortions in the transmission of information. Specifically, for a given  $B$ , the government's incentive in not excessively distorting the information clearly rises with the increase in the government's informational advantage  $A$ .

Let  $L^C$  denote the IMF's ex ante expected loss for an equilibrium of size  $N$ , where the superscript  $C$  stands for centralization. Given the partition  $0 = a_0(N) < a_1(N) < \dots < a_N(N) = A$ , we can write:

$$\begin{aligned} L^C(N, B, A) &= \frac{1}{A} \sum_{i=1}^N \int_{a_{i-1}}^{a_i} \left[ \frac{a_{i-1} + a_i}{2} - a \right]^2 da = \sum_{i=1}^N \frac{(a_i - a_{i-1})^2}{12} \\ &= \frac{1}{12} \sum_{i=1}^N \left[ \frac{A}{N} - 2(2i - N - 1)B \right]^2 = \sigma_a^2, \end{aligned}$$

where  $\sigma_a^2$  denotes the residual variance of  $a$  the IMF expects to have ex ante, before being reported the equilibrium value of  $r$  by the government. Crawford and Sobel show that this is equal to:

$$\sigma_a^2 = \frac{A^2}{12N^2} + \frac{B^2(N^2 - 1)}{3}, \quad (15)$$

where  $\sigma_a^2$  is decreasing with  $N$ . More precisely, if  $N = 1$  there is no communication and  $\sigma_a^2$  is at a maximum, while if  $N = N(B, A)$ ,  $\sigma_a^2$  is at a minimum.<sup>25</sup> Since both players' ex ante expected loss is decreasing with the residual variance of  $a$  ( $\sigma_a^2$ ), we focus, as before, on the focal equilibrium, that is the equilibrium corresponding to the maximum size partition. Then, the following Lemma is established:

<sup>24</sup>Note that  $-\frac{1}{2} + \frac{1}{2} \left[ 1 + \frac{2A}{B} \right]^{\frac{1}{2}}$  is the positive root of  $2N^2B - 2NB - A = 0$  minus one.

<sup>25</sup>It is easy to verify that when  $N = 1$  (uninformative partition) the residual variance  $\sigma_a^2$  is equal to the total variance  $\frac{A^2}{12}$ . To the contrary, for a given  $N$ , the residual variance increases with  $B$ . Indeed, when  $B = 0$ , the residual variance is equal to  $\frac{A^2}{12N^2}$ , which is smaller than the total variance, for  $N > 1$ .



**Lemma 2** *In the focal equilibrium the IMF's ex ante expected loss  $L^C(N, B, A)$  is continuous and increasing in  $A$*

**Proof.** See Appendix. ■

Centralization avoids the agency bias but it results in under-utilization of the government's information. Indeed, the greater the bias the noisier the communication (the lower  $N(B, A)$ ). Therefore, the IMF's ex ante expected loss under centralization is increasing in the informational advantage of the government  $A$ .

## 5 Choice between delegation and centralization: a comparative analysis

**Proposition 2** *The IMF prefers centralization iff  $P \geq P(A, B)$ , where  $P(A, B)$  is continuous and increasing in  $A$  and for any  $B$ ,  $P(A, B) < A$*

**Proof.** See Appendix ■

Proposition 2 shows that the IMF will prefer centralization when its informational advantage is greater than a threshold level  $P(A, B)$ , which, for any  $B$ , is shown to be smaller than  $A$ . This means that the Fund will always choose not to delegate whenever its private information is more important than the agent's private information, that is  $P > A$ . Furthermore, the IMF will still opt for centralization even when  $P(A, B) \leq P < A$ . This means that, due to the bias, the Fund can optimally choose not to delegate even if its informational advantage is strictly smaller than  $A$ . In this case, the loss related to an under-utilization of the government's information is more than compensated by the elimination of the bias and by the full utilization of the IMF's private information. Finally, to choose delegation, the IMF's private information  $P$  has to be smaller than  $P(A, B)$ .

Figure 1 represents the choice among centralization and delegation as a function of  $A$  and  $P$ . As Proposition 2 shows the boundary level  $P(A, B)$  is upward sloping; it divides the  $(A, P)$  plane into two regions (centralization and delegation) and it lies below the 45° line. The centralization region is bigger than the delegation region since the existence of the agency bias requires  $A$  to be strictly greater than  $P$  for delegation to be optimal. Moreover, Figure 1 shows that even when  $P$  equals zero (i.e., the IMF has no private information) delegating control rights over policies still requires  $A$  to be strictly greater than zero.

The boundary level  $P(A, B)$  is in general not monotone in  $B$ .<sup>26</sup> Namely, an increase in  $B$  has two effects: a direct and an indirect one. The direct effect is to increase the agency problem, thus reducing the IMF's incentive to delegate. The indirect effect, at the same time, reduces the amount of information transferred by the IMF to the borrowing government under delegation, which would lead to centralization, and it reduces the amount of information transferred by the government to the IMF under centralization, which would lead to delegation. For some parameter values, this latter effect can outweigh the other two.

FIGURE 1 HERE

---

<sup>26</sup>Since the derivative of  $P(A, B)$  with respect to  $B$  cannot be analytically derived, this result is obtained by numerical simulations (see Harris and Raviv, 2008).

## 6 Empirical model

While our theoretical model provides normative indications about the allocation of control rights over policy actions in the IMF-recipient country relationship, in what follows we carry out an empirical analysis in order to investigate the role that the issue of information transmission plays in the actual design of IMF programs.

According to our theoretical results, we expect that a delegation scheme would prevail when the importance of the country’s local knowledge dominates either the size of the agency bias or the importance of the IMF’s private knowledge. To the contrary, we expect a centralization scheme to prevail when either the importance of the IMF’s knowledge or the size of the agency bias dominates the role of the country’s local knowledge.

We assume that a “narrower” (or less intrusive) conditionality could be considered as a proxy for a greater degree of delegation and we define conditionality to be “narrower” when the number of conditions included in a program – as listed in the letter of intent – is comparably small. In fact, a smaller number of conditions could be considered to be a proxy for delegation since conditions decrease the degrees of freedom of the borrowing country’s authorities.<sup>27</sup> In this context, controlling for countries’ characteristics, their economic performance, and for the IMF’s political motivations, we empirically investigate whether or not the scope of conditionality, over the years and across countries, is affected by variables related to the issue of information transmission. Specifically, we expect to find a narrower conditionality in countries whose local knowledge is more important than the IMF’s knowledge and the agency bias.

The number of conditions has been used as a proxy for stringency of conditionality in several previous studies: Mosley (1987) studied the tightness of World Bank Structural Adjustment Loans using this measure; Ivanova et al. (2005), Gould (2003), Dreher et al. (2006), Dreher and Jensen (2007), and Copelovitch (2009) utilized them to measure the extent of conditionality; the IMF (2001) has used similar data in empirical analyses as well. Rather than employing the number of conditions, Stone (2008) suggests to use the number of areas those conditions refer to. We will use such a measure as a robustness check in Section 8.

### 6.1 Data

#### 6.1.1 IMF conditionality

The IMF’s Monitoring of Fund Arrangements (MONA) database contains more than 22,000 conditions in more than 300 programs approved over the period March 31, 1992 – June 4, 2008, as used in Dreher, Sturm and Vreeland (2009).

This amounts to about 3,400 conditions in 28 Extended Fund Facility Arrangements (EFF), almost 12,000 under 143 Enhanced Structural Adjustment Facility (ESAF)/Poverty Reduction and Growth Facility (PRGF) Arrangements, and about 7,500 in 131 Stand-by Arrangements. 14,700 of those conditions are performance criteria, 2,500 are prior actions, and 5,300 are structural benchmarks. Not all of these conditions enter the arrangements when the respective program is initiated, of course, but are added over the course of the program. Usually, compliance with these conditions is monitored on a quarterly basis.

---

<sup>27</sup>It could be considered only as a proxy since the actual autonomy of a country’s authorities would also depend on the quality of such conditions. However, since the number of conditions is correlated with the degree of specificity, a lower number of conditions will reasonably characterize the delegation scheme.

