



The nonlinear effects of expected and unexpected components of monetary policy on the dynamics of REIT returns

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ABSTRACT

This paper examines empirically whether the expected and unexpected components of monetary policy have nonlinear impacts on the dynamics of REIT returns. Empirical results find the nonlinear response of REIT returns to expected and unexpected components of monetary policy. The unexpected component of monetary policy plays a more prominent role in influencing REIT returns than does the expected component of monetary policy. Specifically, unexpected contractionary monetary policy has a significantly adverse impact on REIT returns, and the adverse effect in a bust market is stronger than in a boom market. In addition, the unexpected monetary policy will also affect the boom–bust dynamics of REIT returns through its effect on the time-varying transition probability matrix. The tightening of the expected and unexpected components of monetary policy will enhance the probability that the REIT market will stay in the bust regime.

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1. Introduction

The behavior of financial assets, such as stock and housing assets, has received great attention, especially during the episodes of financial turmoil occurring in the 1990s and 2000s, due to their important role in the monetary policy transmission process.¹ Hence, understanding whether the monetary policy has an influence on financial assets is an essential step in ascertaining whether the monetary policy will affect the real economic system. A great deal of literature has examined the relationship between monetary policy actions and stock and housing returns. Now, a growing body of studies discusses the issue with regard to the impact of monetary policy on the real estate investment trust (REIT) market because its market capitalization has grown faster in recent decades and some of its attributes resemble those of stock and real estate assets.² The aim of this paper is to examine whether the expected and unexpected components of monetary policy will affect REIT returns. If the monetary policy does exert an impact on returns, this paper will further analyze whether or not the effects of monetary policy are nonlinear by using the Markov regime switching framework.

A great deal of research shows evidence that the change in a federal fund rate (FFR) or short term interest rate will affect REIT returns.³ In studying the relationship between the interest rate and REIT returns, the interest rate is commonly treated as an exogenous explanatory variable (Johnson and Jensen, 1999; Allen et al., 2000; Swanson et al., 2002; He et al., 2003; Bredin et al., 2007). This treatment is suspect and has at least two weaknesses. First, there is no guarantee that parameter estimates and the corresponding standard errors would be unbiased. The shortcoming can be attributed to the ignorance of the dynamics information of the explanatory variable (Amihud and Hurvich, 2004; Lewellen, 2004).⁴

Second, the empirical specification does not distinguish between the impacts of expected and unexpected components of monetary policy on REIT returns. The argument concerning the effectiveness of expected and unexpected monetary policy actions on the financial market and real economy has been an ongoing one.⁵ For example,

³ See, Ling and Naranjo (1997), Johnson and Jensen (1999), Allen et al. (2000), Swanson et al. (2002), He et al. (2003), Ewing and Payne (2005), Bredin et al. (2007) and Xu and Yang (2009), for instance.

⁴ Amihud and Hurvich (2004) show that the significance of independent variable observed in the simple linear regression model will disappear when the correlation between the explanatory variable and error term is incorporated into the empirical analysis. Moreover, Lewellen (2004) demonstrates that, even if the information on the dynamics of explanatory variable is considered, overlooking the near non-stationary feature of explanatory variable will underestimate the explanatory power.

⁵ For example, the rational expectation hypothesis asserts that the expected policy is ineffective but the unexpected policy is effective (Barro, 1977; Leiderman, 1980). The efficient market hypothesis contends that the past information of monetary policy (the expected monetary policy) can not affect the financial market.

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¹ See, for example, Kiyotaki and Moore (1997), Bernanke and Gertler (1999), Poterba (2000), Case et al. (2005), Giuliadori (2005), Elbourne (2008), Iacoviello and Minetti (2008) and Miller et al. (2009).

² See, for instance, Glascock et al. (2000), Bredin et al. (2007), Chang et al. (2010) and Xu and Yang (2009).

Bredin and Hyde (2007) find that the unexpected monetary policy has a significant influence on the UK stock market, while the expected monetary policy does not. Bernanke and Kuttner (2005) show evidence that both unexpected and expected monetary policy actions will affect stock returns, and that the magnitude of the former is stronger than that of the latter. Darrat and Glascock (1989) find that the US real estate returns are relevant to the expected monetary policy, implying the violation of the efficient market hypothesis. Almost all extant studies, to the best of my knowledge, focus on either the effects of expected monetary policy on REIT returns or the effectiveness of unexpected monetary policy.

To address the two difficulties mentioned above, the method put forward by Amihud and Hurvich (2004) is used to explore whether and how the REIT returns react to monetary policy actions.⁶ In doing so, the bias problem can be corrected, and expected and unexpected effects can be explored simultaneously. The FFR has been regarded as the instrument variable of monetary policy in many studies (Bernanke and Blinder, 1992; Garcia and Schaller, 2002; Favero and Rovelli, 2003; Orphanides, 2004; Dennis, 2006). In the correction procedure of Amihud and Hurvich (2004), the previous period's FFR is used to represent the expected monetary policy, and the innovation of FFR is used to stand for the unexpected monetary policy. Moreover, because the dynamic of FFR looks like a near unit root process, another bias-adjusted procedure developed by Lewellen (2004) is adopted to alleviate the influence of the near non-stationary process on parameter estimates.⁷

