

CONDITIONALITY COVENANTS: COMMITMENT VERSUS DISCRETION IN SOVEREIGN CREDIT CONTRACTS

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Abstract: This paper investigates the impact of imposing conditionality covenants on the performance of the signatories to a sovereign credit contract. A two period model is developed in which creditors provide a loan to a sovereign conditional upon the implementation of investments. Commitment to these covenants overcome the debt repudiation problem, as it increases the likelihood of repayment, if the implemented conditionalities contribute to an increase in the sovereign's productive capacity. A three period model is also developed to entertain the possibility that the sovereign engage in credit activities in subsequent periods, where in the final period the debtor has obligations towards junior and senior creditors. This allows for dynamic inconsistency, as the sovereign may be tempted to increase its debt in the second period, thus increasing the probability of repudiation in the third period. Imposing conditionality covenants by senior creditors that increase the portion they can appropriate in case of repudiation, relative to junior creditors, reduces the supply of credit by junior creditors in the second period and thus overcomes the debt dilution problem. Copyright © 2009 John Wiley & Sons, Ltd.

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1 INTRODUCTION

This paper investigates the impact of imposing conditionality covenants on the behaviour of the signatories to a sovereign credit contract. The paper attempts to address whether commitment to these covenants can overcome two problems prevalent in the sovereign credit market: the debt repudiation and debt dilution problems. In this context, conditionality refers to the process by which a creditor provides a loan conditional upon the

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promise of the debtor to pursue a specific set of economic policies, whose purpose is to enhance the productive capacity of the economy.

Several studies attributed the debt repudiation problem to the distinctive features of sovereign credit compared to domestic corporate finance. Unlike sovereign debt, Mohr (1991) emphasizes that national adjudication guarantees debtors' compliance with the stipulations of a domestic credit contract, and ensures seizure of collateral in case of default. On the other hand, Grossman and Van Huyck (1988) postulate that 'the power to abrogate commitments without having to answer to higher enforcement authority is the essential property of sovereignty'. Thus, sovereign risk creates an environment in which contractual obligations are not honoured, and within which pledging collateral and the seizure of assets upon default are substantially restricted. Accordingly, these features have rendered the market vulnerable to recurrent debt default crises.

Some studies asserted that a carrots versus sticks dichotomy could explain a sovereign's incentive to honour contractual obligations and to overcome the debt repudiation problem. In this context, Grossman and Van Huyck (1988) demonstrate that creditors may hold the carrot of a creditworthy reputation for the debtor implying improved ability to raise funds in the future. Alternatively, Bulow and Rogoff (1989a,b) emphasize that sovereign credit must be supported by a deterrent stick such as a threat of imposing sanctions or retaliatory measures that is considered severe enough to dissuade any sovereign who might entertain default as a possible strategy, or as a compensation to creditors' claims after a default occurs.

The rationale behind these proposed incentives; however, has been criticized in the literature. For instance, the debtor's incentive to service its debt to avoid permanent exclusion from participating in credit contracting activities is inconsistent with experience, as debtors with a record of default were enabled to engage in these activities. Similarly, indebted countries' assets that would be accessible to creditors in the event of repudiation are considered trivial relative to what they owe. Therefore, the proceeds from sanctions would be insufficient neither to deter debtors from repudiation nor to compensate creditors if repudiation takes place.

The criticism of these incentives caused other studies to argue that as debt crises can be attributed to both imprudence and profligacy by sovereign debtors, domestic policies ought to be properly designed in order to avoid debt repudiation. In this context, Sachs (1984) claims that as debtors adhere to conditionalities, they enhance their long-term capacity to service their debt obligations, as it is the role of these covenants to impose constraints on domestic policy making. This paper builds upon this argument in favour of commitment versus discretion, whereby ensuring commitment to conditionality covenants can be optimal compared to discretion as represented by relying only on reputation or retaliation incentives.

The other problem that the paper attempts to address is the debt dilution problem, which arises whenever a sovereign approaching financial distress raises new debt in an effort to delay the onset of a debt crisis. This new debt dilutes existing debt by reducing the amount that can be recovered by previous debt holders. Therefore, any new debt raised by junior debtors increases the probability of default and dilutes the value of all senior debts. Bolton and Jeanne (2005) argue that 'when seniority cannot be binding in sovereign debt, sovereigns attempt to achieve it *de facto*.' With each new debt issue, the sovereign is tempted to lower the cost of borrowing by committing to high future restructuring costs, which encourages the sovereign to restructure other debt issues first, and thus provide them a form of seniority. This paper, alternatively, proposes that conditionalities imposed by

senior creditors on their sovereign clients could assist in overcoming this problem. This can be achieved if senior creditors can restrain the country from tapping new funds by imposing conditionalities that enhances the bilateral economic ties with the sovereign debtor, and accordingly increases the portion they can appropriate in the case of default on the expense of junior creditors.

