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# Correlations in emerging market bonds: The role of local and global factors<sup>☆</sup>

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### ABSTRACT

This paper empirically assesses co-movements in emerging market bond returns and disentangles the roles of external and domestic factors during episodes of heightened market volatility. The conceptual framework, set in the context of asset allocation, allows us to describe the channels through which shocks originating in a particular emerging or mature market are transmitted across countries and markets. We show that a simple measure of cross-country correlations, when presented together with the more commonly used average correlation coefficient, can be more informative during episodes of heightened market volatility. Data for the period 1997–2008 are analysed for evidence of true contagion and common external shocks.

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## 1. Introduction

Emerging markets have been marked by several well-documented episodes of volatility spillovers and contagion. The Tequila crisis of 1994–95, the Asian crisis of 1997, the Russian default and the collapse of LTCM in 1998, the market reaction after the September 11 terrorist attacks, the run-up to the Argentine debt default in late 2001, the US high yield market sell off of 2002, or most recently the US sub-prime market-related volatility of summer 2007 and the collapse of Lehman Brothers in mid-September 2008, are

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prominent examples of market events accompanied by the transmission of financial market volatility across borders. Other than foreign direct investment, emerging market (EM) bonds have historically been the largest source of financing to emerging markets since the beginning of the 1990s. International bonds have, however, been a volatile source of financing, vulnerable to external shocks and abrupt shifts in market sentiment. Volatility in secondary markets has usually been associated with diminished appetite for primary market issuance (see, for example, [IMF Emerging Markets Financing, November 2001](#)) and often associated with capital outflows and foreign exchange market pressures.

This paper is an empirical investigation of the co-movement of emerging market bond returns of the EMBI Global benchmark index's key constituent countries over the period 1997–2008. Our aim is to assess the respective roles of common external factors in explaining co-movements in emerging markets bond returns on the basis of a conceptual framework that allows, on the one hand, to identify the potential sources of contagion in emerging bond markets (EMs) and on the other hand, to describe the mechanisms through which shocks originating in a particular emerging or mature market are transmitted across countries and markets.

In this respect, the paper could be viewed as a contribution to a better understanding of the mechanisms through which shocks are transmitted across countries and markets, and to the understanding of which episodes over the past decade represent true contagion. Moreover, it proposes a simple measure of adjusted cross-country correlations, that presented together with the more commonly used average correlation coefficient, can warn about specific or common risks to EM valuations.

The sharp spikes in volatility of emerging market bond prices and returns are often captured by increased cross-country market correlations in the now vast literature on contagion. In fact, correlation analysis represents one of the major strategies to measure the cross-country transmission of shocks.<sup>1</sup> However, in the wake of the Asian crisis, the inference of contagion drawn from increased cross-country correlation coefficients has been challenged by [Ronn \(1998\)](#) and [Forbes and Rigobon \(2001, 2002\)](#). These authors show that the presence of simultaneity, omitted variables or heteroskedasticity in the data may cause correlation coefficients to be biased upward during periods of market turmoil. This may alter the interpretation of traditional correlation coefficients, leading to erroneously interpret market “interdependence” for contagion. Nonetheless, under certain hypotheses, it is possible to adjust these coefficients to eliminate the bias. However, the effectiveness of the correction in the presence of common shocks has also been questioned in subsequent studies (see, for instance, [Corsetti et al., 2005](#)).

Other important studies have argued that the rise in the correlation coefficients is driven entirely by an increase in underlying volatility. This has led to the investigation of volatility spillovers across markets—[King and Wadhani \(1990\)](#), [Chou et al. \(1994\)](#), [Lin et al. \(1994\)](#), [Edwards \(1998\)](#), [Park and Song \(1999\)](#). However, more recently, [Yoon \(2005\)](#) noted that contagion may be due to factors other than increased volatility and that the direction of the bias implicit in correlation coefficients depends strongly upon the underlying data-generating process.<sup>2</sup>

Aside from these technical shortcomings, another objection could be raised with respect to the use of correlation coefficients to gauge contagion, in terms of the role of “third factors”, particularly global financial factors, in driving market co-movements.

In order to address some of the shortcomings of the use of unadjusted aggregate correlation coefficients, in this paper we appeal to a more restrictive definition of contagion viewed as excess co-movement, that is, the transmission of shocks from one market or country to others, unexplained either by common shocks or by fundamental links among the countries. Using an asset allocation decision as the backdrop, and a choice between emerging market bonds, a mature market asset of similar risk profile (high yield mature market corporate bonds), a safe asset (US treasury securities) and an alternative asset class (mature market equities), we adopt a three-factor model of emerging market bond (EM) returns, to address the question of whether the increases in the emerging markets co-movement usually associated with crisis episodes are attributable to common shocks or to “pure” contagion. More precisely, our analysis is based on the average correlations of each country's returns with the rest of the EMBI Global sample, adjusted for the presence of common external factors (for our purposes, U.S. Treasury bonds, U.S. high yield market returns and equity market returns). The correlation coefficients of residuals can thus be viewed as a measure of “excess co-movement” or “true contagion” that is the part of the co-movement

<sup>1</sup> For early papers, see [King and Wadhani \(1990\)](#) and [Lee and Kim \(1993\)](#), and subsequent work by [Calvo and Reinhart \(1996\)](#) and [Frankel and Schmukler \(1998\)](#).

<sup>2</sup> When returns follow, for instance, a STUR process, heteroskedasticity causes the correlation coefficients to be biased downward.

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