Beta Bubbles

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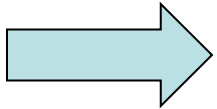Aalto University

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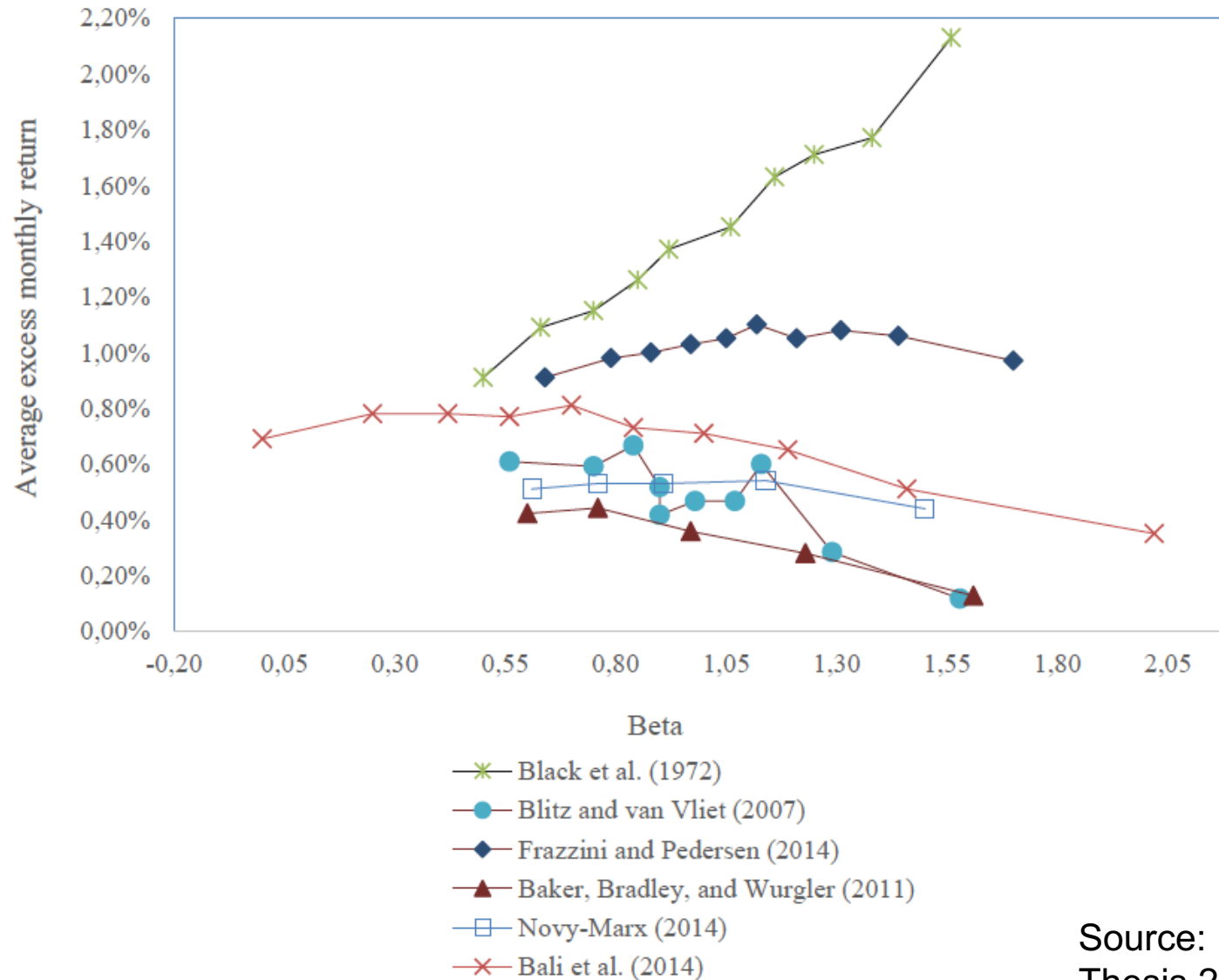Columbia University

Agenda

- Introduction to Beta bubbles
- Empirical Findings
- Conclusion

Introduction to beta anomaly

Source: Miikka Hakala
Thesis 2015, Aalto Univ.

Closely related literature

- Frazzini and Pedersen (2014)
  - Document high returns to short high beta long low beta portfolios
  - Show evidence that mutual funds and individuals are biased towards high beta stocks

- Baker, Bradley, and Wurgler (2011): (the fact that risk is not compensated in returns is) "the greatest anomaly in finance"

- Leading explanations:
  - Leverage constraints (Black, 1972)
  - Benchmarking/differences in opinion (e.g. Baker et al., 2011)
  - Lottery demand (Bali et al., 2014)

Ownership and co-movement

Barberis, Shleifer, and Wurgler (2005) argue that investor groups with similar trading patterns cluster into the same shares ("habitat") thus increasing these stocks' co-movement with each other.

Their theory can explain the puzzling finding in Vijh (1994) that a stock's inclusion in a market index increases its CAPM beta.

