

MBS Real Estate Investment Trusts: A Primer

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Real estate investment trusts (REITs) have played a significant role financing U.S. real estate going back to at least the late 1800s. However, those REITs that invest predominantly in mortgage-backed securities (MBS), the focus of this article, have a much shorter history, dating to the mid-1980s.¹ MBS-focused REITs (mREITs) grew quite rapidly after 2008—so much so that some observers have expressed concerns that the largest might pose systemic risks for the broader economy, which has led to speculation that they may be subjected to heightened supervisory oversight (Solomon 2013). The two largest mREITs, which account for 54 percent of all mREIT assets, have been the focus of special attention from policymakers and the press.^{2,3,4} Currently, mREITs are not as tightly supervised as other financial entities that are thought to pose systemic risks, such as large commercial or investment banks.

Observers have raised concerns along the following three dimensions: 1) mREITs invest in fairly long-term assets but fund themselves with short-term liabilities, implying that they are sensitive to interest

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¹ See Pellerin, Sabol, and Walter (2013, 3–10) for a detailed review of the history of REITs, mREITs, and MBS.

² While some observers define mREITs as those REITs that invest in mortgages or MBS, we use the abbreviation “mREIT” to refer only to REITs that invest in MBS. Additionally, we include in our definition of mREITs only those that finance their assets predominantly with repurchase agreements (or other short-term debt, such as commercial paper).

³ As of 2012:Q4. Please see Table 5 for data on other mREITs.

⁴ For example, see Adrian, Ashcraft, and Cetorelli (2013), International Monetary Fund (2013), and Stein (2013).

rate and liquidity risks; 2) they hold large portfolios of one type of asset, such that if mREITs become troubled and are forced to liquidate holdings, MBS prices might be driven down; and 3) the assets that they hold, predominantly government agency-backed MBS, play an important role in the operation of the home mortgage market, implying that if policymakers become concerned that mREITs might fail, these policymakers could feel compelled to intervene to prevent such failures.

Typical discussions of these risks often provide only sparse information from which one can evaluate them. Therefore, this article sheds light on how mREITs operate, in what ways they are regulated, and how their regulation compares to that of other similar types of firms. It also explains factors contributing to their recent growth, provides some analysis of the risks they face, how they manage these risks, and the potential dangers for the broader financial system.

1. HOW mREITS OPERATE

mREITs are investment vehicles that hold MBS and finance these holdings with equity and debt. Currently, mREITs predominantly hold agency MBS—meaning those MBS issued by Fannie Mae, Freddie Mac, and Ginnie Mae—which enjoy implicit or explicit government backing and therefore have no credit risk. mREIT investors, i.e., the holders of mREIT equity, typically receive greater earnings than they might by simply buying MBS, because mREITs use short-term debt and leverage to magnify returns such that, on average, mREIT assets are 7.4 times equity (Table 1).

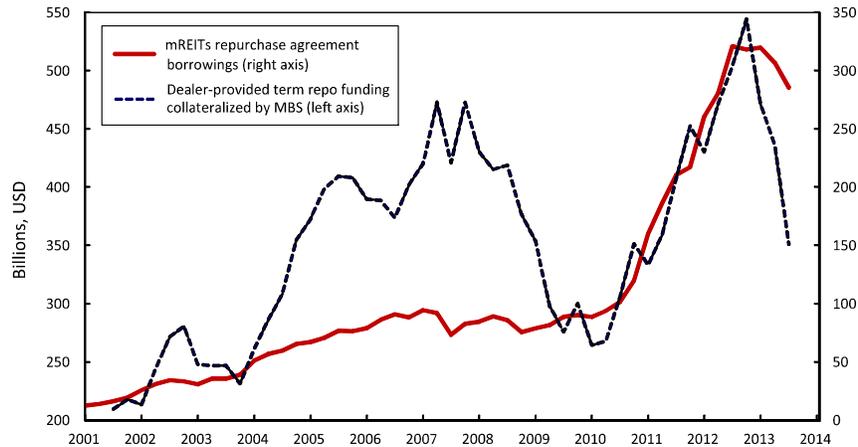
Because MBS have fairly long maturities, one might imagine that mREITs would tend to fund themselves with equity and long-term debt. Instead, mREITs typically are funded with short-term instruments—largely repurchase agreements (repos). Indeed, because short-term debt instruments typically pay a lower rate of interest than long-term instruments, borrowing short-term and holding long-term assets has tended to earn mREITs a significant spread that accounts for much of their income. The combination of a high degree of leverage with an asset-liability mix that emphasizes funding long-term assets with short-term liabilities (such an asset-liability structure is often termed maturity transformation) carries significant risks, leading them to engage in hedging activities (discussed in Section 4).

Table 1 Financial Highlights for all mREITS and the Five Largest

Five Largest mREITS	Total Assets 2012Y	Agency Securities 2012Y	Repurchase Agreements 2012Y	Total Equity 2012Y	Leverage Multiple (Assets-to- Equity)
Annaly Capital Mgmt Inc.	133,452,295	127,724,851	102,785,697	15,924,444	8.4
American Capital Agency Corp.	100,453,000	85,245,000	74,478,000	10,896,000	9.2
Hatteras Financial Corp.	26,404,118	24,057,589	22,866,429	3,072,864	8.6
CYS Investments	21,057,496	20,842,142	13,981,307	2,402,662	8.8
ARMOUR Residential REIT Inc.	20,878,878	19,096,562	18,366,095	2,307,775	9.0
Total (includes all other mREITs)	434,421,733	359,902,940	319,384,054	58,888,023	
Average (includes all other mREITS)	14,980,060	12,410,446	11,013,243	2,030,621	7.4

Source: SNL Financial.

Figure 1 mREIT Repo Borrowing and Broker-Dealer Lending



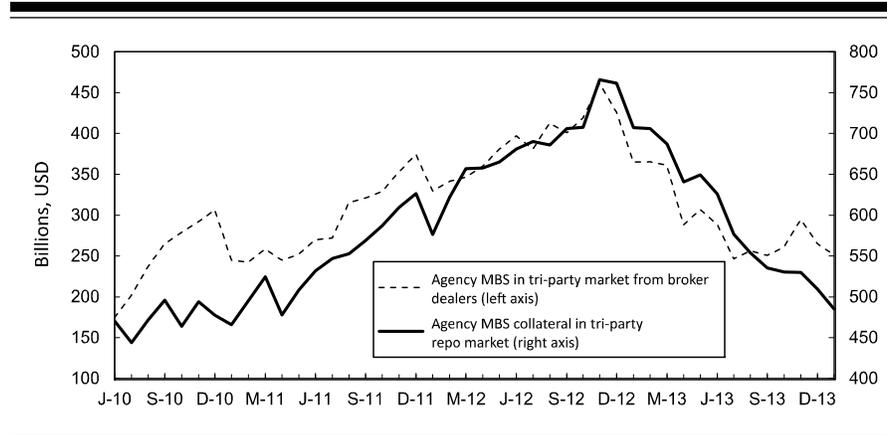
Sources: Federal Reserve Bank of New York FR2004 Form, SNL Financial, and Richmond Fed.

Because repos play such a significant part in how mREITs operate, it is fundamental to understand the broader functioning of the repo market. A repo is the sale of an asset, by the borrower, with an accompanying promise by the borrower to buy back the same (or like) asset upon maturity.⁵ In fact, they typically are thought of as simply a collateralized loan, with the asset acting as the collateral. In the tri-party repo market, the predominant assets backing repos are MBS issued by Fannie Mae, Freddie Mac, or Ginnie Mae (36 percent of all tri-party repo collateral), securities issued by the U.S. Treasury (35 percent),⁶ and debt securities issued by Fannie Mae or Freddie Mac (6 percent). Interest rates on repo borrowing are among the lowest in the funding markets because repos are typically fairly short-term borrowings, repos are collateralized, and repo borrowing receives especially beneficial treatment in bankruptcy.

⁵ Ennis (2011, 389–92) provides background on the repo market.

⁶ Percentage figures from Federal Reserve Bank of New York (2012).

Figure 2 Broker-Dealer Agency MBS Financing and Tri-Party Repo



Sources: Federal Reserve Bank of New York FR 2004 Form, Tri-party Repo Task Force, Richmond Fed, Haver Analytics.

A review of the financial statements of several of the largest mREITs indicates that most of their repo funding comes from broker-dealers.⁷ Brokers receive agency MBS as collateral in bilateral repo transactions with the mREITs and then subsequently use this high-quality collateral to borrow from other financial firms (e.g., money market mutual funds) via the tri-party repo market.⁸ As illustrated in Figure 1, over the last several years the amount of the increase in MBS-backed broker-dealer lending (approximately \$300 billion between June 2010 and December 2012) is almost exactly equivalent to the amount of the increase in mREIT borrowing. In turn, as can be seen in Figure 2, the amount of agency MBS collateral posted to the tri-party market by broker-dealers—the dotted line—increased by about this same \$300 billion between June 2010 and December 2012. The total value of agency

⁷ For mREITs that disclose details on their repo borrowings, broker-dealers appear to be the predominant source of repo financing. See, for instance, the second quarter 2013 10-Qs of the following mREITs: Bimini Capital Management Inc., p. 15; Invesco Mortgage Capital Inc., page 21; CYS Investments, p. 41; or page 11 of Armour Residential REIT, Inc., “Company Update,” December 19, 2013 (available at www.armourreit.com/updates/ARR_Company_Update_Dec_19_2013.pdf).

