Renegotiation, Collective Action Clauses and Sovereign Debt Markets[*]

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Abstract

Collective action clauses (CACs) are provisions specifying that a supermajority of bondholders can change the terms of a bond. We study how CACs determine governments' fiscal incentives, sovereign bond prices and default probabilities in environments with and without contingent debt and IMF presence. We claim that CACs are likely to be an irrelevant dimension of debt contracts in current sovereign debt markets because of the variety of instruments utilized by sovereigns and the implicit IMF guarantee. Nonetheless, under a new international bankruptcy regime like that recently proposed by the IMF, CACs can increase significantly the cost of borrowing for sovereigns, contrary to what is suggested in previous empirical literature.

Keywords: Sovereign debt; Collective action clauses; Renegotiation; Moral hazard; International bankruptcy court.

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1 *Introduction*

Collective action clauses (CACs) are provisions in debt contracts specifying that the terms of the contract regarding principal, interest, and maturity can change if there is consent of a predetermined supermajority of bondholders. This paper studies how CACs determine governments' fiscal incentives, bond yields, and default probabilities. Understanding these interactions is essential for the design of the so-called "Sovereign Debt Restructuring Mechanism" (SDRM) proposed by the IMF and currently under discussion.[1]

CACs introduce flexibility in situations of financial distress by facilitating renegotiation.[2] In their absence, bondholders have no incentives to enter in the renegotiation process since, individually, they are unable to affect the probability of repayment (as long as the debt is not held by a large lender). CACs solve the problem of free riding among creditors within a legal jurisdiction because a supermajority of bondholders can make the outcome of the renegotiation mandatory for all. But the existence of CACs does not always imply a friendly restructuring process. Sovereigns tend to issue debt in different jurisdictions and, while CACs coordinate creditors within each one, the free riding problem between jurisdictions remain. This is a feature of the 1990s not present in the 1980s, when few banks concentrated most of the sovereign bonds. To attend this problem, the idea of an international bankruptcy procedure (or a SDRM), to coordinate creditors in different jurisdictions, has been put forward.[3]

It has been argued that facilitating renegotiation can be good, but also bad. Because renegotiation relieves countries from debt overhang, governments might run reckless fiscal policies that increase their chances of arriving to a crisis. Since lenders anticipate this behavior, the cost of the lack of commitment to run responsible fiscal policies is borne by

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[1]The discussion about policies regarding sovereign debt dates back at least to Adam Smith. See the evolution of these ideas in Rogoff and Zettelmeyer (2002).

[2]See Dixon and Wall (2000) and Sturzenegger (2002) for descriptions of commonly used CACs.

[3]Ghosal and Miller (2003) evaluate CACs against a SDRM with an international bankruptcy court. They favor the latter given that this court is assumed to have verifiability, commitment and enforceability power (all of which are assumed away in our discussion). Eaton (2002) also assumes that an international bankruptcy court can distinguish why things went bad (verifiability).

the country itself. At the end, the severity of the moral hazard problem determines whether facilitating renegotiation, by creating a SDRM, make countries worse or better off. The debate about the goodness of a SDRM lies precisely on this trade off.[4]

We setup up a model to understand the determinants of this tension. We focus on environments where countries can strategically issue debt with and without CACs, and in different legal jurisdictions, both in the presence and absence of the IMF. We show that a SDRM is never a good idea when debt contracts are state contingent. Under uncontingent debt payments, we derive a series of implications that we believe are both new and relevant for the discussion of an international bankruptcy procedure.. Furthermore, we point at some empirical evidence to question conclusions from previous empirical results.

First, our analysis sheds light on the discussion of the role of CACs and a SDRM in affecting the trade off between ex-post restructuring cost and ex-ante moral hazard. Recent work by Eichengreen and Mody (2000) shows that yields on primary sovereign debt markets (initial auctions) are higher when bonds have CACs, especially for low rated borrowers.[5] Becker, Richards and Thaicharoen (2003) and Gugiatti and Richards (2003) argue that bond prices are not affected very much by the implicit (legal jurisdiction) or explicit inclusion of this type of clauses when looking at yields in secondary markets. Hence, they conjecture that either financial markets are not really aware of the role of those clauses, or the moral hazard problem that these clauses bring to international credit markets does not outweigh the ex-post inefficiencies of no renegotiation. Therefore, switching to a SDRM would not increase the yields paid by sovereigns.[6]

We argue that these empirical exercises suffer from the Lucas' critique. The reason is that bond yields are estimated under the current regime, characterized by no renegotiation

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[4]This trade off is in the spirit of Bolton and Scharfstein (1996). See Morris and Shin (2001) and Corsetti, Guimaraes and Roubini (2003) for an interesting catalytic finance approach alternative to our (ex-post) incentive imperfection. See Haldane, Penalver, Saporta and Shin (2003) for an asymmetric informational approach and Jeanne (2003) for a model where debt maturity works as a commitment device.

[5]Eichengreen, Kletzer and Mody (2003) confirm these findings utilizing data on secondary debt markets.

[6]Similar arguments are presented in Haldane, Penalver, Saporta and Shin (2003) and Dixon and Wall (2000).

due to a "compositional effect" and the presence of the IMF. This compositional effect, which is missing in the literature, comes from the free riding problem among creditors of different jurisdictions. We claim that these clauses are likely to be irrelevant in sovereign debt markets and, hence, spreads of yields of bonds with and without CACs are uninformative about moral hazard problems. Nonetheless, our framework suggest that these yields, and the moral hazard problem, could worsen in a regime with a SDRM and CACs (under full coordination among creditors).

Quantitatively, these compositional effects are relevant. By 2002, 59% off all international borrowing occurred under US jurisdiction, 10% under German jurisdiction and 6% under Japanese law, all with no collective action provisions, while 24% resided in the UK, where the opposite is true.[7] It is then reasonable to expect no major difference between yields of bonds with and without CACs. Once the country is financially distress, holders of bonds with friendly restructuring provisions might not forgive because they posses a minority of the total outstanding debt and they can only marginally affect the probability of repayment. In particular, we show the compositional effect was present in the case of Argentina 2001. Furthermore, we show that yields of bonds with and without CACs where not only similar before, but also during the crisis. This is evidence against the argument that the ex-ante moral hazard problem is balanced by the ex-post gains from renegotiation. Instead, this evidence favors our story claiming that compositional effects make CACs irrelevant, explaining why the sovereign debt markets do not really care about these clauses. We also show that compositional effects are likely to have been present in other cases of default.

We also show that the presence of the IMF affects the international allocation of capital, and hence default probabilities and yields. Furthermore, it can also affect the decision of governments to include or not CACs in bonds. When the IMF has a strong interest on the destiny a country, it will be inclined to launch bailouts to avoid a financial crisis. This implies that lenders would always get paid, either by the country or by the IMF, and hence yields would never reflect default probabilities. In this case, yields are uninformative with respect

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[7]See Geithner, Gianviti and Hausler (2002) for the composition of international borrowing. See Gianviti (2002) for differences in main national laws (English, US, German and Japanese laws).

to moral hazard (which under full bailout it is maximized). For that reason, we should carefully understand the interactions of governments, lenders and the IMF in sovereign debt markets before drawing conclusions about a SDRM.

The theory suggests that sometimes there will be conflict between governments and the IMF regarding the creation of a SDRM. Given that the IMF will intervene, governments sometimes prefer not to have a SDRM, to then enjoy the subsidy of the implicit IMF guaranty. But the IMF would prefer to have a SDRM in place so that lenders internalize the costs of lending to reckless governments. The theory also suggest that conflict does not necessarily exist between lenders and the IMF. When moral hazard issues are important, countries and the IMF would prefer not to have a SDRM to induce fiscal responsibility, as a commitment device not to renegotiate.

Lastly, most of the literature works under the assumption that a SDRM always induces some moral hazard. On the contrary, our framework illustrates the possibility that a SDRM could actually induce better incentives. To see this point, first suppose that the IMF would prefer not to intervene if lenders were to renegotiate under a SDRM, but would prefer to launch a bailout in the absence of a SDRM. If the moral hazard problem is important, countries might prefer to be punished by the outcome of the renegotiation with lenders than by having a generous IMF bailout. In other words, countries would be better off under a SDRM precisely because it can provide greater incentives for governments to avoid financial crises.

