Mortgage REITs and Reaching for yield

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Financial intermediation and low interest rates

- Important for policymakers to monitor emerging financial system trends, especially in light of sustained low interest rate environment.
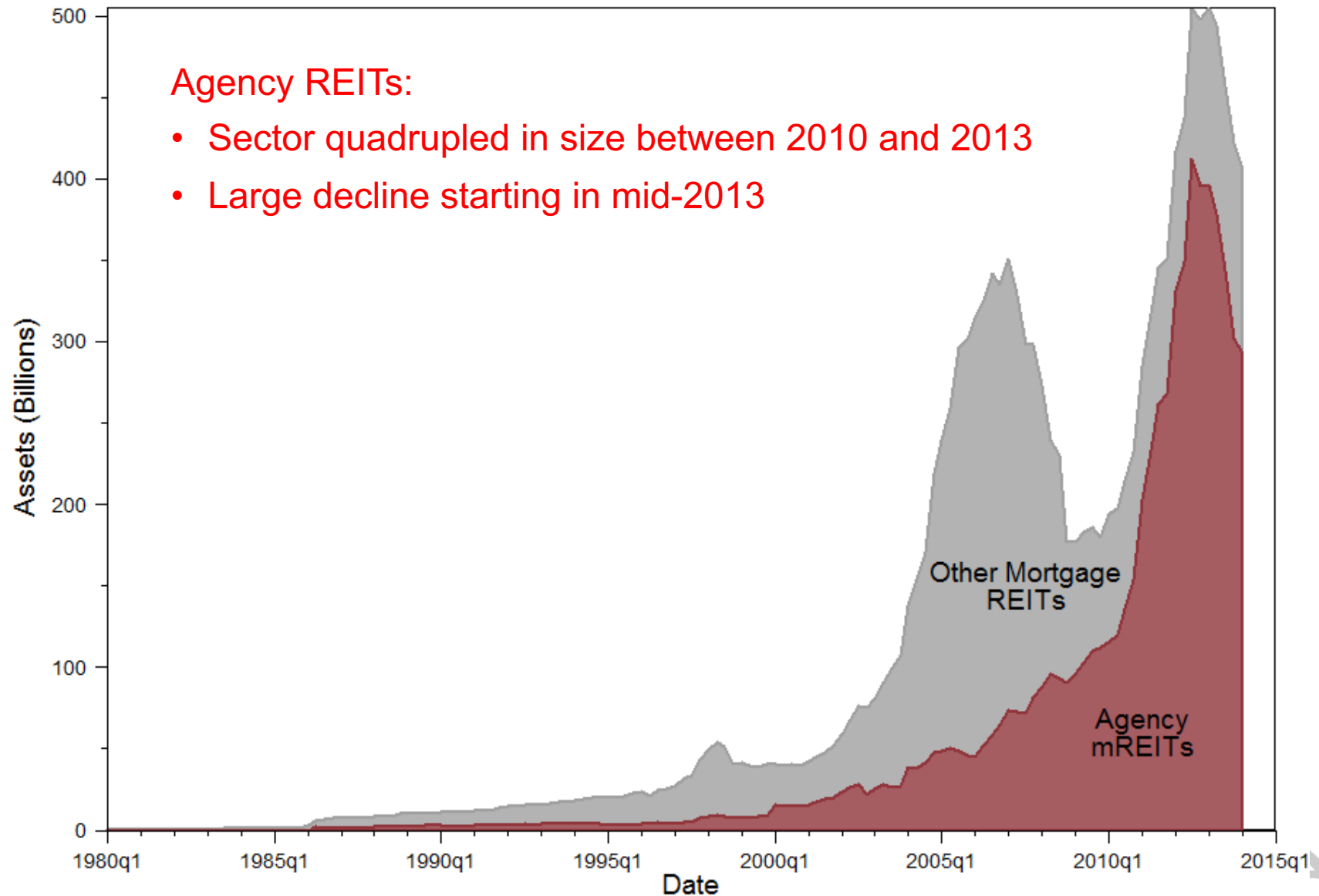
  a prolonged period of low interest rates, of the sort we are experiencing today, can create incentives for agents to take on greater duration or credit risks, or to employ additional financial leverage, in an effort to 'reach for yield.'

  - Gov. Jeremy Stein (2013)

- <u>Today</u>: mortgage real estate investment trusts (REITs).

  - Particular corner of U.S. financial system that has grown rapidly in recent years.

Growth in the mortgage REIT sector

Agency REITs:

- Sector quadrupled in size between 2010 and 2013
- Large decline starting in mid-2013

Plan for today

- What are mortgage REITs, and why should we care?

- What economic factors account for rapid growth in agency REIT sector, and recent decline?

  - Investment skill? Return chasing? Low rates? Institutional factors (e.g., regulation?)

- Our (tentative) interpretation of the evidence:

  - Agency REITs give retail investors leveraged exposure to MBS market.