⁸ A bilateral repo transaction is one in which there are only two parties to the transaction. In contrast, a tri-party repo transaction is one in which the two counterparties use a custodian bank or clearing organization (the third party) to act as an intermediary, and typically the holder of the collateral, to settle the transaction. For more information on the tri-party repo market, see Ennis (2011, 389–92), Copeland et al. (2012), and Adrian et al. (2013, 4–6).

MBS collateral in the tri-party repo market—the solid line—appears to mirror movements in the dotted line, and both increase by about \$300 billion over the same period. Therefore, taken together, Figures 1 and 2 suggest that the agency MBS that mREITs have pledged for most of their recent borrowing has flowed through to the tri-party market via broker-dealers and accounts for much of the growth over the last several years in that market.

Broker-dealers benefit in two ways by performing an intermediary role between mREITs and the tri-party repo market. First, broker-dealers earn a spread between the interest rate paid to them by mREITs and what they must pay to finance these loans. For example, in 2012 the largest mREIT by assets, Annaly, paid a weighted average repo rate for its borrowings with maturities of two to 59 days of 45 to 50 basis points (Annaly 2012, F-19), whereas, the average 30-day MBS-backed repo rate in the tri-party market was 25 basis points in 2012 (Bloomberg 2014). Beyond the spread, broker-dealers also face lower “haircuts” on their repo borrowings than do mREITs.⁹ A haircut is the difference between the current market value of the collateral and the amount the creditor will lend, and it is typically stated as a percentage of the value of the collateral. It provides a buffer to protect the lender if the market value of the collateral declines. The lower the haircut a firm faces, the more it can borrow and re-invest for a given amount of collateral.

While mREITs face no regulatory leverage limits, the haircut itself places a limit on the amount they can lever up, meaning haircuts limit how large an mREIT can grow, given its equity. For example, if an mREIT starts with \$10 million in equity from shareholders and faces a 5 percent haircut, then the maximum amount it can grow without raising more capital is \$200 million. Here is how the process for this mREIT would proceed: 1) starting with the \$10 million in new equity, the mREIT buys \$10 million worth of MBS; 2) it then uses the \$10 million in MBS as collateral for a repo loan of \$9.5 million because the lender requires a 5 percent haircut; 3) it buys an additional \$9.5 million in MBS and repos it out to receive \$9.025 million in a second loan; and 4) it buys an additional \$9.025 million in MBS. This buying and “repoing out” (meaning borrowing in the repo market) of MBS could go on until the firm has MBS holdings equal to one divided by the haircut (in this case $\frac{1}{.05}$) times the original equity (\$10 million), or

⁹ For instance, Annaly’s (2012, 69) average repo collateral haircut in 2012 was 5 percent, while the median repo haircut for cash investors in agency MBS in the tri-party market was only 2 percent (see Federal Reserve Bank of New York [2012], Cash Investor Margin Levels, Agency MBS).

20 times the original equity (meaning \$200 million). However, mREITs' leverage ratios are not typically this high—as of December 31, 2012, their assets (mostly MBS) were on average 7.4 times their equity (see Table 1).

The borrower not only must provide the lender with extra collateral to cover the haircut percentage at the time the loan is initially entered into, but also must ensure that the lender's haircut is maintained throughout the life of the loan (Choudhry 2010, 151–3). If the value of the posted collateral falls more than a specified amount, the lender will issue a margin call requiring the borrower to send the lender additional collateral to reestablish the haircut percentage.¹⁰ The possibility that the value of MBS collateral might fall—for example, when market interest rates increase—provides one explanation of why mREITs do not lever up as much as haircuts might allow. Instead, they must maintain a portfolio of unencumbered assets—that is, assets not used to back loans—in order to be prepared to respond to any margin calls.¹¹ For example, as of the end of 2012, Annaly (2012, F-3) had unencumbered MBS in its portfolio equal to 16 percent of its repo borrowings.

Beyond these market-imposed limitations, an mREIT's payouts, investments, and management and ownership structures must meet a set of requirements found in the federal tax code (see Table 2) in order to ensure that its income is not taxed.¹² Given that one of these requirements is that an mREIT must pass 90 percent of its taxable income to investors in the form of dividends (rather than retaining earnings), it must fund its growth by acquiring new debt or equity financing.

2. HOW mREITS ARE REGULATED

Currently, mREITs face very limited regulatory oversight. In addition to complying with the rules associated with maintaining REIT tax treatment, the mREITs reviewed in this article are registered with the U.S. Securities and Exchange Commission (SEC) and publicly traded and therefore must comply with SEC disclosure and reporting requirements and the rules of the exchange on which they trade (e.g., NYSE or

¹⁰ Specifically, mREITs are subject to two types of margin calls: valuation and factor calls. Valuation calls occur when the value of the collateral falls, whereas factor calls occur when prepayment frequencies (prepayment factors) change, based on prepayment tables published by Fannie Mae and Freddie Mac.

¹¹ Unencumbered assets can include cash, MBS, and other securities.

¹² Note that mREIT distributions are taxable income for their investors.

Table 2 REITs Requirements to Maintain REIT Status

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1. Distribute at least 90 percent of each year's income to shareholders.
 2. Earn at least 75 percent of its gross income from real estate investments, specifically from a) rents on real property; b) interest earned on obligations secured by mortgages on real property; c) gains from the sale or other disposition of real property or mortgages; d) distributions from other REITs or gains from the sale of shares in other REITs; and e) other real estate-related activities.
 3. Earn at least 95 percent of its gross income from: dividends; interest; rents on real property; gains from the sale or other disposition of stock, securities, and real property; and other real estate-related activities.
 4. Less than 30 percent of its gross income is derived from the sale or other disposition of: stock or securities held for less than six months; and real property held for less than four years.
 5. At least 75 percent of the value of its total assets is represented by real estate assets (which includes interests in mortgages), cash and cash items, and government securities; and not more than 25 percent of the value of its total assets is represented by non-mortgage or non-government securities.
 6. The entity issues transferable shares owned by at least 100 persons.
 7. The entity is managed by one or more trustees or directors.
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Notes: Government Printing Office (2010). The Cigar Excise Tax Extension Act of 1960 (Public Law 86-779) amended Subchapter M such that tax protection was given to REITs.

NASDAQ).¹³ However, all SEC-registered and publicly traded financial companies are subject to these rules.

One feature that makes the mREIT unique among its non-REIT competitors is that its business model relies heavily on an exception contained in the Investment Company Act of 1940 (the "1940 Act") that excludes, from the definition of investment company (and therefore from the Act's rules), certain companies involved in "purchasing or otherwise acquiring mortgages and other liens on and interest in real estate."¹⁴ The rationale behind this exception is to differentiate companies exclusively engaged in the mortgage banking business from those in the investment company business and allow the former to benefit from less regulatory oversight since their activities are providing important liquidity into the housing market (National Association of

¹³ Publicly listed companies must satisfy rules related to corporate governance (including having a majority of independent directors), liquidity, earnings, share price, and an internal audit function. For the rule manuals of the NYSE and NASDAQ, see <http://nysemanual.nyse.com/lcm/> and <http://nasdaq.cchwallstreet.com/>, respectively.

¹⁴ The 1940 Act is the primary law that governs investment companies. See Section 3(a)(1) of the Investment Company Act, p. 18, for a definition of an investment company. The exclusion is contained in Section 3(c)(5)(C) of the 1940 Act.

Real Estate Investment Trusts 2011; Securities and Exchange Commission 2011; Securities Industry and Financial Markets Association 2011). To qualify for this exception, the SEC requires that the exempt company invest at least 55 percent of its assets in mortgages and other liens on and interest in real estate (or “qualifying real estate assets”) and at least 80 percent of its assets in the more broadly defined “real estate-related assets.”¹⁵

Traditional REITs that predominantly hold mortgages clearly fit the mortgage banking exemption contained in the 1940 Act (Securities and Exchange Commission 2011, 55,301). However, mREITs, the first of which appeared in 1985 (based on our definition of an mREIT), have relied on SEC staff interpretations of the 1940 Act, which identify “whole pool” agency and non-agency residential mortgage-backed securities (RMBS) as being functionally equivalent to mortgage loans, and therefore “qualifying real estate assets.”^{16,17} Thus, most mREITs hold at least 55 percent of their assets in whole pool agency MBS and treat any “partial pool” agency MBS as satisfying the broader requirements of a real-estate related asset.¹⁸

In 2011, the SEC released a proposal for comment expressing their concerns that certain types of mortgage-focused companies that exist today, such as mREITs, may not be the type of company originally intended to be exempt from the rules of the 1940 Act (Securities and Exchange Commission 2011). Moreover, while traditional REITs engage in activities that are clearly tied to the mortgage banking business, the SEC questions whether the mREIT business model is more similar to that of an investment company and should therefore face the same regulatory oversight as one. For instance, both mREITs and investment companies pool investor assets to purchase securities, provide professional asset management services, publicly offer their securities to retail and institutional investors, and most avoid paying corporate income taxes (Securities and Exchange Commission 2011, 55,303). While

¹⁵ These thresholds are based on SEC staff no-action letters and other interpretations (Securities and Exchange Commission 2011, 55,305) and are broadly recognized by mREITs as indicated in their 10-K financial statements (see, e.g., Annaly [2012, 49] and CYS Investments Inc. [2012]).

