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**Comment** Carmen M. Reinhart

Motivated by the severe Asian crisis of 1997, this paper makes a fine contribution to the growing literature that analyzes the symptoms of a country's vulnerability to currency crises. While the sample of countries covered in the empirical analysis encompasses diverse regions, the discussion in the paper focuses primarily on the Asian crisis. In particular, the authors stress, as they have in their earlier papers, the key role played by weak fundamentals in undermining several of the Asian currencies. Financial sector fundamentals (as in Kaminsky and Reinhart 1999) play an important role, but the authors also devote considerable attention to the countries' capacity to back their "implicit" contingent liabilities, particularly those of the local banking sector (as in Calvo and Mendoza 1996). Furthermore, the analysis by Corsetti, Pesenti, and Roubini (CPR) examines the links between crisis vulnerability and the productivity of investment projects—an important issue, particularly in several of the high-investment Asian countries—that have been largely ignored in this literature.<sup>1</sup>

By focusing on these fundamentals as well as on external imbalances, CPR dismiss a relatively popular explanation of the Asian crisis stressing a liquidity crisis/financial panic story that arises out of self-fulfilling expectations, runs on the banks, and the currency, and that downplays the role of economic fundamentals. Since I happen to concur with most (although not all) of the points made by the authors about the proximate causes of the Asian crisis, I confine my remarks to two areas: First, I focus on issues regarding ways of strengthening the empirical analysis developed in this paper; second, I dwell on some of the features of the antecedents of the Asian crisis that merit attention and are not addressed by the authors.

In the spirit of Sachs, Tornell, and Velasco (1996), the empirical analysis employs a cross-section of countries to examine which variables help explain the extent of depreciation and reserve losses (i.e., a severity index) during the December 1996–97 period. The authors focus primarily on three indicators: the interaction between credit growth and nonperforming loans, to capture the fragility of the banking sector; the interaction between real exchange rate overvaluations and current account imbalances; and the ratio of various monetary aggregates to central bank foreign exchange reserves, to assess the central bank's capacity to back its contingent liabilities. In addition, the authors include the incremental capital-to-output ratio (ICOR) and its interaction with credit growth. The idea is that

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1. CPR is not to be confused with the other CPR—Center for Policy Research.

during lending booms, funds are allocated to increasingly less-productive projects. CPR also experiment with two types of dummy variables that allow for the interaction among the indicators described above. For instance, the current account/real exchange rate variable is allowed to enter directly as well as through an interaction dummy that takes on the value of 1 when the money-to-reserves ratio is in the upper three quartiles.

Both the selection of the variables and the way they are allowed to interact are intuitively appealing and well grounded in theory. I do have, however, some practical reservations about the information content of nonperforming loans for two reasons. First, banks often engage in the “ever-greening” of problem loans for extended periods—as a consequence, nonperforming loans often lag rather than lead the crisis, and the authors use 1996 data for nonperforming loans. Secondly, the criteria applied to classify a loan as nonperforming are highly heterogeneous across countries, particularly in emerging markets. My hunch is that most of the information content of this composite term is coming from the lending boom rather than from nonperforming loans.

As to the estimation strategy, my main criticism has to do with the interaction terms introduced through the two dummy variables. While sympathetic to the economic rationale for wanting to include these additional terms in the regression, I find that they introduce serious collinearity problems. The presence of collinearity is evident in the large standard errors reported for most coefficients in tables 1.2–1.5. Most of these terms are not individually statistically significant; the failure to reject the null hypothesis that the sum of several pairs of coefficients (the Wald tests reported at the bottom of tables 1.2–1.5) comes from the actual variable rather than from the secondary interaction term. The absence of the incremental explanatory power of these interaction dummies is also evident in the reported adjusted  $R^2$ , which, in the majority of cases, does not increase by much and in some cases actually declines. The introduction of these additional terms also chews up precious degrees of freedom, which in some of the regressions is as low as seventeen.<sup>2</sup>

Apart from the collinearity problem, the results accord well with the priors. External imbalances increase the severity of the currency crisis as does booming credit. The interaction terms, although not statistically significant in almost all cases, also have the anticipated signs.

