

Trends in Institutional Stock Ownership and Some Implications

Marshall Blume and Donald Keim
The Wharton School
University of Pennsylvania

Spring Q-Group Conference
April 2, 2008

The Impact of Changing Stock Ownership

- Since World War II, institutional investors have increased their percentage holdings of US equities.
- Importantly, over time the composition of institutional portfolios has diverged from the composition of the market portfolio.
- The increased presence of institutions in the stock market has possible implications for
 - the liquidity of the market
 - the behavior of stock prices
 - the returns on institutional portfolios

What we do

- Update stylized facts on institutional stock ownership, extending the evidence by 10 years to 2006
 - a period of considerable change in equity markets
- Analyze (somewhat preliminary at this point) the implications of this changing ownership for
 - equity market liquidity
 - daily return momentum
 - institutional returns

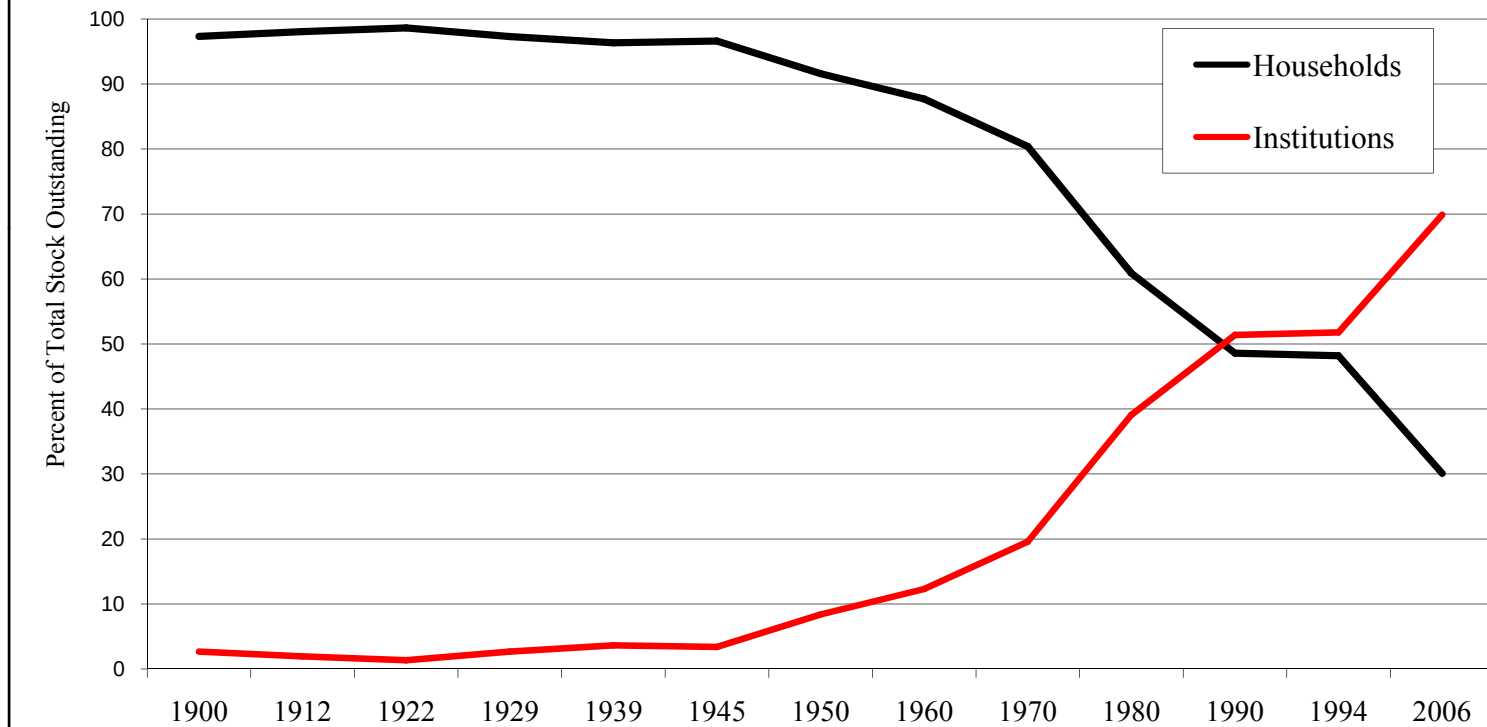
Preview of Conclusions

- Over time, institutions & mutual funds increased their holdings of smaller stocks and decreased their holdings of larger stocks.
 - Now underweight the largest stocks and overweight the smaller stocks relative to market weights.
- The increasing liquidity in the stock market generally, and in smaller cap stocks in particular, over the past two decades mirrors the increase in institutional ownership of common stocks.
 - Today virtually no stale prices, except for very smallest stocks
- Daily return predictability is time varying
- Any excess returns of institutional investors in the past 25 years are primarily due to security selection within market cap deciles, not to allocation across deciles (and not significant).

Institutional Stock Ownership – Literature

- Overall trends in equity holdings
 - Goldsmith (1971) – 1850-1952
 - Friedman (1996)
- Trends in composition of equity holdings
 - Del Guercia (1996) – banks hold safer stocks
 - Falkenstein (1996) – generally tilted towards larger stocks, except small cap funds
 - Gompers and Metrick (2001) – over the 1980 to 1996 period institutions increased their demand for large stocks and decreased their demand for small stocks

Institutional Ownership of Common Stock 1900-2006



Sources: Goldsmith (1971), FRB Flow of Funds

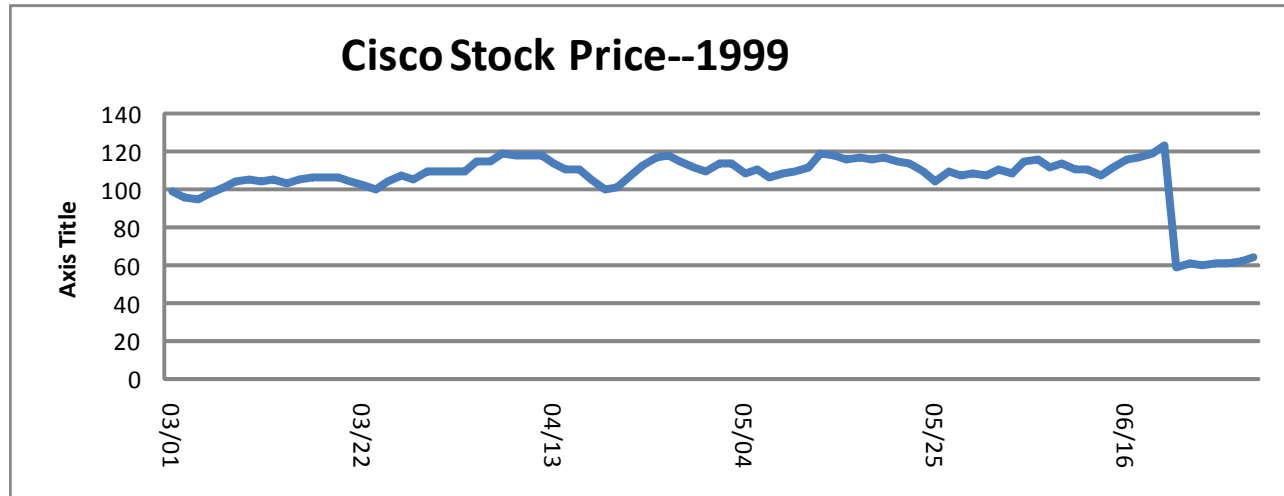
Data

- Institutional Holdings (Thomson/CDA via WRDS)
 - Quarterly institutional holdings from 13f filings
 - Year end 1980 through year end 2006
 - All institutions with over \$100 million in *discretionary* assets must report at quarter end common stock positions of the greater of 10,000 shares or \$200,000
 - Some forms are submitted to the SEC late; some are submitted on time and are, at the request of the institution, made public a year later
- Mutual Fund Holdings (Thomson/CDA via WRDS)
 - Quarterly mutual fund holdings from S12 filings
 - Year end 1980 through year end 2006

Data (cont.)

