



Do Mortgage REITs Reflect the Underlying MBS Market Performance?

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Abstract: Equity REITs own and operate income-producing real estate properties, while mortgage REITs (MREITs) invest in mortgage loans and/or mortgage-backed securities (MBS). Since MBS are debt instruments created through securitization of mortgages, the MREIT and MBS markets should be closely related due to the similarity in their underlying asset claim. This study shows that MREITs and the underlying MBS market indices exhibit completely different return and risk characteristics. In addition, returns on MREITs are much more strongly driven by the stock market systematic factors than the underlying MBS market factors. The results are remarkably robust using either daily or monthly data, full sample or subsample data, and residential or commercial MREITs data. While these results suggest possible inefficiency of the MREIT market, we discuss the limitation of this study and implications for future research.

1. Introduction

In the past two decades, dramatic growth in both the equity and debt sides of real estate has led to increasing investor interest in Real Estate Investment Trusts (REITs). As of 2009, there are 142 REITs traded on stock exchanges in the U.S. with a total market capitalization of \$271 billion, which is equivalent to 23 times the total REIT market capitalization 20 years ago. REITs can be classified into one of three categories: equity REITs (EREITs), mortgage REITs (MREITs) or hybrid REITs. EREITs own and operate income-producing real estate

properties, while MREITs invest in mortgage loans and/or mortgage-backed securities (MBS).

There is a large and growing body of research in REITs in recent years. The relationship between REITs, the general equity market, and the property market has been well researched. Okunev and Wilson (1997), Peterson and Hsieh (1997), Liu and Mei (1998), Oppenheimer and Grissom (1998), Glascock, Lu and So (2000), and Clayton and MacKinnon (2001, 2003) examine the integration and segmentation of the markets for REITs, Real Estate, stocks, and bonds. Waggle and Moon (2006) and Waggle and Agrawal (2006) analyze the correlation between REITs, stocks, and bonds in an optimal portfolio setting. Stevenson (2002) and Cotton and Stevenson (2006) examine the volatility spillover between REITs and the broad U.S. equity market indices. At the cross-sectional level, Capozza and Seguin (2000, 2003) and Hartzell, Sun and Titman (2006) examine the effect of corporate governance on the cross-sectional performance of REITs. Chui, Titman, and Wei (2003), Ambrose, Highfield, and Linneman (2005), and Ott, Riddiough, and Yi (2005) examine other cross-sectional determinants of REIT returns, such as size, financing structure, momentum, turnover and analyst coverage. The existing research, however, has focused on the aggregate REIT market and the EREITs, with little guidance on the MREITs. He (1998) analyzes the relationship between the stock prices of EREITs and MREITs while Cotton and Stevenson (2006) examine the return and volatility linkages between EREITs and MREITs. Jirasakuldech and Knight (2005) test the weak-form efficiency of the REITs and find efficiency in EREITs but some return predictability in MREITs. Lee and Chiang (2004) study the EREITs and MREITs and find that existence of informational commonality and substitutability between these two classes of REITs, suggesting that market participants may not have fully understood the differences between the property-based EREITs and the mortgage-based MERITs. While previous research has examined the linkages between MREITs and the general stock, bond and real estate property markets, none has examined the dynamic linkage between the MREITs and the underlying mortgage market in which the MREITs are investing.

Since MREITs are publicly-traded real estate investment funds that invest in unsecuritized or securitized mortgages, and the MBS are debt instruments created through the securitization of mortgages, these two markets should be closely related due to the similarity in their underlying asset claim. The objective of this study is to examine whether the performance of mortgage REITs reflects the

underlying MBS market performance. In addition, since MREITs can be further grouped into two major categories, those who invest in residential mortgage loans or residential MBS, and those who invest in commercial mortgage loans or commercial MBS, we separately examine the linkage between home MREITs and residential MBS, and that between commercial MREITs and commercial MBS.

2. Data and Empirical Analysis

The National Association of Real Estate Investment Trusts, Inc. (NAREIT) has developed REIT indices for all REITs as well as three REIT categories (Equity, Mortgage and Hybrid) since 1972. The NAREIT mortgage REIT index has been further broken down into home financing and commercial financing REIT indices since 2000. We obtained the daily and monthly data from January 2000 to January 2008 on NAREIT mortgage REIT index and the home financing and commercial financing sub-indices from the FTSE.

Table 1.

Daily Descriptive Statistics (in %)

Panel A. Full Sample Period from January 2000 to January 2008

Variable	Variable Definition	Mean	Median	Maximum	Minimum	Std. Dev.
TRM	Total Return on Mortgage REITs	0.059	0.141	9.233	-12.902	1.329
TRMH	Total Return on Residential Mortgage REITs	0.062	0.146	9.250	-16.428	1.432
TRMC	Total Return on Commercial Mortgage REITs	0.057	0.106	10.654	-10.997	1.469
TRE	Total Return on Equity REITs	0.064	0.085	8.751	-5.581	1.040
TRA	Total Return on All REITs	0.062	0.095	8.392	-5.457	1.030
RMBS_T	Total Return on RMBS Index	0.025	0.025	1.584	-1.971	0.191
ABHE_T	Total Return on Home Equity ABS Index	0.015	0.025	0.993	-7.803	0.278
CMI_T	Total Return on Investment-grade CMBS Index	0.027	0.029	1.322	-1.322	0.293
CMH_T	Total Return on High-yield CMBS Index	0.046	0.062	6.615	-7.658	0.462
MBS_Y	Yield on MBS Index	5.733	5.584	8.123	3.479	0.893
ABHE_Y	Yield on Home Equity ABS Index	5.289	5.337	8.834	2.599	1.383
CMI_Y	Yield on Investment-grade CMBS Index	5.398	5.359	8.327	3.212	1.111
CMH_Y	Yield on High-yield CMBS Index	12.208	11.818	15.243	9.803	1.261
CPI_Y	Yield on Investment-grade Corporate Bond Index	5.806	5.684	8.512	3.769	1.055
CPH_Y	Yield on High-yield Corporate Bond Index	9.886	8.733	14.929	6.737	2.361
HMYSP	Yield Spread between Home Equity ABS and MBS	-0.444	-0.458	3.901	-2.088	0.776
CMYSP	Yield Spread between High-Yield and Investment-Grade CMBS	6.809	6.604	9.531	5.370	0.882
CPYSP	Yield Spread between High-Yield and Investment-Grade Corporate Bonds	4.081	3.484	8.381	1.559	1.756
SPTR	Total Return on S&P 500 Index	0.010	0.046	5.734	-5.828	1.121
ERM	Excess Return on the Stock Market	0.001	0.050	5.310	-6.650	1.127
SMB	Small minus Big Stock Return	0.015	0.030	2.900	-4.570	0.607
HML	High minus Low Book-to-market Stock Return	0.041	0.030	3.360	-4.930	0.627

