The Costs of Sovereign Defaults: Theory and Empirical Evidence

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Abstract

Economic policy makers sometimes perceive a sovereign default as a jump into the unknown. The main piece of information missing is what the costs of the default are going to be and how they arise. Making a good assessment of these costs is crucial when trying to evaluate how far a country should go to avoid a default. This paper analyzes the theoretical and empirical evidence on the costs of sovereign defaults. It classifies the costs of defaults in three categories: (1) costs imposed as penalties by creditors; (2) costs related to the information content of defaults; (3) costs related to domestic agents’ sovereign bond holdings. It begins by presenting a simple model that captures the main intuition behind each of these costs. It then reviews the empirical evidence on the costs of sovereign defaults. Contrary to the conventional wisdom that seems to believe that the main costs of defaults are related to the exclusion of the sovereign from credit markets or higher subsequent borrowing costs for the sovereign, this paper argues that, under the light of the existing evidence, the main costs of defaults are related to their negative effects on credit both foreign and domestic to the domestic private sector and trade. These effects do not seem to be caused by penalties imposed by creditors. They seem to be the result mainly of the effect of defaults on domestic agents’ balance sheets and expectations.

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1 Introduction

How costly will a sovereign default be for the defaulting country? How can these costs be limited? These are crucial questions in the mind of policy makers facing a debt crisis. Being able to estimate these costs is needed to decide how far a country should go to avoid default. In addition, understanding the sources of these costs is crucial to mitigate them and improve the workings of sovereign debt markets.

In recent years, in order to avoid a default, governments have fought tough political battles to cut pension payments or public wages, have postponed investments or risked the health of the domestic banking system by pushing banks to hold more sovereign debt. Governments have been willing to do all these to avoid a default because sovereign defaults are perceived to be very costly. However, understanding the origin of these costs has been difficult. One reason is that sovereign debt contracts differ from corporate debt contracts mainly because their legal framework is weaker. The legal enforceability of sovereign debt contracts is much more limited. The holder of a corporate debt contract owns a legally enforceable claim on the assets of the corporate borrower and, in the event of default, the lender has the right to initiate actions against the borrower under the framework of a bankruptcy code; this is not the case with sovereign debt contracts. Sovereign governments are immune from bankruptcy procedures and few of their assets could be seized in the event of a default. In addition, the overwhelming majority of sovereign debt contracts are not collateralized. Given this legal framework, it seems that a sovereign defaults should not be really costly.

This paper studies the costs of sovereign defaults. It classifies the different theories regarding the costs of default in three groups:

- Costs imposed as penalties by creditors: two main type of costs imposed by creditors have been analyzed: exclusion of the sovereign from international credit markets (Eaton and Gersovitz (1981)) and other type of sanctions such as trade sanctions (Bulow and Rogoff (1989))
• Costs related to the information content of defaults: defaults reveal information affecting agents’ expectations (Cole and Kehoe (1998), Sandleris (2008))

• Costs related to domestic agents’ sovereign bond holdings: domestic bond holders are negatively affected by a default when the government cannot discriminate in their favor in the event of a default and is unable to compensate them adequately after it (Broner and Ventura (2011) and Gennaioli et al (2011)).

We begin by presenting a simple model for each of these theories that captures the main ideas behind them. Doing so, allows for a better understanding of the similarities and differences between them.

The paper reviews also the empirical evidence on the costs of sovereign defaults. As a first past, it evaluates the relationship between defaults and economic growth. Different empirical studies suggest that sovereign defaults are associated with declines of approximately 1 or 2 percentage points in GDP growth. These declines are larger when the economy suffers a banking crisis in addition to the default.

The paper analyzes also the empirical evidence on the effects of default on trade, foreign direct investment and foreign and domestic credit to the private sector. This analysis allows us to better understand the relevance of the different mechanisms through which defaults affect output. The empirical evidence shows that, after controlling for fundamentals, there is a decline in total trade for the defaulting country of approximately 3.2% per year during the first five years following the default. Furthermore, Martinez and Sandleris (2011) show that, given the patterns of the decline in trade, it is unlikely that these declines were generated by trade sanctions. Fuentes and Saravia (2010) show that there is evidence also of a decline in foreign direct investment in the aftermath of defaults. Arteta and Hale (2008) used micro-level data on private sector borrowing from international credit markets and found that sovereign defaults are systematically accompanied by a decline in foreign credit to domestic private firms. After controlling for fundamentals, they found an additional decline in credit of over 20% below the country-specific average during the debt renegotiations, which persists more than two years after the restructuring agreement is reached.
Finally, Gennaioli et al. (2011) analyze the effect of sovereign defaults on financial activity in the defaulting country and find that a default generates a decline of 8.6% in private credit.

Finally, we analyze the empirical evidence on the duration of the exclusion of a sovereign from international credit markets in the aftermath of defaults and the effect of defaults on subsequent borrowing costs for the defaulting country. Gelos et al. (2011) and Alessandro et al. (2011) show that the duration of the exclusion is usually short-lived. The average length of the period from default till reaccess to international credit markets was four and a half years for the period 1980-2000, but it declined in the 1990s. The evidence on higher subsequent costs of borrowing for defaulting countries is mixed. There seems to be higher borrowing costs shortly after a debt restructuring but they disappear after 2 years. Furthermore, these higher borrowing costs seem to be relatively small.

The paper is organized as follows. Section 2 formalizes the default decision faced by a government and presents the different theories regarding the costs of sovereign default. Section 3 analyzes the empirical evidence on the costs of defaults. Finally, Section 4 concludes.