  - This "manufactured leverage" has been valued in recent years, reflecting low yield environment.
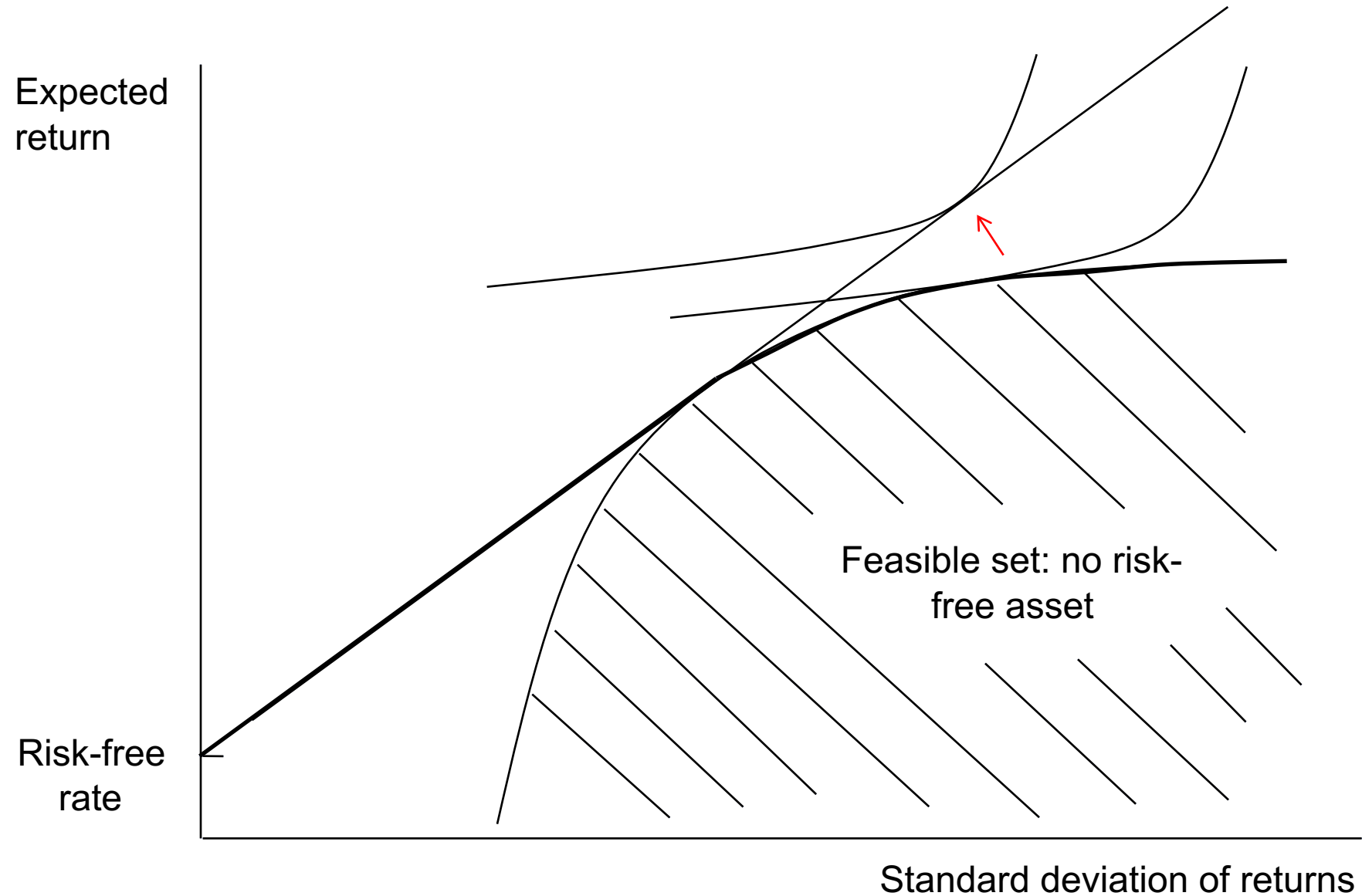
Stylized agency REIT balance sheet

Mortgage-backed securities	$95	Repurchase agreements	$80
Cash	$5	Long-term debt	$5
		Total liabilities	**$85**
Total assets	**$100**	**Equity**	**$15**

Main features:

- **Agency mortgage-backed securities** (MBS). Significant interest rate & prepayment risk. No credit risk, however.

- **Maturity mismatch**: LT assets (yield $\approx$ 200-350bp) funded by ST liabilities, mainly repo (yield $\approx$ 25-75bp). IRR mitigated via swaps.

- **Leverage**: Debt/equity ratio $\approx$ 400-800%.

Leverage in context of portfolio theory

Expected return

Risk-free rate

Feasible set: no risk-free asset

Standard deviation of returns

Dividend yields of agency REITs

- Leverage + maturity mismatch = high dividend yields. (Recent dividend yields of two largest agency REITs around 11%.)

Yield (%)