Political economy approaches provided some insights into the practice of conditionality. In this context, some studies attempted to address the rationale for this practice. For instance, Drazen (2002) argues that conditionalities cannot be justified unless there is a conflict of interest. In this case, conditionality strengthens the reformers against domestic opposition to eliminate the distortions that are chosen to placate these special interests. Mourmouras and Rangazas (2004) discuss a Samaritan's dilemma in which altruistic donors cannot commit in advance to demand repayment from debtors, and the debtor is tempted to underinvest to gain forgiveness. Therefore, donor altruism is a sufficient cause to equip loans with conditionality. Other studies attempted to discuss commitment to these conditionalities. For instance, Mayer and Mourmouras (2005) argue that a viable conditionality programme states the conditions that must be met for the sovereign not only to accept the programme but also to undertake the reforms without jeopardising the stability of the recipient country.

Although previous studies focused on the rationale for conditionality covenants, this paper investigates whether commitment to these covenants can overcome the debt repudiation and dilution problems. In this context, a two period model is developed in which creditors provide credit to sovereign debtors conditional upon the implementation of investments. This framework suggests that commitment to conditionalities increases both the supply of credit and the likelihood of debt repayment. A three period model is also developed to entertain the possibility that the sovereign engage in credit activities in subsequent periods, and where in the final period the debtor has obligations towards junior and senior creditors. The possibility of engaging again in credit activities allows for dynamic inconsistency, as the debtor might be tempted to increase its debt in the second period beyond the efficient amount and thus increasing the probability of repudiation in the third period. In this context, imposing conditionality covenants by senior creditors that increases the portion they can appropriate in case of repudiation, relative to what the junior creditors can, reduces the supply of credit by junior creditors in the second period, and thus overcomes the debt dilution problem.

The remainder of the paper is organised as follows: Section 2 includes the model, and Section 3 the conclusion. References and figures are included thereafter.¹

2 MODEL

A model analysing the strategic relationship between creditors and sovereign debtors is developed as a framework for our analysis. In this context, a two period model is developed to assess whether conditionality covenants can overcome the debt repudiation problem by increasing the likelihood of debt repayment. The framework is extended to a three period model to examine the ability of conditionalities to overcome the debt dilution problem.

¹The proofs of the propositions are included in an extended version of the paper in the author's web page: www.business.fullerton.edu/economics/skhalifa.

2.1 Two Period Model

Assume that a country lives for two periods and has free access to international credit markets. The country is managed by a social planner who maximises a discounted expected utility of the two-periods' consumption that takes the following form:

$$E_1 \left[\frac{(C_1)^{1-\rho}}{1-\rho} + \beta \frac{(C_2)^{1-\rho}}{1-\rho} \right] \quad (1)$$

where $\beta = \frac{1}{1+\theta}$ is the discount factor that reflects the sovereign's rate of pure time preference θ . The instantaneous utility of consumption is of the constant relative risk aversion type. The world interest rate is a constant r . We also assume that creditors are risk neutral, and that the credit market is competitive. In a deterministic context, the country's resources in period 2 are known in advance in period 1, and thus creditors are able to ration the amount of their credit to avoid debtor's default in period 2. However, if period 2 resources are realised in a stochastic manner, creditors have to face the risk of repudiation of their claims. Therefore, we assume that the country's resource endowments are denoted by Y_1 in period 1, and a random variable Y_2 in period 2.

2.1.1 Period 2

In period 2, the country's resource endowments Y_2 is assumed a random variable whose cumulative distribution function is given by $\mathcal{F}_2(Y_2)$, such that $P[Y_2 \leq Y_2^*] = \mathcal{F}_2(Y_2^*)$ measures the probability that output in period 2 is below a threshold Y_2^* . We also assume that Y_2 is uniformly distributed with a support of $[0, \hat{Y}_2]$, such that the probability density function $f(Y_2) = \frac{1}{\hat{Y}_2}$ if $0 \leq Y_2 \leq \hat{Y}_2$ and $f(Y_2) = 0$ otherwise. Let the credit contract include (D_{12}, σ_{12}) , where the first component is the level of debt contracted in period 1 to be repaid in period 2, and the second is the conditionality component $\sigma_{12} \in [0, 1]$. In this context, a loan D_{12} is provided conditional upon assigning in period 1 a portion σ_{12} of the funds procured to the implementation of investments. These investments have two implications on period 2 output. A direct increase based on the rate of return on investment μ . In addition to an indirect impact as these investments expand the production capacity of the economy \hat{Y}_2 . We assume that $\hat{Y}_2 = \sigma_{12}\hat{Y}_2^h + (1 - \sigma_{12})\hat{Y}_2^l$. If the country does not invest, $\sigma_{12} = 0$, the economy's full productive capacity is at its lowest possible level \hat{Y}_2^l . While if the country invests, the capacity level increases with σ_{12} until it reaches the highest possible level \hat{Y}_2^h if $\sigma_{12} = 1$. Thus, period 2 output $Y_2 + \sigma_{12}D_{12}(1 + \mu)$ is comprised of the return to investment $\sigma_{12}D_{12}(1 + \mu)$ and a stochastic component Y_2 whose support relies on the conditionality portion. We follow the argument in Sachs (1988) and assume that $\theta > \mu$, such that 'whenever a sovereign obtains a loan, the resources will be consumed rather than invested because the time discount rate exceeds the return on investment.' This assumption provides a rationale for imposing conditionality.

