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Wealth effect revisited: Novel evidence on long term co-memories between real estate and stock markets

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ABSTRACT

Employing an innovative ECM-ARFIMA methodology, we set out to explore the dynamic interdependence of stock and securitized real estate markets for two developed western economies that exhibit different characteristics. The empirical analysis ran from 2/1/1990 to 13/06/2014. Our results provide support to the ‘wealth effect’ and to the fractional integration process in both countries. It is clear that non-linear co-integration, co-memory, long-run and short-run adjustment dynamics are fundamental concepts in understanding market integration/segmentation. Our findings entail significant implications for policymakers, market regulators and investors.

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1. Introduction

Real estate has long been recognized as an attractive investment vehicle offering diversification benefits as part of a multi-asset portfolio (Worzala and Sirmans, 2003). However, this diversification process is more complicated than was anticipated. In particular, investors’ decisions are largely affected by the presence of fractional co-integration between real estate and the stock market. Fractionally integrated series are characterized by long term co-memories and irregular long cycles that would affect long-term investors’ allocation decisions.

As a result, a voluminous strand of literature emerged seeking to map any long- or/and short-term interdependencies between the real estate market and traditional asset classes such as stocks or bonds (see, inter alia, Li et al., 2015). Despite the extensive coverage of the stock-real estate market causal nexus, evidence is still inconclusive.

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In view of the growing importance of real estate investments at an international level,¹ this paper aims to investigate the ‘wealth effect’ mechanism in Germany and the UK, exploring the level of integration between stock and the securitized real estate market. With respect to the two economies, research on the UK by [Apergis and Lambrinidis \(2011\)](#) and [Liow and Yang \(2005\)](#) has delivered evidence in favour of a fractional integration between real estate and stock markets. Compared to the UK, there is little empirical work on the German real estate market and its interaction with capital markets. For example, [Maurer et al. \(2004\)](#) performed a correlation analysis and found that real estate returns exhibit zero correlation with the stock market and positive correlation with the bond market respectively.

Our selection of countries rests on key findings of a recent study prepared by the International Monetary Fund (IMF, 2014) and, of course, on recent events surrounding the UK referendum on EU membership. Over the past 30 years, UK house prices have registered the largest increase among OECD economies. However, UK house prices exhibit the largest variability compared to other OECD countries. Moreover, the UK’s real estate sector suffered the greatest damage among the G7 economies during the recent global financial crisis. On the other hand, a boom in the real estate sector was observed shortly after the Great Recession in Germany. Finally, it should be noted that Germany has a bank-based financial system, whereas the UK has a market-oriented financial system. In light of the above, the UK and Germany are interesting cases to examine.

The ‘wealth effect’ mechanism implies that a rise in stock prices boosts real estate prices and the transmission flow from the stock market to the real estate market ([Okunev and Wilson, 1997](#); [Okunev et al., 2000](#)). We investigate whether the ‘wealth effect’ is likely to exist in the two markets, since both markets in the two countries have experienced big boom and busts over the last few years. Using a novel econometric model, we attempt to unveil any unidirectional fractional integration in the presence of the ‘wealth effect’ in the two markets.

Our paper is related to the study by [Wilson and Okunev \(1999\)](#), who examined the long-term co-dependence between securitized real estate and the stock markets of the USA, the UK and Australia, and that by [Liow and Yang \(2005\)](#), who examined the existence of long-term co-memory accounting for the influence of macroeconomic factors and a wider range of co-integration, fractional co-integration and short-term adjustment dynamics for Japan, Hong Kong, Singapore and Malaysia. However, compared to the latter study, on methodological grounds we set out to examine non-linear co-integration and then proceeded with an innovative ECM-ARFIMA model that captures both short- and long-term dynamics. In particular, considering the fractional integration process of the model, we examine its impact on real estate returns through an innovative ARMA methodology accounting for error correction effects from a non-linear co-integrated ‘wealth effect’ model. Thus, any short- or long-term effects are captured dynamically from an ARFIMA model, which is augmented with an EC factor.

Previewing our findings, we report a fractional integration with ‘wealth effect’ between stock and real estate markets. Within this context, we develop an ARFIMA model that accounts for the fractional integration process with ‘wealth effect’ through an ECM-ARFIMA methodology. Our findings indicate that the error correction term is significant in Germany and the ARMA coefficients are important in both markets. Thus, through our novel methodology, we managed to uncover the impact of error correction terms and fractional integration terms in the two markets under investigation when the transmission mechanism of ‘wealth effect’ holds. A quite strong relationship between stock and the real estate market is documented that could be attributed to the ‘portfolio adjustment’ effect (e.g. [Kapopoulos and Siokis, 2005](#)).

Against this background, the rest of the paper is structured as follows. [Section 2](#) briefly describes the data and methodology employed and the main results, while [Section 3](#) concludes and presents some interesting implications.

2. Data and methodology

2.1. Data

Daily prices of real estate and stock market indices for the United Kingdom and Germany for the period from 2/1/1990 to 13/06/2014 were collected. Stock market returns were calculated using FTSE 100 for the UK and DAX for Germany. Real estate indices were sourced from FTSE EPRA/NAREIT, including securitized and listed companies that have their core business in real estate activities (REITs and non-REITs). Data for stock market indices were sourced from Thomson Reuters Datastream.

2.2. Fractional integration

As previously stated, we seek to establish whether a nonlinear relationship exists between the real estate and stock markets. To this end, we first employ the original model developed by [Okunev and Wilson \(1997\)](#).

The regression model is given by:

$$\log\left(\frac{RE_{t+1}}{RE_t}\right) = \beta_0 + \beta_1 \log\left(\frac{P_{t+1}}{P_t}\right) + \beta_2 \log(P_t) + \beta_3 \log(RE_t) + \varepsilon_t \quad (1)$$

¹ For example, [Xue et al. \(2012\)](#) constructed a new measure for the evolution of the recent US financial crisis, employing a series of financial and economic indicators including the US real estate market index. However, they concluded that the US sub-prime crisis was transmitted to a sample of Asian countries through international trade rather than through capital markets. In a different setting, [Ling et al. \(2016\)](#) examined the effect of political connections on corporate performance, employing a sample of Chinese listed real estate firms.

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