The rest of the paper is divided in three sections. In Section 2, we present the model and analyze different contractual environments without the IMF. In Section 3 we introduce the IMF and derive its implications for sovereign debt markets. Finally, in Section 4, we explain the implications of our theory regarding sovereign yields and discuss previous literature.

2   The Model

We describe the model with the help of Figure 1. This is a two period world. The world begins with a country issuing an amount D of debt in period one. The resources raised are

allocated into two types of government expenditures: "productive" (G_1) and "unproductive" (G_2).[8] Unproductive government expenditure gives the country's government a total utility of kG_2, with $k > 0$. The interest rate is zero, without loss of generality. In the second period the first source of uncertainty is realized. It is known whether the country enters a situation where it needs a financial restructuring, or if it simply does well. When the country performs well the government obtains a fiscal primary surplus Y_h and pays an amount D_h. At that stage, the government's payoff becomes $Y_h - D_h + kG_2$, which occurs with probability $\theta(G_1)$. We assume that $\theta' \geq 0$, $\lim_{G_1 \to 0} \theta'(G_1) = \infty$, $\theta'(D) = 0$ and $\theta'' < 0$. Thus the role of the productive government expenditure is to increase the probability of the country avoiding the conflict with bondholders and producing a high level of output.
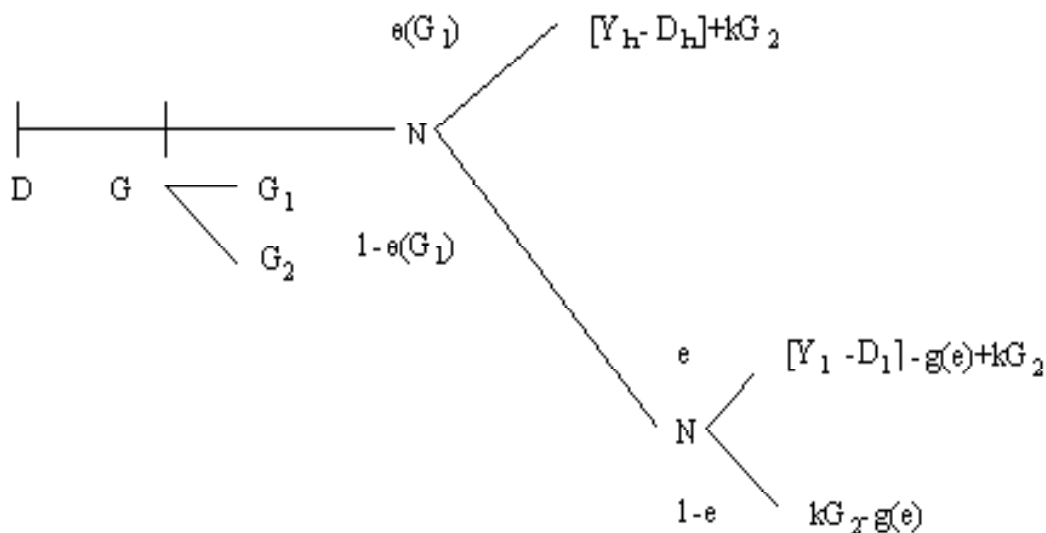

Figure 1: The Game

With probability $1 - \theta(G_1)$ the country falls into a state of financial distress in which chances of meeting debt obligations are at risk. At this stage, the government decides how much fiscal effort e to exert. Higher fiscal effort increases the probability of reaching the intermediate state of the world, where the government gets a monetary payoff Y_l. We assume that $Y_h > Y_l > 0$. The fiscal effort is assumed to be increasingly costly to capture the idea

[8] This resembles the investement-consumption decision in Atkeson (1991).

that raising additional resources when the country is financially distressed is increasingly expensive. This is a non-monetary cost such as the political cost of raising taxes. In particular, we assume that the fiscal effort cost function is $g(e)$ with $g' > 0$, $g'' > 0$, and $e \in [0, 1]$. Also, this cost is paid in advance before the realization of the uncertainty. Thus the government's payoff at the second stage is $Y_l - D_l - g(e) + kG_2$, assumed to occur with probability e. With probability $1 - e$ the government is unable to generate a surplus and hence repay any debt. Then, the government's payoff simply becomes $kG_2 - g(e)$.

The three states of the world are observable for the parties. Debt payments in these states are D_h, D_l and zero. Further notation regarding debt contracts is introduced later to deal with the composition of sovereign debt. Finally, our economy is supposed to face a mass of infinitesimal risk neutral competitive lenders.

For simplicity we also assume:

Assumption 1: $g(e) = \frac{1}{1+\chi}e^{1+\chi}Y_l$, with $\chi > 0$.

Where Y_l is used for normalization purposes. Now we concentrate on solving allocations under different contractual environments.

2.1 First best

As a benchmark we setup the allocation problem of an economy that faces complete contracts (contracts that can be written in terms of all relevant variables). Allocations in this economy come from solving the *first best* problem

$$\max_{D_h, D_l, G_1, G_2, e} EU = \theta(G_1)[Y_h - D_h] + [1 - \theta(G_1)]\left[e(Y_l - D_l) - \frac{e^{1+\chi}}{1+\chi}Y_l\right] + kG_2 \quad (1)$$

subject to

$$\theta(G_1)D_h + [1 - \theta(G_1)]eD_l \geq D \quad (2)$$

$$G_1 + G_2 = D \quad (3)$$

With probability θ the government riches the high state while with probability $1 - \theta$ it gets to the distressed state. Then, the government exerts fiscal effort (at a cost $g(e)$), and

obtains a payoff $Y_l - D_l$ with probability e. The objective function is maximized subject to two constraints.. Equation (2) is the lenders' participation constraint. Lenders' expected profits should be at least zero. Equation (3) is the government's resource constraint.

Note that our allocations solve for all decision variables simultaneously while, in the game, decisions are made sequentially (first, resources are borrowed, then government expenditure is decided, finally fiscal effort is exerted if needed). While allocations maximize the ex-ante utility, they are not optimal ex-post (once the country has borrowed). Nonetheless, the first best problem solves for allocations implicitly assuming that the government is committed (or contractually obligated) to choose the level of productive government expenditure G_1 and the fiscal effort under financial distress e. We now relax the assumption of complete contracts to study the implications for allocations and welfare.

Assumption 2: G_1, G_2, and e are unobservable to lenders.

For future reference, we say that a debt contract *dominates* another one when it derives higher or equal government utility on the parameter set while it derives strictly greater utility for some non-empty parameter subset.

2.2   State contingent debt payments and no CACs

Because of Assumption 2, financial contracts cannot be written on G_1, G_2, or e. As we know, these variables affect the probability of debt repayment. This imperfection introduces a moral hazard problem when G_1 and G_2 are chosen in the first period and when the fiscal effort e is decided in the second period. Allocations in this economy come from maximizing the expected utility of the government subject to constrains (2), (3) and

$$(Y_l - D_l) \ = \ e^\chi Y_l \tag{4}$$

$$\theta'(G_1)\left[Y_h - D_h - e(Y_l - D_l) + \frac{e^{1+\chi}}{1+\chi}Y_l\right] \ = \ k \tag{5}$$

Equation (4) is the incentive compatibility constraint for the government when conflict arises (under financial distress). At that point, the debt contract is irreversible and all

variables except the level of fiscal effort are given. Ex-post, the fiscal effort exerted will be that coming from this expression. Because of Assumption 2, no other fiscal effort level can be contracted (or committed to), and hence allocations must satisfy this constraint since no other allocation is an equilibrium. Note that this constraint holds with equality because D_l will never exceed Y_l since these are all the government's resources at this stage. Equation (5) is the incentive compatibility constraint for the government in the first period, when it chooses to allocate its resources between productive and unproductive uses. Again, the incentive compatibility constraint is imposed because the government cannot commit in advance to a pre-specified government expenditure plan.

From Equation (4) we get that fiscal effort is

$$e = \left[\frac{Y_l - D_l}{Y_l}\right]^{1/\chi} \tag{6}$$

where effort $e \in [0,1]$. The chances of the government of being able to pay back at least part of the debt are driven by D_l itself. In the case of no debt, the fiscal effort exerted is $e = 1$ and the country never reaches the no-output state. A huge debt overhang goes against the fiscal incentives to meet debt payments as effort decreases with D_l. This point turns out to be important in our story. In particular, if $Y_l = D_l$, $e = 0$.