- Trade and Quote (TAQ) data, Jan 1993 to Dec 2006
 - Last transactions prices, volumes, and trade times on primary markets for all NYSE, AMEX and Nasdaq stocks
- CRSP Monthly and Daily Returns Files, 1980 – 2006
(also shares outstanding, volume)
- We exclude ETFs, closed end funds, and ADRs
- TAQ and CRSP data are matched by a WRDS file
- Stock and institutional/mutual fund data are combined by matching cusips of individual stocks

A Caveat when using WRDS-distributed Thomson/CDA Data



Manager 220

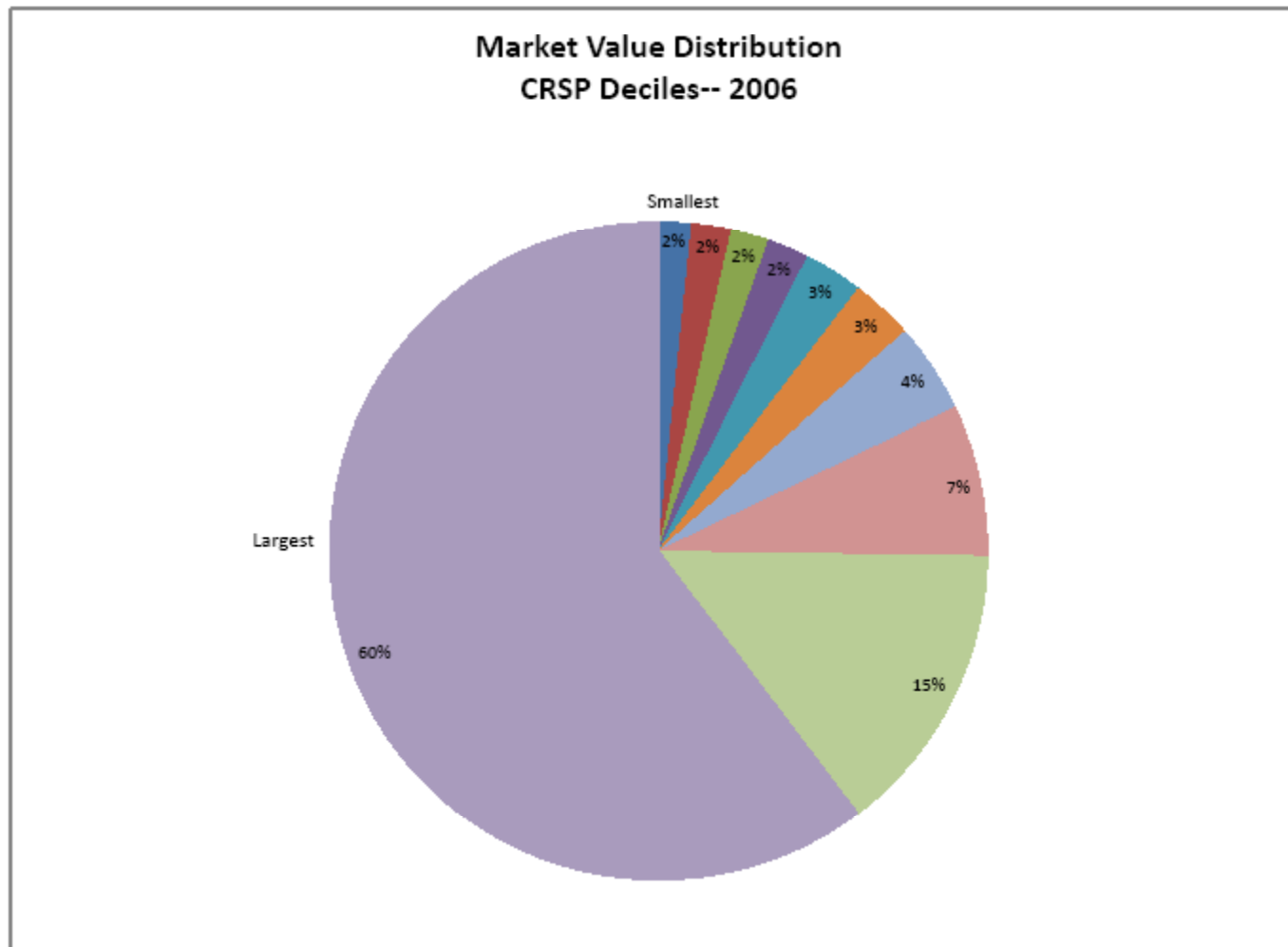
	Original Report (rdate)	Thomson Adjustment (fdate)	WRDS Adjustment (rdate)
Date	31-Mar	30-Jun	31-Mar
Shares	6150	12300	12300
Price	109.563	64.4375	109.5625

→ *WRDS doubled the market value of Cisco*

Distribution of stock holdings across market-cap deciles

- Partition stocks into ten equal-capitalization deciles at the end of each year from 1980 to 2006
 - each decile contains (approximately) 10% of the total market value
- Compute institutional (13f) and mutual fund (S12) holdings within each of the deciles at each year end and produce annual distributions of holdings.
- Compare value of institutional holdings to total market value of each decile and compute under- or over-weighting of institutional holdings.

Equal-Mkt-Cap Deciles vs. Traditional (equal # names) Mkt-Cap Deciles



→ Largest decile represents disproportionately large percent (60%) of market and
Smallest decile represents disproportionately small percent (1.6%) of market

Table 1
Percentage Distribution of Stock Ownership by Market Cap Deciles: All Stocks, Institutions, and Mutual Funds
Year End 1980 and 2006

	Market Cap Decile										Total for
	Largest	2nd	3rd	4th	5th	6th	7th	8th	9th	Smallest	All Stocks
A. 1980											
All Stocks	9.74	10.25	9.92	9.91	10.10	10.07	9.96	10.04	10.01	10.01	\$1,375
All Institutions	9.99	11.02	13.51	12.07	10.99	11.67	10.47	9.69	7.12	3.47	\$473
All Mutual Funds	5.26	6.72	9.40	9.34	11.06	12.50	12.49	13.47	12.67	7.09	\$45
Memo: All Stocks											
Number	4	9	20	35	59	87	133	230	514	3,753	4844
Cumulative	4	13	33	68	127	214	347	577	1,091	4,844	
B. 2006											
All Stocks	9.77	9.77	10.13	10.10	10.16	9.99	10.04	10.01	10.02	10.00	\$18,841
All Institutions	8.38	8.63	8.72	10.35	9.54	10.53	10.95	11.43	11.26	10.20	\$12,594
All Mutual Funds	7.02	8.71	8.28	10.76	9.83	10.83	11.14	12.08	11.83	9.52	\$3,680
Memo: All Stocks											
Number	6	11	19	31	52	81	124	240	584	4,186	5334
Cumulative	6	17	36	67	119	200	324	564	1,148	5,334	

→ Market value of stocks is highly concentrated

→ Institutional / Fund portfolios deviate from market weights, and change over time

Table 2
Percentage Distributions of Stock Ownership by Deciles: All Stocks, Institutions, and Mutual Funds
Year end 1980 and 2006

	Market Cap Decile										Total
	Largest	2nd	3rd	4th	5th	6th	7th	8th	9th	Smallest	
A. Percent Over and Underweight											
1980											
All Institutions	2.7	7.4	36.2	21.9	8.8	15.9	5.1	-3.5	-28.9	-65.3	
All Mutual Funds	-45.9	-34.5	-5.2	-5.7	9.5	24.1	25.4	34.1	26.6	-29.2	
2006											
All Institutions	-14.3	-11.7	-13.9	2.5	-6.1	5.4	9.1	14.1	12.4	2.0	
All Mutual Funds	-28.2	-10.8	-18.2	6.5	-3.2	8.4	10.9	20.7	18.0	-4.9	
B. Percentage Ownership											
1980											
All Institutions	35.3	37.0	46.9	41.9	37.4	39.9	36.2	33.2	24.5	11.9	34.4
All Mutual Funds	1.8	2.2	3.1	3.1	3.6	4.1	4.1	4.4	4.2	2.3	3.3
2006											
All Institutions	57.3	59.0	57.5	68.5	62.8	70.5	72.9	76.3	75.1	68.2	66.8
All Mutual Funds	14.0	17.4	16.0	20.8	18.9	21.2	21.7	23.6	23.0	18.6	19.5

→ By 2006, largest 30% of the market is underweighted by institutions / funds
and smaller-cap stocks (approximately the bottom half) are over-weighted