Agenda
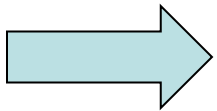
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Sample

- US stock data from CRSP
  - All NYSE, AMEX and NASDAQ stocks, 1980-2014

- Institutional ownership data from Thomson Reuters 13F Filings

- SEO and Repurchase data from SDC Platinum

- Risk factors from Kenneth French website

Key measures

- Breadth of ownership
  - # of institutions owning the stock / # institutions owning stocks in general at that time
  - Cheng, Hong and Stein (2002)

- Breadth of short-term ownership
  - In each time period, all investors are classified as long-term, mid-term or short-term investors based on past two year trading activity
  - Cella, Ellul and Giannetti (2013)

- Exchange-adjusted turnover
  - Share turnover normalized by exchange and time period
  - Accounts for the differences in trading volume reporting standards between NYSE/AMEX and NASDAQ

Estimating betas

We estimate betas using 3 different methods and the results are always similar.

Cohen, Hawawini, Maier, Schwartz, and Whitcomb (1983)
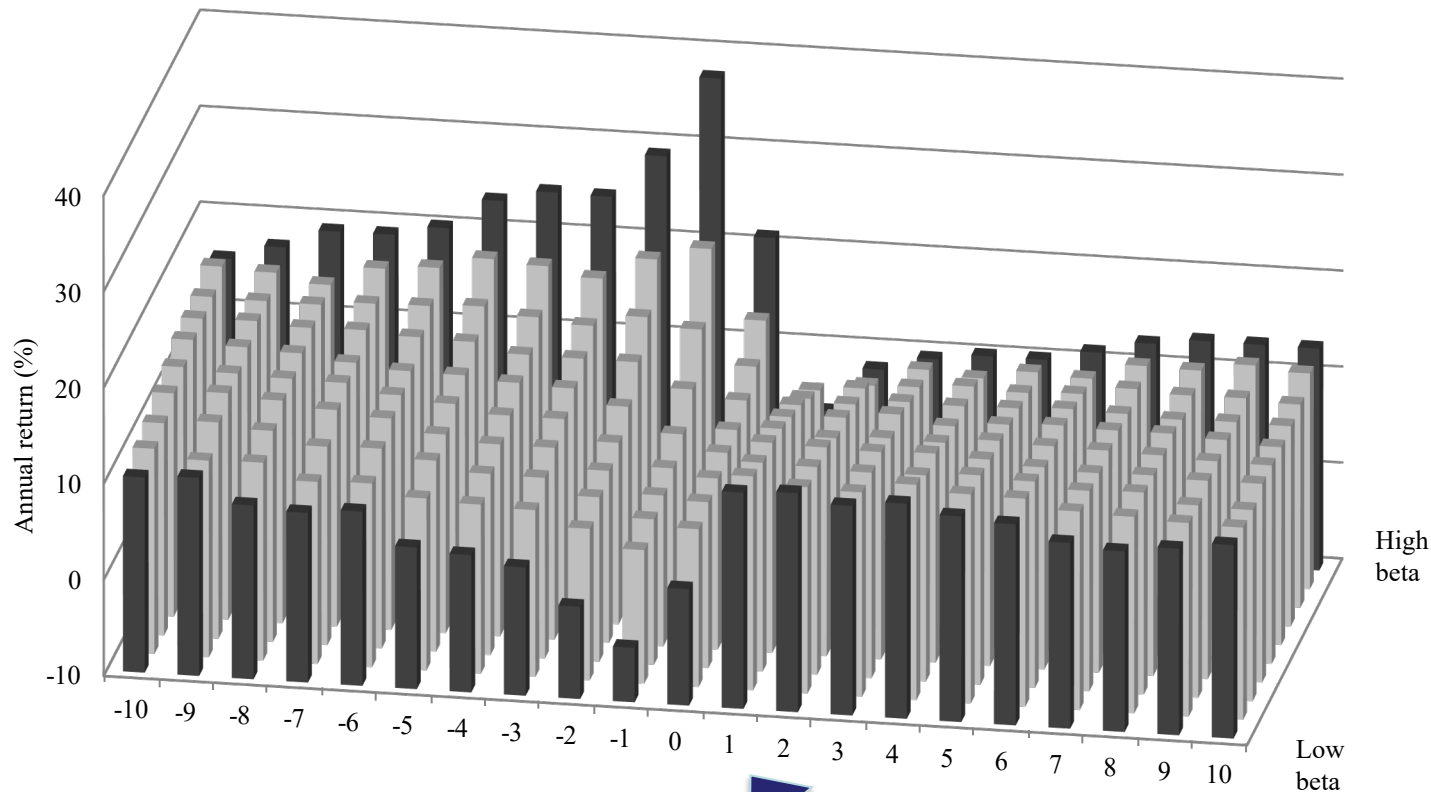
Scholes and Williams (1977)

Dimson (1979)

We also consider shrinking the estimated betas towards one as in Frazzini and Pedersen (2014).