Replacing the effort level in our problem, letting $G_2 = D - G_1$, our problem simplifies to:

Problem I

$$\max_{D_h, D_l, G_1} EU = \theta(G_1)[Y_h - D_h] + [1 - \theta(G_1)]\frac{\chi(Y_l - D_l)^{\frac{1+\chi}{\chi}}}{(1+\chi)Y_l^{1/\chi}} + k(D - G_1) \tag{7}$$

subject to

$$\theta(G_1)D_h + [1 - \theta(G_1)]\frac{(Y_l - D_l)^{1/\chi}D_l}{Y_l^{1/\chi}} \geq D \tag{8}$$

$$\theta'(G_1)\left[Y_h - D_h - \frac{\chi(Y_l - D_l)^{\frac{1+\chi}{\chi}}}{(1+\chi)Y_l^{1/\chi}}\right] = k \tag{9}$$

A closed form solution for this problem does not exist.

Problem I implicitly assumes that the debt contract cannot be renegotiated because of the free riding problem between creditors. This is assumed to be the case when bonds do not

include CACs (unanimous consent are required). When debt constructs do include CACs, bondholders can potentially reach a restructuring agreement that would benefit both sides, creditors and the debtor country.

2.3 Renegotiation

To see how this works, imagine that the government has reached a state of conflict with lenders before effort is exerted. For generality, also assume that at this stage part of the debt is symmetrically distributed in n legal jurisdictions that implicitly or explicitly include collective action provisions in bonds, while the rest of this debt is issued with no special provisions. Jurisdictions can enforce the outcome of the renegotiation process to all bondholders in their own countries, but they are unable to do so in other jurisdictions. Furthermore, assume all jurisdictions renegotiate at the same time. Do lenders have incentive to renegotiate in this case? The answer depends on the composition of the debt. Lenders might be better off by relieving part of the debt overhang to this country and thus inducing the government to increase its probability of repayment when a large enough mass of bonds is renegotiated.

When renegotiation is allowed, the debt after renegotiation would be the one that maximizes the value of the debt for each jurisdiction given the actions of the rest of the jurisdictions. Lenders within jurisdiction i are assumed to behave as one big lender who solves the following problem

$$\max_{D_{li}^C, e} V_i = e D_{li}^C \tag{10}$$

subject to

$$Y_l - D_{li}^C - D_{l-i}^C - D_l^{NC} = e^X Y_l \tag{11}$$

$$D_{li}^C \leq D_l^C / n \tag{12}$$

where D_{li}^C denotes the payment to jurisdiction i after renegotiation, D_{l-i}^C are the payments to the rest of the jurisdictions with collective action provisions, D_l^{NC} are the payments to bondholders without friendly restructuring clauses, and D_l^C are the total payments promised to all jurisdictions that include CACs. Equations (11) and (12) are the government's incentive

compatibility constraint and participation constraint, respectively. Our solution follows from combining the first order conditions of all jurisdictions.

$$D_{li}^C = \frac{\chi}{1+n\chi}\left(Y_l - D_l^{NC}\right) \tag{13}$$

$$\sum_i D_{li}^C + D_l^{NC} = \frac{n\chi Y_l + D_l^{NC}}{1+n\chi} \tag{14}$$

$$e = \left[\frac{Y_l - D_l^{NC}}{(1+n\chi)Y_l}\right]^{1/\chi} \tag{15}$$

As long as an interior solution exists (Equation (12) is not binding), there will be renegotiation. Notice that the total amount of renegotiated debt by jurisdiction decreases with the number of jurisdictions and the amount of debt issued without collective action provisions. This implies that as the free riding problem worsens, each jurisdiction will tend to forgive more. Nonetheless, Equation (14) shows that the total debt after renegotiation increases in n and D_l^{NC}. Also with Equation (15) they show that total forgiveness and effort decrease with the number of jurisdictions and the amount of debt issued without CACs. Hence, the conditional probability of default given that the country is in financial distress (e) increases with these two compositional effects.

But no renegotiation will take place if Equation (12) binds. Indeed, this is the case when $\sum_i D_{li}^C \geq D_l^C$, or

$$n \geq \frac{D_l^C}{\chi\left(Y_l - D_l^C - D_l^{NC}\right)} \tag{16}$$

This expression shows that compositional effects in sovereign debt are important as a commitment device to not renegotiate. Renegotiation is less likely to occur as the composition of debt without CACs increases (D_l^C falls) and as the number of jurisdictions increases. This issue, missing in the literature, turn out to be key in the discussion about the implications of an international bankruptcy procedure on sovereign yields (postpone to the last section).

A SDRM would coordinate bondholders of different jurisdictions since all bonds issued by the same country would fall under this umbrella in case of financial distress. In order to analyze the implications of a SDRM, we focus on two main cases: one where all bonds include CACs and there is no issue about jurisdictions (due to the presence of a SDRM) and one where none does. In the first case, we assume that there is complete coordination

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among bondholders, and hence they act as one big lender. In the second case, we assume the opposite is true and free riding makes renegotiation impossible.[9]

For future reference, we define the allocations as outcomes of the renegotiation process when all bonds have CACs ($D_l^{NC} = 0$) and the number of jurisdictions does not affect the renegotiation outcome ($n = 1$), as

$$D_l^* = \frac{\chi}{1 + \chi} Y_l \tag{17}$$

$$e^* = \frac{1}{(1 + \chi)^{1/\chi}} \tag{18}$$

as long as $D_l^* < D_l$. Note that incentives are driven by χ, a parameter that determines the sensitivity of the government to exert fiscal effort in troubled times. Also, D_l^* decreases with this parameter and it goes to zero when $\chi \longrightarrow 0$ (incentives to renegotiate can be powerful).

Overall, our analysis suggests that allocations under CACs must be different than those coming from solving **Problem I** due to the renegotiation. For this reason we now turn to study those allocations.

2.4 State contingent debt payments, CACs and a SDRM

In the presence of CACs and a SDRM, contracts must be *renegotiation proof*, imposing an additional constraint to our problem. Our problem now becomes: **Problem II**

$$\max_{D_h, D_l, G_1} \textbf{Problem I,} \qquad \text{subject to} \qquad D_l \leq D_l^*$$

where D_l^* is given by Equation (17).

Proposition 1 *Under state contingent debt payments, debt contracts without CACs dominate those with CACs.*

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[9]De Brun and Della Mea (2003) show that the free rider problem in renegotiations without CACs is overestimated, as shown by the recent case of Uruguay 2003. In this case, renegotiation was implemented in a short period of time despite the fact that the swapped debt did not include CACs. Nonetheless, the results of this paper remain relevant as long as CACs can facilitate the renegotiation process.

Note that the lack of commitment to avoid renegotiation adds a constraint to our problem with state contingent debt. Again, under CACs it is not credible to set $D_l > D_l^*$ since it is known that in case of financial distress the debt will be renegotiated.

2.5 Uncontingent debt payments and no CACs

In this case, creditors' rights are assumed to be the same in all states, although default is possible. Furthermore, governments pay what is owed as long as they have enough resources. Otherwise they pay what they have. Then, equilibrium allocations solve the following problem: **Problem III**

$$\max_{D_h,D_l,G_1} \textbf{Problem I,} \qquad \textbf{subject to} \qquad \min\{D_h, Y_l\} = D_l$$

where the constraint imposes that debt cannot be state contingent. This gives the following result:

Proposition 2 *Under no CACs, state contingent debt contracts dominate uncontingent ones.*

The argument here is similar to the one of Proposition 1. Optimal allocations in **Problem I** derive at least the utility derived by allocations in **Problem III**.

2.6 Uncontingent debt payments, CACs and a SDRM

Again, payments are uncontingent in this case, subject to the feasibility constraint. Optimality in this case requires solving: **Problem IV**

$$\max_{D_h,D_l,G_1} \textbf{Problem I,} \qquad \textbf{subject to} \qquad \min\{D_h, D_l^*\} = D_l$$

Because CACs impose an additional constraint due to the fact that $D_l^* < Y_l$ from Equation (17), two statements result:

Proposition 3 *Under CACs, state contingent debt contracts dominate uncontingent ones.*

Now, the feasible set of **Problem IV** is included in the feasible set of **Problem II**.

Proposition 4 *With uncontingent debt payments, there exist economies where debt contracts with no CACs dominate those with such clauses and vice versa.*

Because the intuition behind the proof is important for our discussion, we develop the proof to this proposition here.

