Heterogeneity among Institutional Investors: Portfolio Choices, Trading Behavior, and Stock Returns

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Motivation

- Studies on institutional trading decisions and their impact on prices typically use an aggregate sample of diverse institutions
  - They treat institutional investors as a homogeneous group of managers
- These studies typically examine the behavior and price impact of two types of investors:
  - Institutional investors – the aggregate sample
  - Individual investors – the trading counterparty

Motivation, cont'd

- Institutional investors can be disaggregated into institutional types
- Heterogeneity in institutional types may be related to several characteristics:
  - investment horizon
  - incentives
  - investment objectives
  - trading constraints
- Heterogeneity in institutional types may imply differences in:
  - Portfolio choices
  - Trading behavior
  - Impact of trading on stock returns

Motivation, cont'd

- Analysis of more disaggregated samples of institutions are difficult because of lack of data
- Institutions reporting holdings to SEC (form 13-F) are not accurately classified into institutional types by data provider
- A large set of institutional investors remains unclassified or is erroneously classified after 1998

This paper

- Study all institutions filing SEC form 13-F between 1980 and 2006: 4855 institutional managers
- Classify these managers into 11 different institutional types
- Analyze differences across types of institutions with respect to:
  - Portfolio choices
  - Trading behavior
  - Impact of trading on stock returns
- Evidence of heterogeneity across institutional investors of different type

Related work

- On institutional managers' preferences:
  - Falkenstein (1996), Gompers and Metrick (2001), Bennet, Sias, and Starks (2003), Yan and Zhang (2009), Griffin and Xu (2009)
- On institutional trading behavior:
  - Lakonishok, Shleifer and Vishny (1992), Grinblatt, Titman and Wermers (1995), Wermers (1999), Sias (2004)
- On the price impact of institutional trading:
  - Wermers (1999), Cohen, Gompers and Vuolteenaho (2002), Sias (2004), Coval and Stafford (2007), Frazzini and Lamont (2008)

Data description

- The sample includes quarterly observations for firms listed on NYSE, AMEX and NASDAQ, during the period 1980-2006
- Prices and other stock characteristics are from CRSP and Compustat
- Information on holdings comes from CDA/Spectrum database maintained by Thomson Financials: institutions with more than $100 million under discretionary management are required to file form 13-F with the SEC and report all equity positions greater than either 10,000 shares or $200,000 in market value

Data description, cont'd

- Thomson database classifies institutional managers into five categories: banks, insurance companies, mutual funds, independent advisors, and a residual category of unclassified managers.
- The residual category includes pension funds, university endowments, foundations, and other unidentified institutional managers.
- There are imprecisions in the classification of institutions by type. Furthermore, starting in 1998 a large number of institutions is erroneously classified in the residual category due to a mapping error.

Data classification

- I classify all managers in the dataset by institutional type, using different sources:
  - Hedge fund databases (CISDM)
  - Barron's and other financial press
  - SEC list of Investment Advisors
  - CRSP mutual fund families database
  - Institutions' own web sites
- I obtain 11 different institutional types

Types of institutional investors

Type		Number	Fraction
1	Banks and Trusts (BT)	648	13.35
2	Insurance companies (IC)	173	3.56
3	Mutual Fund Families (MF)	751	15.47
4	Investment Advisors (IA)	2163	44.55
5	Hedge Funds (HF)	839	17.28
6	Pension funds (PF)	67	1.38
7	Companies (PC)	68	1.4
8	Foundations and charities (FC)	24	0.49
9	Private Equity (PE)	51	1.05
10	Venture Capital (VC)	54	1.11
11	Endowments (E)	17	0.35
Total		4855	100

Portfolio value

Type	Portfolio value		Market share	Port. turnover
	Median ($mill)	Total ($bill)	%	Median
BT	294.88	359.11	5.94%	0.11
IC	632.92	235.39	3.96%	0.14
MF	566.25	1590.35	27.03%	0.17
IA	232.15	748.26	12.67%	0.16
HF	290.38	105.36	1.79%	0.24
PF	3476.63	231.25	3.90%	0.10
PC	399.43	21.55	0.35%	0.11
FC	623.02	8.66	0.14%	0.07
PE	221.80	1.82	0.03%	0.21
VC	226.16	3.23	0.05%	0.13
E	359.72	20.00	0.33%	0.11

Institutional preferences for stock characteristics

- Examine the characteristics of portfolio holdings of different institutional types
- Regression of institutional ownership on stock characteristics for different institutional types

Portfolio characteristics of different institutional types

Type	Cap ($bill)	NYSE decile	B/M	Turn	R_t	$R_{t-3:t-1}$	Beta	Idio
Agg	1.975	2.30	0.75	0.07	0.045	0.151	0.79	0.09
BT	1.544	1.96	0.77	0.07	0.041	0.140	0.72	0.11
IC	1.892	2.29	0.70	0.07	0.043	0.156	0.83	0.08
MF	1.426	1.92	0.78	0.06	0.042	0.144	0.71	0.11
IA	1.468	1.96	0.76	0.07	0.042	0.147	0.72	0.11
HF	2.047	2.38	0.71	0.08	0.050	0.170	0.84	0.07
PF	2.072	2.40	0.69	0.07	0.040	0.145	0.85	0.08
PC	3.931	3.18	0.63	0.09	0.045	0.165	0.98	0.05
FC	7.138	3.79	0.58	0.09	0.051	0.163	1.04	0.04
PE	11.668	3.20	0.67	0.09	0.072	0.169	0.86	0.06
VC	7.619	2.60	0.51	0.14	0.031	0.228	1.24	0.14
E	4.567	3.26	0.62	0.09	0.043	0.160	0.96	0.05

Regression analysis of portfolio preferences

- Define institutional ownership for stock i and institutional type k:

$$IO_{it}^{k} = \sum_{j=1}^{N_k} \frac{shares_{i,j,t}}{shares\ out_{i,t}}$$

- Regressions of institutional preferences:

$$\begin{aligned} IO_{it}^{k} &= b_0 + b_1 Cap_{it} + b_2 BM_{it} + b_3 Turn_{it} + b_4 Ret_{it} + b_5 Ret_{it-3:t-1} \\ &\quad + b_6 Volat_{it} + b_7 Beta_{it} + b_8 IdioVol_{it} + e_{it} \end{aligned}$$

- Independent variables are expressed in decile ranks
- Coefficient estimates are time-series averages of coefficients from cross-sectional quarterly regressions (Fama-MacBeth (1973)); standard errors are adjusted for autocorrelation