¹⁶ From Annaly’s (2012, 49) Annual Report: “This interpretation was promulgated by the SEC staff in a no-action letter over 30 years ago, was reaffirmed by the SEC in 1992 and has been commonly relied on by mortgage REITs.”

¹⁷ A “whole-pool” certificate is a security that represents all of the ownership interest in a specific mortgage pool. From CYS Investments Inc. (2012): “We treat Fannie Mae, Freddie Mac and Ginnie Mae whole-pool residential mortgage pass-through securities issued with respect to an underlying pool of mortgage loans in which we hold all of the certificates issued by the pool as qualifying real estate assets.”

¹⁸ A partial pool certificate is a security that represents partial ownership interest in a specific mortgage pool.

mREITs generally have a higher concentration of their assets in real estate, many other investment companies invest in some of the same kinds of assets.¹⁹ Nonetheless, according to a congressional statement associated with the Investment Company Act Amendments of 1970, mortgage REITs are excluded from the 1940 Act's coverage "because they do not come within the generally understood concept of a conventional investment company investing in stocks and bonds of corporate issuers." So it seems likely that mREITs would meet this congressional intent.²⁰

If mREITs became subject to the 1940 Act, they would face stricter regulation. Most importantly, the 1940 Act places limits on investment companies' use of leverage. The Act also gives the SEC the authority to monitor the companies' activities to ensure that, for instance, they are accurately computing the value of their assets and are not engaging in activities with affiliates that benefit insiders at the cost of investors (Securities and Exchange Commission 2011, 55,303).²¹ In addition, it restricts affiliate transactions between the investment company and any affiliate that holds at least 5 percent ownership interest in the company.²²

These additional restrictions could be very costly for mREITs, especially the leverage requirements. Unlike their investment company competitors, mREITs are able to rely more heavily on debt financing because they have no statutory leverage limits.²³ In other words, they can purchase more assets for a given amount of capital compared to their competitors. Imposing additional restrictions would eliminate any advantage they might have compared to investment companies that are subject to greater regulatory oversight. Beyond investment companies, mREITs also compete with other financial entities, which face even greater regulatory oversight, such as banks, investment banks, insurance companies, and other lenders. This comparatively light regulatory oversight is likely one of the contributing factors to the growth of the mREIT sector.

¹⁹ Securities and Exchange Commission 2011, p. 55,303, fn. 27, p. 55,300, fn. 3.

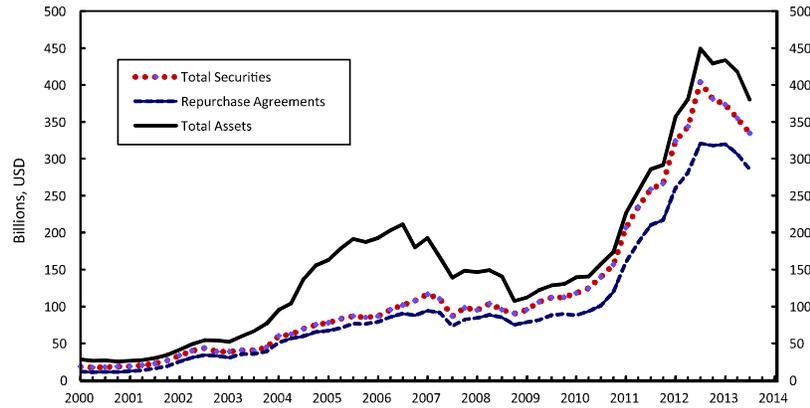
²⁰ U.S. House Investment Company Act Amendments of 1970. House Report 91-1382 (August 7, 1970), at 17.

²¹ From ICI (2013) Factbook in reference to leverage limitations: "these limitations greatly minimize the possibility that a fund's liabilities will exceed the value of its assets." See Section 2(a)(41) of the 1940 Act to see how registered investment companies are required to value their assets.

²² See Section 17 of the 1940 Act for prohibitions related to registered investment companies engaging in certain transactions with their affiliates.

²³ Note that repurchase agreements have restrictive covenants that may also put restrictions on leverage.

Figure 3 Total Assets, Repos, and Securities of mREIT Industry



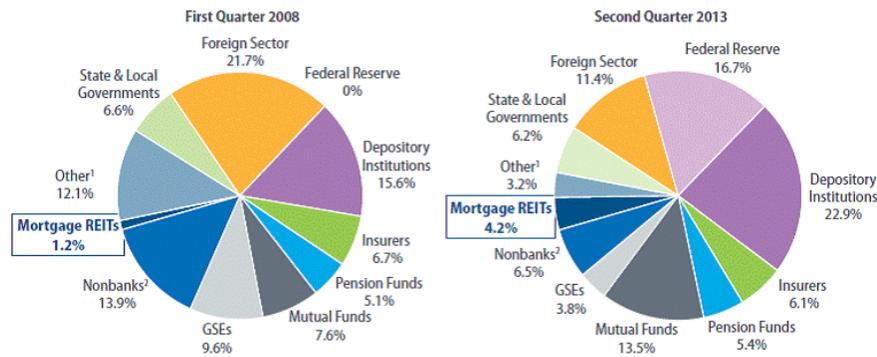
Sources: SNL Financial and Richmond Fed.

3. GROWTH OF mREITS

mREIT assets have grown eight-fold over the last decade (Figure 3). They increased fairly significantly from 2003 until the time of the financial crisis and then grew especially rapidly beginning in 2009. mREITs' share of agency MBS (and agency debt) has also increased considerably (Figure 4). While their share remains fairly small, mREITs have grown to be important suppliers of agency MBS collateral. As of September 2013, mREITs supplied, through broker-dealers, 54 percent of the agency MBS collateral used in the tri-party repo market.²⁴ Clearly, an important reason for their growth is their strong returns. As seen in Figure 5, their dividend yield over the last five years has consistently been around 15 percent, considerably higher than equity REITs. One reason for mREITs' strong performance is the favorable tax treatment that they receive compared to many of their competitors. Of course this cannot be the only explanation given that, at least recently, mREITs have produced much stronger returns than equity REITs, which also enjoy this tax advantage.

²⁴ SNL Financial and Federal Reserve Bank of New York (2013).

Figure 4 Holders of Agency MBS and Agency Debt in 2008 and 2013

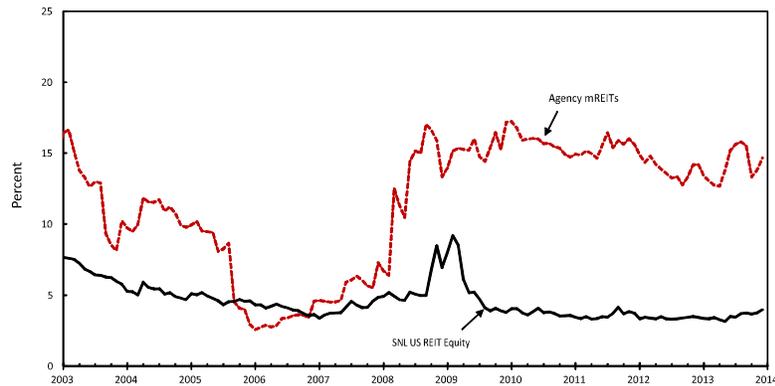


Notes: “Other” includes nonfinancial corporations, households, U.S. government, and credit unions; “Nonbanks” include security brokers and dealers, ABS issuers, holding companies, and money market mutual funds; as of the second quarter of 2013, total agency MBS and agency debt equals \$7.6 trillion, according to Z.1 data. Of this total, \$5.8 trillion is agency MBS, according to Securities Industry and Financial Markets Association data.

Source: Z.1 Federal Reserve Board of Governors’ Financial Accounts of the United States, Table L.210, 2013:Q2.

Other factors that may have contributed to their strong growth and high returns include a lack of regulatory restrictions on mREITs’ use of leverage, federal policies supporting the agency MBS market (and therefore mREITs’ main asset), and advantages associated with using repo (their main liability) as a primary method of financing. mREITs’ ability to produce rapid growth has been dependent on these factors taken together, as well as various external factors, including the growth of securitization and of the repo market, and the interest rate environment.

By investing predominantly in agency MBS, not only do mREITs avoid credit risk, but they are also reliant on a sector that has benefited from a large amount of government support. As a result of the recent financial crisis, the Treasury and the Federal Reserve took actions that stabilized the market for mortgage-related securities (see Table 3 for a list of policy actions that have supported MBS). For instance, in an effort to stimulate the economy, the Federal Reserve purchased a

Figure 5 Dividend Yield for Agency mREITs and Equity REITs

Sources: SNL Financial and Richmond Fed.

significant amount of MBS (holdings total \$1.3 trillion as of September 30, 2013) as part of its large-scale asset purchase program.²⁵

While many sectors were contracting during the financial crisis, existing mREITs continued to grow and new ones were formed. Of the 42 mortgage REITs (both listed and unlisted) existing today, 19 of them were formed between 2008 and 2012 (see Figure 6).²⁶ One of the recently formed mREITs—Five Oaks Investment Corporation—notes that the government policies that support the MBS market created an attractive investment opportunity for mREITs. In its registration statement, it indicates that if such policies were to change, they could experience significant financial hardship.²⁷ Even though some of this support has dwindled, the MBS market has remained liquid and these securities have consistently been relied on as high-quality collateral in repo transactions with broker-dealers. Additionally, the fact that

²⁵ While Fed purchases of MBS could certainly be viewed as making agency MBS more attractive (enhancing liquidity and, therefore, safety), they have also driven up agency MBS prices to some extent, which tends to make agency MBS somewhat less attractive. Data for Federal Reserve MBS holdings from the Board of Governors (2013).