We prove our proposition by example. For this, we make some simplifying assumptions. The first is

$$\theta(G_1) = \begin{cases} \bar{\theta} & G_1 > \overline{G_1} \\ \underline{\theta} & otherwise \end{cases} \tag{19}$$

When the productive government expenditure is large enough, the country reaches a higher probability of success ($\bar{\theta} > \underline{\theta}$). Notice that the distance $\left|\bar{\theta} - \underline{\theta}\right|$ suggests a higher sensitivity of final outcomes to the government expenditure G_1 and it makes incentive issues more relevant in our discussion. Another assumption is that $Y_l < D$. Hence, as we noted from the lender's participation constraint, $D_h > Y_l$.

Now assume that the debt contract does not include CACs. Because there is no renegotiation in this case, the equilibrium level of fiscal effort exerted by the country in case of financial distress is simply $e^* = 0$, given that $D_h > Y_l$. Governments will have no incentives to exert fiscal effort because everything produced would be used to meet debt payments. Then, from the lender's participation constraint, we see that D_h satisfies $\bar{\theta} D_h = D$.

Under our assumption about $\theta(G_1)$, the incentive constraint to support a high level of productive government expenditure is

$$\left(\bar{\theta} - \underline{\theta}\right)(Y_h - D_h) \geq k\overline{G_1} \tag{20}$$

Hence, the expected payoff for a country issuing debt without CACs is

$$EU = \bar{\theta} Y_h - D + k(D - \overline{G_1}) \tag{21}$$

Under CACs, countries and bondholders will renegotiate if the country reaches the state of financial distress. Then, debt payments are given by D_l^*. That problem with CACs is

otherwise equal to the previous one. But it is useful to inspect the incentive compatibility constraint for this case.

Because renegotiation is possible, the state of the world where the country faces financial distress is not that bad, and hence distorts the country's incentives to allocate the funds in productive expenditure. The incentive compatibility constraint for a high level of G_1 is

$$\left(\bar{\theta} - \underline{\theta}\right) \left[Y_h - D_h - \frac{\chi Y_l}{(1+\chi)^{\frac{1+2\chi}{\chi}}} \right] > k\overline{G_1} \tag{22}$$

but we assume that $\chi Y_l(1+\chi)^{-\frac{1+2\chi}{\chi}}$ is big enough to overturn Condition (20). Consequently, the incentive compatibility constraint for $\bar{\theta}$ does not hold and $\theta = \underline{\theta}$. Furthermore, $G_1 = 0$. Since $D_l = D_l^*$ the investors' participation constraint becomes

$$\underline{\theta} D_h + (1 - \underline{\theta}) \frac{(Y_l - D_l^*)^{1/\chi} D_l^*}{Y_l^{1/\chi}} \geq D \tag{23}$$

Using Expression (17) and plugging this constraint into the objective function, we obtain the country's expected payoff under CACs

$$EU^C = \underline{\theta} Y_h - D - (1 - \underline{\theta}) \frac{\chi(2+\chi)}{(1+\chi)^{\frac{1+2\chi}{\chi}}} Y_l + kD \tag{24}$$

Now see that contracts without CACs dominate those with them whenever $EU > EU^C$, or equivalently

$$(1 - \underline{\theta}) \frac{\chi(2+\chi)}{(1+\chi)^{\frac{1+2\chi}{\chi}}} Y_l < \left(\bar{\theta} - \underline{\theta}\right) Y_h - k\overline{G_1} \tag{25}$$

Intuitively, the result depends on the sensitivity of the probability θ to productive government expenditure. If this probability is unaffected by G_1, then the optimal contract should include CACs and renegotiation takes place. Note that when $\left|\bar{\theta} - \underline{\theta}\right| \longrightarrow 0$ our condition will not hold, making debt contracts with CACs optimal. Why? Reducing the cost of the contract ex-post (making renegotiation easy to implement) is optimal ex-ante.

Matters are different when this sensitivity is strong. By making the state of distress harmful for governments, although ex-post inefficient, it provides greater incentives for them to stay out of trouble (by inducing fiscal responsibility). This is the case when, other things equal, $\left|\bar{\theta} - \underline{\theta}\right|$ is big enough.[10] This conclude our proof.

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[10] We work under the assumption that $\underline{\theta} > 0$. Otherwise loans D could not be supported in equilibrium.

Figure 2 summarizes our results regarding the welfare implications of the different contractual arrangements (where > implies dominance).[11]
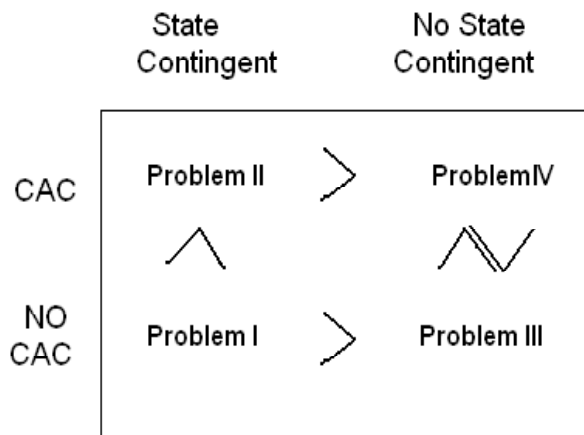

Figure 2: Welfare under different debt contracts

Two main messages follow from this figure. First, CACs and the SDRM can only improve welfare in a world without state contingent contracts. This implies that maybe more attention should be focused on how to complete markets on this regard, rather than on the SDRM (although the usual caveats apply). Indeed, GDP-growth-indexed bonds have been proposed before. Second, our result implies that in an environment without the IMF, countries should be allowed to choose the type of debt contract that best fits their needs. In this sense, a SDRM together with CACs would be harmful when incentives are important. Furthermore, note that in a world with state contingent bonds, CACs would not be utilized since they would reduce welfare.

Our next step is to study the role played by the IMF in affecting the government's expenditure decisions. Understanding the IMF's role in international financial markets turns out to be essential for our discussion, because it distorts the international allocation of capital.

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[11]If we allow D to be a choice variable, although the levels of D are not the same under different contractual environments, the results summarized in Figure 2 would still hold.

3 A world with the IMF

In this paper, we model the IMF as a fund, rather than an enforcer or an auditor.[12] Unlike Miller and Zhang (2000), the fund is also a strategic player that maximize its own payoffs.

We think of the IMF as an institution responsible for representing a club of countries when deciding a bailout in response to international financial crisis. When a country defaults on its debt, it generates negative externalities to other countries in the world, in one way or another. Financial contagion is one example. Other motives for intervention include geopolitical or economic reasons such as trade considerations. We model these reasons as a cost J that the international community incurs when an emerging country arrive to the state of default (the no-output-state in our story).

The IMF has the power to grant subsidized loans to countries in financial distress. In our model, the size of the subsidy or bailout is S, and the purpose is to reduce the debt overhang and introduce incentives for countries to avoid a state of default and financial contagion. We describe the sequence of the model with the help of Figure 3.
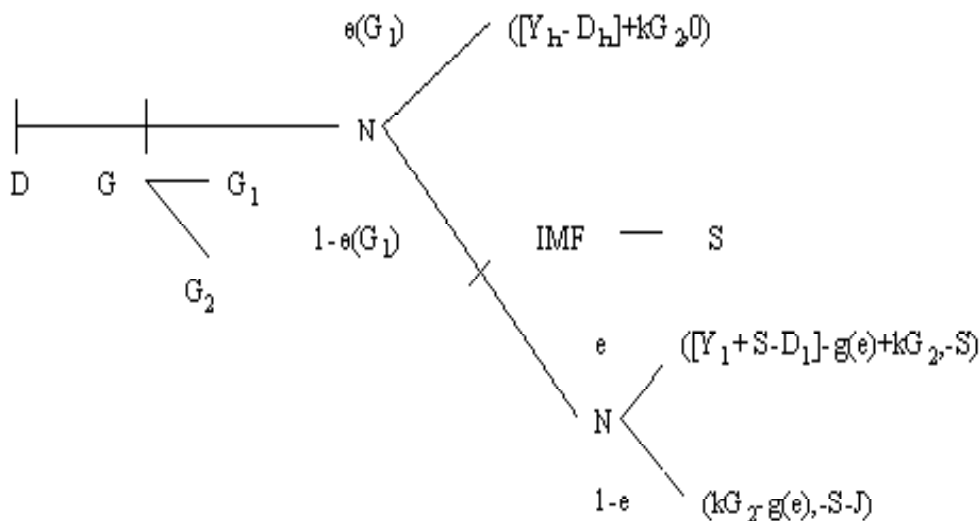

Figure 3: The Game with the IMF

When the first uncertainty is resolved with a bad shock, the IMF has the possibility of bailing out part or all of the outstanding debt. A bailout will affect the country's payoffs and

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[12]See Powel (2002).

hence its incentives to exert fiscal effort. In our simple story, we model the bailout as a gift from the IMF to the country and international investors. While IMF loans are subsidized, these loans are rarely defaulted on. Nonetheless, this assumption captures two important ideas: 1) IMF interventions are subsidies to the recipient country, and 2) IMF re-financing removes the problem from the current government, which we assume only cares about the near future. For both reasons, we model the IMF bailouts as gifts.[13]

For practical purposes, we study the role of the IMF in the environment where international debt obligations are not state contingent.[14] Nonetheless, debt payments might be subject to renegotiation or default. We first study the case where debt contracts do not include CACs.

