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Outcome-Based Conditionality: The Role and Optimal Design

Anna Ivanova
International Monetary Fund

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Anna Ivanova[1]
International Monetary Fund

Abstract

The paper offers a formal model of outcomes-based conditionality from a principle-agent perspective. The results suggest that conditioning IMF finance on outcomes is a good option when opposition to reforms is relatively weak and when the IMF offers financing on market terms. With strong opposition, the benefits from outcomes-based conditionality are less clear and its role and optimal design depend on the type of opposition and terms of IMF financing. To be able to use conditionality as an incentive tool, the IMF would have to offer a loan with an element of a subsidy. The equilibrium policy choice is determined by the competitive power of the IMF versus the domestic lobby. Unobservability, however, weakens IMF's competitive power and the only "player", who never loses from the fact that the IMF does not monitor government decisions, is the lobby.

Introduction

International Monetary Fund (IMF) programs are in essence incentive schemes[2]. The country is "rewarded" with IMF financing if it implements certain policies and achieves certain outcomes. For an IMF program to be successful, its conditionality should be designed in a way that provides the government with the "right" incentives to adopt necessary policy changes. In other words, the government should be willing to implement reforms. This willingness is often referred to as ownership of a reform program[3].

One of the proposals to enhance program ownership through conditionality design is greater use of outcomes-based conditionality[4] under which IMF financing is conditional on the member country meeting particular targets or objectives rather than implementing specific actions (policies). Outcome-based conditionality is viewed as "reducing the perception of micro-management of countries' economic policies and helping foster and build on country

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[2] This view of IMF conditionality was first suggested in Dixit (2000a).

[3] A formal definition of ownership adopted by the IMF is as follows: "Ownership is a willing assumption of responsibility for an agreed upon program of policies, by officials in the borrowing country who have the responsibility to formulate and carry out those policies, based on an understanding that the program is achievable and is in the country's own interest" (IMF (2001a)).

[4]The approach was advocated by Carlos Diaz-Alejandro (1984), and discussed in Khan and Sharma (2001), IMF, (2001e) and IMF (2002b).

ownership, by giving the authorities greater flexibility to design their own economic policies" (IMF (2002b)). Also, drawing on the risk-sharing result of the standard principal-agent model with unobservable action, IMF (2002b) concludes that making financing conditional on outcome would strengthen the incentives of the authorities to achieve a better outcome. Ideally, conditionality should be designed in a way that insures that the outcomes are not achieved by unsustainable or inappropriate policies[5].

From a practical point of view, moving towards greater use of outcome-based conditionality[6] in some cases has clear disadvantages since the results of certain reforms may not be seen for a long time and delaying financing until then may be difficult when financial crisis is imminent. Hence, outcomes-based conditionality is likely to be more appropriate for medium and longer term. Many currently quantitative target (such reserve target) currently employed by the IMF are in effect outcomes-based conditions. But greater flexibility in making policy decisions for authorities comes at a cost of greater risk: any unfavorable outcome, including the one that is a result of exogenous influences, which the authorities do not have control over, would lead to an interruption of financing[7].

Despite numerous discussions on the topic, to my knowledge, there is no formal model of IMF outcomes-based conditionality. The majority of existing theoretical literature focuses on analyzing the effects of conditional aid. Many of these models employ principal-agent framework, for example, Svensson (2000, 2003) and Azam and Laffont (2003). This literature emphasizes the problem with donor's commitment to enforce a conditionality contract when the donor has altruistic preferences. Models of IMF conditional lending are rare and focus on the role of conditionality in the presence of domestic heterogeneity but often do not provide clear justification of the IMF objective function. In Drazen (2001), for example, the IMF cares about "extracting" policy reforms from the borrowing government while facing some financing constraints. Mayer and Mourmouras (2001) define IMF objective more explicitly, namely, the IMF seeks to maximize the weighted sum of utilities of IMF borrowers and lenders but without justifying why IMF financing is required. The existing models of IMF conditionality, which emphasize domestic heterogeneity, are typically models of perfect information (for example, Mayer and Mourmouras (2001) and Drazen (2001)).

[5] Recent review of the 2002 Conditionality Guidelines (IMF 2005) suggests that this may not be the case in practice and points out the risk that conditions might be met in unacceptable or suboptimal ways.

[6] At the moment IMF conditionality is already a mix of policy-based and outcome-based conditionality. Thus, the issue is really whether the relative importance of outcome-based conditionality should be increased.

[7] Khan and Sharma (2001) suggest that in the case of unfavorable outcome, the Fund might need to review the evidence ex-post and decide whether the target was missed because of the exogenous shocks or due to policy slippages that undermined achievement of the target with the former case warranting a waiver. This solution might work in cases when the monitoring cost is high, however, the authorities and the Fund would have to agree ex-ante on what constitutes "good" and "bad" policies, which, to some extent, might defeat the goal of greater flexibility in policy choice.

This paper offers a model of outcome-based conditionality and analyzes its role and design within a consistent theoretical framework with clearly defined objective function of the IMF. The model takes into account uncertainty about outcome realization and unobservability of policy action as well as the fact that government decisions may be affected by outside vested interests.

I employ a common agency approach to model opposition from an outside lobby following Mayer and Mourmouras (2001)[8], but with stochastic outcome of policy reforms and unobservable policy action to the IMF. The lobby also faces a fixed "entry cost" and the policy choice is discrete.

Several features of the IMF and authorities' preferences make this model different from the standard principal-agent model. The IMF is not a typical principal in the sense that it would choose to make a contribution (give a loan) even if the country has enough incentives to implement the desired policy changes without the IMF. This is because the IMF plays a role of the "world" social planner, which aims at removing the consequences of market frictions, which may be beneficial for both its borrowers and lenders. Also unlike the standard principal-agent model, preferences of the country authorities and the IMF are aligned to some extent since the government cares about the reform outcome directly, not only through changes in IMF financing in response to the observed outcomes.

The results suggest that when opposition to reforms is relatively weak and the IMF offers financing effectively on market terms, outcome-based conditionality is a good option for the IMF as forgoing monitoring of policy decisions does not result in an efficiency loss while allowing for greater flexibility in government actions. The optimal conditionality schedule in this case does not contain an incentive component but ensures efficient allocation of resources[9] between IMF borrowers and lenders.

Moving towards outcome-based conditionality may still be optimal for the IMF when resistance to reforms is high. In this case, however, the IMF would have to offer financing at a subsidized interest rate to be able to use conditionality as an incentives device. The optimal conditionality schedule in this case reflects the trade-off between risk-sharing and incentive and shifts additional risk on the government. The schedule should also take political constraints into account. A careful assessment of benefits and costs is very important in this case as the average amount of transfer from the lender to the borrower required to ensure good policy is higher in unobservable compared observable case.

A better understanding of political economy in the country is also crucial in designing optimal conditionality schedule as its role and optimal design depends on the type and strength of

[8]A common agency framework was proposed in Bernheim and Whinston (1986) and further developed in Grossman and Helpman (1994), Dixit, Grossman and Helpman (1996) and Dixit, Grossman and Helpman (1997).

[9] The term "efficiency" is used here somewhat loosely. Its precise meaning is explained later in the text.

opposition reforms face. When the reforms face opposition from outside lobbies, the incentives of the authorities are shaped not only by the IMF "offer" but also by the offer from special interests[10]. Whether reforms are implemented or not is simply a matter of the "competitive power" of the IMF versus domestic lobbies and unobservability may weaken IMF competitive power. Depending on how "close" the lobbies are to the government, the optimal conditionality schedule may need to take the presence of vested interests into account. In some cases, the IMF may find it optimal to incur higher additional cost (or forgo some reforms) in order to induce sound economic policies. However, if the domestic lobbies have to pay an "initial bribe" to approach the government with their deal, conditionality may play no role in inducing good policy objective as in this case the lobby will approach the government only if it can potentially propose a better reimbursement for distorted outcomes compared to the benefits authorities obtain from IMF financing.

The model also makes a surprising prediction about transparency of IMF programs. If the IMF moves first but cannot commit to non-disbursement in case bas policy is chosen, it may play to the advantage of domestic vested interests. The lobby can gain from observing IMF conditionality before it makes its own proposal to the government. In essence, the IMF cannot strategically manipulate a lobby's response when the maximum benefit from lobby's contributions to the authorities exceeds the benefit from IMF financing. However, the lobby, which is closer to the domestic government and can observe policy actions, can make use of the information about IMF conditionality and is the only "player", who never loses from the fact that the IMF cannot monitor government policy decisions. The IMF, however, would be better off by committing to not disburse when the policy is observable but this commitment is not credible as the IMF has incentives to disburse *ex-post.*

The model is of interest also because in many cases the IMF effectively cannot monitor government policy decisions or the monitoring is costly. The government may take indirect steps that violate conditionality and even when *de jure* the agreed policies are adopted, *de facto* policies may differ as the interpretation of laws is usually flexible and there are always exceptions to the laws.

The rest of the paper is organized as follows. Section 1.1 offers a model of IMF conditionality when the government policy choice is not observable. Section 1.2 summarizes results in the case when opposition to reforms comes from an outside lobby. Section 1.3 summarizes results in the case when resistance to reforms comes from veto players. Section 1.4 concludes.

1. The Model

[10] On weakening of incentives in multiple principals and multi-task agent setting see Dixit (1997). In this model the principal can make negative marginal payments for the outcomes of tasks that are primarily of interest to the other principals, thereby, obtaining insurance against those outcomes. This is true for all principals and this overprovided negative externality leads to a weakening of incentives in the Nash equilibrium.

Conditionality is only a tool for achieving ultimate objectives of IMF program. Hence, the issue of paramount importance in understanding the optimal design and role of conditionality is to clearly identify the objective of the IMF. The Articles of Agreement (IMF (2001d)) define the main purposes of the IMF as i) promoting international monetary cooperation, ii) facilitating the expansion and balanced growth of international trade, iii) promoting exchange stability, iv) assisting in the establishment of a multilateral system of payments v) making its resources available (under adequate safeguards) to members experiencing balance of payments difficulties, thus providing them with opportunity to correct maladjustments in their balance of payments without resorting to measures destructive of national or international prosperity and v) shortening the duration and lessening the degree of disequilibrium. These goals emphasize the global nature of the organization, which intends to strike a balance between individual country borrowing needs and stable functioning of the world economy.

The requirement of adequate safeguards emphasizes the non-charitable nature of the organization. In the past decade, however, the IMF has become more involved in supporting macroeconomic stabilization in poor countries, where the objective was more that of an "equity" rather than "efficiency". This paper focuses solely on the efficiency objective of the IMF, leaving aside poverty reduction programs, which from theoretical point of view should be treated differently and, perhaps, are better described in the context of foreign aid literature.

In all the proposals that emphasize efficiency as IMF objective, IMF interference is seen necessary to close the inefficiency gap resulting from the presence of market failures, although the types of market failures and the type of IMF involvement are rather different. Resource allocation may not be efficient in the presence of market failures due to i) informational asymmetries, ii) presence of externalities and iii) missing contracts. Sachs (1999) stresses that informational asymmetries lead to the fact that the lender cannot distinguish insolvent from illiquid banks/countries, which leads to an undersupply of loans or reluctance to roll over existing debt (adverse selection problem). Rogoff (1999) and Frankel (1999) emphasize the presence of externalities from financial crises that may spillover to other countries, while Tirole (2002) emphasizes externalities that different lenders impose on each other by contracting with the government simultaneously. Tirole (2002) also suggests that market failures can result from missing contracts – while foreign investors are affected by the actions of both private borrowers and domestic government[11] they can only contract with the former, which leads to a possibility of government moral hazard if the government favors interests of domestic borrowers over foreign investors.

Proposed solution is either IMF conditional rescue financing itself or the function of delegated monitor, which would substitute for missing contracts between international lenders and the domestic government and insure efficient supply of private financing. Following these proposals, the objective of the IMF adopted in this paper is to design conditionality such that to insure efficient allocation of resources between a borrowing country and international lenders and (if possible) induce desired policy changes in the presence of opposition, which

[11] Government holds many unique control rights in fiscal, monetary, exchange rate, taxation and institutions infrastructure matters that can affect the return of foreign investors.

inevitably appears in any adjustment process. Note that IMF conditional financing in this case may be interpreted not only as IMF loan per se but also as the total amount of financing the country would receive from official and the private parties if it fulfills IMF conditions

I focus on the design of IMF programs in the presence of opposition to reforms. Resistance to reforms may come from powerful vested interests (lobbies) who benefit from distorted economic outcomes and whose welfare is not directly affected by the IMF loan. An example of such lobbies may be conglomerate-controlled banks that are believed to be a weak link in the financial systems of the recent crisis countries (Mexico 1994-1995, Asian financial crises 1997-1998). The lobbies may face a fixed cost to approach the government with their deal or lobby's access to the government may be costless[12]. The government keeps this initial "bribe" even if it eventually implements a good policy; otherwise the "bribe" will be counted towards lobby's final contribution.

To model the situation when unsound economic policies may lead to the outcomes that benefit a small privileged group but negatively affect the welfare of the general public I introduce an index of economic distortions $\omega \in [0, \overline{\omega}]$[13]. The distortions are linked to the policy decision $a \in A$ (where A is a set of policy options) of the borrowing country government but also reflect factors outside of government control and unobservable shocks to the economy. That is, government policy choice (say, their decision not to reform the banking system) cannot be perfectly inferred from the observed economic distortions (say, insolvency of a particular bank). The index of economic distortions is a composite of all distorted outcomes in the economy. Distortions in the borrowing country may "spill over" through trade and financial channels to the rest of the world (including lender-countries of the IMF), thereby, reducing the level of world economic activity.

When the country turns to the IMF it has already been running a balance of payment deficit, which reflects past policy decisions as well as previous shocks that hit the country. For simplicity I model this situation by assuming that the country, which turns to the IMF, faces an exogenous borrowing constraint. It is important to distinguish "past" economic distortions that led to the balance of payment problems, which made the country turn to the IMF, from "new" economic distortions ω, which result from the policy choice a that the government adopts and the shocks that hit the country after it started negotiating a program with the IMF.

The IMF provides financing on the condition that the country undertakes reforms necessary to address the causes of payment imbalances. Conditions might specify particular steps that have to be taken to implement these reforms and/or specific outcomes that have to be achieved as a

[12] The fixed entry cost might reflect a preliminary guarantee that the government may require from the lobby before it considers the "deal". Another type of an "entry" cost the lobby might be facing is the possibility of legal sanctions or, perhaps, some "social" cost for a bribe attempt if government officials were to reject the lobby's offer.

[13] These distortions are different from distortions in Mayer and Mourmouras (2002) in that here the index of distortions is a random variable while in Mayer and Mourmouras (2002) it is a choice variable.

result of these reforms. Therefore, the IMF has to design a conditionality schedule before the government makes its next policy step and before the uncertainty about economic distortions has been cleared.

I first consider the situation, in which the IMF can monitor government policy decisions. Thus, both policy a and outcomes (degree of economic distortions ω) can be specified as a precondition for lending (this is a mix of policy-based and outcome-based conditionality). Next, I consider the case when government policy choice cannot be perfectly monitored by the IMF, so it ties its disbursements to the observed outcomes ω only (this is pure outcome-based conditionality).The conditions have to be met *prior* to the loan disbursement. Thus, uncertainty about the outcome ω clears by the time the borrowing country receives the loan.

When the IMF negotiates a program with the borrowing country, the groups (lobbies) whose interests may be affected by the reform may offer the government a “deal” that would divert it from implementing good policy. Thus, the IMF and the lobby act as principals, who try to influence policy (action) taken by the government (agent), hence, the name common agency.

The role of the IMF as a principal in its relationship with the borrowing country is worth clarifying. This role might seem to contradict the cooperative nature of the institution where every member country can be considered as a principal and the IMF as a common agency. While the IMF is collectively owned by its member countries, they found it productive to delegate their authority to the institution so that the IMF has considerable power in negotiating loans with individual member countries[14]. Because of this power the IMF became an influential “player” on the international arena. Private investors and official creditors[15] often look for the IMF’s “seal of approval” before they make their own investment decisions.

The IMF and the lobby may “move” simultaneously if the IMF reacts quickly to changes in the domestic political environment. Or given the role of the IMF as an official creditor it may be reasonable to think that the IMF “reacts slowly” and can pre-commit to a certain conditionality schedule before the lobby approaches the government (the IMF moves first). In period zero both principals offer schedules: a menu that ties policy (action) if it is observable and the resulting economic outcomes (the degree of distortions) with the amount of contributions.