Mortgage REIT Dividend Yield

10-Year Treasury Yield
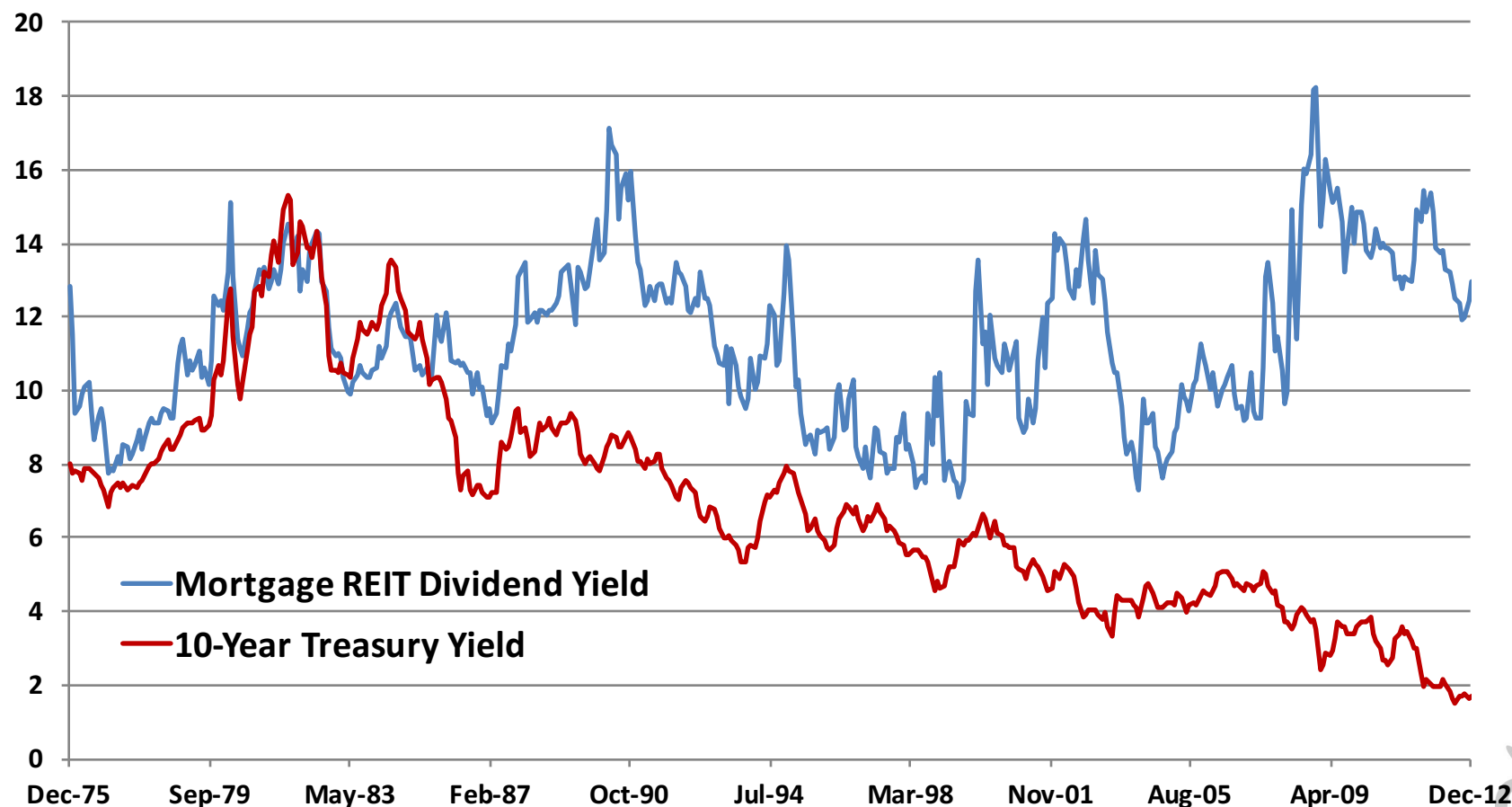
Mortgage REITs and the low rate environment

- *REITs that purchase Freddie and Fannie debt currently pay dividends of about 12%, compared with 3.4% for equity REITs and 1.8% for U.S. Treasury bonds. Low rates are driving investors into instruments such as REITs that promise high returns.*

  - Wall Street Journal (2013)

- *mREIT sector has mushroomed since the financial crisis, thanks to a yield curve that favors the mREIT business model and a low interest rate environment that fosters 'reaching for yield' on the part of investors despite the associated risks.*

  - Pellerin et al. (2013)

- <u>Financial stability concerns</u>: possibility of asset fire sales if REIT unable to roll over short-term repo, forced to liquidate positions.

Do agency REITs generate alpha?

- One hypothesis: flows into agency REIT sector represent a response to skill (i.e. positive *risk-adjusted* returns).

  - E.g. does α explain high returns for agency REITs between 2010-13?

- We estimate simple asset pricing models to test this hypothesis.

Cumulative Value of $1 Invested at End of 1993
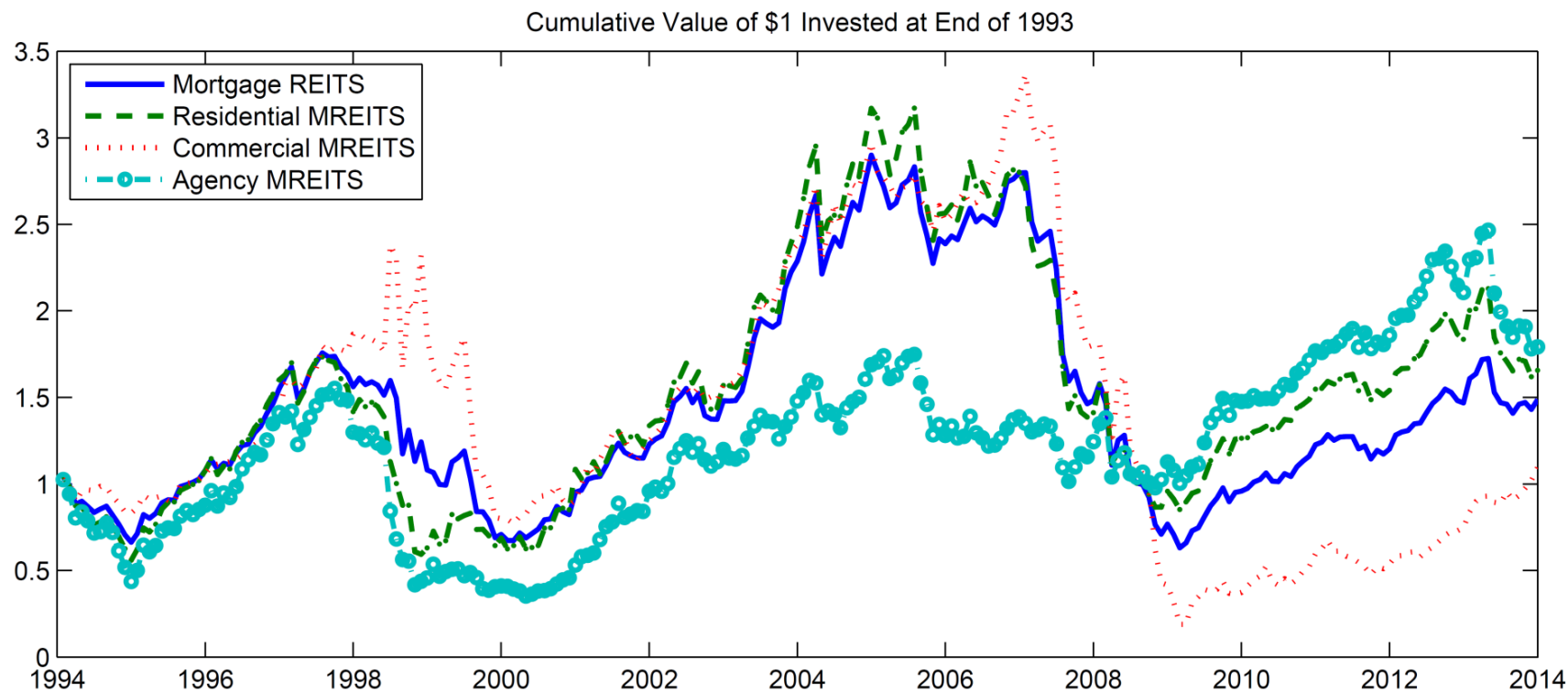
Asset pricing model of mortgage REITs