Portfolio preferences by institutional type

Coefficients x 100

Type	Cap	BM	Turn	R_t	$R_{t-3:1}$	Beta	Idio
Agg	3.87	0.55	2.76	-0.27	-0.28	0.30	-0.90
	(32.78)	(5.92)	(10.41)	(-8.81)	(-6.59)	(2.76)	(-12.97)
BT	0.71	0.05	0.00	-0.04	-0.06	0.01	-0.21
	(11.82)	(4.10)	(-0.05)	(-7.51)	(-5.02)	(0.74)	(-6.48)
IC	0.31	0.11	0.11	-0.05	-0.05	0.00	-0.05
	(7.47)	(6.23)	(7.08)	(-7.50)	(-6.10)	(-0.13)	(-2.49)
MF	1.26	0.21	1.34	-0.06	-0.02	0.15	-0.28
	(6.81)	(4.02)	(6.99)	(-2.51)	(-0.75)	(2.74)	(-7.79)
IA	0.49	0.00	1.04	-0.03	0.01	0.09	-0.30
	(8.91)	(0.08)	(12.48)	(-1.79)	(0.66)	(2.29)	(-10.22)
HF	-0.30	0.11	0.27	0.03	0.04	-0.03	-0.07
	(-10.45)	(6.91)	(5.75)	(2.97)	(2.06)	(-1.79)	(-2.03)

Portfolio preferences by institutional type, cont'd

Coefficients x 100

Type	Cap	BM	Turn	R_t	$R_{t-3:1}$	Beta	Idio
PF	0.34	0.08	0.22	-0.06	-0.14	0.04	-0.07
	(12.04)	(11.20)	(18.84)	(-8.21)	(-9.70)	(3.73)	(-3.80)
PC	-0.18	0.04	-0.04	-0.01	-0.01	-0.01	-0.03
	(-4.26)	(1.97)	(-2.42)	(-2.22)	(-1.06)	(-1.18)	(-1.84)
FC	-0.15	-0.02	-0.01	0.00	0.00	0.00	-0.01
	(-5.67)	(-2.13)	(-0.71)	(0.47)	(0.86)	(-0.09)	(-0.67)
PE	-0.24	0.06	0.29	0.07	-0.20	-0.04	-0.08
	(-1.82)	(0.81)	(1.51)	(0.80)	(-1.18)	(-1.66)	(-2.38)
VC	-0.01	-0.21	0.00	0.08	0.02	-0.04	0.04
	(-0.03)	(-1.51)	(0.02)	(1.18)	(0.35)	(-0.60)	(0.50)
E	-0.08	-0.05	-0.01	-0.01	-0.02	0.00	-0.03
	(-4.81)	(-6.19)	(-1.43)	(-1.98)	(-3.45)	(0.03)	(-4.37)

Heterogeneity in institutional trading behavior

- Define change in institutional ownership for stock i and institutional type k:

$$\Delta IO_{it}^{k} = IO_{it}^{k} - IO_{it-1}^{k} = \sum_{j=1}^{N_k} \frac{Shares_{i,j,t}^{k}}{Shares\ out_{it}} - \sum_{j=1}^{N_k} \frac{Shares_{i,j,t-1}^{k}}{Shares\ out_{it-1}}$$

- Regressions of institutional trading behavior:

$$\Delta IO_{it+1}^{k} = b_0 + b_1 X_{it} + b_2 Ret_{it} + b_3 Ret_{it-3:t-1} + b_4 \Delta IO_{it}^{agg} + e_{it}$$

Trading behavior of different types of institutions

Coefficients x 100

Type	Cap	BM	Turn	Ret (t)	Ret (t-3:t-1)	Beta	Idio	ΔIO_t
Agg	-0.003	-0.014	0.030	0.165	0.074	0.015	-0.022	-0.191
	(-0.19)	(-1.44)	(2.76)	(18.35)	(10.70)	(2.05)	(-1.92)	(-12.13)
BT	-0.011	-0.004	-0.004	0.025	0.022	0.002	-0.004	-0.052
	(-2.10)	(-1.64)	(-0.98)	(9.44)	(9.20)	(0.79)	(-0.78)	(-11.85)
IC	0.000	0.000	-0.002	0.015	0.007	-0.004	-0.003	-0.016
	(-0.00)	(-0.06)	(-0.59)	(6.36)	(3.07)	(-1.31)	(-0.76)	(-3.80)
MF	0.004	-0.003	0.032	0.074	0.017	0.005	-0.013	-0.051
	(0.35)	(-0.47)	(4.07)	(14.91)	(3.26)	(1.14)	(-1.69)	(-5.02)
IA	-0.013	0.001	0.006	0.054	0.031	0.011	-0.005	-0.045
	(-2.04)	(0.14)	(1.00)	(12.60)	(8.18)	(2.43)	(-0.84)	(-8.23)
HF	-0.012	0.006	0.008	0.024	-0.011	-0.003	0.005	-0.017
	(-2.79)	(1.14)	(1.86)	(7.25)	(-3.67)	(-1.04)	(1.14)	(-4.10)

Trading behavior of different types of institutions, cont'd

Coefficients x 100

Type	Cap	BM	Turn	Ret (t)	Ret (t-3:t-1)	Beta	Idio	ΔIO_t
PF	0.001	-0.011	0.005	-0.003	0.009	0.002	-0.005	-0.011
	(0.15)	(-7.71)	(1.72)	(-1.62)	(3.85)	(0.96)	(-1.62)	(-5.00)
PC	0.004	0.001	0.001	-0.001	0.002	0.002	0.003	-0.003
	(1.42)	(0.41)	(0.71)	(-0.42)	(1.60)	(0.93)	(1.08)	(-3.13)
FC	-0.002	0.000	0.000	-0.001	-0.001	0.001	-0.001	-0.002
	(-0.84)	(-0.48)	(-0.24)	(-0.76)	(-0.50)	(0.86)	(-0.34)	(-1.51)
PE	0.727	0.174	-0.145	0.050	0.011	0.123	1.469	-0.150
	(1.09)	(1.13)	(-1.01)	(1.53)	(0.20)	(1.20)	(1.06)	(-1.07)
VC	-0.125	-0.012	0.089	0.043	-0.034	-0.037	-0.007	0.016
	(-0.97)	(-0.24)	(0.79)	(1.10)	(-1.50)	(-1.15)	(-0.33)	(1.71)
E	0.003	0.000	0.001	0.002	0.002	0.001	0.000	-0.006
	(1.36)	(0.35)	(0.60)	(1.58)	(2.39)	(0.72)	(0.08)	(-3.54)

Alternative measure of institutional trading

Herding measure

- Define herding as the number of institutions that buy a stock in a given quarter, as a proportion of all institutions trading the stock in the same period:

$$p_{it}^{k} = \frac{\#\ \text{buyers}_{it}^{k}}{\#\ \text{buyers}_{it}^{k} + \#\ \text{sellers}_{it}^{k}},$$

- Regressions of institutional trading behavior:

$$p_{it+1}^{k} = b_0 + b_1 X_{it} + b_2 Ret_{it} + b_3 Ret_{it-3:t-1} + b_4 p_{it}^{agg} + e_{it}$$