Time Trend of 4 Cap-Decile groups

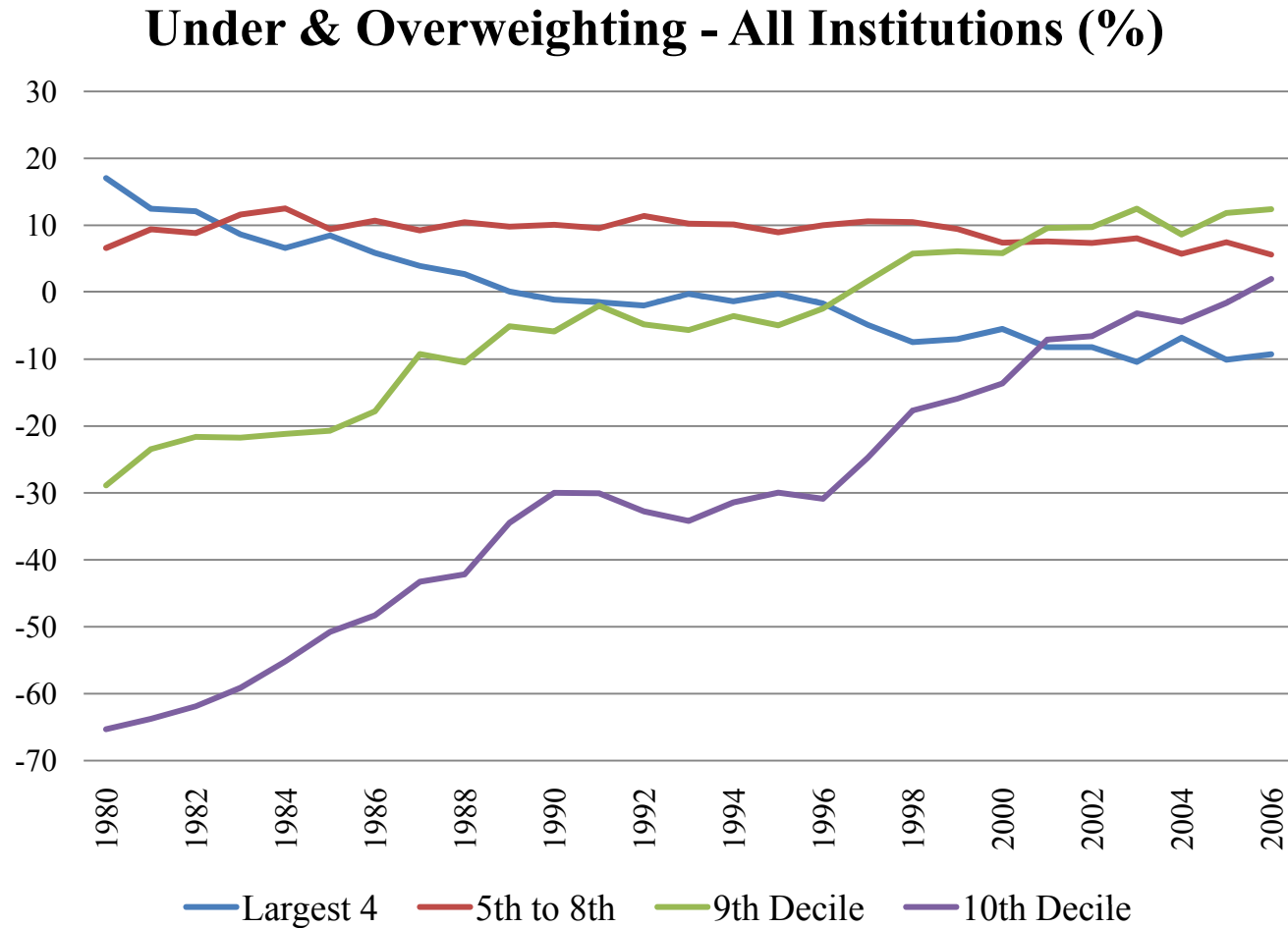


Table 3
Percentage Distributions of Stock Ownership in the Smallest Market Cap Decile
All Stocks, Institutions, and Mutual Funds (Year End 1980 and 2006)

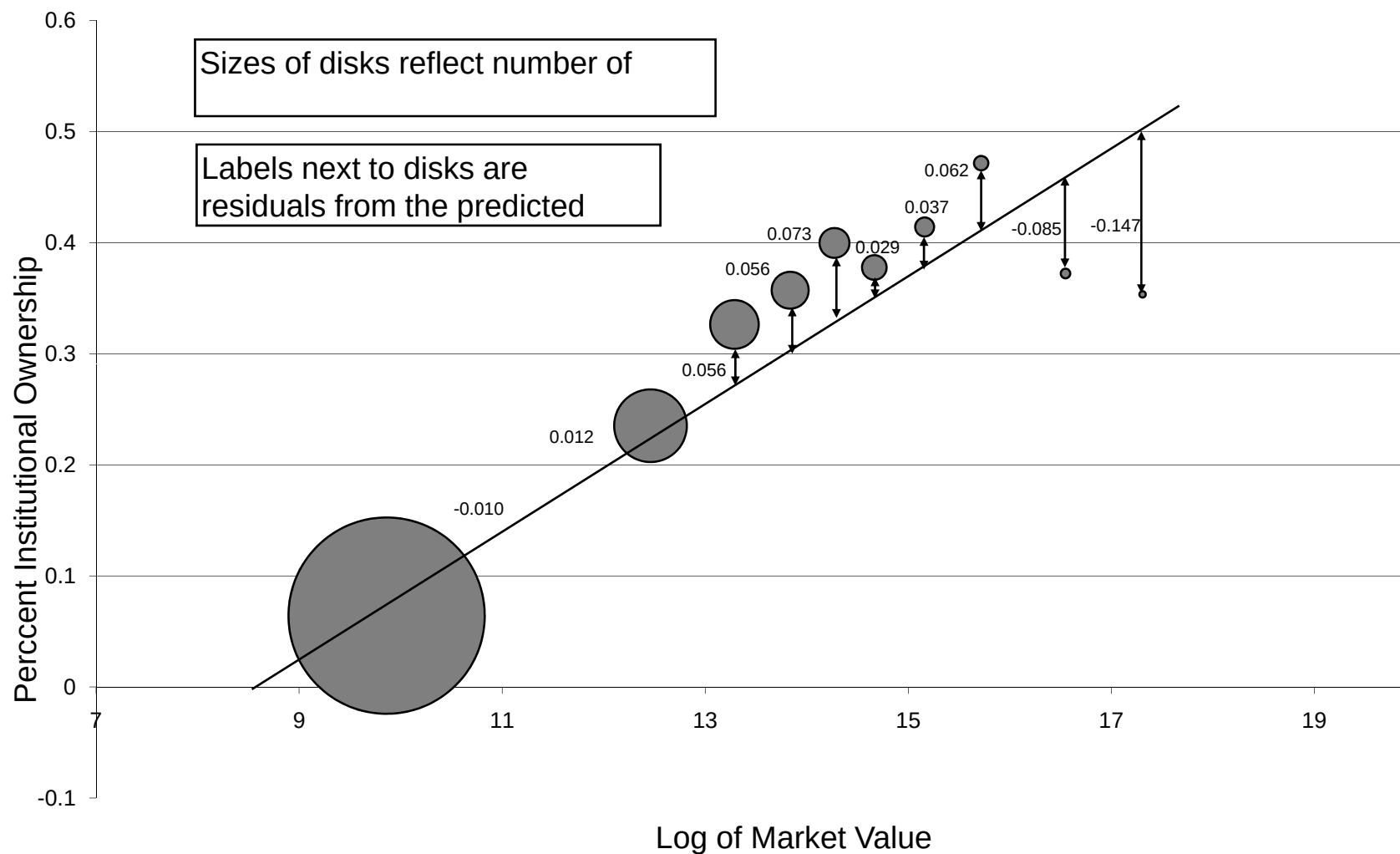
	Ninth Decile (Smallest 10% of Market Value)					
	Largest 8%	Next 1%	Next 0.5%	Next 0.25%	Smallest 0.25%	Entire Decile
A. Percent Over and Underweight						
1980						
All Institutions	17.1	-62.5	-68.1	-79.9	-82.2	
All Mutual Funds	18.8	-66.7	-74.7	-92.5	-93.3	
2006						
All Institutions	8.5	-18.6	-37.7	-54.4	-69.2	
All Mutual Funds	12.2	-34.0	-52.6	-68.3	-81.5	
B. Percentage Ownership						
1980						
All Institutions	14.0	4.5	3.8	2.4	2.1	11.9
All Mutual Funds	2.8	0.8	0.6	0.2	0.2	2.3
2006						
All Institutions	74.0	55.5	42.5	31.1	21.0	68.2
All Mutual Funds	20.9	12.3	8.8	5.9	3.4	18.6
C. Stocks in Sub-Decile as a Percent of Total Stocks in Market						
1980	30.2	11.7	9.8	7.6	18.1	77.5
2006	29.2	11.1	9.7	7.9	20.6	78.5

