Uncertainty and currency crises: Evidence from survey data ☆

Alessandro Prati [a], Massimo Sbracia [b],*

[a] International Monetary Fund, USA
[b] Bank of Italy, Italy

A B S T R A C T

How does uncertainty about fundamentals affect speculation in the foreign exchange markets? This paper studies empirically the role of uncertainty in currency crises. Uncertainty, which is measured using the dispersion of survey forecasts of key macroeconomic variables, is found to have a *non-monotonic* effect on exchange rate pressures: it heightens speculative pressures when expected fundamentals are good and eases them when they are bad. This prediction is consistent with a broad class of currency crisis theories, ranging from first-generation to global-game models. The proposed empirical strategy remains valid in the presence of forecasters with strategic objectives and addresses potential endogeneity bias by building a novel set of instrumental variables.

© 2010 Elsevier B.V. All rights reserved.

1. Introduction

Recent theoretical contributions to the currency crisis literature have turned the spotlight on the role of uncertainty during crises, showing that the same fundamentals may or may not lead to a speculative attack depending on the precision of information about them. The matter is also critical for policy purposes. For example, if greater uncertainty increases the probability of a speculative attack, then exchange rate regimes will be more vulnerable in periods of high uncertainty and policy-makers should adjust their policies accordingly. There has been little debate, however, about the empirical significance of uncertainty about fundamentals during currency crises. This paper analyzes this question by proceeding in two stages.

First, we show that a broad class of currency crisis theories with a unique equilibrium—ranging from first-generation models with public information (such as those pioneered by Krugman, 1979; Flood and Garber, 1984) to global games with public and private information (Morris and Shin, 1998; Hellwig, 2002)—predict that the effect of uncertainty on exchange rate pressures is *non-monotonic* and varies with expected fundamentals.[1] Specifically, these models predict that a reduction in information precision (i.e. an increase in uncertainty) raises the share of speculators attacking the currency when expected fundamentals are "good" and has the opposite effect when expected fundamentals are "bad". This

---

☆ Alessandro Prati passed away in June 2009, when we had just completed one of the latest drafts of this paper; he was a true friend and a great partner in research. This paper supersedes the one that we previously circulated as "Currency crises and uncertainty about fundamentals".

* Corresponding author. Tel.: +39 06 4792 3860; fax: +39 06 4792 4118.

E-mail address: massimo.sbracia@bancaditalia.it (M. Sbracia).

[1] For first-generation models, our results are derived from a framework that nests the models of Grilli (1986) and Goldberg (1991). For global games, we consider the framework analyzed by Hellwig (2002), Metz (2002), and Morris and Shin (2004).

broad-based prediction—which previous studies have overlooked—has a very intuitive interpretation: as information about fundamentals becomes less precise, speculators rely less on it in order to decide whether to attack the currency. Thus, as information about *good* fundamentals becomes less reliable, speculators lose confidence in the good state of the economy and augment exchange rate pressures. By the same token, as information about *bad* fundamentals becomes less reliable, speculators wobble about the success of a speculative attack and diminish exchange rate pressures.

Second, we study empirically how speculation in the foreign exchange markets is affected by uncertainty, by measuring the latter with the dispersion of survey forecasts of key macroeconomic variables in six Asian countries.[2] Survey forecasts are an appealing source of information to test models in which exchange rate pressures depend on agents beliefs about fundamentals. Since 1995, for the six Asian countries in our sample Consensus Economics has gathered individual forecasts from a panel of analysts including both international financial firms and domestic enterprises at a monthly frequency—a higher frequency than that of some key macroeconomic variables, such as GDP growth. Survey forecasts are also inherently forward looking, just like the exchange rate pressures that the currency crisis literature tries to explain. Moreover, it is possible to relate the mean and variance of the individual forecasts to, respectively, expected fundamentals and the precision of information, which are the key parameters of currency crisis models.

The main challenge in the empirical studies of the effect of uncertainty on exchange rate pressures is that causality could go both ways. While currency crisis theories predict a causal effect running from the mean and variance of the forecasts to speculative pressures, shocks to unobservable determinants of exchange rate pressures could also affect the distribution of the forecasts.