Monthly time-series model of excess returns on mortgage REITs.

We hand-classify mortgage REITs based on the composition of their assets (from SEC filings). Construct return sub-indices for different types of mREITs.

Four factor asset pricing model:

(i) Barclays MBS index   Benchmark index of agency MBS total returns

(ii) Market   Aggregate excess stock market returns

(iii) SMB   Excess return on small-minus-big portfolio.

(iv) HML   Excess return on high-minus-low book-to-market portfolio.

Empirical estimates: Four factor model

Dep. variable: excess return on mortgage REIT type (agency, commercial etc.).

Sample: 1994 to 2013, monthly data.

	(1) All mREITS	(2) Resi	(3) Comm	(4) Agency	(5) Non-Ag
$Const$	−10.80	−10.52	−10.43	−9.63	−15.63
t-stat	−2.63	−2.08	−1.77	−1.74	−2.31
R^{mbs}	2.37	3.11	0.84	3.39	2.44
t-stat	6.70	6.92	1.53	6.29	3.54
R^m	0.70	0.51	1.27	0.46	0.85
t-stat	8.60	5.19	8.28	4.74	5.30
R^{smb}	0.43	0.55	0.50	0.49	0.67
t-stat	4.96	4.16	2.97	3.20	4.40
R^{hml}	0.77	0.75	1.29	0.51	1.17
t-stat	7.37	4.91	5.39	3.74	5.35
R^2	43.17	31.08	44.18	26.91	32.33

