

# Can Open Capital Markets Help Avoid Currency Crises?

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## Abstract

By proposing a proper measure for cross-market rebalancing, we provide new insights into the different sources of currency crises. We address three interrelated questions: (i) How can we best capture contagion; (ii) Is the contagion of currency crisis a regional or global phenomenon?; and (iii) By controlling for "cross-market rebalancing" do other mechanisms like "financial openness" increase the probability of a currency crisis? We introduce the concept of conditional probability of joint failure (CPJF) to measure the linkages of currency crisis intra- and inter-regionally. From estimating this measure, we test for contagion and conclude that contagion only exists regionally. Furthermore, we construct a "cross-market rebalancing" variable based on the regional CPJF. By employing a probit model to compare our new variable with a regular contagion variable often used in literature, we conclude that our new variable captures contagion better; moreover, it also captures cross-market rebalancing effects. Our results also show that when we properly account for these effects, then financial openness helps to diminish the probability of a currency crisis even after controlling for the onset of a banking crisis. We also show that monetary policy geared towards price stability reduces the probability of a currency crisis.

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# 1 Introduction

The wave of capital flows running through many emerging market economies since the early 2000s and has brought renewed attention on how macroeconomic policies should respond to these flows, especially in light of current account balance positions (see Figure 1) and the degree of reserves accumulation (see Figure 2). Although these capital flows are associated with ample global liquidity and favorable worldwide economic conditions, in many cases they are (at least in part) a reflection of strengthened macroeconomic policy frameworks and growth-enhancing structural reforms.<sup>1</sup> However, the inflows also generate important challenges because of their potential to generate overheating, loss of competitiveness, and increased vulnerability to crises. Accordingly, significant concerns about the stability of national and international financial systems stemming from the crises that occurred throughout the 1990s have been voiced throughout the last few years. Some economists view increasing financial openness and unregulated capital flows as a grave obstruction to global financial stability (see Bhagwati, 1998; Rodrik, 1998; Stiglitz, 2000; Rodrik and Subramanian, 2008), leading to calls for capital controls (such as “Tobin taxes”) on international asset trade. Other economists have argued that increased openness to capital flows has, in general, proven vital for countries aiming to leapfrog from lower- to middle-income status, while considerably enhancing stability among industrialized countries (e.g., Fischer, 1998; Summers, 2000).<sup>2</sup> Moreover, the fear remains that in an environment of relatively free international capital markets currency crises are becoming more frequent and that such developments may easily spill over to other economies.

Interestingly, there is little empirical evidence supporting the view that financial openness by itself increases vulnerability to crises. However, while crisis episodes receive most of the attention, they are just (for the most part) spiky expressions of the more general phenomenon of macroeconomic volatility. As the foregoing discussion points out, the intensity and “time-clustering” of the crises has now forced both policy makers and academics to focus on contagion as a principal culprit. For example, during the 1990s developed and developing countries experienced severe financial difficulties, including balance-of-payments crises and systemic banking failures. Accordingly, the scale and impact of these events renewed interest in the existing “crisis and contagion” literature and stimulated a large volume of new theoretical and empirical work to explain and/or predict crises in order to

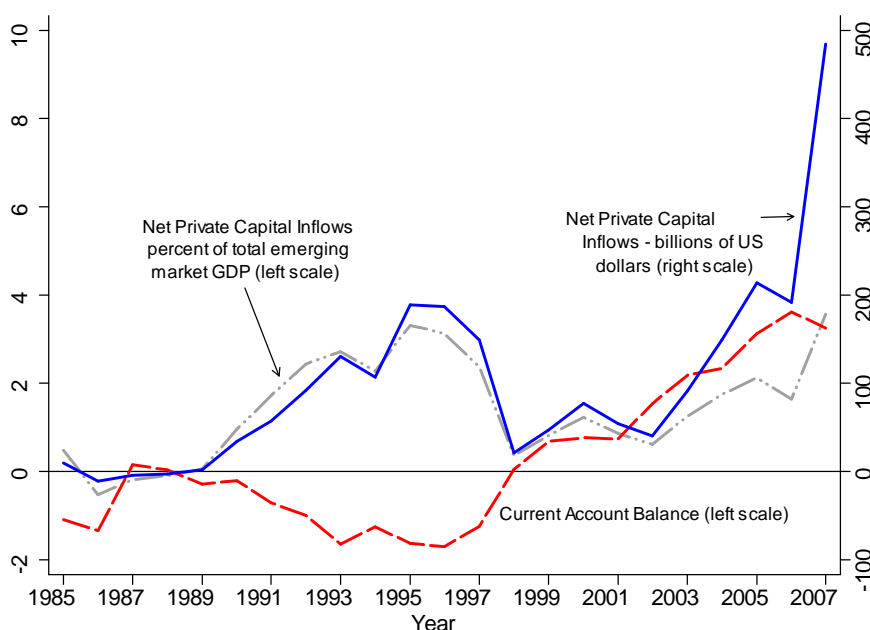
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<sup>1</sup>Moreover, they help deliver the economic benefits of increased financial integration (see Garita, 2008).

