An Analyst’s Perspective on Historical Mortgage REIT Returns

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NYU Stern
Our Perspective

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This talk: look at the 40-year history of mortgage REITs as an asset class.
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- Our perspective is that of an investor wanting to better understand the historical risk-return profile of mREITs
- Caveats: The mREIT industry has undergone several structural changes:
  - Kind of holdings: whole mortgages vs CMO/MBS
  - Kind of players: set up by banks in 60s/70s, REMICS after Act of 86
  - Macro-economic environment: monetary policy cycles, Great Inflation, Great Moderation, Great Recession
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- Not all mREITS are alike: agency resi vs. non-agency resi vs. commercial
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- Not all mREITS are alike: agency resi vs. non-agency resi vs. commercial
- The past may not be the best indicator of the future
History of mREIT Returns: Jan 1972-Jan 2013

Average excess return mortgage REITS: 2.2% per year
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Average excess return stock market: 5.7% per year
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Volatility mREITS (market): 20.6% per year (16.1%)
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Average excess return stock market: 5.7% per year
Volatility mREITS (market): 20.6% per year (16.1%)
Skewness and kurtosis mREITS (market): -0.25(-0.53) and 8(5)
Cumulative Returns: After Financial Crisis

Cumulative Value of $1 Invested in February 2009

- Mortgage REITS
- Equity REITS
- Equity
- Bonds (10yr CMT)

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Mortgage REIT Returns
Cumulative Returns: Since January 2000

Cumulative Value of $1 Invested In January 2000

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- Equity REITS
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Cumulative Returns: Since January 1990

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Mortgage REIT Returns
Cumulative Returns: Since February 1971

Cumulative Value of $1 Invested In December 1971

- Mortgage REITs
- Equity REITs
- Equity
- Bonds (10yr CMT)

Mortgage REIT Returns
Average excess return agency MREITS: 16.3% per year
Average excess return stock market: 6.3% per year
Breakdown of mREIT Returns: Agency (90-11)

- Average excess return agency MREITS: 16.3% per year
- Average excess return stock market: 6.3% per year
- Volatility agency mREITS (market): 31.3% per year (15.6%)
Breakdown of mREIT Returns: Agency (90-11)

- Average excess return agency MREITS: 16.3% per year
- Average excess return stock market: 6.3% per year
- Volatility agency mREITS (market): 31.3% per year (15.6%)
- Skewness and kurtosis mREITS (market): 1.13(-0.62) and 8(4)
Average excess return non-agency MREITS: 2.4% per year
Average excess return stock market: 6.3% per year
Breakdown of mREIT Returns: Non-Agency (90-11)

- Average excess return non-agency MREITS: 2.4% per year
- Average excess return stock market: 6.3% per year
- Volatility non-agency mREITS (market): 30.8% per year (15.6%)
Breakdown of mREIT Returns: Non-Agency (90-11)

Average excess return non-agency MREITS: 2.4% per year
Average excess return stock market: 6.3% per year
Volatility non-agency mREITS (market): 30.8% per year (15.6%)
Skewness and kurtosis mREITS (market): -0.79(-0.62) and 6(4)
Breakdown of mREIT Returns: Commercial (90-11)

- Average excess return commercial MREITs: 1.5% per year
- Average excess return stock market: 6.3% per year
Breakdown of mREIT Returns: Commercial (90-11)

- Average excess return commercial MREITS: 1.5% per year
- Average excess return stock market: 6.3% per year
- Volatility commercial mREITS (market): 31.1% per year (15.6%)
Breakdown of mREIT Returns: Commercial (90-11)

- Average excess return commercial MREITS: 1.5% per year
- Average excess return stock market: 6.3% per year
- Volatility commercial mREITS (market): 31.1% per year (15.6%)
- Skewness and kurtosis mREITS (market): 0.26(-0.62) and 14(4)
Breakdown Cumulative Returns: Since January 2000

Cumulative Value of $1 Invested In January 2000

- Mortgage REITS
- Agency MREITS
- Non-agency MREITS
- Commercial MREITS

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Mortgage REIT Returns
Breakdown Cumulative Returns: Since January 1990

Cumulative Value of $1 Invested In January 1990

- Mortgage REITS
- Agency MREITS
- Non-agency MREITS
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Mortgage REIT Returns
Risk Adjustment

- The lower (average or cumulative) mREIT returns could simply reflect their lower risk.
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- Volatility is not a good indicator of risk. Covariance with the “representative investor’s” investment opportunity set (IOS) is.
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- Volatility is not a good indicator of risk. Covariance with the “representative investor’s” investment opportunity set (IOS) is.
- Approach 1: Market return captures fluctuations in IOS

\[
E[R_{mreit} - R_f] = \alpha_m + \beta_m E[R_{mkt} - R_f]
\]
Risk Adjustment

- The lower (average or cumulative) mREIT returns could simply reflect their lower risk.
- Volatility is not a good indicator of risk. Covariance with the “representative investor’s” investment opportunity set (IOS) is.