A second criticism of the paper, albeit one which is easy to remedy, is that the authors downplay some very interesting results on the interaction between the ICOR and lending booms and its role in explaining who is vulnerable to this kind of crisis.<sup>3</sup> As noted earlier, measures of the productivity of new investment projects have been largely overlooked in this liter-

2. Twenty-four observations and seven coefficients to estimate (see table 1.3).

3. The discussion is limited to a couple of paragraphs.

ature. This is a particularly important issue for understanding why the size of the current account may matter—irrespective of whether it arises out of a low saving rate or a high investment rate.<sup>4</sup> In the aftermath of the Mexican crisis, the “received wisdom” of the day was that Mexico’s large current account deficit was a problem because it was largely owing to a consumption boom. At the time, there was little concern that Thailand’s and Malaysia’s large deficits would be problems since—the argument went—the capital inflows were financing record levels of investment. After Asia’s crisis it becomes evident that unproductive investments are indistinguishable from consumption, as far as vulnerability is concerned.

Turning to the interpretation of the events and developments leading up to the Asian crisis offered in this paper, I agree with CPR that these crises had their roots in a fragile financial sector and that this vulnerability was manifest well before the crisis erupted.<sup>5</sup> As in so many banking crises, the problems first arose in the asset side of the bank balance sheet. Hence, in the discussion that follows, I will focus mainly on filling some holes in this paper’s telling of the proximate causes of the Asian crisis. CPR mention that the liberalization of the capital account and the financial sector was an important factor in explaining the surge in banks’ offshore borrowing in the years before the crisis; I would like to mention two additional factors that drove banks in these countries to become ever more dependent on offshore borrowing.

First, while fiscal policy mistakes are usually easy to spot, mistakes in monetary and exchange rate policies are more difficult to single out—unless these produce high inflation. During the capital-inflow phase of the cycle, the most common policy response in the region to the surge in capital inflows was sterilized intervention. Yet, as shown in Montiel and Reinhart (1999), sterilized intervention appears to be a powerful tool in influencing both the volume and the composition of capital inflows, although hardly in the way that policy makers had originally intended it to. By providing a combination of an implicit exchange rate guarantee and high domestic interest rates on short-term assets vis-à-vis comparable international interest rates, sterilization policies are a magnet in attracting short-term flows. These policies are capable of increasing the volume of the flows and skewing their composition away from FDI to short maturities components.

Second, “push” factors were also important in explaining why banks in the region became so dependent on short-term offshore borrowing. In particular, the protracted economic slump in Japan had dried up domestic loan demand and Japanese banks were all too eager to lend increasing amounts to the rapidly growing, capital-importing emerging Asian econo-

4. For a different interpretation of why the current account matters in explaining the severity of crises, see Calvo and Reinhart (2000).

5. This pattern of interaction between banking and currency crises is not unique to the Asian cases; see Kaminsky and Reinhart (1999).

mies. Indeed, Japan and emerging Asia in the 1990s appear in many ways to have replayed the roles of U.S. banks and Latin America in the late 1970s and early 1980s.

To sum up, this is an interesting paper which helps us understand the traumatic events of 1997 and 1998 in several Asian economies. Furthermore, the analysis is sufficiently general to provide insights into the more generalized features of financial vulnerability.

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## Comment      Aaron Tornell

This very interesting paper belongs to a class of recent papers which show that currency crises do not spread randomly. Although it is not possible to predict the timing of crises, it is possible to explain an important proportion of the cross-country variation in the intensity of the crisis in the event that a generalized crisis hits emerging markets.

This paper focuses on the Asian 1997 crisis and shows that the lending boom and real exchange rate appreciation go a long way in explaining the cross-country variation in the crisis index. These results confirm the findings of earlier papers and provide reinforcing evidence that the behavior of private banks has important macroeconomic effects.

A lending boom is an acceleration of credit from the banking system to private and state-owned firms. During a lending boom, the fast growth of credit might overwhelm both the monitoring capacity of banks and the regulatory capacity of authorities. As a result, a greater share of loans may