Alpha for agency REITs: rolling sample window

Alpha (4-factor model)
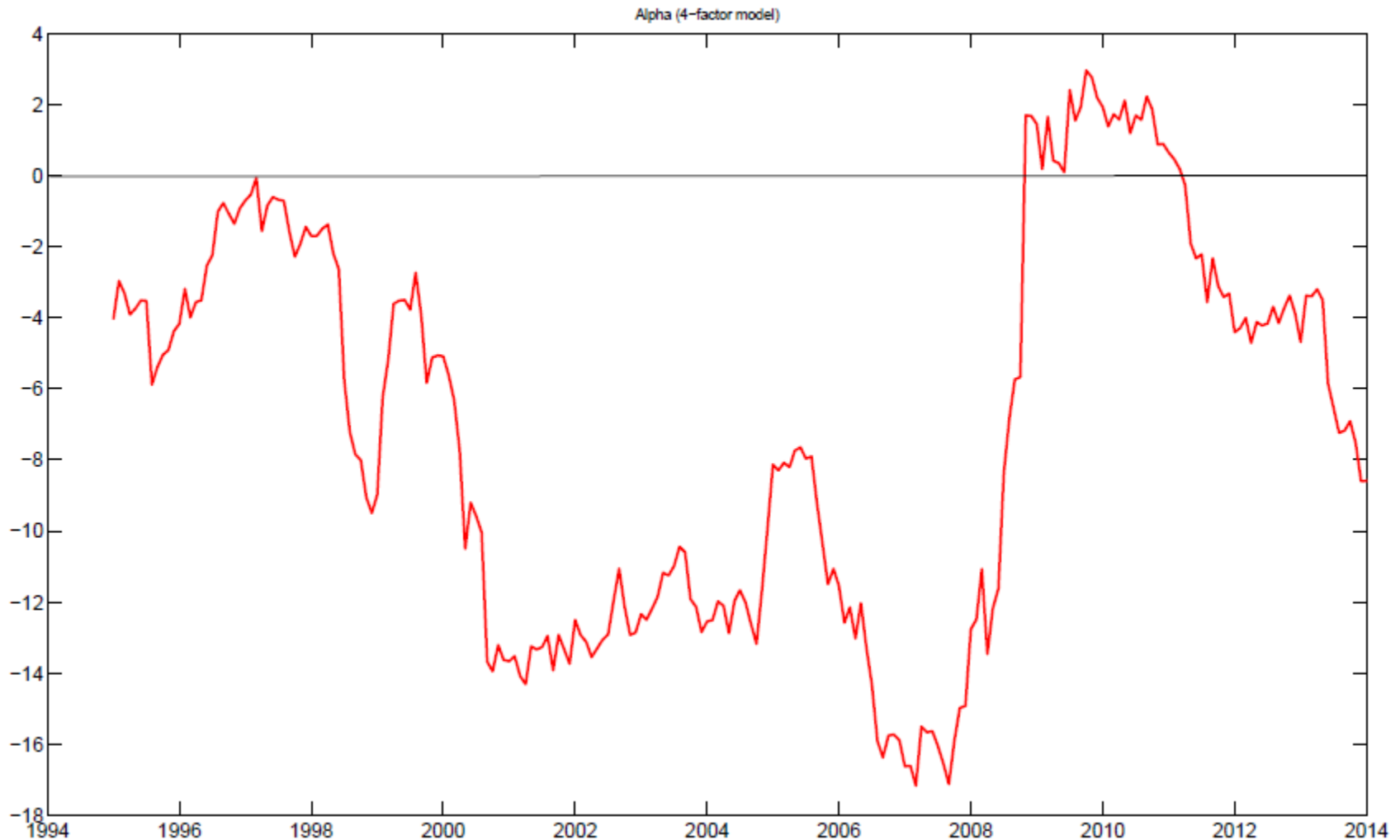
Agency REIT factor: rolling sample window (120 months)
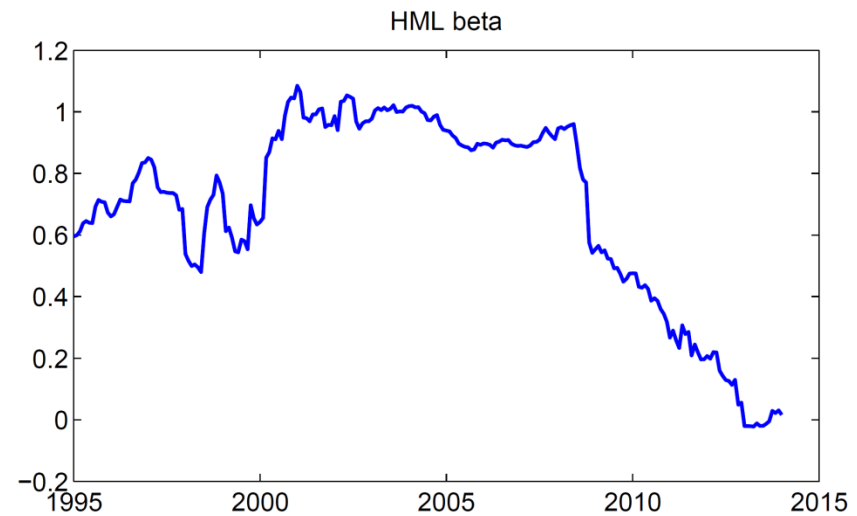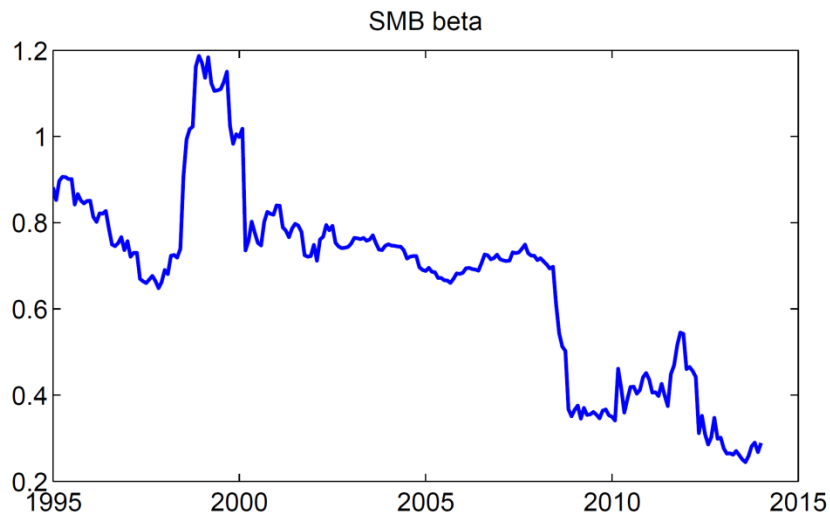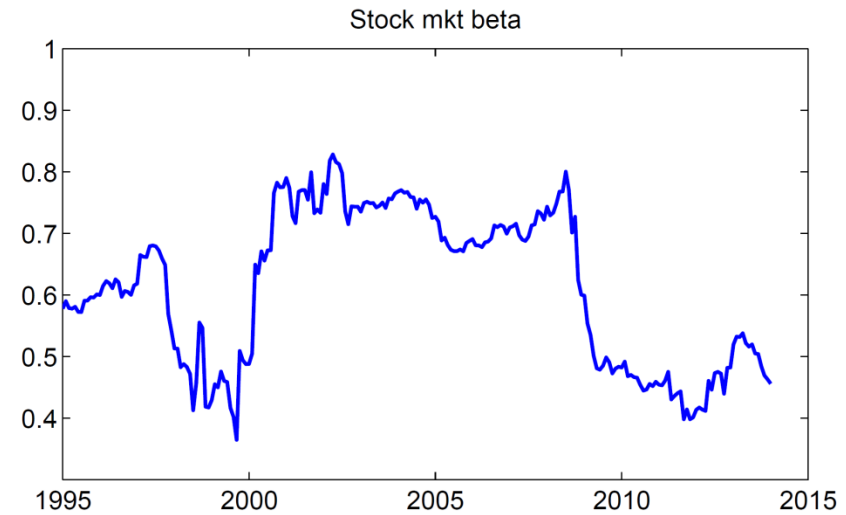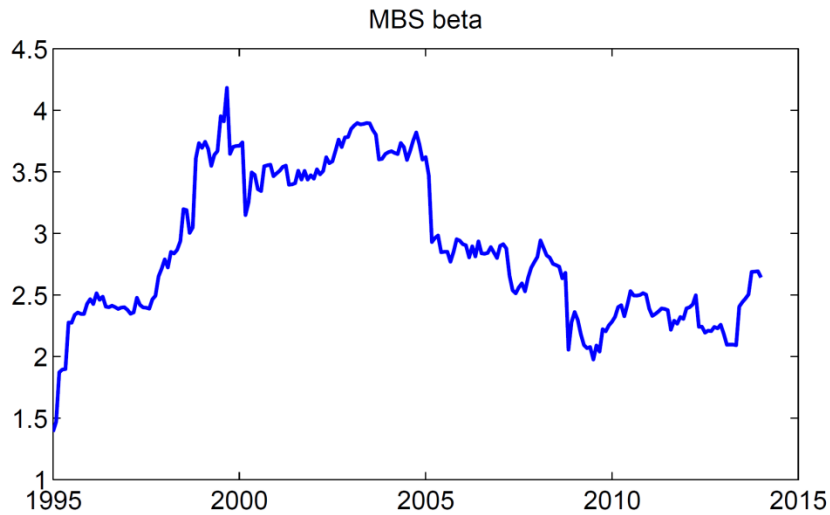
Sifting the evidence