Herding behavior of different types of institutions

Coefficients x 100

Type	Cap	BM	Turn	Ret (t)	Ret (t-3:t-1)	Beta	Idio	p_t
Agg	-0.079	0.074	-0.269	-0.142	-0.088	0.065	-0.269	1.080
	(-1.44)	(2.55)	(-8.56)	(-5.50)	(-3.18)	(2.07)	(-5.04)	(26.77)
BT	-0.317	-0.200	-0.086	-0.179	0.048	0.026	-0.183	0.802
	(-6.12)	(-6.24)	(-2.05)	(-6.72)	(1.47)	(0.66)	(-3.10)	(21.76)
IC	0.152	-0.090	-0.202	-0.054	-0.122	0.061	-0.091	0.527
	(1.58)	(-2.25)	(-4.46)	(-1.35)	(-3.30)	(1.09)	(-1.30)	(12.85)
MF	-0.173	0.051	-0.278	-0.157	-0.147	0.147	-0.222	0.787
	(-3.20)	(1.58)	(-7.98)	(-5.16)	(-5.01)	(3.95)	(-4.89)	(22.17)
IA	-0.225	0.043	-0.197	-0.194	-0.087	0.040	-0.120	0.733
	(-4.06)	(1.59)	(-5.40)	(-7.32)	(-3.47)	(1.29)	(-2.25)	(21.30)
HF	-0.067	0.037	-0.151	-0.047	-0.182	-0.053	0.171	0.256
	(-0.40)	(0.77)	(-3.10)	(-1.18)	(-4.70)	(-0.81)	(1.79)	(5.67)

Herding behavior of different types of institutions, cont'd

Coefficients x 100

Type	Cap	BM	Turn	Ret (t)	Ret (t-3:t-1)	Beta	Idio	p_t
PF	-0.091	-0.258	-0.309	-0.293	-0.089	0.061	-0.305	0.780
	(-0.57)	(-5.51)	(-5.55)	(-6.34)	(-1.64)	(0.69)	(-3.56)	(10.80)
PC	-1.266	-0.186	-0.177	-0.106	0.170	-0.107	-0.140	0.522
	(-5.90)	(-2.84)	(-2.36)	(-1.69)	(2.38)	(-1.08)	(-0.85)	(6.56)
FC	-10.924	-1.647	-0.431	-1.270	-0.071	-3.842	-2.170	1.740
	(-1.35)	(-1.29)	(-0.32)	(-0.73)	(-0.08)	(-1.37)	(-0.49)	(0.98)
PE	-7.435	-1.945	0.149	-0.648	0.476	-1.083	1.641	0.172
	(-2.13)	(-0.58)	(0.06)	(-0.44)	(0.42)	(-1.10)	(1.89)	(0.35)
E	-0.879	-0.027	-0.889	-0.091	0.029	0.075	2.117	-0.304
	(-2.80)	(-0.11)	(-1.02)	(-0.73)	(0.26)	(0.37)	(1.13)	(-0.41)

Differential impact of trading on returns

- Estimate cross-sectional regressions:

$$R_{it+1:t+q} = a + \beta_0 \; X_{it} + \beta_1 \; Ret_{it} + \beta_2 \; Ret_{it-3:t-1} + \beta_3 \; trade_{it}^{k} + \varepsilon_{it+1}$$

- Dependent variable:
  - future one-quarter return R_{it+1}
  - future one-year return $R_{it+1:t+4}$
  - future two-year return $R_{it+1:t+8}$

- Use three different measures of trade:
  - Change in institutional ownership, ΔIO_{it}^{k}
  - Change in number of managers holding the stock, Δn_{it}^{k}
  - Proportion of buyers (herding), p_{it}^{k}

Institutional trading and future returns

Impact of changes in Institutional Ownership

	R_{it+1}	$R_{it+1:t+4}$	$R_{it+1:t+8}$		R_{it+1}	$R_{it+1:t+4}$	$R_{it+1:t+8}$
Agg	*-0.04*	*-0.04*	*-0.16*	**PF**	-0.04	-0.21	-0.50
	(-1.44)	*(-0.49)*	*(-1.41)*		(-0.99)	(-2.74)	(-4.66)
BT	-0.01	0.05	0.01	**PC**	-0.05	-0.04	-0.29
	(-0.20)	(1.04)	(0.10)		(-0.87)	(-0.27)	(-1.22)
IC	-0.02	-0.04	-0.06	**FC**	0.07	-0.12	-0.37
	(-0.73)	(-0.66)	(-0.60)		(0.73)	(-0.55)	(-0.97)
MF	-0.03	-0.02	-0.06	**PE**	0.02	0.53	0.53
	(-1.37)	(-0.32)	(-0.77)		(0.92)	(1.01)	(1.06)
IA	0.03	0.07	0.05	**VC**	0.06	0.72	9.09
	(1.50)	(1.27)	(0.71)		(0.10)	(0.43)	(0.98)
HF	0.09	0.04	-0.03	**E**	0.03	-0.08	-0.10
	(3.88)	(0.62)	(-0.28)		(0.37)	(-0.47)	(-0.44)

Institutional trading and future returns

Impact of changes in ownership diffusion

	R_{it+1}	$R_{it+1:t+4}$	$R_{it+1:t+8}$		R_{it+1}	$R_{it+1:t+4}$	$R_{it+1:t+8}$
Agg	*0.12*	*0.22*	*0.38*	**PF**	-0.05	-0.12	-0.30
	(3.12)	*(2.60)*	*(3.19)*		(-1.08)	(-1.54)	(-1.88)
BT	0.00	-0.01	0.06	**PC**	-0.05	-0.14	-0.35
	(0.03)	(-0.19)	(0.63)		(-0.98)	(-1.30)	(-2.16)
IC	-0.01	-0.04	-0.11	**FC**	-0.14	-0.02	-0.38
	(-0.19)	(-0.51)	(-0.89)		(-1.44)	(-0.09)	(-1.01)
MF	0.08	0.14	0.18	**PE**	0.19	0.76	0.44
	(3.20)	(2.70)	(1.95)		(1.05)	(0.90)	(0.41)
IA	0.07	0.15	0.21	**VC**	-0.56	0.12	2.39
	(2.75)	(2.25)	(2.12)		(-0.80)	(0.06)	(0.49)
HF	0.08	0.08	0.10	**E**	-0.11	-0.15	-0.58
	(2.97)	(1.14)	(0.82)		(-1.04)	(-0.74)	(-1.61)

Institutional trading and future returns

Impact of herding (trade imbalance)