Now our main findings in three Figures

Beta and Returns (Equally weighted)

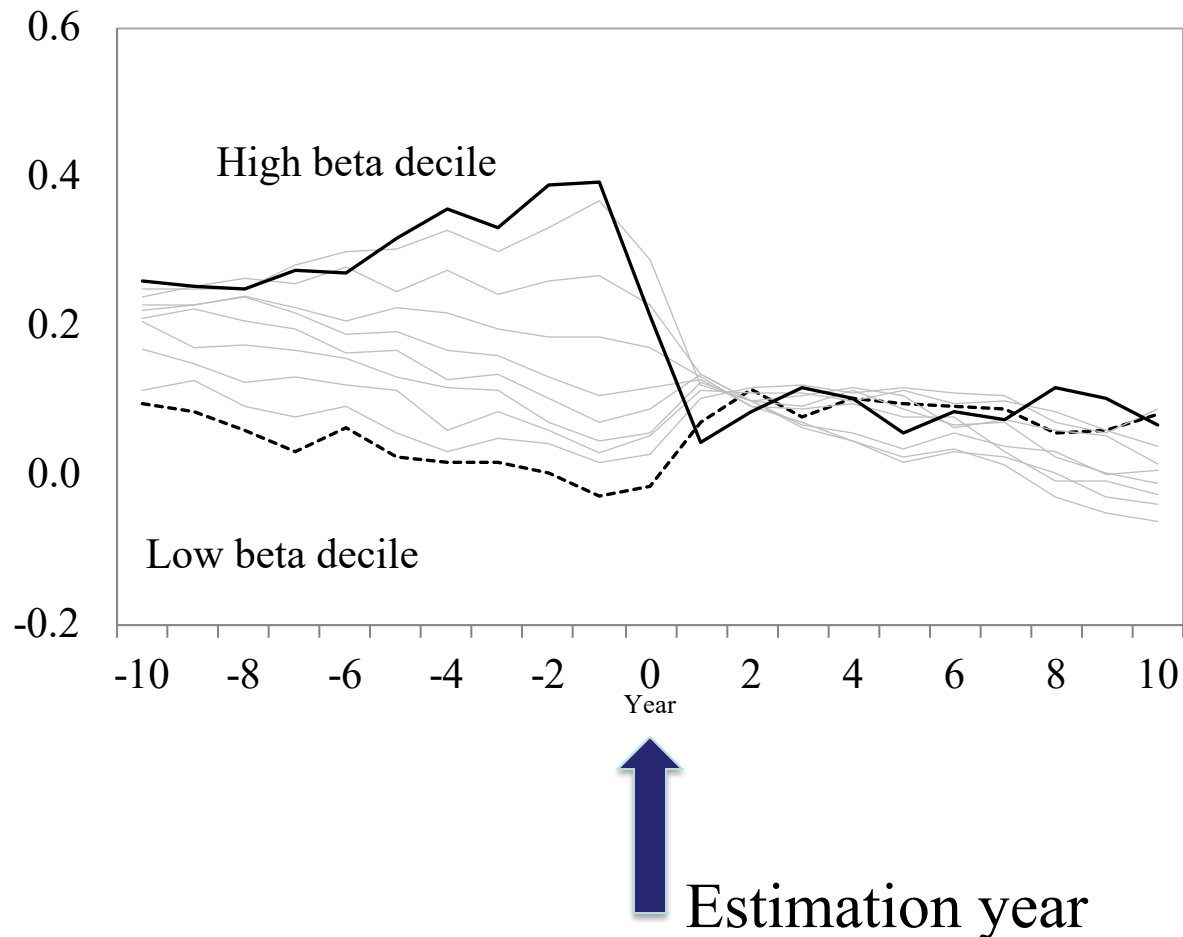Figure 1: Stocks annual returns in beta deciles