This contract is accompanied by R_{12} which denotes repayments due in period 2. The country's consumption in period 2 depends on whether the country repays or repudiates its debt. If the country honours its debt obligations, it consumes its resource endowments and the return to investment after repaying its dues as follows:

$$C_2 = Y_2 + \sigma_{12}D_{12}(1 + \mu) - R_{12} \quad (2)$$

On the other hand, the consumption level in the case of repudiation is given by

$$C_2 = Y_2 + \sigma_{12}D_{12}(1 + \mu) - \lambda Y_2 \tag{3}$$

Where λ is the proportion of output Y_2 downscaled by creditors as they impose sanctions on a unilaterally defaulting debtor. Accordingly, the country prefers to repudiate its debt in period 2, and suffers cost λY_2 if $\lambda Y_2 < R_{12}$, while prefers to service its debt otherwise.

Proposition 1. \exists A threshold $Y_2^* = \left(\frac{R_{12}}{\lambda}\right)$ below which the sovereign debtor prefers to repudiate, and the probability of repudiation is $\mathcal{F}_2[Y_2^*] = \left[\frac{R_{12}}{(\sigma_{12}\hat{Y}_2^l + (1-\sigma_{12})\hat{Y}_2^l)\lambda}\right]$.

This critical value is captured in Figures 1 and 2 which depict the relationship between the resource endowments and consumption. In this context, a distinction between the impact of penalties and conditionalities is warranted. An increase in penalties λ contributes to a decrease in Y_2^* . This is optimal from the point of view of creditors as a lower Y_2^* implies that debtors repudiate only at lower levels of realised output. However, as can be seen in Figure 2, if $Y_2^* \geq \hat{Y}_2^l$ and conditionalities are not implemented, the sovereign defaults regardless of the realised output. Thus, even if sanctions are at the highest level $\lambda = 1$, while $Y_2^* \geq \hat{Y}_2^l$, the probability of default continues to be $\mathcal{F}_2[Y_2^*] = 1$. Nevertheless, if the sovereign implements conditionalities that shift upwards its production possibility frontier \hat{Y}_2 , even if the output realised is not necessarily the highest possible, it increases the