²⁶ Note that these figures include both listed and non-listed mortgage REITs. As of December 31, 2012, 24 of these are publicly traded mREITs (per our definition).

²⁷ From the Five Oaks Investment Corporation (2012, 32–3).

Table 3 Policy Interventions

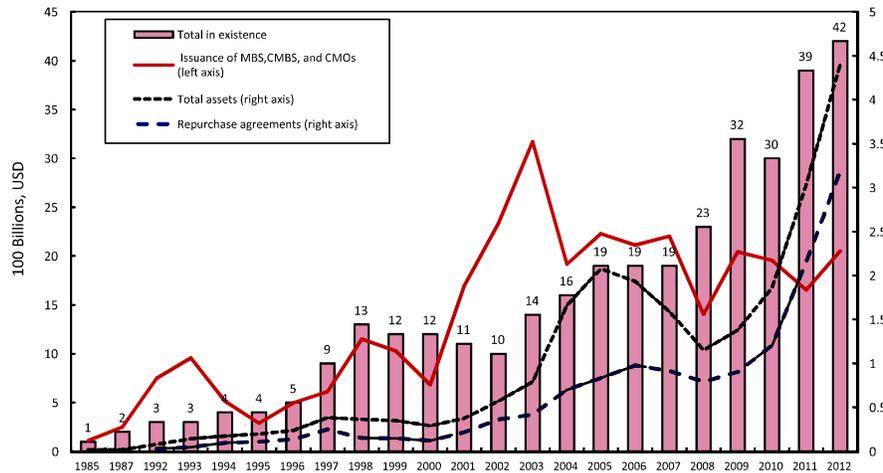
Date	Agency	Policy	Description
Mar-08	Federal Reserve	Primary Dealer Credit Facility (PDCF)	Overnight loans by the Fed against essentially tri-party eligible collateral
Mar-08	Federal Reserve	Term Securities Lending Facility (TSLF)	The TSLF loaned Treasury securities to primary dealers for one month against eligible collateral. For so-called "Schedule 1" auctions, the eligible collateral comprised Treasury securities, agency securities, and agency mortgage-backed securities. For "Schedule 2" auctions, the eligible collateral included schedule 1 collateral plus highly rated private securities.
Jul-08	FHFA	HERA established FHFA as new regulator for Fannie Mae and Freddie Mac	FHFA becomes the new regulator and overseer of Fannie and Freddie
Sep-08	FHFA	FHFA appointed as conservator of Fannie Mae and Freddie Mac	Increase the availability of mortgage financing by allowing these institutions to grow their guarantees without limit, while limiting the size of retained mortgage and security portfolios and requiring these portfolios to be reduced over time
Sep-08	Federal Reserve	Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility	Lending facility that financed the purchases of high-quality asset-backed commercial paper (ABCP) from money market mutual funds by U.S. depository institutions and bank holding companies. The program was intended to assist money funds that hold such paper to meet the demands for redemptions by investors and to foster liquidity in the ABCP market and money markets more generally.
Oct-08	Federal Reserve	Commercial Paper Funding Facility (CPFF)	The CPFF provided a liquidity backstop to U.S. issuers of commercial paper through a specially created limited liability company (LLC), the CPFF LLC. This LLC purchased three-month unsecured and asset-backed commercial paper directly from eligible issuers.
Oct-08	Federal Reserve	Money Market Investor Funding Facility (MMIFF)	Intended to provide liquidity to U.S. money market mutual funds and certain other money market investors, thereby increasing their ability to meet redemption requests and hence their willingness to invest in money market instruments, particularly term money market instruments
Nov-08	Federal Reserve	Term Asset-Backed Securities Loan Facility	Issued loans with terms of up to five years to holders of eligible asset-backed securities (ABS). The TALF was intended to assist the financial markets in accommodating the credit needs of consumers and businesses of all sizes by facilitating the issuance of ABS collateralized by a variety of consumer and business loans; it was also intended to improve the market conditions for ABS more generally.
Nov-08	Federal Reserve	Large-Scale Asset Purchases	\$500 billion in purchases of Agency MBS
Mar-09	Treasury	Home Affordable Modification Program (HAMP)	Provides homeowners with assistance in avoiding residential mortgage loan foreclosures
Mar-09	Federal Reserve	Large-Scale Asset Purchases	Additional \$750 billion in purchases of agency MBS
2008	FHA	Hope for Homeowners Program (H4H)	Allows certain distressed borrowers to refinance their mortgages into FHA-insured loans in order to avoid residential mortgage loan foreclosures
2009	FHFA	Home Affordable Refinance Program (HARP)	Allows borrowers current on their mortgage payments to refinance and reduce their monthly mortgage payments at loan-to-value ratios of up to 125 percent and without new mortgage insurance
Sep-11	Federal Reserve	Re-investments	Begin reinvesting interest and principal payments in agency MBS
Oct-12	FHFA	HARP 2.0	Increase HARP LTV ratio above 125 percent. Enables borrowers to go to any lender to refinance
Sep-12	Federal Reserve	"Open-ended" LSAPs	Begin open-ended purchases of agency MBS at a pace of \$40 billion per month

issuance of non-agency MBS dried up following the crisis (see Figure 7) provides further evidence that government support in the agency MBS market was fundamental to the survival (and growth) of mREITs.

As can be seen in Figure 6, mREITs' total assets (predominantly MBS) grew following a period in which MBS issuance had risen significantly and mREIT assets have increasingly been funded by repos (also see Figure 8), indicating that MBS and repo growth may have contributed importantly to mREIT growth. The repo market is part of the so-called "shadow banking system," which has grown significantly over the last several decades.²⁸ The ratio of private securitization to

²⁸ Shadow banking "comprises a diverse set of institutions and markets that, collectively, carry out traditional banking functions—but do so outside, or in ways only loosely linked to, the traditional system of regulated depository institutions. Examples

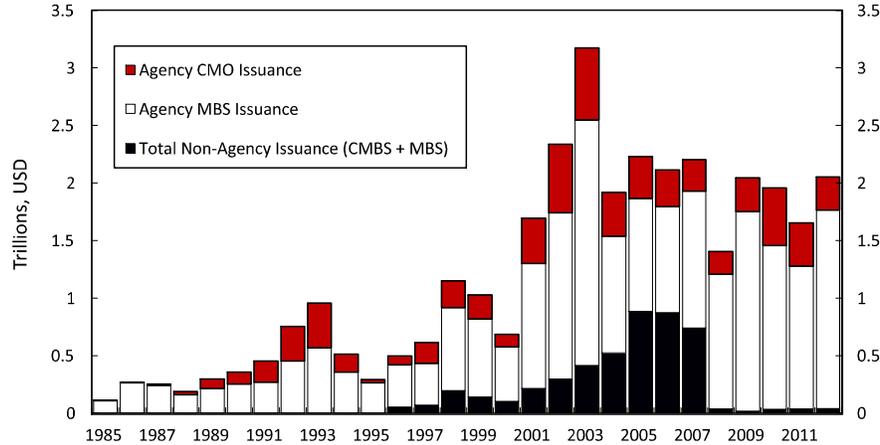
Figure 6 mREITs in Existence, Issuance of Securitized Mortgages, Repo, Assets, and Major Federal Policies



Sources: SNL Financial, SIFMA, Flow of Funds, and Richmond Fed.

total bank loans grew from zero in the early 1980s to over 60 percent prior to the financial crisis (Gorton and Metrick 2010, 265). The overall growth in repo usage and MBS issuance over the last two decades has been attributed to the reduced competitive advantage held by banks for deposits (due to certain innovations and regulations) and the rise in “securitization and the use of repo as a money-like instrument” (Gorton and Metrick 2010, 266). As institutional investors, pension funds, mutual funds, states and municipalities, and nonfinancial firms had a growing demand for nonbank alternatives for deposit-like products, they turned to the repo market, which allowed nonbank financial entities such as mREITs to acquire financing for their activities

of important components of the shadow banking system include securitization vehicles, asset-backed commercial paper conduits, money market mutual funds, markets for repurchase agreements, investment banks, and mortgage companies” (Bernanke 2012). Also see Pozsar et al. (2013) for a thorough discussion of shadow banking.