Table 1. (Continued)**Daily Descriptive Statistics (in %)**

Panel B. First Half (January 2000- December 2003) and Second Half (January 2004- January 2008)

Variable	First Half (January 2000- December 2003)					Second Half (January 2004- January 2008)				
	Mean	Median	Maximum	Minimum	Std. Dev.	Mean	Median	Maximum	Minimum	Std. Dev.
T R M	0.151	0.214	5.616	-5.419	1.026	-0.030	0.056	9.233	-12.902	1.564
TRMH	0.148	0.227	5.519	-7.305	1.172	-0.022	0.053	9.250	-16.428	1.644
TRMC	0.155	0.185	5.953	-7.510	1.112	-0.039	0.012	10.654	-10.997	1.743
T R E	0.076	0.075	4.762	-3.453	0.764	0.053	0.097	8.751	-5.581	1.253
T R A	0.079	0.097	4.683	-3.361	0.756	0.046	0.093	8.392	-5.457	1.240
RMBS_T	0.030	0.030	1.584	-1.971	0.200	0.021	0.021	0.928	-0.817	0.181
ABHE_T	0.030	0.037	0.612	-0.658	0.143	0.001	0.013	0.993	-7.803	0.363
CMI_T	0.041	0.056	1.197	-1.322	0.334	0.013	0.016	1.322	-1.226	0.246
CMH_T	0.057	0.087	6.615	-5.905	0.482	0.035	0.046	4.863	-7.658	0.442
RMBS_Y	6.076	6.137	8.123	3.479	1.103	5.399	5.478	6.227	4.436	0.403
ABHE_Y	5.431	5.272	8.354	2.599	1.604	5.151	5.394	8.834	2.831	1.110
CMI_Y	5.753	5.806	8.327	3.212	1.369	5.051	5.227	6.050	3.510	0.607
CMH_Y	12.835	13.051	14.709	10.352	0.975	11.598	11.413	15.243	9.803	1.207
CPI_Y	6.306	6.380	8.512	3.769	1.204	5.318	5.482	6.269	3.967	0.549
CPH_Y	11.893	12.332	14.929	7.364	1.695	7.936	7.884	10.394	6.737	0.693
HMYSP	-0.645	-0.597	0.464	-2.088	0.601	-0.249	-0.104	3.901	-1.732	0.872
CMYSP	7.079	7.232	7.867	6.057	0.516	6.547	6.144	9.531	5.370	1.066
CPYSP	5.586	5.578	8.381	2.892	1.222	2.619	2.587	5.029	1.559	0.533
S P T R	-0.011	-0.020	5.734	-5.828	1.383	0.030	0.077	2.943	-3.464	0.785
E R M	-0.021	0.000	5.310	-6.650	1.389	0.022	0.080	2.930	-3.430	0.791
S M B	0.036	0.070	2.900	-4.570	0.729	-0.005	-0.010	1.620	-1.520	0.457
H M L	0.065	0.060	3.360	-4.930	0.836	0.018	0.010	1.390	-1.360	0.307

Introduced in 1986, the Lehman Brothers MBS index covers the agency residential MBS (RMBS). As the investor base for Commercial MBS (CMBS) broadened in the late 1990s, Lehman Brothers introduced the investment-grade and high-yield CMBS indices in January 1999. Since the Lehman RMBS index is strictly investment-grade, We also use the home-equity Asset-backed Securities (HE ABS) index to serve as a proxy for the non-conforming or subprime residential mortgages that have been packaged into home equity ABS.

In November 2008, the Lehman Brother fixed income indices were rebranded to Barcap fixed income indices (see Barclays Capital (2008)). Both daily and monthly data from January 2000 to January 2008 on the total returns of RMBS, HE ABS, investment-grade CMBS, high-yield CMBS indices were obtained from the Barclays Capital (see Xu and Fung (2005) and Xu (2007) for detailed discussions on the Lehman residential and commercial MBS indices).

Table 2.**Daily Correlations**

Panel A. Full Sample Period from January 2000 to January 2008

	TRM	TRMH	TRMC	TRE	TRA		TRM	TRMH	TRMC	TRE	TRA
TRM	1.000	0.958	0.844	0.671	0.707	TRM(-1)	0.120	0.096	0.132	0.093	0.098
TRMH	0.958	1.000	0.659	0.594	0.630	TRMH(-1)	0.139	0.113	0.149	0.110	0.115
TRMC	0.844	0.659	1.000	0.658	0.686	TRMC(-1)	0.058	0.042	0.070	0.039	0.042
TRE	0.671	0.594	0.658	1.000	0.998	TRE(-1)	0.042	0.024	0.060	0.079	0.079
TRA	0.707	0.630	0.686	0.998	1.000	TRA(-1)	0.048	0.030	0.067	0.082	0.082
RMBS_T	0.037	0.060	-0.016	-0.008	-0.005	RMBS_T(-1)	0.039	0.048	0.018	0.021	0.023
ABHE_T	-0.022	-0.003	-0.056	-0.079	-0.077	ABHE_T(-1)	0.036	0.035	0.035	0.029	0.031
CMI_T	-0.024	-0.007	-0.051	-0.068	-0.067	CMI_T(-1)	0.032	0.041	0.010	0.009	0.011
CMH_T	-0.021	-0.005	-0.048	-0.087	-0.084	CMH_T(-1)	0.076	0.072	0.068	0.018	0.023
RMBS_Y	-0.003	-0.002	-0.006	-0.004	-0.004	RMBS_Y(-1)	0.000	0.002	-0.006	-0.004	-0.004
ABHE_Y	-0.013	-0.005	-0.026	-0.020	-0.019	ABHE_Y(-1)	-0.008	-0.001	-0.022	-0.020	-0.019
CMI_Y	-0.004	-0.002	-0.010	-0.007	-0.006	CMI_Y(-1)	0.000	0.002	-0.007	-0.004	-0.004
CMH_Y	0.026	0.031	0.009	-0.018	-0.014	CMH_Y(-1)	0.030	0.035	0.012	-0.020	-0.016
CPI_Y	0.011	0.012	0.003	-0.004	-0.003	CPI_Y(-1)	0.013	0.015	0.004	-0.006	-0.005
CPH_Y	0.060	0.060	0.043	0.006	0.010	CPH_Y(-1)	0.062	0.063	0.045	0.004	0.008
HMYSP	-0.020	-0.006	-0.039	-0.031	-0.030	HMYSP(-1)	-0.015	-0.003	-0.032	-0.031	-0.030
CMYSP	0.042	0.046	0.026	-0.017	-0.012	CMYSP(-1)	0.043	0.048	0.026	-0.022	-0.017
CPYSP	0.074	0.074	0.056	0.011	0.016	CPYSP(-1)	0.076	0.075	0.058	0.009	0.014
SPTR	0.438	0.385	0.439	0.513	0.522	SPTR(-1)	0.045	0.035	0.052	0.012	0.015
ERM	0.450	0.394	0.451	0.522	0.531	ERM(-1)	0.043	0.035	0.047	0.011	0.013
SMB	0.209	0.178	0.217	0.175	0.182	SMB(-1)	0.011	0.010	0.004	0.019	0.019
HML	-0.022	-0.027	-0.008	-0.058	-0.058	HML(-1)	-0.031	-0.034	-0.022	0.021	0.019