3.1 Uncontingent debt payments and no CACs

The game is solved by backward induction. Once the first shock is realized as bad, the IMF decides the size of the bailout, anticipating that there will be no renegotiation (CACs are absent). The IMF's bailout affect incentives and the probability of default and financial contagion. Thus, the IMF solves the following problem:

$$\max_{S^*, e^*_{IMF}} U^{IMF} = -S^* - (1 - e^*_{IMF}) J \tag{26}$$

subject to

$$Y_l + S^* - D_l = e^{*\chi}_{IMF} Y_l \tag{27}$$

$$D_l = \min\{D_h, Y_l + S^*\} \tag{28}$$

$$0 \leq S^* \leq D_h \tag{29}$$

where Equation (27) is the government's incentive compatibility. Condition (28) states that the debt is uncontingent. Note that the total amount of resources available in the second state is now $Y_l + S^*$. Condition (29) implies that the size of bailouts launched by the IMF

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[13]That the IMF could recover part of the bailout is equivalent to an increase in J (which favors more frequent IMF interventions).

[14]We also rule out the possibility that the IMF could reward countries that reach the high output state.

never exceed D_h, or equivalently that $e \leq 1$. As long as an interior solution to the IMF's problem exists, this is

$$S^{int} = -Y_l + D_h + \left[\left(\frac{J}{\chi} \right)^\chi 1/Y_l \right]^{1/(\chi-1)} \tag{30}$$

$$e^{int} = \left(\frac{J}{\chi Y_l} \right)^{1/(\chi-1)} \tag{31}$$

When $S^{int} < 0$, the optimal solution for the IMF bailout is $S^* = 0$, which implies a fiscal effort of $e^* = \left(\frac{Y_l - D_l}{Y_l} \right)^{1/\chi}$. Thus, when the debt overhang is low, or the negative externality of default on the international community is low, the IMF best response is to stay out. Equivalently, when $S^{int} > D_h$ the IMF will implement a full bailout and drive the effort to $e^* = 1$.

The second order condition show that when $\chi < 1$, or the elasticity of fiscal effort to bailouts is greater than one, there is always a corner solution with full or no bailout depending on the size of J. The necessary and sufficient condition for a full bailout is

$$U^{IMF} \left(S = D_l \right) = -D > - \left[1 - \left(\frac{Y_l - \min\{Y_l, D_h\}}{Y_l} \right)^{1/\chi} \right] J = U^{IMF} \left(S = 0 \right)$$

Note that when there is full bailout, $D_l = D_h$, and because $e = 1$, $D_h = D$. Thus, when a full bailout is anticipated, bonds will exhibit no risk premium (under no CACs). When there is no bailout, the fiscal effort exerted is less than one and hence $D_h > D$. In this way, the full bailout condition becomes

$$\left[1 - \left(\frac{Y_l - D_h}{Y_l} \right)^{1/\chi} \right] J > D \qquad \text{for } Y_l \geq D_h, \text{ or} \tag{32}$$

$$J > D \qquad \text{otherwise.} \tag{33}$$

A full bailout arises if its cost (D) is smaller than the expected benefits $((1 - e)J)$, or in other words, if the IMF cares enough about the destiny of the country (J is big enough).

In short, independently of the parameter χ being greater or less than one, we get that the IMF's best responses (possible bailout solutions) are

$$S^* \in \left\{ 0, -Y_l + D_l + \left[\left(\frac{J}{\chi} \right)^\chi 1/Y_l \right]^{1/(\chi-1)}, D_h \right\} \tag{34}$$

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depending on the case described by the above conditions.

Having solved for the IMF response, we can continue solving the country's government problem.

Problem V

$$\max_{D_h, D_l, G_1} EU = \theta\left(G_1\right)\left[Y_h - D_h\right] + \left[1 - \theta\left(G_1\right)\right]\frac{\chi\left(Y_l + S^* - D_l\right)^{\frac{1+\chi}{\chi}}}{(1+\chi)Y_l^{1/\chi}} - kG_1 \qquad (35)$$

subject to

$$\theta\left(G_1\right)D_h + \left[1 - \theta\left(G_1\right)\right]\left[S^* + \frac{\left(Y_l + S^* - D_l\right)^{1/\chi}\left(D_l - S^*\right)}{Y_l^{1/\chi}}\right] \geq D \qquad (36)$$

$$\theta'\left(G_1\right)\left[Y_h - D_h - \frac{\chi\left(Y_l + S^* - D_l\right)^{\frac{1+\chi}{\chi}}}{(1+\chi)Y_l^{1/\chi}}\right] = k \qquad (37)$$

$$D_l = \min\{D_h, Y_l + S^*\} \qquad (38)$$

and given that the bailout is optimally chosen by the IMF (see 34). Thus, in case of financial distress, lenders receive at least S^* regardless of the outcome at this stage. When the bailout is not full, lenders will get an additional $D_l - S^*$ when the government manages to pull the country out of default and meet debt payments. This event happens with conditional probability $e = \left(\frac{Y_l + S^* - D_l}{Y_l}\right)^{1/\chi}$. Several observations follow from this problem.

First, note that the incentive compatibility constraint for G_1 implies that, for the same debt contract $\{D, D_h, D_h\}$, the productive government expenditure falls with the size of the bailout. In that sense, episodes of financial distress are more frequent if the IMF intervenes. Also notice that **Problem V** nests **Problem III** when there is no intervention ($S^* = 0$). This occurs when the size of the externalities on the international community J is small enough ($\chi < 1$ and Condition (32) does not hold or $\chi > 1$ and $e^{int} < \left(\frac{Y_l - D_l}{Y_l}\right)^{1/\chi}$).

We obtain that whenever the IMF intervenes ($S^* > 0$), then $D_l = D_h$, even if bailouts are partial. This is because the IMF objective is to induce the government to exert effort, and this would *not* happen when $D_l < D_h$ (since the country would get zero payoff in the intermediate state). Moreover, bailouts never exceed the promised D_h since at $S^* = D_h$ the fiscal effort is at its maximum ($e = 1$, given our choice of the effort function). We conclude that if the IMF intervenes ($S^* > 0$) the size of the bailout will be $D_h - Y_l \leq S^* \leq D_h$.

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Now we turn to the case where bonds include CACs and there is a SDRM to coordinate creditors. We model the IMF and the lenders in a game where they choose the amount of debt the IMF bails out and that lenders forgive. In particular, we analyze a sequential game where the IMF is the leader in the debt restructuring process.[15] We consider the sequential (versus the simultaneous) game more realistic, given that the IMF is wired to deal with countries in financial distress and hence has a first mover advantage.

3.2 Uncontingent debt payments, CACs and a SDRM

Again, we solve the problem by backward induction and start analyzing the behavior of the lender for a given size of the IMF's bailout, under CACs and a SDRM.