Approach 2: Bond return captures fluctuations in IOS

\[
E[R^{mreit} - R^f] = \alpha_b + \beta_b E[R^{10yr} - R^f]
\]
Risk Adjustment

- The lower (average or cumulative) mREIT returns could simply reflect their lower risk.
- Volatility is not a good indicator of risk. Covariance with the "representative investor’s” investment opportunity set (IOS) is.

**Approach 3:** Market and bond returns capture fluctuations in IOS

\[
E[R_{mreit} - R_f] = \alpha_2 + \beta_m E[R_{mkt} - R_f] + \beta_b E[R_{10yr} - R_f]
\]
The lower (average or cumulative) mREIT returns could simply reflect their lower risk.

Volatility is not a good indicator of risk. Covariance with the “representative investor’s” investment opportunity set (IOS) is.

Approach 4: Market, size, and value factor returns capture fluctuations in IOS

\[ E[R^\text{mreit} - R^f] = \alpha_3f + \beta_m E[R^\text{mkt} - R^f] + \beta_{smb} E[R^{smb}] + \beta_{hml} E[R^{hml}] \]
Risk Adjustment

- The lower (average or cumulative) mREIT returns could simply reflect their lower risk.
- Volatility is not a good indicator of risk. Covariance with the “representative investor’s” investment opportunity set (IOS) is.

Approach 5: Market, bond, size, and value factor returns capture fluctuations in IOS

\[ E[R^{\text{mreit}} - R^f] = \alpha_4 + \beta_m E[R^{\text{mkt}} - R^f] + \beta_b E[R^{10yr} - R^f] + \beta_{\text{smb}} E[R^{\text{smb}}] + \beta_{\text{hml}} E[R^{\text{hml}}] \]
## Risk-adjusted Returns

### Table: Analyzing Mortgage REIT Performance 1972-2012

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>-1.61</td>
<td>0.25</td>
<td>-2.81</td>
<td>-5.84</td>
<td>-7.41</td>
</tr>
<tr>
<td>$R_{mkt}^t - R_f^t$</td>
<td>0.62</td>
<td>–</td>
<td>0.60</td>
<td>0.67</td>
<td>0.63</td>
</tr>
<tr>
<td>$R_{10yr}^t - R_f^t$</td>
<td>–</td>
<td>0.60</td>
<td>0.47</td>
<td>–</td>
<td>0.57</td>
</tr>
<tr>
<td>$R_{smb}$</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.43</td>
<td>0.51</td>
</tr>
<tr>
<td>$R_{hml}$</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.61</td>
<td>0.61</td>
</tr>
</tbody>
</table>

$R^2$  

23.9  

5.3  

27.1  

35.3  

40.0

The dependent variable is the excess return on the NAREIT mortgage REIT index. The independent variables are listed in the first column. The sample is January 1972 until December 2012 or 492 months.

- **Interpretation**: A passive strategy that is a weighted average of the 4 factors (weights given in last column) has 63% correlation with mREIT returns but has a 7.4% higher return per year.
Table: Analyzing Mortgage REIT Performance 1990-2011

<table>
<thead>
<tr>
<th>Category</th>
<th>$\alpha_m$</th>
<th>$\alpha_{2f}$</th>
<th>$\alpha_{3f}$</th>
<th>$\alpha_{4f}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All mREITS</td>
<td>1.13</td>
<td>-1.05</td>
<td>-1.61</td>
<td>-4.42</td>
</tr>
<tr>
<td>All Classified</td>
<td>0.87</td>
<td>-1.47</td>
<td>-2.61</td>
<td>-5.53</td>
</tr>
<tr>
<td>Agency Resi</td>
<td>12.57</td>
<td>10.73</td>
<td>11.24</td>
<td>8.76</td>
</tr>
<tr>
<td>Non-agency Resi</td>
<td>-2.29</td>
<td>-5.50</td>
<td>-7.07</td>
<td>-11.12</td>
</tr>
<tr>
<td>Commercial</td>
<td>-4.80</td>
<td>-4.50</td>
<td>-10.53</td>
<td>-10.65</td>
</tr>
</tbody>
</table>

The dependent variable is the excess return on our own mortgage REIT index and its components. The sample is January 1990 until December 2011 or 264 months.

**Interpretation:** Agency resi has had positive abnormal returns, non-agency and commercial significantly negative ones.
**Individual Firm mREITs**