<sup>2</sup>This is evidently a matter of substantial policy significance, especially with economies like China and India taking steps to open up their capital accounts. But also because of the current “financial crisis” engulfing the world economy.

provide countries with appropriate policy advice needed to avert any impending crises. In response to these events, several different theoretical models were developed showing how crises end up spreading across countries. For example, some of the major models of contagion are based on trade linkages and macroeconomic similarities (Gerlach and Smets, 1995; Eichengreen et al., 1996; Glick and Rose, 1999; van Rijckeghem and Weder, 2001), while other models are based on financial linkages, neighborhood effects, and exogenous shifts in investors' beliefs (Masson, 1999; Calvo and Mendoza, 2000; Kaminsky and Reinhart, 2000; Kodres and Pritsker, 2002).

Figure 1: Waves of Capital Flows to Emerging Markets and Current Account Balances

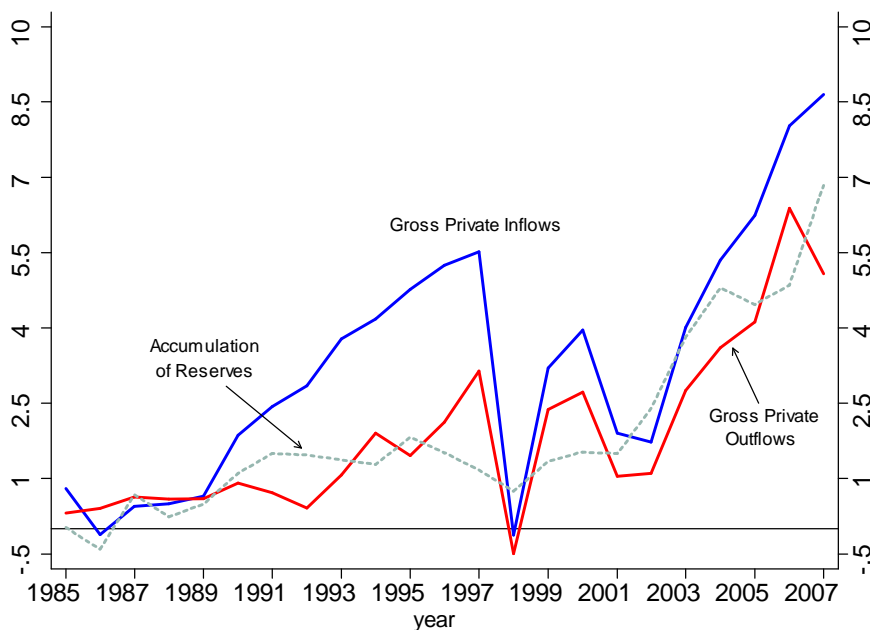


In “first-generation” interpretations of currency crises,<sup>3</sup> the viability (or lack thereof) of a fixed exchange rate is determined by exogenous fundamentals unrelated to the behavior of economic agents. For instance, in these types of models market participants base their expectations on the conjecture that their actions will not affect fiscal imbalances or domestic credit policies. By contrast, the interaction between expectations and actual outcomes is at the core of the second-generation models of crises, in which market expectations unswervingly influence macroeconomic policy decisions.<sup>4</sup>

<sup>3</sup>The approach was pioneered by Krugman (1979), who adapted a model by Salant and Henderson (1978) to the analysis of currency crises. It was further refined by Flood and Garber (1984).