Institutional ownership

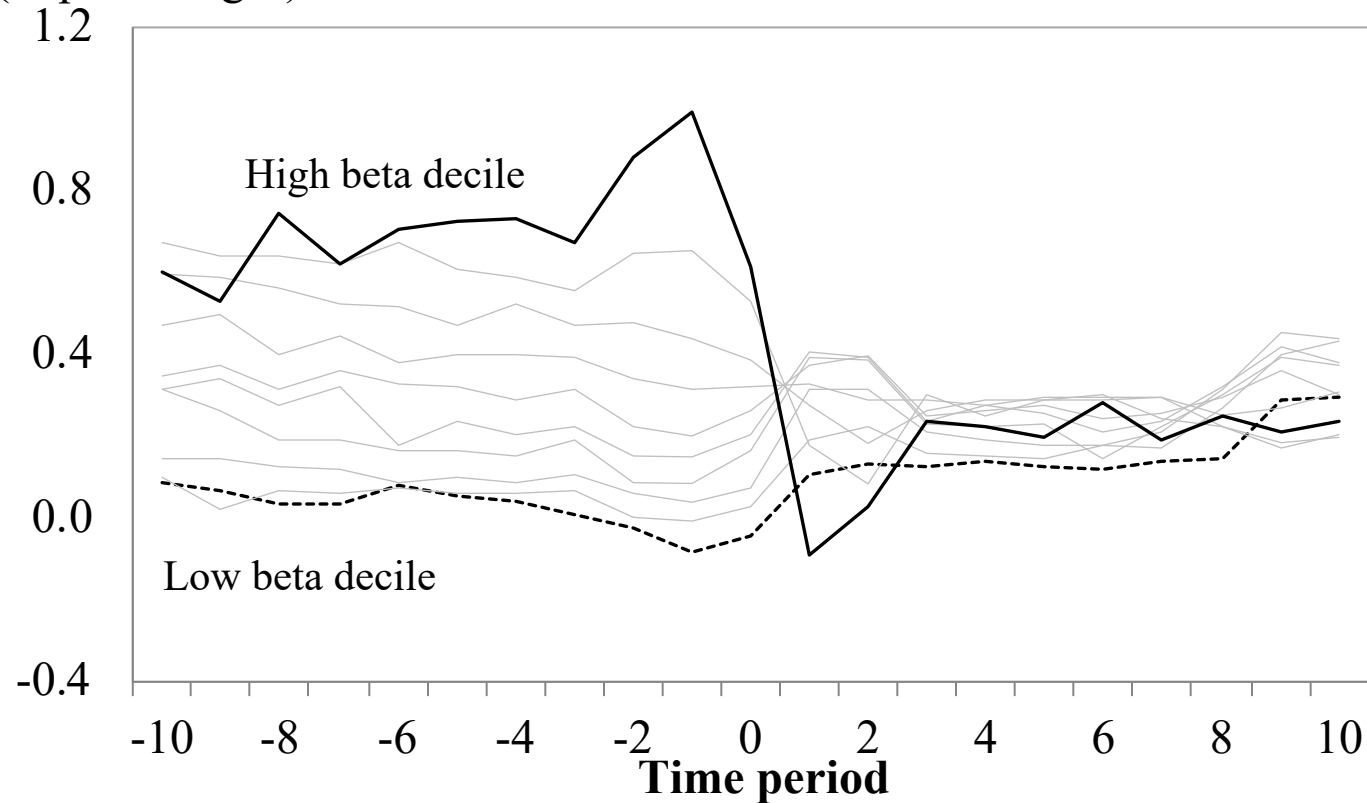Annual change in ownership breadth in beta deciles (%)

High beta decile

Low beta decile

Year

Estimation year

Beta and Breath of short-term ownership

Annual change in short-term breadth in beta deciles
(in percentages)

What can be going on?

- High beta stocks have had large returns prior to beta estimation year
  - Size mechanically increases betas? Not enough to matter!

- High beta stocks have had large increases in institutional ownership prior to beta estimation year
  - Institutional ownership increases betas (habitat theory)?
  - Institutional owners purchase stocks that are becoming high beta stocks as they desire high beta (leading explanation why betas and ownership positively related; e.g Frazzini and Pedersen (2014))?
  - It kind of seems there is a price effect from institutional purchasing (followed by reversal)??

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Tests

- Test if change in institutional ownership increases betas. Regression results say yes, but temporarily.

- Ownership breadth of short-term investors increases, long-term investors decreases betas. Also increase in turnover increases betas.

  – Control for contemporaneous changes in fundamentals like leverage, operational leverage, analyst coverage.