- Finding: No evidence of positive alpha for aREITs. (If anything $\alpha < 0$.)

  - Strong sector returns from 08-11 reflect *beta*: high loading on MBS factor.

<u>Next</u>: Additional evidence on demand for agency REITs:

1. Determinants of **flows** into agency REITs (net equity issuance):

   - *Dividend yield*: proxy for amount of risk transformation that the REIT is engaged in.

   - *Price / NAV*. etc.

2. Study **composition** of investors. Compute "retail share" (i.e. % of non-institutional investors) using 13-F SEC filings.

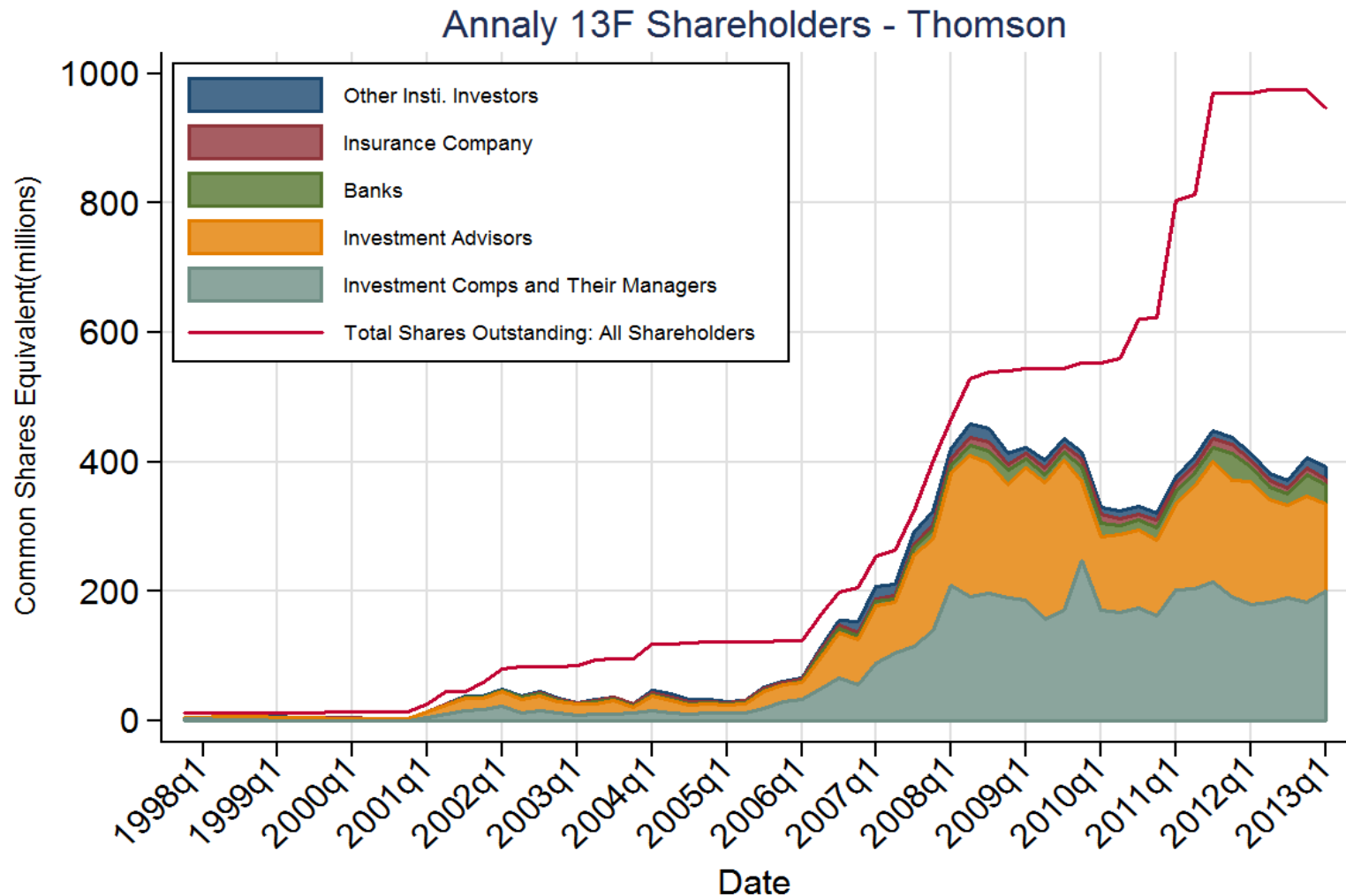# Dependent variable: log equity issuance for agency REITs

[Regression also includes other controls + firm & time fixed effects]