<sup>4</sup>The standard studies on self-fulfilling crises are Obstfeld (1986, 1994).

Figure 2: Waves of Capital Flows to Emerging Markets and the Accumulation of Reserves.



The key point emphasized in second-generation models is that the interaction between investors' expectations and actual policy outcomes can lead to self-fulfilling crises. For example, in a country whose monetary authorities are committed to maintaining a fixed exchange rate but are willing to float their currency under "extraordinary circumstances" then foreign investors would face the possibility of a devaluation of that currency. This in turn would reduce the value of their claims if the country's loans from abroad were denominated in the borrowing nation's domestic currency. Moreover, if foreign investors considered the possibility of a devaluation to be very likely, they would charge a high-risk premium on their loans. This implies that the economies' borrowing costs would rise significantly, thereby reducing credit opportunities and restraining output growth. Given this scenario, the country's authorities would feel the costs of maintaining "the fix" to be too high and choose to devalue their currency in order to boost aggregate demand. Interestingly, the devaluation would validate the initial investors' expectations, which leads to self-fulfilling prophecies in that the expectations of devaluation lead to actions (a risk premium hike) that raise the opportunity cost of defending the fixed exchange rate. Therefore, the forecasts force a policy response (the abandonment of the peg) that validates the original expectations. As discussed by Pesenti and Tille (2000), the main advantage of resorting to such an interpretation of currency crises is the ability to differentiate between

two types of volatility: "one related to financial markets and one related to macroeconomic fundamentals". Following this interpretation, market sentiment, in the form of sudden changes in market participants' expectations, plays an important role in the determination of a crisis. Since we know that exchange rates (and other asset prices) are less predictable than they are in models with a unique outcome, as a result, second generation models are deemed to "square better with the stylized facts of global financial markets" (Masson, 1999). When speculators expect the occurrence of a crisis across countries, they have an incentive to engage in financial market transactions that create links between otherwise "separate" markets. As in Kodres and Pritsker (2002), this is called "cross-market rebalancing"<sup>5</sup>. If speculators expect that a crisis in country  $i$  will be immediately followed by a crisis in country  $j$ , they have an incentive to be active in both currency markets in order to "benefit" from this joint correlation. When a crisis occurs in country  $i$ , it will change the wealth levels of these speculators and, therefore, change their actions in country  $j$ 's currency market in a way that increases the probability of a crisis in the latter. The belief that contagion will occur is "self-fulfilling": if investors expect there to be no correlation between the outcomes of the two markets, they will have no incentive to rebalance their portfolios, and contagion will not occur. This view is a simple theory of contagion in which a devaluation of one currency acts as a signal that coordinates expectations on the crisis equilibrium in another currency market.<sup>6</sup> The immediate source of equilibrium contagion (when it occurs) in this simple setting, is the fact that the same investors *can* be active in both markets, which generates a wealth channel through which crises are transmitted. In this way, the analysis herein relates to a number of papers that study how financial interdependence can lead to contagion (see Kodres and Pritsker, 2002).

While contagion can occur in other areas of an economy, the likelihood and harshness in financial systems is often regarded as considerably higher, since a full crisis in the financial system can have strong adverse consequences for general economic welfare. This it has long been argued as a particular feature of financial that is called "systemic risk". However, while "systemic risk" is now widely accepted as the fundamental concept for the study of financial (in)stability, most work thus far only tackles a few aspects of that risk, and there is no clear understanding of the overall concept of contagion and the linkages between its different features.

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<sup>5</sup>In our case, "cross-market rebalancing" only occurs within the same region, since as shown in section 3.4, currency crisis contagion is not very likely to jump across regions.

<sup>6</sup>If two countries are highly integrated, of course, (through trade, etc.) it is not entirely surprising that a crisis in one would have strong effects on the other. The importance of expectations is most often stressed in cases where the two currencies are, at least in principle, not closely related.

Moreover, because no open economy can fully insulate itself from its "surrounding environment", countries may need to adopt regionally or globally coordinated measures in order to prevent any contagious effects or "systemic risks". However, despite the "burst" of contagion models, consensus does not exist with respect to the relevant contagion channels and the implications for policy. For example, if the trade channel is relevant then countries may need to diversify their trade portfolio, and/or fix their exchange rates (collectively) in order to avoid speculative attacks following the loss of international competitiveness.<sup>7</sup> If, on the other hand, the "financial integration" channel is relevant, then countries may need to impose capital controls on (short-term) capital flows.