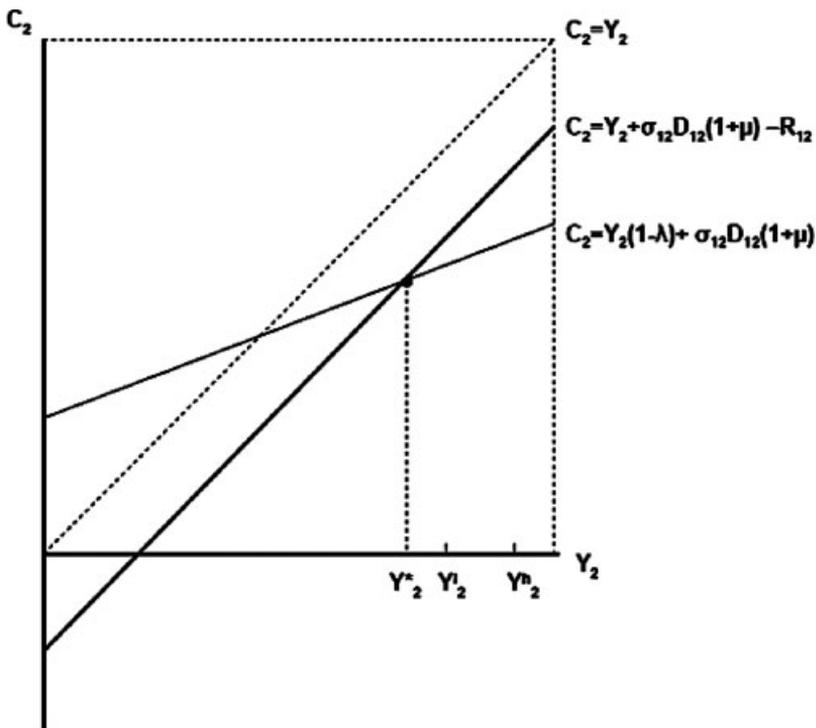


Figure 1. Threshold at the two period model when $Y_2^* < \hat{Y}_2^l$

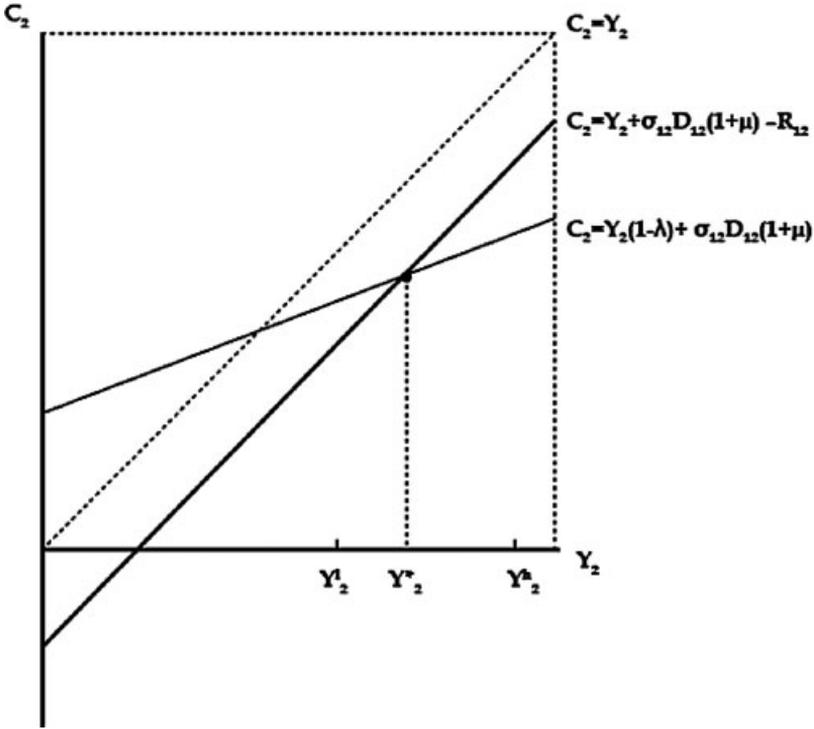


Figure 2. Threshold at the two period model when $Y_2^* > \widehat{Y}_2^l$

probability of repayment. So, an increase in the full capacity level \widehat{Y}_2 increases the likelihood of repayment by reducing the probability of repudiation.

2.1.2 Period 1

In period 1, the country consumes its resource endowments and a portion $(1 - \sigma_{12})$ of the debt, if it abides by the conditionality covenant, as follows:

$$C_1 = Y_1 + (1 - \sigma_{12})D_{12} \tag{4}$$

If the country decides not to abide by the conditionality covenant, then $\sigma_{12} = 0$. The participation constraint ensures that the utility derived if the conditionalities are implemented is higher than if they are not, and is given by

$$\begin{aligned} \text{Max}_{D_{12}, R_{12}} & \left\{ \begin{aligned} & U[Y_1 + (1 - \sigma_{12})D_{12}] + \beta \int_0^{Y_2^*} U[Y_2 + \sigma_{12}D_{12}(1 + \mu) - \lambda Y_2] d\mathcal{F}_2(Y_2) \\ & + \beta \int_{Y_2^*}^{\sigma_{12}\widehat{Y}_2^h + (1 - \sigma_{12})\widehat{Y}_2^l} U[Y_2 + \sigma_{12}D_{12}(1 + \mu) - R_{12}] d\mathcal{F}_2(Y_2) \end{aligned} \right\} \geq \\ \text{Max}_{D_{12}, R_{12}} & \left\{ U[Y_1 + D_{12}] + \beta \int_0^{Y_2^*} U[Y_2 - \lambda Y_2] d\mathcal{F}_2(Y_2) + \beta \int_{Y_2^*}^{\widehat{Y}_2^l} U[Y_2 - R_{12}] d\mathcal{F}_2(Y_2) \right\} \end{aligned} \tag{5}$$

Proposition 2. \exists A threshold \bar{Y}_2 , such that if $(\hat{Y}_2^h - \hat{Y}_2^l) \geq \bar{Y}_2$ the participation constraint is satisfied and the country abides by the conditionality covenants.

In order to identify the optimal amount of debt D_{12} that the country wishes to contract in period 1, an assumption must be made as to how it will be repaid in period 2. In this context, creditors can ensure that the country will repay λY_2 if $Y_2 < Y_2^*$ and R_{12} otherwise. Assume that the loan contract price is given by q_{12} such that if the creditor receives R_{12} in period 2, it provides $q_{12}R_{12}$ in period 1. In this case, creditors choose R_{12} to maximise expected profits given by the difference between expected repayments and the opportunity cost as follows:

$$\text{Maximize}_{R_{12}} \left[-q_{12}R_{12}(1+r) + R_{12} [1 - \mathcal{F}_2(Y_2^*)] + \int_0^{Y_2^*} \lambda Y_2 d\mathcal{F}_2(Y_2) \right] \tag{6}$$

Proposition 3. In the deterministic context, the opportunity cost of debt is given by the repayment due

$$D_{12}(1+r) = R_{12} \tag{7}$$

while in the stochastic context, it is given by the repayment due less a risk premium

$$D_{12}(1+r) = R_{12} - \frac{(R_{12})^2}{\lambda [\sigma \hat{Y}_2^h + (1-\sigma)\hat{Y}_2^l]} \tag{8}$$

It is obvious that at any arbitrary amount of debt, more repayment is expected under the case of uncertainty due to a risk premium that creditors demand to safeguard themselves against any contingencies that could prevail in the market. This also demonstrates that a lower amount of risk premium is charged when the sovereign debtor is committed to conditionality covenants. Therefore, we might conclude that commitment results in an equilibrium somewhere between the deterministic case and the case with discretionary uncertainty.