The lenders' forgiveness comes from their utility maximization problem. Lenders get the IMF bailout S^+ when the country reaches the zero output state, which happens with probability $(1 - e^+)$, and D_l^+ when the country reaches the intermediate output level state, occurring with probability e^+. Superscript $+$ stands for the optimal in the sequential game. Note that while the debt is uncontingent, actual payments are subject to renegotiation, and hence D_l^+ is an endogenous variable of the lenders' utility maximization problem:

$$\max_{D_l^+, e^+} V^+ = e^+ D_l^+ + \left(1 - e^+\right) S^+ \tag{39}$$

subject to

$$Y_l + S^+ - D_l^+ = \left(e^+\right)^\chi Y_l \tag{40}$$

$$0 \leq D_l^+ \leq D_h^+ \tag{41}$$

If there is forgiveness from the lenders, the solution to our problem is given by:

$$D_l^+ = \frac{\chi}{1 + \chi} Y_l + S^+ = D_l^* + S^+ \tag{42}$$

$$e^+ = \frac{1}{(1 + \chi)^{1/\chi}} = e^* \tag{43}$$

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[15] In an Appendix, available upon request, we analyze a simultaneous game. Multiplicity of equilibria in pure and mixed strategies might arise in this case.

where lenders renegotiate under a SDRM (no free riding). First, note that the level of effort is independent of S^+, the IMF bailout. In fact, this is the same level of effort that the borrower would exert under no bailout (see Equation (18)). Also note that D_l^+ increases one-to-one with S^+, so the lenders' debt forgiveness plus the IMF's bailout is a constant. Hence the remaining debt is the same as under no IMF intervention ($D_l^+ - S^+ = D_l^* = \frac{\chi}{1+\chi}Y_l$). Strictly speaking, the lenders' best response to an IMF bailout of size S^+ is

$$D_l^+ = \begin{cases} \frac{\chi}{1+\chi}Y_l + S^+ & \text{when } \frac{\chi}{1+\chi}Y_l + S^+ \le D_h^+ \\ D_h^+ & \text{otherwise} \end{cases} \tag{44}$$

But the IMF will never implement a bailout in the following range

$$S^+ \le D_h^+ - \frac{\chi}{1+\chi}Y_l$$

When lenders forgive some of their capital, the IMF best response is to avoid wasting resources in a bailout. In this case, a bailout does not change the fiscal effort exerted by the government, and hence the likelihood of avoiding the international financial contagion. Thus the IMF would only intervene when the bailout can induce a probability $e^+ = \left(\frac{Y_l + S^+ - D_l^+}{Y_l}\right)^{1/\chi} > 1/(1+\chi)^{1/\chi}$, which implies that the bailout S^+ is bigger than the lenders' forgiveness $D_h^+ - D_l^*$ without IMF intervention. Given the lenders' best response (Equation (44)), the IMF bailout has to be strictly greater than $D_h^+ - \frac{\chi}{1+\chi}Y_l$. This result proves the following proposition[16]

Proposition 5 *Under uncontingent debt contracts with CACs and a SDRM, the debt forgiveness comes either from the IMF or from lenders, but never from both of them.*

The minimum amount of forgiveness is given by that coming from lenders ($\max\{D_h^+ - \frac{\chi}{1+\chi}Y_l, 0\}$, as under **Problem II**). The IMF will only intervene with a bailout larger than the potential forgiveness of lenders. See that if the bailout is small, lenders would forgive less (crowding out), and the fiscal effort would remain constant. In other words, the IMF intervention would be sterilized by a smaller private debt forgiveness. For this reason, if the

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[16]See that, in this case, the overall level of forgiveness to the government is greater, since $D_l^+ - S^+ < D_l^*$.

IMF's targeted fiscal effort is only slightly higher than e^+ in Equation (43), the IMF would prefer to stay out, rather than inducing a higher fiscal effort.

When does the IMF intervene? The condition is $U^{IMF}(S = S^+) > U^{IMF}(S = 0)$.[17] Qualitatively, IMF intervention will occur when J is large enough and the difference between the fiscal effort targeted by the IMF, and that of the lenders under no intervention (e^*), is large relative to the size of the bailout. Both partial (if $\chi > 1$) and full bailouts can be observed as equilibrium outcomes.

In summary, forgiveness comes either entirely from the IMF or from the lenders but never from both, as stated by Proposition 5. Then, if bailouts (partial or full) are equilibrium IMF responses in the sequential game, allocations will necessarily coincide with those of **Problem V** (uncontingent debt payments, no collective action provisions and IMF). Also, if the IMF response is no bailout, allocations would coincide with those of **Problem IV** (uncontingent debt payments, collective actions clauses and a SDRM without IMF).

Now we show that, once a country is financially distressed, the IMF intervention is more likely to occur under debt contracts without CACs.

Proposition 6 *Contingent on being in a financial crisis, the parameter set for which there is IMF intervention is larger under no CACs.*

This proposition follows from the following argument. Assume we are under financial crisis. We know from Proposition 5 that when there are CACs there is never forgiveness from both the IMF and the lenders. This implies that when there are CACs and the equilibrium is such that the IMF intervenes anyway, the IMF would be indifferent between having a SDRM in place or not. However, when there is no IMF intervention ($S = 0$), the IMF's payoff is higher under CACs and a SDRM, since there is some forgiveness by the lenders and hence the fiscal effort exerted by the government (e) is higher. Therefore, whenever there is intervention under CACs and a SDRM, there is also intervention under no CACs, while

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[17]This is

$$-S^+ + J\left[\left(\frac{Y_l + S^+ - D_l^+}{Y_l}\right)^{1/\chi} - \frac{1}{(1+\chi)^{1/\chi}}\right] > 0 \qquad (45)$$

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the converse is false. This argument could explain the IMF position in favor of CACs and a SDRM.

3.3   Implications of IMF intervention

A complete characterization of the mapping from parameters to results is beyond the scope of this paper since many cases arise in a world with the IMF. Instead, we now focus on issues suggested by the theory, that bring interesting economic insights to our discussion.

First note that if $e^* < 1$, and J is large enough, the IMF would always lunch a full bailout (since it will never allow a positive probability of default). Accepting that there are economies where full bailout is an equilibrium outcome, we state

Proposition 7 *The government's welfare under full bailout is greater than under partial and no bailout, independently of the inclusion of CACs.*

Proof. See Appendix. ■

The heart of the proof of this proposition relies on the fact that the incentive compatibility constraint for G_1 is not binding when there is a full bailout ($S^* = D_l = D_h = D$). The intuition is that moral hazard is a problem for the government because lenders charge them a higher premium. But premiums disappear under a full bailout because of the implicit IMF guarantee (since lenders always get paid).

But Proposition 7 cannot be generalized. The government's welfare is not necessarily increasing in the size of bailouts.

Proposition 8 *The government's welfare under partial bailout might be greater or smaller than under no bailout, independently of the inclusion of CACs.*

Proof. See Appendix. ■

The intuition of this proposition is similar to that of Proposition 4. Knowing that the IMF would intervene, countries would implement lower levels of productive government expenditure. If the productive government expenditure is sensitive to bailouts, the ex-ante

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moral hazard problem would be aggravated by the IMF presence. In this world, and despite the implicit subsidy of the IMF intervention, countries could be better off if the IMF did not exist.

The theory also suggests that sometimes there is conflict between governments and the IMF. When both the IMF and lenders' targeted fiscal effort levels are about the same, governments will definitely choose not to include CACs. In this case, the IMF prefers that lenders forgive, but the country prefers an IMF bailout to receive the subsidy. This argument makes debt without CACs an attractive proposition for governments, and a SDRM a desirable institution for the IMF.

Of course, conflict between the IMF and the issuing government about the inclusion of CACs does not always arise. Both might prefer debt contracts without CACs for moral hazard considerations. On the other hand, both will prefer including these clauses in environments where J is small enough and the moral hazard problem is negligible. Also, conflict does not arise when the IMF wishes to implement a full bailout regardless of the inclusion of CACs in debt contracts (J is big enough).

Finally, our theory sheds light about the theoretical possibility that CACs can be used as a commitment device to induce fiscal responsibility, opposite to common wisdom. This might happen in environments where the targeted fiscal effort of the IMF is higher than that of lenders. In this case, if the government decides to include CACs in debt contracts and the IMF chooses not to implement a bailout, lenders would renegotiate. Then, the fiscal effort exerted by the government is that targeted by the lenders (which is lower). On the contrary, if the government opted for no friendly orderly restructuring provisions, the IMF would implement a bailout. When moral hazard problems are severe in that parameter range, the IMF intervention might end up reducing the government's welfare.[18] In this environment, a SDRM that facilitates renegotiation would be welfare enhancing for both, the IMF and the government precisely for moral hazard considerations.

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[18] Eichengreen and Ruhl (2000) also point out that CACs can make it incentive compatible for the IMF not to intervene.