2 The Costs of Sovereign Defaults: The Theory

2.1 The default decision in a two-period model with exogenous output costs

In order to develop some intuition and understand the different theories regarding the costs of sovereign defaults we present first a two periods model where the only cost of default is in terms of output. One can think of this output costs as being the result of sanctions or, alternatively, as a reduced form formulation of some other mechanism (not modeled in this subsection) that generates the declines in output.

Assume that there is a small open economy with a representative agent whose welfare the government tries to maximize. There is also a group of competitive, risk neutral foreign creditors. Creditors have access to a risk free asset that yields the risk-free interest rate, $r^f$. The representative
agents income is exogenously given. Income at time 0 is $y_0$ while income at time 1 is uncertain with $y_1 \in [y_{1L}, y_{1H}]$.

The government can smooth the consumption of the representative agent borrowing from foreign creditors using a one period defaultable discount bond and saving using the risk-free asset. The representative agent is risk averse and its utility function is given by:

$$W = E_0 \sum_{t=0}^{1} \beta^t u(c_t) = u(c_0) + E_0 [\beta u(c_1)] \quad (1)$$

Although the government makes two decisions in this model (first, at $t = 0$ it chooses how much debt to issue or hold, then, at $t = 1$, after observing the income level, $y_1$, it decides whether to repay or default on the debt), we will focus only on the second one, taking the level of debt, $B_1$, as given. We assume that if the government defaults it does not make any payment to creditors.\(^1\) Repaying is costly for the government as it involves transferring resources to foreign creditors whose welfare does not enter into the government welfare function. The government decision is the following one:

$$V(B_1, y_1) = \max_{\{ND; D\}} \{V^{ND}(B_1, y_1), V^D(y_1)\} \quad (2)$$

where:

$$V^{ND}(B_1, y_1) = u(y_1 - B_1) \quad (3)$$

$$V^D(y_1) = u(h(y_1)) \quad (4)$$

where $h(y_1) \leq y_1$ captures the presence of the costs of default in terms of output. Following, Grossman and Van Huyck (1988) argument of excusable defaults we assume that the cost of default

\(^1\)This assumption is extreme as it excludes any possible renegotiation that could generate a positive repayment to foreign creditors upon default, which is what we usually observe in reality. This assumption makes the presentation simpler as it let us focus on the dichotomic choice between default and repayment. However, it is important to bear in mind that the same forces that would enforce repayment when the decision is dichotomic will also enforce it when the government can choose the optimal amount of repayment.
is increasing in the level of income: \( h(y_1) = \alpha y_1 \) with \( \alpha \leq 1 \). As mentioned above, these costs in terms of output could be the result for example of sanctions imposed by the creditors upon default as suggested by Bulow and Rogoff (1989) or, alternatively, we can think of them as a reduced form version of a more structural underlying model.\(^2\)

The following lemma characterizes the government default set in this framework.

**Lemma 1** When \( \alpha < 1 \) there will be some, \( B_1 \) such that \( 0 < B_1 < y_{1H} \), for which \( \exists y_1^* : V^{ND}(B_1, y_1^*) = V^D(y_1^*) \). And, \( \forall y_1 \geq y_1^* \) the government will repay, and \( \forall y_1 < y_1^* \) it will choose to default.

**Proof.** As the government is indifferent between repaying and defaulting when income is \( y_1^* \), we just need to look at how \( V^{ND} \) and \( V^D \) change as \( y_1 \) increases

\[
\frac{\partial V^{ND}(B_1, y_1)}{\partial y_1} = \frac{\partial u}{\partial c_1} > \frac{\partial V^D(y_1)}{\partial y_1} = \frac{\partial u}{\partial c_1} \alpha
\]

Note that if \( B_1 \) is too large, there might not exist such a \( y_1^* \). However, it is straight forward to show that such a \( B_1 \) could never arise in equilibrium. Note also that if \( \alpha = 1 \) \( \forall y_1 \), that is when defaults are costless the government decision is trivial. Repayment entails giving up resources, defaulting does not. So, the government will always choose to default. However, creditors will anticipate this and the equilibrium price of the debt will be 0. In other words, if defaults were costless the government would be unable to borrow.

For a given \( B_1 \), let \( \pi \) be the probability of \( y_1 \geq y_1^* \), or what is equivalent, the probability that \( V^{ND} \geq V^D \). So, \( \pi \) is the probability of repaying, and \((1 - \pi)\) is the probability of default. As \( B_1 \) increases, the probability of repaying, \( \pi \), falls. The reason is that \( V^{ND}(B_1, y_1) \) increases as \( B_1 \) goes up, but \( V^D(y_1) \) remains unchanged. So, as \( B_1 \) increases, the level of output, \( y_1^* \), that leaves the government indifferent between repaying or defaulting becomes higher, and as a result the probability of repaying falls.

\(^2\)See Section 2.3 for an example.
As foreign creditors are risk neutral and can invest at the risk free rate, \( r^f \), as an outside option, the bond price, \( q \), in equilibrium will be such that:

\[
q(1 + r^f) = \pi 1 + (1 - \pi) 0
\]

which implies that:

\[
q = \frac{\pi}{1 + r^f} = \frac{\Pr\{V^{ND}(B_1, y_1) \geq V^D(y_1)\}}{1 + r^f}
\] (5)

That is, as the probability of default goes up (lower \( \pi \)), the bond price falls. In particular, note that if \( \pi = 1 \) the price of the bond will be equal to that of the risk free asset.

### 2.2 Costs of defaults related to penalties imposed by creditors

Having developed some intuition regarding the default decision in a simple two-period model, we now extend it to infinite time to present what has become the work horse model in the quantitative sovereign debt literature. The costs of default are now twofold. First, as in the previous section, a default triggers sanctions that generate an output cost. Second, a default triggers the exclusion from credit markets. After the default, every period there is an exogenously given probability \( \theta \) that the government will reaccess the markets.\(^3\)

As Bulow and Rogoff (1989) showed, for the exclusion from credit markets to be costly it has to be the case that the government cannot replicate the payoffs from the contract that is excluded from. Given the standard features of most real world sovereign debt instruments, if the government could save after defaulting, it could undo most of the costs of the exclusion from credit markets.