If the lobby decides to enter the competition with the IMF the government carefully studies both schedules and decides which policy to adopt. Here for simplicity I assume that there are only two policy options: “good” and “bad” policy. The degree of economic distortions is a result of adopted policies but also of some exogenous shocks that hit the economy. The

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[14] Dixit (2000a) suggests a helpful analogy between the IMF and the Internal Revenue Service (IRS). IRS is collectively owned by the citizens but it has been found socially optimal to delegate significant powers to this organization when dealing with individual citizens.

[15] For example, the World Bank often makes an IMF program a precondition for its own lending.

stochastic relationship between policy choice a and distorted economic outcomes ω is described by the conditional distribution function $f(\omega|a)$. It is also assumed that any outcome ω may arise under any policy choice implying that $f(\omega|a) > 0 \;\forall\; \omega \in [0, \overline{\omega}]$ and $\forall\; a \in \{a_b, a_g\}$. Thus, it is impossible to perfectly deduce policy choice from observed distortions. The distribution of distortions conditional on the adoption of "bad" policy first order stochastically dominates the distribution of distortions conditional on adoption of "good" policy[16]. This assumption implies that on average the level of distortions is higher under the "bad" policy choice

After the outcome of reforms (degree of economic distortions ω) has been observed the IMF disburses the loan T as prescribed by its schedule under a realized degree of distortions ω and policy choice. The lobby also contributes C according to its schedule.

At this point it might be helpful to summarize the timing in the model. Figure 1 presents timing in the case when the IMF can revise its conditionality schedule (the IMF and the lobby move simultaneously). Figure 2 presents timing in the case when the IMF can pre-commit to a certain conditionality schedule (the IMF moves first).

The IMF loan T can be used for either consumption in this period C_1 or investment I by a representative consumer in the borrowing country. The loan has to be repaid[17] in the next period at an interest rate r^B [18]. For simplicity we can think of a representative lender-member of the IMF that finances a loan to the borrowing country. The lender is remunerated at the rate r^L. The borrowing country can lend at a private market interest rate r^* but cannot borrow from the private markets, while the lender is constrained to lend. Liquidity constraint reflects the presence of market frictions, which may arise due to informational asymmetries,

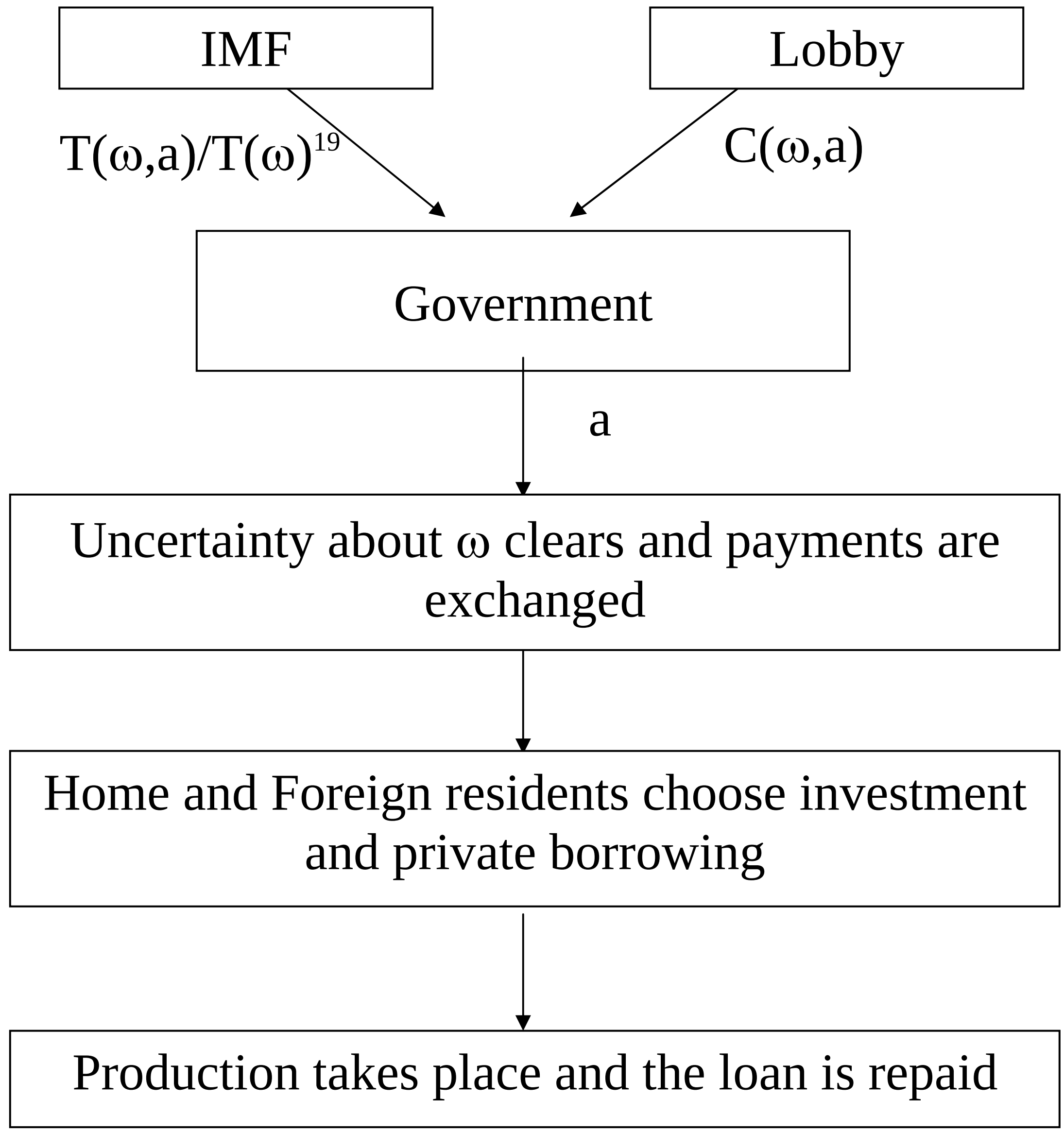
[16] A formal definition of the first order stochastic dominance in this case is: $F(\omega|a_b) \le F(\omega|a_g)$ for $\omega \in [0, \overline{\omega}]$, with strict inequality for some open set $\Omega \subset [0, \overline{\omega}]$; where $F(\omega|a_b)$ and $F(\omega|a_g)$ are cumulative distribution functions of the distribution of distortions conditional on "bad" policy (a_b) and distribution of distortions conditional on "good" policy (a_g) respectively.

[17] This formulation abstracts from the possibility of default, which is central to the relationship between private borrowers and lenders. While it may seem that by ignoring default issues the main conflict of interest between borrowers and lenders is eliminated, the truth of the matter is that IMF loans have almost always been repaid with an interest (see, for example, Rogoff (2002)). The IMF is a preferred creditor and takes priority in repayment. Thus, as a practical matter default is not a primary issue for the IMF. On justification of conditionality from the borrower-lender perspective see also Khan and Sharma (2001)

[18] The IMF levies market-related interest rate for non-concessional financing, which is based on the SDR (Special Drawing Rights) interest rate that is revised weekly to take account of changes in short-term interest rates in the major international money markets. It charges higher interest to the borrower (the rate of charge) than the interest rate accrued to the lenders (rate of remuneration) with the difference covering the cost of IMF operations.

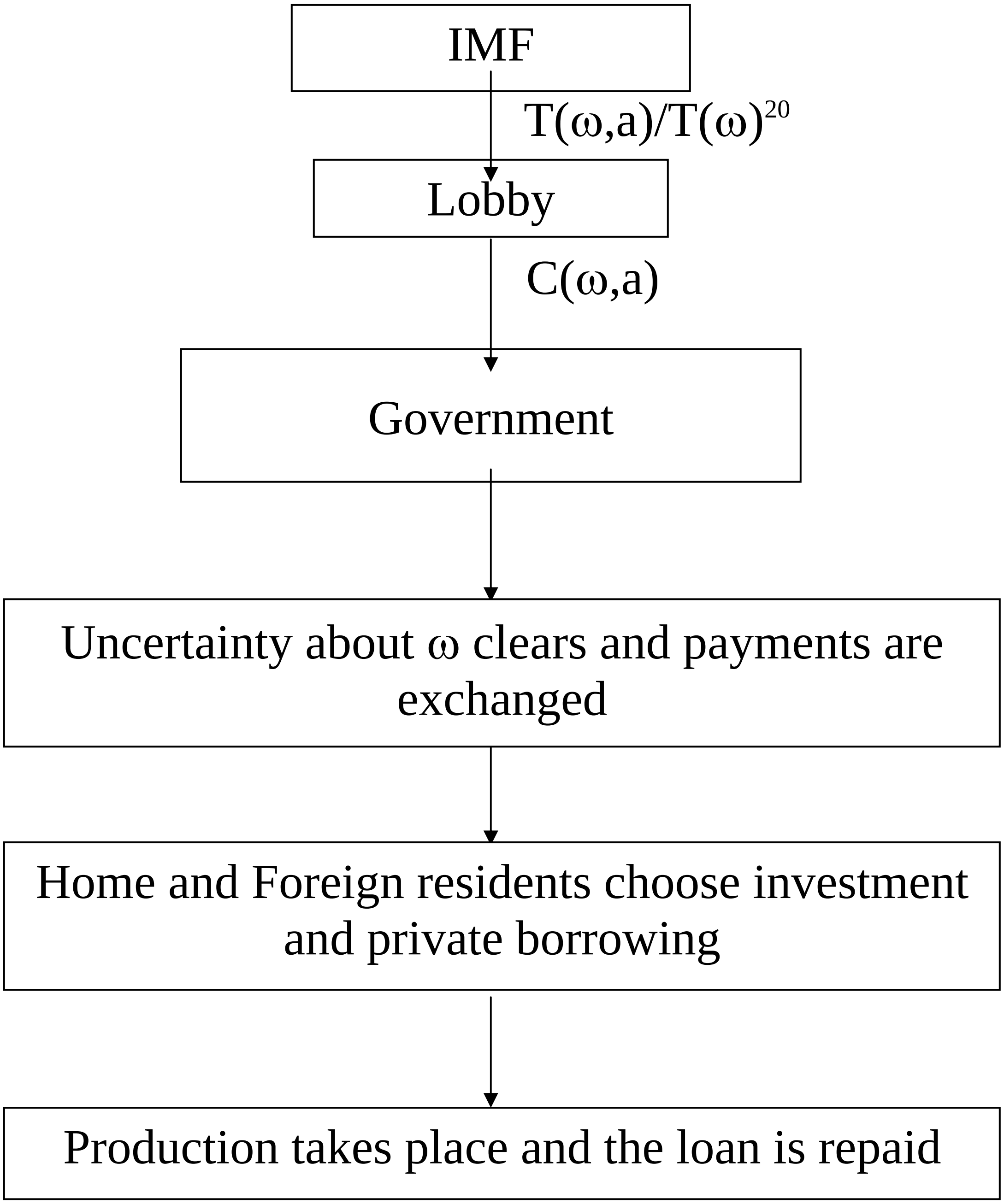
externalities or missing contracts. As these frictions are not central to the discussion in the paper for simplicity I model them through the presence of exogenous borrowing constraint.

Figure 1. Timing when the IMF and lobby move simultaneously with observable/unobservable policy choice



[19] T(ω,a) is the schedule the IMF offers when policy choice is observable, while T(ω) is the schedule that IMF offers when policy choice is unobservable.

Figure 2. Timing when the IMF moves first with observable/unobservable policy choice.



[20] T(ω,a) is the schedule the IMF offers when policy choice is observable, while T(ω) is the schedule that IMF offers when policy choice is unobservable.

I consider two cases: i) when the IMF charges the borrower an interest rate higher than the market rate, $r^B = r^* + \theta > r^*$, while the lender is remunerated at an interest rate below the market rate $r^L = r^* - \theta < r^*$ with θ approaching zero and ii) and the case when the borrower receives a subsidized loan from the IMF $r^B = r^L = r^* - s$.

The model can be solved backwards starting from the household problem. A representative consumer in the borrowing country chooses the amount of investment and private borrowing such that

$$\max_{C_1, C_2, I, B} U(C_1) + \delta U(C_2)$$

subject to the constraints:

$$C_1 = Y_0 - I + T + B$$

$$C_2 = g(I, \omega) - (1 + r^*)T - (1 + r^*)B$$

$$B \leq 0$$

where Y_0 is the national income (endowment) in period 1, which is unrelated to current distortions and $\delta > 0$ is the discount rate. The utility function $U(C)$ is twice continuously differentiable and concave.

In the second period investment is converted into output according to the per capita production function $g(I, \omega)$ where $\omega \in [0, \overline{\omega}]$ indicates that income in the second period can be affected by the degree of economic distortions observed in the first period. The assumptions on the production function are as follows $g_I > 0$; $g_\omega < 0$; $g_{II} < 0$; $g_{\omega\omega} < 0$ and $g_{I\omega} < 0$. The last assumption says that at any level of investment the marginal product of investment is lower at higher level of distortions.

The solution to this problem defines investment $I^0(\omega, T)$ and the amount of private borrowing $B^0(\omega, T)$ as functions of IMF loan T and degree of observed distortions. The indirect utility function of a representative consumer in the borrowing country can be written as

$$W(\omega, T) = U(Y_0 - I^0(\omega) + T + B^0(\omega, T)) + \delta U(g(I^0(\omega), \omega) - (1 + r^B)T - (1 + r^*)B^0(\omega, T)) \quad (1.1)$$

The properties of the indirect utility function of home consumers can be obtained by differentiating the first order conditions with respect to the parameters (see Appendix 1 for details). The utility function is concave in IMF loan $W_{TT}(\omega, T) < 0$ and distortions reduce public welfare $W_\omega(\omega, T) < 0$.

When the borrowing constraint is binding the utility of the general public in the borrowing country is increasing in IMF loan ($W_T(\omega, T) \geq 0$) but the sign on the cross-partial $W_{T\omega}(\omega, T)$

is ambiguous (it depends on how distortions affect the marginal return on investment)[21]. When the borrowing constraint is not binding, the borrowing country does not benefit from IMF loan any longer ($W_T(\omega,T)<0$) as when distortions are high, home residents would prefer to lend abroad at a market interest rate *r** but instead are forced to borrow from the IMF at a higher-than-market interest rate. As it will become clear, in equilibrium the IMF will never offer positive amount in this case. The cross-partial in this case ($W_{T\omega}(\omega,T)<0$) reflects increasing marginal disutility from IMF loan with increase in distortions.

A representative consumer in the lender country solves (see Appendix 1 for more detail).

$$\max_{C_1^*,C_2^*,I^*,B^*} U(C_1^*)+\delta^* U(C_2^*)$$

subject to the constraints:

$$C_1^* = Y_0^* - I^* - nT + B^*$$
$$C_2^* = g^*(I^*,\omega)+(1+r^L)nT-(1+r^*)B^*$$
$$B^* \geq 0$$

The indirect utility function of a representative consumer in the lender country is

$$W^*(\omega,T)=U(Y_0^*-I^{*0}(\omega,T)-nT+B^{*0}(\omega,T))+\delta^* U(g^*(I^{*0}(\omega,T),\omega)+(1+r^L)nT-(1+r^*)B^{*0}(\omega,T)) \tag{1.2}$$

with $g_I^*>0$; $g_\omega^*\leq 0$; $g_{II}^*<0$; $g_{\omega\omega}^*\leq 0$ and $g_{I\omega}^*\leq 0$. These assumption imply that income of foreign residents in the second period may be adversely affected by borrower's distortions, reflecting negative spillovers of economic problems in the borrowing country (such as, for example, financial instability) to the rest of the world.

The properties of the indirect utility function of a representative consumer in the lender country are as follows (Appendix 1). Lender country may be adversely affected by borrowers' distortions ($W_\omega^*\leq 0$) and the marginal utility of IMF loan is decreasing ($W_{TT}^*<0$).When the lending constraint is not binding foreign residents benefit from increase in IMF lending as it helps to relax the lending constraint ($W_T^*\geq 0$) but the effect of distortions on marginal utility of IMF loan ($W_{\omega T}^*$) is ambiguous. When the lending constraint is not binding IMF loan reduces welfare in the lender country ($W_T^*<0$) as in this case lender country would actually prefer to borrow at the market interest rate r^*, instead it is forced to lend at a slightly below-the-market rate through IMF loan. The cross-partial in this case is negative ($W_{\omega T}^*\leq 0$).