→ Only the *smallest* 2% of stocks are under-weighted by institutions / funds

Comparison with Previous Results

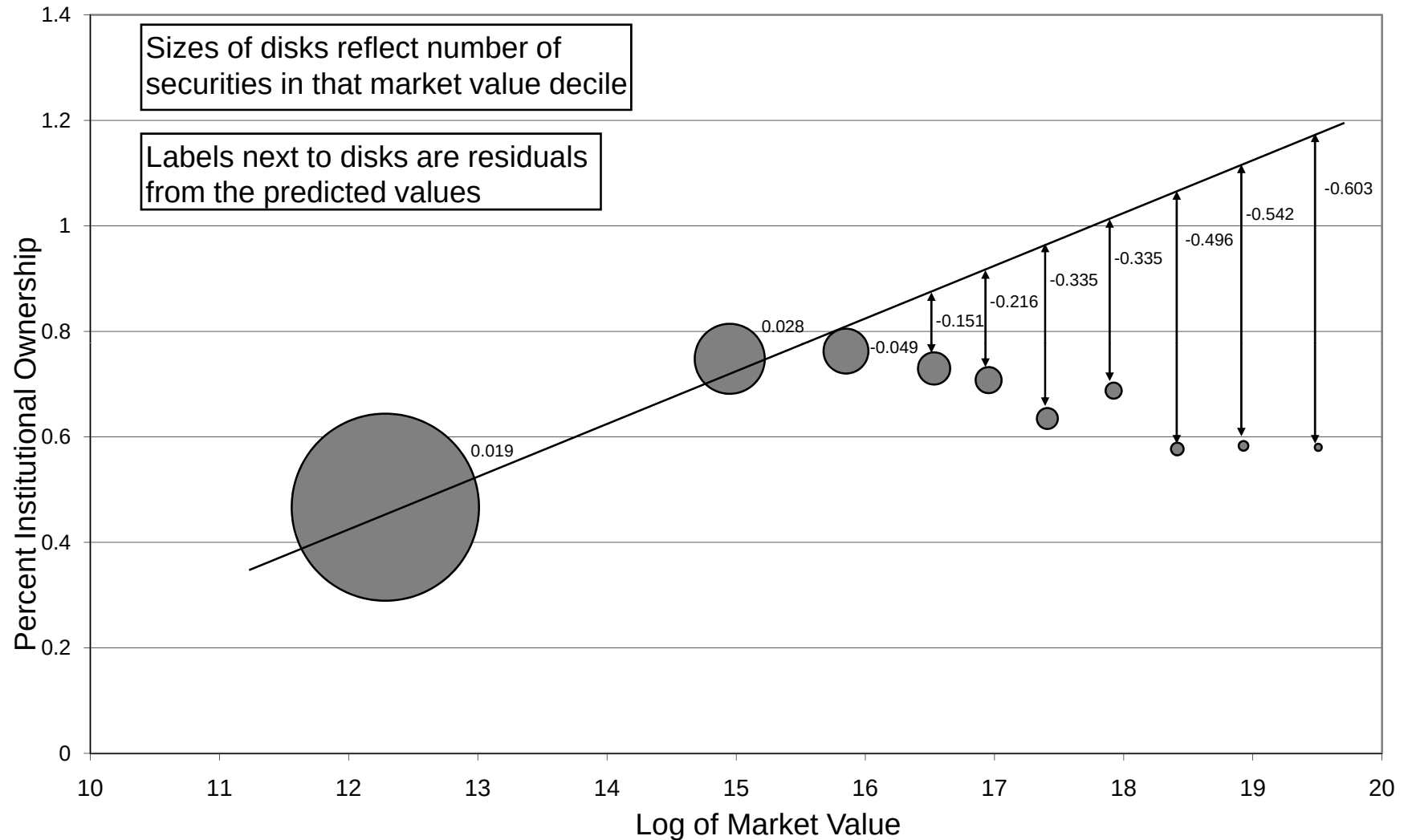
- Gompers and Metrick report an average correlation from 1980 through 1996 between institutional ownership and $\log(\text{market value})$ of 0.625
- We recalculated this correlation each year from 1980 through 2006.
- Values ranged from 0.61 to 0.67 $\rightarrow$ same results
- But the results from Equal-Cap decile distributions shown above are inconsistent with these results...
- What is happening?

**Figure 3A. Predicted and Actual Institutional Ownership of Securities by Market Value Deciles
1980**



→ The estimated regression fits the data reasonably well

**Figure 3B. Predicted and Actual Institutional Ownership of Securities by Market Value Deciles
2006**



→ Estimated regression line driven by stocks in the smallest two deciles

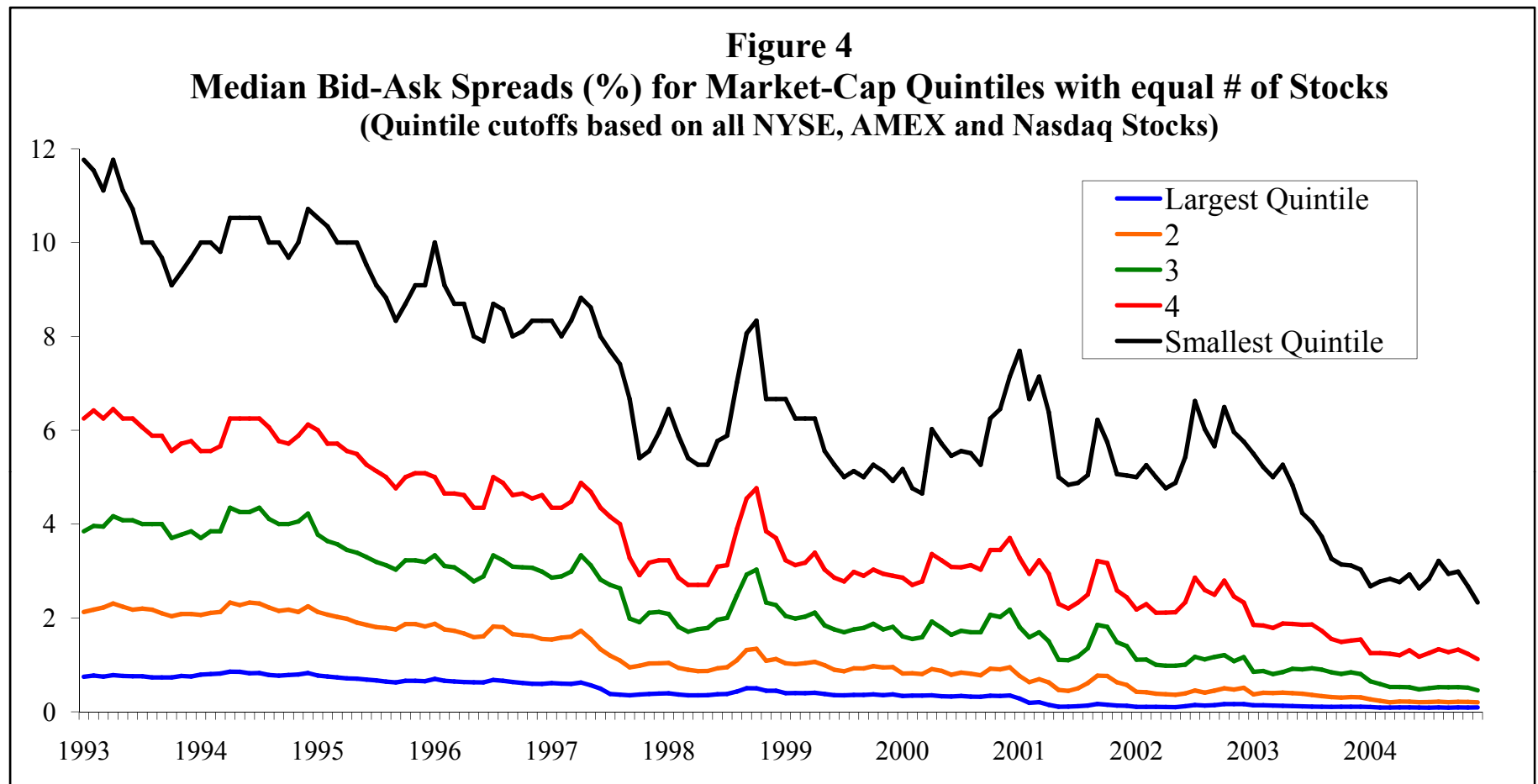
Table 4
Percentage Distribution of Stock Ownership by Cap Deciles
All Stocks, Institutions, and Diversified Equity Mutual Funds; Grouped by Morningstar Equity Style Categories
Year End 2006