That stock returns respond to monetary policy has been substantiated by many studies, such as Patelis (1997), Thorbecke (1997), Rigobon and Sack (2003), Bernanke and Kuttner (2005), He (2006), and Ioannidis and Kontonikas (2008). Moreover, Chen (2007) and Chang et al. (2010) further discovered that the unexpected monetary policy has a nonlinear effect on stock returns through the Markov regime switching framework. For example, Chen (2007) showed that a contracting policy harms stock returns and this adverse effect is stronger during the period of a bear market than during that of a bull market. Besides, a tightening monetary policy also induces a statistically significant increase in the possibility of changing from a bull market to a bear market. Because the dynamics of REIT returns, to some extent, are very similar to stock returns (see, for example, Liu and Mei, 1992; Glascock et al., 2000), it behooves us to examine whether the effect of monetary policy on REIT returns is time-variant. Chang et al. (2010) found the nonlinear response of the REIT market to unexpected monetary policy; however, they did not distinguish the effectiveness of expected and unexpected monetary policy actions on returns and transition probabilities.

The contracting monetary policy will lead to a decrease in the value of real estate related assets through many channels, such as wealth effect and credit constraints because when the contracting monetary policy is implemented, the collateral value of REIT assets goes down (wealth decreases) and the possibility of credit constraints faced by the REIT firms increase. The interaction between the above two effects will induce a fall in REIT prices. Moreover, the speed of deterioration of the REIT price will accelerate in a bust market than in a boom market (see, for example, Gertler, 1988; Bernanke and Gertler, 1995).⁸ Hence, examining the magnitude of the effect of monetary policy on REIT returns in different market situations is an interesting and important topic.

In order to assess the possible nonlinear effects of the expected and unexpected components of monetary policy on US REIT returns in the boom and bust markets,⁹ the Markov regime switching specification will be used to carry out the empirical analysis in this paper. The main advantage of the Markov switching framework is that the identification of bust and boom markets is made objectively in accordance with the parameters of regression models and smoothed probabilities, without predetermining the threshold values of different market conditions.¹⁰ As with Chen (2007), this paper examines not only the nonlinear effects of expected and unexpected monetary policy actions on REIT returns but also their effects on the probabilities of staying in boom and bust markets.

The contribution of this paper is twofold. First, in contrast to existing studies, this paper simultaneously examines the effectiveness of expected and unexpected monetary policy actions through the correction procedures of Amihud and Hurvich (2004) and Lewellen (2004). Second, the possible nonlinear effects of the expected and unexpected parts of monetary policy are investigated. Their effects on returns and the possibility of remaining in bust and boom markets are discussed in this paper. Some interesting findings are uncovered. First, the effect of an expected monetary policy on REIT returns is underestimated when the correlation between error term and FFR or the higher persistence of FFR is ignored. Second, under the regime switching framework, the expected component of FFR only has a statistically significant effect on returns in the boom regime. Its effect is not obvious in the bust regime. On the other hand, the unexpected change in FFR has apparent nonlinear effects. The effect in the bust regime is about 4.8 times that in the boom regime, supporting the notion that both credit channel and wealth effect result in the nonlinear effects. Finally, both the expected and unexpected components of monetary policy will enhance the probability of a bust market occurring and the magnitude of the former effect is about one-half that of the latter. Hence, the effectiveness of unexpected monetary policy implies that the US REIT market is not an efficient market.

The rest of this paper is constructed as follows. In Section 2, this paper introduces two bias-correct methods. After controlling for bias, the extended Markov switching model is adopted to analyze the nonlinear impacts of expected and unexpected components of monetary policy on REIT returns. Section 3 first shows the linear results (with and without bias correction) and then the nonlinear effects of monetary policies are reported. The effects of monetary policies on the transition probabilities are provided in Section 4. Concluding remarks are contained in the final section.

2. Methodology

In order to correctly assess the impacts of monetary policy, the bias-adjusted methods for two common problems confronted in the least square estimation are introduced here. Furthermore, this section also introduces means by which an examination of the regime-dependent effects of expected and unexpected monetary policies on REIT returns can be made.

2.1. Time-invariant monetary policy effects

To discern the effects of expected and unexpected monetary policies on REIT returns, the specification proposed here is as follows:

$$r_t = \delta_0 + \delta_1 x_t^e + \pi^c x_t^u + \varepsilon_t \quad (1)$$

⁶ Amihud and Hurvich (2004) suggest a bias-correction method in which the possible relationship between explanatory variable and error term is included in the empirical analysis.

⁷ The principal purpose of the adjusted procedure of Lewellen (2004) is to analyze the predictive ability of dividend yield which is stationary but closely resembles the variable which is integrated of order one.

⁸ Empirical studies, including Weise (1999), Garcia and Schaller (2002) and Kaufmann (2002), find that monetary policy has a stronger effect on the real economy during recessions than in expansions.

⁹ The term "nonlinear effect" is used to measure the regime-dependent effect of monetary policy. However, the term "asymmetric effect" used in macroeconomic studies is meant to capture the effects of positive and negative monetary policy shocks (e.g., Cover, 1992; Karras, 1996).

¹⁰ See Hamilton (1989, 1994) for more details about the merits of Markov switching model.

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