	R_{it+1}	$R_{it+1:t+4}$	$R_{it+1:t+8}$		R_{it+1}	$R_{it+1:t+4}$	$R_{it+1:t+8}$
Agg	*0.01*	*-0.03*	*-0.03*	**PF**	0.04	0.03	0.01
	(0.44)	*(-0.43)*	*(-0.31)*		(1.40)	(0.48)	(0.08)
BT	0.02	0.04	0.19	**PC**	0.04	0.05	0.20
	(0.81)	(0.81)	(2.37)		(0.98)	(0.63)	(1.31)
IC	0.02	0.01	0.09	**FC**	0.56	1.02	1.79
	(0.80)	(0.29)	(0.88)		(2.64)	(1.89)	(2.10)
MF	0.03	-0.01	0.03	**PE**	-0.46	-0.32	-2.57
	(1.27)	(-0.19)	(0.23)		(-1.00)	(-1.00)	(-1.00)
IA	0.08	0.07	0.04	**VC**			
	(3.37)	(0.92)	(0.34)				
HF	0.01	0.12	0.37	**E**	0.08	0.76	0.05
	(0.28)	(1.33)	(2.36)		(0.92)	(1.56)	(0.13)

Differential impact of trading on returns, II

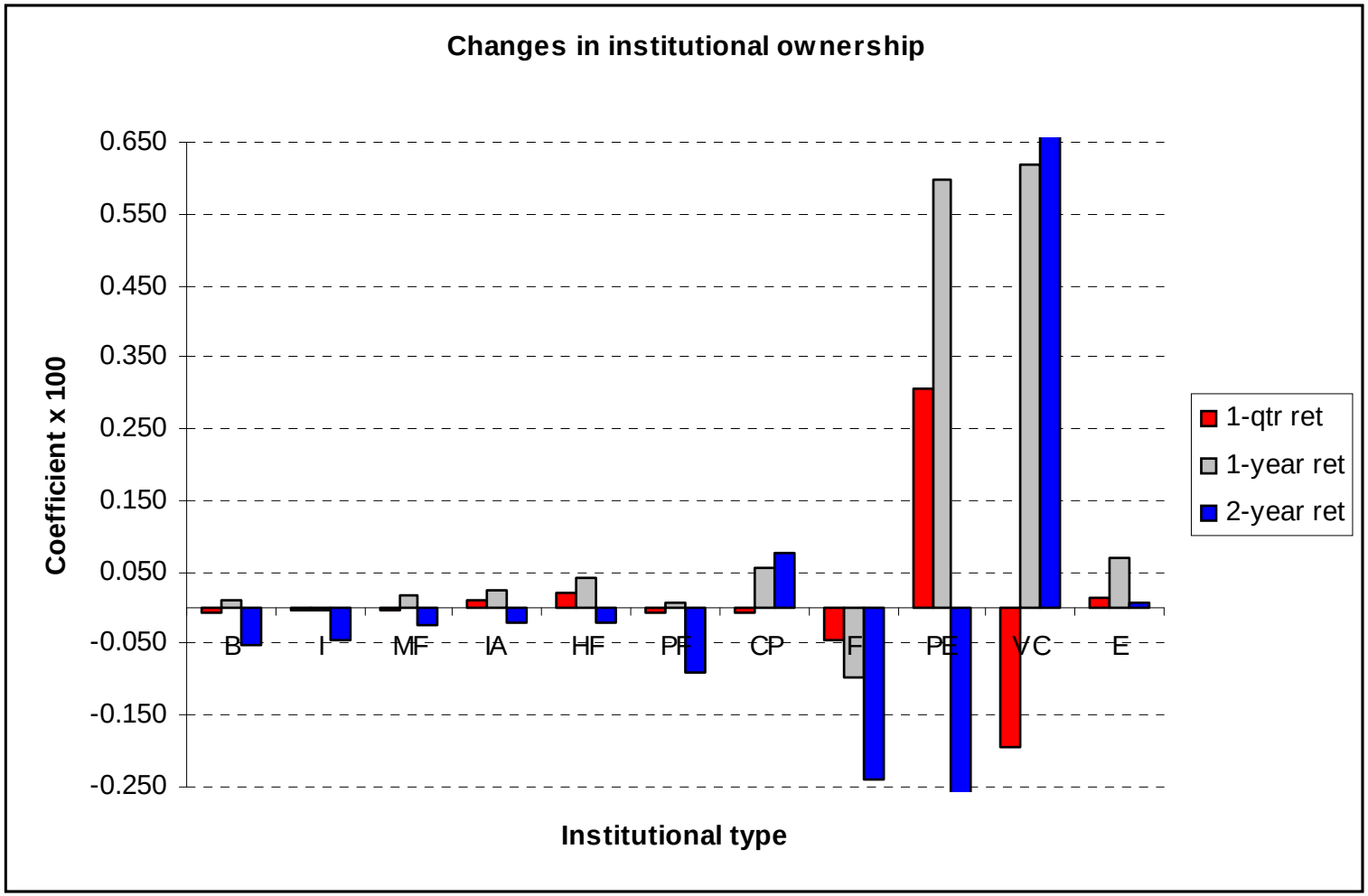
- Estimate cross-sectional regressions:

$$R_{it+1:t+q} = a + \beta\ X_{it} + \sum_{k=1}^{11} \gamma_k\ trade_{it}^{k} + \varepsilon_{it+1}$$

- Dependent variables:
  - Future one-quarter return R_{it+1}
  - Future one-year return $R_{it+1:t+4}$
  - Future two-year return $R_{it+1:t+8}$
- Use three different measures of trade:
  - Change in institutional ownership, ΔIO_{it}^{k}
  - Change in number of managers, Δn_{it}^{k}
  - Proportion of buyers (herding), p_{it}^{k}