Effect of Δbreadth on Δbeta

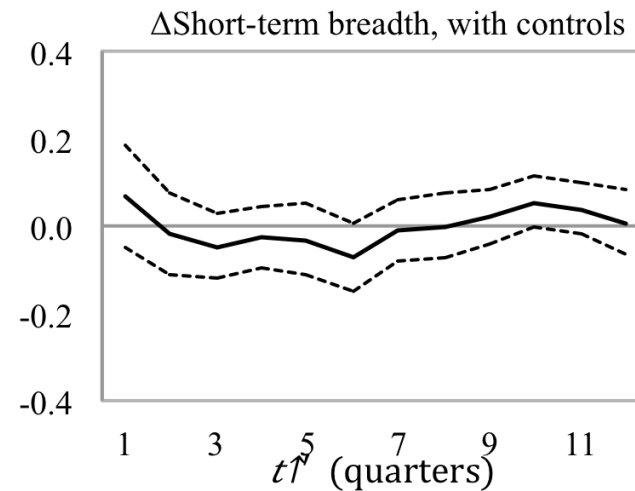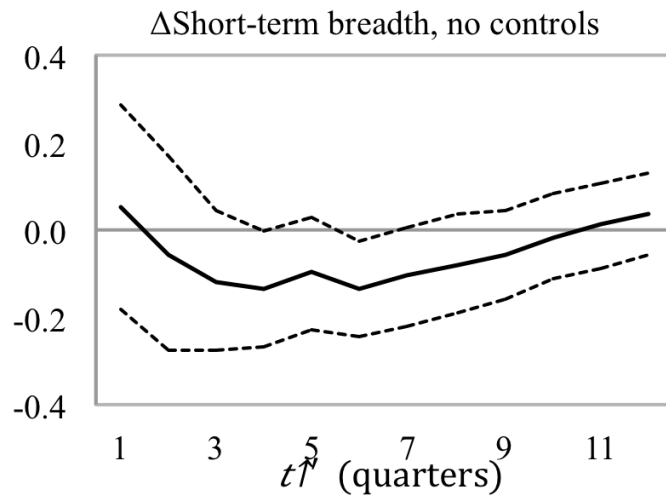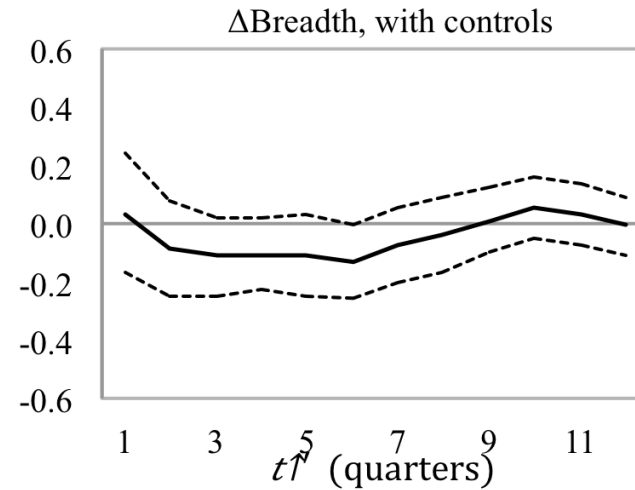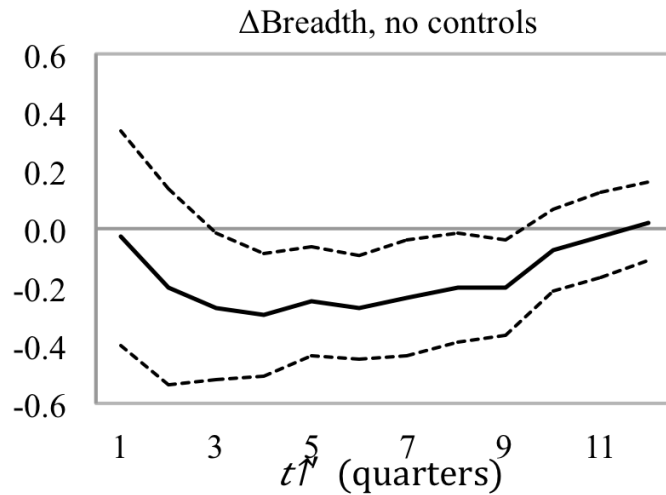| Dependent variable: ΔBeta									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lagged ΔBreadth	**2.331**					**1.519**		**1.235**	
	(3.95)					(3.59)		(2.96)	
Lagged ΔLong-term breadth		0.397					-0.572		**-0.670**
		(1.01)					(-1.78)		(-2.05)
Lagged ΔMedium-term breadth			**0.988**				0.235		0.069
			(2.76)				(0.79)		(0.23)
Lagged ΔShort-term breadth				**1.780**			**1.218**		**1.225**
				(5.16)			(5.35)		(5.30)
Lagged ΔTurnover					**0.015**	**0.037**	**0.036**	**0.037**	**0.036**
					(3.08)	(5.85)	(5.73)	(5.98)	(5.84)
Lagged ΔBeta						**-0.473**	**-0.473**	**-0.472**	**-0.471**
						(-28.55)	(-28.43)	(-26.60)	(-26.44)
Lagged ΔVolatility						**3.390**	**3.362**	**3.599**	**3.614**
						(5.00)	(4.98)	(5.18)	(5.19)
Lagged Return						**0.105**	**0.101**	**0.088**	**0.084**
						(6.22)	(6.05)	(5.73)	(5.54)
Lagged ΔAmihud						513.1	458.7	**-730.0**	**-750.0**
						(0.69)	(0.62)	(-2.77)	(-2.80)
Lagged ΔReversal						**-0.155**	**-0.156**	**-0.149**	**-0.151**
						(-5.88)	(-5.98)	(-5.62)	(-5.78)