4 Lessons from yields

Our paper has a series of empirical implications. Eichengreen and Mody (2000) conduct an empirical investigation to answer the question whether CACs raise borrowing costs. Looking at primary debt markets (issuance), they find that during the 1990s, East Asian issuers paid lower spreads under UK law –which forces all debt contracts to include CACs– while Latin American and Eastern European spreads were lower under US law –which does not enforce friendly orderly restructuring provisions. These findings are confirmed by Eichengreen, Kletzer and Mody (2003) who work with data on secondary debt markets. From their findings, they conjecture that for "less credit-worthy borrowers, the advantage of provisions facilitating an orderly restructuring are offset by the moral hazard and additional default risk associated with the presence of renegotiation-friendly loan provisions." Becker, Richards and Thaicharoen (2001) and Gugiatti and Richards (2003) argue that bond prices are not affected much by the implicit or explicit inclusion of this type of clauses when we look at yields in secondary markets. Hence, they say, either financial markets are not really aware of the role of those clauses, which seems to be supported by their conversations with practitioners, or the moral hazard problem that these clauses bring to international credit markets does not outweigh the ex-post inefficiencies (of no renegotiation).

We rationalize this discussion with the help of the lenders' participation constraint, from which we derive (*ex-ante*) sovereign debt yields.

$$Yield \equiv \frac{D_h}{D} - 1 = \underbrace{\frac{1-\theta}{\theta}}_{\text{Part 1}} \left(\underbrace{1 - \frac{eD_l + (1-e)S}{D}}_{\text{Part 2}} \right)$$

In the absence of IMF bailouts ($S = 0$), the value of the debt under financial distress (eD_l) increases if CACs are present, reducing the yields (Part 2 decreases). Renegotiation allows the parties to appropriate the *ex-post* gains from trade. If moral hazard is mild, then θ will change only marginally, leading to a lower yield for debt issued with CACs. But if moral hazard is important, then yields will be higher under CACs (since Part 1 increases). As long as θ is sensitive to G_1, CACs are a bad idea (since they introduce to much moral hazard). Led by this argument, the empirical literature mentioned above argues that, because the

spread between yields in bonds with and without CACs is small, these two forces must be balanced. Hence, they claim, a SDRM cannot be harmful.[19]

Our model shows that these conclusions are incorrect when: a) the IMF is inclined to intervene, and b) there are compositional effects in sovereign debt markets. The former occurs when the destiny of the country is important for the international community, or J is large. Anticipating the bailout, countries would issue debt without CACs, or disseminated in various jurisdictions (compositional effect). The IMF would then launch a bailout if a crisis occurs given that it is its best response. But a full bailout ($S = D_h$) implies $e = 1$, $D_l = D_h$ and zero yield (lenders always collect, either from the country or from the IMF). In this case, yields do not reflect moral hazard problems (Part 2 is zero). Note that yields in bonds with and without CACs are the same, although the probability of a crisis (the moral hazard) is at its maximum.

But even in the absence of the IMF, we claim that the empirical exercise mentioned before might suffer from the Lucas' critique due to a compositional effect in sovereign debt markets. A large fraction of sovereign debt is placed in jurisdictions that do not include CACs, while the rest is divided among many jurisdictions. As shown by Condition (16), that incentives are aligned within a jurisdiction does not imply that lenders would forgive. If so, CACs become an irrelevant dimension of debt contracts since, under financial distress, no debt would be condoned (and yields would be the same).[20] Assuming that no yield differential implies that the moral hazard problem is balanced by the gains from renegotiation is, simply, a mistake. Furthermore, under a new regime with a SDRM, bond prices could be substantially different due to the presence of moral hazard (Lucas' critique).

The data we examined suggest that CACs were an irrelevant dimension of debt contracts for the case of Argentina 2001. If CACs are irrelevant because of the compositional effect, bond yields should be the same not only ex-ante, but also once the country has fallen into financial distress (before renegotiation and after or during a financial crisis). If they are relevant, yield on bonds with CACs should increase more during a crisis, since these

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[19] Other contributions support this idea. See arguments presented in Haldane, Penalver and Saporta (2003) and Dixon and Wall (2000).

[20] Note that this argument could explain why practioners do not pay attention to CACs.

bondholder will forgive while the rest will not.

Before proceeding, we point out that the compositional effect is heavily present in the Argentine case. About 46 percent of the total debt is likely to be excluded from renegotiation. For example, loans from multilateral agencies, which are non-renegotiable, account for 19% of the total debt. The remaining 54% of the debt is distributed among 8 jurisdictions of which New York, Germany and Japan (accounting for 70% of the renegotiable debt), have no CACs.

EXCLUDED DEBT	Total	% of Total
Guaranteed Loans	14.917	8,6%
Provincial Guaranteed Bond*	9.140	5,3%
BODENs*	23.026	13,3%
Exception Bonds*	312	0,2%
Multilateral	32.358	18,7%
Total	79.752	46,1%

New York 51% — England — Germany 17% — Argentina 11% — Japan 2% — Other 1%
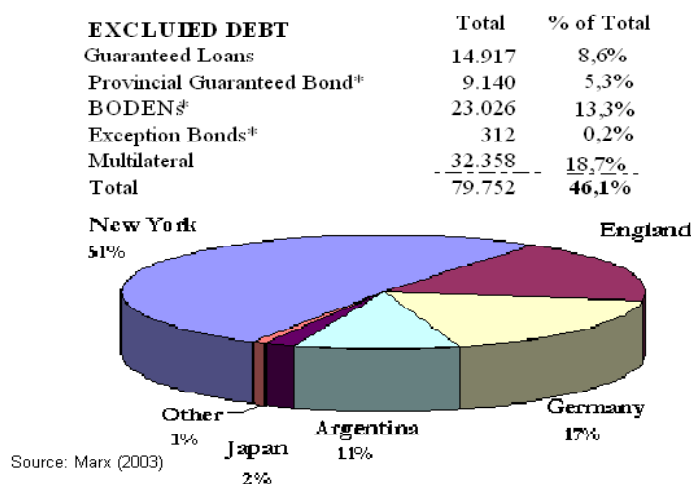
Source: Marx (2003)

Figure 5: Debt composition. Argentina 2002.

Having said that, Figure 6 shows the evolution of yields for two very similar Argentinean bonds issued under UK law, with CACs, and German law, without them, during the period of financial distress.[21] Argentina fell into financial distress in the last quarter of 2001, when fundamentals were weak and the US announced its position against IMF intervention.

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[21]Both bonds are named "Letras Externas de la Republica Argentina", and are denominated in Euros. Both pay principal upon maturity (the one issued in Germany, in January 26 of 2007 while the one issued in UK, in February 22 of 2007). Interests are paid annually (the German bond pays 10.25% and the UK one 10%). Source: JPMorgan.
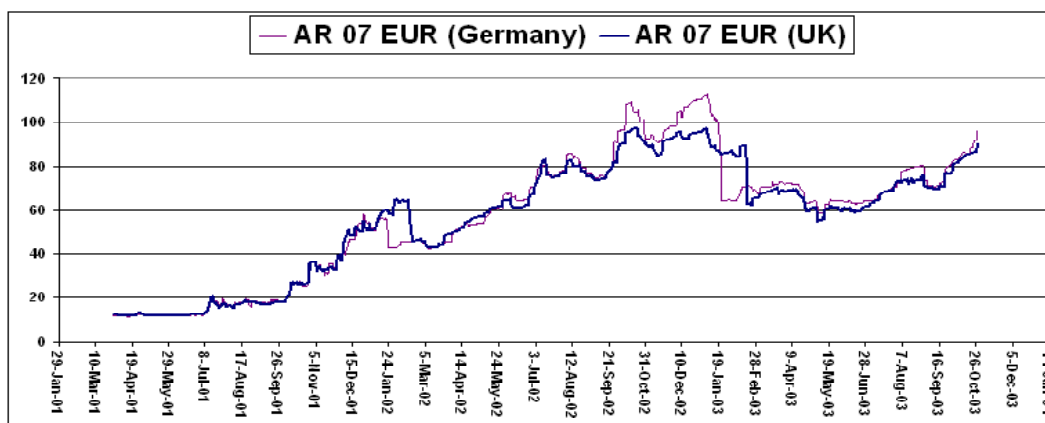
Figure 6: Argentine yields comparison in 2001 crisis.