\(^3\)See Yue (2010) for a paper where the probability of reaccess is the result of a bargaining game between creditors and the government.
So, following the practice in the sovereign debt literature we will assume that following a default a government goes to financial autarky. It can neither borrow nor save and lend.\footnote{See Wright (2002) and Kletzer and Wright (2000) for models that endogenize this assumption. Alternatively, see Amador (2003) for a model that generates suboptimal savings.}

The setup of the model follows Aguiar and Gopinath (2006) and Arellano (2008) adaptation of the classical work by Eaton and Gersovitz (1981). The representative agent utility function is given by:

\[ W = E_0 \sum_{t=0}^{\infty} \beta^t u(c_t) \]  

with standard assumptions on \( u(.) \).

Every period the government has to decide whether to default or repay its outstanding debts and, in case of choosing to repay, it also has to decide how much it wants to borrow. We can write the government problem recursively as follows:

\[ V(B, y) = \max \{ V^{ND}(B, y), V^D(y) \} \]  

where:

\[ V^D(y) = u(h(y)) + \beta \int_Y \{ \theta V(0, y') + (1 - \theta) V^D(y') \} f(y', y) dy' \]  

\[ V^{ND}(B, y) = \max_{B'} u(y - B + q(B', y) B') + \beta \int_Y V(B', y') f(y', y) dy' \]  

The value function of defaulting, \( V^D \), is the autarky value function where \( h(y) \leq y \) captures the presence of output costs of default, and \( \theta \) is the exogenous probability of reaccess. Note that
we are assuming that upon reaccess the government returns to international credit markets with no outstanding debt. The value function of repaying, $V^{ND}$, captures the optimal borrowing choice today plus the possibility of being able to choose to default or repay in the next period.

Given that creditors are risk neutral and have access to a risk free asset, the equilibrium bond price will be given by:

$$q = \frac{\Pr\{v^{ND}(B, y) \geq v^D(y)\}}{1 + r^f}$$

(10)

The government will default if $V^D > V^{ND}$. While repaying implies transferring resources to foreigners that do not enter into the government welfare function, defaulting is also costly as it triggers sanctions imposed by foreigners. These sanctions generate output losses and the exclusion from credit markets. However, these output losses could also be generated by other mechanisms different from sanctions. In such a case, the way in which we modeled the decline in output in this section could be interpreted as a reduced form version of a more structural model in which a default causes a decline in output through mechanisms different that sanctions. The next two sections review these kind of stories.

2.3 Costs related to the information content of defaults

In the previous section we presented a model where the presence of sanctions created some exogenous costs of defaults in terms of output. However, the decline in output in the aftermath of a default could arise even in the absence of sanctions. In this section we present a model in which there are costs of default in terms of output that arise due to the information revealed by a default as suggested by Cole and Kehoe (1998) and Sandleris (2008).

The basic idea is that the repayment/default decision is a signal. An example could clarify this. When Luiz Inacio “Lula” Da Silva became President of Brazil, he decided not to default on Brazil’s debt. The months prior to Lula’s election were characterized by a tremendous amount of
uncertainty and concerns for investors and entrepreneurs (both Brazilian and from abroad). In particular, there were worries about Lula’s government’s attitudes towards issues such as property rights, privatizations and the business environment in general. Even the more optimistic observers worried about the Workers’ Party ability to run an efficient government. Once elected, Lula tried to dissipate these concerns, and debt repayment was an important component of the strategy. Lula’s government undertook a costly fiscal adjustment to be able to make its debt payments. Although not the only feasible explanation, it can be argued, that repaying foreign creditors was one of the costly signals that Lula’s government had to undertake in order to improve investors and entrepreneurs’ expectations. Had he chosen to default, the negative effect on expectations and the economy would have been substantial. Although more general, this could be a good example of the sort of story that these models try to capture.

The presentation that we do of the model follows that of Sandleris (2008). The setup is similar to that of the two-period model presented in Section 2.1 with two main differences First, in addition to the government, and foreign creditors we now have foreign direct investors that contribute to time 1 output. Let:

\[ y_1 = e_1(\theta) + \gamma A(\theta)F(K) \] (11)

where \( \theta \) is the government type (or the state of the economy), \( e_1 \) is the endowment received by domestic agents, \( A(\theta)F(K) \) is the amount of output produced by foreign direct investors and \( \gamma \) is the exogenously determined share of this output that goes to domestic agents.

The second change with respect to the two period model of the previous section is that we

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5 The Brazilian stock market, the exchange rate, and government debt reflected these concerns. From the beginning of 2002 until the elections in October, the Brazilian stock market index lost a third of its value, the nominal exchange rate depreciated more than 60%, and Brazil’s sovereign risk soared to break the 2000 bps mark.

6 See Gavin and Werneck (2002) for an example of investors’ concerns during this period.

7 A related idea can be found in Cole and Kehoe’s (1998). Cole and Kehoe "reputation spillovers" argument was based in the idea that the costs of defaults arise outside the government/foreign creditors relation, in other trust-based relations in which it could be involved. However, their focus on reputation prevented them from articulating the more important and direct role that information and signaling could play.