Effect of Δbreadth on Δbeta (cont'd)
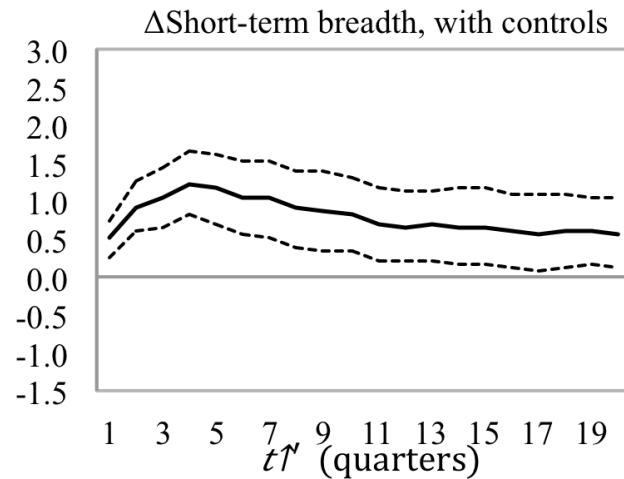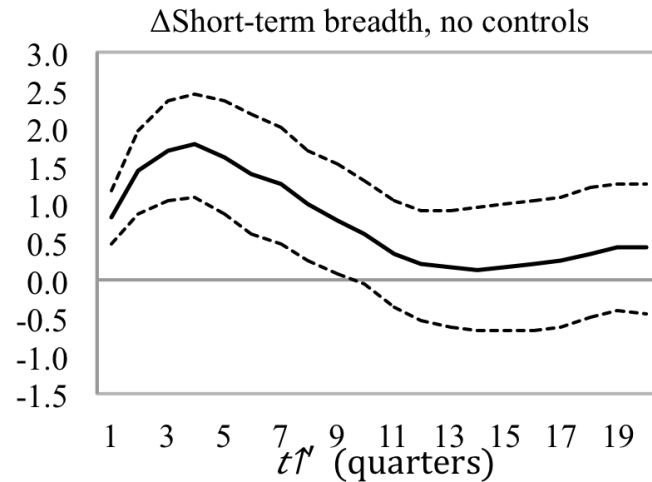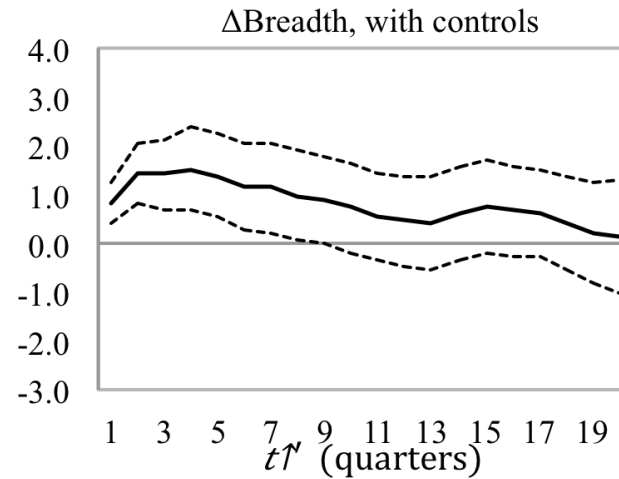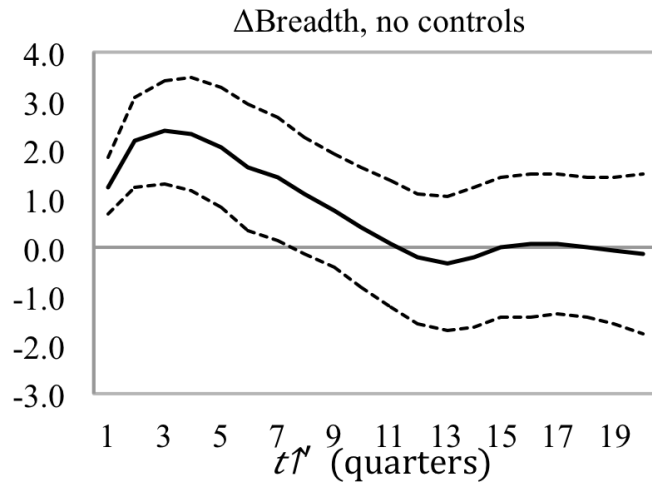
Ownership and returns

- Test if change in institutional ownership reduces expected returns. Weak evidence.

    – Institutional ownership breadth reduces CAPM alphas and helps explain the beta anomaly

Effect of Δbreadth on returns

ΔBreadth, no controls

ΔBreadth, with controls

ΔShort-term breadth, no controls

ΔShort-term breadth, with controls

Causality

Natural experiment: mutual fund scandal in 2003. Some funds caught in illegal trading and this led to large withdrawals from the affected funds. Exogenous change in ownership breadth.

What happens to betas of stocks widely held by the affected funds?

Answer: They go down (as ownership breadth decreases). T-stat 4-7 depending on specifications

Effect is large

Following mutual fund scandal, 50% of the stocks with above median ownership by scandal funds experienced a decrease in beta so big that their beta decile decreased!

One standard deviation decrease in estimated ownership breadth decreases beta by 0.6.

Other results

What happens to betas following

SEOs?

Repurchases?

Splits?