**Table: Analyzing Individual Firm mREIT Performance**

<table>
<thead>
<tr>
<th>Company</th>
<th>$\alpha_m$</th>
<th>$\alpha_{2f}$</th>
<th>$\alpha_{3f}$</th>
<th>$\alpha_{4f}$</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annaly Capital Management</td>
<td>12.75</td>
<td>9.82</td>
<td>12.17</td>
<td>8.74</td>
<td>9/97-12/11</td>
</tr>
<tr>
<td>Capstead Mortgage</td>
<td>9.53</td>
<td>4.43</td>
<td>9.09</td>
<td>2.32</td>
<td>8/85-12/11</td>
</tr>
<tr>
<td>Anworth Mortgage Asset</td>
<td>10.31</td>
<td>9.99</td>
<td>6.95</td>
<td>5.66</td>
<td>2/98-12/11</td>
</tr>
<tr>
<td>MFA Financial</td>
<td>8.29</td>
<td>7.46</td>
<td>5.47</td>
<td>3.78</td>
<td>3/98-12/11</td>
</tr>
<tr>
<td>Indymac Bancorp</td>
<td>-2.44</td>
<td>-6.87</td>
<td>-4.83</td>
<td>-10.32</td>
<td>8/85-7/08</td>
</tr>
<tr>
<td>Thornburg Mortgage</td>
<td>-15.84</td>
<td>-13.91</td>
<td>-18.95</td>
<td>-18.05</td>
<td>5/93-12/08</td>
</tr>
<tr>
<td>Redwood Trust</td>
<td>5.29</td>
<td>2.94</td>
<td>3.77</td>
<td>0.22</td>
<td>7/95-12/11</td>
</tr>
<tr>
<td>Dynex Capital</td>
<td>10.37</td>
<td>8.73</td>
<td>10.36</td>
<td>7.92</td>
<td>1/88-12/11</td>
</tr>
<tr>
<td>RAIT Financial Trust</td>
<td>7.98</td>
<td>6.15</td>
<td>2.80</td>
<td>-0.97</td>
<td>12/97-12/11</td>
</tr>
<tr>
<td>Capital Trust</td>
<td>1.20</td>
<td>3.25</td>
<td>-3.78</td>
<td>-3.70</td>
<td>11/80-12/11</td>
</tr>
</tbody>
</table>

The dependent variable is the excess return on individual mortgage REITs. Companies are chosen to have at least 10 years of data.
Agency mREITs in Optimal Portfolio

- What is weight of Agency resi mREITs in a mean-variance efficient portfolio, using data from 1990-2011?
- 9%; portfolio has annual ret of 9.5% and Sharpe ratio of 1.4.
Summary

- Mortgage REITs as an asset class have had low risk-adjusted returns over past 20 and 40 years.
- This under-performance is due to non-agency and commercial mREITs.
- Agency mREITs delivered positive abnormal returns; returns outpacing the stock market and even equity REITS since 1990.
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There is heterogeneity in performance across mREITs within each food group.
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Are there other risks in mREITs, historically and going forward?
Missing Relevant Risk Factors?

- Maybe previous analysis misses important risk factors that drive mREIT returns?
- Do *unexplained* returns from 4-factor model covary with other macro factors?

**Table: Analyzing Unexplained mREIT Returns**

<table>
<thead>
<tr>
<th>Correlation with:</th>
<th>All mREITs (1971-2012)</th>
<th>1990-2012</th>
<th>Agency mREITs (1990-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Activity</td>
<td>−0.10</td>
<td>−0.15</td>
<td>−0.08</td>
</tr>
<tr>
<td>Recession</td>
<td>0.04</td>
<td>0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>House Price Growth</td>
<td>0.04</td>
<td>0.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Mortgage Basis</td>
<td>0.05</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Corp. Credit Factor</td>
<td>0.04</td>
<td>0.05</td>
<td>−0.02</td>
</tr>
<tr>
<td>All</td>
<td>0.21</td>
<td>0.24</td>
<td>0.14</td>
</tr>
</tbody>
</table>
When Do Agency mREITs Crash?

- Look at 20% lowest abnormal Agency mREIT returns (53 mos).
  Agency mREIT (abnormal) returns are -9.5% (-10.7%) on average, or 1.25 standard deviations below average.
Predicting mREIT Returns

- Forecast twelve-month ahead mREIT index returns using:
- (1) spread 30yr FRM and short rate, (2) dividend-price ratio
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- Forecast twelve-month ahead mREIT index returns using:
  - (1) spread 30yr FRM and short rate, (2) dividend-price ratio
- Actual and predicted return have 45% correlation
Recent Past/Near Future

- Mortgage-short rate spread: -60bps btw. Dec. 2011 and Dec. 2012; coeff. is 6, effect is -3.6%
Recent Past/Near Future

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- Dividend yield: -14%; coeff. is 0.33, effect is -4.6%
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- Dividend yield: -14%; coeff. is 0.33, effect is -4.6%
- Predicted 12-month ahead return has fallen from 11.9% in Dec 2011 to 3.7% in Dec 2012
- Predicted mREIT return of 3.7% for 2013 is modest...
- ... but the possibility of an increasingly upward sloping term structure bodes well for future returns, especially if it coincides with increasing dividend yields
Concluding Thoughts

- Non-agency resi and commercial mREITs will need to make major changes to business model to overcome weak track record
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- Agency mREITs, however, have built strong track record and seem well positioned to take advantage of reduced role of GSEs/Fed in future.
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- In addition to the risk factors discussed, funding via short-term repos remains a key vulnerability.
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- Agency mREITs, however, have built strong track record and seem well positioned to take advantage of reduced role of GSEs/Fed in future.

- In addition to the risk factors discussed, funding via short-term repos remains a key vulnerability.

- Interesting areas of research:
  - Identifying sources of out-performance of Agency mREITs as a whole.
  - mREIT out-performance attribution to individual firms.