According to Gale and Hellwig (1985), competitive pressure in the capital market leads the creditor and debtor to write a contract which maximises the expected utility of the debtor subject to the constraint that the expected return to the creditor covers the opportunity cost of funds. In this context, the sovereign chooses D_{12} in order to maximise its discounted expected utility as follows:

$$\text{Maximize}_{D_{12}} \left[U(Y_1 + (1-\sigma_{12})D_{12}) + \beta \int_0^{Y_2^*} U(Y_2 + \sigma_{12}D_{12}(1+\mu) - \lambda Y_2) d\mathcal{F}_2(Y_2) + \beta \int_{\sigma_{12}\hat{Y}_2^h + (1-\sigma_{12})\hat{Y}_2^l}^{\infty} U(Y_2 + \sigma_{12}D_{12}(1+\mu) - R_{12}) d\mathcal{F}_2(Y_2) \right] \tag{9}$$

subject to the credit supply constraint (8) and $(\hat{Y}_2^h - \hat{Y}_2^l) \geq \bar{Y}_2$ to guarantee the implementation of conditionalities. The sovereign chooses the optimal level of debt such

that

$$\begin{aligned}
 & [Y_1 + (1 - \sigma_{12})D_{12}]^{-\rho}(1 - \sigma_{12}) \left[1 - \frac{R_{12}}{\lambda \widehat{Y}_2} \right] \\
 &= \frac{\beta(1+r)}{\widehat{Y}_2} \left[\frac{\left(\widehat{Y}_2 + \sigma_{12}D_{12}(1 + \mu) - R_{12} \right)^{1-\rho}}{1 - \rho} - \frac{\left(Y_2^* + \sigma_{12}D_{12}(1 + \mu) - R_{12} \right)^{1-\rho}}{1 - \rho} \right]
 \end{aligned}
 \tag{10}$$

To conclude, the first contribution of the paper is to demonstrate that imposing and implementing conditionality covenants increases the likelihood of repayment by the debtor, reduces the risk premium and expands the supply of credit.

2.2 Three Period Model

In order to entertain the possibility of further engaging in credit activities by creditors and debtors in subsequent periods, the previous model is extended to three periods. In this context, assume that a country lives for three periods. The country can acquire a short-term debt D_{12} in period 1 where the service of this debt R_{12} is due in period 2, and a long-term debt D_{13} in period 1 where the service of this debt R_{13} is due in period 3. At period 2, the country may decide to borrow again D_{23} , which is associated with repayment R_{23} due in period 3. Denote Y_1, Y_2, Y_3 as the resources that the country is endowed with in the three periods respectively. Furthermore, assume that at period 1, Y_1 is known, however Y_2 and Y_3 are two independent random variables drawn from cumulative distribution functions $\mathcal{F}_2(Y_2)$ and $\mathcal{F}_3(Y_3)$, respectively. If the country defaults at period 2, its endowments at periods 2 and 3 are scaled down to $(1 - \lambda)Y_2$ and $(1 - \lambda)Y_3$ respectively, and if defaults only at period 3, its endowments at period 3 only are scaled down to $(1 - \lambda)Y_3$. Finally, the country is managed by a social planner who maximises an expected utility of the three periods consumption given by

$$E_1 \left[\frac{(C_1)^{1-\rho}}{1 - \rho} + \beta \frac{(C_2)^{1-\rho}}{1 - \rho} + \beta^2 \frac{(C_3)^{1-\rho}}{1 - \rho} \right]
 \tag{11}$$

where $\beta = \frac{1}{1+\theta}$ is the discount factor that reflects the sovereign’s rate of pure time preference θ . The instantaneous utility function is of the constant relative risk aversion type. The world interest rate is a constant r , creditors are risk neutral and the capital market is competitive. To examine the equilibrium that is attained by the country, and to arrive at the optimal strategy available, the model is solved using backwards induction. Taking as given the financial commitment made by the country during the previous periods, the following analysis attempts to discover the best available strategy from any time on.

