NORTH-HOLLAND The Quarterly Review of Economics and Finance 41 (2001) 335–346

The QUARTERLY REVIEW OF ECONOMICS AND FINANCE

Time varying risk premia for real estate investment trusts: A GARCH-M model

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Abstract

This study employs the generalized autoregressive conditionally heteroskedastic in the mean (GARCH-M) methodology to investigate the return generating process of real estate investment trusts (REIT). The trade-off between excess returns and the conditional variance was positive for both equity and mortgage REITs but it was significant only for the latter. Changes in interest rates and their conditional variance were found to be inversely related to REIT excess returns. The 1986 tax law had a negative impact on the excess returns to both REIT sectors but the coefficient was significant only for mortgage REITs. The GARCH-M specification was determined to be more appropriate for the mortgage REIT portfolio than for the portfolio of equity REITs.

1. Introduction: Section 1

Real Estate Investment Trusts (REITs) are closed-end investment companies that are broadly categorized as equity REITs (EREITs) or mortgage REITs (MREITs). EREITs invest at least 75% of their total assets in income producing real estate properties while MREITs invest 75% of their total assets in residential mortgages, commercial mortgages and construction loans. Since 1978, the number of publicly traded MREITs followed by the National Association of Real Estate Investment Trusts (NAREIT) has grown by approximately 50% while the number of publicly traded EREITs over the same period increased by 500%.

Despite similarities in the legal and organizational structures of EREITs and MREITs,

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1062-9769/01/$ – see front matter
PII: S1062-9769(00)00074-0

research suggests that there are differences in their return generating process. Using the five-factor model of Fama and French (1993), Peterson and Hsieh (1997) found that three stock market factors explain returns to EREITs but do not explain returns to MREIT investors. The one class of stocks that might be expected to most closely resemble REITs may be the returns to other financial intermediaries that also hold and/or issue interest rate sensitive debt.

The literature on the sensitivity of REIT returns to interest rate movements is limited. Mueller and Pauley (1995) found that interest rates are not an important factor in explaining EREIT returns. They did not examine MREITs. In contrast, Chen and Tzang (1988) concluded that both EREITs and MREITs responded to interest rate movements and that MREITs were more sensitive to changes in real interest rates and expected inflation than EREITs.

Evidence suggests that residential and commercial mortgage markets have become more fully integrated with national debt markets. Devaney, Pickerill and Krause (1992) found that the primary and secondary markets for residential mortgages were cointegrated with the ten-year Treasury rate and that the mortgage rate was more responsive to interest rate movements over more recent time periods. They attributed mortgage market integration to financial innovation, deregulation and growth in the secondary market. Sa-Aadu, Shilling and Wang (1999) found that while the relationship between interest rates and commercial mortgages was weaker than it is for residential mortgages, the commercial mortgage market was also cointegrated with the ten-year Treasury rate.

REIT returns may also be influenced by changes in tax law. Sanger, Sirmans and Turnbull (1990) investigated the effects of the 1976 and 1986 tax reforms on REIT risk/return and found that the market assessed the 1976 tax change to be favorable to REITs while the 1986 tax law was found to be detrimental.

Most REIT risk/return performance studies have assumed returns independence, constant conditional variance, and linearity in the risk premium. These assumptions have been challenged in the financial literature. Carroll, Thistle and Wei (1992), Poterba and Summers (1986) and Akgiray (1989) have shown that the relaxation of restrictive assumptions can alter conclusions regarding the return generating process.

The ARCH model was first proposed by Engle (1982) and generalized to GARCH by Bollerslev (1986). The framework was further extended to ARCH and GARCH in mean (ARCH-M and GARCH-M) by Engle, Lilien and Robins (1987) and allows for a time varying risk premium. Rational expectations theory asserts that economic agents do not waste useful information. When forecasting a return series that assumes the risk premium depends on the variance of return (risk), rational agents utilize the conditional distribution over the holding period, not the unconditional risk.

In this study, a GARCH-M model of EREIT and MREIT returns is estimated similar to the model Elyasiani and Mansur (1998) used to examine returns to commercial bank stocks. In addition to relaxing the restrictive assumptions discussed above, the model examines the impact of interest rate movements and the change in the 1986 tax law on REIT excess returns within the time varying framework. The next section briefly describes the data. Section 3 presents the GARCH-M model and Section 4 reports the empirical results. The concluding section summarizes the findings.