



Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Determinants of financial stress in emerging market economies

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ARTICLE INFO

Article history:
Available online xxx

JEL classification:
F30
G01
G15

Keywords:
Financial stress index
Financial contagion
Emerging market economies

ABSTRACT

The global financial crisis of 2008–2009 illustrates how financial turmoil in advanced economies could trigger severe financial stress in emerging markets. Previous studies dealing with financial crises and contagion show the linkages through which financial stress are transmitted from advanced to emerging markets. This paper extends the existing literature on the use of financial stress index (FSI) in understanding the channels of financial transmission in emerging market economies. Using FSI of 25 emerging markets, our panel regression estimates show that not only advanced economies FSI, but also regional and nonregional emerging market FSIs significantly increase domestic financial stress. Our findings also suggest that there is a common regional factor significantly affecting domestic FSI in emerging Asia and emerging Europe. Furthermore, the results from a structural vector autoregression model with contemporaneous restrictions indicate that although a domestic financial shock still accounts for most of the variation in domestic FSI, regional shocks play an important role in emerging Asia.

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1. Introduction

The recent global financial crisis demonstrates the adverse effects of financial globalization. Although financial integration brings direct and indirect benefits to economies, it may increase the countries' vulnerability to financial crises originating elsewhere (Stulz, 2005; Kose et al., 2006; Moshirian, 2008). For instance, the freezing of the credit markets in advanced economies, particularly the United States (US), in late 2008 caused significant turmoil in emerging market financial systems. As emerging markets are rapidly integrated into global and regional markets, the origin of financial stress is also becoming ubiquitous and the impact felt borderless. For example, the financial crisis which started in Thailand in 1997 quickly spread to the rest of East Asia, and then to the Russia Federation and Brazil.

The transmission of financial crises has been the subject of a substantial body of economic literature. Cross-border transmission of financial crises is often manifested in co-movements of asset prices and capital flows during times of crises. Earlier studies classified the causes of financial contagion into two broad categories (Calvo and Reinhart, 1996; Dornbusch et al., 2000; Kaminsky and Reinhart, 1999, 2000; Moser, 2003). First, financial asset prices and capital flows can move similarly when economies share similar fundamentals and have strong macroeconomic interdependence through trade and financial linkages. Similar fundamentals

may induce similar response to a shock, which leads to strong co-movements in asset prices and capital flows. Second, the co-movements may also result from herding behaviors and/or certain decisions of investors, which affect different countries simultaneously. For example, a crisis in one country may prompt investors to withdraw from all emerging market countries.

While the impact of financial crisis is often devastating especially in emerging market economies, it has not been easy to monitor the buildup of a full-blown financial crisis and to trace its spread across borders. A number of studies have used a financial stress index (FSI) as a continuum and contemporaneous measure of the severity of financial crises. Using FSI shows that financial stress intensifies due to greater fragility in the financial systems and exogenous shocks. Since the pioneering work of Illing and Liu (2006) – who defined financial stress as episodes where economic agents are subjected to extreme uncertainty and varying expectations of loss in financial markets – other authors developed their own versions of FSI, including Hakkio and Keeton (2009) for the Federal Reserve Bank of Kansas City; Hollo et al. (2012) for European markets; Misina and Tkacz (2009) for selected advanced economies; and Yiu et al. (2010) for Hong Kong Monetary Authority.

The use of FSI has far-reaching benefits for monetary authorities and financial regulatory and supervisory agencies. First, FSI combines various financial market indicators into an aggregate index to measure financial market stress, hence eliminating the dependency on one or few indicators in the measurement of financial stress. Second, FSI allows for a measure of financial stress to capture the degree and severity of financial stress on a continuous

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basis such that spikes in the stress index correspond to the periods of severe financial stress. It also allows fast, reliable identification of crises or stressful periods. Third, FSI offers an aggregate measure of financial stability that is much simpler than other measures of systemic financial risks, without the complications of “micro-level” assumptions of other measures.¹ Nevertheless, FSI is found very useful in alerting systemic risk conditions by its signaling properties for identifying systemic stress episodes, grade thresholds, and corresponding probability of systemic stress (Oet et al., 2011). Of course, FSI has its own shortcomings; particularly pertaining to its construction including choice variables, aggregation, and frequency choice.

Existing studies dealing with financial stress, however, offer little insight on various channels for transmission of financial stress emanating from advanced economies and emerging market economies (either from the same region or from different regions) to domestic financial markets. Balakrishnan et al. (2009, 2011) explore the issue of financial transmission from advanced and other emerging economies to individual emerging market economies, but paid little attention to geographical proximity in financial transmission and did not distinguish between regional and nonregional markets. Fernandez (2007) studied the impact of instability in the Middle East to regional and nonregional emerging stock markets; however, she focused on political stability as the source of financial market turmoil. This paper addresses the gap in the literature. Specifically, it aims to examine the determinants of financial stress in emerging market economies and to assess the transmission of financial shocks emanating from advanced and other regional and nonregional emerging market economies to individual emerging market economies. This paper adds to the previous literature in the following aspects.