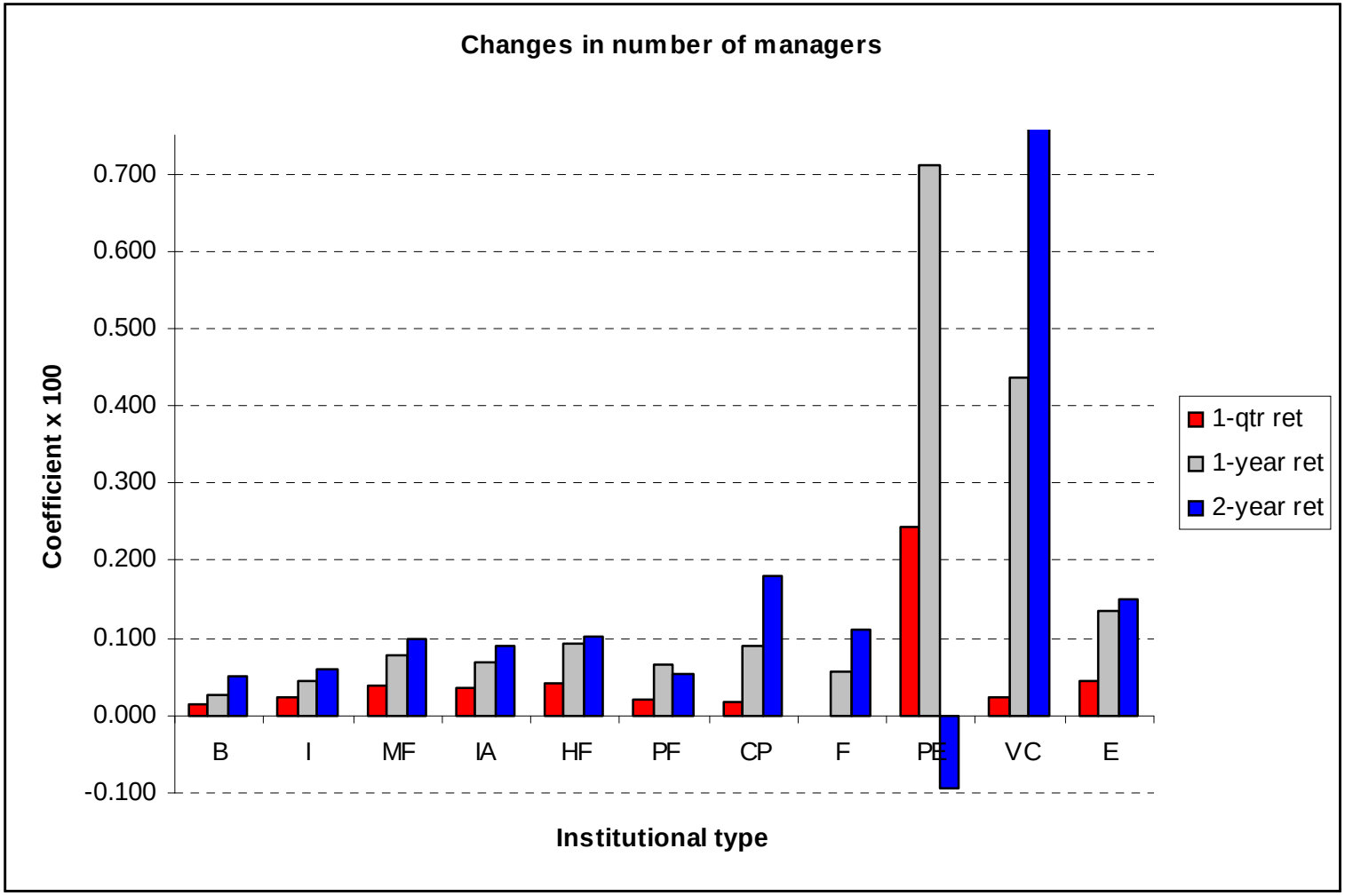
Institutional trading and future returns

Impact of changes in Institutional Ownership



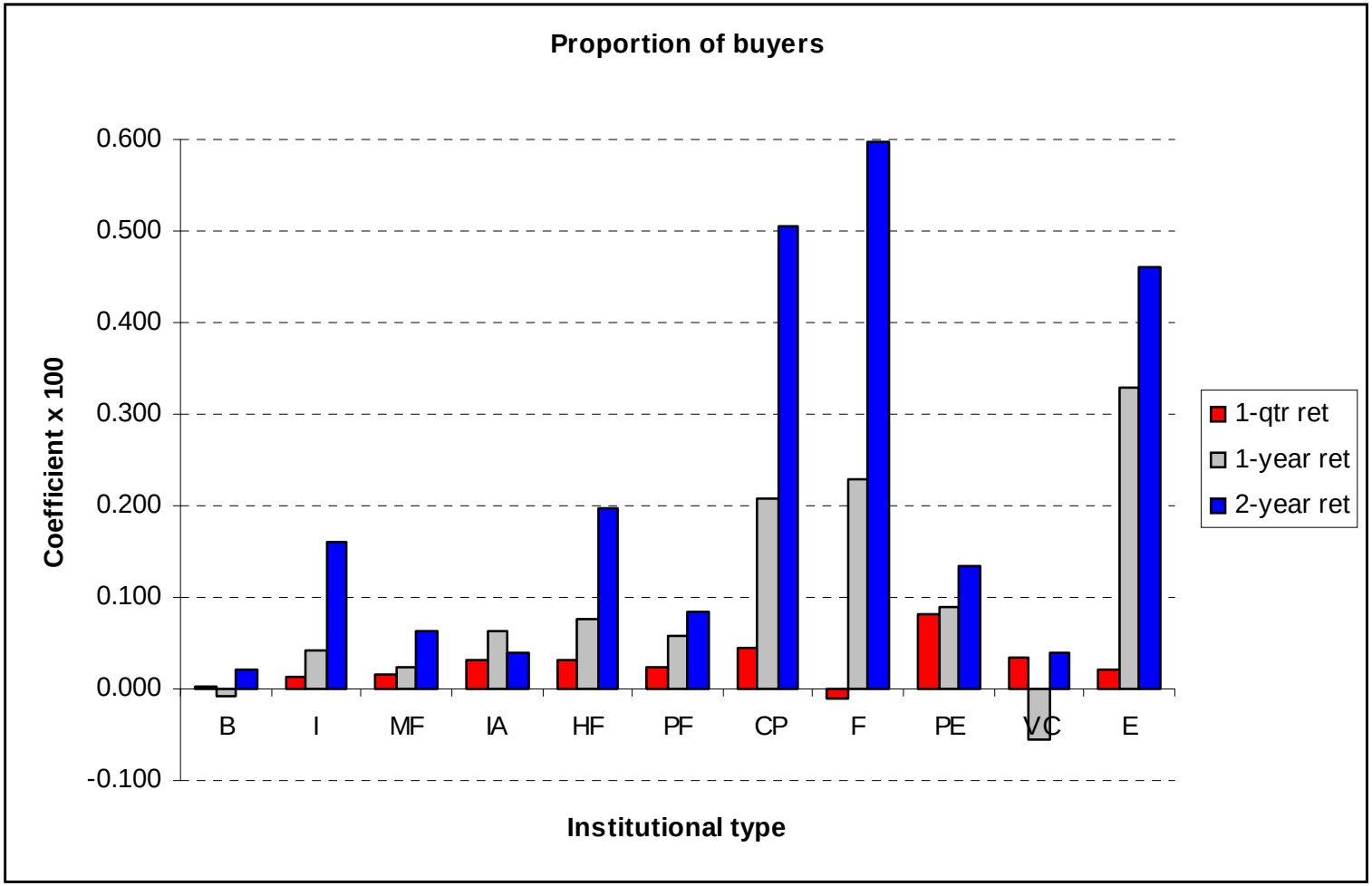
Institutional trading and future returns