Figure 7 MBS, CMBS, and CMO Issuance from 1985 to 2012

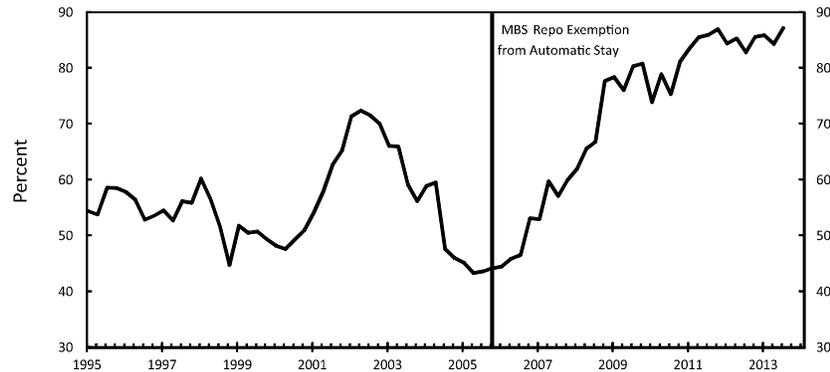
Source: Fannie Mae, Federal Reserve, Freddie Mac, Ginnie Mae, HUD, FHFA; data compiled by SIFMA.

in return for collateral.²⁹ The growth in securitization meant that an increasing amount of collateral was available for repo financing.

Additionally, bankruptcy's favorable treatment of repos, which limits counterparty risk, may be another factor contributing to mREIT growth. In a repo transaction, if the borrower defaults, the lender is not subject to the automatic stay provisions of the code (whereby creditors of a bankrupt firm are prevented, or "stayed," from making any attempts to collect what they are owed) and can take possession and immediately liquidate the assets pledged as collateral under the repurchase agreement. Financial contracts that receive this special treatment in bankruptcy (exemption from the stay) are called qualified financial contracts (QFCs) and include repurchase agreements, commodity contracts, forward contracts, swap agreements, and securities contracts. While special treatment for certain financial contracts has existed since 1978, only in 2005 was the definition of a QFC expanded to include

²⁹ "In 2003, total world assets of commercial banks amounted to USD \$49 trillion, compared to USD \$47 trillion of assets under management by institutional investors" (Bank for International Settlements 2007, 1, fn. 2).

Figure 8 Repurchase Agreements as a Percentage of Total mREIT Liabilities



Notes: Quarterly observations of repo liabilities as a percentage of total liabilities for mREITs.

Sources: SNL Financial and Richmond Fed.

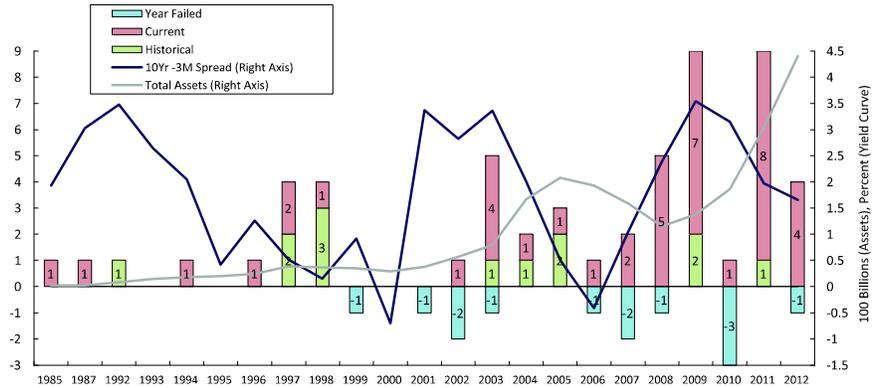
repos backed by MBS (Government Accountability Office 2011, 14).³⁰ Because the risk to mREIT counterparties is greatly reduced, mREITs receive repo financing on favorable terms (fees and haircuts), and counterparties may be more willing to be heavily exposed to mREITs. As a result, repos' special treatment in bankruptcy could be a significant factor in mREITs' growth.³¹ Notably, the vast majority of mREIT asset growth took place after the MBS repo exemption and, as seen in Figure 8, repos have accounted for an increasing share of mREIT liabilities since 2005. Importantly, mREITs rely, almost exclusively, on the use of repo financing to attain leverage.

mREITs' ability to lever up without regulatory restriction seems to be a critical part of their ability to produce high returns and grow rapidly. According to Annaly, the largest mREIT, if leverage limits

³⁰ For the types of contracts currently exempt from the stay, see the following sections of the Bankruptcy Code: 11 U.S.C. § 362(b)(6), (b)(7), (b)(17), 546, 556, 559, 560.

³¹ For a discussion of potential inefficiencies that might arise because of exemption of QFCs (e.g., repos) from the stay, see Roe (2011).

Figure 9 Formation and Failures of mREITs and the Yield Curve



Notes: “Historical” refers to MBS REITs that were founded but are currently no longer in existence. “Current” refers to MBS REITs that are still in existence. Asset data only for listed mREITs.

Sources: SNL Financial, FRED, and Richmond Fed.

were imposed its business model would have to be changed in a way that would have a material adverse impact (Annaly 2012, 49).

While equity REITs also use leverage, their returns over the last six years have been considerably lower than returns produced by mREITs (Figure 5). An important differentiating feature that could account for this earnings difference is that mREITs lever up using short-term debt. This ability to lever up with short-term debt (repo) is particularly advantageous during periods in which short-term interest rates are low relative to long-term rates, for example over the last six years. During such periods, mREITs benefit from holding long-term assets (MBS) at favorable spreads over their funding (repo) costs and utilize leverage to amplify returns. Figure 9 shows that when the yield curve environment is favorable (when the spread between 10-year and three-month Treasury securities is greatest), mREITs’ asset growth and formations increased.

The Effect of the Recent Increase in Interest Rates

In late 2012, long-term interest rates increased slightly and then significantly in mid-2013, producing a less favorable environment for mREIT earnings and growth. In the third quarter of 2012, mREIT assets peaked at \$449 billion (see Figure 3) and declined afterward in response to this increase in interest rates.

The selloff of mREIT assets as rates increased could be explained by three things. First, to the extent that investors shifted into mREITs when interest rates were low and falling to “reach for yield,” when interest rates started increasing these same investors may have started shifting back to less risky investments. Second, mREIT managers themselves may have developed concerns about the adverse effect that increasing interest rates would have on their MBS portfolio and therefore reduced leverage to an extent (by 1.4 percent to 7.2 percent over a period of nine months) by selling assets and repaying debt.³² Third, repo counterparties could have become concerned about increased mREIT risks and the risks of holding MBS collateral in a rising rate environment and therefore may have become less willing to roll over MBS-based repo funding or may have increased funding-related costs (e.g., interest rates, haircuts, and fees).

Although recently mREIT assets have decreased somewhat, their business model has generally remained favorable—meaning they continued to provide investors with high dividend yields (Figure 5)—even in 2014. However, mREITs carry some significant risks. In the following section, we will look more closely at the risks inherent in their business model and how they manage them.

4. mREIT RISKS AND RISK MANAGEMENT

mREITs are exposed to: 1) interest rate risk, 2) prepayment risk, 3) credit risk to the extent that mREITs hold assets other than government-guaranteed MBS, and 4) liquidity risk. To mitigate these risks, mREITs engage in measures such as hedging and taking steps to reduce the fragility of their funding structure.

³² Leverage here is assets divided by equity (data from SNL Financial). The leverage calculations here are not weighted by mREIT assets, as they were in Table 1.

Interest Rate Risk

Because of the maturity mismatch between mREITs' assets and liabilities, interest rate movements can affect their earnings and, indeed, their solvency. As of December 31, 2012, mREITs' repo maturities were, on average, about 48 days,³³ while their average MBS maturity was 4.5 years.³⁴ This maturity mismatch implies that when interest rates increase, mREITs' earnings will decline because their repos re-price quickly while the yield on their MBS remains unchanged or increases slowly.

If interest rates increase rapidly, the value of MBS holdings could decline enough to threaten mREIT solvency. The way in which this could happen is as follows. An interest rate-driven decline in the value of an mREIT's MBS holdings will lead its creditors to issue margin calls, requiring the mREIT to use its unencumbered assets to post additional collateral to secure their repo funding. If interest rates increase enough, all of the mREIT's unencumbered assets will be expended, and the mREIT will be unable to meet additional margin calls.

Prepayment Risk

Prepayment risk exists because most mortgage contracts allow the borrower the option to prepay, meaning pay back their mortgage prior to maturity. Because 82 percent of mREITs' assets are agency MBS (as of December 31, 2012), mREITs are highly exposed to prepayment risk. The prepayment option can produce losses for mREITs when interest rates fall or rise. When interest rates fall, homeowners are more likely to refinance their mortgages, meaning they will prepay. As a result, MBS holders are repaid more quickly than they would be if there were no prepayment option, and they are likely to suffer losses when their funds are returned to them and must be reinvested at the prevailing lower market yields. When interest rates rise, homeowners are less likely to refinance their mortgages, meaning MBS maturities (or, alternatively, durations³⁵) are extended. Therefore, the value of the MBS declines in response to this rise more than it would for a "plain vanilla"

³³ Figures are for the 26 firms that fit our mREIT definition and are as of December 31, 2012. See Table 5.

³⁴ We don't have a figure for the average maturity of all mREITs' MBS holdings. This figure (4.5 years) is the weighted average maturity of Annaly (2012, F-16) and American Capital Agency Corporation (2012, 44) only.