[21] While it is not possible to sign the cross-partial, all of the relevant expressions in this paper can be unambiguously signed.

Before solving the game, it might be useful to clarify the role of the IMF in the absence of the lobby and if it were to choose the amount of financing ex post, that is, after the degree of economic distortions has been observed. In the absence of frictions a market equilibrium outcome (no borrowing/lending constraint) can be replicated by maximizing a weighted sum of utilities of domestic and foreign consumers subject to the resource constraint with appropriately chosen weights. Let us normalize the weight of the foreign country to one and denote the weight on the borrower's country utility, which replicates frictionless market, equilibrium by γ.

If the IMF provides financing at the market interest rate $r^B = r^L = r^*$ and makes its choice after the distortions have been observed by maximizing

$$\max_T \gamma W(\omega, T) + W^*(\omega, T) \tag{1.3}$$

it would effectively replicate a frictionless market equilibrium. In this sense, the objective of the IMF would be to achieve an efficient allocation of resources between IMF borrowers and lenders. The IMF would increase the amount of financing up to the point where the marginal return on investment is equal to gross market interest rate.

However, multiple equilibria are possible in this case in relation to the amount of IMF loan as IMF financing is a perfect substitute for private borrowing[22]. Equilibrium market interest rate would also be a function of distortions. However, in practice, the IMF specifies the terms of financing before the outcome of policy reforms has been observed and has an operating cost. For simplicity, I assume that private market interest rate is fixed at r^* and consider two cases: i) when the IMF charges the borrower an interest rate slightly higher than the market rate, while the lender receives a rate of remuneration slightly below the market rate and ii) the case when the IMF offers a loan to the borrower at a subsidy. In the former case, IMF financing is not a perfect substitute for market financing but the solution is unique. To solve for an equilibrium that replicates frictionless market outcome I assume that θ approaches zero. In this case, IMF involvement cannot insure efficient market allocation but can provide a second best solution in the presence of market frictions.

While the consumers cannot affect the level of distortions, the IMF can use financing to influence government policy choice, which, in turn, affects the resulting amount of distortions. Hence, the task of the IMF is not only to mitigate inefficiencies stemming from market frictions but also, if possible, to induce good policy, which increases public welfare in both countries. When the IMF can observe policy choice it offers the government a contract that ties the amount of loan with policy decisions and/or observed outcomes with an objective

[22] Any amount of IMF loan will be optimal when the borrowing constraint is not binding as the borrower can simply re-channel IMF funds abroad at no cost when the return on domestic investment is low.

to maximize expected utility of its members - a weighted average of public welfare of IMF members (borrowers and lenders)[23]:

$$IMF = E_{\omega}\left[\gamma W(\omega,T(\omega,a)) + W^{*}(\omega,T(\omega,a))\middle| a\right] = \int_{0}^{\bar{\omega}}\left[\gamma W(\omega,T(\omega,a)) + W^{*}(\omega,T(\omega,a))\right] f(\omega \mid a)d\omega \tag{1.4}$$

where $W(\omega,T)$ is as defined in (1.1) and $W^{*}(\omega,T)$ is as defined in (1.2), γ can be also interpreted as the degree of concern of the IMF about the borrowing country and policy choice a is affected by the IMF offer T.

The government in the borrowing country is concerned about public welfare but also values contributions from the domestic lobby. When both the IMF and the lobby can differentiate between the two policies, the expected utility of the government can be written as

$$G = E_{\omega}\left[\alpha W(\omega,T(\omega,a)) + C(\omega,a)\middle| a\right] \tag{1.5}$$

where α is the degree of government concern about public welfare, which is defined in (1.1), and $C(\omega,a)$ is the contribution from the lobby for observed distortion level ω under the government chooses policy a.

The lobby benefits from distortions and its expected utility can be written as

$$L = E_{\omega}\left[V(\omega) - C(\omega,a)\middle| a\right] \tag{1.6}$$

where $V(\omega)$ is lobby's valuation of distortions with $V_{\omega}(\omega) > 0$.

When the IMF cannot monitor government policy choice, it conditions disbursements on the observed level of distortions only. The expected utility of the IMF in this case becomes

$$IMF = E_{\omega}\left[\gamma W\left(\omega,T(\omega)\right) + W^{*}\left(\omega,T(\omega)\right)\middle| a\right] \tag{1.7}$$

and the expected utility of the government when can be written as

$$G = E_{\omega}\left[\alpha W(\omega,T(\omega)) + C(\omega,a)\middle| a\right] \tag{1.8}$$

I assume that in the absence of the IMF the lobby benefits enough from distortions to induce bad policy outcome, namely,

$$E_{\omega}\left[V(\omega)\middle| a_b\right] - E_{\omega}\left[V(\omega)\middle| a_g\right] > E_{\omega}\left[aW(\omega,0)\middle| a_g\right] - E_{\omega}\left[aW(\omega,0)\middle| a_b\right]$$

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[23] This formula explains notation used in the rest of the paper. For simplicity, the expectation sign is not spelled out afterwards.

Observable Case

No IMF and no Lobby

In the absence of the IMF and the lobby, the government makes its policy decision by comparing national welfare under good and bad policy. Since public welfare is decreasing in distortions and the distribution of distortions conditional on adoption of "bad" policy (a_b) first order stochastically dominates the distribution of distortions conditional on adoption of "good" policy (a_g) from Appendix 2 it follows that

$$E_{\omega}\left[aW(\omega,0)\middle|a_g\right] > E_{\omega}\left[aW(\omega,0)\middle|a_b\right]$$

Thus, in the absence of both principals the government chooses good policy. It completely owns a reform program and would implement it even without the IMF. In this case the government attains utility $G_0^L = E_{\omega}\left[aW(\omega,0)\middle|a_g\right]$.

IMF and no Lobby

The outcome of the game between the IMF and the government in the absence of opposition can be summarized in the following way:

Proposition 1. *When the government policy choice is observable and in the absence of a lobby, the government chooses good policy and the IMF transfers resources from the lender to the borrower according to its "minimum credible" schedule* $\mathrm{T}^0(\omega)$ *that also maximizes IMF utility ex-post.*

Since in this case there is no problem with incentives (both the IMF and the government dislike distortions and there is no side payment from the lobby) the only role the IMF end up playing in this case is to redistribute resources between the borrower and lender to remedy the presence of market frictions since the government would choose good policy even in the absence of the IMF. The schedule $\mathrm{T}^0(\omega)$ that maximizes IMF utility that maximizes IMF utility subject to the non-negativity constraint[24] given good policy choice is the same that that maximizes IMF utility ex-post. Namely, the schedule $\mathrm{T}^0(\omega)$ satisfies

[24] I assume that the IMF cannot offer negative contributions. Perhaps, withdrawing financing and, thereby, discouraging private lenders could be viewed as a "negative" payment but it is hard to think of a proportionately higher punishment for higher levels of distortions that would be required in the model to introduce negative payments.

$$\gamma W_T(\omega,T^0(\omega))+W_T^*(\omega,T^0(\omega))=-\frac{\lambda_T(\omega)}{f(\omega|a_g)}\leq 0 \qquad (1.9)$$

where $\lambda_T(\omega)=0$ if $T^0(\omega)>0$ and $\lambda_T(\omega)\geq 0$ for $T^0(\omega)=0$.

When IMF offers financing at close-to-market interest rate, namely, $r^B=r^*+\theta>r^*$ and $r^L=r^*-\theta<r^*$ with $\theta>0$ approaching zero, the marginal utilities of IMF loan are either non-negative in both countries (the borrowing constraint is binding) or both negative (the borrowing constraint is not binding). In this case, (1.9) implies that the IMF provides financing that maximizes utilities of the borrower and lender separately. Namely, $W_T(\omega,T^0(\omega))=0$ and $W_T^*(\omega,T^0(\omega))=0$ for those levels of distortions where the borrowing constraint is binding in the absence of the IMF and zero financing $T^0(\omega)=0$ for those (high) levels of distortions where the borrowing constraint is not binding ($W_T(\omega,0)<0$ and $W_T^*(\omega,0)<0$) In this case, the amount of IMF financing is just enough to ensure frictionless market allocation *ex post*, provided $\theta\to 0$. The IMF acts as a "world social planner" and conditionality plays a role of an "efficiency tool" even in the absence of opposition.

When the IMF offers a loan at a subsidized interest rate $r^B=r^L=r^*-s$ its "minimum credible schedule" may deviate from frictionless market outcome due to the distortions introduced by a subsidy. In this case the IMF offers non-zero financing up to the point where the weighted marginal utility of IMF loan in the borrowing country is equal to the marginal disutility of the loan to the lender $\gamma W_T(\omega,T^0(\omega))=-W_T^*(\omega,T^0(\omega))$.

Note that in both cases $\mathrm{T}^0(\omega)$ also maximizes IMF utility subject to non-negativity constraint given the distribution of distortions conditional on bad policy (the only difference would be the density function, which should be replaced with $f(\omega|a_b)$ .and the corresponding values of Lagrange multiplier where the IMF offers zero). In this sense, $\mathrm{T}^0(\omega)$ is the "minimum" contribution schedule to which the IMF can credibly commit.

IMF and Lobby (Common Agency).

First, I consider the case when neither the IMF nor lobby can use strategies that involve non-credible threats. When the IMF and the lobby move simultaneously (Figure 1) and the policy choice is observable, the two principals make simultaneous offers that involve contribution schedule conditional on both policy (a) and outcome (ω). The strategy for each of the principals in this case is a pair: a schedule relating principal's contribution to the observed outcome when good policy is chosen and a schedule relating principal's contribution to the observed outcome when bad policy is chosen.

A subgame perfect Nash equilibrium in the common agency game can be characterized as follows[25]:

- $C^*(\omega,a)=\{C^*(\omega,a_b),C^*(\omega,a_g)\}$ and $T^*(\omega,a)=\{T^*(\omega,a_b),T^*(\omega,a_g)\}$ are feasible with $C^*(\omega,a)\geq 0, T^*(\omega,a)\geq 0$ for $\forall\omega\in[0,\overline{\omega}]$ and $a\in\{a_g,a_b\}$ (1.10)

- $$a^*=\arg\max_{a\in\{a_b,a_g\}} E_\omega\left[aW\left(\omega,T^*\left(\omega,a\right)\right)+C^*\left(\omega,a\right)\middle|a\right] \tag{1.11}$$

- $$\left\{a^*,C^*\left(\omega,a\right)\right\}=\arg\max_{a\in\{a_b,a_g\},C(\omega,a)} E_\omega\left[V\left(\omega\right)-C\left(\omega,a\right)\middle|a\right] \tag{1.12}$$

s.t. $$E_\omega\left[aW\left(\omega,T^*\left(\omega,a\right)\right)+C\left(\omega,a\right)\middle|a\right]\geq E_\omega\left[aW\left(\omega,T^*\left(\omega,a_g\right)\right)\middle|a_g\right] \tag{1.13}$$

and $$C(\omega,a)\geq 0 \tag{1.14}$$

$$\left\{a^*,T^*\left(\omega,a\right)\right\}=\arg\max_{a\in\{a_b,a_g\},T(\omega,a)} E_\omega\left[\gamma W\left(\omega,T\left(\omega,a\right)\right)+W^*\left(\omega,T\left(\omega,a\right)\right)\middle|a\right] \tag{1.15}$$

s.t. $$E_\omega\left[aW\left(\omega,T\left(\omega,a\right)\right)+C^*\left(\omega,a\right)\middle|a\right]\geq \max_{a\in\{a_b,a_g\}} E_\omega\left[aW\left(\omega,T^0\left(\omega\right)\right)+C^*\left(\omega,a\right)\middle|a\right] \tag{1.16}$$

and $$T(\omega,a)\geq 0 \tag{1.17}$$

Constraint (1.13) reflects the fact that in the absence of a lobby the government will choose good policy. Since, the IMF is willing to contribute $T^0(\omega)$ even when bad policy is chosen and by assumption the players cannot use non-credible threats, the IMF evaluates the situation in (1.16) comparing it to the "minimum" to which it can credibly commit in the absence of the lobby, that is, when the IMF contributes $T^0(\omega)$. The lobby does not "like" making contributions and by assumption cannot punish the government with a negative payment, hence, the lobby always offers zero for good policy outcome.

Since there are only two possible policy options, in essence, the IMF and the lobby compete with their contributions to offer the government higher utility for the policy that each of the principals prefers in the absence of the other principal. The two principals raise their "offers" until one of them finds that increasing the "bid" makes him worse off compared to the case when it settles on the policy preferred by his opponent. Note, that since both principals are certain about each other's preferences, in equilibrium the "winner" needs to insure the government with the same level of utility as it would attain by accepting the offer that makes the other principle indifferent between the two policy choices.

[25] Dixit, Grossman and Helpman (1996) provide a characterization of equilibrium in the common agency game (Theorem 1). Since the only required assumption to prove this theorem is that government utility is increasing in contributions of both principals, the proof goes through for the model presented in this paper with the only difference that all utilities need to be replaced by expected utilities.

Since lobby's contribution enters linearly into lobby's and government's objective functions, the "maximum feasible" schedule that the lobby is willing to contribute for bad policy, $C_{\max}^{Lobby}(\omega, a_b)$, is determined solely by the lobby's preferences towards distortions, namely,

$$E_\omega\left[C_{\max}^{Lobby}(\omega, a_b)\middle| a_b\right] = E_\omega\left[V(\omega)\middle| a_b\right] - E_\omega\left[V(\omega)\middle| a_g\right] \tag{1.18}$$

If the government chooses bad policy under this schedule $C_{\max}^{Lobby}(\omega, a_b)$ it attains utility:

$$G_{\max}^{Lobby} = E_\omega\left[\alpha W\left(\omega, T^0(\omega)\right) + C_{\max}^{Lobby}\left(\omega, a_b\right)\middle| a_b\right] \tag{1.19}$$

Similarly, the "maximum feasible" schedule that the IMF is willing to contribute is the one that provides the IMF with the lowest payoff, still at least as much as IMF's payoff under bad policy. Namely, the "maximum feasible" schedule $T_{ob\max}^{IMF}(\omega, a_g)$ satisfies [26]

$$E_\omega\left[\gamma W(\omega, T_{ob\max}^{IMF}(\omega, a_g)) + W^*(\omega, T_{ob\max}^{IMF}(\omega, a_g))\middle| a_g\right] \geq E_\omega\left[\gamma W(\omega, T^0(\omega)) + W^*(\omega, T^0(\omega))\middle| a_b\right] \tag{1.20}$$

and the first order condition (μ_1 is Lagrange multiplier on individual rationality constraint (1.16) and $\lambda_{IMF}(\omega)$ is Lagrange multiplier on non-negativity constraint (1.17)):

$$\gamma W_T(\omega, T_{ob\max}^{*g}(\omega, a_g)) + W_T^*(\omega, T_{ob\max}^{*g}(\omega, a_g)) + \mu_1 \alpha W_T(\omega, T_{ob\max}^{*g}(\omega, a_g)) = -\frac{\lambda_{IMF}(\omega)}{f(\omega | a_g)} \tag{1.21}$$

With this contribution schedule from the IMF the government can attain utility

$$G_{ob\max}^{IMF} = \int_0^{\overline{\omega}} \alpha W(\omega, T_{ob\max}^{IMF}(\omega)) f(\omega | a_g) d\omega \tag{1.22}$$

Since there are only two policy options I assume that when the two principals "tie", the government chooses bad policy. Hence for the IMF to win it would need to ensure the government with utility at least $G_{\max}^{Lobby} + \varepsilon$, where ε is some small positive number.

Subgame perfect equilibria in this case can be characterized as follows (Appendix 3 offers more details).

[26] Essentially, the question being asked here is "What is the maximum average lobby's contribution for bad policy that the IMF can outbid?" $T_{ob\max}^{IMF}(\omega, a_g)$ is the "maximum" schedule that the IMF is willing to contribute for good policy and, therefore, determines maximum lobby's contribution that the IMF can outbid.