Note that these yields behave alike (similar for other bonds). Assuming that arbitrage opportunities are absent in bond markets, we argue that CACs were irrelevant clauses in Argentine bonds probably because of the compositional effect. In other words, CACs had no value along the equilibrium path.

Lastly, compositional effects were likely to be present in other experiences of default. Table 1 presents data on debt composition for Russia, Ukraine, Ecuador, Pakistan and Argentina. The number of bonds issued by these sovereigns, as well as the number of jurisdictions involved, is not as large as for the case of Argentina. Yet, official debt is largely non-renegotiable (in the case of Pakistan, for example, the official debt was 88 percent).

Comparison of crisis features					
Issue	Russia	Ukraine	Ecuador	Pakistan	Argentina
# Old Bonds Involved	3	5	5	3	152
Amount Restructured (US$ MM)	31,600	2,600	6,600	610	82,000
# of Legislations Involved	1	3	2	1	8
Official Debt/Total Debt	45%	75%	50%	88%	23%

Source Marx (2003)

Table 1

While evidence suggest that CACs are unlikely to be a relevant characteristic in debt contracts for these experiences, future research should be done to assert whether this is also the case for most emerging countries and, furthermore, whether the presence of the IMF can also help explain the small value of these clauses in sovereign debt markets.

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Appendix

Proof of Proposition 7.

We start by defining **Problem V(-IC)** as **Problem V** without the incentive compatibility constraint for G_1:

$$\max_{D_h, G_1} EU = \theta\left(G_1\right)\left[Y_h - D_h\right] + \left[1 - \theta\left(G_1\right)\right] \frac{\chi\left(Y_l + S^* - D_l\right)^{\frac{1+\chi}{\chi}}}{(1+\chi)Y_l^{1/\chi}} - kG_1 \tag{46}$$

subject to

$$\theta\left(G_1\right) D_h + \left[1 - \theta\left(G_1\right)\right]\left(S^* + \frac{\left(Y_l + S^* - D_l\right)^{1/\chi}\left(D_l - S^*\right)}{Y_l^{1/\chi}}\right) \geq D \tag{47}$$

where

$$
\begin{aligned}
D_l &= \min\{Y_l + S^*, D_h\} \\
S^* &\in \left\{0, -Y_l + D_h + \left(\left(\frac{J}{\chi}\right)^\chi 1/Y_l\right)^{1/(\chi-1)}, D_h\right\}
\end{aligned}
$$

Note the following facts:

1. The utility of the government under **Problem V(-IC)** is increasing in S^*, since the objective function is increasing in S^* and the lender's participation constraint relaxes with S^*.

2. The utility of the government for a given value of S^* under **Problem V(-IC)** is greater than or equal to the one under **Problem V,** since **Problem V** has an additional constraint (the incentive compatibility for G_1).

3. When $S^* = D_h$ the solution of **Problem V(-IC)** satisfies the incentive compatibility constraint. Hence the value of the utility of the government under **Problem V(-IC)** equals the one under **Problem V.**

The proof follows from these three facts. ∎

Proof of Proposition 8.

We prove our proposition by example, as we did for **Proposition 4**. Again we assume

$$\theta(G_1) = \begin{cases} \bar{\theta} & G_1 > \overline{G_1} \\ \underline{\theta} & otherwise \end{cases} \tag{48}$$

where $(\bar{\theta} > \underline{\theta})$.[22] Another assumption is that $Y_l < D$.

The incentive constraint to support a high level of productive government expenditure under our assumption about $\theta(G_1)$ is then

$$\left(\bar{\theta} - \underline{\theta}\right)(Y_h - D_h) \geq k\overline{G_1}. \tag{49}$$

The expected payoff for a country issuing debt without collective action clauses and under no bailout is

$$EU = \bar{\theta}Y_h - D + k(D - \overline{G_1}). \tag{50}$$

Under partial bailout, if the country reaches the state of financial distress the IMF will provide funds in the amount of $S^* = -Y_l + D_h + \left(\left(\frac{J}{\chi}\right)^\chi 1/Y_l\right)^{1/(\chi-1)}$. It is useful to inspect the incentive compatibility constraint for this case. Because under partial bailout the state of the world where the country faces financial distress is not that bad, the government's incentives to allocate the funds in productive expenditure deteriorate. The incentive compatibility constraint for a high level of G_1 is

$$\left(\bar{\theta} - \underline{\theta}\right)\left(Y_h - D_h - \frac{\chi\left(\frac{J}{\chi}\right)^{\frac{1+\chi}{\chi-1}} Y_l^{\frac{2}{1-\chi}}}{(1+\chi)}\right) > k\overline{G_1} \tag{51}$$

but we assume that $\frac{\chi\left(\frac{J}{\chi}\right)^{\frac{1+\chi}{\chi-1}} Y_l^{\frac{2}{1-\chi}}}{(1+\chi)}$ is big enough to overturn Condition (49). Consequently, the incentive compatibility constraint for $\bar{\theta}$ does not hold and $\theta = \underline{\theta}$. Furthermore, $G_1 = 0$. Since $D_l = D_h$ the investors' participation constraint becomes

$$\underline{\theta}D_h + (1 - \underline{\theta})\left(S^* + \frac{(Y_l + S^* - D_h)^{1/\chi}(D_h - S^*)}{Y_l^{1/\chi}}\right) \geq D \tag{52}$$

---

[22]We work under the assumption that $\underline{\theta} > 0$. Otherwise loans for the amount of D could not be supported in equilibrium.

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or similarly

$$D_h + (1 - \underline{\theta}) \left[1 - \left(\frac{J}{\chi Y_l} \right)^{1/(\chi-1)} \right] \left[-Y_l + \left(\left(\frac{J}{\chi} \right)^{\chi} 1/Y_l \right)^{1/(\chi-1)} \right] \geq D \qquad (53)$$

Plugging this constraint into the objective function, we obtain the country's expected utility when the IMF is present

$$EU\,(IMF) = \underline{\theta} Y_h - \underline{\theta} D_h - (1 - \underline{\theta}) \frac{\chi\,(Y_l + S^* - D_h)^{\frac{1+\chi}{\chi}}}{(1 + \chi) Y_l^{1/\chi}} + kD \qquad (54)$$

or similarly

$$
\begin{aligned}
EU(IMF) \;=\; & \underline{\theta} Y_h - \underline{\theta} D - \\
& \underline{\theta}\,(1 - \underline{\theta}) \left[1 - \left(\frac{J}{\chi Y_l} \right)^{1/(\chi-1)} \right] \left[-Y_l + \left(\left(\frac{J}{\chi} \right)^{\chi} 1/Y_l \right)^{1/(\chi-1)} \right] \\
& - (1 - \underline{\theta}) \frac{\chi \left(\frac{J}{\chi} \right)^{\frac{1+\chi}{\chi-1}} Y_l^{\frac{2}{1-\chi}}}{(1 + \chi)}.
\end{aligned}
\qquad (55)
$$

Now we are able to observe that contracts without CACs dominate those with them whenever $EU > EU(IMF)$. Equivalently

$$
\begin{aligned}
(1 - \underline{\theta}) \left(\begin{array}{c} D + \frac{\chi \left(\frac{J}{\chi} \right)^{\frac{1+\chi}{\chi-1}} Y_l^{\frac{2}{1-\chi}}}{(1+\chi)} \\[2ex] + \underline{\theta} \left[1 - \left(\frac{J}{\chi Y_l} \right)^{1/(\chi-1)} \right] \left[-Y_l + \left(\left(\frac{J}{\chi} \right)^{\chi} 1/Y_l \right)^{1/(\chi-1)} \right] \end{array} \right) & \\
< \; (\bar{\theta} - \underline{\theta}) Y_h - k\overline{G_1}. &
\end{aligned}
\qquad (56)
$$

As in **Proposition 4,** the result depends on the sensitivity of the probability θ to productive government expenditure. If this probability is unaffected by G_1 then the government is better with partial bailout. Note that when $|\bar{\theta} - \underline{\theta}| \longrightarrow 0$ it is more unlikely that our condition will hold. Why? Reducing the cost of the contract ex-post is optimal ex-ante.

Matters are different when this sensitivity is strong. Making the state of distress very bad (although ex-post inefficient) will provide greater incentives for countries to stay out of trouble and to maintain fiscal conduct. This is the case when, other things equal, $|\bar{\theta} - \underline{\theta}|$ is bigger. ∎