³⁵ From Vickery and Wright (2013): "Duration is a measure of the maturity of a fixed-rate security or, equivalently, its sensitivity to movements in interest rates. A duration of four years implies that a 1 percent change in yields is associated with a 4 percent change in price. Note that this market rule-of-thumb estimate of MBS duration is approximate—because future prepayment rates are unknown, the expected duration

bond (one without any call or prepayment features). This is because the increase in interest rates extends the maturity or duration of the MBS—due to the embedded prepayment option in mortgages—thereby producing more losses.

Credit Risk

Agency MBS has come to dominate mREIT holdings as non-agency MBS issuance declined to just a few billion per year starting in 2008 (see Figure 7).³⁶ Therefore, today's mREITs face little credit risk—the danger that the issuer of the security (the borrowing firm) will be unable to repay all of the principal or interest promised in the security contract, leading to a loss for the security holder. However, mREITs have historically held a mix of mortgage-related securities, including non-agency MBS and therefore at times have been exposed to credit risk (Figure 10). If the non-agency MBS market recovers, mREITs may, once again, increase their holdings of non-agencies, thus making credit risk a greater concern.

Liquidity Risk

Liquidity risk arises for mREITs because of their reliance on short-term funding. If an mREIT's counterparties grew concerned about its financial health, these counterparties could become unwilling to roll over their repo funding. Because mREITs are highly dependent on short-term funding, such unwillingness could quickly cause mREITs to go out of business. For instance, the mREIT Thornburg Mortgage (Thornburg) financed \$29 billion of non-agency MBS it owned in the second quarter of 2007 with repurchase agreements and asset-backed commercial paper. Between the second and third quarter of 2007, Thornburg began having trouble rolling over its repos and eventually had to repay \$14.2 billion³⁷ of its repo borrowings, in part by selling assets.^{38,39} Ultimately, Thornburg defaulted on JPMorgan when

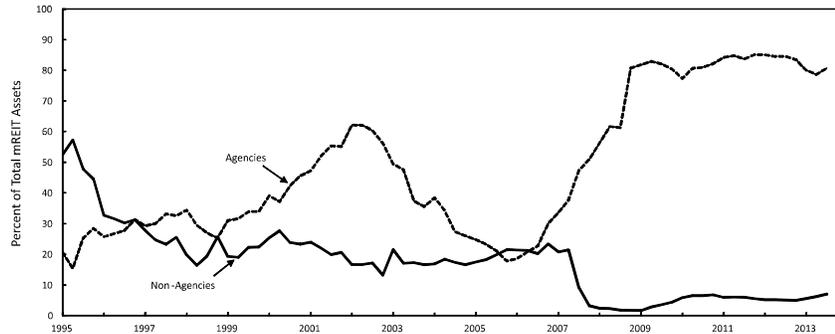
of an MBS will fluctuate over time because of variation in market conditions and the term structure of interest rates.”

³⁶ www.sifma.org/research/statistics.aspx, “U.S. Mortgage-Related Issuance and Outstanding.”

³⁷ Figure from the difference in repo holdings between 2007:Q3 and 2007:Q4 from Thornburg's 10-Qs.

³⁸ See Kingsbury and Wei (2007).

³⁹ From class action complaint: Case 1:07-cv-00815-JB-WDS Document 68 Filed 05/27/2008, UNITED STATES DISTRICT COURT, DISTRICT OF NEW MEXICO, IN RE THORNBURG MORTGAGE, INC Case No. 07-815 JB/WDS, SECURITIES LITIGATION.

Figure 10 Non-Agency and Agency Holdings for All mREITs

Notes: Quarterly holdings of non-agency MBS and agency MBS as a percentage of total assets of mREITs. Data from mREITs listed in Table 5.

Sources: SNL Financial and Richmond Fed.

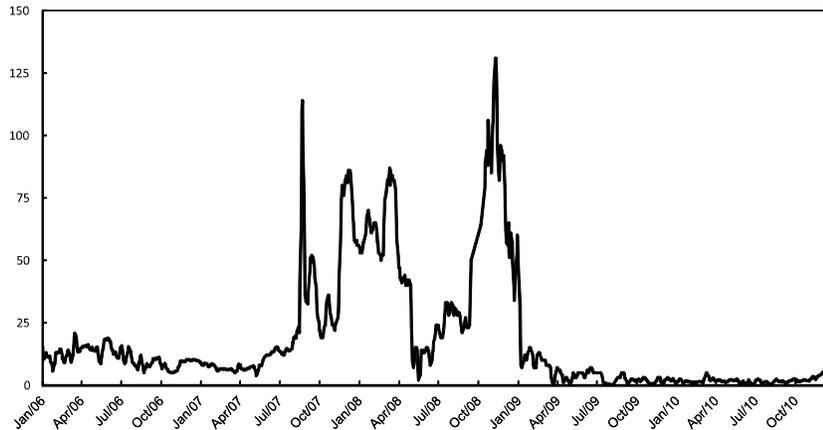
they failed to meet a margin call on a repo agreement.^{40,41} This default triggered “cross-default provisions”—a feature that is common to the repo market—whereby the default on one repo contract automatically puts the borrower in default on other repo contracts. These provisions can exacerbate liquidity risk because they create the possibility that all of an mREIT’s repo creditors may instantly demand their money back regardless of the maturity of repo contracts.

While for Thornburg the losses occurred because of its non-agency MBS holdings, today’s mREITs invest predominantly in agency MBS. Excluding other problems at an agency-MBS-focused mREIT, one would imagine that liquidity risk would be a fairly minor problem given that repos backed by agency MBS could easily be rolled over because they enjoy an implicit government guarantee. However, if lenders were to become unwilling to accept agency MBS collateral, mREITs could experience trouble rolling over their repos. Figure 11 suggests that during the financial crisis repo lenders did become less willing to accept agency

⁴⁰ See Bogoslaw (2008), Mildenberg (2008), and Thornburg (2008).

⁴¹ Thornburg ultimately declared bankruptcy on April 1, 2009, at which point any remaining repo contracts would have been terminated and may have been immediately liquidated. See McCarty (2009).

Figure 11 Spread between Agency MBS Term Repo Rate and Treasury Term Repo Rate



Notes: Five-day centered moving average of spread between 60-day agency MBS repo and 60-day Treasury repo, in basis points.

Sources: ICAP/Bloomberg and Richmond Fed.

MBS as collateral, at least relative to U.S. Treasury securities, as evidenced by the widened spread between MBS-backed and Treasury-backed repo rates (Figure 11). As some observers have claimed, there was a flight to the highest quality securities, i.e., Treasury securities, during the financial crisis, which could be one explanation for the widened spread.⁴²

Risk Management

mREITs engage in several forms of risk management in order to limit some of the risks we have just outlined. Because the fundamental feature of mREITs is that they engage in maturity transformation, most of their risk management efforts are focused on addressing interest rate risk, but some efforts simultaneously address liquidity risk and

⁴² http://research.stlouisfed.org/publications/regional/10/07/treasury_securities.pdf, p. 18.

prepayment risk. One such activity that addresses both interest rate risk and liquidity risk is laddering—spreading out the maturities of their financing so that all of their liabilities do not come due at once. Beyond laddering, mREITs also hedge using simple and complex derivative-based strategies to address interest rate risk and the risks associated with the prepayment option embedded in MBS.⁴³ Currently, mREITs are less concerned with managing credit risk since their portfolios are comprised largely of agency MBS.

Figure 12 illustrates the magnitude of the asset-liability mismatch of one of the largest mREITs (AGNC) and the extent to which it hedges. The size of the “bubbles” indicates the amount of either the notional values of swaps and swaptions or market values of agency MBS and repos. The vertical axis represents the interest rates earned on assets (positive numbers), repo rates paid (positive numbers), and net swap rates on hedges (fixed pay less floating receive rate).⁴⁴ The horizontal axis represents the maturity (in days) of assets, liabilities, or derivative contracts. From the figure, it is clear that AGNC’s MBS have a much greater average maturity (and yield) than their repo liabilities, but some of this mismatch is offset by the swaps and swaptions, albeit at a cost.

Laddering

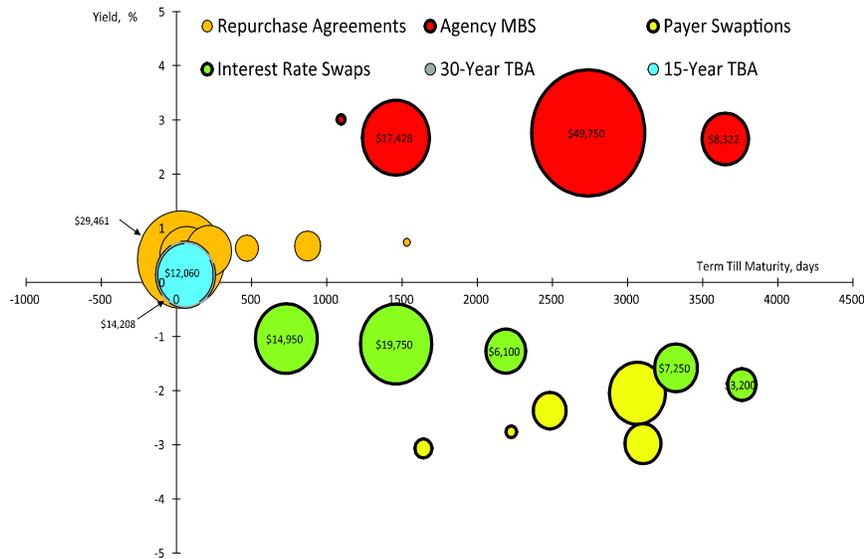
Repo financing is typically thought of as being very short term—having an overnight maturity.⁴⁵ If all mREIT repo financing was overnight, they would be exposed to bank-like runs, since all of their liabilities would mature daily. In other words, it is possible that all mREIT creditors could, on a given day, refuse to roll over their repo financing; just like all depositors of a bank could demand their funds on a given day—producing a run. mREITs typically will arrange their repo funding such that their contracts have various terms to maturity, which can mitigate the possibility of bank-like runs.