Ideally, we would want to count only those conditions that were included at the initiation of the program. However, the structure of the MONA database (as we have access to) does not provide this information for many of the programs. While we do know which conditions have been included in the program, the time at which the condition did enter is not indicated. For our analysis, we thus calculate the sum of all the conditions. As the resulting number is obviously larger the longer a program is in effect, we control for the number of quarters that it is effective. Table 1 reports the number of conditions per program and type. In the middle panel of the Table, the total number of conditions is divided by the number of quarters the programs are in effect. When a condition is included at all test dates throughout the program, it is thus counted as “one.” While the average number of conditions listed in the table is a good proxy for the number of performance criteria, it represents a lower bound for structural benchmarks and prior actions. This is because a specific performance criterion is usually included throughout the program, while prior actions and benchmarks “come and go.” For more details see Dreher, Sturm and Vreeland (2009).

TABLE 1 HERE

### 6.1.2 Control variables

Our choice of control variables follows the literature on the determinants of IMF credit supply and participation in IMF programs.<sup>28</sup> Economic variables include the current account balance (in percent of GDP), (log) per capita income, the rate of inflation, GDP growth, and the amount of international reserves (in percent of imports).<sup>29</sup> We also control for whether a country votes more or less in line with the U.S. in the United Nations General Assembly (UNGA). According to the recent results in Dreher and Jensen (2007), e.g., countries voting in line with the U.S. in the UNGA receive IMF programs with fewer conditions.<sup>30</sup> We also control for disbursements of new IMF loans (as a share of GDP) which might arguably be related to the number of conditions (and the variables of interest) either.<sup>31</sup> As described above, the number of quarters a specific program is in effect is also controlled for.

Our variables of interest are the so called “informational variables.” Such variables are meant to capture the impact of the agency bias, the country’s local knowledge and the IMF’s knowledge on the number of (or areas covered by) conditions.

*Agency bias.* The bias in the objective function of the country’s authorities is due to political economy reasons while the bias of the IMF’s objective function depends on its role as a multilateral institution. According to the political economy literature, measures of political instability, polarization and social division (e.g., Tabellini and Alesina, 1990;

---

<sup>28</sup>See Steinwand and Stone (2008) for a recent survey.

<sup>29</sup>We have also included the domestic (fixed) investment (to GDP), the growth of government consumption (to GDP), total debt service (to exports) and total external debt (to GDP). While these additional variables have not been significant at conventional levels, our main results are not affected by their inclusion. Note that the rate of inflation has been transformed using the formula  $(\text{inflation}/100)/(1+(\text{inflation}/100))$  to prevent the influence of extreme outliers.

<sup>30</sup>Kuziemko and Werker (2006) find that countries serving on the United Nations Security Council (UNSC) receive more United Nations Development Project support, and more direct foreign aid from the United States; Dreher et al. (2006) report the same for the IMF. We therefore also included a dummy for temporary UNSC membership. While the dummy is not significant at conventional levels, the results for the remaining variables are unchanged.

<sup>31</sup>Arguably, IMF loans might not be an exogenous determinant of the number of conditions, but might simply be determined by the same set of variables. While we still include the variable here, note that the results are unchanged when we omit IMF loans from the regressions.

Alesina and Drazen, 1991) and whether a government is democratically elected or not (Besley and Case, 1995) should account for a country’s “resistance” towards reforms (or *status quo* bias).<sup>32</sup> Therefore, in order to “capture” the country’s *status quo* bias in the empirical model we considered measures of “institutional capacity” and “socioeconomic complexity.” On that respect we included some of the International Country Risk Guide’s (ICRG) indicators: government stability, law and order, bureaucratic quality, and ethnic tensions. These (subjective) indices range from zero to 12, with higher values showing “better” environments. High scores on the bureaucratic quality variable indicate “autonomy from political pressure” and “established mechanisms for recruiting and training.” Government stability is “a measure of the government’s ability to carry out its declared program(s) and its ability to stay in office.” Law and order refers to the impartiality of the legal system and the assessment of popular observance of the law, while ethnic tensions measure “the degree of tension within a country attributable to racial, nationality or language divisions” (PRS Group 1998).<sup>33</sup> We also included an index of democracy as defined in the Polity IV dataset (ranging from -10 to 10).

Moreover, we considered measures of both economic and financial openness since the divergence of interests between the country and the IMF may also depend on the existence of some externalities generated by the government’s policy choices, which in turn will be more relevant the greater the trade and cross-border capital flows.<sup>34</sup> Specifically, we included the sum of a country’s imports and exports (relative to GDP).<sup>35</sup>

Theoretical predictions about the effect of the agency bias on the number of conditions included in an average IMF program are not clear-cut. As we described in Section 5, an increase in the agency bias has direct and indirect effects. The direct effect would reduce the IMF’s incentive to delegate, while the indirect effect, in principle, could either reduce or increase the incentive to delegate.

*Country’s local knowledge.* The importance of a country’s local knowledge is supposed to be crucial for less transparent countries and for countries with a more complex socio-economic structure. In order to measure the importance of a country’s local knowledge we use indexes of transparency, such as democracy and press freedom (the latter taken from Freedom House 2006). Our main index follows Rosendorff and Vreeland (2008) who suggest missing data on standard economic indicators (like inflation, etc.) as indicators of (lack of) transparency.<sup>36</sup> Rather than choosing any arbitrary data series, however, we

---

<sup>32</sup>In Tabellini and Alesina (1990), under political instability and polarization, a balanced budget is not a political equilibrium, since the current majority does not internalize the costs of budget deficits and the more so the greater the difference between its preferences and the expected preferences of future majority. Alesina and Drazen (1991) find that, when stabilization has significant distributional implications, a “war of attrition” among different socioeconomic groups may delay stabilization. Besley and Case (1995), testing a reputation-building model of political behavior, find that (gubernatorial) term limits (consistent only with democracy) have a significant effect on economic policy choices.

<sup>33</sup>We tried to control for some of the other ICRG indicators, such as corruption, investment profile and social conditions and our results are unchanged. We also tried to include the variable “strength of special interests” (referring to the share of seats in the parliament held by “special interests” parties) and “education” but missing data reduced the sample substantially, so we do not report the results below. Different specifications are available upon request.

<sup>34</sup>Namely, policies in one country may impose externalities on others, especially trade and exchange rate policies.

<sup>35</sup>We have also included the KOF Index of Globalization and its subcomponent on economic restrictions (<http://globalization.kof.ethz.ch/>) and the first principal component of four categories of restrictions: the existence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and requirement of the surrender of export proceeds. The Chinn-Ito (2007) measure of financial openness was also employed.

<sup>36</sup>Another index that might come to mind is membership in the IMF’s Special Data Dissemination

evaluate all 250 series classified as “economics” in the World Bank’s World Development Indicators (2008). Our resulting transparency indicator shows the share of series for which there is no data available in a given country and year. In addition, as an indicator of socioeconomic complexity we use “ethnic tensions” from the ICRG introduced above. As an increase in the relevance of the local knowledge  $A$  increases the incentives to delegate, we expect the number of conditions to be negatively related to  $A$ .

*IMF’s specific knowledge.* A poor quality of governmental staff could be a reason why a country may be in need of the Fund’s technical advice. In order to capture that, we included the index of “bureaucratic quality.” Finally, the IMF’s informational advantage will be more relevant for more open countries since the IMF, as a multilateral institution, could be an ideal place to internalize spillovers (Rajan, 2008). We employ the indicators of openness introduced above to test this hypothesis. As  $P$  increases the incentives to centralize decisions, we should find that the number of conditions increases as the IMF’s informational advantage  $P$  increases.

Table 2 contains the details of the definitions and sources of the variables included in the regressions below. Descriptive statistics are provided in the Appendix. Clearly, some of the variables refer, at the same time, to the influence of the agency problem or to the importance of the local or the IMF’s knowledge. Since the impact of such indicators could have opposite effects, in these cases the sign of the coefficient will tell us the “net effect,” i.e., the impact that dominates. The Appendix also shows the correlations of the variables included in the analysis. Note in particular that the correlations between the institutional and, respectively, informational variables are surprisingly low.

TABLE 2 HERE

## 7 Method and Results

We examine the determinants of the number of conditions in IMF programs over the period 1992-2005. Our sample comprises a maximum of 221 programs from 68 countries, depending on the control variables we include. As count data often show non-normal distributions we first test for the normality of our dependent variable. The variable shows a nicely bell-shaped distribution and the null-hypothesis of normality is not rejected at conventional levels of significance. We therefore adopt a GLS fixed effects estimator in order to control for country unobservables and to correct for AR(1) autocorrelation within panels and cross-sectional heteroskedasticity across countries (rather than referring to count models like Poisson or Negative Binomial Regression).<sup>37</sup> We also replicated all regressions taking the natural log of the number of conditions. The results are qualitatively unchanged. The same holds when we do not correct for serial correlation, lag the explanatory variables to account for potential simultaneity/endogeneity, include year dummies, or, respectively, do neither control for heteroskedasticity nor serial correlation.