Impact of changes in ownership diffusion



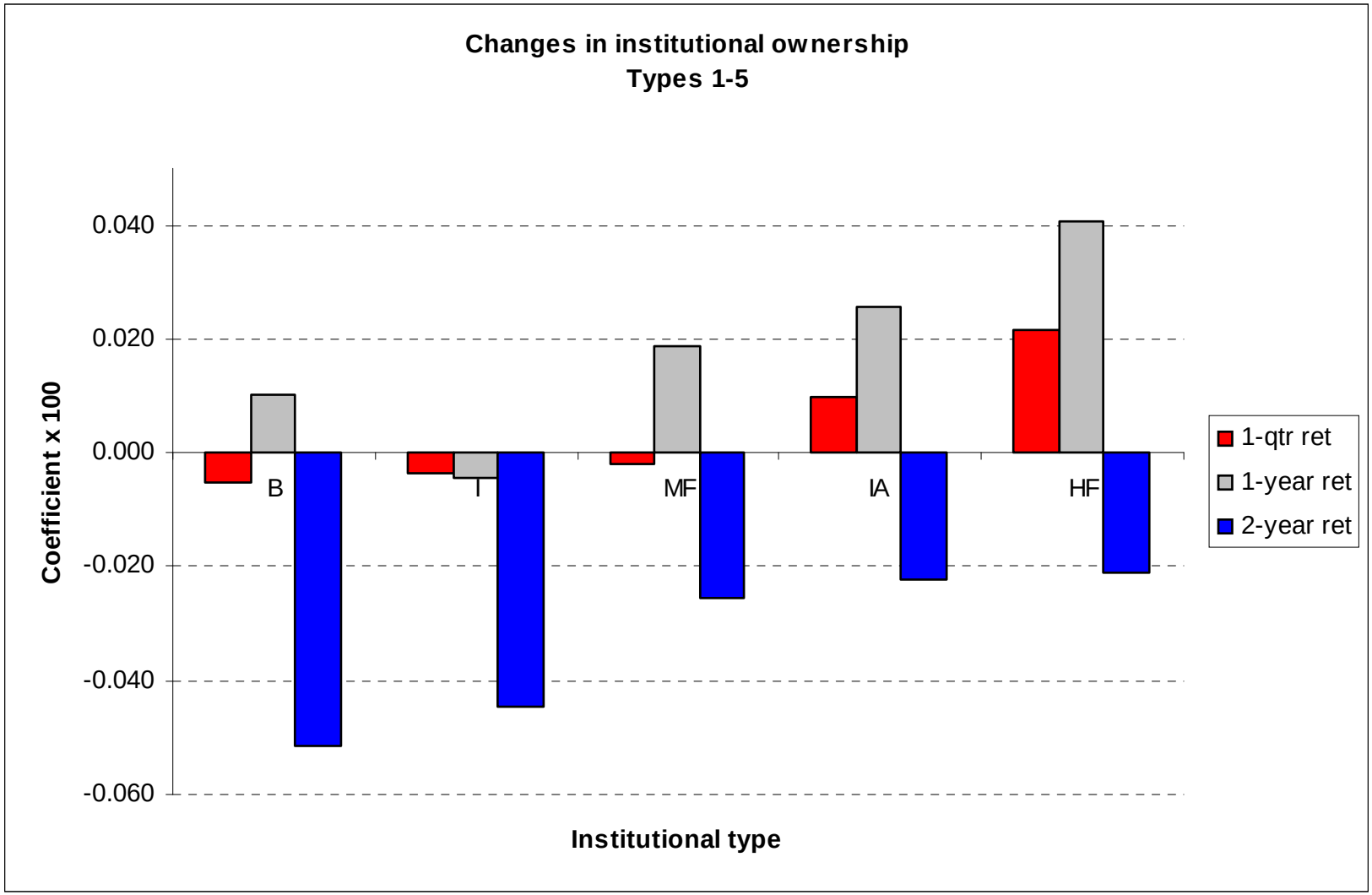
Institutional trading and future returns

Impact of herding (trade imbalance)



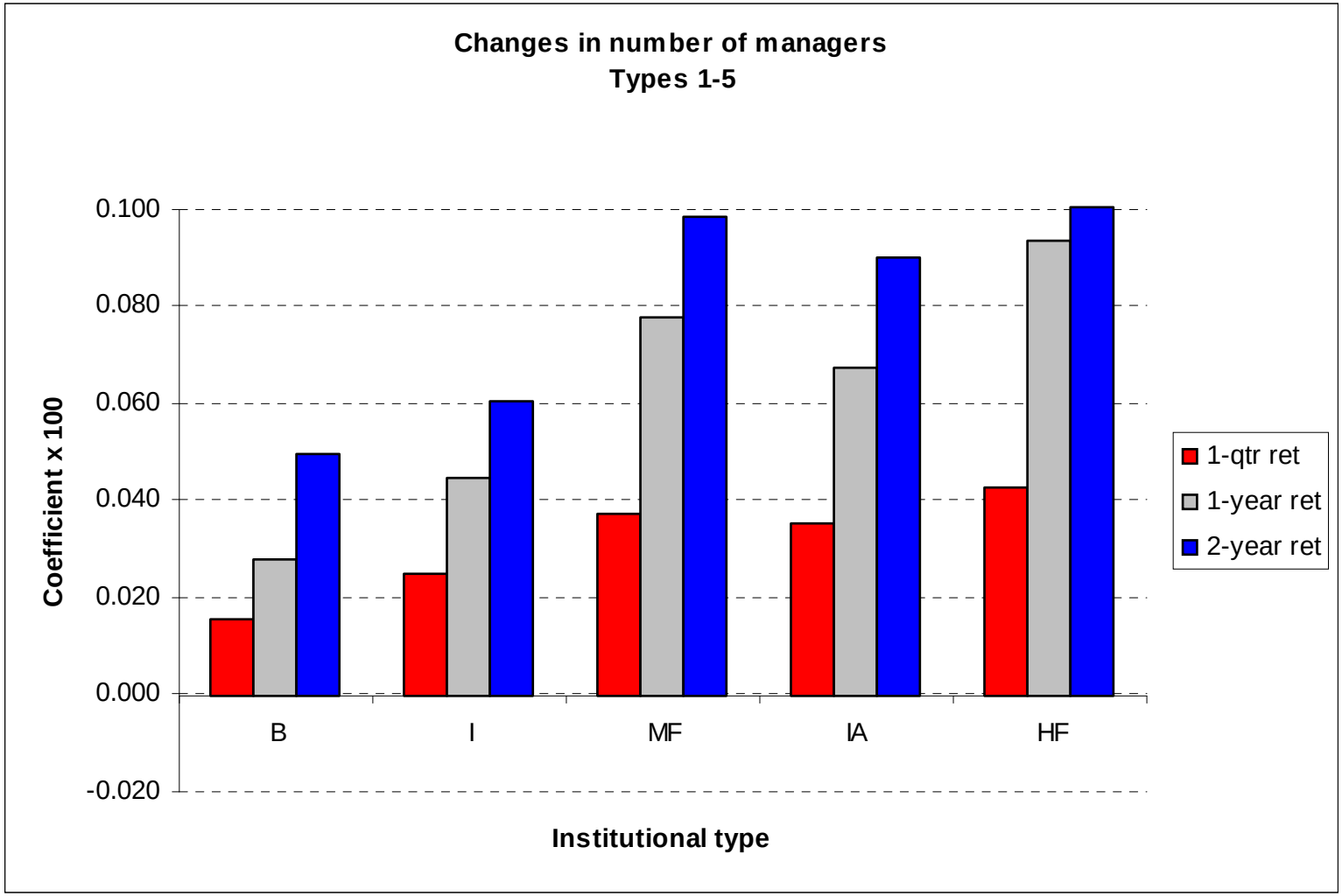
Institutional trading and future returns