⁴³ One might imagine that mREITs would need to address prepayment risk associated with declining interest rates (the chance that falling interest rates will cause mortgage borrowers to refinance, and therefore repay their mortgages, forcing mREITs to need to reinvest these received funds at the new lower interest rate) because MBS contains such risk. However, because mREITs’ have longer-term assets than liabilities, a decline in interest rates would reduce their funding costs, tending to offset any losses produced by prepayments.

⁴⁴ Interest payments on repos are expressed as a positive number, rather than a negative number, to allow readers to more easily visualize the net interest margin (spread).

⁴⁵ Investopedia defines a repo contract as “a form of short-term borrowing for dealers in government securities. The dealer sells the government securities to investors, usually on an overnight basis, and buys them back the following day” (www.investopedia.com/terms/r/repurchaseagreement.asp).

Figure 12 AGNC’s Balance Sheet and Hedges



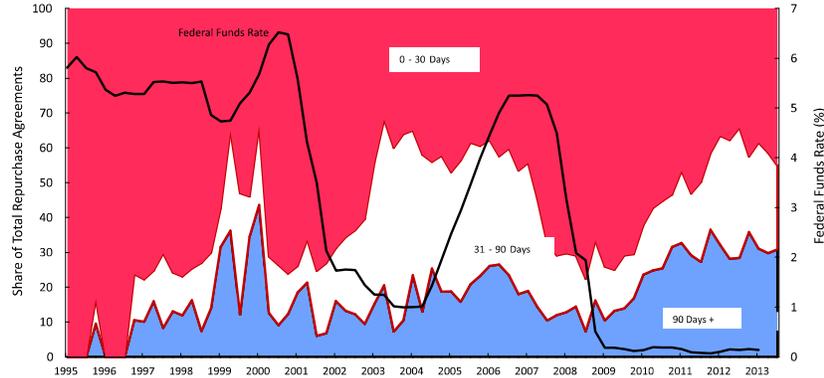
Notes: For swaps and swaptions, the “yield” is the receive rate minus the pay rate; the size of the bubble refers to the notional dollar amount. For agency MBS the value is their fair value, the yield is the current yield, and the life is the estimated average life. For repos, notional is the size and yield rate is the repo rate. The term until maturity for ARMS was their average number of days until reset. TBAs are net notionals, rate is dollar roll, implied financing rate, and maturity is 60 days. The 30-year TBA bubble lies behind the 15-year TBA bubble and is of similar size, so it is obscured. All dollar amounts are in millions.

Sources: Richmond Fed and AGNC 2013:Q1 10Q.

While over the last couple of decades the majority of mREITs’ repo contracts have had maturities of fewer than 30 days, a large portion of their repo financing has still been for greater than 30 days, particularly in periods when interest rates were expected to rise.⁴⁶ As seen in Figure 13, mREITs increased the proportion of repos with maturities greater than 30 days beginning in 2002 and again in 2009, periods during which it seemed clear that interest rates could only increase. Creditors may have greater concerns about the health of firms, such

⁴⁶ The decline in the use of repos with maturities greater than 30 days during the 2007–09 financial crisis could have been, in part, due to broker-dealers’ efforts to shorten the maturities of their repo loans.

Figure 13 mREITs Share of Repo Borrowing by Maturity and Federal Funds Rate



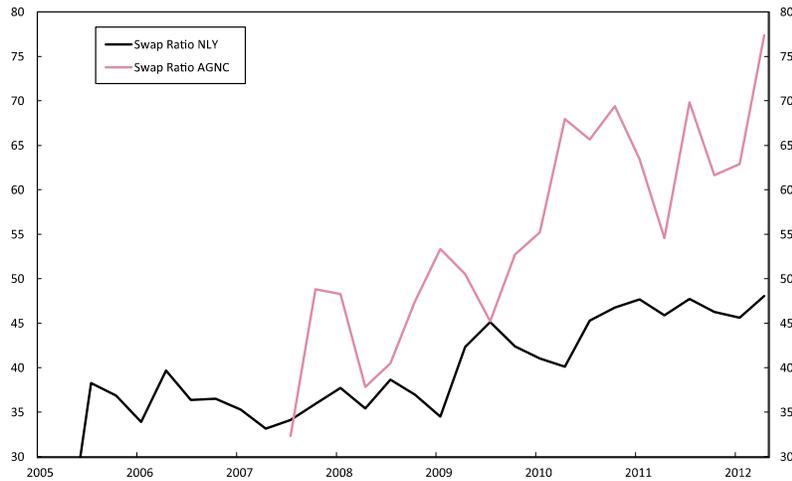
Sources: SNL Financial, Haver Analytics, and Richmond Fed.

as mREITs, which have significant maturity mismatch, when rising interest rates are expected to produce losses.

In addition to protecting them somewhat from liquidity risk, lengthening repo maturities also reduces interest rate risk to a limited extent because it reduces the maturity gap between their assets and liabilities. Despite their use of laddering, as seen in Figure 12, their liabilities (orange bubbles) still have significantly shorter maturities than most of their assets (red bubbles). Thus, while laddering can mitigate some of the rollover risk mREITs face, it still leaves them exposed to interest rate risk.

Fixed-for-floating interest rate swaps

Of all their risk management activities, mREITs rely most heavily on interest rate swaps to manage interest rate risk. In fact, the notional value of their swaps at the end of 2012 totaled \$160 billion (equal to 37 percent of all mREIT assets) (Table 5). Because mREITs' funding costs (determined by repo rates) adjust more quickly than the interest earnings on their MBS portfolio, when interest rates rise, their net income declines. To compensate for the increased funding costs, mREITs enter into fixed-for-floating rate swap contracts that pay off when interest rates rise. Fixed-for-floating swaps, in this case, will pay the mREIT's swap counterparty a fixed rate while the mREIT receives a

Figure 14 Annaly and AGNC's Swap Ratio

Notes: Swap ratio is defined as the notional amount of swaps divided by the repo borrowings outstanding.

Sources: AGNC and NLY 10K/10Qs, Richmond Fed.

floating rate tied to some short-term market interest rate index, such as the London Interbank Offered Rate (LIBOR). Since short-term interest rates tend to move together, the income that an mREIT receives on its contract will increase at the same time that their repo costs are increasing.

The average swap ratio for all mREITs—total notional value of swaps divided by total repos—was only 50 percent as of December 31, 2012 (Table 5). This means that approximately 50 percent of any rise in mREITs' repo funding costs resulting from an increase in market rates will be offset by the income received on these swap contracts. However, given that the two largest mREITs have recently added, rather aggressively, to the amount of their interest swaps, this figure is larger than it was in recent years and appears to continue to trend upward. Combined, these mREITs increased the notional amount of their swaps by \$68 billion from 2010 to the second quarter of 2013, providing evidence that they were expecting interest rates to rise (Figure 14).

Other commonly used hedging activities

Beyond laddering and entering into interest rate swaps, mREITs engage in a number of other activities to hedge interest rate risk caused by their maturity mismatch. mREITs use the measure duration to estimate the size of their maturity mismatch. Specifically, mREITs control their duration gap (duration of assets minus duration of liabilities) by engaging in hedging activities such as swaptions, options, futures, and short sales.⁴⁷ Table 4 shows the market values and durations of all of AGNC's assets, liabilities, and hedges as of the first quarter of 2013 and the resulting net duration gap. A positive duration gap, such as AGNC's, means that a firm will experience losses when interest rates rise. The larger the positive duration gap, the larger the losses.

Some observers argue that there exists a feedback between hedging and the volatility of market interest rates. Hedging, therefore, is seen as one way mREITs potentially pose risks for the broader financial system (Financial Stability Oversight Council 2013, 88–9).

5. RISKS mREITS POSE (SYSTEMIC RISKS)

While mREITs' holdings of MBS are only a small share of all MBS outstanding (see Figure 4), a number of observers have raised concerns about the potential systemic impact of mREIT problems. A sudden rise in interest rates, a decline in MBS prices caused by other market forces, or any event that causes mREITs to lose a significant portion of their funding, could lead to rapid deleveraging by mREITs and possibly declines in MBS prices broadly and problems for other financial firms.⁴⁸

For example, one observer argues that a 50-basis-point sudden increase in interest rates could lead to a decline in the values of mREITs' MBS portfolios and significant mREITs sales, and generate "temporary dislocations in MBS markets" (International Monetary Fund 2013, 10).⁴⁹ More specifically, the idea seems to be that an initial increase in market interest rates could produce mREIT actions—sales of MBS—that could amplify the initial interest rate movement, thereby producing large enough increases in mortgage rates to slow the growth of home sales.

⁴⁷ mREITs may also modify their portfolio holdings as a means of controlling their duration gap.

