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Do securitized real estate markets jump? International evidence ☆

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ABSTRACT

We apply a jump GARCH model to daily returns of the ten largest international securitized real estate markets and investigate the sources of large price changes. We document, for the first time, evidence for jump dynamics across major international securitized real estate markets. Large price jumps exist during both crisis and non-crisis periods. There is also evidence that jump intensity over time across different markets is inversely related to the degree of economic and financial integration, yet the degree of political and social integration yields no additional explanatory power beyond these two factors.

1. Introduction

Understanding financial market volatility and particularly the economic source of such volatility is a central and yet unresolved problem (Engle and Rangel, 2008). Compared to continuous price changes, jumps in financial markets generate occasional large price changes and extreme volatility, which represent a significant

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source of non-diversifiable risk (Eraker, Johannes, and Polson, 2003; Bollerslev, Law, and Tauchen, 2008). Jump risks are important for investors who may demand large premia to carry these risks (Pan, 2002) and for policy makers who must make decisions in real time during times of jump-inducing chaotic conditions in financial markets. The existing studies on the jump in equity and bond markets have shown that understanding jump risk is important for risk measurement and management, portfolio allocation, the valuation of derivative securities, and policy actions. For example, Zhou and Zhu (2012) show that accounting for jump components can improve the performance of volatility measurement and volatility forecasting. Liao (2013) documents that modeling jump in realized volatility models can significantly improve the VaR prediction. Jiang, Lo, and Verdejhan (2011) report that jump risks play an important role in the U.S. T-bond price discovery.

Securitized real estate such as REITs offers an interesting setting to study jump risks for several important reasons. First, earlier studies focus on common stocks and generally ignore REITs, although REITs or the securitized real estate has grown tremendously and has become an important asset class (Derwall, Huij, Brounen, and Marquering, 2009; French, Lynch, and Yan, 2012). Second, the real estate market including REITs was at the core of the recent global financial crisis during 2007–2008 and an understanding of its large price movement (i.e., jump) and its cause is obviously important for both the academics and policymakers (French, Lynch, and Yan, 2012).[1] Brounen, Kok and Ling (2012) document the existence of frequent jumps in the U.S. securitized real estate market during the crisis.[2] Finally, as discussed in the literature (e.g., Roll, 1992; Chui, Titman, and Wei, 2003; Yang, Kolari, and Zhu, 2005), the price behavior of a market portfolio of diverse stocks is probably quite different from that of stocks restricted to a particular industry. Previous work by Roll (1992) has convincingly shown that each country's industrial structure plays a major role in explaining stock market price index behavior (i.e., about 40% of stock market index movements), which largely explains why aggregate stock price indexes exhibit disparate behavior. Consequently, Roll (1992) has advocated the use of industry indexes to measure market integration, the point of which is particularly suitable for this study. In this context, REITs are a particularly good industry, as it is can be viewed as a relatively large and homogeneous industry group, in contrast with most other industries (Chui, Titman, and Wei, 2003, p. 364). Hence, an interesting question is whether international securitized real estate markets also exhibit jump risk, and more importantly, what factors may affect jump risk in international securitized real estate markets.

This study examines the jump dynamics of the ten largest international securitized real estate markets using jump GARCH models and investigates some sources of jump risks. First, to the best of our knowledge, this is the first comprehensive study to explore jump risk in international securitized real estate markets, which has not yet been explored in the literature. While a large number of studies have examined the return behavior of securitized real estate markets such as REITs, relatively few have examined securitized real estate market volatility. More importantly, earlier studies have typically employed GARCH models to explore securitized real estate market volatility (e.g., Cotter and Stevenson, 2008; Fei, Ding, and Deng, 2010; Zhou and Kang, 2011), which focus on the smooth component of volatility dynamics and may not be adequate to capture large and occasional price volatility movements due to jumps. None of these studies explore jump behavior in securitized real estate markets.[3]

Second, extending the existing literature (e.g., Xu and Yang, 2011; Asgharian and Nossman, 2013), we explore how various measures of economic, political and social integration affect the occurrence of such price jumps across international securitized real estate markets over time. As pointed out in Engle and Rangel (2008, p. 1187), while there are numerous models that have been developed to describe and predict volatility based on time series information, the models that incorporate economic variables are hard to find. A similar

[1] REITs experienced a dramatic fall in value during the recent global financial crisis followed by a strong recovery since 2010.

[2] The Dow Jones Equity All REIT index registered 64 upward or downward jumps of larger than 5% of trading days from September 2008 to March 2009. Nevertheless, such ex-post evidence of jump risk differs substantially from the ex-ante estimate of probability of jumps, or more explicitly jump intensity, which is the focus of this study. Furthermore, different from Brounen, Kok and Ling (2012), we explore some integration/openness factors which may be particularly relevant for international securitized real estate markets.

[3] As mentioned above, while there are studies on jump risk on stock markets, the jump risk for securitized real estate may be quite different. More specifically, jump risk of REITs might not be as high as other stocks due to their high dividend payout. On the other hand, REITs could also have a higher jump risk than stocks because of their high leverage and/or less diversification. Zhou and Anderson (2012) document significantly higher extreme risks for securitized real estate than general stock markets, especially during the recent crisis. Nevertheless, our jump risk measure is different from their tail risk measure, which enables us to exploit the time-variation of the jump risk measure and explore how various aspects of international integration affects such risk, not yet addressed in the literature.