Examination of the descriptive statistics from Table 1 reveals that return behavior of MREITs is dramatically different from that of the MBS. As shown in Panel A, mean daily returns on all MREITs, residential MREITs, and commercial MREITs are 0.059%, 0.062%, and 0.057%, respectively. However, the mean daily returns on RMBS, HE ABS, investment-grade CMBS, and high-yield CMBS are only 0.025%, 0.015%, 0.027% and 0.046%, respectively. On other hand, the standard deviations of the residential and commercial mortgage REITs indices are 1.432% and 1.469%, while the standard deviations of RMBS and investment-grade CMBS indices are only 0.191% and 0.293%. We further split the sample into first half (Jan. 2000 to Dec. 2003) and second half (Jan. 2004 to Jan. 2008). The descriptive statistics in Panel B of Table 1 show high positive mean returns for the MREITs in the first half and negative mean returns in the second half, while the MBS indices deliver positive mean returns in both periods. Standard deviations of MREITs are much higher than those of MBS indices in both periods.

Table 2. (Continued)**Daily Correlations**

Panel B. First Half (January 2000- December 2003)

	TRM	TRMH	TRMC	TRE	TRA		TRM	TRMH	TRMC	TRE	TRA
TRM	1.000	0.949	0.766	0.523	0.557	TRM(-1)	0.183	0.169	0.150	0.137	0.145
TRMH	0.949	1.000	0.531	0.477	0.510	TRMH(-1)	0.169	0.149	0.149	0.134	0.141
TRMC	0.766	0.531	1.000	0.445	0.471	TRMC(-1)	0.145	0.144	0.104	0.099	0.105
TRE	0.523	0.477	0.445	1.000	0.999	TRE(-1)	0.129	0.109	0.119	0.151	0.154
TRA	0.557	0.510	0.471	0.999	1.000	TRA(-1)	0.136	0.115	0.125	0.155	0.159
RMBS_T	-0.087	-0.075	-0.088	-0.148	-0.148	RMBS_T(-1)	0.022	0.049	-0.026	-0.032	-0.030
ABHE_T	-0.126	-0.110	-0.123	-0.227	-0.227	ABHE_T(-1)	0.033	0.042	0.008	0.007	0.009
CMI_T	-0.133	-0.116	-0.129	-0.213	-0.213	CMI_T(-1)	0.020	0.032	-0.001	-0.005	-0.004
CMH_T	-0.097	-0.088	-0.091	-0.177	-0.175	CMH_T(-1)	-0.021	-0.013	-0.025	-0.003	-0.004
RMBS_Y	-0.028	-0.020	-0.038	0.002	-0.001	RMBS_Y(-1)	-0.030	-0.023	-0.039	-0.002	-0.005
ABHE_Y	-0.031	-0.019	-0.048	-0.007	-0.010	ABHE_Y(-1)	-0.029	-0.019	-0.043	-0.006	-0.008
CMI_Y	-0.027	-0.018	-0.040	-0.001	-0.004	CMI_Y(-1)	-0.027	-0.019	-0.037	0.001	-0.002
CMH_Y	-0.018	-0.013	-0.026	0.006	0.004	CMH_Y(-1)	-0.019	-0.016	-0.024	0.007	0.005
CPI_Y	-0.027	-0.014	-0.044	-0.009	-0.011	CPI_Y(-1)	-0.026	-0.016	-0.040	-0.010	-0.013
CPH_Y	-0.011	0.015	-0.055	-0.030	-0.030	CPH_Y(-1)	-0.010	0.016	-0.054	-0.038	-0.039
HMYSP	-0.032	-0.014	-0.058	-0.022	-0.023	HMYSP(-1)	-0.023	-0.009	-0.043	-0.013	-0.014
CMYSP	0.038	0.023	0.057	0.014	0.017	CMYSP(-1)	0.034	0.020	0.051	0.011	0.013
CPYSP	0.012	0.035	-0.032	-0.032	-0.031	CPYSP(-1)	0.012	0.038	-0.035	-0.043	-0.041
SPTR	0.405	0.359	0.371	0.530	0.539	SPTR(-1)	0.118	0.096	0.129	0.036	0.042
ERM	0.410	0.363	0.377	0.534	0.543	ERM(-1)	0.113	0.093	0.120	0.027	0.033
SMB	0.082	0.077	0.061	0.010	0.014	SMB(-1)	-0.058	-0.051	-0.058	-0.034	-0.037
HML	-0.098	-0.093	-0.080	-0.158	-0.160	HML(-1)	-0.067	-0.055	-0.080	0.032	0.029

Table 2 performs correlation analysis between MREIT and MBS indices. The contemporaneous correlation is only 0.060 between the residential MREIT and RMBS return indices, and -0.051 between the commercial MREIT and CMBS return indices. In order to see whether this low correlation is due to delayed response, we check for the correlations between the total returns on MREIT indices and the previous day's MBS indices. The lag 1 correlation is only 0.048 between the residential MREIT and RMBS indices, and 0.010 between the commercial MREIT and CMBS indices. In addition, the low correlation between MREITs and MBS is robust for the residential or commercial markets, using the investment-grade or high-yield indices, and for the first-half or second-half of the sample periods.

