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Was the European sovereign crisis self-fulfilling? Empirical evidence about the drivers of market sentiments ☆

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ABSTRACT

We investigate the presence of self-fulfilling dynamics during the European sovereign crisis in the light of a theoretical model that we bring to the data. Our empirical framework allows us to empirically test the presence of self-fulfilling dynamics and to identify what may have driven the market sentiment during this crisis. To do so we estimate the probability of default of five European "peripheral" countries during January 2006 to September 2011 with a panel smooth threshold regression. Our estimation results suggest that (1) both the fundamentals and "animal spirit" ignited the European sovereign crisis; (2) we isolate the risk indicator through which investors' belief coordinate.

1. Introduction

The fiscal crisis in Greece that began in the autumn of 2009 has turned into a full-fledged sovereign crisis across Europe. The ten-year process of interest rate convergence has been wiped out and two distinct categories have emerged, the peripheral and the core European economies. Some economists put forward the presence of self-fulfilling speculation, or more precisely a situation where the fear of default is precisely what leads to default.[1] Was speculation self-fulfilling? Did it make sovereign states vulnerable to erratic speculative movements? If it has been the case, we would like to know the channels of coordination of market expectations. What drove market sentiments? The answers to these questions are important because they will determine subsequent regulation responses to address self-fulfilling herd behaviors.

The academic answer to these topical questions is still being debated. A few theoretical papers have argued in favor of the presence of self-fulfilling speculation. The fact that investors have put peripheral countries under scrutiny and the subsequent risk of speculative attacks have been emphasized by several works indeed. The reasons invoked are policy coordination failures among domestic executives (De Grauwe and Ji, 2012), the lack of a lender of last resort until the ECB's announcement of September 2012 to buy debt in unlimited amounts (Pâris and Wyplosz, 2013), the lack of a credible backstop at the European level such as a fiscal union (Chamley, 2012). In the existing papers however the surge in the spreads is

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[1] See e.g. Krugman in "A Self-Fulfilling Euro Crisis?" (the New York Times, August 7, 2011).

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due to a shift from optimistic to pessimistic market sentiments (Arghyrou and Kontonikas, 2012; Conesa and Kehoe, 2011; De Grauwe, 2011), while a more precise idea about what drives market sentiment would be needed.

Similar questions motivated the development of the "second generation" approach to currency crises.[2] In the second-generation model, the economic fundamentals are not sufficient to explain the sudden eruption of a crisis. The credibility of the government's commitment to maintaining a fixed-exchange rate regime becomes a subject of speculation by rational investors. The expectation of devaluation increases the cost of maintaining a peg and therefore the policy-maker will move to devalue. Such interaction between investors' beliefs and the government's objectives gives rise to self-fulfilling dynamics and multiple equilibria.

In this paper, we draw on these theoretical elements to give a functional form to the European sovereign crisis. More precisely, we refer to Jeanne and Masson's (2000) escape clause model that analyzes the benefits and costs to policymakers of exiting from a peg and specifies the probability of devaluation as applied to the European Monetary System crisis of 1993. We transpose their approach to model the probability of default in the context of the European sovereign crisis. Their framework has the advantage of proposing a linearized reduced form of the self-fulfilling speculation model, which is amenable to the data using econometric techniques. We extend Jeanne and Masson's (2000) model to obtain a linearized form of the econometric specification where not only the constant but also the coefficients of the fundamentals are allowed to vary depending on observable variables. In sum, we rely on their framework to assess the plausibility of self-fulfilling dynamics and multiple equilibria empirically during the European sovereign crisis and we adapt their model in order to associate observable variables with the underlying equilibria.

Indeed, a limit of Jeanne and Masson's approach is that the variable that coordinates investors with optimistic or pessimistic expectations is not observable. In other words, the model is tuned on the dynamics of the beliefs of market participants. Yet, it is key to better understanding the crisis and designing proper regulations.

To address this issue, we estimate the model within a threshold regression model. This specification has the advantage of offering a parametric solution to explain the nonlinearity. Indeed, it allows the parameters to change as a function of a threshold variable. We test different market signals that may have coordinated the expectations of market participants during the crisis and induced nonlinearity. We select six candidates among the financial variables that convey public information both about the economy as well as the mood of the market participants.[3] In sum, we use the panel smooth threshold regression approach (PSTR), initially proposed by González et al. (2005)), to estimate the sovereign spreads of five European "peripheral" countries: Spain, Ireland, Italy, Portugal and Greece during January 2006 to September 2011. This modeling strategy allows us to test the hypothesis that the elasticities in the spread determination model changed smoothly over time according to market signals, a nonlinear pattern that we interpret as evidence of multiple equilibria.

The contributions of this paper are threefold. First, we adapt and extend an existing model of self-fulfilling speculation to obtain a structural approach to assess the nature of the European sovereign crisis. Second, we bring the model to the data. Our estimation results suggest that both the fundamentals and "animal spirit" ignited the European sovereign crisis. Third, we adopt an empirical strategy to capture the dynamics of investors' beliefs during the crisis. We find that the Credit Default Swap (CDS) market has played a dominant role in driving market sentiments, a concerning finding given the opaqueness and concentration of this market. This finding leads us to suggest regulation implications.

The remainder of this paper is organized as followed. In the first section, we present our theoretical framework. In Section 2, we justify our empirical strategy and, in Section 3, we present the estimation procedure and data. Our empirical results are detailed in Sections 4 and 5. We conclude in Section 7.

2. The escape clause model and sovereign crises

The basic logic of self-fulfilling multiple equilibria derives from the circularity between market expectations and the policy-maker's decision. In the seminal model, the policy-maker's decision is about maintaining the fixed exchange rate or devaluing. In this Section, we transpose the reasoning to a situation in which the government decides to default or not. We rely on Jeanne and Masson (2000) (JM hereafter) and clarify which modifications we introduce to extend their model with the objective of reducing constraints.

The benefit of defaulting arises from the reduction of the interest burden on the outstanding debt. The authorities' optimal policy may validate market expectations *ex post*; that is, default if investors expect a default. This is due to the fact that default expectations increase the policymaker's benefit from defaulting. In fact, if investors become pessimistic, they sell government bonds, which increases the interest rate and interest rate payments and thus leads to the burden of public debt and the subsequent required austerity efforts. The benefit from defaulting then becomes higher. In sum, whether or not a default occurs depends on market expectations.

Default expectations depress output by rising the interest rate, which makes fiscal austerity more costly. In consequence on the one hand the benefit function of default ($B(\cdot)$) is higher than the cost (the loss of credibility in the capital market)

[2] Seminal papers include Obstfeld (1986), Eichengreen and Wyplosz (1993), Krugman (1996), Flood and Marion (1996, 1999). Jeanne (2000) proposed a taxonomy of second-generation models. In turn, in the context of a single currency area, the 3rd generation crisis model implying balance sheet effects due to currency mismatches seems less relevant to analyze the sovereign bond pricing during the crisis.

[3] For example, the *Euribor-OIS spread*, the difference between the Euro Interbank Offered Rate and the overnight indexed swap rate, which reflects both the cost of lending as well as the perception of risk by banks in lending to each other.