8 We can think of \( \gamma A(\theta)F(K) \) as a reduced form of a more complicated model where there is domestic production and foreign production in the country uses domestic inputs. The only relevant thing in this assumption is that the amount of foreign investing affects domestic agents welfare.
introduce now private information.\(^9\) The fundamental shock that will determine the endowment
and the productivity of investment is only observed by the government.\(^10\) At time 1 the government
gets to know its type (or the fundamentals) \(\theta\), while other agents in the economy only know
the probability distribution of the fundamentals: good \((\bar{\theta})\) with probability \(p\) and bad \((\theta)\) with
probability \(1 - p\). This assumption tries to capture the fact that governments, particularly in
developing countries, might have some private information that affect private sector actions. This
information could be related, for example, to the government ability or willingness to deal with
corruption or implement structural reforms that may enhance some fundamental institutions of a
country such as the respect of property rights or the rule of law.

After observing its private information, the government chooses whether to repay its debt with
foreign creditors or to default. The government makes this decision being aware that foreign in-
vestors might update their beliefs from \(p\) to \(p'\) based on the government action. Posterior beliefs, \(p'\),
matter as they will affect the optimal amount of investment that foreign agents will undertake.\(^{11,12}\)

Foreign investors solve the following problem:

\[
\max_K E[1 - \gamma)A(\theta)F(K) - r_f K | x]
\]

where \(x = D, ND\) is the government default decision. The first order condition of this problem is
standard and makes clear that if investors’ beliefs about the fundamentals, \(\theta\), are more optimistic,
the chosen level of investment will be higher and with it the budget constraint of the domestic
agent will be more relaxed and welfare higher.

\(^9\) Also, in order to highlight the informational channel, we assume that there are no sanctions or exclusion from
credit markets following a default.

\(^10\) Note that, at the cost of some additional notation, we could have the government and the investors both receiving
noisy signals about the fundamentals. The relevant assumption in such an environment for the results of the model
to carry over would be that the government’s information is different and relevant for investors.

\(^11\) Sandleris (2011) presents a related model where the costs are the result of the effect of defaults on the amount of
investment that credit-constrained domestic entrepreneurs can undertake. Better beliefs about the fundamentals may
relax the domestic entrepreneurs’ credit constraint. Andreasen (2011) presents a similar mechanism but working
through the interest rate at which domestic entrepreneurs can borrow.

\(^12\) The fact that investment takes place after the government repayment/default decision is not a strong assumption
as there are a myriad of decisions that are influenced by fundamentals that are made almost all the time in the real
world. So, for example there will always be some investment decisions made after the government repayment/default
decision.
The government faces two decisions in the model. At time 0 it has to decide how much to borrow and at time 1, once it has received its private information, it has to decide whether to repay or default on the debt. As international credit markets are perfectly competitive and foreign creditors are risk neutral, their expected return should be equal to the risk free rate.

The presence of private information on the hands of the government is what makes defaults costly in this model. The information structure of the model is such that the repayment/default decision of the government may act as a signal revealing information to other agents about the fundamentals of the economy. A default may negatively affect foreign investors’ beliefs about the fundamentals of the economy leading them to reduce their investment, and, through this channel, affect welfare.

The cost of repaying is that it implies a transfer of resources to foreigners; the benefits are related to the potential impact that this action may have on investors expectations. Note that in this model if repaying does not reveal any information, it will not affect beliefs and foreign investors’ actions, then the government will always be better off by defaulting on any outstanding amount of debt. However, in the presence of private information, a separating equilibrium may arise in which for some levels of debt the government will repay when fundamentals are good and default when they are bad. The intuition for this result is the following. The productivity of capital is higher when fundamentals are better, and, therefore, the gains in terms of output of affecting beliefs through repayment and having higher levels of investment will be larger. On the other hand, the cost of repaying with standard debt instruments is either invariant or decreasing in the fundamentals. This is what generates the single crossing property in the model. For a given level of debt, a separating equilibrium could arise in which a “good” government may choose to repay rather than default and suffer a decline in the output generated by foreign investors, while a “bad” one might choose the opposite as the decline in output would be smaller. However, for relatively lower levels of debt a pooling equilibrium in which both the “good” and the “bad” government

\[13\] In general, there would be two effects to take into account when analyzing how better fundamentals affect the effect of higher FDI on welfare. The first effect can be thought of as a substitution effect -it is more convenient to have more foreign investment when fundamentals are good as you are more productive-. The second effect, that appears with concavity, is a wealth effect -when fundamentals are good there is more output, so the welfare gain of having additional goods is smaller-. Both effects work in opposite directions. In our setup we assume that the first effect dominates.
would choose to repay. In equilibrium, foreign creditors will limit the amount of lending to the government, so that the government finds it optimal to repay at least for some realizations of the fundamentals. The interest rate on the government debt will reflect the default risk.

Repayment is one of the many possible signals that a government may undertake to influence expectations. However, just communicating the information to the private sector (i.e.: just telling them) is usually not one of them. The reason is that the government faces a credibility problem. In the model, welfare is higher the higher the level of FDI, which in turn is positively related to beliefs about the government’s private information. This means that regardless of the realization of its private information, the government would, in general, like to induce the highest possible beliefs if doing so is costless. An interesting characteristic of the model is that the presence of alternative costly signals might reduce welfare. The reason is that if other signals exist, then the amount of repaying that the government could "commit" itself to make will be reduced and, as a result, creditors will reduce the amount of lending, limiting the production of public goods.

Summarizing, a second type of costs of default arises when defaults reveal information. This information could generate a decline in foreign investment as discussed in this section but also a decline in foreign credit or a credit crunch in domestic credit markets as suggested by Sandleris (2011) and Andreasen (2011).