Other results

Dependent variable	SEOs				Splits				Repurchases			
	ΔBeta	ΔBreadth	ΔST breadth	ΔTurnover	ΔBeta	ΔBreadth	ΔST breadth	ΔTurnover	ΔBeta	ΔBreadth	ΔST breadth	ΔTurnover
Panel A: Univariate tests	**0.117**	**0.008**	**0.010**	**0.285**	**0.128**	**0.006**	**0.004**	-0.008	**-0.069**	**-0.001**	-0.002	**-0.063**
	(5.77)	(18.68)	(12.15)	(18.11)	(8.74)	(17.44)	(3.98)	(-0.75)	(-4.42)	(-2.11)	(-1.92)	(-4.71)
Panel B: Fama-MacBeth tests	**0.113**	**0.009**	**0.010**	**0.321**	**0.112**	**0.005**	0.003	-0.001	-0.041	**-0.001**	-0.002	-0.049
	(4.85)	(5.72)	(4.28)	(8.63)	(4.86)	(5.81)	(1.71)	(-0.05)	(-1.70)	(-2.35)	(-1.40)	(-1.91)
Panel C: Matched firm tests	**0.125**	**0.009**	**0.010**	**0.329**	**0.126**	**0.007**	**0.005**	**0.046**	-0.005	0.001	0.002	-0.015
	(7.96)	(13.74)	(11.29)	(17.46)	(10.48)	(20.31)	(8.54)	(4.46)	(-0.26)	(1.07)	(1.15)	(-0.89)

SEOs: Beta increases (ownership breadth increases)

Repurchases: Beta decreases (breadth decreases)

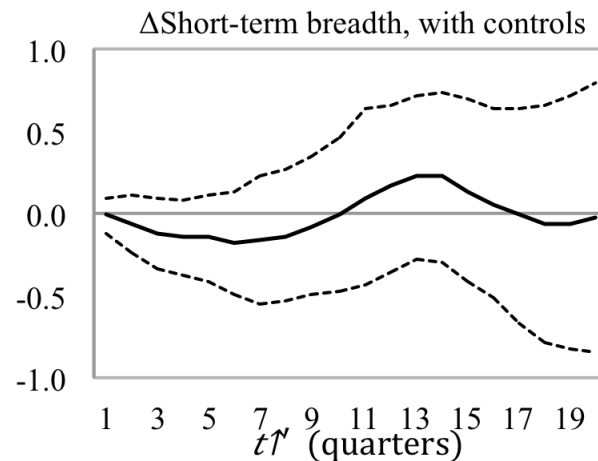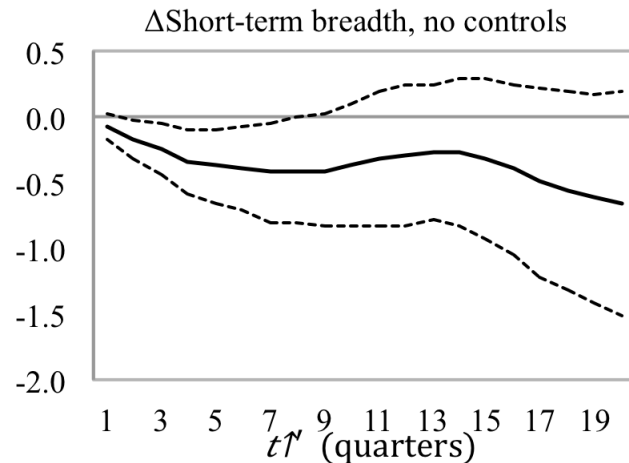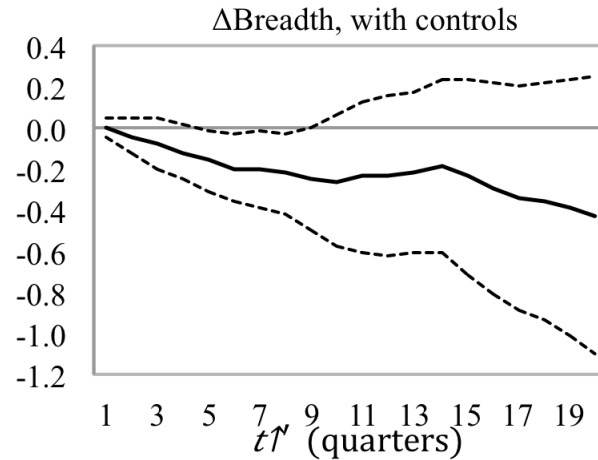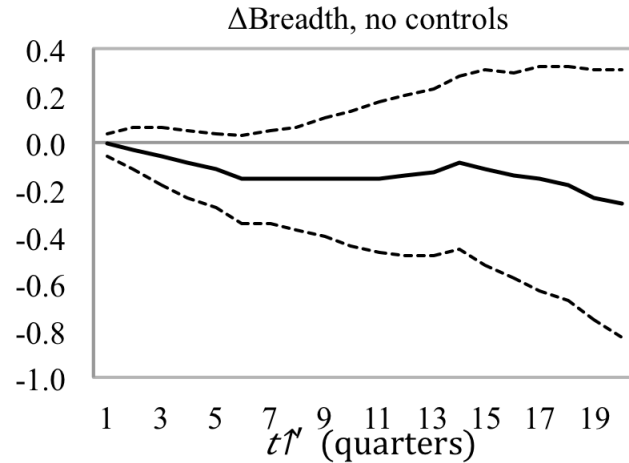Splits: Beta increases (breadth increases)

What about reverse causality?

- Can we find evidence that increases in betas increase institutional ownership?