Proposition 2. *When the government policy choice is observable and the IMF moves simultaneously with the lobby, two sets of subgame perfect equilibria are possible:*

1) *If the IMF is a potential "winner"($G_{\max}^{Lobby} < G_{ob\max}^{IMF}$ as defined in* (1.19) *and* (1.22)*)*

- *the lobby offers its "maximum feasible" schedule for bad policy $C_{\max}^{Lobby}(\omega, a_b)$ (see* (1.18)) *and zero for good policy*

$$C^*(\omega, a) = \{C^*(\omega, a_b) = C_{\max}^{Lobby}(\omega, a_b), C^*(\omega, a_g) = 0 \ \forall \omega \in [0, \overline{\omega}]\}$$

- *the IMF offers a schedule for good policy that provides the government with slightly higher utility than what it could obtain under the "maximum feasible" lobby contribution by choosing bad policy and offers its "minimum" credible schedule for bad policy*

$$T^*(\omega, a) = \{T^*(\omega, a_b) = T^0(\omega), T^*(\omega, a_g) = T_{ob}^{*g}(\omega, a_g) \geq T^0(\omega) \ \forall \ \omega \in [0, \overline{\omega}]\}$$

where $T_{ob}^{*g}(\omega, a_g)$ satisfies

$$E_{\omega}\left[\alpha W(\omega, T_{ob}^{*g}(\omega, a_g)) \middle| a_g\right] \geq E_{\omega}\left[\alpha W(\omega, T^0(\omega)) + C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right] + \varepsilon \qquad (1.23)$$

and the first order condition (μ_1 is Lagrange multiplier on constraint(1.16)):

$$\gamma W_T(\omega, T_{ob}^{*g}(\omega, a_g)) + W_T^*(\omega, T_{ob}^{*g}(\omega, a_g)) + \mu_1 \alpha W_T(\omega, T_{ob}^{*g}(\omega, a_g)) = -\frac{\lambda_{IMF}(\omega)}{f(\omega | a_g)} \qquad (1.24)$$

- *the government chooses good policy $a^* = a_g$*

If the lobby is a potential winner, that is, ($G_{\max}^{Lobby} \geq G_{ob\max}^{IMF}$)

- *the lobby offers zero for good policy and for bad policy a schedule that reimburses the government for switching from good policy under IMF "maximum feasible" schedule $T_{ob\max}^{IMF}(\omega, a_g)$ to bad policy under IMF "minimum credible" schedule $T^0(\omega)$, namely,*

$$C^*(\omega, a) = \{C^*(\omega, a_b) = C_{ob}^{*b}(\omega, a_b), C^*(\omega, a_g) = 0 \ \forall \omega \in [0, \overline{\omega}]\}$$

where $C_{ob}^{*b}(\omega, a_b)$ satisfies

$$E_{\omega}\left[C_{ob}^{*b}(\omega, a_b) \middle| a_b\right] \geq E_{\omega}\left[aW\left(\omega, T_{ob\max}^{IMF}(\omega, a_g)\right) \middle| a_g\right] - E_{\omega}\left[aW\left(\omega, T^0(\omega)\right) \middle| a_b\right]$$

- *the IMF offers its "maximum feasible" schedule $T_{ob\max}^{IMF}(\omega, a_g)$ for good policy and its "minimum credible" schedule $T^0(\omega)$ for bad policy*

$$T^*(\omega,a) = \{T^*(\omega,a_b) = T^0(\omega), T^*(\omega,a_g) = T^{IMF}_{ob\max}(\omega,a_g) \geq T^0(\omega)\ \forall \omega \in [0,\overline{\omega}]$$

where $T^{IMF}_{ob\max}(\omega,a_g)$ *satisfies* (1.20) *and* (1.21)

- *the government chooses bad policy* $a^* = a_b$

Note, however, that when the IMF offers a loan at an interest rate close to the market rate ($r^B = r^* + \theta > r^*$ and $r^L = r^* - \theta < r^*$ with θ approaching zero), the only way condition (1.21) can be satisfied for non-zero amount of IMF loan is to choose IMF financing such that $W_T(\omega, T^{*g}_{ob\max}(\omega,a_g)) = 0$ and $W^*_T(\omega, T^{*g}_{ob\max}(\omega,a_g)) = 0$. The schedule that satisfies these conditions is IMF "minimum credible" schedule $T^0(\omega)$. This schedule is also the one that maximizes IMF welfare under both good and bad policy (see (1.9) and footnote 24). Hence, the IMF offers the same schedule for good and bad policy irrespective of who is the winner

$$T^*(\omega,a_b) = T^*(\omega,a_g) = T^{IMF}_{ob\max}(\omega,a_g) = T^{*g}_{ob}(\omega,a_g) = T^0(\omega)$$

Hence, the only role conditionality ends up playing in this case is that of an efficiency tool. This is because when the IMF offers financing at an interest rate approaching the market rate, government utility at any given level of lobby's contribution is maximized at IMF "minimum credible" schedule, which effectively removes the borrowing constraint. Since *ex-post* the IMF is always better off by proving financing according to its "minimum credible" schedule and the government does not benefit from the loan amount higher than that determined by the equilibrium in a frictionless market, the IMF effectively cannot use conditionality as an incentive tool.

When the IMF provides its loan at a subsidy to the borrower ($r^L = r^B = r^* - \theta < r^*$), the borrower always benefits from IMF loan ($W_T > 0$) while the lender may be hurt beyond certain level of desired lending ($W^*_T < 0$). In this case, the IMF may find it optimal to trade-off some of lenders' resources for good policy, which reduces the likelihood of distorted outcomes and benefits the general public in both countries. When the IMF provides a loan at a subsidized interest rate, the role of conditionality is two-fold: an incentive tool for motivating the government to implement necessary policy changes and an "efficiency" tool for mitigating the presence of market frictions (borrowing constraint)[27]. Although the IMF cannot ensure an efficient market outcome in this case because of the distortions introduced by a subsidy, the world may be better off if the IMF offers a subsidized loan to the borrower if the IMF can induce good policy outcome, which otherwise would not be possible.

[27] I assume that the subsidy is small enough so that at least for some levels of distortions the lender would still benefit from IMF loan.

In either case the resulting policy choice is a matter of the competitive power of the IMF versus the domestic lobby. Note, however, that if the lobby faces a fixed cost to approach the government with its deal, the IMF would offer its "minimum credible" schedule for both good and bad policy when the lobby cannot win (whether it charges a subsidized interest rate or not) as the lobby would enter the competition with the IMF only if it can win. Hence, the role and optimal design of conditionality depend on the type of opposition reforms face and the terms of financing the IMF offers.

If the IMF moves first (Figure 2) it picks the "point" on the lobby's "reaction function" that provides the IMF with the highest utility. Subgame perfect equilibria in a sequential game can be characterized as follows (see Appendix 3 for details).

Proposition 3. *When government policy choice is observable and the IMF moves first, two sets of subgame perfect equilibria are possible*

1) *If the IMF is a potential winner* ($G_{\max}^{Lobby} < G_{ob\max}^{IMF}$)

- *the lobby offers any credible and feasible offer for bad policy and zero for good policy*

$C^*(\omega, a) = \{C^*(\omega, a_g) = 0 \forall \omega \in [0, \overline{\omega}]$, $C^*(\omega, a_b) =$ any credible lobby's offer$\}$

- *the IMF offers for good policy a schedule that provides the government with slightly higher utility than what it could obtain with "maximum feasible" lobby contribution under bad policy and for bad policy IMF "minimum" credible schedule*

$T^*(\omega, a) = \{T^*(\omega, a_b) = T^0(\omega), T^*(\omega, a_g) = T_{ob}^{*g}(\omega, a_g) \geq T^0(\omega) \ \forall \ \omega \in [0, \overline{\omega}]\}$

where $T_{ob}^{*g}(\omega, a_g)$ satisfies (1.23) and (1.24).

- *the government chooses good policy* $a^* = a_g$

2) *If the lobby is a potential winner* $G_{\max}^{Lobby} \geq G_{ob\max}^{IMF}$

- *the IMF offers its "minimum credible" schedule for bad policy and any credible contribution schedule for good policy, namely,*

  $T^*(\omega, a) = \{T^*(\omega, a_b) = T^0(\omega)$, any $T^*(\omega, a_g)$ *that satisfies FOC* (1.21) *and provides the government with at least the level of utility it attains under* $T^0(\omega)$ *when it chooses good policy and does not exceed the level of utility* $G_{ob\max}^{IMF}$ $\}$

- *the lobby enters the competition and offers zero for good policy and a schedule* $C^{*b}_{ob}(\omega, a_b)$ *for bad policy that reimburses the government for switching from good policy under IMF schedule* $T^*(\omega, a_g)$ *to bad policy under IMF schedule* $T^0(\omega)$ $C^*(\omega, a) = \{C^*(\omega, a_b) = C^{*b}_{ob}(\omega, a_b)\,, C^*(\omega, a_g) = 0 \;\forall\, \omega \in [0, \overline{\omega}]\}$
- *the government chooses bad policy* $a^* = a_b$

Again as in the case when the IMF and the lobby move simultaneously, the IMF offers its "minimum credible" schedule for both good and bad policy if it offers an interest rate close to the market rate. The equilibrium policy choice is simply a matter of whether the benefit to the government from a frictionless market outcome under a good policy exceeds the benefit of frictionless market outcome under a bad policy plus the "maximum" bribe the lobby can offer. When the loan is subsidized and the lobby is a potential winner, the IMF may offer a less attractive package for good policy (which will not be disbursed anyway) compared to the package it would offer in a simultaneous move game. Thus, the lobby is at least as well off in bad policy equilibrium in a sequential subgame perfect bad policy equilibrium as it is in a simultaneous game.

Note, however, that if the IMF could pre-commit not to disburse any amount when the government chooses bad policy, it might be better off as may be able to induce the good policy outcome in a situation when it cannot do without commitment. This is because for a lobby to win in this case, it would have to reimburse the government for switching from good policy under IMF "maximum feasible" schedule to bad policy under zero IMF contribution. And while the lobby may be able to reimburse the government to switching to bad policy under IMF "minimum credible" contribution, it may not be able to so when and the IMF disburses zero in case of bad policy choice. However, zero disbursement under a bad policy is not optimal for the IMF *ex-post*. Hence, IMF faces a time-inconsistency problem and the threat of zero disbursement is not credible.

Unobservable Case

No IMF and no Lobby

In the absence of both principals the government completely owns a reform program and would implement it even without the IMF. In this case the government attains utility $G_0^L = E_\omega\left[\alpha W(\omega, 0) \middle| a_g\right]$

IMF and no Lobby

Proposition 5. *When government policy choice is not observable to the IMF, and in the absence of a lobby the government chooses good policy and the IMF provides financing* *according to its "minimum credible" schedule* $T^0(\omega)$. *Hence, there is no loss of efficiency from unobservability.*

Since IMF "minimum credible" schedule $T^0(\omega)$ maximizes IMF utility *ex-ante* conditional on both good and bad policy in the absence of the lobby, the IMF will offer this schedule when policy choice is not observable. The total derivative of the borrower's welfare function with respect to distortions under the IMF "minimum credible" schedule is negative (see Appendix 4), that is, $\frac{d}{d\omega}W(\omega,T^0(\omega))<0$. Hence, the government is better off choosing good policy under this schedule (see Appendix 2) as

$$E_\omega\left[\alpha W(\omega,T^0(\omega))\middle| a_g\right] > E_\omega\left[\alpha W(\omega,T^0(\omega))\middle| a_b\right]$$

IMF and Lobby (Common Agency)

Unlike the IMF that can monitor government activities from "outside" only to a certain extent, the domestic lobbies are tightly integrated into the domestic political economy system and have significantly better information about government "moves" including actions that might not be visible to the IMF or indirect steps whose affect the IMF may not immediately recognize. Thus, it seems reasonable to assume that domestic lobbies can observe government policy choice.

First, consider the case when the IMF and the lobby move simultaneously (Figure 1 above). A subgame perfect Nash equilibrium in this case can be characterized as follows:

- $C^*(\omega,a)=\{C^*(\omega,a_b),C^*(\omega,a_g)\}$ and $T^*(\omega)$ are feasible with
  $C^*(\omega,a)\geq 0, T^*(\omega)\geq 0$ for $\forall\,\omega\in[0,\overline{\omega}]$ and $a\in\{a_g,a_b\}$ (1.25)
- $$a^* = \underset{a\in\{a_b,a_g\}}{\arg\max}\, E_\omega\left[aW\left(\omega,T^*(\omega)\right)+C^*(\omega,a)\middle| a\right] \quad (1.26)$$
- $$\left\{a^*,C^*(\omega,a)\right\} = \underset{a\in\{a_b,a_g\},C(\omega,a)}{\arg\max}\, E_\omega\left[V(\omega)-C(\omega,a)\middle| a\right] \quad (1.27)$$
- $$E_\omega\left[aW\left(\omega,T^*(\omega)\right)+C(\omega,a)\middle| a\right]\geq E_\omega\left[aW\left(\omega,T^*(\omega)\right)\middle| a_g\right]$$

s.t. $E_\omega\left[aW\left(\omega,T^*(\omega)\right)+C(\omega,a)\middle| a\right]\geq E_\omega\left[aW\left(\omega,T^*(\omega)\right)\middle| a_g\right]$ (1.28)

and $C(\omega,a)\geq 0$ (1.29)

- $$\left\{a^*,T^*(\omega)\right\} = \underset{a\in\{a_b,a_g\},T(\omega)}{\arg\max}\, E_\omega\left[\gamma W\left(\omega,T(\omega)\right)+W^*\left(\omega,T(\omega)\right)\middle| a\right] \quad (1.30)$$

s.t. $E_\omega\left[aW\left(\omega,T(\omega)\right)+C^*(\omega,a)\middle| a\right]\geq \max\limits_{a\in\{a_b,a_g\}} E_\omega\left[aW\left(\omega,T^0(\omega)\right)+C^*(\omega,a)\middle| a\right]$ (1.31)

a solves $\max_{\tilde{a}\in\{a_g,a_b\}} E_\omega\left[aW\left(\omega,T\left(\omega\right)\right)+C^*\left(\omega,\tilde{a}\right)\middle|\tilde{a}\right]$ (1.32)

and $T(\omega)\geq 0$ (1.33)

Constraint (1.32) is the incentive compatibility constraint. It insures that under the optimal contribution schedule from the lobby and the IMF, the government voluntarily chooses the policy desired by the IMF. This constraint has to be satisfied only if good policy is chosen in equilibrium. Since bad policy will be implemented only in the presence of the lobby and the lobby can observe government decision it will make sure that the government does not deviate from bad policy when “nobody is looking”. Individual rationality constraint (1.31) takes into account that $T^0(\omega)$ is the “minimum” schedule the IMF can credibly commit to.

As before, the maximum utility the lobby can insure the government with under bad policy is

$$G_{\max}^{Lobby}=E_\omega\left[aW\left(\omega,T^0\left(\omega\right)\right)+C_{\max}^{Lobby}\left(\omega,a_b\right)\middle|a_b\right] \tag{1.34}$$

where $C_{\max}^{Lobby}$ satisfies

$$C_{\max}^{Lobby}\left(\omega,a_b\right)=E_\omega\left[V\left(\omega\right)\middle|a_b\right]-E_\omega\left[V\left(\omega\right)\middle|a_g\right] \tag{1.35}$$

However, under unobservability the maximum utility level that the IMF can insure the government with if it chooses good policy $G_{unob\max}^{IMF}$ may be lower than that when the IMF can monitor government policy choice. The “maximum” IMF contribution schedule $T_{unob\max}^{IMF}(\omega,a_g)$ should still provide the IMF with provides the IMF with the lowest payoff, still at least as much as IMF’s payoff under bad policy, that is,

$$E_\omega\left[\gamma W(\omega,T_{unob\max}^{IMF}(\omega))+W^*(\omega,T_{unob\max}^{IMF}(\omega))\middle|a_g\right]\geq E_\omega\left[\gamma W(\omega,T^0(\omega))+W^*(\omega,T^0(\omega))\middle|a_b\right] \tag{1.36}$$

But now it also has to satisfy the first order condition from a more constrained IMF problem taking into account the incentive compatibility constraint (1.32), namely,

$$\begin{aligned}&\gamma W_T(\omega,T_{unob\max}^{IMF}(\omega))+W_T^*(\omega,T_{unob\max}^{IMF}(\omega))+\mu_1\alpha W_T(\omega,T_{unob\max}^{IMF}(\omega))\\&+\mu_2\alpha W_T(\omega,T_{unob\max}^{IMF}(\omega))\left[1-\frac{f(\omega|a_b)}{f(\omega|a_g)}\right]=-\frac{\lambda_{IMF}(\omega)}{f(\omega|a_g)}\end{aligned} \tag{1.37}$$

Essentially, the schedule $T_{unob\max}^{IMF}(\omega)$ determines the maximum average lobby’s contribution for bad policy that the IMF can outbid under unobservability. If the IMF were trying to reimburse the government for the loss in utility from switching to good policy under the same maximum lobby’s contribution that the IMF could outbid under observability ($C_{ob}^{*b}(\omega,a_b)$), it may attain lower utility as now it faces a more constrained problem. Thus, to keep IMF’s utility constant at the level defined in (1.36) the maximum average lobby's contribution that the IMF can outbid under unobservability should be no higher than that under observability.