2.4 Cost of defaults related to domestic agents’ sovereign bond holdings

The models presented above share the feature that only foreign agents hold sovereign debt. However, this is not the case in reality. This issue is irrelevant if the government can perfectly discriminate between foreigners and domestic bond holders when defaulting or, alternatively, if it can perfectly engineer post-default bailouts, so as to avoid hurting domestic bond holders. However, if these two assumptions do not hold a sovereign default will hurt domestic bond holders and may create in this way additional costs of default.
Broner and Ventura (2011) analyze the issue of non-discrimination in the more general context of sovereign risk. In a framework in which domestic agents can contract with other domestic agents and also with foreigners, they assume that the government can choose to enforce either both contracts or none which creates sovereign risk.\footnote{See Broner et al (2010) to understand the microfoundations of this assumption.} However, it can not choose to enforce one set of contracts and not the other. Gennaioli et al. (2011) and Alessandro (2011) apply the idea of non-discrimination to sovereign borrowing.\footnote{Guembel and Sussman (2009) apply this idea also in a different setup.} They assume that some domestic agents hold sovereign debt and the government is unable to discriminate in their favor when defaulting and, additionally, it cannot compensate them after the default. In both models the domestic agents holding the sovereign debt are banks. As a result, a default damages banks’ balance sheet.

The Argentine crisis of 2001 and the current debt crisis in Europe illustrate the effect of a sovereign debt crisis on the banks’ balance sheet. In the Argentine crisis, banks holdings of sovereign debt were one of the reasons that trigger a bank run given the inminence of the sovereign default. In Europe, the downgrade of sovereign credit ratings and the risk of sovereign defaults has raised concerns about the solvency of Greek and other European banks because of their exposure to sovereign debt.

In this subsection we present a very simple model that captures the intuition of Gennaioli et al (2011). The model is similar to the two periods model of subsection 2.1., but we assume now that there are two types of domestic agents: banks and entrepreneurs. Banks receive some endowment at time 0, $e_0$. Entrepreneurs do not receive an endowment at time 0, but receive an investment opportunity at the beginning of time 1 that will mature at the end of the period. Banks and entrepreneurs are risk neutral and derive utility from time 1 consumption.

The government borrows at time 0 to finance an investment opportunity of size $I_g$ that will generate $Y_g = A_g I_g$ at the end of period 0, where $A_g > 1$ and $I_g > e_0$. This last assumption implies that the government needs to borrow both from domestic banks and foreign creditors to finance its investment. At the beginning of time 1 the government has to decide whether to repay both foreigners and domestic agents (banks) or to default on both. It can not discriminate between
them (i.e. it cannot default on one and not on the other). We assume as we did in the signaling model that there are no exogenous costs of default. Entrepreneurs’ investment opportunity at time 1 is of size $I_E < e_0$. The investment will generate $Y_E = A(\theta)I_E$ at the end of the period. The productivity of investment, $A$, is determined by a random shock $\theta$ that occurs at the beginning of period 1: the shock is good $(\bar{\theta})$ with probability $p$ and bad $(\underline{\theta})$ with probability $1 - p$. Assume $A(\bar{\theta}) > A(\underline{\theta}) - \varepsilon = 1$ with $\varepsilon > 0$ but arbitrarily small. The shock is public information. In order to finance their investment entrepreneurs can only borrow from domestic banks. Government transfers that entrepreneurs may receive at the beginning of time 1 cannot be used for investment purposes. That is, only funds intermediated by banks can be used for investment.

As before we assume that foreign creditors are risk neutral operate in a competitive market and that the world interest rate is equal to 1 for simplicity. After observing the shock at the beginning of period 1 the government has to decide whether to repay or default. Repaying implies a transfer of goods to foreigners. Any remaining goods can be transferred to banks and entrepreneurs in a lump sum way. If it chooses to repay, it gives foreigners some resources, but at the same time it gives resources to banks that can be lent to entrepreneurs and transformed into productive investment. A default, on the other hand, avoids the transfer to foreigners but at the same time hurts banks’ balance sheet reducing the amount that they can lend to entrepreneurs. Depending on the value of the shock and on the amount of debt held by banks and foreigners the government will choose to repay or default.

The costs of a sovereign default in this framework arise as a result of the effect of the default in domestic banks’ balance sheet. A default damages the balance sheet and reduces the amount of lending that banks can undertake. In doing so, it reduces investment, output and welfare. The key reason why defaults generate this effect in this model is that the government can neither discriminate between foreign and domestic bond holders when defaulting, nor sufficiently compensate domestic agents after the default.

3 The Costs of Sovereign Defaults: The Empirical Evidence
Sovereign defaults are usually just one component of a more general economic crisis. As a result, the main difficulty when trying to analyze empirically the costs of sovereign default is to isolate their specific effects from those of the other events that tend to occur simultaneously. Most research on the topic try to control for these other events with different degree of success. A second problem that arises when dealing with the effect of defaults on aggregate variables such as growth, trade, investment is that of endogeneity. Again, the literature has tried to take this into account, but problems remain. Keeping these caveats in mind, this section discusses the empirical evidence on the costs of defaults.

In order to gain some perspective, as a first pass, we begin by examining the relationship between sovereign defaults and GDP growth. While this does not allow to distinguish between the different theories of default costs, it can say something about the significance and lag structure of the costs. We then present some evidence on some of the channels through which these costs might occur. Following the empirical literature, the focus is on the effects of defaults on trade, foreign direct investment and credit, both foreign and domestic, to the domestic private sector. Finally, we analyze the empirical evidence on what has been usually considered the reputational effects of defaults. Namely, the evidence on exclusion from international credit markets in the aftermath of defaults and the effect of sovereign defaults on subsequent borrowing costs for the defaulting country.

