Journal of International Economics 84 (2011) 65–72

Contents lists available at ScienceDirect

Journal of International Economics

journal homepage: www.elsevier.com/locate/jie

Sovereign defaults and liquidity crises ☆

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ARTICLE INFO

Article history:
Received 9 December 2008
Received in revised form 1 February 2011
Accepted 2 February 2011
Available online 21 March 2011

JEL classification:
F34
O16

Keywords:
Legal institutions
Liquidity
Sovereign risk
Financial dependence

ABSTRACT

Sovereign debt crises in emerging markets are usually associated with liquidity and banking crises. The conventional view is that the domestic turmoil is the consequence of foreign retaliation, although there is no clear empirical evidence on "classic" default penalties. This paper emphasizes, instead, a direct link between sovereign defaults and liquidity crises building on two natural assumptions: (i) government bonds represent a source of liquidity for the domestic private sector and (ii) the government cannot discriminate between domestic and foreign creditors in the event of default. In this context, external debt emerges even in the absence of classic penalties, and government default is countercyclical, triggers a liquidity crunch, and amplifies output volatility. In addition, a reform that involves a substitution of government bonds with privately-sourced liquidity instruments could backfire by restricting governments' access to foreign credit.

1. Introduction

Sovereign debt crises in emerging markets are usually associated with liquidity and banking crises. Borensztein and Panizza (2008) show that sovereign default was, in fact, a good predictor of a banking crisis in many emerging countries during the period from 1980 to 2000.[1] The conventional view interprets domestic turmoil as an indirect consequence of foreign retaliation, for example trade sanctions or exclusion from international financial markets.[2] Yet, this interpretation is controversial. First, there is no clear-cut empirical evidence supporting the application of "classic" penalties.[3] Second, in recent sovereign crises (*e.g.*, Argentina 2001 and Russia 1998) government default had a direct "balance-sheet" effect on domestic financial institutions, which were major holders of public debt (Mishkin, 2006). In this paper, I study the direct connection between sovereign defaults and liquidity crises abstracting from external penalties.

The model builds on two natural assumptions for emerging markets. First, public debt represents a source of liquidity for the private sector. Specifically, domestic firms need to refinance their projects in the future but are not able to access spot credit markets due to limited enforcement of creditors' rights. Firms then save in government bonds, either directly or indirectly through the banking sector, to hoard a reserve of liquidity. This aspect of the model is consistent with the negative correlation observed in the data between creditors' rights protection and banks' holdings of government debt.[4] Second, the government cannot discriminate between domestic and foreign bondholders in the event of default. This assumption, which hinges on both the anonymity and the increasing integration of secondary markets for government bonds, is consistent with the large haircuts suffered by domestic financial institutions during recent debt crises.

The implications of these two assumptions are clear. Sovereign default has opposing effects on the domestic economy as, on the one hand, it avoids a transfer of domestic resources to foreign creditors while, on the other, it generates a liquidity crisis that disrupts private investment and lowers domestic production. The trade-off faced by the government then explains the emergence of sovereign debt even in the

☆ This paper previously circulated with the title "Legal Enforcement, Public Supply of Liquidity and Sovereign Risk".

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[1] These authors apply a methodology similar to Kaminsky and Reinhart (1999) and show that the probability of a banking crisis conditional on a sovereign default in the same year or in the year before is statistically larger than the unconditional probability while this is not the case for the probability of a sovereign default conditional on a banking crisis.

[2] The nature of costs associated with default has been studied extensively since Eaton and Gersovitz (1981) and Bulow and Rogoff (1989). Scholars agree that debt repayment hinges on a sovereign's willingness to avoid the cost of a default given that existing legal arrangements do not provide sufficient protection of creditors' rights (due to the jurisprudential principle of "sovereign immunity"). See Grossman and Van Huyck (1988), Bulow and Rogoff (1989), Fernandez and Rosenthal (1990), Cole and Kehoe (1998), Kletzer and Wright (2000), Wright (2002), Amador (2004), Yue (2005), Aguiar and Gopinath (2006) and Arellano (2008), among others. Eaton and Fernandez (1995), Sturzenegger and Zettelmeyer (2006) and Panizza et al. (2009) survey this literature.

[3] See Borensztein and Panizza (2008).

[4] See Kumhof and Tanner (2005).

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doi:10.1016/j.jinteco.2011.02.001

absence of foreign penalties. Nevertheless, a default might occur in some states. In particular, sovereign default is countercyclical, as a drop in aggregate productivity lowers the cost of triggering a liquidity crisis, and has an amplification effect on the business cycle, as the shortage of liquidity dampens private investment and output.

Having established the link between sovereign defaults and liquidity crises, the paper discusses a novel implication of financial reforms; namely, reforms do not necessarily raise domestic welfare and, in some cases, can backfire on welfare. Consider a reform that enables domestic firms to hedge their future refinancing needs using some type of contingent contracts rather than resorting to precautionary savings in non-contingent government bonds. Conventional wisdom suggests that this reform must have a positive effect on welfare as it allows firms to reallocate efficiently liquidity across future states. However, this interpretation considers only one aspect of the reform. The reverse aspect of it is that the consequent decline in domestic holdings of public bonds makes government's default less costly and, therefore, it might restrict the government's prior access to foreign credit. In conclusion, an assessment that focuses exclusively on the efficiency gains for the private sector could overestimate the true effect of a financial reform by failing to recognize that the reform could involve a reallocation of capital from the public to the private sector, which would be particularly detrimental in countries with large returns on public infrastructures.

