



Real estate global beta and spillovers: An international study



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ABSTRACT

This study investigates the dynamics of real estate global beta and international spillovers among 16 public real estate markets for the period of 1995–2015. We find that international public real estate markets are characterized by a varying degree of increasing global stock market linkages during the financial crises. Although increases in real estate global betas are linked to conditional correlation increases and market integration over time, the relative conditional standard deviation (real estate/global stock) is more important in driving the changes in real estate global betas over time. In an international environment, the real estate global beta spillovers are substantial and time-varying across the countries examined. There are institutional and economic implication associated with real asset securitization that can influence the changes in real estate global betas and their spillovers in international financial markets.

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1. Introduction

Financial markets have become increasingly global in the past decades. Although previous studies have reported that correlations between international stock returns, and to a lesser extent, between public real estate returns have increased in the context of globalization and financial integration, there has been little work on the joint behavior of the respective volatilities between national/regional public real estate markets and the global stock market. In contributing to the existing knowledge on this topic, in this study we systematically analyze two key aspects of real estate global beta for a sample of 16 national public real estate markets across two regions over the last two decades. We first assess the level and evolution of joint volatility behavior between the public real markets and the world (global) stock market, which is complemented by a measure of market-specific conditional variances through conditional correlation metrics.¹ Moreover, the recent financial and economic crises shed light on the integration level and the volatility transmission pattern of financial markets (i.e. volatility spillovers). Accordingly, our second issue focuses on the real estate global beta spillovers and co-movement in international financial markets.

While the stock and bond markets have become more and more integrated over the last decade, benefits from diversification across

international stock and bond markets decreased, both in the long-term and in the short-term. These stronger linkages between international stock markets and between international bond markets prompted investors to search for different opportunities to diversify their portfolios. In this context, real estate investments have emerged to show low correlation with stocks and bonds and therefore, have appropriate characteristics contributing to portfolio optimization (Schindler, 2011). On a further note, many Asian markets have been generally perceived as having low exposure to global factors and therefore little integration with western economies and the global stock market. Hence incorporating Asian market stocks, bonds and real estate in an investment portfolio was seen as part of attempting to increase returns and reduce risks. In particular, international investors have been drawn to the Asian emerging markets since the early 2000's, when the real estate investment trust (REIT) vehicle was first introduced in Japan, because of this region's rapid economic development and massive urbanization, high returns and attractive potential for diversification. Public real estate has therefore grown in importance as a destination for international portfolio investment and there has been a large increase in the volume of REITs globally.

At the same time, increasing global integration of financial and economic activities might be expected to impact real estate investors and markets (Bardhan et al., 2008) due to real estate securitization and changing real estate financial systems around many parts of the world. Given increasing economic integration, the domestic economy and stock markets are more and more connected to international markets, which might also cause spillovers to the real estate market. Moreover, with real estate as a major capital asset that has contributed to both investors' diversification and wealth creation in many national

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¹ Gatfaoui (2013) characterizes the systematic risk, or equivalently, the correlation risk though examining the trend in the level of conditional correlations between the US and three European stock markets under consideration.

economies, the issue of public real estate and global stock market integration has increasingly attracted the attention of global investors and academics. Cross-asset market (real estate and stock) integration implies a high degree of substitution between public real estate and stocks, whilst cross-asset market segmentation implies the two asset types provide good risk diversifiers for each other in portfolio management. Additionally, we note that some developed public real estate markets (especially those of the Western countries) have higher correlations with the global stock market, because they are able to attract international investors to their financial instruments which are in real estate equity or debt format. One important implication arising from this higher interdependence and/or joint volatility behavior between public real estate and the global stock market is that there will be lesser opportunities for cross-asset and cross-border diversification for global investors and country funds, more or faster transmission of a crisis and being much more vulnerable to domestic shocks (Liow and Schindler, 2014).

In this study, the term “real estate” refers to securitized real estate or public real estate. Unlike previous literature which focused on the relationship between public real estate and local stock market (e.g. Okunev and Wilson, 1997; Liow and Yang, 2005), we appeal to an international version of the CAPM (ICAPM) proposed by Adler and Dumas (1983) to measure and examine the relationship between each of the 16 national real estate returns and the global stock market returns over the period between January 12, 1995 and December 31, 2015.² Our measure of this relationship is a time-varying real estate global beta, which is an index of real estate global systematic risk (joint volatility).³ The global beta coefficient of the ICAPM for a country's real estate market may be defined as the ratio of the covariance between the expected returns on the country's real estate market and the expected returns on the world stock market portfolio to the variance of the expected returns on the world stock market portfolio. For this purpose, we first estimate an AR (1) - GJR- Asymmetric Dynamic Conditional Correlation (ADCC-GARCH) model (Engle, 2002; Cappiello et al., 2006). An attractive feature of the ADCC-GARCH model is that it keeps the simple interpretation of the univariate GARCH models, as well as providing a consistent estimate of the dynamic correlation matrix. Moreover, the model is useful to take into account the leverage effects (leverage) of return volatility.