First, it covers a longer period by extending the observations from 1992 to 2012 to include a number of episodes of emerging market crises in the early to mid-1990s as well as the latest crisis episode that affected the global financial markets in 2008–2009. Extending the sample period with more crisis episodes will allow for the analysis to provide more reliable results regarding the transmission of a financial shock.

Second, this paper employs two methodologies for constructing domestic FSI for each emerging market in the sample – one is the variance-equal weights and the other is the principal component analysis. This will allow for robustness checks on the overall patterns of individual FSIs.

Third, this study assesses the impact of external financial shocks on domestic FSI by differentiating their economic and geographic origins, such as advanced versus emerging market economies as well as regional versus nonregional emerging market economies. The analysis specifically focuses on whether or not a shock originating from emerging market economies would exert influence on the FSI of an individual emerging market economy in addition to a shock from advanced economies. It will also assess the effect of a common regional factor in domestic FSI for emerging markets. The significance of a common regional factor would help explain the vulnerability of emerging market countries to regional financial contagion.

Fourth, following the panel regression analysis on the magnitude and significance of advanced and other regional and nonregional emerging market FSI on domestic FSI, we employ impulse response functions and variance decompositions to assess the impact of a financial shock coming from advanced and other emerging market economies on individual emerging market economies' FSI. A financial shock generated from other emerging market economies are decomposed into regional and nonregional emerging

market financial shocks. This will help assess whether or not the impact of a financial shock on domestic FSI would differ by the origins of the shock such as different economic (advanced versus emerging market economies) and geographic (regional versus nonregional) groupings.

To carry out the empirical analysis of this study, aggregate domestic FSI are constructed, drawing on the methodology used by Cardarelli et al. (2011) and Balakrishnan et al. (2011), for a sample of emerging market economies using variance-equal weights and principal component analysis as aggregation technique. To verify the importance of global, country-specific, other countries financial stress, and regional factors in explaining domestic FSI, a panel regression model involving 25 emerging markets from various regions including emerging Asia, emerging Americas, emerging Europe, and other emerging countries is employed using quarterly data from Q1 1992 to Q4 2012.² Specifically, it aims to determine which factors – including common regional factors – contribute to the increase of financial stress in developing economies. Knowing the significance of advanced and other emerging market FSI in determining domestic FSI, we examine the impact of a financial shock emanating from advanced and other emerging economies on individual domestic FSI using a structural vector regression approach with contemporaneous restrictions. This will allow us to determine the magnitude and persistence of the effects of advanced and other emerging market financial shocks on individual domestic FSI.

This paper proceeds as follows. Section 2 discusses and constructs financial stress index. Section 3 presents the determinants of FSI and provides empirical specification for the panel regression which will determine the significance of advanced and other emerging market financial stress on domestic FSI, as well as the importance of a common-regional factor. Section 4 provides the structural vector autoregression specification and presents the impulse response functions and variance decompositions of FSI shocks from advanced and other emerging market economies on domestic emerging market FSI. Summary and some policy implication follow in Section 5.

2. Financial stress index

2.1. Literature review

There is abundant literature investigating the occurrence and determinants of currency, banking, and sovereign debt crises in advanced and emerging economies; however, this literature failed to account for the proper dating and intensity of said crises. For instance, Laeven and Valencia (2008) developed a database on the timing and frequency of banking, currency, and sovereign debt crises for both advanced and emerging markets. Eichengreen et al. (2004) looked into currency crises by developing an index of foreign exchange market pressure which incorporates foreign exchange depreciation and changes in international reserves. Reinhart and Rogoff (2008) studied sovereign debt defaults and found that crises usually emanate from financial centers; and were often accompanied by other crises like currency and banking crises. However, these studies devote little attention in dealing with the contemporaneous severity of financial crises. This comes from the fact that most studies measure the occurrence of crises as a simple binary variable, i.e., no crisis takes the value of zero (0) and presence of crisis takes a value of one (1). As pointed out by

¹ See Arnold et al. (2012) for discussion on the challenges in monitoring banking systemic risks; and Allen et al. (2012) for discussion on the micro-level systemic risk measures.

² Emerging Asia includes the People's Republic of China; Hong Kong, China; India; Indonesia; the Republic of Korea; Malaysia; the Philippines; Singapore; Taipei, China; and Thailand. Emerging Americas includes Argentina, Brazil, Chile, Colombia, Mexico, and Peru. Emerging Europe includes Czech Republic, Hungary, Poland, Russian Federation, and Romania. Other emerging countries include Egypt, Israel, South Africa, and Turkey.

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