	Market Cap Decile									
	Largest	2nd	3rd	4th	5th	6th	7th	8th	9th Smallest	
Percent Over and Underweight										
S&P 500	45	35	29	26	10	23	17	-8	-76	-99
Index Funds	49	35	30	33	7	21	15	-16	-74	-99
Large Value	19	34	25	22	43	8	-2	-7	-52	-90
Large Blend	11	29	18	30	8	27	2	-9	-40	-76
Large Growth	-38	-26	23	44	13	50	18	25	-34	-77
Mid Value	-99	-95	-88	-95	-88	-67	18	154	268	90
Mid Blend	-97	-96	-89	-86	-75	-60	9	146	270	76
Mid Growth	-99	-96	-96	-90	-88	-64	-2	160	255	120
Small Value	-100	-100	-100	-100	-100	-98	-86	180	602	
Small Blend	-100	-100	-100	-100	-100	-99	-98	-81	159	617
Small Growth	-100	-100	-100	-100	-99	-97	-84	152	626	

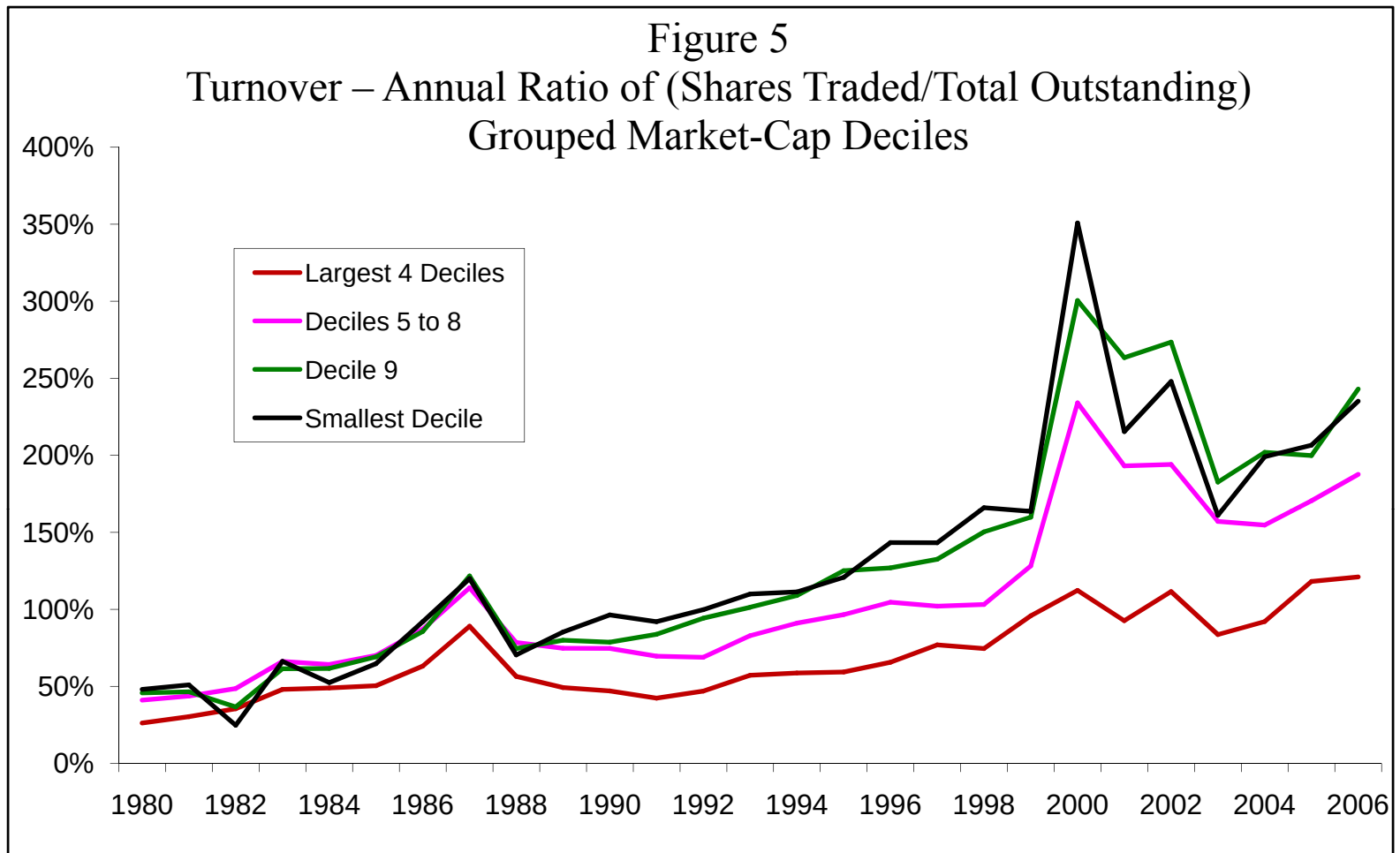
- Relative to the S&P, Large-Cap funds underweight the largest cap stocks
- Mid-Cap funds tilt toward the smallest 4 deciles, relative to market weights
- Small Value and Small Growth funds do not hold any stocks from smallest decile
- Small Blend funds concentrate their portfolios in the 9th and 10th deciles

Institutional Stock Ownership & Equity Market Liquidity

- Some stylized facts:
 - Institutions trade more than individuals
 - Institutional stock ownership increased over last 25 years
 - Big institutional shift to smaller stocks over last 25 years
- Two conjectures:
 - (1) as institutions increase their overall ownership of stocks (figure 1), overall equity market liquidity should increase, holding constant other influences on liquidity
 - (2) as institutions increase their relative holdings of smaller stocks (figure 2), the relative liquidity of smaller stocks should increase
- We examine three liquidity measures:
bid-ask spreads, yearly turnover rates, and stale prices