In this paper, we address three interrelated questions: (i) How can we best capture contagion? (ii) Is the contagion of currency crisis a regional or a global phenomenon? (iii) By controlling for "cross-market rebalancing", do other mechanisms like "financial openness" increase the probability of a currency crisis? To address these questions, the paper follows a three-step approach. First, we employ an alternative statistical method known as extreme value theory (EVT) to identify the linkage between currency crises. This statistical technique is particularly well designed to address the co-movements of financial market crises. In an univariate setting, this approach has been used to study the frequency of currency market (Koedijk et al., 1990; Hols and de Vries, 1991), stock market (Jansen and de Vries, 1991; Longin, 1996) and bond market (Hartman et al., 2004) crashes in industrial countries. We focus on emerging and developing markets (Asia, Africa, and the Western Hemisphere) and extend the analysis of extreme exchange rate fluctuations to a bivariate setting, measuring the joint occurrence of currency market crashes. Secondly, we propose a revised version of the "crises elsewhere" variable that is often constructed in the contagion literature. By construction, the "crises elsewhere" variable in literature only considers whether one of the neighboring countries is suffering a crisis. However, this methodology gives the same weight (i.e. the same importance) to (all) other countries, which is counterfactual in light of the fact that countries may have different links during crises periods.<sup>8</sup> Accordingly, our second step is to incorporate the different levels of connections between countries by taking into account the conditional probability of joint failure (CPJF) to weight our contagion variable, which results in a new measure of contagion effects *vis-à-vis* currency crisis. Thirdly, we estimate a panel probit

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<sup>7</sup>Where at the extreme international cooperation of the countries in question may lead to the creation of a common currency like in the USA or the EU.

<sup>8</sup>The "crises elsewhere" variable should also consider the quantitative contagion effect for crises. Therefore, to specify a "crisis elsewhere" without considering the differences in the linkages, can at the very least lead to misleading results

model as in Eichengreen et al. (1996), to test for "cross-market rebalancing" effects, while also empirically identifying the true likelihood of contagion. Therefore, when constructing the "crises elsewhere" or contagion variable, it is necessary to consider the CPJFs between this country and the others as weights. In this manner we downweight those countries who are less connected, while giving a higher weight to those countries that are more highly connected. This precisely the link to the "cross-market rebalancing" effect as derived by Kodres and Pritsker (2002). The effects of other potential channels help to clarify the effect of other resources on currency crisis. This research herein differs from Eichengreen et al. (1996) in at least two ways. First, the evaluation of contagion is undertaken using extreme value theory. This approach represents a significant deviation from prior work in this area, and takes into account the extreme co-movement of currency pressure. This new approach opens the opportunity to construct a new "crises elsewhere" variable which quantitatively measures the contagion effect. Secondly, we use an expanded data set representing many different regions of the world. This allows for testing contagion on a broader basis while also allowing contagion to operate through "cross-market rebalancing" and the neighborhood channel.

Overall, our analysis indicates that currency crises are contagious, but only within regions. For example, economies within Asia and some economies within Africa display significant tail-dependence on currency crises. Moreover, we do not find evidence that contagion spreads from region to region, contrary to what is often voiced by pundits. The probit results reveal that higher levels of *de facto* financial integration into world financial markets lowers the probability of a crises when controlling for contagion effects by using our new "cross-market rebalancing" variable. Our results also indicate that the sudden stop of long-term capital flows (i.e. FDI) and their quick reversal exacerbates the probability of a crisis. We also show that monetary policy geared towards price stability reduces the probability of a currency crisis. The answers to the aforementioned questions are now clear: (i) Yes the contagion effect does exist, but only from neighbors; (ii) the CPJF measures the contagion effect and helps in improving our understanding of such effect. Furthermore, constructing the weighted cross market rebalancing variables based on CPJF helps to provide a more informative measure for a specific country. (iii) When accounting for cross market rebalancing effects correctly (i.e by reducing information assymetry), financial integration into world capital markets helps reduce the probability of a currency crisis.

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