This also implies that with the "maximum" IMF contribution under unobservability the government may attain lower utility than with the "maximum" IMF contribution under observability. Namely, under unobservability the maximum utility the IMF can insure the government with is

$$G^{IMF}_{unob\max} = E_{\omega}\left[aW\left(\omega, T^{IMF}_{unob\max}(\omega)\right) \middle| a_g \right] \le G^{IMF}_{ob\max} \qquad (1.38)$$

Subgame perfect equilibria for the case when the IMF and the lobby move simultaneously can be summarized as follows (Appendix 5 offers more details).

Proposition 6.

1) *If* $G^{Lobby}_{\max} < G^{IMF}_{unob\max}$ *(see(1.34) and(1.38)) then a set of good policy equilibria can be described as follows:*

- *the lobby offers its 'maximum feasible" contribution for bad policy and zero for good policy*

$$C^*(\omega, a) = \{C^*(\omega, a_b) = C^{Lobby}_{\max}(\omega, a_b),\ C^*(\omega, a_g) = 0\ \forall \omega \in [0, \overline{\omega}]\}, \qquad (a.39)$$

where $C^{Lobby}_{\max}(\omega, a_b)$ satisfies (1.18)

- *the IMF offers an outcomes-based schedule* $T^*(\omega) = T^{*g}_{unob}(\omega)$, which satisfies individual rationality constraint

$$E_{\omega}\left[\alpha W(\omega, T^{*g}_{unob}(\omega)) \middle| a_g \right] \ge E_{\omega}\left[\alpha W(\omega, T^0(\omega)) + C^{Lobby}_{\max}(\omega, a_b) \middle| a_b \right] + \varepsilon \qquad (a.40)$$

incentive compatibility constraint

$$E_{\omega}\left[\alpha W(\omega, T^{*g}_{unob}(\omega)) \middle| a_g \right] \ge E_{\omega}\left[\alpha W(\omega, T^{*g}_{unob}(\omega)) + C^{Lobby}_{\max}(\omega, a_b) \middle| a_b \right] \qquad (a.41)$$

and the following first order condition (μ_1 is Lagrange multiplier on the constraint (a.40) and μ_2 is Lagrange multiplier on the constraint (a.41)):

$$\begin{aligned} &\gamma W_T(\omega, T^{*g}_{unob}(\omega)) + W^*_T(\omega, T^{*g}_{unob}(\omega)) + \mu_1 \alpha W_T(\omega, T^{*g}_{unob}(\omega)) \\ &+ \mu_2 \alpha W_T(\omega, T^{*g}_{unob}(\omega)) \left[1 - \frac{f(\omega \mid a_b)}{f(\omega \mid a_g)} \right] = -\frac{\lambda_{IMF}(\omega)}{f(\omega | a_g)} \end{aligned} \qquad (a.42)$$

- *the government chooses good policy* $a^* = a_g$

2) *If* $G^{Lobby}_{\max} \geq G^{IMF}_{unob\max}$ *, there are no pure strategy equilibria in a simultaneous move game when the IMF offers subsidized loan.*

However, when the IMF offers its financing at an interest rate close to the market rate, the bad policy equilibrium can be characterized as follows ($r^B = r^* + \theta > r^*$ *and* $r^L = r^* - \theta < r^*$ *with* θ *approaching zero)*

- *the IMF offers its "minimum credible" efficiency schedule* $T^*(\omega) = T^0(\omega)$
- *the lobby offers zero for good policy and a schedule for bad policy that reimburses the government for switching from good to bad policy under IMF "minimum" efficiency schedule* $T^0(\omega)$*, namely,*

$$C^*(\omega, a) = \{C^*(\omega, a_b) = C^{*b}_{unob}(\omega, a_b)\, ,\, C^*(\omega, a_g) = 0\ \forall\, \omega \in [0, \overline{\omega}]\}$$

where $C^{*b}_{unob}(\omega, a_b)$ satisfies

$$E_\omega\left[C^{*b}_{unob}(\omega)\middle| a_b\right] = E_\omega\left[aW\left(\omega, T^0(\omega)\right)\middle| a_g\right] - E_\omega\left[aW\left(\omega, T^0(\omega)\right)\middle| a_b\right]$$

- *the government chooses bad policy* $a^* = a_b$

The schedule $T^*(\omega) = T^{*g}_{unob}(\omega)$ ensures that the government has enough incentives to voluntarily choose good policy. The optimal schedule in this case reflects the trade-off between risk-sharing an incentive. It rewards those outcomes that are more likely to occur under good policy and punishes those outcomes that are more likely to occur under bad policy choice. Hence, in order to motivate the government to adopt good policy when the IMF cannot monitor policy decisions, it shifts additional risk on the government but the average amount of financing required to induce good policy is higher in unobservable case.

Note, however, that when the IMF offers financing at an interest rate close to the market rate ($r^B = r^* + \theta > r^*$ and $r^L = r^* - \theta < r^*$ with θ approaching zero) the optimal outcomes-based schedule is the same as in the observable case, namely,
$T^*(\omega) = T^{IMF}_{unob\max}(\omega) = T^{*g}_{unob}(\omega) = T^0(\omega)$

This is because, the IMF cannot offer the government any better schedule that its "minimum credible" schedule in this case as this schedule also maximizes public welfare in the borrowing country and, hence, government welfare at any level of lobby's contribution. In this case it is not possible that both individual rationality and incentive compatibility constraints are binding. As at any schedule other than $T^0(\omega)$, the left-hand side of (a.41) will

be strictly lower than the left-hand side of (a.40) violating the latter constraint. Hence, the only possible solution is $T^0(\omega)$ under which both constraints are non-binding.
The result for the case when the lobby is a potential winner and the IMF offers financing at a subsidy is worth clarifying. To see that in this case there are no equilibria in pure strategies, first note that if there were bad policy equilibrium the IMF would not contribute more than its "minimum" schedule $T^0(\omega)$ in this equilibrium since under unobservability the IMF cannot differentiate between the two policy options. In this case the best response for the lobby is to offer reimbursement to the government for the utility loss when moving from good to bad policy under IMF contribution $T^0(\omega)$, namely, the lobby offers

$$E_\omega\left[C^{*b}_{unob}\left(\omega\right)\middle|a_b\right]=E_\omega\left[aW\left(\omega,T^0\left(\omega\right)\right)\middle|a_g\right]-E_\omega\left[aW\left(\omega,T^0\left(\omega\right)\right)\middle|a_b\right] \qquad (1.43)$$

However, if the lobby offers $C^{*b}_{unob}(\omega)$ as in (1.43), the IMF can do better by redesigning its schedule such that to provide the government with a little bit more utility and induce good policy. In turn, the best response for the lobby is to reimburse the government for the loss in utility when switching to bad policy under this new IMF schedule. The process will continue up to the point where the IMF offers its "maximum" schedule under unobservability, namely, $T^{IMF}_{unob\max}(\omega)$. At this point the IMF does not find it worthwhile to increase its offer since it is indifferent between offering $T^{IMF}_{unob\max}(\omega)$ for good policy and agreeing on bad policy. By assumption the lobby can win the competition ($G^{Lobby}_{\max} \geq G^{IMF}_{unob\max}$) and, therefore, it can induce bad policy at the point where the IMF exhausts its competitive power. Yet in response to bad policy the IMF will offer $T^0(\omega)$ and the process starts again. Thus, there is no equilibrium in pure strategies in the simultaneous move game when the IMF cannot observe policy choice. It should be also clear, why there exists bad policy equilibrium when the lobby is strong in case the IMF offers a loan at a close-to market interest rate, as in this case IMF "maximum feasible" schedule coincides with its "minimum credible" schedule.

When the IMF moves first (Figure 2) the lobby can induce bad policy equilibrium even when the IMF provides a loan at a subsidy. In this case the IMF simply picks the "point" on the lobby's "reaction function" that provides the IMF with maximum utility. Since the lobby can potentially win the competition it can induce bad policy under any credible IMF contribution schedule. Hence, the IMF cannot do better than offering $T^0(\omega)$ when the lobby is a potential winner. The results for this case can be summarized as follows (see Appendix 5 for details).

Proposition 7. *When the IMF cannot monitor government policy choice and moves first two sets of subgame perfect equilibria are possible:*

1) *If* $G^{Lobby}_{\max} < G^{IMF}_{unob\max}$ *then the good policy equilibrium is the same as when two principals move simultaneously and is described in part 1) of Proposition 6.*

- If $G^{Lobby}_{\max} \geq G^{IMF}_{unob\max}$ *then bad policy equilibrium is the same as describes in part 2) of Proposition 6 where* $T^0(\omega)$ *is a "minimum credible" schedule for either subsidized or close-to-market interest rate case.*

Hence, as in the observable case when the IMF charges close-to-market interest rate, the only role conditionality ends up playing is that of an efficiency tool. In this case, there is no loss of efficiency from unobservability as if the government would choose good policy under IMF efficiency schedule when the IMF can monitor government policy choice, it would do so also when the IMF cannot observe government policy.

Note that if the lobby faces a fixed entry cost, it will enter only if it can win the competition. In this case, the IMF would offer its "minimum credible" schedule $T^{*g}_{unob}(\omega) = T^0(\omega)$ when the lobby cannot, irrespective of the interest rate it charges as the lobby would enter the competition with the IMF only if it can win. There may be no loss of efficiency from unobservability in this case as well.

When the IMF does not provide a subsidy to the borrower or the lobby cannot freely access the government with its deal, moving towards outcome-based conditionality does not imply shifting more risk on the domestic government compared to the case when the IMF can monitor government actions. In this case the IMF is better off by switching to outcome-based conditionality as even small monitoring cost or the benefit from flexibility of policy choice would make outcomes based conditionality more attractive.

Depending on the type of opposition and the terms of IMF financing, the role of outcomes-based conditionality may be different. When the IMF offers a loan at a subsidized interest rate and can potentially win the competition with the lobby, outcomes-based conditionality may serve as an incentive tool to motivate the government to adopt good policies. In the presence of strong opposition and when the IMF offers essentially market terms of financing conditionality plays a role of an efficiency tool.

While as in the observable case, the equilibrium policy choice is determined by the competitive power of the IMF versus the domestic lobby, unobservability may weaken IMF competitive power as the maximum utility the IMF can insure the government with under unobservability ($G^{IMF}_{unob\max}$) may be lower than that under observability ($G^{IMF}_{ob\max}$).

If bad policy arises in equilibrium when the IMF can monitor government decisions, it will be also an equilibrium policy in unobservable case. In bad policy equilibrium in a sequential game (Proposition 7) the government is no better off, the lobby is at least as well off and the IMF receives the same payoff when it cannot monitor government policy decisions compared to the case when policy choice is observable (Proposition 3). In some cases, the IMF may not be able to induce good policy under unobservability even if it could do so when policy choice is observable. Thus, the only player who never loses from the fact that the IMF does not observe government decisions is the lobby.

Conclusions

The paper employs a principle-agent framework to analyze the role and optimal design of outcome-based conditionality in the presence of opposition to reforms and with clearly defined objective function for the IMF, namely, to maximize joint welfare of its members in the presence of market frictions and heterogeneity of interests in the borrowers' country.

The results suggest that outcomes-based conditionality may be a good option for the IMF when opposition to reforms is relatively weak as it provides the benefit of flexibility and allows the IMF to save on monitoring costs without loss of efficiency from unobservability. The benefit of moving towards outcome-based conditionality in the presence of strong opposition to reforms, however, is less clear and the role and optimal design of conditionality depend on the type of opposition reforms face.

In the presence of powerful special interests, who extract significant rents from economic distortions and can "insure" the government against unfavorable outcomes, conditioning IMF financing on outcomes may not lead to a strengthening of authorities' incentives to achieve a better outcome. In essence, the lobby "undoes" everything the IMF does to motivate the government to implement policy changes. If the lobby can offer authorities a "bribe" that outweighs the value of adopting reforms, including that of IMF financing, the best the IMF can credibly commit to in this case is to provide financing such that to mitigate the presence of market frictions (the borrowing constraint).

The equilibrium policy choice is a matter of the "competitive power" of the IMF versus the domestic lobby. Non-obseravability, however, weakens the IMF competitive power and the lobby turns out to be the only "player" who never loses from the fact that the IMF cannot monitor policy decisions.

In order to be able to use conditionality as an incentives device the IMF might need to offer financing at a subsidized interest rate. The optimal conditionality schedule in this case reflects a trade-off between risk-sharing and incentive and shifts additional risk on the government. It should also take political constraints into account. However, the average amount of transfer from the lender to the borrower required to induce good policy when the IMF cannot monitor government policy decisions is higher compared to the observable case.

While clearly a theoretical possibility, it is not clear whether such conditionality can be properly designed in practice given the complexity of the relationship between policies and outcomes in IMF-supported programs. Empirical evidence on the effectiveness of performance-based incentives in the public sector[28] suggests (see Dixit (2000b)) that those

[28] See for example, the analysis of the success of a program on Performance Based Organizations launched in 1993 in the US, which in some sense is akin to outcome-based conditionality.

incentives work well in agencies where performance is relatively easily and unambiguously measurable. It is hard to argue that this is the case with IMF programs.

Without explicitly modeling the benefit from flexibility authorities obtain when they can choose their own economic policies, the model cannot answer the question on the ultimate effectiveness of outcome-based conditionality but the results suggest that the optimal design and role of such conditionality will be quite different depending on the terms of IMF financing and the type and strength of opposition reforms face. To make a definitive conclusion on the effectiveness of performance based incentives in IMF-supported programs, more empirical research is needed.

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Appendix 1. Properties of the Welfare Functions

Domestic and foreign residents choose consumption and investment after the level of distortions is observed and the IMF has disbursed its loan. Hence, there is no uncertainty for the domestic and foreign consumers and they take the level of distortions and IMF financing as given. The size of the foreign country is normalized to one and the size of the home country is n (n<1 reflecting the fact that the borrowing country is smaller compared to the lender country).

First I consider a benchmark case in a frictionless market and in the absence of the IMF. Then I analyze the properties of the welfare function when the home country faces an exogenous borrowing constrain, which reflects the presence of market frictions in the presence of IMF.

- **Frictionless market in the absence of the IMF**

A home resident solves:

$$\max_{C_1, C_2, I, B} U(C_1) + \delta U(C_2)$$

subject to the constraints:

$$C_1 = Y_0 - I + B$$

$$C_2 = g(I, \omega) - (1 + r^*) B$$

where I,C and B are per capita investment, consumption and borrowing and $g(I, \omega)$ is a per capita production function. FOCs for this problem are

$U'(C_1^{FM}) = \delta U'(C_1^{FM})(1 + r^*)$ and $U'(C_1^{FM}) = \delta U'(C_1^{FM}) g_I(I^{FM}, \omega)$.

A foreign resident solves

$$\max_{C_1^*, C_2^*, I^*, B^*} U(C_1^*) + \delta^* U(C_2^*)$$

subject to the constraints:

$$C_1^* = Y_0^* - I^* + B^*$$

$$C_2^* = g^*(I^*, \omega) - (1 + r^*) B^*$$

FOCs:

$$U'(C_1^{*FN}) = \delta^* U'(C_2^{*FM})(1 + r^*)$$

$$U'(C_1^{*FM}) = \delta^* U'(C_2^{*FM}) g_I^*(I^{*FM}, \omega)$$

In equilibrium in a frictionless market, return on investment is equalized across countries and is equal to frictionless market interest rate, namely, $g_I(I^{FM},\omega) = (1+r^*) = g_I^*(I^{*FM},\omega)$.
I consider two cases: i) when the IMF charges the borrower and the lender an interest rate close to the market rate, namely, the borrower pays slightly higher than the market rate $r^B = r^* + \theta > r^*$, while the lender receives slightly lower that the market rate $r^L = r^* - \theta < r^*$ with θ approaching zero and ii) when the borrower receives a subsidized loan from the IMF $r^B = r^L = r^* - s$ and the lender receives below-the-market rate on IMF loan.