Another interesting observation from Table 2 is the high contemporaneous correlation between MREITs and stock market systematic factors. The return on MREITs has a 0.450 and 0.209 correlation with the stock market excess return and the stock market size factor, much higher than its correlation with the MBS market

return. This correlation is strong in the first half and even stronger in the second half. As for the correlation between MREITs and the corporate credit spread (yield spread between high-yield and investment-grade corporate bonds), it is very low (0.012) in the first half but much higher (0.061) in the second half.

Table 2. (Continued)

Daily Correlations

Panel C. Second Half (January 2004- January 2008)

	TRM	TRMH	TRMC	TRE	TRA		TRM	TRMH	TRMC	TRE	TRA
TRM	1.000	0.963	0.874	0.728	0.765	TRM(-1)	0.088	0.057	0.118	0.075	0.079
TRMH	0.963	1.000	0.714	0.645	0.683	TRMH(-1)	0.121	0.090	0.145	0.100	0.104
TRMC	0.874	0.714	1.000	0.737	0.765	TRMC(-1)	0.017	-0.008	0.050	0.016	0.018
TRE	0.728	0.645	0.737	1.000	0.998	TRE(-1)	0.007	-0.012	0.036	0.053	0.052
TRA	0.765	0.683	0.765	0.998	1.000	TRA(-1)	0.013	-0.008	0.043	0.055	0.054
RMBS_T	0.123	0.162	0.029	0.080	0.085	RMBS_T(-1)	0.049	0.046	0.046	0.057	0.058
ABHE_T	-0.002	0.022	-0.046	-0.048	-0.046	ABHE_T(-1)	0.034	0.030	0.039	0.035	0.036
CMI_T	0.060	0.089	0.000	0.035	0.037	CMI_T(-1)	0.039	0.048	0.013	0.021	0.024
CMH_T	0.027	0.055	-0.025	-0.037	-0.032	CMH_T(-1)	0.144	0.136	0.132	0.032	0.041
RMBS_Y	-0.062	-0.057	-0.058	-0.039	-0.041	RMBS_Y(-1)	-0.044	-0.035	-0.051	-0.029	-0.030
ABHE_Y	-0.014	-0.005	-0.026	-0.038	-0.036	ABHE_Y(-1)	-0.006	0.004	-0.022	-0.038	-0.036
CMI_Y	-0.042	-0.037	-0.043	-0.034	-0.035	CMI_Y(-1)	-0.029	-0.022	-0.035	-0.026	-0.026
CMH_Y	-0.006	0.010	-0.032	-0.047	-0.044	CMH_Y(-1)	0.004	0.021	-0.025	-0.047	-0.043
CPI_Y	-0.035	-0.030	-0.036	-0.027	-0.028	CPI_Y(-1)	-0.025	-0.017	-0.034	-0.024	-0.024
CPH_Y	0.020	0.035	-0.011	-0.004	-0.001	CPH_Y(-1)	0.043	0.053	0.016	0.020	0.023
HMYSP	0.011	0.020	-0.007	-0.030	-0.027	HMYSP(-1)	0.013	0.022	-0.005	-0.035	-0.031
CMYSP	0.018	0.033	-0.011	-0.034	-0.030	CMYSP(-1)	0.021	0.036	-0.008	-0.038	-0.034
CPYSP	0.061	0.077	0.024	0.024	0.027	CPYSP(-1)	0.082	0.088	0.056	0.051	0.055
SPTR	0.595	0.506	0.637	0.650	0.661	SPTR(-1)	-0.022	-0.031	-0.014	-0.008	-0.008
ERM	0.616	0.525	0.658	0.666	0.678	ERM(-1)	-0.020	-0.027	-0.016	-0.002	-0.003
SMB	0.376	0.315	0.411	0.368	0.378	SMB(-1)	0.076	0.074	0.060	0.072	0.075
HML	0.085	0.073	0.098	0.054	0.059	HML(-1)	0.002	-0.025	0.051	0.016	0.015

Note: See Panel A of Table 1 for the variable definitions. Variable Name (-1) stands for the lag one of the variable.

To further examine the relationship between MREITs and MBS, we also include the Fama-French three factors (i.e., the stock market excess return, size factor, and book to market value factor), the corporate credit spread, and lag squared return on MREITs (volatility proxy) in the regressions analysis. Table 3 presents the regression results for four different models: model 1 is a simple regression of MREITs return on the MBS return; model 2 is a regression of MREITs return on the Fama-French three factors (stock market excess return, size factor, and book to market value factor); model 3 is based on the MBS return and the Fama-French three factors; model 4 is based on the MBS return, the Fama-French three factors, the corporate credit spread, and lag squared return on

MREITs. Panels A, B, C present the regression analysis for the full sample period, first half and second half, respectively.

Table 3.

Regression Estimates for Daily Returns on Mortgage REITs

Panel A. Full Sample Period from January 2000 to January 2008

Variable	Variable Definition	Model 1		Model 2		Model 3		Model 4	
C	Intercept	0.001	<i>(1.80)</i>	0.0003	(0.45)	0.0006	(-0.27)	-0.002	<i>(-4.35)</i>
RMBS_T	Total Return on MBS Index	0.253	(1.33)			0.713	<i>(4.36)</i>	0.718	<i>(4.42)</i>
ERM	Excess Return on the Stock Market			0.786	<i>(20.40)</i>	0.799	<i>(20.40)</i>	0.821	<i>(24.26)</i>
SMB	Small minus Big Stock Return			0.924	<i>(15.19)</i>	0.914	<i>(14.97)</i>	0.947	<i>(17.26)</i>
HML	High minus Low Book-to-market Stock Return			0.605	<i>(12.40)</i>	0.611	<i>(12.57)</i>	0.624	<i>(12.89)</i>
CPYSP	Corporate Bond Credit Spread							0.052	<i>(4.12)</i>
TRM21	Lag 1 Squared Total Return on Mortgage REITs							1.469	<i>(1.76)</i>
F-test		2.65		360.42		278.19		199.09	
Adjusted R ²		0.082%		34.679%		35.483%		37.147%	

Panel B. First Half (January 2000- December 2003)

Variable	Variable Definition	Model 1		Model 2		Model 3		Model 4	
C	Intercept	0.002	<i>(5.09)</i>	0.001	<i>(3.71)</i>	0.001	<i>(3.54)</i>	0.000	(-0.38)
RMBS_T	Total Return on MBS Index	-0.454	<i>(-2.87)</i>			0.077	(0.51)	0.113	(0.75)
ERM	Excess Return on the Stock Market			0.546	<i>(12.25)</i>	0.547	<i>(11.90)</i>	0.572	<i>(15.16)</i>
SMB	Small minus Big Stock Return			0.600	<i>(8.64)</i>	0.598	<i>(8.48)</i>	0.643	<i>(10.64)</i>
HML	High minus Low Book-to-market Stock Return			0.373	<i>(6.33)</i>	0.373	<i>(6.29)</i>	0.406	<i>(7.04)</i>
CPYSP	Corporate Bond Credit Spread							0.021	(0.92)
TRM21	Lag 1 Squared Total Return on Mortgage REITs							2.753	<i>(1.65)</i>
F-test		7.78		128.52		94.74		68.24	
Adjusted R ²		0.677%		27.630%		27.370%		28.952%	