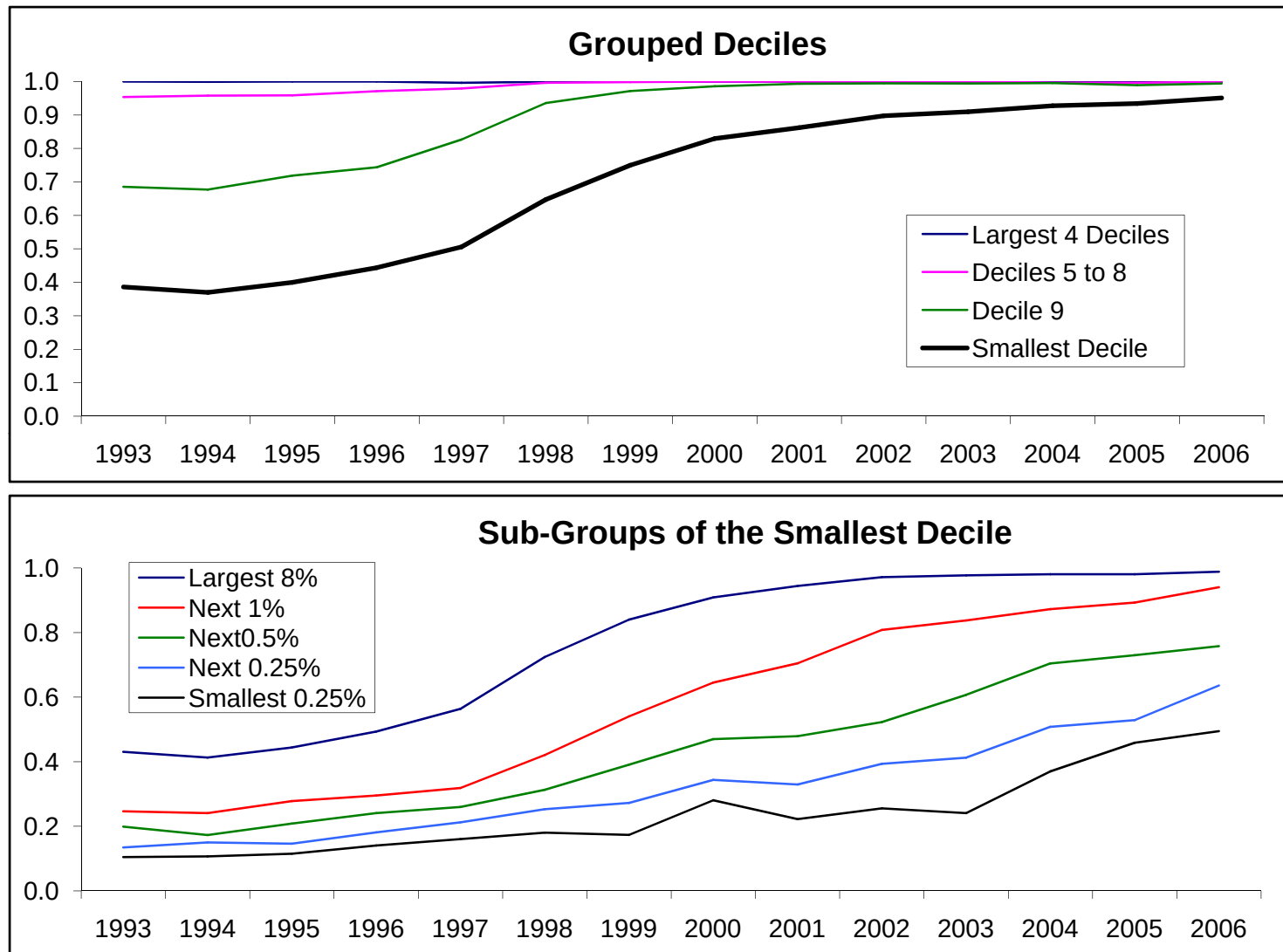


- Even during regimes when minimum tick size was constant at eighths, sixteenths and pennies, percent spreads were falling
- Largest declines for the 3 smallest quintiles (~ the smallest decile in analysis above)
 - smallest stocks most sensitive to changes in factors affecting liquidity
 - Decline due to increased institutional holdings of these stocks over the period?



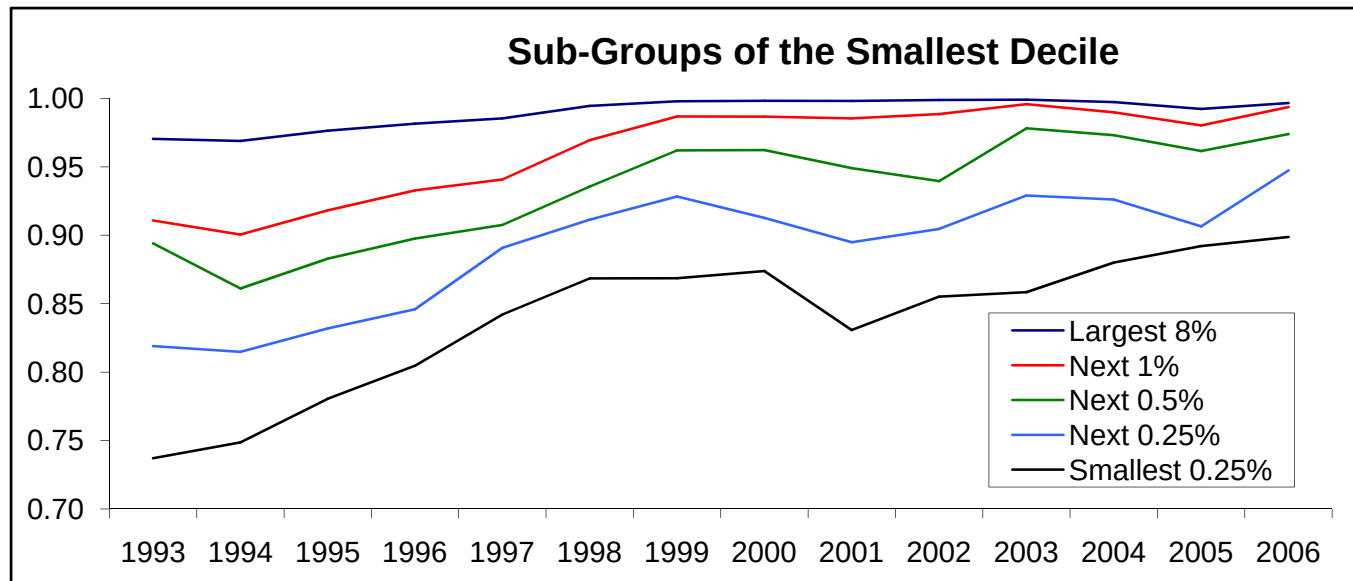
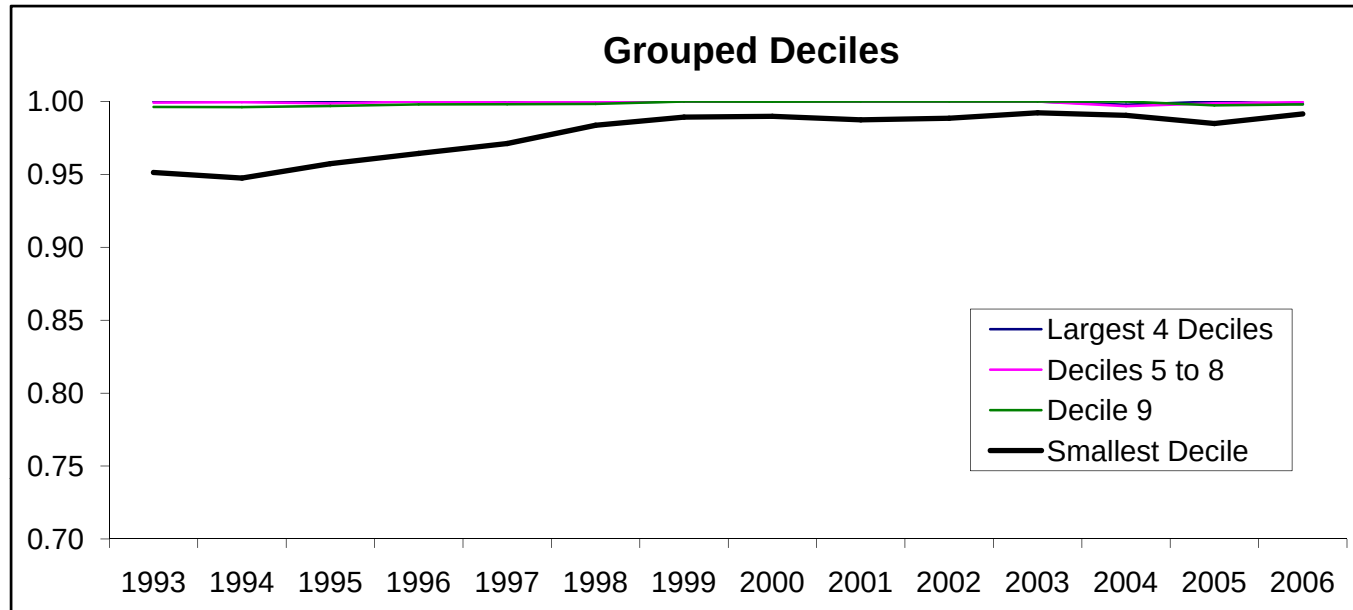
- General increase in turnover through 2001 is consistent with first conjecture, but subsequent decline afterward despite increased institutional ownership is inconsistent
- Ratio of smallest-cap turnover to largest-cap turnover increased from 1.83 in 1980 to only 1.94 in 2006, despite the large institutional shift toward smaller-cap stocks
→ Inconsistent with second conjecture

Percentage of Stocks that Traded Within the Last Five minutes of the Trade Day



→ By end of 2006 there were virtually no stale prices, except for very smallest stocks

Percentage of Stocks that Traded on Day t



Institutional Stock Ownership & Stock Return Predictability

- Research has documented short-term predictability in returns, and some attribute part of this predictability to stale prices.
 - Mutual fund predictability:
Chalmers, Edelen, and Kadlec (2002); Goetzmann, Ivkovic, and Rouenhorst (2001); and Zitzewitz (2003)
 - Direct Tests of Stock Return Predictability:
e.g., Lo & Mackinlay (1988,1989,1990), Kadlec & Patterson (1999)
- The recent increase in trade volume and institutional ownership – and the concurrent decrease in stale prices, particularly for smaller stocks – warrants a reexamination of the evidence on predictability.
- Using equal-cap decile groups, we examine daily predictability with:
 - Regressions using lagged S&P 500 futures price changes
 - Conditional returns (based on extreme prior-day S&P price changes)

Table 5
Time Variation in Stock Return Predictability (w\ Stale Prices)

Estimated slope coefficients from the following model estimated separately in each of the 14 annual periods:

$$R_{i,t} = a_0 + a_2 R(SP\ fut)_{t-1} + e_{i,t}$$

where $R_{i,t}$ is the return on cap-decile group i for day t and $R(SP\ fut)_{t-1}$ is the S&P 500 futures price change over the interval from the close on day $t-2$ to 3:55 pm on day $t-1$. Values in **bold** indicate significance at the .05 level.