⁴⁸ These concerns are raised in the following: Financial Stability Board (2013, 38–9), Financial Stability Oversight Council (2013, 7 and 87–90), International Monetary Fund (2013, 9–14), and Office of Financial Research (2013, 16–8).

⁴⁹ See the Financial Stability Board (2013, 39) and the Office of Financial Research (2013, 16) for a discussion of similar concerns.

Table 4 AGNC Balance Sheet and Hedges

Assets	Market Value	Duration
Fixed	74.8	4.2
ARM	0.8	1.8
CMO	0.7	6.7
TBA	27.3	4.4
Cash	3.3	0.0
Total	106.9	4.1
Liabilities and Hedges	Market Value/Notional	Duration
Liabilities	-66.3	-0.3
Liabilities (Other)	-0.9	-7.0
Swaps	-51.3	-4.5
Preferred	-0.2	-8.4
Swaptions	-22.9	-1.9
Treasury/Futures	-13.6	-6.8
Total		-3.6
Net Duration Gap		0.5

Notes: CMO balance includes interest-only, inverse interest-only, and principal-only securities; “Liabilities (Other)” represents other debt in connection with the consolidation of structured transactions under generally accepted accounting principles; the “Net Duration Gap” is derived from the weighted duration of assets and liabilities and is not calculated by simply summing the various durations listed here.

Source: American Capital Agency Group, Investor Presentation, June 12, 2013, p. 24.

Observers have also noted that mREITs are important suppliers of MBS collateral to the tri-party repo market, and that rapid mREIT sales of MBS could have negative effects on this market (Office of Financial Research 2013, 16). Presumably, the concern here is that the withdrawal of this collateral from the market could impede the smooth functioning of the tri-party market and perhaps reduce the ability of other tri-party-dependent borrowers to raise funds in the tri-party market. Still, this could only be a problem if the buyers of the MBS that are being sold by mREITs tend to hold these MBS in portfolio, rather than themselves returning them to the tri-party market in repo loan transactions.⁵⁰

⁵⁰ Some observers refer to this as a reduction in “collateral velocity.” See Singh (2011) for more information on collateral velocity.

Table 5 mREITS—Financial Highlights

Name	Some Facts			Swaps			Repurchase Agreements			Fitch/S&P Composite and Assets					
	Inland Manager	Date Established	Type	Net Interest Margin (%)	Stock/Total Leverage (%)	Swap (Notional) (Million \$)	Weighted Average Pay (Notional) (Million \$)	Weighted Average Receive (Notional) (Million \$)	Weighted Avg Days To Maturity	Notional Agreements (Million \$)	Weighted Avg Inland Rate	Weighted Avg Maturity	Agency Status as a % of Total (Million \$)	Total Assets (Million \$)	Total Agency Holdings (Million \$)
US Mortgage Investment Trust	1	12/2011	Hybrid	1.51	1.51	17,277	1,122	1,122	4.2	0.13	329	329	37.33	1,122	1,122
American Capital Mortgage Investment	1	7/2008	Hybrid	1.81	1.81	4,848	1,146	1,146	4.2	0.29	114	114	82.73	7.7	6.37
Arundel Capital Mortgage Inc.	1	1/10/2011	Hybrid	2.31	6.8	47	248	1,33	0.32	6.25	0.51	50	82.73	7.7	6.37
Arundel Capital Mortgage Investment	1	1/10/2011	Agency	1.14	6.8	458	489	2,21	0.24	102.79	0.63	191	92.89	131.69	123.96
Arundel Residential Mortgage	1	10/20/1987	Agency	1.03	7.6	39.4	3.16	1.98	3M LIBOR	8.02	0.47	34	99.46	9.29	9.24
ARMOUR Residential REIT Inc.	1	3/10/2011	Hybrid	2.7	5.1	41.1	1.3	1.2	3M LIBOR	3.05	0.61	20	73.27	4.49	3.29
Berke Capital Mgmt Inc.	1	2/5/2008	Hybrid	1.45	8	17.4	8.7	1.2	0.21	18.57	0.49	34	91.48	20.88	19.1
Bluebird Capital Mgmt Inc.	1	12/19/2003	Agency	0.87	42.6	0	0	0	0	0.15	0.49	14	89.47	0.19	0.17
Chimera Investment Corp.	1	1/10/2007	Agency	1.39	3.9	0	0	0	0	1.53	0.52	58	23.99	7.74	1.81
Chimera Investment Corp.	1	6/1/2007	Hybrid	0.4	8.2	13.5	1.81	0.21	0	1.53	0.52	58	23.99	7.74	1.81
CVS Investments	1	1/10/2006	Agency	1.14	5.8	53.6	7.49	1.27	3M LIBOR	13.98	0.48	19.6	88.77	21.06	20.8
Dreyfus Capital Inc.	0	12/16/1987	Hybrid	2.95	5.8	41	1.46	1.53	1-3M LIBOR	3.59	0.37	67	81.54	4.33	3.49
First Horizon Real Estate	1	1/10/2007	Agency	1.4	7.4	14.7	1.47	1.47	0	22.97	0.47	25.6	300.81	28.4	23.55
First Horizon Real Estate	1	11/20/07	Agency/ARM	1.15	7.4	46.0	10.7	14.7	2.6	22.97	0.47	25.6	300.81	28.4	23.55
Inovest Mortgage Capital Inc.	1	6/5/2008	Hybrid	1.91	6.1	50.9	8	2.13	1M LIBOR	15.72	0.78	17	67.60	18.91	12.8
JANIELLA Mortgage Investment Corp.™	1	8/10/2012	Hybrid	0.66	7.7	28.9	0.33	1.5	0.3	1.14	0.82	41	86.05	1.29	1.11
MFA Financial Inc.	0	4/10/1988	Hybrid	2.7	2.6	28.8	2.52	2.31	1.4	8.75	0.85	79	53.48	13.82	7.23
New York Mortgage Trust Inc.	0	6/24/2004	Hybrid	3.28	2.8	40.4	0.36	0.74	0.89	0.54	0.54	39	13.97	7.16	1
Novesta Investment Corp.	1	10/10/2012	Multiple	4.23	0.9	16.1	0.15	5.04	0.90	0.31	36.5	20.76	3.95	0.82	0.82
Novesta Investment Corp.	1	5/10/2009	Multiple	3.85	1.06	0	0	0	0	0.16	0.14	88	1.00	0.72	0.72
Novesta Investment Corp.	1	5/10/2009	Multiple	2.21	1.06	0	0	0	0	0.16	0.14	88	1.00	0.72	0.72
Novesta Investment Corp.	1	3/6/2006	Multiple	4.85	0.2	127.3	0.14	4.94	0.11	2.28	19	36.7%	0	2.48	0
Novesta Investment Corp.	1	3/6/2006	Multiple	4.85	0.2	127.3	0.14	4.94	0.11	2.28	19	36.7%	0	2.48	0
Novesta Investment Corp.	1	3/6/2006	Multiple	4.85	0.2	127.3	0.14	4.94	0.11	2.28	19	36.7%	0	2.48	0
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Novesta Investment Corp.	1	3/6/2006	Multiple												

Regardless of such systemic concerns, and the various risks faced by mREITs (interest rate, prepayment, credit, and liquidity risks), the mREIT industry seems to have weathered recent stresses reasonably well. During the crisis of 2007 and 2008 only two mREITs failed, both of which invested primarily in non-agency MBS, and the industry as a whole produced fairly consistent earnings through the crisis (see Figure 5). In the years following the crisis, short- and long-term interest rates had been consistently falling or flat until long-term rates bottomed out in mid-2012 and then, beginning in May 2013 increased rapidly through the summer (10-year Treasury rate increased from 1.70 percent in May to 2.92 percent in September). One might expect that such an increase would lead to significant MBS sales by mREITs, and that such sales could have an impact on MBS interest rates. Indeed mREITs did sell following the rate increase and interest rates on MBS rose over this period. However, it is not clear that mREIT sales amplified interest rate increases. Surprisingly, given mREITs' heavy reliance on leverage and significant maturity mismatch, mREITs don't seem to have reacted as strongly to rising interest rates as some other players. As illustrated in Figure 1, mREITs' repo borrowings only account for about one-quarter of the decline of dealer-provided MBS repo funding, indicating that other parties reduced their MBS repo funding even more, and likely sold even more MBS.

6. CONCLUSION

Policymakers, the press, and other observers have raised concerns about possible systemic risks that may flow from mREITs, especially given the speed with which they have grown over the last five years. mREITs invest heavily in MBS, a long-term asset, and fund these investments largely with term repo, a fairly short-term liability.

Clearly investors in mREITs have reason to be concerned given that this asset-liability mix leaves mREITs critically exposed to interest rate risk. In fact, recent interest rate increases have caused mREITs to shrink and have produced significant declines in mREIT stock prices.

Still, the danger to the financial system more broadly is less clear. For one thing, interest rates would need to increase significantly and rapidly to cause widespread mREIT insolvencies. Additionally, mREITs' share of all MBS outstanding, while not insignificant, is only about 6 percent as of December 31, 2012 (Securities Industry and Financial Markets Association 2011; Table 5), so that any problems at mREITs would have to be magnified by counterparty actions in order to produce system-wide problems.

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