3.1 Sovereign defaults and output

We discussed above three main mechanisms through which defaults become costly. They all predict a decline in output for the defaulting country. And, indeed, sovereign defaults seem to be associated with output declines. Tables 1, 2 and 3 present some summary statistics of the evolution of output in the years prior and post default for countries that defaulted on their sovereign debt in the period 1980-2000. We use S&P database to date the sovereign default events on foreign debt and real GDP growth rates from the IMF WEO. Table 1 shows that there is a significant decline in output growth rates in the year of the default and the years prior and post default. Indeed, real GDP growth rate declines by approximately 1.5 percentage points in the year prior to the default and the year post
default relative to the growth rate of the two previous years, and by an additional percentage point in the year of default Table 2 and 3 present the same information but disaggregated by decade and region.

Table 1: Real GDP growth rates during sovereign default episodes. 1980-2000

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<thead>
<tr>
<th></th>
<th>Mean Growth Rate</th>
<th>Std. Dev.</th>
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<tbody>
<tr>
<td>t-3</td>
<td>3.33</td>
<td>4.45</td>
</tr>
<tr>
<td>t-2</td>
<td>2.41</td>
<td>4.54</td>
</tr>
<tr>
<td>t-1</td>
<td>0.88</td>
<td>4.71</td>
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Table 2: Real GDP growth rates during sovereign default episodes, per decade
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Table 3: Real GDP growth rates during sovereign default episodes, 1980-2000 per region.
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The fact that the decline in output begins before the default should not be surprising.\(^{16}\) One possible explanation for this phenomenon is that, as the possibility of default becomes more clear, we start to see some of the negative effects of defaults both in terms of information and of their

\(^{16}\)Levy Yeyati and Panizza (2011) find a similar result using quarterly data. In fact, they argue that most of the decline in output occurs prior to the default.
effect on domestic agents’ balance sheet even before the default occurs. Another explanation is that the default is not the cause of the decline in output but, instead, some other shock might be causing both the default and the decline in output.

The literature has explored the evidence on the effects of default on output. Chuan and Sturzenegger (2005) performed a parametric analysis of the relationship between sovereign defaults and growth. They do so estimating cross-section and panel growth regressions and find that default episodes are associated with a reduction in growth of approximately 0.6 percentage points. If the default coincides with a banking crisis, the effect is much larger and growth decreases by 2.2 percentage points. Panizza and Borensztein (2009) follow a similar methodology. Using an unbalanced panel that includes up to 83 countries for the 1972–2000 period, they find that, on average, default is associated with a decrease in growth of 1.2 percentage points per year. Table 4 presents some non-parametric evidence on the effect of defaults on GDP growth rates considering separately the case when the default occurs jointly with a banking crisis (we use the World Bank data on banking crises for this regard).

Table 4: Real GDP growth rates during sovereign default episodes with and without banking crises, 1980–2000
3.2 The effect of sovereign defaults on trade, foreign direct investment and credit to the private sector

This subsection analyzes the empirical evidence on the effects of sovereign defaults on the domestic private sector. In particular, it reviews the empirical evidence on the effects of sovereign defaults on trade, foreign direct investment (FDI) and credit to the domestic private sector. All these variables are possible channels through which a default can affect economic activity. Any of the theories presented above can explain an effect of defaults on these variables, and, unluckily, there are few empirical papers that try to assess their relative importance.

Sovereign defaults are associated with declines in the defaulting country trade. Rose (2005) documented empirically this relationship. He found that sovereign defaults negatively affected trade between the defaulting country and the creditor countries affected by the default. Rose’s empirical findings left open the question of which mechanisms link sovereign defaults with the declines in trade. Martinez and Sandleris (2011) focused on this issue. They studied the cause

<table>
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of these declines in trade in the aftermath of defaults. In particular, they analyzed the empirical plausibility of the main mechanism suggested in the sovereign debt literature for this to happen, trade sanctions. In doing so, this paper became one of the very few papers to test empirically the relevance of one of the theories discussed above.

An obvious problem with the trade sanctions argument is that in the aftermath of the 116 sovereign defaults with private creditors and 269 with official creditors we have observed in the last 30 years, it is hard to point to a single case in which substantial, overt bilateral creditor-debtor trade sanctions have actually been imposed.\footnote{Gunboat diplomacy that affected a defaulting country trade or revenues from trade was a relatively common practice before World War I though. It was used by creditors with Egypt in 1880 and Venezuela in 1902. Furthermore, the Dominican Republic’s attempt to default led to an invasion of the U.S. Marines and a takeover of the country’s customs revenue in 1905. Something similar happen to Nicaragua in 1911-12.} It is possible, however, that creditor countries have found a \textit{sub rosa} approach to impose trade sanctions (through covert actions that disrupt or harass the defaulting country’s trade). So, even if trade sanctions are not observed one might be able to observe their effect on the defaulting country trade.

Martinez and Sandleris (2011) look for evidence of two types of covert sanctions, which may be termed bilateral or multilateral sanctions. If in the aftermath of default, the specific creditor countries that suffered the default imposed trade sanctions, then bilateral trade with the affected creditor countries will suffer a significantly larger decline than trade with other countries. In the case of multilateral sanctions, they consider the possibility of punishment by a collection of all major creditor countries (not just those affected by the default). In this case, the maintained assumption is that if in the aftermath of defaults all creditors coordinate to impose trade sanctions, then trade should decline more with all creditor countries (not just those affected by the default) than with non-creditor or debtor countries. Finally, if the defaulting country’s trade does not decline either “bilaterally” or “multilaterally” relative to trade with other countries, then they view this as evidence that sanctions are playing no substantive role in the evolution of that country’s trade.

In order to disentangle a “general” decline in trade from a “bilateral” one, they use a gravity equation of trade flows and add to it a default dummy that captures the “bilateral” effect (i.e. an effect of defaults on bilateral trade between the defaulting country and an affected creditor
country) and another one that captures the effects on overall trade. So, this would be equivalent to looking for the existence of a “bilateral” effect once we control for a potential “general” effect. They proceed likewise to disentangle the “general” from the “multilateral” one.