In this paper, this complex interaction is teased out by building a novel set of instrumental variables. These instruments include the level and dispersion of forecasts of consumption growth and the unemployment rate in the United States, as well as alternative composite instruments computed as the trade-weighted version of the same macroeconomic indicators for the G-7 countries excluding Japan (G-6 countries, hereafter).

Are these instruments valid for GDP growth forecasts of Asian countries? The ideal instrument is an external source of variation that randomly changes the mean and variance of the GDP growth forecasts of Asian countries, in a manner that is uncorrelated with the unobservable determinants of exchange rate pressures. Forecasts of domestic demand conditions in the United States (or in G-6 countries) satisfy the requirement of being positively correlated with GDP growth forecasts of Asian countries, because the export-oriented economies of the latter depend on cyclical conditions in the former. Moreover, the proposed instruments are exogenous to speculative pressures in Asian countries since they reflect mostly domestic factors in the United States, on which exchange rate developments in Asian countries have a negligible effect.

These two characteristics, however, are not sufficient to fully justify the use of forecasts of domestic demand conditions in the United States as instruments for GDP growth forecasts of Asian countries. The additional identifying assumption which is required is that these instruments have no reason to be included as regressors in the second stage of the IV estimation.[3] In other words, it is necessary to assume that forecasts of domestic demand conditions in the United States only affect exchange rate pressures in Asian countries *indirectly*, i.e. by modifying these countries' GDP growth forecasts. We justify this exclusion restriction by including forecasts of U.S. interest rates, as well as their interaction with lagged levels of short-term debt in each Asian country. These variables aim at capturing changes in financial market conditions in the United States that might affect exchange rate pressures in Asian countries—for example, through higher expected costs of servicing their external debt—and that might be proxied by the proposed instruments. Then, the identifying assumption maintained in this paper is that, after controlling for U.S. interest rates and their interaction with Asian countries' short-term external debt, forecasts of domestic demand conditions in the United States do not have any residual *direct* effect on Asian countries' exchange rate pressures.

Using IV estimates is crucial also to address another problem that could potentially affect the empirical analysis. The mean forecast is only an imperfect measure of expected fundamentals (think, for instance, at the sample error due to the fact that only a finite number of forecasters is interviewed). Therefore, in a multivariate specification like the one that is predicted by the theory, OLS would provide biased estimates of all coefficients (in a direction that is difficult to assess), including also the coefficient related to uncertainty, which is the main variable of interest. Instrumental variables, then, are the main weapons to address this second problem as well.

Table 1 presents some preliminary evidence about the effect of uncertainty on exchange rate pressures. The north-west panel of the table presents that, when GDP growth forecasts are bad, high uncertainty is associated with low exchange rate pressures.[4] Conversely, the north-east panel of the table presents that, when GDP growth forecasts are good, high uncertainty is associated with high exchange rate pressures. Both findings are consistent with the non-monotonic effect

---

[2] The countries in our sample are: Hong Kong, Indonesia, Malaysia, Singapore, South Korea, and Thailand. Data are monthly and cover the period from January 1995 to April 2005.

[3] This exclusion restriction is critical because, if domestic demand conditions in G-6 countries needed to be included in the second stage and were instead omitted, then the instruments would be correlated with the residual unobservable determinant of exchange rate pressures.

[4] In Table 1, the thresholds separating good from bad expected fundamentals and high from low uncertainty are, respectively, the median value of GDP growth forecasts and the median value of the variance of GDP growth forecasts. In the regressions, instead, the threshold separating good from bad fundamentals is estimated (while no threshold is needed for the variance). Following Eichengreen et al. (1996), our measure of exchange rate pressures is a weighted average of changes in the exchange rate, changes in international reserves (which can be paid out in responding to pressures), and changes in the domestic interest rates (since interest rates can be raised to fend off an attack). Section 3 explains in detail the construction of this variable. We thank Jonathan Eaton for the suggestion of including this table in the paper.