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The dynamics of sovereign debt crises and bailouts☆

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ABSTRACT

Motivated by the recent European debt crisis, this paper investigates the scope for a bailout guarantee in a sovereign debt crisis. Defaults may arise from negative income shocks, government impatience or a "sunspot"-coordinated buyers strike. We introduce a bailout agency, and characterize the strategy with the minimal actuarially fair intervention which guarantees the no-buyers-strike fundamental equilibrium, relying on the market for residual financing. The intervention makes it cheaper for governments to borrow, inducing them borrow more, leaving default probabilities possibly rather unchanged. The maximal backstop will be pulled precisely when fundamentals worsen.

1. Introduction

Since 2010, financial markets have expressed recurrent concerns about risks to debt sustainability in a number of countries. One symptom of these developments is the observed pattern of eurozone members sovereign yields since 2010, as shown in Fig. 1. Various bailouts and interventions have been proposed or been executed, with considerable controversy and mixed success.[1] Of particular interest to this paper is the ECB President Mario Draghi's attempt to restore confidence by pledging to do "whatever it takes" to preserve the euro zone. The ECB followed this speech with a program known as outright monetary transactions (OMT) in September 2012, intended to reduce country-specific distress yields per potentially unlimited purchases of the short-term government bonds of that country. Yields subsequently declined, despite such purchases never taking place. While ECB Draghi stated that "OMT has been probably the most successful monetary policy measure undertaken in recent time", it has been attacked at German constitutional court hearings in June 2013 as fiscal policy and outside the legal framework provided by the Maastricht treaty. It received a favorable ruling by the European Court of Justice on June 16th 2015, but the issue has now

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[1] For example, in the summer of 2015, the Greek voters rejected a proposed bailout and its impositions on fiscal policy, only to see it being implemented anyways, with minor changes. It remains to be seen whether this will lead to a sustainable solution in Greece, but doubts persist. Yields on 10 year bonds are 10% above those of German bunds at the time of writing these comments.

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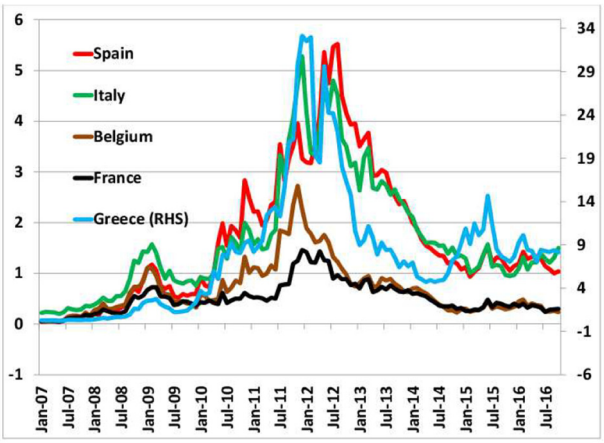

Fig. 1. 10 yr yield spread to Germany.
(Source: Bloomberg.)

returned to the German constitutional court, with the latest round of hearings in February 2016. At the heart of the controversy is whether this ECB program represents monetary policy or whether it represents fiscal policy and a bailout, financed by reductions in seignorage revenue for other member countries or an inflation tax.

This paper is motivated by these developments. The analysis presented here played a considerable role in the testimony of the second author at the German constitutional court hearings in May 2013, see Uhlig (2013, 2015). The paper seeks to understand the dynamics of sovereign default crisis and the potential role of a large, risk-neutral investor or agency in coordinating expectations on a "good equilibrium", when sovereign debt markets might be prone to panics and run. The perspective proposed here can be understood as a benign version of the OMT program. In particular, we characterize the minimal actuarially fair intervention that restores the "good" equilibrium of Cole and Kehoe (2000), relying on the market to provide residual financing. "Fair value" here means that the resources provided by the bail-out fund earn the market return in expectation. We believe this is an important benchmark, shedding light on the OMT program of the ECB. The key issue in this benchmark is that the bail-out agency is able to restore the "good equilibrium" without endangering resources of tax payers in other countries, and it does so just by announcing that it is ready to step in and purchase debt at market prices, which would prevail in the "good equilibrium". The main insight of the paper is not that the "good equilibrium" can be restored by this agency (to some, this may be fairly obvious), but rather to characterize the implications of the implementation of such a policy.