- **Home resident solves:**

$$\max_{C_1, C_2, I, B} U(C_1) + \delta U(C_2)$$

subject to the constraints:

$$C_1 = Y_0 - I + T + B$$

$$C_2 = g(I,\omega) - (1+r^B)T - (1+r^*)B$$

$$B \le 0$$

The borrowing constraint reflects market frictions. Utility function is assumed to be twice continuously differentiable and concave. The properties of the production function are as follows $g_I > 0$; $g_\omega < 0$; $g_{II} < 0$; $g_{\omega\omega} < 0$ and $g_{I\omega} < 0$.

FOCs for this problem are:
$U'(C_1) = \delta U'(C_2)(1+r^*) + \lambda_B$ and $U'(C_1) = \delta U'(C_2) g_I(I,\omega)$.

The complementary slackness condition $\lambda_B \mathrm{B} = 0$ implies that $\lambda_B = 0 \;\; if \;\; \mathrm{B} < 0$ and $\lambda_B \ge 0 \;\; if \;\; \mathrm{B} = 0$.

These equations define investment $I^0(\omega,T)$ and the amount of private borrowing $B^0(\omega,T)$ as functions of the amount of distortions ω and IMF loan. The equations also imply that $\delta U'(C_2^0)\left[g_I(I^0,\omega) - (1+r^*)\right] = \lambda_B \ge 0$ and since the first derivative of the utility function is positive it should be the case that $g_I(I^0,\omega) \ge (1+r^*)$.

The indirect utility function of home residents can be written as

$$W(\omega,T) = U(Y_0 - I^0(\omega) + T + B^0(\omega,T)) + \delta U(g(I^0(\omega),\omega) - (1+r^B)T - (1+r^*)B^0(\omega,T))$$

Depending on the level of distortions and amount of IMF loan, two cases may arise. The first case corresponds to the situation when in a frictionless market the home country would borrow a positive amount from foreign residents. In the presence of the borrowing constraint, however, it cannot borrow as much as it would like and the marginal product of investment is higher than the risk-free market rate. The second case corresponds to the situation when the return on domestic investment is low making it beneficial for the home country to lend abroad and the borrowing constraint is not binding. Which situation arises in practice depends on the amount of realized distortions and IMF loan[29].

Case 1. Borrowing constraint is binding $\mathrm{B}^0 = 0$ *and* $\lambda_B \geq 0$.

In this case we can write the equilibrium consumption levels as

$$C_1^0 = Y_0 - I^0(\omega, T) + T\ ;\ C_2^0 = g(I^0(\omega, T), \omega) - (1 + r^B)T$$

and the indirect utility function of the Home residents as

$$W(\omega, T) = U(Y_0 - I^0(\omega, T) + T) + \delta U(g(I^0(\omega, T), \omega) - (1 + r^B)T)$$

The derivatives of the indirect utility function with respect to the parameters *T* and ω, which the representative consumer takes as given, can be obtained using envelope theorem. Differentiating FOCs with respect to parameters, we can obtain the derivative of optimal investment level with respect to distortions and IMF loan.

IMF financing is beneficial for home residents since in this case the IMF helps domestic country to relax the borrowing constraint (for notational simplicity, I omit the arguments of the production function below):

$$W_T = U'(C_1^0) - \delta U'(C_2^0)(1 + r^B) = \delta U'(C_2^0)[g_I - (1 + r^B)] \geq 0 \qquad \text{(a.44)}$$

I assume that when $r^B = r^* + \theta > r^*$, θ is close to zero so that $[g_I - (1 + r^B)] \geq 0$. If $r^B = r^* - s < r^*$ then home consumers definitely benefit from IMF loan at the margin ($W_T > 0$).

Home consumers are hurt by distortions:

$$W_\omega = \delta U'(C_2^0) g_\omega < 0 \qquad \text{(a.45)}$$

It is not clear how optimal investment level changes with distortions:

[29] Note that this Appendix provides the properties of the indirect utility functions of IMF borrower and lender for any given amount of IMF loan and distortions. The amount of IMF loan chosen in equilibrium will depend on the properties of these functions.

$$I_\omega^0 = -\frac{\delta\overbrace{[U''(C_2^0)g_\omega g_I + U'(C_2^0)g_{I\omega}]}^{?}}{\underbrace{\delta U''(C_2^0)(g_I)^2 + \delta U'(C_2^0)g_{II} + U''(C_1^0)}_{(-)}}$$

Investment level might increase with distortions if $g_\omega g_I U''(C_2^0) + U'(C_2^0)g_{I\omega} > 0$. To understand this result, consider the case when the marginal product of investment is not affected by distortions, that is, when $g_{I\omega} = 0$. In this case, investment would unambiguously increase with higher levels of distortions ($I_\omega^0 > 0$). This is because, while higher distortions negatively affect output, they do not lower the return on investment, which by assumption in this case is high (higher than the risk-free return on investment abroad). Hence, a consumer, who engages in intertemporal smoothing, will counteract the negative effect of distortions on output by increasing investment. When the marginal product of investment is lowered by distortions ($g_{I\omega} < 0$), the incentives to increase investment are reduced and with sufficiently high burden of distortions on investment return when $U''(C_2^0)g_\omega g_I < U'(C_2^0)g_{I\omega}$, investment will decline in response to distortions increase.

Investment is increasing with IMF loan as IMF financing relaxes the borrowing constraint in a situation when return on investment is high:

$$I_T^0 = \frac{\overbrace{\delta(1+r^B)U''(C_2^0)g_I + U''(C_1^0)}^{(-)}}{\underbrace{\delta U''(C_2^0)(g_I)^2 + \delta U'(C_2^0)g_{II} + U''(C_1^0)}_{(-)}} > 0$$

The indirect utility function is concave with respect to the IMF loan:

$$W_{TT} = \frac{\overbrace{[g_I - (1+r^B)]^2 \delta U''(C_1^0)U''(C_2^0)}^{(+)} + \overbrace{\delta U'(C_2^0)g_{II}[U''(C_1^0) + \delta(1+r^B)^2 U''(C_2^0)]}^{(+)}}{\underbrace{\delta U''(C_2^0)(g_I)^2 + \delta U'(C_2^0)g_{II} + U''(C_1^0)}_{(-)}} < 0$$

(a.46)

The sign of the cross-partial with respect to IMF loan is ambiguous:

$$W_{\omega T} = \underbrace{-I_T I_\omega^0}_{(?)}\underbrace{\left[\delta U''(C_2^0)(g_I)^2 + \delta U'(C_2^0)g_{II} + U''(C_1^0)\right]}_{(-)}\underbrace{-\delta U''(C_2^0)(1+r^B)g_\omega}_{(-)}$$

The sign of this derivative depends on the effect of distortions on investment. If investment is decreasing with distortions ($I_\omega^0 < 0$), the marginal utility of IMF loan is decreasing with distortions as well. If investment increases with distortions, the marginal utility of IMF loan may be increasing depending on the benefit from higher investment versus the direct cost imposed by distortions on production.

The second derivative with respect to distortions cannot be signed but it is not relevant for any calculations in the paper and, hence, omitted.

Case 2. Borrowing constraint is not binding $\mathrm{B}^0 < 0$ *and* $\lambda_B = 0$.

FOCs in this case become

$$U'(C_1) = \delta U'(C_2)(1+r^*)$$
$$U'(C_1) = \delta U'(C_2) g_I(I,\omega)$$

and, consequently, $1+r^* = g_I(I,\omega)$, which means that domestic investment is independent of IMF loan ($I^0 = I^0(\omega)$) and $I^0_\omega = -\dfrac{g_{I\omega}}{g_{II}} < 0$ while $I^0_T = 0$.

In this case equilibrium consumption levels are

$$C_1^0 = Y_0 - I^0(\omega) + T + B^0(\omega,T)$$
$$C_2^0 = g(I^0(\omega),\omega) - (1+r^B)T - (1+r^*)B^0(\omega,T)$$

and the indirect utility function of home residents can be written as

$$W(\omega,T) = U(Y_0 - I^0(\omega) + T + B^0(\omega,T)) + \delta U(g(I^0(\omega),\omega) - (1+r^B)T - (1+r^*)B^0(\omega,T))$$

The higher the level of distortions, the more domestic residents would choose to lend abroad:

$$B^0_\omega = \frac{\overbrace{U''(C_1^0)I^0_\omega}^{(+)} + \overbrace{\delta U''(C_2^0)(1+r^*)[g_I I_\omega + g_\omega]}^{(+)}}{\underbrace{U''(C_1^0) + \delta U''(C_2^0)(1+r^*)^2}_{(-)}} < 0$$

Hence, the borrowing constraint is more likely to bind at the low levels of distortions when the return on domestic investment is relatively high, while with high distortions home residents are better off by lending to foreigner at a risk-free interest rate *r**.

Also keeping other things constant the IMF borrower would lend abroad more the higher is the amount of IMF financing

$$B_T^0 = -\frac{\overbrace{\delta U''(C_2^0)(1+r^*)(1+r^B)}^{(-)} + \overbrace{U''(C_1^0)}^{(-)}}{\underbrace{U''(C_1^0) + \delta U''(C_2^0)(1+r^*)^2}_{(-)}} < 0$$

The presence of positive interest rate wedge discourages the borrower from IMF financing when the borrowing constraint is not binding, while the presence of interest rate subsidy makes IMF loan always attractive to the home consumer.

$$W_T = \delta U'(C_2^0)\left[r^* - r^B\right] < 0 \text{ if } r^B = r^* + \theta > r^* \quad \text{(a.47)}$$

$$W_T = \delta U'(C_2^0)\left[r^* - r^B\right] > 0 \text{ if } r^B = r^* - s < r^* \quad \text{(a.48)}$$

Other properties of the indirect utility function of home residents in this case are

$$W_\omega = \delta U'(C_2^0) g_\omega < 0 \quad \text{(a.49)}$$

$$W_{TT} = \frac{\overbrace{\delta U''(C_1^0)U''(C_2^0)(r^* - r^B)^2}^{(+)}}{\underbrace{U''(C_1^0) + \delta U''(C_2^0)(1+r^*)^2}_{(-)}} < 0 \quad \text{(a.50)}$$

$$W_{T\omega} = \frac{\overbrace{\delta U''(C_1^0)U''(C_2^0)g_\omega(r^* - r^B)}^{(+)}}{U''(C_1^0) + \delta U''(C_2^0)(1+r^*)^2} < 0 \text{ if } r^B = r^* + \theta > r^* \quad \text{(a.51)}$$

$$W_{T\omega} = \frac{\overbrace{\delta U''(C_1^0)U''(C_2^0)g_\omega(r^* - r^B)}^{(-)}}{U''(C_1^0) + \delta U''(C_2^0)(1+r^*)^2} > 0 \text{ if } r^B = r^* - s < r^* \quad \text{(a.52)}$$

- **Foreign resident solves:**

$$\max_{C_1^*, C_2^*, I^*, B^*} U(C_1^*) + \delta^* U(C_2^*)$$

subject to the constraints:

$$C_1^* = Y_0^* - I^* - nT + B^*$$

$C_2^* = g^*(I^*, \omega) + (1+r^L)nT - (1+r^*)B^*$
$B^* \geq 0$

The latter condition reflects the lending constraint that the foreign country faces, that is, foreign country cannot lend but can only borrow from the home country. For simplicity I assume that consumers in the home country have the same preferences as consumers in the foreign country and the production function has the following properties: $g_I^* > 0$; $g_\omega^* \leq 0$; $g_{II}^* < 0$; $g_{\omega\omega}^* \leq 0$ and $g_{I\omega}^* \leq 0$.

FOCs:

$$U'(C_1^*) = \delta^* U'(C_2^*)(1+r^*) - \lambda_B^*$$
$$U'(C_1^*) = \delta^* U'(C_2^*) g_I^*(I^*, \omega)$$

And $\lambda_B^* = 0$ if $\mathrm{B}^* > 0$ and $\lambda_B^* \geq 0$ if $\mathrm{B}^* = 0$.

The FOCs and complementary slackness condition define investment $I^{*0}(\omega, T)$ and the amount of private borrowing $B^{*0}(\omega, T)$ as functions of the amount of distortions and IMF loan and imply that $\delta^* U'(C_2^{*0})\left[g_I^*(I^{*0}, \omega) - (1+r^*)\right] = -\lambda_B^* \leq 0$ and since the first derivative of the utility function is positive it should be the case that $\left[g_I^*(I^{*0}, \omega) - (1+r^*)\right] \leq 0$.

The indirect utility function of foreign residents can be written as

$$W^*(\omega, T) = U(Y_0^* - I^{*0}(\omega, T) - nT + B^{*0}(\omega, T)) + \delta^* U(g^*(I^{*0}(\omega, T), \omega) + (1+r^L)nT - (1+r^*)B^{*0}(\omega, T))$$

Depending on whether the lending constraint is binding or not two cases are possible.

Case 1. Lending constraint is binding $\mathrm{B}^{*0} = 0$ *and* $\lambda_B^* \geq 0$.

In this case we can write the equilibrium consumption levels as

$$C_1^* = Y_0^* - I^{*0}(\omega, T) - nT$$
$$C_2^* = g^*(I^{*0}(\omega, T), \omega) + (1+r^L)nT$$

and the indirect utility function of the foreign residents becomes

$$W^*(\omega, T) = U(Y_0^* - I^{*0}(\omega, T) - nT) + \delta^* U(g^*(I^{*0}(\omega, T), \omega) + (1+r^L)nT)$$

Using envelope theorem, the derivative of this function with respect to IMF loan

$W_T^* = -n\delta^* U'(C_2^{*0})\left[g_I^*(I^{*0}(\omega,T),\omega) - (1+r^L)\right] \geq 0 \quad r^L = r^* - \theta < r^*$ with θ close to zero(a.53)

$W_T^* = -n\delta^* U'(C_2^{*0})\left[g_I^*(I^{*0}(\omega,T),\omega) - (1+r^L)\right]$ ambiguous when $r^L = r^* - s < r^*$ (a.54)

When the IMF offers a loan at a subsidized rate the lender country may or may not benefit from IMF loan at the margin. If subsidy is sufficiently large the marginal utility of IMF loan may become negative even if the country would prefer to lend at a market rate r^*.

Hence, when the interest rate wedge is small, foreigners benefit from IMF loan at the margin as it helps to relax the lending constraint. When the subsidy *s* is sufficiently large the lender is hurt by IMF loan since the cost of subsidy, borne by the lender, outweighs the benefit from additional unit of lending.

Foreign residents may also be negatively affected by the home country distortions:

$$W_\omega^* = \delta^* U'(C_2^{*0}) g_\omega^* \leq 0 \qquad \text{(a.55)}$$

We can obtain the properties of the optimal investment by differentiating FOCs with respect to the parameters. Private borrowing does not change with the parameters, that is, $B_\omega^{*0} = 0$ and $B_T^{*0} = 0$.

The sign of the derivative of the optimal investment level with respect to distortions is ambiguous if distortions do spillover to the foreign country:

$$I_\omega^{*0} = -\frac{\delta^*[\overbrace{g_\omega^* g_I^* U''(C_2^{*0}) + U'(C_2^{*0}) g_{I\omega}^*}^{?}]}{\underbrace{\delta^* U''(C_2^{*0})\left(g_I^*\right)^2 + \delta U'(C_2^{*0}) g_{II}^* + U''(C_1^{*0})}_{(-)}}$$

Investment in the foreign country is decreasing with IMF loan:

$$I_T^{*0} = -\frac{n[\overbrace{U''(C_1^{*0}) + (1+r^L)\delta^* g_I^* U''(C_2^{*0})}^{(-)}]}{\underbrace{\delta^* U''(C_2^{*0})\left(g_I^*\right)^2 + \delta^* U'(C_2^{*0}) g_{II}^* + U''(C_1^{*0})}_{(-)}} < 0$$

The indirect utility function is concave with respect to IMF loan.

$$W_{TT}^{*} = \frac{\overbrace{[g_I - (1+r^L)]^2 \delta n^2 U''(C_1^0)U''(C_2^0)}^{(+)} + \overbrace{\delta n^2 U'(C_2^0) g_{II} [U''(C_1^0) + \delta(1+r^L)^2 U''(C_2^0)]}^{(+)}}{\underbrace{\delta U''(C_2^0)\left(g_I\right)^2 + \delta U'(C_2^0) g_{II} + U''(C_1^0)}_{(-)}} < 0$$

(a.56)

The sign of the cross-partial is not clear:

$$W_{\omega T}^{*} = \underbrace{-I_T^{*0} I_\omega^{*0}}_{?} \underbrace{\left[\delta^* U''(C_2^{*0})\left(g_I^*\right)^2 + \delta U'(C_2^{*0}) g_{II}^* + U''(C_1^{*0})\right]}_{(-)} + \underbrace{\delta^* U''(C_2^{*0}) g_\omega^* (1+r^L) n}_{(+)}$$

(a.57)

As in the case with home country it depends on the effect of distortions on investment versus the direct effect of distortions on output.