year	Market Capitalization Decile Groups			
	Largest 4	5 to 8	9	Smallest
1993	-0.054	0.152	0.303	0.304
1994	-0.058	0.146	0.293	0.267
1995	-0.018	0.133	0.241	0.242
1996	0.081	0.168	0.210	0.229
1997	-0.053	0.077	0.162	0.164
1998	-0.056	0.098	0.226	0.243
1999	-0.030	0.009	0.103	0.163
2000	0.037	0.163	0.265	0.255
2001	0.009	0.030	0.116	0.144
2002	-0.019	0.027	0.078	0.031
2003	-0.186	-0.090	0.026	0.070
2004	-0.109	-0.058	0.027	-0.056
2005	-0.138	-0.035	0.054	-0.004
2006	-0.056	0.086	0.183	0.162

→ Time series of estimated slopes is inconsistent with patterns in stale prices

Time Variation in Stock Return Predictability (No Stale Prices)

Estimated slope coefficients from the following model estimated separately in each of the 14 annual periods:

$$R_{i,t} = a_0 + a_2 R(SP\ fut)_{t-1} + e_{i,t}$$

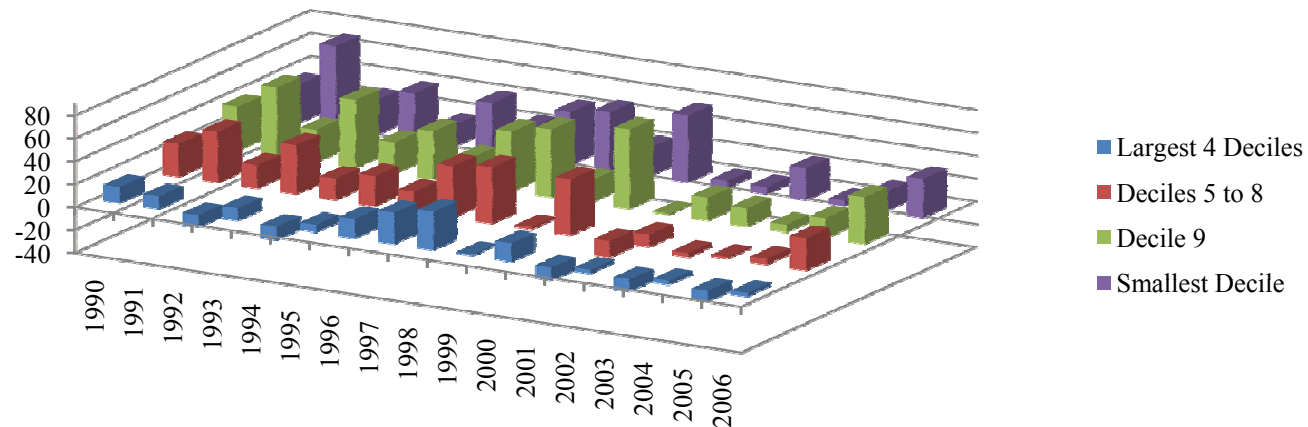
where $R_{i,t}$ is the return on cap-decile group i for day t and $R(SP\ fut)_{t-1}$ is the S&P 500 futures price change over the interval from the close on day $t-2$ to 3:55 pm on day $t-1$. Values in **bold** indicate significance at the .05 level.

year	Market Capitalization Decile Groups			
	Largest 4	5 to 8	9	Smallest
1993	-0.055	0.141	0.290	0.395
1994	-0.060	0.134	0.305	0.294
1995	-0.017	0.122	0.251	0.330
1996	0.081	0.163	0.222	0.287
1997	-0.063	0.078	0.159	0.195
1998	-0.057	0.091	0.222	0.283
1999	-0.028	-0.005	0.106	0.219
2000	0.027	0.162	0.261	0.278
2001	0.000	0.029	0.114	0.144
2002	-0.027	0.026	0.069	0.003
2003	-0.188	-0.107	0.017	0.069
2004	-0.112	-0.062	0.019	-0.081
2005	-0.139	-0.066	0.033	-0.033
2006	-0.067	0.044	0.146	0.130

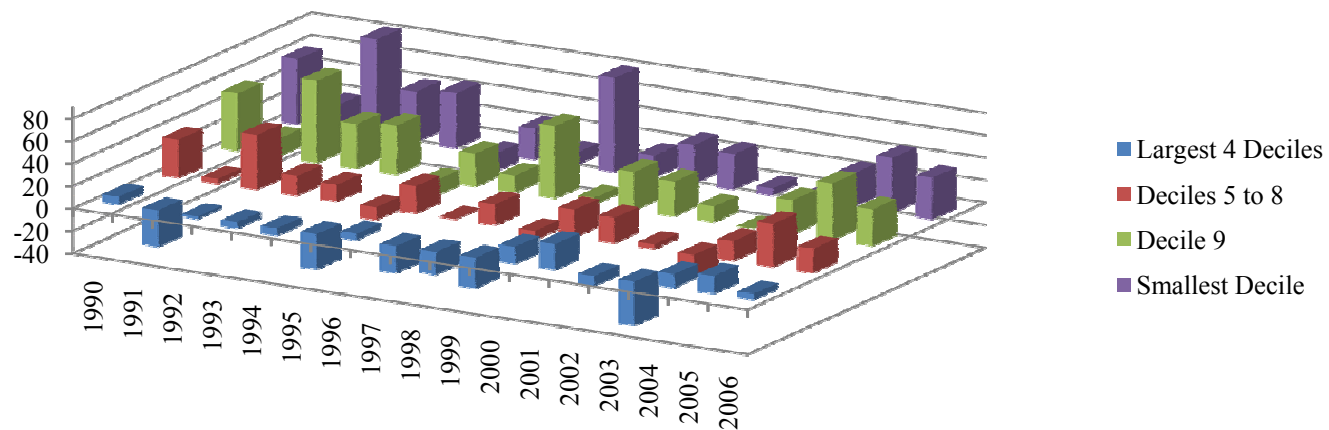
→ Compared to results with stale prices, coefficients here are often larger in the early part of sample, and little different thereafter - stale prices??

Daily Returns (basis points) conditional on prior-day return on S&P 500

S&P up 1%



S&P down 1% (*decile return multiplied by -1*)



Institutional Stock Holdings & Institutional Returns

- Long academic literature linking trading to returns
 - block trading, speculation and prices, S&P listing effect
- Investment industry has for many years used investment flows to explain and predict returns
 - e.g., Biryini Associates
- Gompers and Metrick (2001) conclude that institutional flows explain “part of the disappearance of the historical small-company stock premium.”
- Do institutional stock holdings forecast equity returns?

