



## Are emerging market indicators of vulnerability to financial crises decoupling from global factors?

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### ABSTRACT

This paper assesses the extent to which common factors underlie indicators of vulnerability to financial crises in emerging market economies (EMEs) and whether this link is changing over time. We use a Bayesian dynamic common factor model to estimate their common component in a sample of up to 41 countries including both developed as well as emerging economies. This permits us to interpret the component in common to both of them as a global factor. We introduce time variation into the model to investigate whether indicators are decoupling from global factors over time. While decoupling can be observed in a few cases, the exposure to global factors in most countries tends to fluctuate around the mean. Broadly speaking then, the answer is no.

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### 1. Introduction

Traditional indicators of vulnerability to financial crises in emerging market economies (EMEs) have undergone a remarkable transformation in recent years. Ratios associated with the onset of a crisis such as reserves over external short-term debt or total external debt in terms of exports, have improved significantly within a short period of time. Fig. 1 reveals that this trend seems to be present across all regions, despite their heterogeneity in economic policies and levels of development.

Frankel and Saravelos (2010) survey 80 early warnings system studies and find that various indicators of international reserve adequacy, such as the 12 month change or the ratio to short-term external debt, to imports of goods and services or M2, and real exchange rate appreciation are “the two leading indicators that have proven the most useful in explaining crisis incidence across different countries and crises in the past”. Given their importance in predicting crises we therefore focus on these two variables in this study. The availability of comparable data of denominators in measures of international reserve adequacy at monthly horizon constrains our analysis to focus on the 12 month growth rate of international reserves.

As most EMEs are considered small open economies, both of these variables are to some extent driven by external economic developments. An early study by Calvo et al. (1993) found that a substantial fraction of reserves and real exchange rates in Latin America (LA) prior to the crises of the 1990s was driven by one common factor. This conclusion is confirmed by VAR studies. Hoffmaister and Roldos (1997) find that external factors can contribute up to 30% of the variation of domestic macroeconomic variables in East Asia (EA) and LA.<sup>1</sup> Using different identification schemes, regional studies by Canova (2005) on LA, Mackowiak (2006) on Emerging Europe (EE) and Rueffer et al. (2007) on EA show that external factors contribute about 50% to the variation of domestic macroeconomic aggregates. The conclusions from these studies suggest external factors are important drivers of international reserves, real fx rates and business cycles in EMEs.

But the speed and size of the recent improvement has led some economists to believe that this time it is different. The change in indicators, it is argued, may reflect economic reforms following the financial crises of the last two decades. For example, the transition towards a flexible exchange rate regime may reduce the automatic movement of international reserves associated with fixed exchange rate regimes during periods of persistent capital inflows. Similarly, an exchange rate peg only leaves the price level as

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<sup>1</sup> Subsequently, a number of other empirical studies came to a similar conclusion.

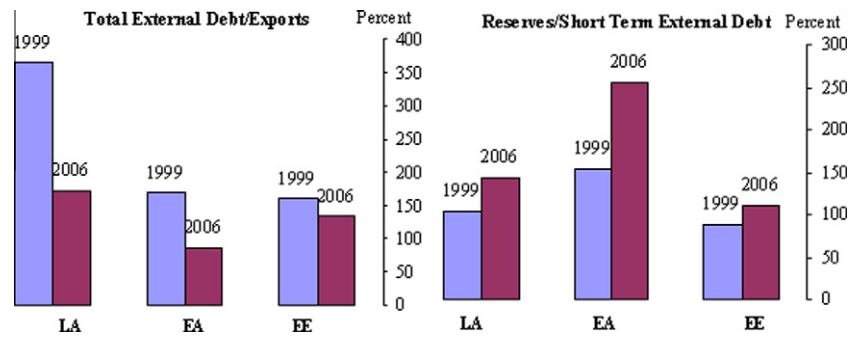


Fig. 1. Financial crises indicators over time.

the only margin of adjustment during periods of capital inflows, leading to persistent real exchange rate appreciation. With a flexible exchange rate regime on the other hand, nominal exchange rate appreciation can partially offset domestic inflationary pressure during episodes of capital inflows, therefore weakening the link between real exchange rate appreciation and capital inflows. Reforms of the monetary system may therefore reduce the effect of international factors on, and thus increase the country specific contribution to, vulnerability indicators permanently. In this case vulnerability indicators will become less dependent on global factors over time. In other words, reforms may lead to decoupling from global factors.