---

Standard (SDDS). When including a dummy for whether or not a country has met the SDDS requirements for transparency, its coefficient is not statistically significant at conventional levels. The same applies for a dummy indicating whether or not a country posted data on the General Data Dissemination System (GDDS).

<sup>37</sup>The FGLS estimator has been shown to perform efficiently under heteroskedasticity and autocorrelation as compared to standard panel estimators. Note that the FGLS correction for a single AR(1) term is unlikely to cause the standard errors to be flawed as would be the case employing the Parks correction with individual AR(1) terms for each country (Beck and Katz 1995: 637). In all specifications a likelihood ratio test rejects the hypothesis of no AR(1) at conventional levels of significance. The procedure of estimation employed here is standard in the recent literature (see, e.g., Kilby 2006).

Specifically, we test:

$$C_{it} = \alpha + \beta_1 Z_{it} + q_{it} + \eta_i + u_{it} \quad (16)$$

where  $C_{it}$  represents the number of conditions in IMF programs in country  $i$  at year  $t$ ,  $q$  measures the number of quarters a specific program has been in effect, and  $Z$  is a vector containing the variables introduced above. Finally,  $\eta_i$  are country fixed effects.

The results of the full model of equation (16) are presented in column 3 of Table 3. In column 1 we report the coefficients of the variables that are meant to capture the “informational component” only, while column 2 is restricted to the values of the coefficients of the variables related to economic and political factors. While these results are reported for comparison, we largely restrict our discussion to the full model.

As can be seen, the results support our hypotheses regarding the effect of the informational variables on the number of IMF conditions. Consistent with our theoretical model, more open countries obtain more conditions, at the one percent level of significance. Indeed, for countries which are more open the importance of the Fund’s knowledge increases, which leads to more centralization. On the other hand, a greater openness increases  $B$  (through  $\gamma e$ ), where this latter effect might also be consistent with a centralization scheme, according to the theory.

At the one percent level, the number of conditions decreases with “law and order,” implying that a lower strength and impartiality of the legal system (i.e., weaker institutions or a larger bias) increases the number of IMF conditions. This is consistent with our theoretical prediction according to which centralization could dominate delegation when the bias of the countries’ authorities, relative to the IMF, is too large. To the contrary, the coefficient of the variable “government stability” is positive and highly significant. Here, the lower “government stability,” the smaller the number of conditions would be. This result is counterintuitive as one would expect more conditions (less delegation) for more unstable countries (i.e., more biased countries). This argument, however, overlooks the fact that an increase in the country’s bias has also the effect of reducing the amount of communication under centralization, thus making such decision more costly. This could explain the positive coefficient.<sup>38</sup>

The number of conditions rises with the absence of “ethnic tensions,” at the one percent level of significance. Since for all ICRG indexes higher scores indicate “better” environments, the higher the degree of tension within a country attributable to racial, nationality or language divisions, the lower the number of conditions. In other words, there is more room for delegation when a country is more complex from a social point of view and, consequently, its local knowledge is more important. The number of conditions increases with transparency and greater freedom of the press, both at the one percent level of significance. The lack of transparency and the absence of press freedom indicate the importance of the country authority’s knowledge as compared to the IMF’s knowledge. In line with our theoretical model, more transparent countries receive more conditions.

As expected, the number of conditions is positively affected by the duration of a program (i.e., by the number of quarters that a program is effective), at the one percent level of significance. Regarding the impact of IMF loan disbursements, it is interesting to compare columns 2 and 3. When we do not control for institutional quality (in column 2), the number of conditions rises with loan size. In the full model of column 3, however, programs with higher loan disbursements contain fewer conditions, at the one percent level

---

<sup>38</sup>Furthermore, the result is in line with the previous literature according to which the IMF might not want to further destabilize already weak governments by imposing numerous conditions which the government would be politically held accountable for. Stone (2008), for example, finds that the number of areas covered by conditions rises significantly with the number of seats in parliament supporting the government, while it decreases with the number of coalition members participating in the government.

of significance. Controlled for institutional quality, the result is thus in line with Drazen (2001), showing that fewer conditions are required for larger loans, since the government will find it easier to remunerate lobbies and veto players in exchange for reforms with larger loans.

Turning to the economic and political control variables, countries with lower values in their per capita GDP and higher deficits in their current account receive a greater number of conditions, both significant at the one percent level. This is consistent with the idea that more conditions are needed when the economic conditions that countries face are more difficult. Moreover, a country's bargaining power might increase with per capita income, decreasing the number of conditions. At the one percent level, the number of conditions decreases with the availability of international reserves. Apparently, countries with higher reserves are less in need of IMF support, all else equal, increasing their bargaining power.

Finally, consistent with previous studies (e.g., see Dreher and Jensen, 2007), we find that countries voting in line with the U.S. in the UN General Assembly obtain fewer conditions in their IMF programs (significant at the one percent level). Democracy, GDP growth and inflation are not significantly related to the number of conditions at conventional levels (according to the full model of column 3).

Regarding the quantitative impact of our variables of interest, the results of column 3 imply that an increase by one point on the 12-scale index of government stability increases the number of conditions by more than 4.5. An increase (decrease) by one point on the law and order (ethnic tensions) index reduces (increases) the number of conditions by 8.5 (21.6). A one percentage point increase in trade openness increases the number of conditions by 0.6; one additional category (out of 250) for which no data is reported reduces it by 1.3 ( $= (1/250) * 332$ ), while an increase by one category on the 3-scale index of press freedom increases the number of conditions by almost 10. With each additional quarter an IMF program remains in effect, almost 7 additional conditions enter.

INSERT TABLE 3

The next section tests for the robustness of these findings.

## 8 Test for robustness

In this section we replicate the analysis considering as the dependent variable the number of areas covered by an IMF program, rather than the number of conditions. To capture the scope of IMF conditionality we follow Dreher, Sturm and Vreeland (2009) and build 20 categories, allocating all conditions to one of them, with the 20th category containing the residual. These categories refer to: Arrears, Balance of Payments/Reserves, the Capital Account more broadly, Central Bank Reform, Credit to Government, Debt, Exchange system, Financial sector, Governance, Government Budget, Monetary Ceiling, Pricing, Private Sector Reforms, Privatization, Public Sector, Social, Systemic, Trade and Wages & Pensions. Clearly, these categories are to some extent arbitrary and some of them represent sub-categories of others.

The lower panel of Table 1 gives an overview about the number of areas covered by the average IMF program, overall, and split according to type of condition. As can be seen, the average IMF program covers 10 areas; 7 areas are covered by performance criteria, on average, 2 by prior actions, and 4 by structural benchmarks. The minimum number of areas covered by conditions is one; the maximum 17, and the median 10 (not shown in the table).

Table 4 reports the results.<sup>39</sup> As can be seen, they are similar to those presented in Table 3. Among our variables of interest, the exception is democracy which decreases the number of areas covered by conditionality at the five percent level according to the full model of column 3. This is again in line with our hypothesis implying that a smaller bias (due to higher democracy) would justify more delegation (i.e. fewer conditions).<sup>40</sup>

Among the covariates, the scope of conditions now increases with higher GDP growth, at the one percent level of significance. At the ten percent level, IMF loan disbursements is correlated with more areas covered by conditions. The current account balance, international reserves, and UNGA voting in line with the U.S. are not significant at conventional levels.

The coefficients imply that an increase by one point on the government stability index increases the number of areas covered by conditions by more than 0.35. An increase (decrease) by one point on the law and order (ethnic tensions) index reduces (increases) the number of areas by 0.15 (0.6). A one percentage point increase in trade openness increases the number of areas covered by conditions by 0.03; one additional category for which no data is reported reduces it by 0.03 ( $= (1/250) * 6.95$ ), while an increase in the index of press freedom by one point increases the scope of conditions by 0.5. With each additional quarter an IMF program remains in effect, 0.2 additional areas are covered. Finally, an increase in the index of democracy by one point reduces the number of areas covered by more than 0.1.