2.2.1 Period 3

In period 3, the country’s resource endowments Y_3 is assumed a random variable whose cumulative distribution function is given by $\mathcal{F}_3(Y_3)$, such that $P[Y_3 \leq Y_3^*] = \mathcal{F}_3(Y_3^*)$ measures the probability that output in period 3 is below a threshold Y_3^* . We also assume that Y_3 is uniformly distributed with a support of $[0, \widehat{Y}_3]$, such that the probability density

function $f(Y_3) = \frac{1}{Y_3}$ if $0 \leq Y_3 \leq \widehat{Y}_3$ and $f(Y_3) = 0$ otherwise. Let the credit contract in period 1 include (D_{13}, σ_{13}) , where D_{13} is the level of senior debt contracted in period 1 to be repaid in period 3, which is provided conditional upon assigning in period 1 a portion $\sigma_{13} \in [0, 1]$ of the funds procured to the implementation of investments. In addition, let the credit contract in period 2 include (D_{23}, σ_{23}) , where D_{23} is the level of junior debt contracted in period 2 to be repaid in period 3, which is provided conditional upon assigning in period 1 a portion $\sigma_{23} \in [0, 1]$ of the funds procured to the implementation of investments. These investments have two implications on period 3 output. A direct increase based upon the rate of return on investment μ . In addition to an indirect impact as these investments expand the production capacity of the economy \widehat{Y}_3 . We assume that $\widehat{Y}_3 = \sigma_{23}\widehat{Y}_3^h + (1 - \sigma_{23})[\sigma_{13}\widehat{Y}_3^h + (1 - \sigma_{13})\widehat{Y}_3^l]$. In this context, if the country invests σ_{13} of the senior debt, it expands the production possibility frontier to $[\sigma_{13}\widehat{Y}_3^h + (1 - \sigma_{13})\widehat{Y}_3^l]$. If the country invests σ_{23} of the junior debt, it expands the production possibility frontier further to \widehat{Y}_3 , which is between $[\sigma_{13}\widehat{Y}_3^h + (1 - \sigma_{13})\widehat{Y}_3^l]$ and \widehat{Y}_3^h . If the country does not invest, the economy's full productive capacity is at its lowest possible level \widehat{Y}_3^l .

If the country defaulted in period 2, it does not have access to credit markets, and its consumption in period 3 is equal to its output after imposing sanctions. These sanctions are assumed to be equivalent to λY_3 if $Y_3 < \widehat{Y}_3^l$ and $\lambda \widehat{Y}_3^l$ otherwise. Assuming junior and senior creditors receive a proportion of the proceeds of the sanctions that is equivalent to the ratio of the debt repayment requirements to total obligations by debtors in this period, then senior creditors receive $\left(\frac{R_{13}}{R_{13}+R_{23}}\right)\lambda Y_3$, while junior creditors receive $\left(\frac{R_{23}}{R_{13}+R_{23}}\right)\lambda Y_3$. In addition, creditors can sequester a portion λ of the output beyond \widehat{Y}_3^l if $Y_3 \geq \widehat{Y}_3^l$, where senior creditors receive a portion γ , while junior creditors receive a portion $(1 - \gamma)$.

On the other hand, as the country reaches period 3 without yet defaulting in period 2, it owes R_{13} and R_{23} to its senior and junior creditors respectively. In this period, as the country have access to credit in period 2, it has two options available: either to repudiate or repay its obligations. If $\lambda Y_3 \geq R_{13} + R_{23}$ the country chooses not to repudiate its debt, and its level of consumption is given by

$$C_3 = Y_3 + \sigma_{13}D_{13}(1 + \mu)^2 + \sigma_{23}D_{23}(1 + \mu) - R_{13} - R_{23} \tag{12}$$

On the other hand, if $\lambda Y_3 < R_{13} + R_{23}$, then the country would rather default than service its debt, and its consumption level is given by

$$C_3 = Y_3 + \sigma_{13}D_{13}(1 + \mu)^2 + \sigma_{23}D_{23}(1 + \mu) - \lambda Y_3 \tag{13}$$

Proposition 4. \exists A threshold $Y_3^* = \left(\frac{R_{13}+R_{23}}{\lambda}\right)$ below which the sovereign debtor prefers to repudiate and the probability of repudiation is $\mathcal{F}_3(Y_3^*) = \left(\frac{R_{13}+R_{23}}{\lambda Y_3}\right)$.