Panel C. Second Half (January 2004- January 2008)

Variable	Variable Definition	Model 1		Model 2		Model 3		Model 4	
C	Intercept	-0.001	(-1.08)	-0.001	<i>(-1.80)</i>	-0.001	<i>(-2.48)</i>	-0.006	<i>(-2.95)</i>
RMBS_T	Total Return on MBS Index	1.058	<i>(3.11)</i>			1.280	<i>(5.12)</i>	1.233	<i>(4.98)</i>
ERM	Excess Return on the Stock Market			1.118	<i>(14.49)</i>	1.134	<i>(14.80)</i>	1.137	<i>(15.43)</i>
SMB	Small minus Big Stock Return			0.908	<i>(6.21)</i>	0.802	<i>(5.69)</i>	0.830	<i>(5.99)</i>
HML	High minus Low Book-to-market Stock Return			0.586	<i>(5.11)</i>	0.581	<i>(5.22)</i>	0.585	<i>(5.43)</i>
CPYSP	Corporate Bond Credit Spread							0.169	<i>(2.21)</i>
TRM21	Lag 1 Squared Total Return on Mortgage REITs							1.220	(1.32)
F-test		15.59		255.46		205.93		141.74	
Adjusted R ²		1.409%		42.614%		44.556%		45.291%	

The t-statistics in parentheses are computed using White's heteroskedasticity-consistent variance-covariance estimator. **Bold** -- Significant at 5%; **Bold and Italic** -- Significant at 10%

Table 4.**Regression Estimates for Daily Returns on Residential Mortgage REITs vs. Commercial Mortgage REITs**

Panel A. Residential Mortgage REITs

Variable	Variable Definition	Model 1		Model 2		Model 3		Model 4	
C	Intercept	0.001	(1.64)	0.000	(0.65)	0.000	(-0.07)	-0.003	(-4.13)
RMBS_T	Total Return on Residential MBS Index	0.440	(2.01)			0.876	(4.25)	0.880	(4.28)
ERM	Excess Return on the Stock Market			0.731	(16.90)	0.746	(17.03)	0.770	(19.73)
SMB	Small minus Big Stock Return			0.838	(12.02)	0.824	(11.80)	0.856	(13.28)
HML	High minus Low Book-to-market Stock Return			0.545	(9.17)	0.553	(9.33)	0.567	(9.52)
CPYSP	Corporate Bond Credit Spread							0.056	(3.94)
TRMH21	Lag 1 Squared Return on Residential Mortgage REITs							1.468	(2.15)
F-test		6.92		233.48		184.27		158.47	
Adjusted R ²		0.293%		25.580%		26.686%		28.136%	

Panel B. Commercial Mortgage REITs

Variable	Variable Definition	Model 1		Model 2		Model 3		Model 4	
C	Intercept	0.001	(1.89)	0.000	(0.65)	0.000	(0.04)	0.000	(-0.41)
CMI_T	Total Return on Investment-grade CMBS Index	-0.259	(-2.06)			0.890	(20.23)	0.311	(3.05)
ERM	Excess Return on the Stock Market			0.731	(16.90)	1.082	(15.11)	0.909	(20.08)
SMB	Small minus Big Stock Return			0.838	(12.02)	0.708	(13.70)	1.081	(15.07)
HML	High minus Low Book-to-market Stock Return			0.545	(9.17)	0.000	(0.04)	0.709	(13.75)
CPYSP	Corporate Bond Credit Spread							0.311	(3.05)
TRMC21	Lag 1 Squared Return on Commercial Mortgage REITs							0.000	(-0.41)
F-test		5.40		395.13		298.10		245.81	
Adjusted R ²		0.218%		36.818%		37.109%		37.838%	

The t-statistics in parentheses are computed using White's heteroskedasticity-consistent variance-covariance estimator. **Bold** -- Significant at 5%; **Bold and Italic** -- Significant at 10%

The most striking result from Panel A of Table 3 is that the MBS return is statistically insignificant and it only explains 0.08% of the variation in MREITs return (see model 1). Panels B and C show that model 1's R² is 0.68% in first half and 1.41% in the second half, confirming the low explanatory power of MBS return for the MREIT return. In comparison, the Fama-French stock market three

factors are highly significant and explain 34.68% of the variation in MREITs return (see model 2). All three Fama-French three factors are positive and highly significant. With the inclusion of both MBS return and Fama-French stock market three factors, the MBS return variable is also positive and statistically significant (see model 3). However, model 3's adjusted R2 is only slightly higher than that of model 2. With the addition of the corporate credit spread and lag MREITs return volatility, the adjusted R2 of model 4 only improved by less than 2%. These two additional variables are positive and statistically significant for the full sample period. The corporate credit spread variable has a stronger significance in the second half while the lag MREITs return volatility variable is more significant in the first half.

Table 4 examines the relationship between home MREITs and RMBS returns in Panel A and the relationship between commercial MREITs and CMBS returns in Panel B. Consistent with the results from Table 3, the MBS return in the residential and commercial markets both show an extremely low explanatory power for the return on home MREITs and commercial MREITs (see model 1), and stock market factors show much higher explanatory power for the MREITs return (see model 2). Although the MBS return becomes significant in model 3, its incremental explanatory power is very low. The corporate bond credit spread appears to be significant in model 4 for both groups, while only the lagged return volatility is significant for the residential MREITs.