Case 2. Lending constraint is not binding $\mathrm{B}^{*0} > 0$ *and* $\lambda_B^* = 0$.

FOCs are

$$U'(C_1^*) = \delta^* U'(C_2^*)(1+r^*)$$
$$U'(C_1^*) = \delta^* U'(C_2^*) g_I^*(I^*, \omega)$$

Consequently, $1 + r^* = g_I^*(I^*, \omega)$ and $I^{*0} = I^{*0}(\omega)$ with the following properties

$$I_\omega^{*0} = -\frac{g_{I\omega}^*}{g_{II}^*} \leq 0$$
$$I_T^0 = 0$$

In this case equilibrium consumption levels are

$$C_1^{*0} = Y_0^* - I^{*0}(\omega) - nT + B^{*0}(\omega, T)$$
$$C_2^{*0} = g^*(I^{*0}(\omega), \omega) + (1+r^L)nT - (1+r^*)B^{*0}(\omega, T)$$

and the indirect utility function of foreign residents can be written as

$$W^*(\omega, T) = U(Y_0^* - I^{*0}(\omega) - nT + B^{*0}(\omega, T)) + \delta^* U(g^*(I^{*0}(\omega), \omega) + (1+r^L)nT - (1+r^*)B^{*0}(\omega, T))$$

The higher the level of distortions, the less foreign residents would choose to borrow if distortions can spill-over to the foreign country:

$$B_{\omega}^{*0} = \frac{\overbrace{U''(C_1^{*0}) I_{\omega}^{*0}}^{(+)} + \overbrace{\delta^* U''(C_2^{*0})(1+r^*)[g_I^* I_{\omega}^* + g_{\omega}^*]}^{(+)}}{\underbrace{U''(C_1^{*0}) + \delta U''(C_2^{*0})(1+r^*)^2}_{(-)}} \leq 0$$

$$B_T^{*0} = \frac{n\overbrace{\left[U''(C_1^{*0}) + \delta^*(1+r^L)U''(C_2^{*0})(1+r^*)\right]}^{(-)}}{\underbrace{U''(C_1^{0}) + \delta^* U''(C_2^{*0})(1+r^*)^2}_{(-)}} > 0$$

Foreign residents are hurt by an increase in IMF loan as the IMF provides financing at below-the-market rate.

$$W_T^* = -n\delta^* U'(C_2^{*0})\left[r^* - r^L\right] < 0 \tag{a.58}$$

The properties of the indirect utility function of the foreign residents in this case are

$$W_{\omega}^* = \delta^* U'(C_2^{*0}) g_{\omega}^* \leq 0$$

Lender welfare function is concave in IMF loan

$$W_{TT}^* = \frac{\overbrace{\delta^* n^2 U''(C_1^{*0}) U''(C_2^{*0})(r^* - r^L)^2}^{(+)}}{\underbrace{U''(C_1^{*0}) + \delta U''(C_2^{*0})(1+r^*)^2}_{(-)}} < 0 \tag{a.59}$$

And the marginal disutility of IMF loan decreases with distortions,

$$W_{T\omega}^* = -\frac{\overbrace{\delta^* n U''(C_1^{*0}) U''(C_2^{*0}) g_{\omega}^* (r^* - r^L)}^{(-)}}{\underbrace{U''(C_1^{*0}) + \delta^* U''(C_2^{*0})(1+r^*)^2}_{(-)}} \leq 0 \tag{a.60}$$

Note that if the borrowing country is small compared to the lender country ($n \to 0$)lender country welfare is not affected by IMF loan ($W_T^* \to 0$, $I_T^{*0} \to 0$, $W_{TT}^* \to 0$ and $W_{\omega T}^* \to 0$) whether the borrowing constraint is binding or not. It also seems reasonable to assume in this case that lender country production function is not affected by borrower's distortions, that is, $I_{\omega}^{*0} \to 0$ and $W_{\omega}^* \to 0$.

Appendix 2. Mathematical Reference

Proposition: Let *h(ω)* be a strictly decreasing (increasing) differentiable function of ω and let the distribution of ω conditional on a_b first order stochastically dominate the distribution of ω conditional on a_g, then conditional expectation of *h(ω)* given a_b is strictly less (greater) than conditional expectation of *h(ω)* given a_g.

Proof: First order stochastic dominance implies that $F(\omega|a_g) \geq F(\omega|a_b)\ \forall\omega \in [0,\overline{\omega}]$ with strict inequality for some open set $\Omega \in [0,\overline{\omega}]$ (here F is CDF of conditional distribution). From the properties of CDF we have:

$$F(0|a_g) = F(0|a_b) = 0 \text{ and } F(\overline{\omega}|a_g) = F(\overline{\omega}|a_b) = 1$$

$$f(\omega|a) = \frac{d}{d\omega}F(\omega|a)$$

Let first *h(ω)* be strictly decreasing, that is, $\frac{d}{d\omega}h(\omega) < 0\ \ \forall\omega \in [0,\overline{\omega}]$. Consider the following difference:

$$E[h(\omega)|a_b] - E[h(\omega)|a_g] = \int_0^{\overline{\omega}} h(\omega)f(\omega|a_b)d\omega - \int_0^{\overline{\omega}} h(\omega)f(\omega|a_g)d\omega$$

$$= \int_0^{\overline{\omega}} h(\omega)dF(\omega|a_b) - \int_0^{\overline{\omega}} h(\omega)dF(\omega|a_g)$$

Using integration by parts we obtain

$$E[h(\omega)|a_b] - E[h(\omega)|a_g] = \int_0^{\overline{\omega}} \underbrace{\left[F(\omega|a_g) - F(\omega|a_b)\right]}_{(+)} \underbrace{\left[\frac{d}{d\omega}h(\omega)\right]}_{(-)} d\omega < 0$$

The last inequality follows from first order stochastic dominance and the fact that *h(ω)* is strictly decreasing on the whole interval $[0,\overline{\omega}]$.

Similarly, for a strictly increasing function *h(ω)* such that $\frac{d}{d\omega}h(\omega) > 0\ \ \forall\omega \in [0,\overline{\omega}]$, we have

$$E[h(\omega)|a_b] - E[h(\omega)|a_g] = \int_0^{\overline{\omega}} h(\omega)f(\omega|a_b)d\omega - \int_0^{\overline{\omega}} h(\omega)f(\omega|a_g)d\omega = \int_0^{\overline{\omega}} \underbrace{\left[F(\omega|a_g) - F(\omega|a_b)\right]}_{(+)} \underbrace{\left[\frac{d}{d\omega}h(\omega)\right]}_{(+)} d\omega > 0$$

Appendix 3. Government Policy is Observable

Consider two possibilities in the common agency game.

- IMF is a potential winner ($G_{\max}^{Lobby} < G_{ob\max}^{IMF}$)

First, consider the case when the IMF and the lobby move simultaneously (Figure 1). Suppose the lobby enters the competition and the IMF wins. This happens if the government can attain a higher utility under the "maximum" schedule that the IMF is willing to contribute for good policy compared to the "maximum" schedule the lobby is willing to contribute for bad policy, that is, if $G_{\max}^{Lobby} < G_{ob\max}^{IMF}$. Since there are only two policy options I assume that when the two principals "tie", the government chooses bad policy. Thus, if the IMF can win, the government chooses good policy and attains utility $G_{\max}^{Lobby} + \varepsilon$, where ε is some small positive number. The equilibrium contribution schedule of the IMF in this case should satisfy

$$E_{\omega}\left[\alpha W(\omega, T_{ob}^{*g}(\omega, a_g)) \middle| a_g\right] \geq E_{\omega}\left[\alpha W(\omega, T^0(\omega)) + C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right] + \varepsilon \qquad \text{(a.61)}$$

and the first order condition (μ_1 is Lagrange multiplier on constraint (a.61)):

$$\gamma W_T(\omega, T_{ob}^{*g}(\omega, a_g)) + W_T^*(\omega, T_{ob}^{*g}(\omega, a_g)) + \mu_1 \alpha W_T(\omega, T_{ob}^{*g}(\omega, a_g)) = -\frac{\lambda_{IMF}(\omega)}{f(\omega | a_g)}$$

(a.62)

If lobby's competitive power, defined as the maximum utility the lobby can insure the government with under bad policy ($G_{\max}^{Lobby}$) is relatively weak, the IMF efficiency schedule $T^0(\omega)$ might be enough to outweigh lobby's contribution. Namely, if

$$E_{\omega}\left[\alpha W(\omega, T^0(\omega, a_g)) \middle| a_g\right] > E_{\omega}\left[\alpha W(\omega, T^0(\omega)) + C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right] = G_{\max}^{Lobby}$$

(a.63)

then $T_{ob}^{*g}(\omega, a_g) = T^0(\omega)$ is the optimal IMF schedule in good policy equilibrium.

Thus, the equilibrium in this case ($G_{\max}^{Lobby} < G_{ob\max}^{IMF}$) can be described as follows:

$$a^* = a_g$$

(a.64)

$C^*(\omega, a) = \{C^*(\omega, a_b) = C_{\max}^{Lobby}(\omega, a_b), C^*(\omega, a_g) = 0 \ \forall \omega \in [0, \overline{\omega}]\}$, where $C_{\max}^{Lobby}(\omega, a_b)$ satisfies $E_{\omega}\left[C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right] = E_{\omega}\left[V(\omega) \middle| a_b\right] - E_{\omega}\left[V(\omega) \middle| a_g\right]$

(a.65)

$$T^*(\omega, a) = \{T^*(\omega, a_b) = T^0(\omega), T^*(\omega, a_g) = T_{ob}^{*g}(\omega, a_g) \geq T^0(\omega) \ \forall \ \omega \in [0, \overline{\omega}]\}$$

where $T_{ob}^{*g}(\omega, a_g)$ satisfies (a.61) and **Error! Reference source not found.**.

In this equilibrium the payoffs to all the players are:

$$G_{ob}^{ge} = G_{\max}^{Lobby} + \varepsilon \tag{a.66}$$

$$IMF_{ob}^{ge} = E_{\omega}\left[\gamma W(\omega, T_{ob}^{*g}(\omega, a_g)) + W^{*}(\omega, T_{ob}^{*g}(\omega, a_g)) \middle| a_g\right] \tag{a.67}$$

$$L_{ob}^{ge} = E_{\omega}\left[V\left(\omega\right) \middle| a_g\right] \tag{a.68}$$

If the IMF moves first (Figure 2) it picks the "point" on the lobby's "reaction curve" that provides the IMF with the highest utility. If the IMF can potentially win the competition, the best response for a lobby is to outbid any IMF's contribution up to the lobby's "maximum" potential (and, thereby, induce bad policy) and to respond with any credible schedule for bad policy when the IMF offer for good policy provides the government with utility that exceeds maximum utility the lobby can insure the government with. For good policy the lobby always offers zero. Therefore, the IMF picks a schedule that is just enough to outweigh the lobby's "maximum" offer and induce good policy.

Hence, when the IMF is a potential winner ($G_{\max}^{Lobby} < G_{ob\max}^{IMF}$) the equilibrium in a sequential game can be described as follows:

$$a^{*} = a_g \tag{a.69}$$

$$C^{*}(\omega, a) = \{C^{*}(\omega, a_g) = 0 \forall \omega \in [0, \overline{\omega}],\ C^{*}(\omega, a_b) = \text{any credible lobby's offer}\} \tag{a.70}$$

$$T^{*}(\omega, a) = \{T^{*}(\omega, a_b) = T^{0}(\omega), T^{*}(\omega, a_g) = T_{ob}^{*g}(\omega, a_g) \geq T^{0}(\omega)\ \forall\ \omega \in [0, \overline{\omega}]\} \tag{a.71}$$

where $T_{ob}^{*g}(\omega, a_g)$ satisfies (a.61) and **Error! Reference source not found.**

In this equilibrium the payoffs to all the players are:

$$G_{ob}^{ge} = G_{\max}^{Lobby} + \varepsilon \tag{a.72}$$

$$IMF_{ob}^{ge} = E_{\omega}\left[\gamma W(\omega, T_{ob}^{*g}(\omega, a_g)) + W^{*}(\omega, T_{ob}^{*g}(\omega, a_g)) \middle| a_g\right] \tag{a.73}$$

$$L_{ob}^{ge} = E_{\omega}\left[V\left(\omega\right) \middle| a_g\right] \tag{a.74}$$

- Lobby is a potential winner ($G_{\max}^{Lobby} \geq G_{ob\max}^{IMF}$)

Again, first consider a simultaneous move game. If the lobby can induce bad policy the IMF will contribute its "minimum" schedule, namely, $T^*(\omega, a_b) = T^0(\omega)$ for bad policy and its "maximum feasible" schedule, namely, $T^*(\omega, a_g) = T^{IMF}_{ob\max}(\omega, a_g)$ that satisfies

$$E_\omega\left[\gamma W(\omega, T^{IMF}_{ob\max}(\omega, a_g)) + W^*(\omega, T^{IMF}_{ob\max}(\omega, a_g)) \middle| a_g\right] \geq E_\omega\left[\gamma W(\omega, T^0(\omega)) + W^*(\omega, T^0(\omega)) \middle| a_b\right] = \tag{a.75}$$

and the FOC

$$\gamma W_T(\omega, T^{*g}_{ob\max}(\omega, a_g)) + W^*_T(\omega, T^{*g}_{ob\max}(\omega, a_g)) + \mu_1 \alpha W_T(\omega, T^{*g}_{ob\max}(\omega, a_g)) = -\frac{\lambda_{IMF}(\omega)}{f(\omega|a_g)} \tag{a.76}$$

The lobby simply reimburses the government for the loss in utility when moving from good to bad policy under the "maximum feasible" IMF contribution, namely, lobby's contribution should satisfy:

$$E_\omega\left[C^{*b}_{ob}(\omega, a_b) \middle| a_b\right] = E_\omega\left[\alpha W(\omega, T^{IMF}_{ob\max}(\omega, a_g)) \middle| a_g\right] - E_\omega\left[\alpha W(\omega, T^0(\omega)) \middle| a_b\right] \tag{a.77}$$

Thus, when the lobby wins the competition ($G^{Lobby}_{\max} \geq G^{IMF}_{ob\max}$) the equilibrium in a simultaneous move game (Figure 1) can be described as follows:

$$a^* = a_b \tag{a.78}$$

$C^*(\omega, a) = \{C^*(\omega, a_b) = C^{*b}_{ob}(\omega, a_b),\ C^*(\omega, a_g) = 0\ \forall \omega \in [0, \overline{\omega}]\}$,

where $C^{*b}_{ob}(\omega, a_b)$ satisfies (a.77)

$T^*(\omega, a) = \{T^*(\omega, a_b) = T^0(\omega), T^*(\omega, a_g) = T^{IMF}_{ob\max}(\omega, a_g)\}$,

where $T^{IMF}_{ob\max}(\omega, a_g)$ satisfies (a.75) and (a.76)

In this equilibrium the payoffs to all the players are:

$$G^{be}_{ob} = G^{IMF}_{ob\max} \tag{a.79}$$

$$IMF^{be}_{ob} = E_\omega\left[\gamma W(\omega, T^0(\omega)) + W^*(\omega, T^0(\omega)) \middle| a_b\right] \tag{a.80}$$

$$L^{be}_{ob} = E_\omega\left[V(\omega) \middle| a_b\right] - E_\omega\left[C^{*b}_{ob}(\omega, a_b) \middle| a_b\right] \tag{a.81}$$

Now consider the case when the IMF moves first (Figure 2. If the lobby can win the competition then its best response to any credible IMF contribution is to always reimburse the government for the loss in utility when it switches from good to bad policy under a given IMF offer. Then the IMF receives the same payoff (IMF utility under bad policy choice) irrespective of which credible offer $T^{*g}_{ob}(\omega, a_g)$ it makes to the government for good policy.