Two strands of the literature are brought together in this paper. First, the motivation for holding government bonds is based on the corporate finance approach to liquidity hoarding (*e.g.*, Holmstrom and Tirole, 1998). According to these authors, whenever in the economy there is a demand for liquid assets which cannot be satisfied by the private sector due to a lack of commitment, the government can intervene by issuing government bonds, which are implicitly guaranteed by the government's ability to commit agents' income through taxation. A common counterargument, however, is that integration with a mature market, having a virtually unbounded financial capacity, could alleviate the need for government intervention in the economy; indeed, foreign bonds represent a perfect substitute for government bonds. Yet, this paper shows that this is not true in general and, therefore, the existence of a market for government bonds can enhance liquidity even in open economies. More specifically, a slight and realistic modification of Holmstrom and Tirole's framework, that is, the inclusion of sovereign risk, implies that foreign bonds are no longer perfect substitutes for government bonds. The intuition is that the government can manipulate the returns on public bonds and make them procyclical, allowing domestic bondholders to efficiently reallocate resources across states of nature.

The second strand of the literature that is closely related to this paper includes a number of recent papers that focus on the direct consequences of sovereign default on the domestic private sector (*e.g.*, Broner and Ventura, 2008, 2011; Guembel and Sussman, 2009; Gennaioli et al., 2009).[5] These papers have in common with mine the assumption that government's repayment is non-discriminatory across domestic and foreign creditors, but they emphasize different implications: the welfare and distributional effects of default, the political process governing sovereign repayment and the interaction between private and public capital flows, respectively. My paper concentrates on the emergence of a liquidity crisis in the event of default and on the disruption of private investment.

With regard to the empirical evidence, the paper documents that sovereign debt crises are associated with domestic liquidity crises. Using sectoral data for a panel of 59 emerging countries over the period from 1980 to 2000, the evidence shows that sovereign defaults exert a differential effect across manufacturing sectors, which is both statistically and economically significant, suggesting that financially dependent industries experience sharper contractions. Furthermore, the evidence shows that the domestic liquidity crisis is not fully explained by the contraction in foreign credit to the private sector in the event of a sovereign default.

The remainder of the paper is organized as follows. Section 2 presents the model and discusses the main results. Section 3 addresses the consequences of a financial reform in this framework. Section 4 presents the empirical evidence and Section 5 concludes.

2. A model of sovereign risk and liquidity crises

This section first characterizes a stylized economy where government debt represents a source of liquidity due to frictions in private credit markets. It then analyzes the implications of sovereign risk on private investment and aggregate output.

2.1. Technology

Consider a small open economy that lasts for three periods: $t=0,1,2$. There is a single homogenous good which is produced by a continuum of risky investment projects. Investment in each project j costs one unit of the good in $t=0$ and returns θA_j in $t=2$ where θ and A_j denote two independent shocks realized in $t=1$. θ captures an *aggregate* shock, which affects all projects equally and takes values $\theta_H>1$ with probability $\pi_H\equiv\pi(\theta_H)$ (good state) and $\theta_L<1$ with probability $\pi_L\equiv\pi(\theta_L)=1-\pi_H$ (bad state). For simplicity, normalize the expected value of the aggregate shock to one, that is, $\pi_H\theta_H+\pi_L\theta_L=1$. A_j captures an *idiosyncratic* shock, which affects each project individually and takes values $A>0$ if the project is lucky and zero if the project is unlucky. Each project has an equal probability of being lucky or unlucky. In the latter case, the project admits an additional investment with variable size, i, which returns $\theta\rho i$ in $t=2$. Setting $A/2>1$ and $\theta_L\rho>1$, both date 0 and date 1 investments are profitable. Fig. 1 describes the timing of investment projects.

2.2. Agents and preferences

The economy is populated by a continuum of individuals with mass one who have zero initial endowment, consume only at date 2 and are risk neutral. There are two types of individuals: *entrepreneurs* (firms) and *workers*, both with mass one half. Entrepreneurs have access to the investment technology and each one can start a single project. Workers, on the other hand, have no access to the investment technology, but derive income w at date 1. There is also a benevolent government that maximizes the average welfare of domestic individuals. At date 0, the government has access to a public investment project with rate of return $\phi>1$ and maximum size $\bar{g}$.

2.3. Financial frictions

The economy is financially integrated with an international financial market (IFM), which is risk neutral, has deep pockets and can lend/borrow at a zero interest rate. As the economy has zero initial endowment, both the entrepreneurs and the government borrow from the IFM to finance their projects. Let's now discuss the type of financial frictions existing in

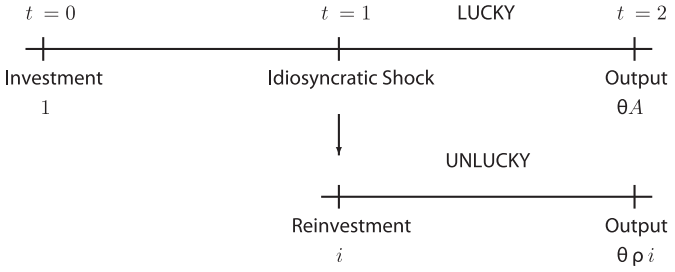

Fig. 1. Timing of investment projects.

[5] See also Sandleris (2008) and Basu (2008).