Table 5.
The Top Ten Most Volatile Days of REITs (January 2000 to January 2008)

	Mortgage REITs		Residential Mortgage REITs		Commercial Mortgage REITs		Equity REITs	
	Date	Return	Date	Return	Date	Return	Date	Return
1st Biggest % Loss	20070814	-12.90%	20070814	-12.90%	20070803	-11.00%	20071211	-5.58%
2nd Biggest % Loss	20040412	-8.69%	20070305	-8.14%	20070731	-9.61%	20071126	-5.21%
3rd Biggest % Loss	20070731	-8.58%	20040412	-8.69%	20040412	-8.85%	20040412	-4.99%
4th Biggest % Loss	20070305	-8.14%	20070731	-8.58%	20070801	-7.76%	20040406	-4.15%
5th Biggest % Loss	20070313	-6.57%	20010702	-4.89%	20020701	-7.51%	20071101	-3.89%
5th Biggest % Gain	20070808	5.52%	20020726	5.62%	20020726	5.95%	20071113	2.02%
4th Biggest % Gain	20070918	5.56%	20070918	5.56%	20070816	6.18%	20071128	4.53%
3rd Biggest % Gain	20020726	5.62%	20080122	5.35%	20070817	9.20%	20070808	5.52%
2nd Biggest % Gain	20070816	7.84%	20070816	7.84%	20070808	9.88%	20020729	4.08%
1st Biggest % Gain	20070817	9.23%	20070817	9.23%	20080123	10.65%	20080123	4.61%

Table 6.**The Top Ten Most Volatile Days of MBS (January 2000 to January 2008)**

	Agency Residential MBS Index		Home Equity ABS Index		Investment-grade CMBS Index		High-yield CMBS Index	
	Date	Return	Date	Return	Date	Return	Date	Return
1st Biggest % Loss	20000512	-1.97%	20071130	-7.80%	20011115	-1.32%	20070730	-7.66%
2nd Biggest % Loss	20080124	-0.82%	20080131	-5.70%	20040402	-1.23%	20030508	-5.90%
3rd Biggest % Loss	20030813	-0.75%	20070830	-2.60%	20011205	-1.21%	20070806	-3.53%
4th Biggest % Loss	20040507	-0.73%	20071228	-2.52%	20030813	-1.17%	20071026	-3.14%
5th Biggest % Loss	20070920	-0.71%	20080124	-1.06%	20010103	-1.03%	20071127	-2.30%
5th Biggest % Gain	20070907	0.71%	20010102	0.61%	20040305	0.98%	20020823	1.36%
4th Biggest % Gain	20000720	0.72%	20040806	0.65%	20010104	0.99%	20020913	1.44%
3rd Biggest % Gain	20071126	0.78%	20080102	0.66%	20040806	1.07%	20050506	1.85%
2nd Biggest % Gain	20040615	0.93%	20080122	0.95%	20010102	1.20%	20040617	4.86%
1st Biggest % Gain	20000511	1.58%	20071126	0.99%	20071126	1.32%	20030507	6.61%

To further examine the robustness of our results, we rank the daily total return on MREITs index and tabulate the 5 days with biggest % loss and 5 days with biggest gain in Table 5. The mortgage REITs have experienced huge swings in daily return, ranging from a daily loss of -12.90% on August 14, 2007 to a daily gain of 9.23% on August 17, 2007. Interestingly, eight of the ten most volatile days from January 2000 to January 2008 occurred in 2007 during the subprime crisis. In Table 6, we rank the MBS total return index and tabulate the 5 days with biggest % loss and 5 days with biggest % gain. The MBS return is much more stable, especially for the agency residential MBS return and the investment-grade CMBS return. The home equity ABS return and the high-yield CMBS return are much more volatile, but their volatilities are still much less than the return volatility on MREITs.

Since the above empirical results are based on daily data, one might be wondering whether the MREITs return would track the MBS return more closely on a monthly basis. In Table 7, we present the descriptive statistics in Panel A, the correlation statistics in Panel B, the most volatile months for MREITs in Panel C, the most volatile months for MBS return in Panel D, and the regression estimates in Panel E. Panel A shows that the mean and volatility of monthly MREIT returns are also dramatically different from those of the related MBS indices. Panel B displays the monthly correlations between the total returns on mortgage REITs and MBS indices, showing greater comovement relative to the daily correlations from Table 2. However, similar to the daily case, the monthly

correlation between mortgage REITs and MBS indices are still much lower than that between mortgage REITs and stock indices. Panels C and D present the top ten most volatile months of mortgage REITs and MBS, respectively. As for the ranking of the most volatile months, April 2004 and July 2007 topped the worst performing months for mortgage REITs, with a total return of -23.74% and -22.11%, respectively. The two worst performing months for residential MBS and commercial MBS both occurred in March 2007 and April 2004, with a decline that is much smaller than that of the mortgage REITs.

Table 7.

Re-examination using Monthly Data (January 2000 to January 2008)

Panel A. Monthly Descriptive Statistics (in %)

Monthly Descriptive Statistics	Full Sample Period (Jan. 2000-Jan. 2008)					First Half (Jan. 2000-Dec. 2003)			Second Half (Jan. 2004- Jan. 2008)		
	Mean	Median	Max	Min	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
TRM	1.329	2.278	14.170	-23.737	6.275	3.264	3.697	4.585	-0.527	1.106	7.114
TRMH	1.354	2.066	18.514	-22.940	6.646	3.152	3.594	5.347	-0.370	0.665	7.336
TRMC	1.335	2.475	13.833	-28.077	6.813	3.413	3.541	4.972	-0.658	1.392	7.739
TRE	1.377	1.888	8.740	-14.581	4.339	1.588	1.928	3.418	1.174	1.848	5.098
TRA	1.338	2.111	8.498	-15.264	4.287	1.657	2.068	3.351	1.032	2.193	5.041
RMBS_T	0.527	0.664	2.138	-1.873	0.781	0.628	0.710	0.818	0.428	0.493	0.738
ABHE_T	0.316	0.432	1.899	-5.556	1.063	0.632	0.674	0.703	0.006	0.199	1.256
CML_T	0.574	0.669	3.443	-4.464	1.344	0.872	1.032	1.542	0.283	0.327	1.053
CMH_T	0.956	0.970	5.816	-5.807	1.967	1.198	1.186	2.024	0.719	0.880	1.901
RMBS_Y	5.708	5.568	7.883	3.717	0.893	6.034	6.054	1.120	5.389	5.447	0.395
ABHE_Y	5.309	5.298	8.834	2.817	1.435	5.384	5.226	1.617	5.236	5.428	1.245
CML_Y	5.377	5.335	8.101	3.449	1.102	5.704	5.714	1.377	5.057	5.236	0.602
CMH_Y	12.198	11.850	15.159	9.844	1.285	12.785	13.014	0.981	11.622	11.431	1.295
CPLY	5.776	5.661	8.271	4.039	1.051	6.249	6.277	1.225	5.313	5.483	0.544
CPHY	9.891	8.828	14.584	6.757	2.371	11.860	12.419	1.771	7.962	7.933	0.706
HMYSP	-0.399	-0.456	3.901	-2.067	0.895	-0.650	-0.604	0.606	-0.154	-0.093	1.057
CMYSP	6.820	6.577	9.355	5.376	0.906	7.082	7.267	0.518	6.565	6.152	1.115
CPYSP	4.115	3.483	8.212	1.614	1.770	5.611	5.674	1.254	2.649	2.611	0.541
SPTR	0.206	0.740	9.783	-10.868	3.996	-0.226	-0.423	5.168	0.620	1.245	2.376
ERM	-0.006	0.770	8.180	-10.760	4.227	-0.494	-0.165	5.389	0.472	0.920	2.614
SMB	0.417	0.050	22.180	-16.700	4.293	0.931	0.950	5.701	-0.088	-0.230	2.122
HML	0.884	0.540	13.800	-12.800	3.801	1.388	1.420	5.104	0.391	0.280	1.696

Note: See Panel A of Table 1 for the variable definitions.