INSERT TABLE 4 HERE

## 9 Conclusions

The combination of agency problems and informational asymmetries does seriously affect the design, and thus the implementation, of multilateral conditionality. This paper has focused on the importance of the transmission of information between the IMF and a recipient country in designing the most efficient reform package, where such relationship is meant to represent the more general problem of optimal reform design by multilateral institutions.

By explicitly relating the quality of the supplied information by a recipient country to the IMF (and vice versa) to the misalignment of interests between the two agents, we have analyzed the properties of different lending schemes relative to the quality of the transmitted information and, in turn, to the quality (or quantity) of the implemented reforms. More specifically, we have compared a lending scheme in which control rights over policies are allocated to the Fund, i.e., a “centralization” scheme (or policy-based conditionality), with a lending scheme in which the recipient is left with considerable freedom to devise its own details of actions, to be ultimately judged by their outcomes, i.e., a “delegation” scheme (or outcome-based conditionality).

Our results are as follows. For a given agency bias, the informational advantage of the government must be strictly greater than the advantage of the IMF for the delegation scheme to be optimal. As the effect of the agency bias is concerned, the intuition suggests that an increase in the conflict of interests between the IMF and the government would lead towards centralization. However, since an increase in the bias also reduces the amount of information transferred by the government to the IMF under centralization, the IMF’s

---

<sup>39</sup> Again, the null hypothesis of normality is not rejected for conventional levels of significance.

<sup>40</sup> At least this effect dominates the other one, according to which higher transparency leads to tougher conditionality.



incentives to delegate may increase. Therefore, the impact of the agency bias on the optimal choice of the lending scheme is a priori undetermined.

In the empirical section we have investigated the “scope” (i.e. the degree of “intrusiveness”) of conditionality in relation to information transmission. In this context, a “narrower” conditionality is considered as a proxy for a greater degree of delegation and we defined conditionality to be “narrower” when the number of program conditions is relatively small. Controlling for countries’ characteristics, their economic performance, and for the IMF’s “political” motivations, we find that the empirical results are consistent with the theory. More specifically, the number of conditions increases for more open countries and decreases with lack of transparency and with greater social complexity. More open countries obtain more conditions because the importance of the IMF’s knowledge becomes more relevant. Less transparent countries and countries with a greater social complexity receive fewer conditions as in this case the importance of their local knowledge increases.

As the measures of the agency bias are concerned, the evidence we find is blurred, as expected. On the one hand, the number of conditions decreases with the impartiality of the legal system (confirming the intuition of a negative relationship between delegation and the agency bias). On the other hand, more conditions are assigned to more stable governments, which is counterintuitive but as well consistent with the theoretical results, when taking into account the indirect (communication) effect of an increase in the agency bias. Our empirical results provide support to the idea that, in program design, the IMF follows an allocation rule of control rights over policies, which leaves the recipient countries more freedom whenever their local knowledge appears to be particularly relevant in shaping conditions.

# Appendix

**Proof. Lemma 1** The proof follows directly from Lemma 1 in Harris and Raviv (2005).

$L^D(N, B, P)$  is continuous and increasing in  $P$ . Define  $P_n$  to be the value of  $P$  such that  $N(B, P_n)$  jumps from  $n - 1$  to  $n$ . Noting that  $N(B, P_n) = n - 1$ . At such point from (8) we obtain:

$$0 = P_n - 2Bn(n - 1),$$

solving for  $P_n$ :

$$P_n = 2Bn(n - 1), \quad (\text{A.1})$$

and we obtain:

$$L^D(n - 1, B, 2Bn(n - 1)) = \frac{(2Bn(n - 1))^2}{12(n - 1)^2} + \frac{B^2((n - 1)^2 - 1)}{3} + B^2 = \frac{2B^2n(n - 1)}{3} + B^2,$$

and

$$\begin{aligned} L^D(n, B, 2Bn(n - 1)) &= \frac{4B^2n^2(n - 1)^2}{12n^2} + \frac{B^2(n^2 - 1)}{3} + B^2 = \\ &= \frac{B^2(n - 1)^2}{3} + \frac{B^2(n^2 - 1)}{3} = \frac{2B^2n(n - 1)}{3} + B^2. \end{aligned} \quad (\text{A.2})$$

Therefore:

$$\lim_{P \rightarrow P_n^-} L^D(n - 1, B, P_n) = \lim_{P \rightarrow P_n^+} L^D(n, B, P_n).$$

This implies that  $L^D(N(B, P), B, P)$  is continuous in  $P$  although  $N(B, P)$  is not and that  $L^D(N(B, P), B, P) = L^D(n, B, P)$  for  $P \in [P_n, P_{n+1}]$ . Furthermore, since  $L^D(n, B, P)$  is increasing in  $P$ , for a fixed  $n$ , and  $L^D(N(B, P), B, P)$  is continuous in  $P$ , it follows that  $L^D(N(B, P), B, P)$  is increasing in  $P$ . ■

**Proof. Lemma 2** It follows the same argument as Lemma 1. ■

**Proof. Proposition 2** The proof follows directly from Theorem 1 in Harris and Raviv (2005).

The IMF prefers centralization iff  $P \geq P(A, B)$ , where  $P(A, B)$  is given by:

$$P(A, B) = \left\{ \begin{array}{l} \sqrt{(8B^2n^3 - 16B^2n^2 + A^2)\frac{n-1}{n}}, \text{ if } A \in [P_n, \widehat{A}_n] \\ [A^2 - 12n^2B^2]^{\frac{1}{2}}, \text{ if } A \in [\widehat{A}_n, P_{n+1}] \end{array} \right\},$$

where  $n = N(B, A)$ ,  $P_{N(B, A)}$  is defined by (A.1),  $\widehat{A}_{N(B, A)}$  is defined by (A.3) below. Furthermore,  $P(A, B)$  is increasing and continuous in  $A$ , and for any  $B$ ,  $P(A, B) \leq [\max\{-12B^2 + A^2, 0\}]^{\frac{1}{2}}$ , then  $P(A, B) < A$ , for all  $B$ .

Define  $A = \widehat{A}_n$  such that the IMF is indifferent between delegation (with  $P = P_n$ ) and centralization (with  $A = \widehat{A}_n$ ).

$$L^D(n - 1, B, P_n) = L^D(n, B, \widehat{A}_n),$$

and

$$B^2 + \frac{2B^2n(n - 1)}{3} = \frac{\widehat{A}_n^2}{12n^2} + \frac{B^2(n^2 - 1)}{3}.$$

Solving for  $\widehat{A}_n$ , we obtain:

$$\widehat{A}_n = 2Bn(n^2 - 2n + 4)^{\frac{1}{2}}. \quad (\text{A.3})$$

It can be verified that:

$$P_n \leq \widehat{A}_n \leq P_{n+1}.$$

Suppose that  $A \in [P_n, \widehat{A}_n]$  and  $P$  is such that the IMF is indifferent between centralization and delegation. Then  $P$  must satisfy

$$L^D(n-1, B, P) = L^D(n, B, A),$$

and

$$\frac{P^2}{12(n-1)^2} + \frac{B^2((n-1)^2 - 1)}{3} + B^2 = \frac{A^2}{12(n)^2} + \frac{B^2(n^2 - 1)}{3}.$$

Thus, it follows that

$$P = \sqrt{(8B^2n^3 - 16B^2n^2 + A^2)} \frac{n-1}{n}. \quad (\text{A.4})$$

Now suppose that  $A \in [\widehat{A}_n, P_{n+1}]$  and  $P$  is such that the IMF is indifferent between centralization and delegation. In this case:

$$L^D(n, B, P_n) = L^D(n, B, A),$$

and:

$$\frac{P^2}{12(n)^2} + \frac{B^2((n)^2 - 1)}{3} + B^2 = \frac{A^2}{12(n)^2} + \frac{B^2(n^2 - 1)}{3}.$$

Thus, it follows:

$$P = \sqrt{(-12B^2n^2 + A^2)}. \quad (\text{A.5})$$

Combining (A.4) and (A.5) yields the  $P(A, B)$  given in the statement of the Proposition. It is easy to check that this function is continuous in  $A$ . The IMF prefers centralization iff

$$L^D(N(B, P), B, P) \geq L^C(N(B, A), B, A).$$

By definition of  $P(A, B)$ :

$$L^D(N(B, P(A, B)), B, P(A, B)) = L^C(N(B, A), B, A),$$

which implies that the IMF prefers centralization iff

$$L^D(N(B, P), B, P) \geq L^D(N(B, P(A, B)), B, P(A, B)).$$

Using Lemma 1, the IMF prefers centralization iff  $P \geq P(A, B)$ .