The results they obtain show that sovereign defaults are often associated with a decline in total trade for the defaulting country of approximately 3.2% per year during the first five years following the default. This decline is statistically and economically significant (the accumulated loss in trade reaches almost 16% in the five years after the default). But, contrary to the prediction of the trade sanction argument, there seems to be no significant decline on bilateral trade between the defaulting country and defaulted creditor countries in the aftermath of defaults. The decline in trade is mostly concentrated in bilateral relationships involving defaulting countries and non-creditor countries. There is no "multilateral" effect either in the aftermath of defaults.

These results show that sovereign defaults seem to have a negative impact on the defaulting country trade, but they imply that trade sanctions do not seem to be the cause of these declines. Instead, these declines could be the result of any of the other costs of defaults discussed above.\(^\text{18}\)

Fuentes and Saravia (2010) used a methodology similar to that of Martinez and Sandleris (2011) to analyze the effects of a sovereign default on the amount of foreign direct investment (FDI) that the defaulting country receives. They estimate the parameters of an equation that captures the main determinants of FDI from country \(i\) to country \(j\) and add to it a default dummy that captures whether country \(j\) defaulted on a given year (general effect) and another one that captures whether country \(j\) defaulted to country \(i\) in a given year.

They find that a sovereign default declines the amount of bilateral FDI that a country receives by approximately 0.05 percentage points.\(^\text{19}\) A puzzling finding of their paper is that while FDI

\(^{18}\)Within the sovereign borrowing literature reputation or information contents of defaults stories could potentially do it. And the same could be said of a mechanism where defaults affect the balance sheet of domestic agents. Alternatively it could be argued that the decline in trade is not the result of the default but of macroeconomic distress in the tradable sector that may be causing both the default and the decline in trade.

\(^{19}\)The mean value of bilateral FDI flows to GDP is 0.07 percentage points in their sample and the median value is 0.001 percentage points.
from countries affected by the default declines substantially, FDI from countries not affected by it show a large increase.

Another channel through which economic activity can be affected by sovereign defaults is the tightening of external financial constraints for private firms. Is this the case? Do sovereign defaults affect the ability of the defaulting country private sector to access international credit markets? Arteta and Hale (2008) were the first ones to study this issue empirically. They used micro-level data on private sector borrowing from international credit markets and found that sovereign defaults are systematically accompanied by a decline in foreign credit to domestic private firms. After controlling for fundamentals, they found an additional decline in credit of over 20% below the country-specific average during the debt renegotiations, which persists more than two years after the restructuring agreement is reached. When they analyze different types of debt restructuring agreements, they find that the contraction in foreign credit to the private sector is smaller after agreements with commercial creditors as opposed to agreements with official creditors and that no contraction occurs after voluntary debt swaps and debt buybacks.

Gennaioli et al (2011) analyze the effect of sovereign defaults on financial activity in the defaulting country. They build a panel of emerging and developed countries over the years from 1980 and 2005 using aggregate data. They find that sovereign defaults are followed by large drops of aggregate financial activity in the defaulting country (a default generates a decline of 8.6% in private credit). They also found that post-default credit crunch is stronger in countries where banks hold more public debt, which is consistent with the theory that the costs of default are related to domestic agents, in this case banks, sovereign bond holdings. They also find that the credit crunch is stronger in countries with higher levels of financial development.

3.3 The exclusion from credit markets

One of the potential costs of default according to the theory is that governments that default are excluded from international credit markets for some time. For example, following its sovereign
default in 1982 Dominican Republic did not reaccess international credit markets for more than twenty years. After defaulting on that same year, Turkey immediately regained access. Are lengthy exclusions from international credit markets the rule or the exception? Gelos et al. (2011) and Alessandro et al. (2011) analyze this issue.

In order to study the duration of the periods of exclusion, being able to pinpoint with precision the year in which a government is able to reaccess the market is crucial. Both Gelos et al (2011) and Alessandro et al (2011) use a unique micro dataset on international bond issuances and borrowing through private syndicated loans from non-domestic banks by sovereign governments that allows us to do it. This data, provided by Capital Data Bondware and Loanware, contains information on 2053 individual bond issuances and 5065 commercial bank syndicated loans to national governments (or with government guarantee) from 150 developing countries between 1980 and 2000. In order to identify the default date they use, as most of the literature does, Standard & Poor’s database on sovereign defaults on foreign-currency debt. They identify 101 sovereign defaults episodes during the period.\textsuperscript{20}

Gelos et al (2011) find that while being in default usually prevents a country from accessing the markets during those years, the probability of market access is not influenced by a country’s frequency of defaults. They also find that a recent default, if resolved quickly, does not reduce significantly the probability of tapping the markets. Measuring the time elapsed between the start of a default episode and the date of reaccess, they obtain statistics about the distribution of exclusion periods across default episodes. They document that the average length of the period from default till reaccess to international credit markets was four and a half years for the whole sample period. However, they find that it fell substantially in the 1990s. While governments that had defaulted on their debt in the 1980s were unable to access the market for four years on average, during the 1990s the average was two years.\textsuperscript{21} Part of this period of exclusion is probably the

\textsuperscript{20}Dias and Richmond (2010) also analyze the issue of exclusion from credit markets, but they use aggregate data on capital flows instead of microdata which makes it more difficult for them to pinpoint with precision the date of market reaccess.

