Fundamental pitfalls of exchange market pressure-based approaches to identification of currency crises

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Abstract

This study seeks to demonstrate that the identification of crisis episodes based on commonly applied exchange market pressure (EMP) indices, namely, Eichengreen, Rose and Wyplosz [Eichengreen, B., Rose, A., and Wyplosz, C., 1995, Exchange Market Mayhem: The Antecedents and Aftermaths of Speculative Attacks, Economic Policy 21 (October), 249–312.], Sachs, Tornell and Velasco [Sachs, J.D., Tornel, A., and Velasco, A., 1996, Financial Crises in Emerging Markets: The Lessons From 1995, Brooking Papers on Economic Activity 1, 147–215.], and Kaminsky, Lizondo and Reinhart [Kaminsky, G., Lizondo, S., and Reinhart, C., 1998, Leading Indicators of Currency Crises, IMF Staff Paper 45, 1 (March), 1–48.] are highly sensitive to the choice of: a) the weighting scheme for each component of the EMP index; and b) the statistical parametric assumption used in the constructions of crisis thresholds. To highlight further some of the potential consequences of these two pitfalls in identifying crisis episodes, this paper employs a number of possible alternative approaches to measure the exchange market pressure.
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1. Introduction

One of the primary tasks of recent research on currency crises is to construct a single composite index that will systematically identify the presence and severity of currency crises or speculative attacks on a currency. Studies such as Eichengreen, Rose, and Wyplosz (1995, 1996)—henceforth ERW, Sachs, Tornell, and Velasco (1996)—henceforth STV, and Kaminsky, Lizondo, and Reinhart (1998), Kaminsky and Reinhart (1999)—henceforth KLR—have proposed different constructions of what is now known as *exchange market pressure* (EMP) index. This indicator is usually a weighted average of the rate of depreciation of the local currency (mostly against the US dollar in either

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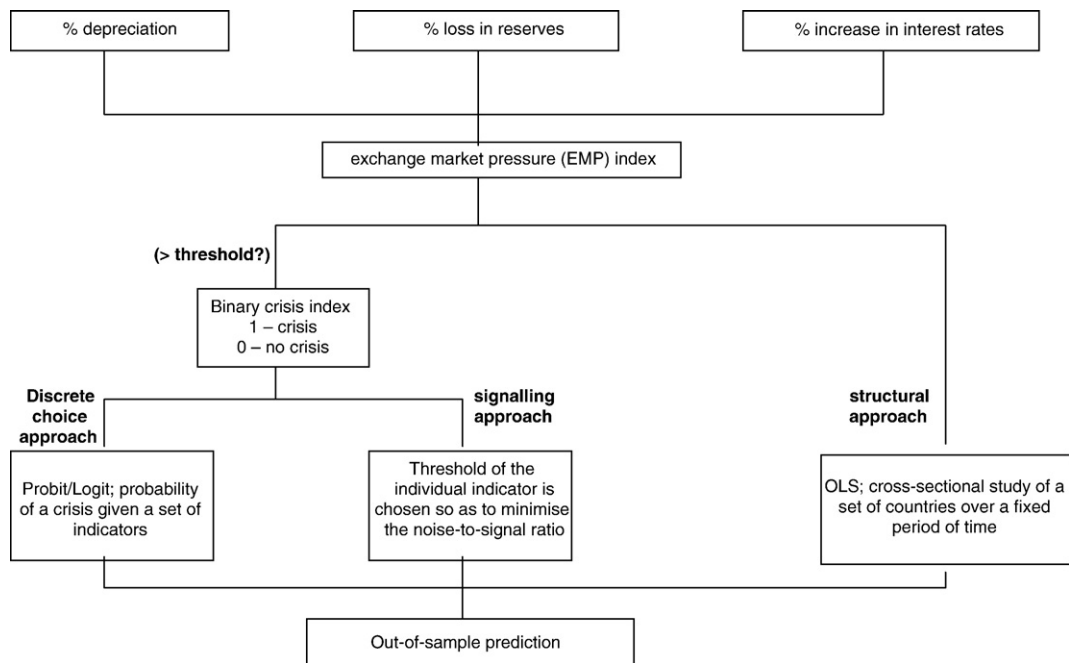*E-mail address:* reza.siregar@adelaide.edu.au (R. Siregar).

Fig. 1. Approaches in building leading indicator models of currency crises. Source: Chui (2002).

nominal or real terms), the monthly percentage changes in international reserves, and the monthly changes in the interest rate.[1]

The objective of this paper is neither to construct another crises index, nor to conduct another study on the determinants of crises using the different approaches listed in Fig. 1 (discrete, signaling and structural approach). We also do not intend to argue as to which among of the above EMP indices are the most powerful or accurate indicator of exchange market pressures. What we, instead, seek to demonstrate in this paper is that the identification of crisis episodes is highly sensitive to choice of the followings: a) the weighting scheme used for each component of the EMP index; and b) the statistical parametric assumption used in the construction of crisis thresholds.[2]

To help illustrate our arguments, the exchange market pressure indices of ERW, STV and KLR are constructed for two groups of countries, namely, the Latin American countries (Argentina, Brazil, Chile and Mexico) and the East Asian countries (Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand) for the period of 1985–2003. As in previous studies, we adopt various conventional thresholds used in the literature, i.e. based on a certain arbitrary number of standard deviations (usually ranging from 1.5 to 3 standard deviations) above the mean of the EMP index.[3] An important point to note as far as conventional thresholds is that it implicitly assumes that the EMP indices are normally distributed. However, based on the examination of their basic statistical properties, none of the EMP indices according to the groups of countries examined here are normally distributed.

In view of this, to deal with the non-normality, we apply Extreme Value Theory (EVT) based, in particular, to the tail index estimator proposed by Huisman, Koedijk, Kool, and Palm (2001)—henceforth HKKP.[4] The HKKP is employed

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[1] As shown in Fig. 1, the EMP index will eventually be employed to either directly construct a binary dependent variable in logit/probit models, in which case a value of 1 indicates a speculative attack or currency crisis episode when the computed EMP index for that period exceeds or falls outside a certain threshold, or 0, otherwise, or, on the other hand, as a continuous dependent variable in a structural empirical model of currency crises.

[2] The level of exchange market pressure exceeding (or falling below) the threshold point signals an incidence of currency crises.

[3] Some other studies use variants of the EMP to identify currency crises by focusing only on large movements of the exchange rate. For instance, Frankel and Rose (1996) uses an arbitrary threshold of exchange rate depreciations of at least 25% and exceeding last year's depreciation by at least 10%.

[4] Hardly any study has applied this methodology to the study of currency crises. A recent exception is by Pozo and Dorantes (2003). Their study applies EVT to identify periods of currency crisis for a broad cross-section of Asian, European and Latin American countries from the mid-1960s to 1997.