Now suppose  $A \in [0, \widehat{A}_1]$ , from (A.4)  $P(A, B) = 0$ ; for all  $A \geq \widehat{A}_1$  from (A.5)  $P(A, B) \leq \max \left\{ \sqrt{(-12B^2 + A^2)}, 0 \right\} < A$ . For  $A \in [P_n, \widehat{A}_n]$  for some  $n \geq 2$  we want to show that:

$$P(A, B) = \sqrt{(8B^2n^3 - 16B^2n^2 + A^2)} \frac{n-1}{n} \leq A.$$

It will suffice to show that this is true for  $A = P_n$ . Using (A.1) and substituting we obtain:

$$2Bn\sqrt{n^2 - 3} < 2Bn^2,$$

which is always true for  $n \geq 2$ . ■

## References

- [1] Aghion, Philippe, and Jean Tirole. 1997. "Formal and Real Authorities in Organization." *Journal of Political Economy*, 105: 1-29.
- [2] Alesina, Alberto, and Allan Drazen. 1991. "Why Are Stabilizations Delayed?" *American Economic Review*, 81: 1170-1188.
- [3] Beck, Nathaniel, and Jonathan N. Katz. 1995. "What to do (and not to do) with Time-Series Cross-Section Data." *American Political Science Review*, 89: 634-647.
- [4] Besley, Tim, and Anne Case. 1995. "Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits." *Quarterly Journal of Economics*, 110: 769-798.
- [5] Blustein, Paul. 2003. *The Chastening. Inside the Crisis that rocked the global financial system and humbled the IMF*. New York: Public Affairs.
- [6] Copelovitch, Mark. 2009. Forthcoming. "Master or Servant? Common Agency and the Political Economy of IMF Lending." *International Studies Quarterly*.
- [7] Crawford, Vincent, and Joel Sobel. 1982. "Strategic Information Transmission." *Econometrica*, 50, 1431-1451.
- [8] Dessein, Wouter. 2002. "Authority and Communication in Organizations." *Review of Economic Studies*, 69, 811-838.
- [9] Dixit, Avinash. 2000. "IMF Programs as Incentive mechanism." Unpublished.
- [10] Dixit, Avinash. 2009. "Governance, Institutions and Economic Activity." *American Economic Review*, 99, 5-24.
- [11] Drazen, Allan. 2001. "Conditionality and Ownership in IMF Lending: A Political Economy approach." Unpublished.
- [12] Drazen, Allan, and Paul Isard. 2004. "Can public discussion enhance program "ownership"? Unpublished.
- [13] Dreher, Axel, and Nathan M. Jensen. 2007. "Independent Actor or Agent? An Empirical Analysis of the Impact of U.S. Interests on IMF Conditions." *Journal of Law and Economics*, 50, 105-124.
- [14] Dreher, Axel, Jan-Egbert Sturm, and James R. Vreeland. 2006. Forthcoming. "Global Horse Trading: IMF loans for votes in the United Nations Security Council." *European Economic Review*.
- [15] Dreher, Axel, Jan-Egbert Sturm, and James R. Vreeland. 2009. "UNSC membership and IMF conditions." Unpublished.
- [16] Easterly, William. 2006. *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good*. London: The Penguin Press.
- [17] Easterly, William. 2008. "Institutions: Top Down or Bottom Up?" *American Economic Review, Papers and Proceedings*, 98, 95-99.
- [18] Fernandez, Raquel, and Dani Rodrik. 1991. "Resistance to Reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty." *American Economic Review*, 81, 1146-1155.

- [19] Freedom House. 2006. Freedom of the Press Index, [www.freedomhouse.org](http://www.freedomhouse.org) (accessed December 02, 2008).
- [20] Gould, Erica R. 2003. "Money Talks: Supplemental Financiers and International Monetary Fund Conditionality." *International Organization* 57, 3: 551-586.
- [21] Harris, Milton, and Arthur Raviv. 2005. "Allocation of Decision Making Authority." *Review of Finance*, 9, 353-383.
- [22] Harris, Milton, and Arthur Raviv. 2008. "A theory of Board Control and Size." *Review of Financial Studies*, 21(4), 1797-1832.
- [23] International Monetary Fund. 2001. "Conditionality in Fund-supported programs: Policy issues." Policy development and Review Department. International Monetary Fund. Washington DC.
- [24] Ivanova, Anna; Wolfgang Mayer; Alex Mourmouras, and George Anayiotos. 2005. "What Determines the Implementation of IMF-Supported Programs?" In *IMF-Supported Programs: Assessing Program Design, Implementation, and Effectiveness*, Chapter 10, ed. Ashoka Mody and Alessandro Rebucci, 160-186. Washington, DC: International Monetary Fund.
- [25] Ivanova, Anna. 2006. "Outcome-Based Conditionality: its role and optimal design." IMF Working Paper 128.
- [26] Khan, Mohsin S., and Sunil Sharma. 2001. "IMF Conditionality and Country Ownership of Programs." IMF Working Paper 142.
- [27] Kilby, Christopher. 2006. "Donor Influence in Multilateral Development Banks: The Case of the Asian Development Bank." *Review of International Organizations*, 2, 173-159.
- [28] Kuziemko, Ilyana, and Eric Werker. 2006. "How much is a Seat on the Security Council Worth? Foreign Aid and Bribery at the United Nations." *Journal of Political Economy*, 114, 905-930.
- [29] Marchesi, Silvia, and Laura Sabani. 2007a. "IMF concern for reputation and conditional lending failure: theory and empirics." *Journal of Development Economics*, 84, 640-666.
- [30] Marchesi, Silvia, and Laura Sabani. 2007b. "Prolonged use and conditionality failure: investigating the IMF responsibility." In *Advancing Development: Core Themes in Global Economics*, eds. George Mavrotas and Anthony Shorrocks, 319-332. London, New York: Palgrave-Macmillan.
- [31] Marshall, Monty G., and Keith Jagers. 2009. *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2007*. University of Maryland.
- [32] Mayer, Wolfgang, and Alex Mourmouras. 2008. "IMF conditionality: An approach based on the theory of special interest politics." *Review of International Organizations*, 3, 2: 105-121.
- [33] Mosley, Paul. 1987. "Conditionality as Bargaining Process: Structural-Adjustment Lending 1980-86." Princeton N.J.: *Essays in International Finance*, No. 168.
- [34] Mussa, Michael, and Miguel A. Savastano. 1999. "The IMF Approach to Economic Stabilization." In *NBER Macroeconomics Annual 1999*, eds. Ben S. Bernanke and Julio J. Rotemberg, 79-122. Cambridge, MA: MIT Press.

- [35] Nsouli, Saleh, Rouben Atoian, and Alex Mourmouras. 2005. "Institutions, program implementation and macroeconomics performance." In *IMF-supported programs: assessing program design, implementation and effectiveness*, chap 9, ed. Ashoka Mody and Alessandro Rebucci, Washington DC: International Monetary Fund.
- [36] PRS Group. 1998. International Country Risk Guide (ICRG), 19, 4. Syracuse, NY: IBC. <http://www.prsgroup.com>.
- [37] Rajan, Raghuran. 2008. "The future of the IMF and the World Bank" *American Economic Review, Papers and Proceedings*, 98, 110-115.
- [38] Rosendorff, B. Peter, and James R. Vreeland. 2008. "Democracy and Data Dissemination: The Effect of Political Regime on Transparency." Unpublished.
- [39] Steinwand, Martin, and Randall Stone. 2008. "The International Monetary Fund: A Review of the Recent Evidence." *Review of International Organizations*, 3(2),123-149.
- [40] Stone, Randall. 2008. "The Scope of IMF Conditionality: How Autonomous is the Fund?" *International Organization*, 62, 589-620.
- [41] Svensson, Jakob. 2000. "When Is Foreign Aid Policy Credible? Aid Dependence and Conditionality." *Journal of Development Economics*, 61, 61-80.
- [42] Tabellini, Guido, and Alberto Alesina. 1990. "Voting on the budget deficit." *American Economic Review*, 80, 37-49.
- [43] Vaubel, Roland. 1986. "A Public choice approach to international organizations." *Public Choice*, 51, 39-57.
- [44] Vaubel, Roland. 2006. "Principal-Agent Problems in International Organizations." *Review of International Organizations*, 1(2), 125-138.
- [45] Voeten, Eric. 2004. Documenting Votes in the UN General Assembly, <http://home.gwu.edu/~voeten/UNVoting.htm>.
- [46] Vreeland, James R. 2006. "IMF program compliance: Aggregate index versus policy specific research strategies." *Review of International Organizations*, 4 (1), 359-378.
- [47] World Bank. 2008. World Development Indicators, CD-Rom. Washington, D.C.