Impact of changes in Institutional Ownership, types 1 to 5



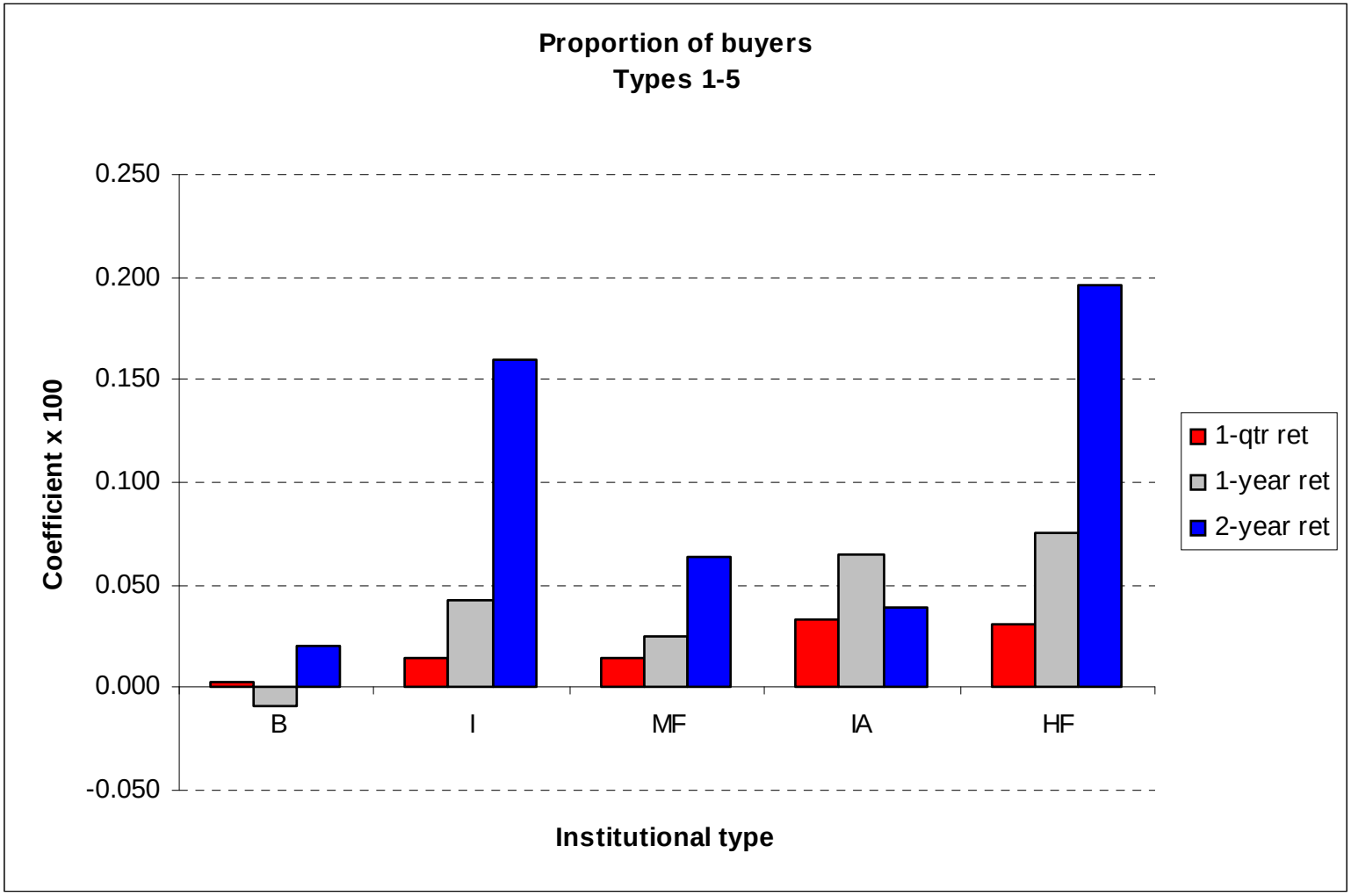
Institutional trading and future returns

Impact of changes in ownership diffusion, types 1 to 5



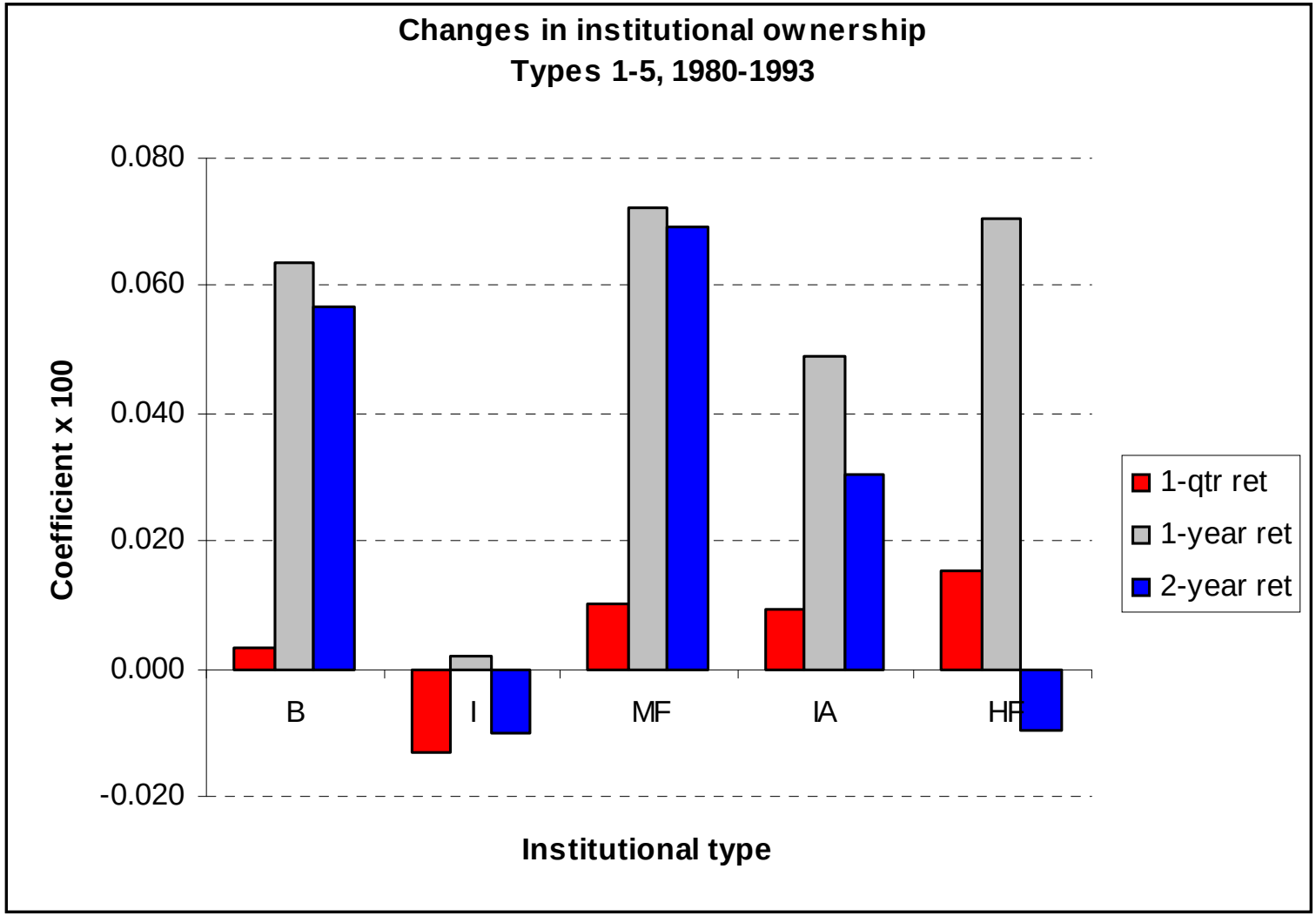
Institutional trading and future returns