Our analysis of the dynamics of a sovereign debt crisis builds on and extends three branches of the literature in particular. First, Arellano (2008) has analyzed the dynamics of sovereign default under fluctuations in income, and shown that defaults are more likely when income is low.[2] Second, Cole and Kehoe (1996, 2000) have pointed out that debt crises may be self-fulfilling: the fear of a future default may trigger a current rise in default premia on sovereign debt and thereby raise the probability of a default in the first place. Both theories imply, however, that countries would have a strong incentive to avoid default-triggering scenarios in the first place. We therefore build on the political economy theories of the need for debt constraints in a monetary union of short-sighted fiscal policy makers as in to provide a rationale for a default-prone scenario, see e.g. Beetsma and Uhlig (1999) or Cooper et al. (2010).

We study a dynamic endogenous default model à la Eaton and Gersovitz (1981). This framework is commonly used for quantitative studies of sovereign debt and has been shown to generate a plausible behavior of sovereign debt and spread. Within this framework, we consider a bailout agency, modeled as a particularly large and infinitely lived investor and who is committed to rule out the sunspot-driven defaults of Cole and Kehoe (2000) per debt purchases, even if all other investors do not. We analyze the game between the government, the private sector, and this bailout agency. We show that the intervention only requires knowledge of the amount of revenues needed to prevent a default and whether the country is in the crisis zone or not, in order to avoid potentially bailing out an insolvent government. We also provide practical interpretations of the game, distinguishing between a primary market and a secondary implementation which could have important policy implications in practice. Then, we assume that this bailout agency seeks an actuarially fair return, and characterize the minimal intervention. The bailout agency will not prevent defaults due to fundamental reasons as in Arellano (2008) nor impose additional policy constraints such as conditionality as in e.g. Fink and Scholl (2016).

We find that introducing an actuarially fair bailout agency could effectively serve as a coordination on the "good equilibrium ", by issuing debt purchase guarantees and without incurring losses in expectation. We find that the agency needs to be willing to potentially purchase (nearly) the entire amount of newly issued debt, casting doubts on proposals that, say, seek to limit the amount the ECB can buy a priori. At that maximum, we find that a small worsening in fundamentals will make the bailout agency jump from the commitment to buy the entire amount of newly issued debt to buying no debt at all and letting the country default: the country is let-go when a future recession becomes more likely than it was. We find that the policy overall leads to higher debt levels and possibly rather small changes in the probability of default, as the probability of default for fundamental reasons is increased. Thus, while the bailout agency intervention may eliminate multiple equilibria, default events may not be reduced as a result of higher debt levels. However, now defaults would only occur due to fundamental reasons. Our numerical analysis shows, that changing the maturity of the debt may have little influence on default probabilities: the main change instead may be the level of debt. Our analysis is "positive", not "normative". The impatience of the government and its objectives may well be different from those of the population, which a social planner would take into account. On purpose, we therefore refrain from assessing the efficiency and welfare implications: these would require additional assumptions.

Our study is related to the recent literature on quantitative models of sovereign default that extended the approach developed by Eaton and Gersovitz (1981), starting with Aguiar and Gopinath (2006) and Arellano (2008). Different aspects of sovereign debt dynamics and default have been analyzed in these quantitative studies. Excellent surveys of the literature on sustainable public debt and sovereign default are in the handbook chapters by Aguiar et al. (2016) and D'Erasmo et al. (2016). However, these studies do not consider defaults driven by a buyers strike and the role of bailouts in eliminating self-fulfilling debt crises.

A few recent papers also analyzed the role of bailouts in models of strategic sovereign default. Boz (2011) introduces a third party that provides subsidized enforceable loans subject to conditionality in order to replicate the procyclical use of market debt but the countercyclical use of IMF loans. Fink and Scholl (2016) also include bailouts and conditionality to reproduce the observed frequency and duration of bailout programs. Juessen and Schabert (2013) include bailout loans at favorable interest rates but conditional to fiscal adjustments,

[2] That may sound unsurprising, but is actually not trivial and it follows from the assumption of non-contingent bonds. Indeed the recursive contract literature typically implies incentive issues for contract continuation at high rather than low income states, see e.g. Ljungqvist and Sargent (2004).