Attribution Analysis

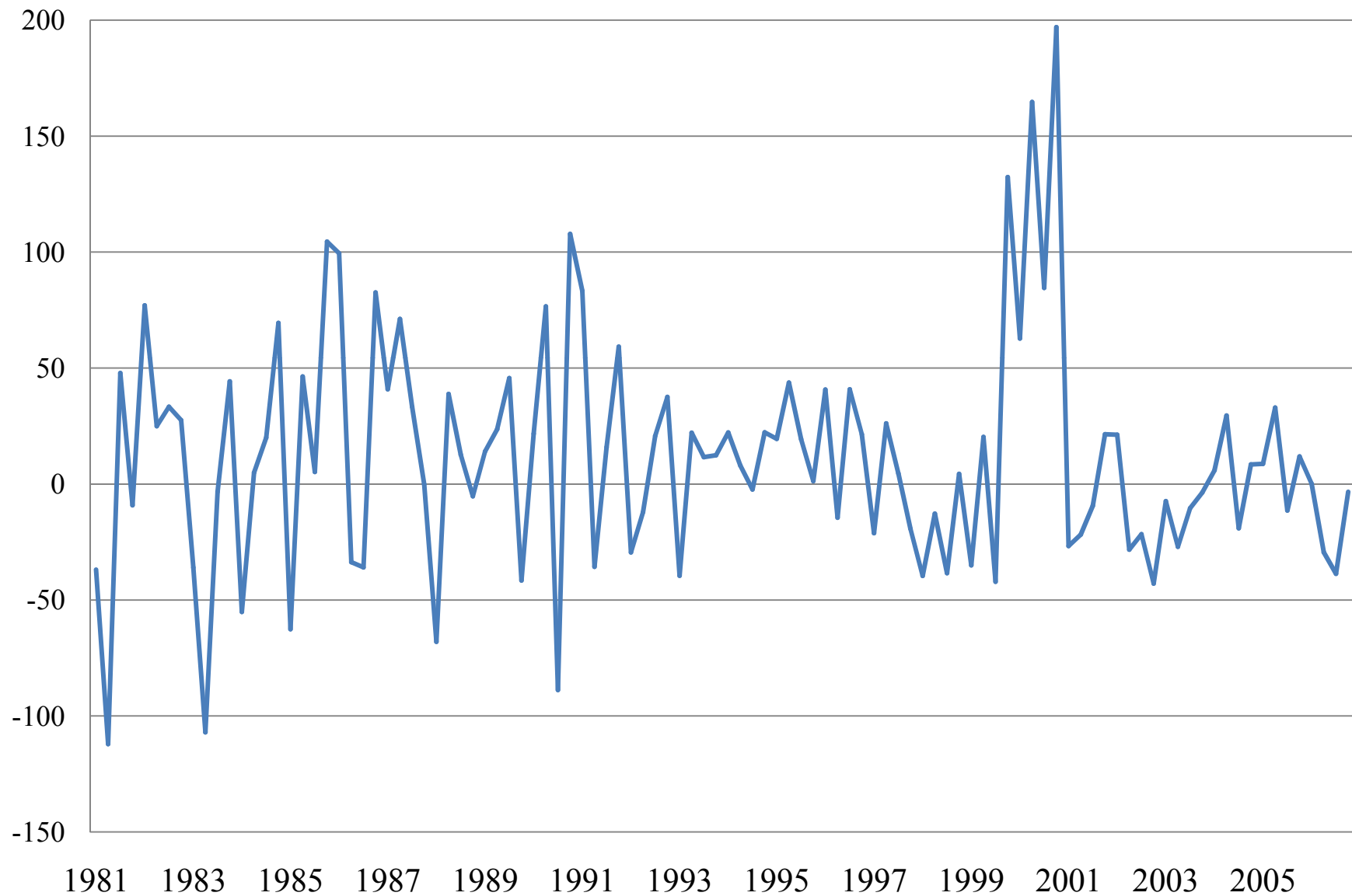
Decompose the institutional excess returns into excess returns earned from *security selection* (deviation from market weights on securities within market-cap deciles) and from *asset allocation* (deviation from market weights for market-cap deciles):

$$r - R = \underbrace{\sum_k w_k (r_k - R_k)}_{\text{Security Selection}} + \underbrace{\sum_k (w_k - W_k) (R_k - R)}_{\text{Asset Allocation}}$$

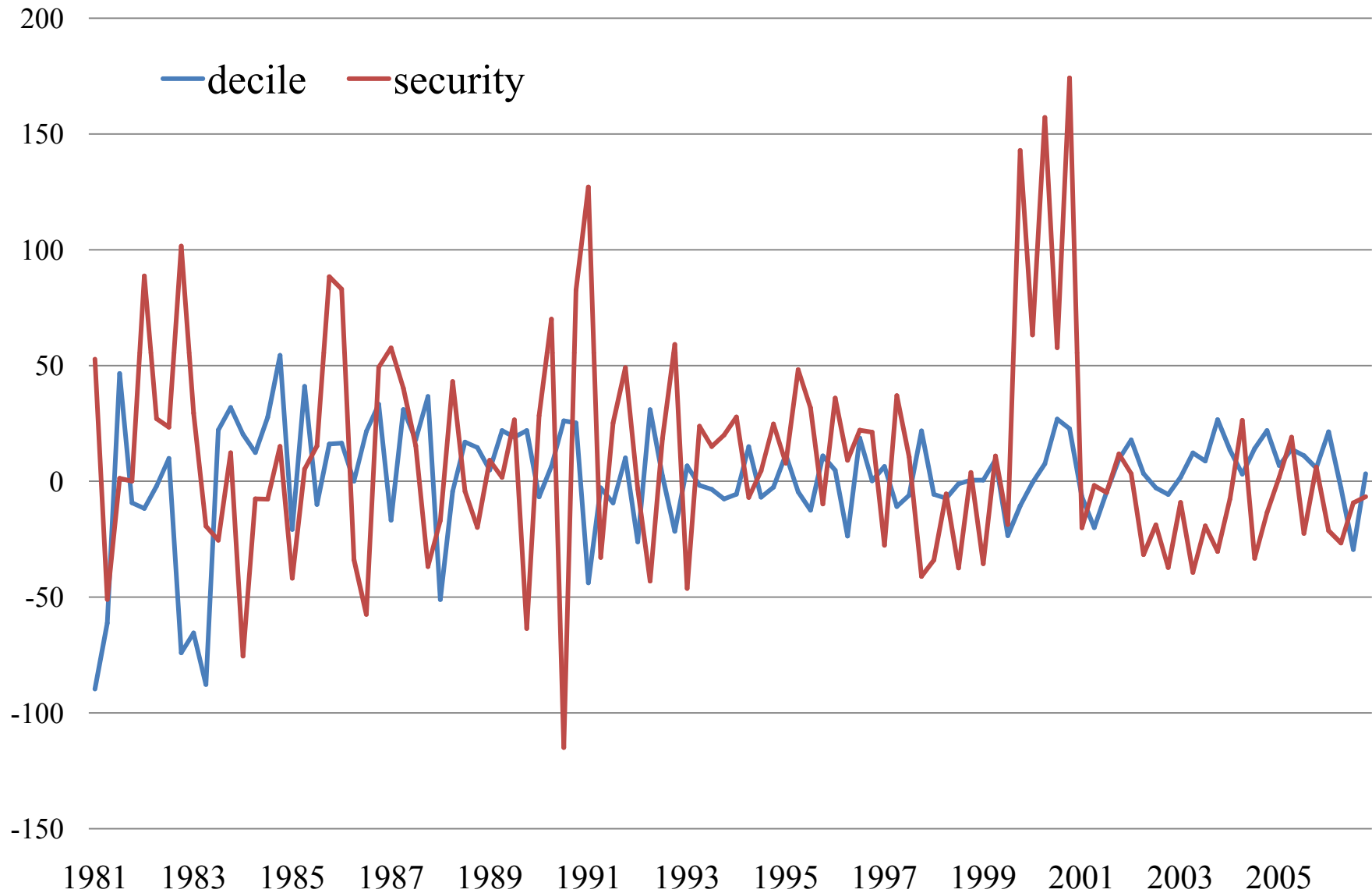
Lower case letters represent attributes of the aggregate of institutional portfolios and upper case letters attributes of the market portfolio.

Subscripts refer to deciles of market cap.

Total Excess Return by Quarter (basis points)



Security and Decile Excess Returns (basis points)



Attribution Analysis

Comparison of Institutional Returns to Benchmark Returns

The table reports means and t-values (*in italics*) of the quarterly total excess returns (in basis points) for institutional investors in our sample, and the decomposition into security selection and asset allocation, for several time periods.

	Excess Returns (basis points)		
	Security Selection	Asset Allocation	Total
1981-1998	10.09	0.33	10.41
	<i>2.37</i>	<i>0.12</i>	<i>2.29</i>
1999-2000	68.99	4.07	73.06
	<i>4.56</i>	<i>0.45</i>	<i>4.71</i>
2001-2006	-11.85	5.14	-6.71
	<i>-3.30</i>	<i>1.95</i>	<i>-1.56</i>
1981-2006	7.50	3.07	10.57
	<i>1.64</i>	<i>1.26</i>	<i>2.17</i>
1981-2006	4.60	1.53	6.13
(exc 1999-2000)	<i>1.14</i>	<i>0.59</i>	<i>1.44</i>

Attribution Analysis - Discussion

- 1999 and 2000 aside, institutional performance during 1981-2006 is marked by substantial variation
- Positive value added from security selection in the 1981-1998 period is offset by negative contribution from security selection in the 2001-2006 period.
- Positive contribution from asset allocation in the 2001-2006 period likely reflects the overweighting of smaller-cap stocks and underweighting of larger-cap stocks over this time period relative to market weights (see figure 2)
 - a period when small-cap stocks significantly outperformed large-cap stocks.
- Excess returns of institutions are not significant in this period

Conclusions

- Over time, institutions & mutual funds increased their holdings of smaller stocks and decreased their holdings of larger stocks.
 - Now underweight the largest stocks and overweight the smaller stocks relative to market weights.
- The increasing liquidity in the stock market generally, and in smaller cap stocks in particular, over the past two decades mirrors the increase in institutional ownership of common stocks.
 - Today virtually no stale prices, except for very smallest stocks
- Daily return predictability is time varying
- Any excess returns of institutional investors in the past 25 years are primarily due to security selection within market cap deciles, not to allocation across deciles (and not significant).