	(1)	(2)	(3)	(4)	(5)	(6)
$ln(D/P)$	0.483**	1.646**	0.386	1.655**	0.344	1.995**
	(0.198)	(0.536)	(0.259)	(0.529)	(0.294)	(0.502)
$ln(D/P) * lnYield_{10yr}^{CMT}$		-0.278**		-0.291**		-0.382**
		(0.132)		(0.114)		(0.110)
$Return_t$			-1.050**	-1.052**	-0.535	-0.707**
			(0.402)	(0.299)	(0.351)	(0.277)
$Return_{t-1}$			-0.198	-0.231	-0.213	-0.122
			(0.292)	(0.267)	(0.357)	(0.222)
$ln(P/NAV)$			0.950	4.558**	-0.012	3.686**
			(0.780)	(0.651)	(0.725)	(0.766)
$ln(P/NAV) * lnYield_{10yr}^{CMT}$				-0.943**		-0.868**
				(0.188)		(0.219)

Measuring the "retail share"

We use 13-F filings to measure share of retail investors.

Annaly 13F Shareholders - Thomson

Legend:
- Other Insti. Investors
- Insurance Company
- Banks
- Investment Advisors
- Investment Comps and Their Managers
- Total Shares Outstanding: All Shareholders

X-axis: Date (1998q1 to 2013q1)
Y-axis: Common Shares Equivalent(millions)
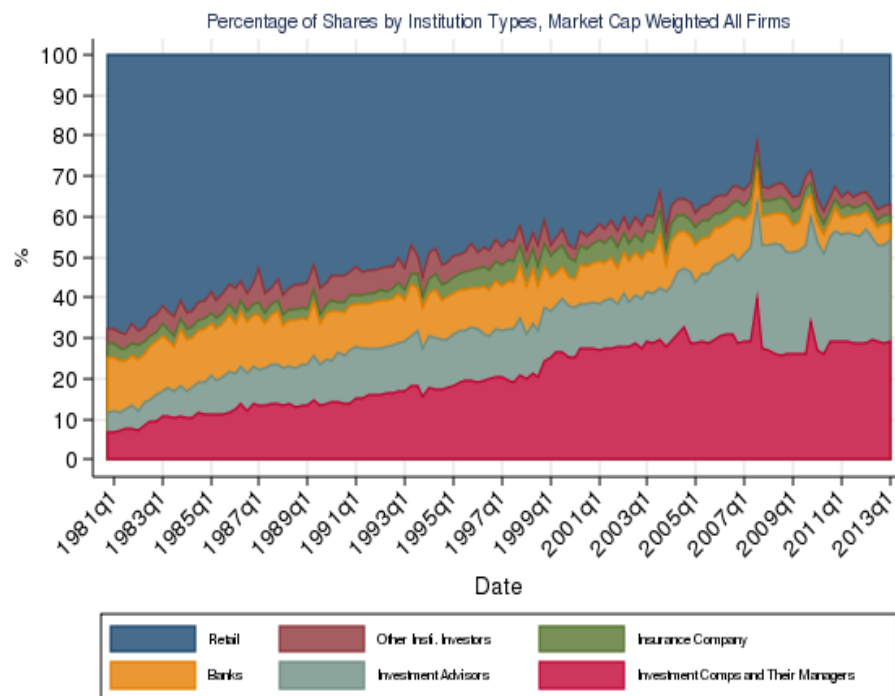
Growing retail share of agency REITs as rates have fallen

- Since 2008: growth in agency REIT sector associated with increasing share of noninstitutional investors (blue area on graph).

- Not true of public corporations as a whole over same period.

Agency REITs only

All public stocks (13F)

Percentage of Agency mREITs Shares by Institution Types, Market Cap Weighted

Percentage of Shares by Institution Types, Market Cap Weighted All Firms

Legend: Retail, Other Insti. Investors, Insurance Company, Banks, Investment Advisors, Investment Comps and Their Managers
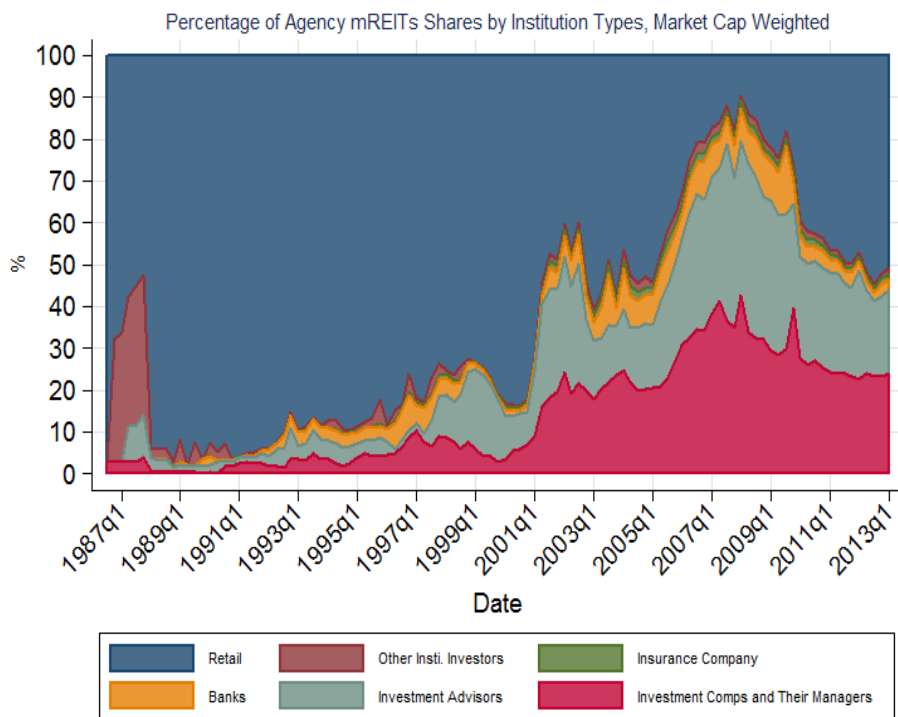
Determinants of retail share for agency REITs