Hence, any credible contribution schedule from the IMF that satisfies FOC **Error! Reference source not found.** can be an equilibrium offer for good policy. As before, for bad policy the IMF offers its "minimum" schedule $T^0(\omega)$. The lobby responds with $C_{ob}^{*b}(\omega)$ that satisfies:

$$E_\omega\left[C_{ob}^{*bs}(\omega)\middle|a_b\right] = E_\omega\left[\alpha W(\omega, T_{ob}^{*g}(\omega, a_g))\middle|a_g\right] - E_\omega\left[\alpha W(\omega, T^0(\omega))\middle|a_b\right] \qquad \text{(a.82)}$$

and offers zero for good policy.

To summarize, the equilibria in a sequential game (Figure 2) when the lobby wins the competition ($G_{\max}^{Lobby} \geq G_{ob\max}^{IMF}$) can be described as follows:

$a^* = a_b$

$T^*(\omega, a) = \{T^*(\omega, a_b) = T^0(\omega), \text{any}\, T^*(\omega, a_g) = T_{ob}^{*g}(\omega, a_g)$ that satisfies FOC **Error! Reference source not found.** and provides the government with at least the level of utility it attains under $T^0(\omega)$ when it chooses good policy and does not exceed the level of utility $G_{ob\max}^{IMF}$ defined as

$G_{\max}^{Lobby} = E_\omega\left[\alpha W(\omega, T^0(\omega)) + C_{\max}^{Lobby}(\omega, a_b)\middle|a_b\right]$

$C^*(\omega, a) = \{C^*(\omega, a_b) = C_{ob}^{*bs}(\omega, a_b)\, , C^*(\omega, a_g) = 0\ \forall \omega \in [0, \overline{\omega}]\}$,

where $C_{ob}^{*bs}(\omega, a_b)$ satisfies (a.82).

The payoffs to all the players in these equilibria are

$$G_{ob}^{bes} = E_\omega\left[\alpha W(\omega, T^0(\omega)) + C_{ob}^{*bs}(\omega, a_b)\middle|a_b\right] \leq G_{ob}^{be} = G_{ob\max}^{IMF} \qquad \text{(a.83)}$$

$$IMF_{ob}^{bes} = E_\omega\left[\gamma W(\omega, T^0(\omega)) + W^*(\omega, T^0(\omega))\middle|a_b\right] = IMF_{ob}^{be} \qquad \text{(a.84)}$$

$$L_{ob}^{bes} = E_\omega\left[V(\omega)\middle|a_b\right] - E_\omega\left[C_{ob}^{*bs}(\omega, a_b)\middle|a_b\right] \geq L_{ob}^{be} \qquad \text{(a.85)}$$

If there is no fixed entry cost for the lobby it would attain the same level of utility in the good policy equilibrium as when it does not enter competition (L_{ob}^{ge} as described in (a.68) and (a.74)). If the lobby has to pay an initial "bribe" to approach the government with its deal, it will do so only if it can win. If the lobby does not enter, the outcome is the same as when there is only the IMF and the domestic government.

Appendix 4. Welfare Function at the IMF "Minimum" Schedule

This Appendix demonstrates that at the optimal schedule $T^0(\omega)$ that maximizes IMF utility subject to non-negativity constraint only, the total derivative of the welfare function with respect to distortions level is negative wherever $T^0(\omega)$ is differentiable, namely,

$$\frac{d}{d\omega}W(\omega,T^0(\omega))<0$$

Consider the total derivative:

$$\frac{d}{d\omega}W(\omega,T^0(\omega))=\underbrace{W_\omega(\omega,T^0(\omega))}_{(-)}+\underbrace{W_T(\omega,T^0(\omega))}_{(+)}\underbrace{T^0_\omega(\omega)}_{?} \qquad \text{(a.86)}$$

- $T(\omega)$ is positive

For those levels of distortions where IMF offers non-zero amount the first order condition becomes: $\gamma W_T(\omega,T(\omega))+W_T^*(\omega,T(\omega))=0$. Differentiating it respect to the level of distortions we have

$$T^0_\omega(\omega)=-\frac{\gamma W_{T\omega}(\omega,T^0(\omega))+W^*_{T\omega}(\omega,T^0(\omega))}{\gamma W_{TT}(\omega,T^0(\omega))+W^*_{TT}(\omega,T^0(\omega))}$$
(a.87)

Case 1: $r^B=r^*+\theta>r^*$ and $r^L=r^*-\theta<r^*$ with θ close to zero.

- **The borrowing constraint is binding in the absence of the IMF**

In this case $W_T\geq 0$ and $W_T^*\geq 0$. For the FOC to hold it should the case that both $W_T=0$ and $W_T^*=0$. Hence, the IMF provides financing just enough to make the borrowing constraint non-binding. Differentiating these conditions with respect ω and rearranging we have $T^0_\omega(\omega)=-\frac{W_{T\omega}(\omega,T^0(\omega))}{W_{TT}(\omega,T^0(\omega))}<0$ as it follows from (a.51). Hence, $\frac{d}{d\omega}W(\omega,T^0(\omega))<0$ and public welfare of the borrower is decreasing in distortions at the optimal IMF conditionality schedule.

- **The borrowing constraint is not binding in the absence of the IMF**

In this case $W_T(\omega,T(\omega))<0$ and $W_T^*(\omega,T(\omega))<0$ and the IMF would never offer a non-zero amount of loan for those values of distortions at which the borrowing constraint is not binding in the absence of the IMF.

Case 2: $r^B = r^L = r^* - s$

- **The borrowing constraint is binding in the absence of the IMF**

I assume that subsidy is small and the IMF weighs borrower's welfare enough to eliminate the borrowing constraint at the optimum. From (a.48), (a.49),(a.50) and (a.52) it can be shown that

$$W_\omega(\omega,T^0(\omega))W_{TT}(\omega,T^0(\omega)) - W_T(\omega,T^0(\omega))W_{T\omega}(\omega,T^0(\omega)) = 0$$

(a.88)

Substituting (a.87) into (a.86) and using (a.88) we have

$$\frac{d}{d\omega}W(\omega,T^0(\omega)) = \frac{\left[\overbrace{\underbrace{W_\omega(\omega,T^0(\omega))W_{TT}^*(\omega,T^0(\omega))}_{(+)} - \underbrace{W_T(\omega,T^0(\omega))W_{T\omega}^*(\omega,T^0(\omega))}_{(-)}}^{(+)}\right]}{\underbrace{\gamma W_{TT}(\omega,T^0(\omega)) + W_{TT}^*(\omega,T^0(\omega))}_{(-)}} < 0$$

(a.89)

- **The borrowing constraint is not binding in the absence of the IMF**

Since in this case the IMF may offer financing at a subsidized interest rate to the borrower even when in the borrowing constraint is not binding in the absence of the IMF, (a.89) applies.

- $T(\omega)$ is zero

For those points where $T^0(\omega)=0$ and differentiable $T_\omega^0(\omega)=0$ and

$$\frac{d}{d\omega}W(\omega,T^0(\omega)) = \underbrace{W_\omega(\omega,T^0(\omega))}_{(-)} < 0$$

Hence, wherever $T^0(\omega)$ is differentiable we have $\frac{d}{d\omega}W(\omega,T^0(\omega))<0$.

There might be a set of points where $\mathrm{T}^0(\omega)$ is not differentiable, namely, where the schedule hits zero. These points, however, will be separated. To see this, imagine there were no non-negativity constraint. Given the assumptions on utility and production functions, we have $\frac{\partial^2}{\partial T^2}IMF = \gamma W_{TT}(\omega,T(\omega)) + W_{TT}^*(\omega,T(\omega)) \neq 0 \ \ \forall\omega\in[0,\overline{\omega}]$. Then the schedule that maximizes unconstraint IMF utility, denote it by $T^{0uncon}(\omega)$, would be continuously differentiable everywhere. Since $T^{0uncon}(\omega)$ is a continuous function of ω, if it ever falls below zero it will remain negative for some sufficiently close ω. For those ω, for which $T^{0uncon}(\omega)$ is negative, $\mathrm{T}^{0}(\omega)$ will be zero. Hence, once the schedule hits zero it will remain zero for some sufficiently close ω and the points where the schedule switches between positive and zero values will be separated. A set of separated points has Lebesgue measure zero and can be ignored for the purpose of integration.

Appendix 5. Government Policy is Unobservable

Consider two possibilities.

- IMF is a potential winner ($G_{\max}^{Lobby} < G_{unob\max}^{IMF}$)

First, consider the case when the IMF and the lobby move simultaneously (Figure 3). If $G_{\max}^{Lobby} < G_{unob\max}^{IMF}$ then the IMF can still win this competition under unobservability. The optimal contribution schedule of the IMF in this case should satisfy individual rationality constraint

$$E_{\omega}\left[\alpha W(\omega, T_{unob}^{*g}(\omega)) \middle| a_g\right] \geq E_{\omega}\left[\alpha W(\omega, T^0(\omega)) + C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right] + \varepsilon \qquad \text{(a.90)}$$

incentive compatibility constraint

$$E_{\omega}\left[\alpha W(\omega, T_{unob}^{*g}(\omega)) \middle| a_g\right] \geq E_{\omega}\left[\alpha W(\omega, T_{unob}^{*g}(\omega)) + C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right]$$

(a.91)

and the following first order condition (here μ_1 is Lagrange multiplier on constraint (a.40) and μ_2 is Lagrange multiplier on constraint (a.41)):

$$\gamma W_T(\omega, T_{unob}^{*g}(\omega)) + W_T^*(\omega, T_{unob}^{*g}(\omega)) + \mu_1 \alpha W_T(\omega, T_{unob}^{*g}(\omega))$$
$$+ \mu_2 \alpha W_T(\omega, T_{unob}^{*g}(\omega)) \left[1 - \frac{f(\omega \mid a_b)}{f(\omega \mid a_g)}\right] = -\frac{\lambda_{IMF}(\omega)}{f(\omega | a_g)} \qquad \text{(a.92)}$$

If the lobby's competitive power is relatively weak such that when the IMF can monitor government policy choice the optimal IMF schedule is the IMF efficiency schedule $T^0(\omega)$, then it will also be the optimal IMF offer under unobservability. In this case there is no efficiency loss from unobservability and all of the players receive the same payoffs.

If the IMF can win the competition under unobservability ($G_{\max}^{Lobby} < G_{unob\max}^{IMF}$) the equilibrium can be described as follows:

$$a^* = a_g \qquad \text{(a.93)}$$

$$C^*(\omega, a) = \{C^*(\omega, a_b) = C_{\max}^{Lobby}(\omega, a_b),\, C^*(\omega, a_g) = 0 \;\forall \omega \in [0, \overline{\omega}]\}, \qquad \text{(a.94)}$$

where $C_{\max}^{Lobby}(\omega, a_b)$ satisfies

$$E_{\omega}\left[C_{\max}^{Lobby}(\omega, a_b) \middle| a_b\right] = E_{\omega}\left[V(\omega) \middle| a_b\right] - E_{\omega}\left[V(\omega) \middle| a_g\right]$$

$T^*(\omega) = T_{unob}^{*g}(\omega)$, where $T_{unob}^{*g}(\omega)$ satisfies (a.40), (a.41) and (a.42)

(a.95)

In this equilibrium the payoffs to all the players are:

$$G^{ge}_{unob} = G^{Lobby}_{\max} + \varepsilon = G^{ge}_{ob} \quad \text{(a.96)}$$

$$IMF^{ge}_{unob} = E_{\omega}\left[\gamma W(\omega, T^{*g}_{unob}(\omega)) + W^{*}(\omega, T^{*g}_{unob}(\omega)) \middle| a_g\right] \le IMF^{ge}_{ob} \quad \text{(a.97)}$$

$$L^{ge}_{unob} = E_{\omega}\left[V(\omega) \middle| a_g\right] = L^{ge}_{ob} \quad \text{(a.98)}$$

Now consider the case when the IMF moves first (Figure 4). The IMF picks the "point" on the lobby's "reaction curve" that guarantees the IMF the highest utility. If the IMF can potentially win the competition, the best response for a lobby is to outbid any IMF's contribution up to the lobby's "maximum" potential (and, thereby, induce bad policy) and to respond with any credible schedule for bad policy when IMF offer provides the government with utility that exceeds maximum utility the lobby can insure the government with. For good policy the lobby always offers zero. Therefore, the IMF picks a schedule that is just enough to outweigh the lobby's "maximum" offer under unobservability and, thereby, induces good policy.

Hence, when the IMF is a potential winner ($G^{Lobby}_{\max} < G^{IMF}_{ob\max}$) the equilibrium in a sequential game can be described as follows:

$$a^{*} = a_g \quad \text{(a.99)}$$

$$C^{*}(\omega, a) = \{C^{*}(\omega, a_g) = 0 \,\forall\, \omega \in [0, \overline{\omega}],\ C^{*}(\omega, a_b) \text{ is any credible lobby's offer}\} \quad \text{(a.100)}$$

$$T^{*}(\omega) = T^{*g}_{unob}(\omega), \text{ where } T^{*g}_{unob}(\omega) \text{ satisfies (a.40), (a.41) and (a.42)} \quad \text{(a.101)}$$

In this equilibrium the payoffs to all the players are:

$$G^{ge}_{unob} = G^{Lobby}_{\max} + \varepsilon = G^{ge}_{ob} \quad \text{(a.102)}$$

$$IMF^{ge}_{unob} = E_{\omega}\left[\gamma W(\omega, T^{*g}_{unob}(\omega)) + W^{*}(\omega, T^{*g}_{unob}(\omega)) \middle| a_g\right] \le IMF^{ge}_{ob} \quad \text{(a.103)}$$

$$L^{ge}_{unob} = E_{\omega}\left[V(\omega) \middle| a_g\right] = L^{ge}_{ob} \quad \text{(a.104)}$$

- Lobby is a potential winner ($G^{Lobby}_{\max} \ge G^{IMF}_{unob\max}$)

It turns out that when the lobby can potentially win the competition with the IMF there is no equilibrium in pure strategies if the IMF and the lobby move simultaneously (Figure 3) and the IMF offers a loan at a subsidized interest rate. This case is discussed in detail in the paper.

But when the IMF moves first the lobby can induce bad policy equilibrium. In this case the IMF simply picks the point on the lobby's "reaction function" that provides the IMF with maximum utility. Since the lobby can win the competition it can induce bad policy under any credible IMF contribution schedule. Thus, the IMF cannot do better than offering $T^{0}(\omega)$ for bad policy.

Therefore, the equilibrium in a sequential game when the lobby can win the competition ($G_{\max}^{Lobby} \geq G_{unob\max}^{IMF}$) is described as follows:

$$a^* = a_b \tag{a.105}$$

$$C^*(\omega, a) = \{C^*(\omega, a_b) = C_{unob}^{*b}(\omega, a_b)\,, C^*(\omega, a_g) = 0\ \forall\, \omega \in [0, \overline{\omega}]\},$$

where $C_{unob}^{*b}(\omega, a_b)$ satisfies

$$E_\omega\left[C_{unob}^{*b}(\omega)\middle| a_b\right] = E_\omega\left[\alpha W(\omega, T^0(\omega))\middle| a_g\right] - E_\omega\left[\alpha W(\omega, T^0(\omega))\middle| a_b\right]$$

$$T^*(\omega) = T^0(\omega)$$

The payoffs to all the players in this equilibrium are:

$$G_{unob}^{bes} = E_\omega\left[\alpha W(\omega, T^0(\omega))\middle| a_b\right] \leq G_{ob}^{bes} \tag{a.106}$$

$$IMF_{unob}^{bes} = E_\omega\left[\gamma W(\omega, T^0(\omega)) + W^*(\omega, T^0(\omega))\middle| a_b\right] = IMF_{ob}^{bes} \tag{a.107}$$

$$L_{unob}^{bes} = E_\omega\left[V(\omega)\middle| a_b\right] - E_\omega\left[C_{unob}^{*b}(\omega, a_b)\middle| a_b\right] \geq L_{ob}^{bes} \tag{a.108}$$

If there is no cost for the lobby to approach the government, it would attain the same utility in the good policy equilibrium as when it does not enter (see (a.98) and (a.104)). Thus, if the lobby has to pay an “entry” cost simply for approaching the government with its deal it will do so only if it can win.