Regression analysis based on monthly data is shown in Panel E of Table 7. The results are largely consistent with those from the daily analysis. Results from Model 1M show that the return on MBS index is insignificant and it fails to explain

the variation in the return on the mortgage REITs, for either the residential or commercial groups. Results from Model 2M demonstrate that the Fama-French stock market factors (i.e., the stock market excess return, size factor, and book to market value factor) are significant drivers of the returns on MREITs and explain the largest proportion of the variation in the return on mortgage REITs. Additional variables such as the MBS return (in models 3M and 4M) and the corporate bond credit spread (in model 4M) are statistically significant but add little explanatory power to those contributed by the Fama-French three factors.

Table 7.(Continued)**Re-examination using Monthly Data (January 2000 to January 2008)**

Panel B. Monthly Correlations

	TRM	TRMH	TRMC	TRE	TRA		TRM	TRMH	TRMC	TRE	TRA
TRM	1.000	0.963	0.867	0.495	0.556	TRM(-1)	0.204	0.199	0.171	-0.069	-0.043
TRMH	0.963	1.000	0.706	0.379	0.441	TRMH(-1)	0.203	0.195	0.176	-0.095	-0.067
TRMC	0.867	0.706	1.000	0.613	0.661	TRMC(-1)	0.149	0.153	0.111	-0.018	-0.002
TRE	0.495	0.379	0.613	1.000	0.997	TRE(-1)	0.150	0.160	0.089	-0.052	-0.036
TRA	0.556	0.441	0.661	0.997	1.000	TRA(-1)	0.165	0.174	0.105	-0.054	-0.037
RMBS_T	0.136	0.167	0.037	-0.013	-0.002	RMBS_T(-1)	0.080	0.050	0.133	0.053	0.062
ABHE_T	0.177	0.149	0.187	0.249	0.247	ABHE_T(-1)	-0.007	-0.038	0.065	0.076	0.072
CMI_T	0.153	0.156	0.109	0.031	0.041	CMI_T(-1)	0.047	0.025	0.092	-0.023	-0.012
CMH_T	0.228	0.188	0.250	0.055	0.072	CMH_T(-1)	0.029	0.024	0.048	-0.026	-0.019
RMBS_Y	0.005	0.001	0.000	0.018	0.017	RMBS_Y(-1)	0.057	0.062	0.021	0.019	0.022
ABHE_Y	-0.065	-0.032	-0.121	-0.116	-0.114	ABHE_Y(-1)	-0.005	0.029	-0.077	-0.078	-0.074
CMI_Y	-0.008	0.002	-0.038	-0.022	-0.022	CMI_Y(-1)	0.047	0.057	0.003	0.000	0.003
CMH_Y	0.098	0.136	-0.004	-0.112	-0.095	CMH_Y(-1)	0.180	0.206	0.081	-0.090	-0.067
CPI_Y	0.026	0.035	-0.008	-0.047	-0.042	CPI_Y(-1)	0.092	0.102	0.044	-0.012	-0.004
CPH_Y	0.176	0.195	0.100	-0.083	-0.064	CPH_Y(-1)	0.264	0.271	0.196	-0.006	0.017
HMYSP	-0.107	-0.051	-0.192	-0.200	-0.197	HMYSP(-1)	-0.072	-0.018	-0.159	-0.158	-0.155
CMYSP	0.146	0.187	0.040	-0.131	-0.107	CMYSP(-1)	0.196	0.220	0.111	-0.127	-0.099
CPYSP	0.221	0.240	0.139	-0.084	-0.060	CPYSP(-1)	0.299	0.302	0.236	-0.001	0.025
SPTR	0.252	0.182	0.327	0.329	0.333	SPTR(-1)	0.101	0.074	0.133	0.206	0.210
ERM	0.273	0.212	0.335	0.345	0.349	ERM(-1)	0.101	0.065	0.145	0.167	0.171
SMB	0.190	0.207	0.145	0.171	0.179	SMB(-1)	0.070	0.029	0.102	-0.036	-0.031
HML	0.120	0.051	0.219	0.127	0.134	HML(-1)	0.007	0.064	-0.083	-0.018	-0.018

Note: See Panel A of Table 1 for the variable definitions. The Variable Name (-1) stands for the lag one of the variable.

Table 7.(Continued)**Re-examination using Monthly Data (January 2000 to January 2008)**

Panel C. The Top Ten Most Volatile Months of REITs (January 2000 to January 2008)

	Mortgage REITs		Residential Mortgage REITs		Commercial Mortgage REITs		Equity REITs	
	Month	Return	Month	Return	Month	Return	Month	Return
1st Biggest % Loss	200404	-23.74%	200404	-22.94%	200707	-28.08%	200404	-14.58%
2nd Biggest % Loss	200707	-22.11%	200707	-18.24%	200404	-25.15%	200711	-9.07%
3rd Biggest % Loss	200708	-12.38%	200708	-17.50%	200706	-10.92%	200706	-9.07%
4th Biggest % Loss	200702	-11.43%	200702	-12.34%	200711	-10.25%	200501	-8.40%
5th Biggest % Loss	200508	-10.62%	200508	-11.91%	200207	-9.92%	200707	-7.80%
5th Biggest % Gain	200212	8.94%	200204	10.67%	200408	10.41%	200507	7.14%
4th Biggest % Gain	200204	10.32%	200801	10.70%	200208	10.68%	200601	7.31%
3rd Biggest % Gain	200112	10.78%	200112	11.02%	200307	10.93%	200408	7.94%
2nd Biggest % Gain	200304	11.19%	200104	12.74%	200003	12.09%	200701	8.42%
1st Biggest % Gain	200101	14.17%	200101	18.51%	200304	13.83%	200007	8.74%