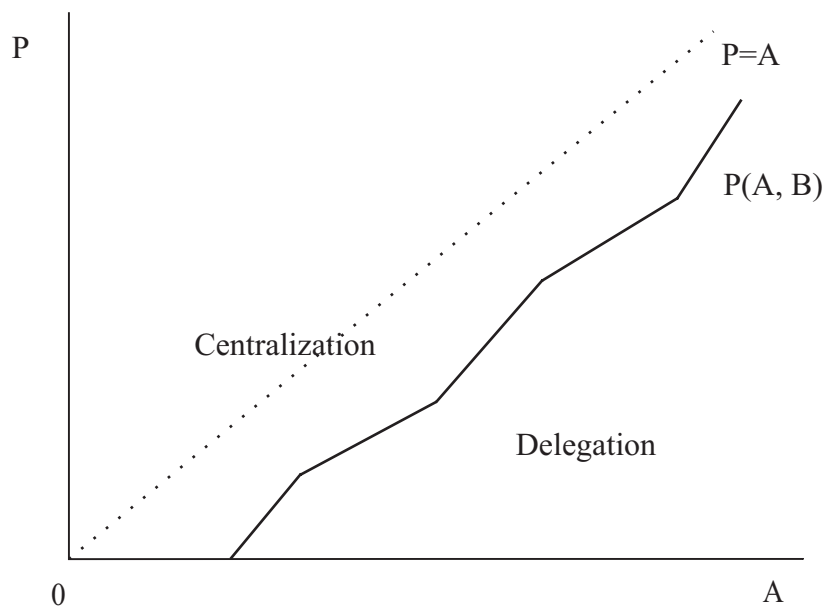


Figure 1: Choice among centralization and delegation as a function of  $A$  and  $P$

**Table 1: Descriptive Statistics**

	EFF	SBA	SAF	ESAF	PRGF	all
Number of programs	28	131	3	66	77	305
Avg. number of quarters	10	5	7	10	10	8.4
<b>Total</b>						
Number of conditions	3357	7534	108	5527	6012	22538
Performance criteria	2353	5353	67	3171	3772	14716
Prior actions	470	805	0	581	692	2548
Structural benchmarks	534	1376	41	1775	1548	5274
<b>Average</b>						
Number of conditions	12	12	5	8	8	9
Performance criteria	8	8	3	5	5	6
Prior actions	2	1	0	1	1	1
Structural benchmarks	2	2	2	3	2	2
<b>Number of areas covered by conditionality</b>						
Total	10	9	9	13	11	10
Performance criteria	7	6	6	10	8	7
Prior actions	3	2	0	2	3	2
Structural benchmarks	4	3	4	6	5	4

Note: "Average" indicates the average number of conditions per quarter a program is in effect.



**Table 2: Sources and Definitions**

	<b>Variables</b>	<b>Definition</b>	<b>Source</b>
<b>ECONOMIC</b>			
	Log of per capita income	GDP per capita (constant 2000 US\$)	WDI, WB (2008)
	GDP growth	GDP growth (annual %)	WDI, WB (2008)
	Rate of inflation	Inflation, consumer prices (annual %)	WDI, WB (2008)
	International reserves (to imports)	Total reserves in months of imports	WDI, WB (2008)
	Current account balance	Current account balance (% of GDP)	WDI, WB (2008)
<b>POLITICAL</b>			
	Voting in line with the U.S. in the UNGA	Percentage of votes within a year inline with the U.S.	Based on Voeten (2004)
<b>BIAS</b>			
<b>Institutional Capacity and Complexity</b>			
	Government stability	Government Stability, annual averages	ICRG (1984-2005)
	Law and order	Law and Order, annual averages	ICRG (1984-2005)
	Bureaucracy quality	Bureaucracy Quality, annual averages	
	Ethnic tension	Ethnic Tensions, annual averages	ICRG (1984-2005)
	Democracy	Polity2 score taken from the Polity IV dataset	Marshall and Jagers (2009)
<b>Externalities</b>			
	Trade	Exports plus imports (% of GDP)	WDI, WB (2008)
<b>LOCAL KNOWLEDGE</b>			
<b>Transparency</b>			
	Democracy	Polity2 score taken from the Polity IV dataset	Marshall and Jagers (2009)
	Press freedom	Freedom of the press index	Freedom House (2006)
	Missing data	Share in 250 Economics data series for which no data reported	WDI, WB (2008)
<b>Complexity</b>			
	Ethnic tension	Annual averages	ICRG (1984-2005)
<b>IMF KNOWLEDGE</b>			
Government officials			
	Bureaucracy quality	Bureaucracy Quality, annual averages	ICRG (1984-2005)
<b>Externalities</b>			
	See above		

**Table 3: Number of IMF Conditions, GLS, 1992-2005**

	(1)	(2)	(3)
Government Stability	3.966*** (4.53)		4.537*** (4.87)
Law and Order	-8.602*** (-5.20)		-8.511*** (-4.85)
Bureaucratic Quality	-2.737** (-2.20)		-1.444 (-1.38)
Ethnic Tensions	14.656*** (8.12)		21.602*** (10.5)
Democracy	0.289 (0.38)		-0.063 (-0.077)
Press Freedom	3.894 (0.88)		9.711*** (2.64)
Trade (percent of GDP)	-0.145 (-0.96)		0.599*** (5.01)
Lack of Transparency	-226.699*** (-8.81)		-331.617*** (-15.8)
IMF loans (share of GDP)	-0.473 (-0.0073)	98.392** (2.46)	-185.548*** (-2.89)
Number of Quarters	5.756*** (10.3)	6.251*** (23.5)	6.773*** (15.0)
(log) GDP p.c.		-12.374 (-0.92)	-140.052*** (-10.3)
GDP growth		-1.030*** (-4.59)	-0.712 (-1.61)
Current Account Balance (percent of GDP)		-0.251*** (-3.52)	-0.849*** (-2.65)
Reserves (percent of imports)		1.894 (1.63)	-3.289*** (-3.05)
Inflation		-30.434*** (-3.13)	-25.021 (-1.14)
UNGA voting		-78.654*** (-4.77)	-99.940*** (-4.34)
Number of observations	167	216	145
Number of countries	54	67	47

Absolute value of z statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Note: Higher values for government stability, law and order, bureaucratic quality, ethnic tensions, democracy, and press freedom indicate "better" values.

**Table 4: Areas covered by IMF Conditions, GLS, 1992-2005**

	(1)	(2)	(3)
Government Stability	0.272*** (6.36)		0.351*** (6.07)
Law and Order	-0.278*** (-3.82)		-0.154* (-1.89)
Bureaucratic Quality	-0.254*** (-4.99)		-0.061 (-0.99)
Ethnic Tensions	0.687*** (8.85)		0.597*** (5.06)
Democracy	-0.044 (-1.16)		-0.111** (-2.06)
Press Freedom	0.263 (1.41)		0.489* (1.93)
Trade (percent of GDP)	0.009 (1.43)		0.034*** (4.83)
Lack of Transparency	-5.965*** (-4.90)		-6.953*** (-3.27)
IMF loans (share of GDP)	5.493* (1.88)		7.151* (1.85)
Number of Quarters	0.225*** (11.8)	0.194*** (11.6)	0.219*** (7.92)
(log) GDP p.c.		-1.719*** (-3.43)	-5.739*** (-4.46)
GDP growth		0.052*** (5.86)	0.085*** (4.74)
Current Account Balance (percent of GDP)		-0.043*** (-4.89)	-0.027 (-1.32)
Reserves (percent of imports)		0.010 (0.16)	0.076 (0.65)
Inflation		0.507 (1.04)	0.388 (0.33)
UNGA voting		-3.448*** (-5.27)	-0.631 (-0.43)
Number of observations	167	221	145
Number of countries	54	68	47

Absolute value of z statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Note: Higher values for government stability, law and order, bureaucratic quality, ethnic tensions, democracy, and press freedom indicate "better" values.