Instead of decoupling, the outcomes of reforms of a country's monetary system may result in greater comovement with the external economic environment. Improvements in policies and greater monetary credibility can attract international investors, increasing a country's exposure to shocks originating from international financial markets. *Imbs (2004)* finds that financial integration tends to increase business cycle synchronization. Similarly, economic reforms can pave the way for a greater degree of trade integration, which may also result in greater business cycle synchronization (*Frankel and Rose, 1998*). Any decoupling benefits of reforms could therefore be offset by economic integration.

Economists and policy makers find it difficult – albeit important – to assess whether EMEs are actually decoupling from global factors. Even following economic reforms, it is hard to be confident whether decoupling has occurred. The question we thus seek to answer is to which extent EME indicators of vulnerability to financial crises are driven by external factors and whether this relationship has been weakening or strengthening in recent times?

Previous work on decoupling has used a variety of ways to test this hypothesis. *Kose et al. (2011)* apply a Bayesian dynamic common factor model to annual growth rates of consumption, investment and GDP to quantify global business cycle fluctuations. They compare the contribution of their estimated global common factor to EMEs during the pre-globalization period (1960–1985) and the globalization period (1985–2005). They find that the variance decomposition of the global factor in EMEs declines in the latter and interpret this as decoupling. *Walti (2009)* filters annual GDP data with a Hodrick-Prescott filter. Using a concordance measure of synchronization among countries, he does not find any evidence of decoupling of EMEs from industrial country business cycles. Finally, *Dooley and Hutchison (2009)* analyze EMEs' CDS spreads and US financial markets with a rolling coefficients VAR. They find that while EMEs decoupled from US financial markets during the first phase of the subprime crisis, they recoupled following the failure of Lehman Brothers during September 2008. Similarly, *Levy-Yevati (2010)* documents the absence of decoupling in financial markets of emerging market economies.

Our approach differs from previous studies in two respects. To our knowledge, this is the first study to focus on the improvement

in indicators of vulnerability to financial crises, as opposed to GDP growth rates or CDS spreads. We follow *Kose et al. (2011)* and use a dynamic common factor model to quantify the effect of a common driver on country specific indicators. Second, previous work has estimated empirical models across different time periods or used rolling regressions to identify decoupling in the data. Unfortunately, this approach can not differentiate whether changes in coefficients are due to a cyclical or permanent change in correlations. In our approach, we follow *Del Negro and Otrok (2008)* and introduce time variation into the coefficients relating the common factor to vulnerability indicators. This feature of our model permits us to analyze changes in indicators' exposure to common factors as a result of permanent structural changes rather than cyclical fluctuations. To facilitate the interpretation of our extracted common component as global, we include several industrial countries into the sample as well. Our model will therefore permit for a rigorous test of whether EMEs have become permanently more or less resilient to fluctuations in global economic environment following the financial crises of the 1990s. In other words, this will allow us to assess whether EMEs have started to decouple from or converge with global factors in recent years.

We find that one common factor explains on average 60% of the variation in vulnerability indicators. In some countries the exposure to this common factor shows a persistent decline throughout our sample period. We interpret this gradual decline as evidence of decoupling. But most countries in this study lack a systematic pattern of continuously falling exposure of vulnerability indicators to the common factor. This evidence leads us to conclude against the presence of decoupling in the majority of emerging market economies.

Nevertheless the interpretation of the common factor, estimated from a one-factor model, as global could be invalid if there is an EME specific factor. To control for this and check for the robustness of our results we also estimate a model on a sample that is restricted to EMEs only. Since the common factor seems to have a similar shape and pattern in both cases, our base-line model does not appear to be misspecified.

The rest of the paper is organized as follows. Section 2 outlines the methodology and the empirical model. Section 3 describes the implementation of the model and the data. Section 4 presents the results, while Section 5 provides a robustness check and a discussion of potential caveats. Finally, Section 6 concludes.

## 2. Methodology

In this study we employ a Bayesian dynamic common factor model to quantify the contribution of one common factor to country specific vulnerability indicators and to analyze how this contribution has evolved over time. In previous applications such methods have been employed to study and separate the

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