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Volatility transmission between US and Latin American stock markets: Testing the decoupling hypothesis



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ABSTRACT

We test for volatility transmission between US and the six largest Latin American stock markets (Argentina, Brazil, Chile, Colombia, Mexico and Peru) using MGARCH-BEKK models in daily frequency from March 1993 to March 2013. As expected, we find strong evidence of volatility transmission from US to the Latin American markets but not so in the opposite direction. Besides, we reject the hypothesis of decoupling between US, Brazil and Mexico: the conditional correlations between US and the two emerging markets have steadily increased over the sample period and volatility transmissions have become more significant from 2003 onwards. We also find some evidence on the leadership of Brazil in the region, being the only Latin American stock market consistently transmitting volatility to US. We discuss implications for the financial integration literature.

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1. Introduction

The study of volatility transmission between international financial markets has made a comeback after the Subprime crisis and Great Recession from 2007 to 2009, and the Eurozone sovereign debt crisis, starting from 2010 to the present. Unlike the period of 1997–1999 that witnessed the emerging market crises of Southeast Asia, Russia and Brazil, recent worldwide financial instability has mainly come from developed markets. Besides after the late 90's crises, most emerging countries have advanced in terms of economic and financial stability, allegedly altering the pattern of volatility transmission from developed markets. In this context, the controversial idea of a “decoupling” between emerging and developed stock markets has gained popularity since the 2000's decade (The Economist, 2008, Dooley and Hutchison, 2009; Bekiros, 2014). To understand volatility transmission from and to emerging markets is important for portfolio management. International volatility transmission and the contemporaneous increase in correlation worsen portfolio losses in globally diversified portfolios. Besides, it is a well-established fact that low correlation disappears in worldwide bear markets, precisely when needed the most (Soriano and Climent, 2005).

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In this paper we test for volatility transmission between the US and the main six Latin American stock markets, in the period June 2007–March 2013, using bivariate MGARCH models. We use the MGARCH-BEKK specification (Engle and Kroner, 1995) that estimates volatility transmission in a very general setting, provides estimations of time-varying conditional correlations and has become the standard approach to test volatility transmission, as discussed below. Besides, with trivariate MGARCH models, we test for the role of leadership of Brazil stock markets in the region. Finally, we test for the decoupling hypothesis by estimating both volatility transmission and conditional correlation between US and both Brazil and Mexico, the largest markets of the region, in three additional periods, starting on March 1993. Those results describe the evolution of volatility transmission and conditional correlation in a large span of time, that includes two periods of bullish international stock markets (Mar. 1993–Jun. 1997 and Nov. 2003–May 2007), and two convulsed periods, the first including crises originating mostly from emerging markets (Jul. 1997–Oct. 2003), and the second, from developed markets (Jun. 2007–Mar. 2013).

US and Latin America offer an interesting case to study volatility transmission from developed to emerging markets. First, the Latin American countries are strongly linked to US by trade and capital flows, cultural proximity, time zone, and macroeconomic effects. For example, Canova (2005) reports strong transmissions of US monetary shocks to Latin American countries. Second, Latin American stock markets have become more important for worldwide portfolio investments. Market capitalization of the region has increased from an average of 28% of GDP in the late 90's to 42% in 2011 (OECD, 2013). Foreign investment allocations in Latin American stock exchanges have increased by 14.5 times from 1996 to 2011 as reported the Emerging Portfolio database. Third, Latin American markets offer variety in terms of size, development and economic links with US. Brazil holds by far the largest and deepest stock market in the region, a hallmark among emerging markets, classified in 2001 as a one of the BRIC economies. Mexico, the second largest, is deeply interconnected with US economy, especially since the NAFTA Free trade agreement in the middle of the 90's. The stock markets of Chile, Colombia, and Peru, of medium to small size among emerging markets, have gained visibility among foreign investors in the last decade for their growing economies and improving sovereign credit rankings, and are working towards a unified securities market, named MILA (*Mercado Integrado Latinoamericano*).¹ On the other hand, Argentina, two decades ago an obliged reference of emerging markets, has been mostly shunned by foreign portfolio investors since the “Corralito” crisis in 2001, to the point that is currently excluded from the emerging market classifications of MSCI and SP DowJones.

A wide set of studies have explored volatility transmission between stock markets. For example, Lin et al. (1994) in the stock exchanges of Tokyo and New York, Chanchaochai and Dibooglu (2006) in six southeast Asian stock markets and Japan and US during the Asian Crisis, Sakthivel et al. (2012) between developed markets and India, and Fayyad and Daly (2011), from US, UK and a group of Arab oil exporting countries and the oil prices. However, studies on volatility transmission of Latin American stock markets are scarce. The more closely related to this paper are: Christofi and Pericli (1999), who report volatility spillovers between five major Latin American markets; Edwards and Susmel (2001), that use a bivariate switching volatility model finding strong co-movements between four Latin-American markets during the 90's; Weber (2012) that models stochastic volatility transmissions between American equity markets, finding volatility spillovers from US to Mexico and Brazil from 1989 to 2008; Andreou et al. (2013) who identify bidirectional volatility spillovers between stock and foreign exchange markets for a sample of emerging Asian and Latin-American markets; and finally, Rejeb and Arfaoui (2016), who study interdependence between the stock markets of US and Japan and a set of emerging stock markets, including five of Latin America, interpreting their results as an indirect evidence of volatility transmission.

The contribution of this article to the emerging markets literature is twofold. On the one hand, by running the model in a long span of time, 1993–2013, we are able to test the decoupling hypothesis, measuring the evolution of volatility transmission and conditional correlation between US and Mexico and Brazil, the two largest markets in the region. On the other hand, to our knowledge, this is the first study that tests volatility transmissions between US and Latin American stock markets using the MGARCH-BEKK model, unlike previous studies (Christofi and Pericli, 1999; Edwards and Susmel, 2001; Weber, 2012; Rejeb and Arfaoui, 2016). The MGARCH-BEKK model is currently deemed as the standard methodology for detecting volatility spillovers amongst financial markets (Gannon and Au-Yeung, 2004; Caporale et al., 2006; Koulakiotis et al., 2009; Hammoudeh et al., 2010; Fayyad and Daly, 2011; Arouri et al., 2011; Andreou et al., 2013).

As for the results, we find evidence of volatility transmission from US to each of the six Latin American stock markets, for the period Jun. 2007–Mar. 2013. We also find some evidence consistent with the leading role of Brazil in the region: Brazil transmits volatility not only to four out of the other five Latin American countries, but also to US in four out of five models. Interestingly, Brazil receives volatility transmission by four Latin American countries. Only two other countries, Mexico and Peru, apparently transmit volatility to the US stock market, but this effect is explained away when including Brazil in trivariate MGARCH models. Finally, bivariate MGARCH models between US and Brazil and US and Mexico for four periods from 1993 to 2013 provide strong evidence of an increasing integration of Latin American stock markets with those of US, contrary to the decoupling hypothesis. The evidence is twofold: First, volatility transmission from US is statistically significant for Mexico in the last two periods and for Brazil in the last three. Second, the conditional correlations with US show a strong upward trend in the whole period 1993–2013, especially rising upon the Asian Crisis (1998), and along the

¹ Chile, Colombia and Peru were the founding partners of MILA in 2011, Mexico joined in 2015.

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