**Appendix: Descriptive Statistics (Estimation sample of column 3, Table 3)**

Variable	Min	Max	Mean	St.Dev.
Number of Conditions	14	349	73.63	47.87
Areas covered by Conditions	4	16	9.88	2.94
Government stability	3.67	12	7.87	1.97
Law and order	2	12	6.63	2.12
Bureaucracy quality	3	10.63	5.53	2.1
Ethnic tension	2	12	8.19	2.52
Democracy	-7	10	4.52	5.15
Press freedom	0	3	2	0.68
Trade (percent of GDP)	14.73	222.88	72.99	37.86
Lack of Transparency	0.01	0.46	0.13	0.09
IMF loans (share of GDP)	0	0.37	0.04	0.05
Number of Quarters	3	18	9.95	4.29
(log) GDP p.c.	4.82	9.01	6.97	1.07
GDP growth	-11.03	16.73	3.3	4.31
Current account balance (percent of GDP)	-44.84	19.75	-3.19	7.71
International reserves (percent of imports)	0.04	11.08	3.63	2.33
Inflation	-0.08	0.9	0.14	0.15
Voting in line with the U.S. in the UNGA	0.16	0.63	0.37	0.11

**Appendix: Correlations of the variables (Estimation sample of column 3, Table 3)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) Number of Conditions	1																	
(2) Areas covered by Conditions	0.53	1																
(3) Government stability	0.39	0.26	1															
(4) Law and order	0.06	-0.02	0.04	1														
(5) Bureaucracy quality	-0.18	-0.24	-0.07	0.25	1													
(6) Ethnic tension	0.14	-0.14	0.07	0.39	0.07	1												
(7) Democracy	0.02	-0.24	0.04	0.05	0.00	0.24	1											
(8) Press freedom	-0.05	-0.21	-0.08	0.19	0.15	0.24	0.55	1										
(9) Trade (% of GDP)	-0.04	0.11	0.06	0.15	0.11	0.02	0.14	0.24	1									
(10) Lack of transparency	-0.07	0.07	-0.13	-0.11	-0.25	-0.11	-0.05	0.03	0.17	1								
(11) (log) GDP p.c.	-0.12	-0.51	0.05	0.21	0.38	0.46	0.36	0.40	0.10	-0.33	1							
(12) GDP growth	0.01	0.14	0.00	0.02	-0.26	-0.01	-0.07	-0.09	-0.06	0.01	-0.11	1						
(13) Current account balance (% of GDP)	0.06	-0.07	0.16	0.00	0.22	0.03	-0.08	-0.02	-0.02	0.00	0.21	-0.05	1					
(14) International reserves (% of imports)	-0.02	-0.15	0.16	0.13	0.04	0.16	0.13	0.10	-0.24	-0.36	0.26	0.11	0.15	1				
(15) Inflation	-0.08	0.08	-0.37	0.13	-0.05	0.08	0.10	0.00	0.06	0.21	-0.10	-0.27	0.01	-0.14	1			
(16) Voting in line with the U.S. in the UNGA	-0.14	-0.15	-0.25	0.51	0.13	0.29	0.23	0.22	0.12	0.10	0.25	-0.13	-0.14	-0.07	0.47	1		
(17) IMF loans (share of GDP)	0.20	0.28	0.00	0.09	-0.10	-0.01	-0.05	-0.06	0.32	0.05	-0.26	-0.02	-0.21	-0.12	0.15	-0.05	1	
(18) Number of Quarters	0.44	0.53	0.29	-0.08	-0.24	-0.12	-0.19	-0.16	0.01	0.12	-0.46	0.22	-0.10	0.00	-0.16	-0.26	0.34	1

## **Bisher erschienene Diskussionspapiere**

- Nr. 86: Marchesi, Silvia; Sabani, Laura; Dreher, Axel: Read my lips: the role of information transmission in multilateral reform design, Juni 2009
- Nr. 85: Heinig, Hans Michael: Sind Referenden eine Antwort auf das Demokratiedilemma der EU?, Juni 2009
- Nr. 84: El-Shagi, Makram: The Impact of Fixed Exchange Rates on Fiscal Discipline, Juni 2009
- Nr. 83: Schneider, Friedrich: Is a Federal European Constitution for an Enlarged European Union Necessary? Some Preliminary Suggestions using Public Choice Analysis, Mai 2009
- Nr. 82: Vaubel, Roland: Nie sollst Du mich befragen? Weshalb Referenden in bestimmten Politikbereichen – auch in der Europapolitik – möglich sein sollten, Mai 2009
- Nr. 81: Williamson, Jeffrey G.: History without Evidence: Latin American Inequality since 1491, Mai 2009
- Nr. 80: Erdogan, Burcu: How does the European Integration affect the European Stock Markets?, April 2009
- Nr. 79: Oelgemöller, Jens; Westermeier, Andreas: RCAs within Western Europe, März 2009
- Nr. 78: Blonski, Matthias; Lilienfeld-Toal, Ulf von: Excess Returns and the Distinguished Player Paradox, Oktober 2008
- Nr. 77: Lechner, Susanne; Ohr, Renate: The Right of Withdrawal in the Treaty of Lisbon: A game theoretic reflection on different decision processes in the EU, Oktober 2008
- Nr. 76: Kühl, Michael: Strong comovements of exchange rates: Theoretical and empirical cases when currencies become the same asset, Juli 2008
- Nr. 75: Höhenberger, Nicole; Schmiedeberg, Claudia: Structural Convergence of European Countries, Juli 2008
- Nr. 74: Nowak-Lehmann D., Felicitas; Vollmer, Sebastian; Martinez-Zarzoso, Inmaculada: Does Comparative Advantage Make Countries Competitive? A Comparison of China and Mexico, Juli 2008
- Nr. 73: Fendel, Ralf; Lis, Eliza M.; Rülke, Jan-Christoph: Does the Financial Market Believe in the Phillips Curve? – Evidence from the G7 countries, Mai 2008
- Nr. 72: Hafner, Kurt A.: Agglomeration Economies and Clustering – Evidence from German Firms, Mai 2008
- Nr. 71: Pegels, Anna: Die Rolle des Humankapitals bei der Technologieübertragung in Entwicklungsländer, April 2008
- Nr. 70: Grimm, Michael; Klasen, Stephan: Geography vs. Institutions at the Village Level, Februar 2008
- Nr. 69: Van der Berg, Servaas: How effective are poor schools? Poverty and educational outcomes in South Africa, Januar 2008
- Nr. 68: Kühl, Michael: Cointegration in the Foreign Exchange Market and Market Efficiency since the Introduction of the Euro: Evidence based on bivariate Cointegration Analyses, Oktober 2007
- Nr. 67: Hess, Sebastian; Cramon-Taubadel, Stephan von: Assessing General and Partial Equilibrium Simulations of Doha Round Outcomes using Meta-Analysis, August 2007
- Nr. 66: Eckel, Carsten: International Trade and Retailing: Diversity versus Accessibility and the Creation of “Retail Deserts”, August 2007
- Nr. 65: Stoschek, Barbara: The Political Economy of Environmental Regulations and Industry Compensation, Juni 2007