2.2.2 Period 2

During period 2, the country finds out the value Y_2 of its resources. The sovereign accordingly decides whether to repay R_{12} , and therefore be able to acquire debt D_{23} and consumes

$$C_2 = Y_2 + D_{23}(1 - \sigma_{23}) - R_{12} \tag{14}$$

or else default on its debt to its creditors, have no access to the credit market, and consumes

$$C_2 = Y_2(1 - \lambda) \tag{15}$$

Assuming that the loan contract price is q_{23} such that if a creditor receives R_{23} in period 3 it provides $q_{23}R_{23}$ in period 2, then creditors maximise expected profits which is given by the difference between their expected repayment and the opportunity cost of credit as follows:

$$\begin{aligned} & \underset{R_{23}}{\text{Maximize}} \left[-q_{23}R_{23}(1 + r) + R_{23} \left[1 - \mathcal{F}_3(Y_3^*) \right] \right. \\ & \left. + \int_0^{Y_3^*} \left[\left(\frac{R_{23}}{R_{13} + R_{23}} \right) \lambda \widehat{Y}_3^l + (1 - \gamma) \lambda (Y_3 - \widehat{Y}_3^l) \right] d\mathcal{F}_3(Y_3) \right] \end{aligned} \tag{16}$$

This is the case if $Y_3 \geq \widehat{Y}_3^l$. Otherwise, $(1 - \gamma) \lambda (Y_3 - \widehat{Y}_3^l) = 0$.

Proposition 5. *An increase in the repayment due to the period 1 long-term creditors reduces the supply of period 2 short-term credit which is given by*

$$D_{23}(1 + r) = \begin{cases} R_{23} - \frac{R_{13}R_{23}}{2\lambda\widehat{Y}_3} - \frac{(R_{23})^2}{\lambda\widehat{Y}_3} & \text{if } Y_3 < \widehat{Y}_3^l \\ R_{23} - \frac{R_{13}R_{23} + 2(R_{23})^2}{\lambda\widehat{Y}_3} + \frac{(1 - \gamma)R_{23}(R_{13} + R_{23})}{\lambda\widehat{Y}_3} + R_{23} \frac{\lambda\widehat{Y}_3^l(R_{13} + R_{23}) - R_{23}\lambda\widehat{Y}_3^l}{(R_{13} + R_{23})^2} & \text{if } Y_3 \geq \widehat{Y}_3^l \end{cases} \tag{17}$$

If the country chooses to repay R_{12} , and attempts to raise new funds in the international credit market, it chooses D_{23} to maximise the utility of consumption in period 2 given that the sovereign repays its debt, and the discounted expected utility of consumption in period 3 as follows:

$$\underset{D_{23}}{\text{Maximize}} \left[U(Y_2 + (1 - \sigma_{23})D_{23} - R_{12}) + \beta \int_0^{Y_3^*} U(Y_3 + I_3 - \lambda Y_3) d\mathcal{F}_3(Y_3) + \beta \int_{Y_3^*}^{\widehat{Y}_3} U(Y_3 + I_3 - R_{13} - R_{23}) d\mathcal{F}_3(Y_3) \right] \tag{18}$$

where $I_3 = \sigma_{13}D_{13}(1 + \mu)^2 + \sigma_{23}D_{23}(1 + \mu)$. This is subject to the credit supply constraint (17). Let $\Gamma_2(Y_2, R_{12}, R_{13})$ be the utility value reached by the country in period 2 if it chooses the programme that solves this equation. Therefore, the country prefers defaulting to choosing the market solution if

$$U(Y_2 - \lambda Y_2) + \beta \int_0^{\widehat{Y}_3} U(Y_3 - \lambda Y_3) d\mathcal{F}_3(Y_3) \geq \Gamma_2(Y_2, R_{12}, R_{13}) \tag{19}$$

Proposition 6. *The amount of credit that the country procures in period 2 from the international credit market is larger than the efficient amount.*

2.2.3 Period 1

There are two types of creditors: long-term creditors who provide D_{13} in period 1 accompanied with a repayment R_{13} due in period 3 and short-term creditors who provide D_{12} in period 1 accompanied with a repayment R_{12} due in period 2. The long-term creditors

choose R_{13} to maximise their expected profit given by

$$\begin{aligned} & \text{Maximize}_{R_{13}} \left[-q_{13}R_{13}(1+r)^2 + R_{13} [1 - \mathcal{F}_3(Y_3^*)] \right. \\ & \left. + \int_0^{Y_3^*} \left[\left(\frac{R_{13}}{R_{13} + R_{23}} \right) \lambda \widehat{Y}_3^l + \gamma \lambda (Y_3 - \widehat{Y}_3^l) \right] d\mathcal{F}_3(Y_3) \right] \end{aligned} \tag{20}$$

This is the case if $Y_3 \geq \widehat{Y}_3^l$. Otherwise, $\gamma \lambda (Y_3 - \widehat{Y}_3^l) = 0$.