Impact of herding (trade imbalance), types 1 to 5



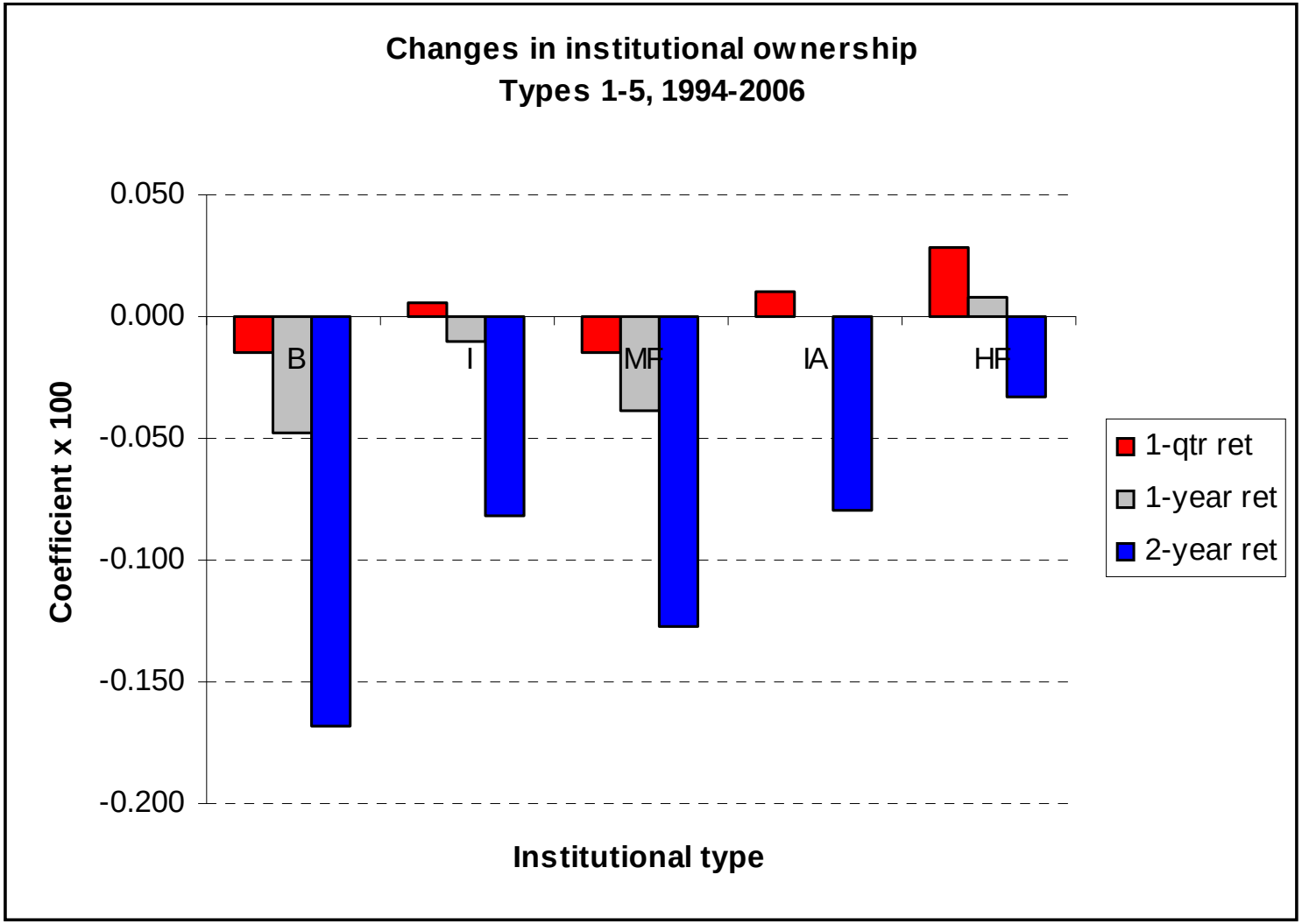
Institutional trading and future returns

Impact of changes in Institutional Ownership, types 1 to 5, 1980-1993



Institutional trading and future returns

Impact of changes in Institutional Ownership, types 1 to 5, 1994-2006



DGTW-adjusted returns

- Are the differences in the price impact of trading driven by different investment styles adopted by different institutional types?
- I compute benchmark-adjusted returns following Daniel, Grinblatt, Titman and Wermers (1997)
- Very similar findings for DGTW-adjusted returns, thus results on heterogeneity are not driven by style

Summary of results

- I classify all institutions filing 13-F reports from 1980 to 2006, identifying 11 different institutional types
- I analyze the heterogeneity of institutions with respect to:
  - Portfolio preferences
  - Trading behavior
  - Impact of trading on stock returns

Summary of results, cont'd

- Evidence of heterogeneity in preferences for stock characteristics
  - For example, hedge funds prefer small stocks, venture capital funds hold volatile stocks, and foundations hold the least volatile stocks
- Evidence of heterogeneity in trading behavior
  - For example, institutions are on average momentum traders, hedge funds buy recent winners and sell past winners, pension funds sell recent winners and buy past winners
- Evidence of heterogeneity in the price impact of trading
  - For example, an increase in share ownership by hedge funds implies positive returns in the next quarter, while an increase in ownership by pension funds implies return reversals in the next two years

Summary of results, cont'd

- Time-variation in the price impact of institutional trading across types
  - For example, trading by banks and mutual funds is positively associated with future one-year returns during the period 1980-1993, but is associated with reversals during the more recent period 1994-2006
- The results are not driven by different investment styles followed by different types of institutions