We extend this model by allowing for cross-effects between real estate and the global stock to extract the time-varying conditional covariance and correlation of weekly public real estate and global stock market returns. A time-varying real estate global beta is then estimated.⁴ The stock market portfolio (R_m) is defined as the global stock market that is represented by the S&P global stock market index. From there, we study the effect of the Asian financial crisis and global financial crisis (GFC)/European sovereign debt crisis (ESDC) on the cross-asset common market risk at the national and regional levels.⁵ Our second objective is to examine the co-movement structure of the national real estate global betas for their “spillover” characteristics

using the generalized VAR methodology of Diebold and Yilmaz (2012) by decomposing forecast errors of a generalized vector autoregressive model of the betas in the crises and stable periods. One major advantage of this beta spillover index approach is that the multivariate cointegration procedure can be used to reveal the direction of real estate global beta transmission in addition to its strength (intensity). A beta spillover index is defined as the share of beta return variability in one real estate market attributable to beta surprises in other real estate markets.

Overall, the empirical results indicate whilst the non-Asian developed real estate markets have shown some varying tendency toward global stock market integration, at the same time the Asian real estate markets have displayed some changing decline of their integration with the global stock market. Thus, there are important heterogeneity across both regions in real estate beta relationship with the global stock market. Moreover, real estate markets have experienced a varying degree of increasing “global linkages” during the financial crises. In an international environment, the “real estate global beta” spillovers are substantial and time-varying across the countries examined.

This research thus adds value to the existing literature along three directions. Firstly, most of the previous literature works on the more traditional asset classes of stock, bond and currency and is silent on the topic of cross real estate-global stock market's joint volatility behavior, which is the main focus of this analysis. This topic is of key importance to those investors who aim to diversify across the two important asset classes of global economies, and should therefore receive growing attention in the literature. There is growing recognition on the important role of real estate such as its contribution to lower overall portfolio risk, providing high absolute returns and hedging against unexpected inflation or deflation (Hudson-Wilson et al., 2003). Moreover, considering that public real estate are traded on major stock exchanges, its inclusion in this study seeks to reflect the increasing important role of this new “asset” class in domestic and international financial markets. The outperformance of public real estate in both their REITs and corporate forms, led to increasing investors' awareness for this segment of the market. Together with the internationalization and globalization of real estate markets that cause stronger integration and more co-movements among many national real estate markets, an in-depth assessment of cross real estate and global stock market beta relationship is important. This development reinforces the specific importance of this topic.

Second, by examining the behavior of real estate global betas during different phases of the two financial crises and stable periods, we are able to assess which of the national /regional real estate markets/groups are insulated (decoupled) from the GFC/ESDC or sharing more joint volatility behavior with the global stock markets. Our results suggest Asian real estate markets' global betas have reacted differently from the non-Asian real estate markets' global beta, in response to the two crises. These results are new and have important institutional and economic implications which can be adopted and monitored by portfolio managers and policy-makers.

Third, although there are abundant literature in the field of return and volatility spillovers across stock markets (e.g. Alotaibi and Mishra, 2015), to our knowledge less formal attention has been focused on real estate markets. Moreover, our study is one of very few to explore the global beta spillover and cross-asset market interactions. The issue of real estate global beta spillovers in international financial markets is of fundamental importance because of its important consequences for the global economy in relation to monetary policy, optimal asset allocation, risk measurement, capital adequacy and asset pricing. A relevant point is that although real estate asset securitization is conducive to the long-term development of international financial markets and economic growth, it may generate financial stability because of price volatility spillovers in financial markets. Moreover, an increase in the spillover intensity during the crises periods may imply global beta contagion. This issue has major implications for international investors

² The ICAPM takes countries as stock portfolios in the global market and suggests that the only systematic source of risk is the global stock market risk.

³ Under the country beta approach suggested by Harvey (1991), country risk is measured as the conditional sensitivity (or covariance) of country stock market returns to a world stock return. Using this approach, Erb et al. (1996) estimate country betas for 21 developed and 26 emerging stock markets as a function of country credit risk.

⁴ The use of MGARCH method is popular in the literature to estimate the conditional betas. In the literature, there are other techniques that are available to model and analyze the time-varying beta at the country/industry level. They include: stochastic volatility (SV) model, state space model and the Markov Switching model. It is beyond the scope of this paper to estimate and compare beta using these alternative modeling techniques. To account for beta instability using the MGARCH method, the Aas is shown in Eq. (1). Also, the conditional volatilities and conditional correlations estimated from the MGARCH model can be used for other related analysis.

⁵ In this study, we include two crises: (a) Crisis1: AFC; (ii) Crisis2: GFC/EDC: according to the Fed Reserve Board of St Louis (2009), the EDC follows the GFC closely and it may be difficult to separate them, as such, we prefer to combine the GFC and EDC as Crisis2 in our aggregate analysis. Please also refer to Section 5.1 for more details on the different phases of the GFC and EDC.

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