Dependent variable: share of noninstitutional investors (13F data)

	(1)	(2)	(3)	(4)	(5)	(6)
$ln(D/P)$	0.192**	0.180**	0.443**	0.108**	0.090*	0.277**
	(0.041)	(0.044)	(0.112)	(0.043)	(0.047)	(0.092)
$ln(P/NAV)$		-0.297**	-0.344*		-0.222**	-0.443**
		(0.071)	(0.181)		(0.071)	(0.202)
$ln(D/P)*lnYield_{10yr}^{CMT}$			0.013			0.060
			(0.036)			(0.046)
$ln(P/NAV)*lnYield_{10yr}^{CMT}$			-0.063**			-0.047**
			(0.024)			(0.021)
$Return_t$	0.109*	0.230**	0.227**	0.042	0.131**	0.125**
	(0.062)	(0.086)	(0.089)	(0.040)	(0.062)	(0.061)
$Return_{t-1}$	-0.004	-0.004*	-0.004	-0.010**	-0.008**	-0.008**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)

Levered vs unlevered holdings of agency MBS

- Study MBS holdings of agency REITs relative to mutual fund holdings.
  - Both invest in MBS: key difference is that mortgage REITs take leverage.

- Finding: Low Treasury yield ⇔ high aREIT MBS ownership share.

Legend: 10 yr Tsy yields — MBS: Agency REIT as % mutual fund
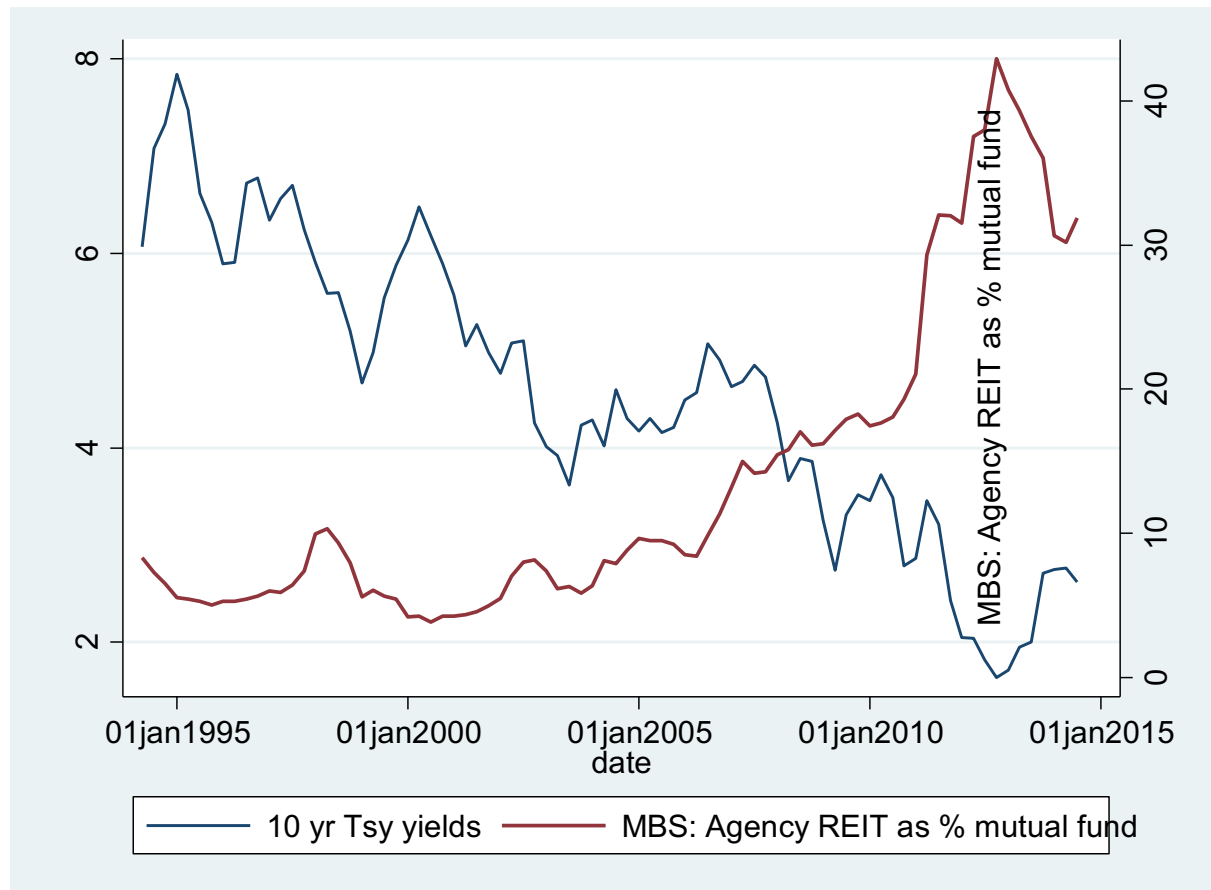
Summing up:

- We study determinants of growth of agency REITs. To what extent can growth in this sector be linked to low-yield environment?

Findings:

1. No evidence that agency REIT growth is due to "skill" (α)

2. Suggestive evidence consistent with reaching for yield

   - Larger flows into agency REITs that do more risk transformation (high D/P); especially when mkt yields are low.

   - High D/P aREITs have a high share of retail investors

   - Time series: larger aREIT MBS holdings when yields are low, relative to mutual funds (shift to leverage).

What's missing?

- Cohesive theoretical model of "reaching-for-yield". Working on this.