  – No evidence on this
  – If anything, opposite

Causality examined by explaining market participation with betas

Dependent varible	ΔBreadth				ΔShort-term breadth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged ΔBreadth	0.08 ***			0.05 ***				
	(6.00)			(3.70)				
Lagged ΔLong-term breadth								
Lagged ΔMid-term breadth								
Lagged ΔShort-term breadth					-0.15 ***			-0.18 ***
					(-12.28)			(-14.91)
Lagged ΔTurnover		-0.0003 ***		-0.001 ***		-0.001 ***		-0.001 ***
		(-3.95)		(-6.81)		(-4.87)		(-5.44)
Lagged ΔBeta			-0.00002	-0.0002 *			-0.0005 ***	-0.0001
			(-0.21)	(-1.86)			(-2.64)	(-0.73)
Lagged ΔVolatility				-0.004				-0.01
				(-0.58)				(-1.56)
Lagged Return				0.003 ***				0.004 ***
				(7.12)				(6.37)
Lagged ΔAmihud				3.35				7.7
				(0.97)				(1.02)
Lagged ΔReversal				0.001 ***				0.002 ***
				(2.77)				(2.80)

Causality examined by explaining market participation with betas (cont'd)

ΔBreadth, no controls

ΔBreadth, with controls

ΔShort-term breadth, no controls

ΔShort-term breadth, with controls

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Conclusions

We have argued and presented evidence that

Betas increase following increases in breadth of ownership. These changes in ownership are associated with poor future stock returns.

In contrast to what is often argued in the literature we find no evidence that high beta stocks would attract new owners, vice versa in fact

THANK YOU FOR YOUR ATTENTION ☺

Same in value weighted portfolios

Figure 1. Annual return by beta decile
(in percentages)
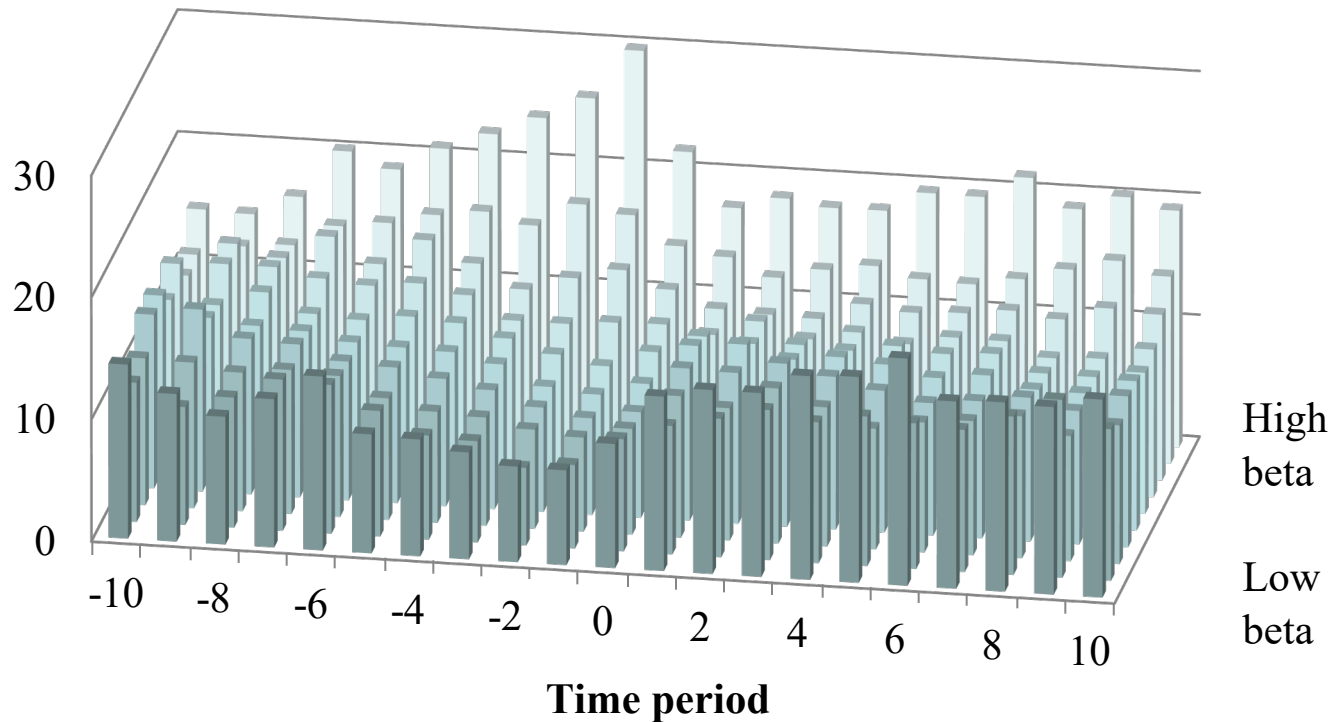
Hypothesis

- Assets with institutional owners

    - comove more with the market (higher beta)

    - They have higher trading volume

    - Lower expected returns (better risk sharing due to more owners; short term price pressure)
    - Increases in the number of owners increase stock's betas (not the other way around as assumed typically in the literature)