Panel D. The Top Ten Most Volatile Months of MBS (January 2000 to January 2008)

	Agency Residential MBS Index		Home Equity ABS Index		Investment-grade CMBS Index		High-yield CMBS Index	
	Month	Return	Month	Return	Month	Return	Month	Return
1st Biggest % Loss	200307	-1.87%	200711	-5.56%	200307	-4.46%	200707	-5.81%
2nd Biggest % Loss	200404	-1.78%	200712	-3.35%	200404	-3.24%	200307	-4.79%
3rd Biggest % Loss	200203	-1.06%	200801	-3.29%	200203	-1.89%	200404	-3.00%
4th Biggest % Loss	200111	-0.92%	200404	-1.70%	200111	-1.76%	200708	-2.71%
5th Biggest % Loss	200001	-0.87%	200708	-1.61%	200801	-1.71%	200203	-1.96%
5th Biggest % Gain	200711	1.74%	200101	1.51%	200204	2.80%	200505	4.39%
4th Biggest % Gain	200107	1.78%	200204	1.60%	200006	2.82%	200408	4.57%
3rd Biggest % Gain	200801	1.85%	200109	1.73%	200212	2.84%	200208	4.75%
2nd Biggest % Gain	200204	1.89%	200107	1.82%	200305	3.03%	200209	5.65%
1st Biggest % Gain	200006	2.14%	200012	1.90%	200309	3.44%	200406	5.82%

Table 7.(Continued)**Re-examination using Monthly Data (January 2000 to January 2008)**

Panel E. Regression Estimates on Monthly Total Returns of Mortgage REITs

Variable	Variable Definition	Model 1M		Model 2M		Model 3M		Model 4M	
I. Dependent Variable: Mortgage REITs									
C	Intercept	0.007	(0.73)	0.003	(0.47)	-0.008	(-0.84)	-0.041	(-2.56)
RMBS_T	Total Return on MBS Index	1.102	(0.94)			2.033	(2.10)	<i>1.711</i>	<i>(1.79)</i>
ERM	Excess Return on the Stock Market			0.627	(3.64)	0.736	(4.27)	0.792	(4.51)
SMB	Small minus Big Stock Return			0.521	(3.11)	0.529	(3.29)	0.580	(3.78)
HML	High minus Low Book-to-market Stock Return			0.852	(3.66)	0.897	(4.00)	0.845	(3.95)
CPYSP	Corporate Bond Credit Spread							0.903	(2.94)
TRM21	Lag 1 Squared Total Return on Mortgage REITs							-0.277	(-0.25)
Adjusted R ² / F-test		1.837% / 1.76		21.312% / 6.17		27.278% / 9.91		33.456% / 8.88	
II. Dependent Variable: Residential Mortgage REITs									
C	Intercept	0.006	(0.58)	0.006	(0.69)	-0.007	(-0.73)	-0.044	(-2.66)
RMBS_T	Total Return on Residential MBS Index	1.438	(1.24)			2.214	(2.20)	<i>1.931</i>	<i>(1.89)</i>
ERM	Excess Return on the Stock Market			0.474	(2.52)	0.593	(3.21)	0.651	(3.48)
SMB	Small minus Big Stock Return			0.510	(2.81)	0.519	(2.88)	0.602	(3.55)
HML	High minus Low Book-to-market Stock Return			0.657	(2.69)	0.706	(3.07)	0.648	(2.94)
CPYSP	Corporate Bond Credit Spread							0.956	(2.77)
TRMH21	Lag 1 Squared Total Return on Residential Mortgage REITs							0.109	(0.09)
Adjusted R ² / F-test		2.789% / 2.70		15.161% / 5.48		17.863% / 6.17		24.462% / 6.07	
III. Dependent Variable: Commercial Mortgage REITs									
C	Intercept	0.010	(1.07)	0.000	(-0.03)	-0.006	(-0.72)	-0.036	(-2.31)
CMI_T	Total Return on Investment-grade CMBS Index	0.552	(0.73)			1.035	(1.55)	0.784	(1.20)
ERM	Excess Return on the Stock Market			0.912	(5.57)	0.995	(5.64)	1.054	(5.64)
SMB	Small minus Big Stock Return			0.583	(3.37)	0.576	(3.62)	0.585	(3.44)
HML	High minus Low Book-to-market Stock Return			1.236	(5.27)	1.240	(5.59)	1.231	(5.42)
CPYSP	Corporate Bond Credit Spread							0.757	(2.42)
TRMC21	Lag 1 Squared Total Return on Commercial Mortgage REITs							0.151	(0.42)
Adjusted R ² / F-test		0.136%/1.13		37.508% / 20.00		40.922% (17.45)		43.188% / 12.91	

The t-statistics in parentheses are computed using White's heteroskedasticity-consistent variance-covariance estimator. **Bold** -- Significant at 5%; **Bold and Italic** -- Significant at 10%

3. Conclusions and Implications

Although mortgage REITs are investing in mortgages and/or MBS, this study shows that returns on MREITs and the underlying MBS market indices exhibit

completely different return and risk characteristics. In addition, MREITs are much more strongly driven by the stock market systematic factors than the underlying MBS market factors. The results are remarkably robust using either daily or monthly data, full sample or subsample data, and residential or commercial MREITs data. At first glance, these results seem to indicate that the markets for MREITs are inefficient in reflecting the underlying MBS market performance. However, we believe that further research is needed to address this puzzle about the disconnection between the returns on MREITs and the underlying MBS market.

MREITs, like all real estate investment trusts, are publically traded stocks. The features associated with stocks, such as margin trading, short selling and intraday quoting, make the MREITs much more liquid than the over-the-counter traded MBS and more sensitive to stock market volatility and changes in investor sentiment. An interesting question to ask, is whether such sensitivity is justified by the underlying asset value and if not, whether the presence of such inefficiency leads to any profitable arbitrage opportunity.

In addition, the Barcap MBS indices used in this study may not fully reflect the performance of each mortgage REIT's underlying mortgage and/or MBS portfolio. The Barcap residential MBS index only covers agency residential MBS, and the Barcap home equity ABS index only includes investment-grade home equity ABS.

Finally, many MREITs might be holding more whole loans than the securitized mortgages in the form of RMBS or CMBS. If the monthly net asset value (NAV) of individual MREITs is made available, future research should directly test the efficiency of the MREIT market using the monthly closing price on MREITs and their respective NAVs.

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