- Nr. 64: Martínez-Zarzoso, Inmaculada; Nowak-Lehmann D., Felicitas; Vollmer, Sebastian: The Log of Gravity Revisited, Juni 2007
- Nr. 63: Gundel, Sebastian: Declining Export Prices due to Increased Competition from NIC – Evidence from Germany and the CEEC, April 2007
- Nr. 62: Wilckens, Sebastian: Should WTO Dispute Settlement Be Subsidized?, April 2007
- Nr. 61: Schöllner, Deborah: Service Offshoring: A Challenge for Employment? Evidence from Germany, April 2007
- Nr. 60: Janeba, Eckhard: Exports, Unemployment and the Welfare State, März 2007
- Nr. 59: Lambsdorff, Johann Graf; Nell, Mathias: Fighting Corruption with Asymmetric Penalties and Leniency, Februar 2007
- Nr. 58: Köller, Mareike: Unterschiedliche Direktinvestitionen in Irland – Eine theoriegestützte Analyse, August 2006
- Nr. 57: Entorf, Horst; Lauk, Martina: Peer Effects, Social Multipliers and Migrants at School: An International Comparison, März 2007 (revidierte Fassung von Juli 2006)
- Nr. 56: Görlich, Dennis; Trebesch, Christoph: Mass Migration and Seasonality Evidence on Moldova's Labour Exodus, Mai 2006
- Nr. 55: Brandmeier, Michael: Reasons for Real Appreciation in Central Europe, Mai 2006
- Nr. 54: Martínez-Zarzoso, Inmaculada; Nowak-Lehmann D., Felicitas: Is Distance a Good Proxy for Transport Costs? The Case of Competing Transport Modes, Mai 2006
- Nr. 53: Ahrens, Joachim; Ohr, Renate; Zeddies, Götz: Enhanced Cooperation in an Enlarged EU, April 2006
- Nr. 52: Stöwhase, Sven: Discrete Investment and Tax Competition when Firms shift Profits, April 2006
- Nr. 51: Pelzer, Gesa: Darstellung der Beschäftigungseffekte von Exporten anhand einer Input-Output-Analyse, April 2006
- Nr. 50: Elschner, Christina; Schwager, Robert: A Simulation Method to Measure the Tax Burden on Highly Skilled Manpower, März 2006
- Nr. 49: Gaertner, Wulf; Xu, Yongsheng: A New Measure of the Standard of Living Based on Functionings, Oktober 2005
- Nr. 48: Rincke, Johannes; Schwager, Robert: Skills, Social Mobility, and the Support for the Welfare State, September 2005
- Nr. 47: Bose, Niloy; Neumann, Rebecca: Explaining the Trend and the Diversity in the Evolution of the Stock Market, Juli 2005
- Nr. 46: Kleinert, Jörn; Toubal, Farid: Gravity for FDI, Juni 2005
- Nr. 45: Eckel, Carsten: International Trade, Flexible Manufacturing and Outsourcing, Mai 2005
- Nr. 44: Hafner, Kurt A.: International Patent Pattern and Technology Diffusion, Mai 2005
- Nr. 43: Nowak-Lehmann D., Felicitas; Herzer, Dierk; Martínez-Zarzoso, Inmaculada; Vollmer, Sebastian: Turkey and the Ankara Treaty of 1963: What can Trade Integration Do for Turkish Exports, Mai 2005
- Nr. 42: Südekum, Jens: Does the Home Market Effect Arise in a Three-Country Model?, April 2005
- Nr. 41: Carlberg, Michael: International Monetary Policy Coordination, April 2005
- Nr. 40: Herzog, Bodo: Why do bigger countries have more problems with the Stability and Growth Pact?, April 2005
- Nr. 39: Marouani, Mohamed A.: The Impact of the Multifiber Agreement Phaseout on Unemployment in Tunisia: a Prospective Dynamic Analysis, Januar 2005

- Nr. 38: Bauer, Philipp; Riphahn, Regina T.: Heterogeneity in the Intergenerational Transmission of Educational Attainment: Evidence from Switzerland on Natives and Second Generation Immigrants, Januar 2005
- Nr. 37: Büttner, Thiess: The Incentive Effect of Fiscal Equalization Transfers on Tax Policy, Januar 2005
- Nr. 36: Feuerstein, Switgard; Grimm, Oliver: On the Credibility of Currency Boards, Oktober 2004
- Nr. 35: Michaelis, Jochen; Minich, Heike: Inflationsdifferenzen im Euroraum – eine Bestandsaufnahme, Oktober 2004
- Nr. 34: Neary, J. Peter: Cross-Border Mergers as Instruments of Comparative Advantage, Juli 2004
- Nr. 33: Bjorvatn, Kjetil; Cappelen, Alexander W.: Globalisation, inequality and redistribution, Juli 2004
- Nr. 32: Stremmel, Dennis: Geistige Eigentumsrechte im Welthandel: Stellt das TRIPs-Abkommen ein Protektionsinstrument der Industrieländer dar?, Juli 2004
- Nr. 31: Hafner, Kurt: Industrial Agglomeration and Economic Development, Juni 2004
- Nr. 30: Martinez-Zarzoso, Inmaculada; Nowak-Lehmann D., Felicitas: MERCOSUR-European Union Trade: How Important is EU Trade Liberalisation for MERCOSUR's Exports?, Juni 2004
- Nr. 29: Birk, Angela; Michaelis, Jochen: Employment- and Growth Effects of Tax Reforms, Juni 2004
- Nr. 28: Broll, Udo; Hansen, Sabine: Labour Demand and Exchange Rate Volatility, Juni 2004
- Nr. 27: Bofinger, Peter; Mayer, Eric: Monetary and Fiscal Policy Interaction in the Euro Area with different assumptions on the Phillips curve, Juni 2004
- Nr. 26: Torlak, Elvira: Foreign Direct Investment, Technology Transfer and Productivity Growth in Transition Countries, Juni 2004
- Nr. 25: Lorz, Oliver; Willmann, Gerald: On the Endogenous Allocation of Decision Powers in Federal Structures, Juni 2004
- Nr. 24: Felbermayr, Gabriel J.: Specialization on a Technologically Stagnant Sector Need Not Be Bad for Growth, Juni 2004
- Nr. 23: Carlberg, Michael: Monetary and Fiscal Policy Interactions in the Euro Area, Juni 2004
- Nr. 22: Stähler, Frank: Market Entry and Foreign Direct Investment, Januar 2004
- Nr. 21: Bester, Helmut; Konrad, Kai A.: Easy Targets and the Timing of Conflict, Dezember 2003
- Nr. 20: Eckel, Carsten: Does globalization lead to specialization, November 2003
- Nr. 19: Ohr, Renate; Schmidt, André: Der Stabilitäts- und Wachstumspakt im Zielkonflikt zwischen fiskalischer Flexibilität und Glaubwürdigkeit: Ein Reform-ansatz unter Berücksichtigung konstitutionen- und institutionenökonomischer Aspekte, August 2003
- Nr. 18: Ruehmann, Peter: Der deutsche Arbeitsmarkt: Fehlentwicklungen, Ursachen und Reformansätze, August 2003
- Nr. 17: Suedekum, Jens: Subsidizing Education in the Economic Periphery: Another Pitfall of Regional Policies?, Januar 2003
- Nr. 16: Graf Lambsdorff, Johann; Schinke, Michael: Non-Benevolent Central Banks, Dezember 2002
- Nr. 15: Ziltener, Patrick: Wirtschaftliche Effekte des EU-Binnenmarktprogramms, November 2002
- Nr. 14: Haufler, Andreas; Wooton, Ian: Regional Tax Coordination and Foreign Direct Investment, November 2001
- Nr. 13: Schmidt, André: Non-Competition Factors in the European Competition Policy: The Necessity of Institutional Reforms, August 2001



- Nr. 12: Lewis, Mervyn K.: Risk Management in Public Private Partnerships, Juni 2001
- Nr. 11: Haaland, Jan I.; Wooton, Ian: Multinational Firms: Easy Come, Easy Go?, Mai 2001
- Nr. 10: Wilkens, Ingrid: Flexibilisierung der Arbeit in den Niederlanden: Die Entwicklung atypischer Beschäftigung unter Berücksichtigung der Frauenerwerbstätigkeit, Januar 2001
- Nr. 9: Graf Lambsdorff, Johann: How Corruption in Government Affects Public Welfare – A Review of Theories, Januar 2001
- Nr. 8: Angermüller, Niels-Olaf: Währungskrisenmodelle aus neuerer Sicht, Oktober 2000
- Nr. 7: Nowak-Lehmann, Felicitas: Was there Endogenous Growth in Chile (1960-1998)? A Test of the AK model, Oktober 2000
- Nr. 6: Lunn, John; Steen, Todd P.: The Heterogeneity of Self-Employment: The Example of Asians in the United States, Juli 2000
- Nr. 5: Güßefeldt, Jörg; Streit, Clemens: Disparitäten regionalwirtschaftlicher Entwicklung in der EU, Mai 2000
- Nr. 4: Haufler, Andreas: Corporate Taxation, Profit Shifting, and the Efficiency of Public Input Provision, 1999
- Nr. 3: Rühmann, Peter: European Monetary Union and National Labour Markets, September 1999
- Nr. 2: Jarchow, Hans-Joachim: Eine offene Volkswirtschaft unter Berücksichtigung des Aktienmarktes, 1999
- Nr. 1: Padoa-Schioppa, Tommaso: Reflections on the Globalization and the Europeanization of the Economy, Juni 1999

Alle bisher erschienenen Diskussionspapiere zum Download finden Sie im Internet unter: <http://www.uni-goettingen.de/de/60920.html>.