



The global financial crisis: Is there any contagion between real estate and equity markets?



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HIGHLIGHTS

- We test contagion across equity and real estate markets of Hong Kong, US and UK.
- We use the Forbes–Rigobon test, the coskewness test and the cokurtosis test.
- Cokurtosis test shows significant contagion between equity and real estate markets.
- The contagion between US's equity and real estate markets is most significant.

ARTICLE INFO

Article history:

Received 11 September 2013

Received in revised form 14 January 2014

Available online 13 March 2014

Keywords:

Contagion

Coskewness

Cokurtosis

Real estate

Financial crisis

ABSTRACT

This study examines contagion across equity and securitized real estate markets of Hong Kong, US and UK during the global financial crisis by the Forbes–Rigobon, coskewness and cokurtosis tests. In particular, this is the first study to use the cokurtosis test to examine contagion between real estate and equity markets. The results show that the cokurtosis test can detect additional channels of contagion, and hence is a more powerful test. In contrary to Fry et al. (2010), we find that the cokurtosis test shows a highly significant evidence of contagion between the equity and real estate markets in both directions. In particular, the contagion between US's equity and real estate markets is the most significant. This reflects that US is the centre of shock of the global financial crisis.

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1. Introduction

It is well known in investment science that risk can be mitigated by diversification. However, when a financial crisis happens, the same assets of different countries (or even different types of assets) would tend to move down together, leading to a smaller opportunity of diversification. We call this phenomenon contagion. The most commonly adopted definitions of contagion are given by the World Bank Group [1], who raises three definitions of contagion, of which we will use the very restrictive definition (which is adopted by most articles): contagion occurs when cross-country correlations increase during “crisis times” relative to correlations during “tranquil times” [1]. Besides the World Bank Group [1]’s definitions, there are also other definitions of contagion (e.g. Ref. [2]).

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The crisis we choose to study is the recent global financial crisis since it is the most severe financial crisis since the Great Depression, its magnitude is extremely large and it affects the whole world significantly. The global financial crisis, triggered by the subprime crisis in the US (see Ref. [3] for key characteristics of the subprime crisis), began on September 15, 2008, when the bankruptcy of Lehman Brothers led to a global stock market slump. The crisis triggered a huge deleveraging effect lasting until the 1st quarter in 2009. The S&P 500 Index, for example, fell from a historical high of 1565.15 on October 9, 2007 to a nearly 13-year low of 676.53 on March 9, 2009—a 57% fall in 1 1/2 years. To avoid loss, investors sold risky assets such as stocks, derivative products and commodities (except precious metals such as gold), resulting in a sharp plunge in their prices. However, the “safe havens” like the US Dollar and the Japanese Yen appreciated in value. The global economy also underwent a deep recession from late 2008 to early 2009. This first shock triggered by Lehman Brothers’ bankruptcy is sometimes called the “financial tsunami”. Since the second quarter of 2009, the global economy began to recover and the stock market started to rebound. However, the European sovereign debt crisis (or the Euro crisis), which emerged in Greece in 2010 and intensified in 2011–2012, caused the global market to remain volatile until June 17, 2012, when Antonis Samaras and his allies won the Greek legislative re-election and formed a new government successfully, easing worries of a Greek default. The global market has rebounded since then.

The above reflects the seriousness of the global financial crisis. Most equity markets in the world fell by over 50% from October 2007 to March 2009. This was the largest global stock market collapse since the Great Depression, so it is possible that contagion has occurred. If investors noticed signals of contagion (e.g. sudden increase in correlation), they could avoid greater loss by portfolio reallocation. Furthermore, we can use contagion patterns in crises that happened in the past as references to examine contagion patterns in future crises. Hence studying contagion is important. Therefore, there were a number of studies on contagion in the past (see Section 2).

Our work adds value to the existing literature in the following ways. Firstly, most of the previous literature worked on stock markets. For example, using the Forbes–Rigobon test, Forbes and Rigobon [4] found that there was a high level of interdependence, but virtually no contagion, during the 1987 US market crash, 1994 Mexican devaluation and 1997 Asian crisis. Wang and Nguyen Thi [5] applied the forward forecasting test on dynamic conditional correlation (DCC) to test contagion between Taiwan and US stocks. They discovered two kinds of contagion, “positive” and “negative”, between the markets. However, recently, there was growing concern on real estate markets. Hudson-Wilson et al. [6] mentioned that real estate could lower overall risk of portfolio, provide high absolute returns and hedge against unexpected inflation or deflation. These motivate investors to include real estate in their portfolio. Moreover, according to Hatemi-J and Roca [7], the recent internationalization and globalization of real estate markets cause stronger integration, so more co-movements among global property prices are expected. However, by Hui and Zheng [8], real estate can serve as a type of consumption goods as well as an investment tool. Therefore, real estate markets may have a different pattern of contagion. Furthermore, the limited number of articles on this topic leads to mixed results (see Section 2). This paper contributes to the limited research on existence of contagion between real estate markets.

Secondly, most of the previous studies used methods based on correlation. For example, Forbes and Rigobon [4] derived the adjusted correlation coefficient from the ordinary correlation coefficient. Thus the Forbes–Rigobon test was constructed. However, sometimes correlation cannot reveal the whole contagion pattern. Some investors would like to know the higher order moments of asset returns, too. For example, for a risk adverse person, positive skewness and lower kurtosis are preferred. Therefore, it is worth considering the higher order moments. We may explore a different contagion pattern. Harvey and Siddique [9] discussed this issue and derived one important outcome: the interaction between the first and second moments of the joint distribution of returns, i.e. coskewness. Applying the generalized exponential class as the framework, Fry et al. [10,11] constructed the coskewness test and applied it to examine contagion across real estate markets. One can generalize this framework to other contagion tests based on different combinations of higher ordered moments. One example is the cokurtosis test constructed by Hui and Chan [12] by extending Fry et al. [11]’s framework to fourth ordered moments. The cokurtosis test is applied by Hui and Chan [13] to investigate contagion across European securitized real estate markets during the European sovereign debt crisis. However, these two studies applied the cokurtosis test on the real estate markets only, but they did not study the general equity markets. This paper is the first to apply the cokurtosis test to examine contagion across equity markets, and, in particular, between real estate and equity markets. Thus we can know more about the contagion pattern across real estate and equity markets (and, more importantly, between the two markets) of different countries during the global financial crisis. This is useful for both investors and policy makers. Investors should reallocate their portfolio accordingly (avoid holding two classes of assets in which significant contagion is likely to occur between them) when a crisis happens to reduce their loss. Policy makers should take measures to stabilize the economy and mitigate the effects of contagion. Furthermore, unlike Hui and Chan [12,13] who used the DataStream indices, this study uses the FTSE EPRA/NAREIT indices which incorporate REITs and stocks of listed real estate companies, and are suitable for use as the basis for investment products like derivatives and ETFs. This study can also act as a reference for further study on contagion across real estate and equity markets of other countries.

This study investigates contagion among equity and real estate markets (and between the two markets) of three countries: Hong Kong, US and UK, during the global financial crisis. In this paper, “real estate market” refers to securitized real estate market. The following three tests are used: the Forbes–Rigobon test, the coskewness test and the cokurtosis test, which are constructed by extending Fry et al. [11]’s method of constructing the coskewness test to further higher order moments.

The paper proceeds as follows. Section 2 reviews the previous literature on contagion across real estate markets (and between real estate and equity markets). Section 3 describes the tests of contagion we use. In Section 4, we select the crisis

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