Proposition 7. *An increase in the repayment due to the period 2 short-term creditors reduces the supply of period 1 long-term credit given by*

$$D_{13}(1+r)^2 = \begin{cases} R_{13} - \frac{R_{13}R_{23}}{2\lambda\widehat{Y}_3} - \frac{(R_{13})^2}{\lambda\widehat{Y}_3} & \text{if } Y_3 < \widehat{Y}_3^l \\ R_{13} - \frac{R_{13}R_{23} + 2(R_{13})^2}{\lambda\widehat{Y}_3} + \frac{-\gamma R_{13}(R_{13} + R_{23})}{\lambda\widehat{Y}_3} + R_{13} \frac{\lambda\widehat{Y}_3^l(R_{13} + R_{23}) - R_{13}\lambda\widehat{Y}_3^l}{(R_{13} + R_{23})^2} & \text{if } Y_3 \geq \widehat{Y}_3^l \end{cases} \tag{21}$$

The period 1 short-term creditors solve a similar problem choosing R_{12} to maximise expected profits. In period 1, the decision by the sovereign to borrow D_{12} and D_{13} in period 1 can be subdivided into two phases. The first phase can be described as the solution to the programme

$$\Pi_1(D_{12}, D_{13}) = \text{Max}_{R_{13}, R_{23}} \int_0^{\widehat{Y}_2} (\Gamma_2) d\mathcal{F}_2(Y_2) \tag{22}$$

subject to the credit supply constraint for D_{12} where the opportunity cost of credit is equal to the expected return R_{12} if $\lambda Y_2 \geq R_{12}$ and λY_2 otherwise. This is also subject to the credit supply constraint (21). The second phase of the country’s decision making process in period 1 is to choose D_{12} and D_{13} so as to maximise the discounted expected utility as follows:

$$\text{Maximize}_{D_{12}, D_{13}} [U(Y_1 + D_{12}(1 - \sigma_{12}) + D_{13}(1 - \sigma_{13})) + \beta \Pi_1(D_{12}, D_{13})] \tag{23}$$

Proposition 8. *The market equilibrium is dynamically inefficient.*

The dynamic inefficiency prevalent in this framework is that, unlike a firm, a sovereign cannot promise to pay some creditors and default on others. Therefore, any new debt raised by junior debtors increases the probability of default and dilutes the value of all senior debts.

Proposition 9. *If the portion γ received by senior creditors is an increasing function of its contribution to the increase in the production possibility frontier $\frac{[\sigma_{13}\widehat{Y}_3^l + (1 - \sigma_{13})\widehat{Y}_3^l] - \widehat{Y}_3^l}{\widehat{Y}_3 - \widehat{Y}_3^l}$, while the portion $(1 - \gamma)$ received by junior creditors is an increasing function of its contribution to the increase in the production possibility frontier $\frac{\widehat{Y}_3 - [\sigma_{13}\widehat{Y}_3^l + (1 - \sigma_{13})\widehat{Y}_3^l]}{\widehat{Y}_3 - \widehat{Y}_3^l}$, then the equilibrium is dynamically consistent.*

In this context, if senior creditors provide their credit conditional upon a clause in the contract that requires the sovereign to redirect a portion σ_{13} of the loan to expanding the production capacity of the country beyond a threshold \widehat{Y}_3^l , and where this expansion is in

the core of bilateral economic ties between the senior creditor and the debtor, then senior creditors can increase the portion they sequester in the case of default on the expense of junior creditors. This implies that the higher the contribution of senior creditors in the increase in the production possibility, the lower the segment that is available to junior creditors to expand the productive capacity to its maximum level \widehat{Y}_3^h . This is plausible as it is justified to assume that the contribution of creditors to the expansion of actual output is equivalent to their contribution to the increase in possible output.

In the three period model, as in the two period model, the rationale for imposing conditionality relies on the argument in Sachs (1988) that the rate of pure time preference is assumed larger than the rate of return on investment $\theta > \mu$. Commitment to conditionalities is guaranteed in this context by assuming that there exists thresholds \overline{Y}_2 and \overline{Y}_3 such that if $(\widehat{Y}_2^h - \widehat{Y}_2^l) \geq \overline{Y}_2$ and $(\widehat{Y}_3^h - \widehat{Y}_3^l) \geq \overline{Y}_3$, the participation constraint is satisfied and the country abides by the conditionality covenants in periods 1 and 2 in the same sense as in proposition 2.

3 CONCLUSION

Though a process that are being practised by some participants in the international credit market, conditionality covenants have not been discussed in a rigorous analytical manner that reveals its implications on the behaviour of the signatories to a sovereign credit contract.

This paper develops a two period model in which creditors provide credit to sovereign debtors conditional upon the implementation of investments by the debtor. This framework suggests that commitment to the conditionality covenants increases the likelihood of repayment by sovereign debtors, and thus overcomes the repudiation problem. In addition, a three period model is also developed to entertain the possibility that the sovereign debtor engage in credit activities in subsequent periods, and where in the final period the debtor has obligations towards junior and senior creditors. Engaging again in credit activities allows for the possibility of dynamic inconsistency, as the debtor might be tempted to increase its debt in the second period beyond the efficient amount and thus increasing the probability of repudiation in the third period. In this context, imposing conditionality covenants by senior creditors that increases the portion that they can appropriate from the sovereign in case of repudiation, relative to what the junior creditors can, reduces the supply of credit by junior creditors in the second period. This overcomes the debt dilution problem encountered in this market.

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