\textsuperscript{21}This analysis faces an identification problem. In principle, a government’s lack of borrowing after a default could be the result from the creditors not wanting to lend (the supply side) or because the sovereign does not wish to borrow (the demand side). Both Gelos et al. (2011) and Alessandro et al. (2011) take a series of sequential steps that aim to help minimize cases of voluntary abstention (that is, lack of demand for credit).
result of the fact that countries are usually unable to borrow while being in default. However, the evidence they present suggests that reaccess is quick after restructuring the debt.

Alessandro et al (2011) perform a duration analysis to study the length of the exclusion. The duration analysis, studies the probability of reaccessing the credit market in each period after the start of the default episode, given that reaccess was not obtained before and regardless of whether reaccess will be obtained in the future. While Gelos et al (2011) approach requires an "end-point" for each episode and can only incorporate positively resolved default episodes (where reaccess was obtained), Alessandro et al (2011) approach has the advantage of allowing them to include both episodes in which reaccess has already occurred and episodes in which it has not. They find that countries there is a 50% probability that countries will reaccess the market within 4 years of defaulting. They also find that countries either reaccess the markets in the first six years after a default or have to wait much longer to do it, and that political stability significantly increases the chances of reaccessing the market in any given period after the default. Comparing across decades in which the default occurred, they find that it is easier to reaccess the markets in the 1990s than in the 1980s as long as the country does it quickly (in the first three years), but the probability of having been able to reaccess within the first four, five or six years is higher in the 1980s.

In summary, the duration of the exclusion from the moment of default until the moment in which reaccess to international credit markets occur is not very lengthy on average. Furthermore, the length of the exclusion seems to have diminished in recent decades.

3.4 Do sovereign defaults increase subsequent borrowing costs?

There are two contrasting views on the effect of sovereign defaults on subsequent borrowing costs by the defaulting country. The first one suggests that a default will entail higher future borrowing costs. The other one affirms that bygones are bygones and that, as a result, a past default should not affect future borrowing conditions for the defaulting country once the default is settled.\footnote{Those that support the later statement tend to argue that markets are forward looking. However, these are two different things. Markets might be forward looking and, at the same time, a defaulting country may face higher}
view is the right one? In this subsection we review the empirical evidence on the effect of defaults on subsequent borrowing costs for the defaulting country.

After a debt restructuring has been concluded borrowing costs tend to be higher than in normal times, even after controlling for fundamentals. However, this effect seems to be short-lived. Analyzing a sample of 31 emerging market countries in the 1997-2004 period, Borensztein and Panizza (2008) find that in the year after a default spreads are about 400 basis point higher than in tranquil periods, but this premium falls to 250 basis points in the second year losing statistical significance, and dissapears in the following years. Flandreau and Zumer (2004) find a similar pattern for the 1880-1914 period: default episodes are associated with an increase in spreads of approximately 90 basis points in the year that follows the episode, but the effect of the default dies out very rapidly.

A group of papers study the effect of defaults on borrowing costs over longer periods of time. Eichengreen and Portes (1989) study the effect of defaults in the 1930s on borrowing conditions in the 1980s. They found little evidence that countries which defaulted in the 1930s suffered inferior capital market access in the later period. Lindert and Morton (1989) arrived to a similar result looking at defaults pre1940 and post 1940 and their effect on borrowing costs in the 1970s. On the other hand, Ozler (1993) found that defaults declared in the 1930s or postwar period had an impact on the interest rate charged to these countries in the 1968-1981 period, although the amount does not appear to be economically significant (in the order of 25 and 40 basis points, respectively), Benczur and Ilut (2011) arrive to a similar result analyzing a panel data sample of bank loans to 37 developing countries in the period 1973-1981.23

Finally, in a more recent paper Cruces and Trebesch (2011) build a new database on the magnitude of the haircuts that corresponded to most sovereign defaults events in recent decades. Using this data they find that the effect of defaults on subsequent borrowing costs depends on the magnitude of the haircut. Larger haircuts entail higher subsequent borrowing costs. However, even when taking this into account, the effects seem relatively small.

borrowing costs. This would be the case when defaults act as a signals, as a previous default might provide information about characteristics of the government or the country that could affect the perceived likelihood of a new default occurring in the future.

23See Panizza et al. (2009) for a more detailed review of the empirical evidence on this regard.
Overall, these findings do not lend much support to the idea that a sovereign default generates significantly higher costs in subsequent borrowing. The effects of defaults on borrowing costs seem small, and short-lived. That is, losing reputation with international credit markets does not seem to be an important cost of default.

3.5 Conclusions

Despite the weak legal framework in which sovereign borrowing takes place, sovereign defaults are costly for the defaulting country. The theory suggests three potential sources of the cost of defaults. First, sanctions imposed by creditors. In this group we include the traditional explanations of the costs of default. Namely, both the exclusion from credit markets and other actions that creditors could take that imply output losses for defaulting countries such as trade sanctions. Second, defaults could be costly if they reveal negative information about the government or the fundamentals of the country. Third, if domestic agents hold sovereign debt and the government cannot discriminate in their favor when it defaults (or compensate them adequately after it), a default could generate costs for the domestic economy.

The empirical evidence seems to suggest that the costs generated in the aftermath of defaults by traditional mechanisms such as trade sanctions or exclusion from credit markets have not been significant in recent decades. Information revelation and the effect of defaults on domestic agents’ holding debt, particularly when the holders are banks, seem to be the main costs of sovereign defaults. Avoiding these costs seems to be the reason that deters defaults.

This conclusion could generate important policy implications. For example, it is common that regulations allow banks to meet their reserves requirements holding government bonds which are considered risk free assets. This seems to be a mistake, as it provides incentives to the banks to hold may be too much debt, and, as a result, makes defaults more costly when they occur. This issue merits further research.
4 References

References


[34] Sandleris, G., 2011, Sovereign Defaults, Credit to the Private Sector and Domestic Credit Markets, CIF-UTDT WP #01/2010
