

The Divergence of Liquidity Commonality in the Cross-Section of Stocks

Avi Kamara

University of Washington

Xiaoxia Lou

University of Delaware

Ronnie Sadka

University of Washington
(visiting University of Chicago/GSB)



Literature Overview

How can liquidity affect asset prices?

- Transaction costs and profitability
- Return premium for holding illiquid securities
- Aggregate liquidity as a risk factor



Motivation and Focus

- Commonality in liquidity
- Why is it there?
- Does commonality change over time? Do we expect a time trend? Would it differ across firms?
- What are the implications for asset pricing and asset management?



Outline and Main Findings

- Time trend in liquidity commonality during 1963-2005
 - The cross-sectional variation has increased
 - Large firms versus small firms

- The trend can be explained by institutional ownership
 - Cross-section
 - Time series

- Relation to return commonality

- Implications for diversification of return and liquidity risks

Measure of Liquidity and Empirical Framework

- Measure of liquidity:

$$\Delta ILLIQ_{i,d} = \log \left[\frac{|r_{i,d}|}{dvol_{i,d}} / \frac{|r_{i,d-1}|}{dvol_{i,d-1}} \right]$$

- Measuring commonality

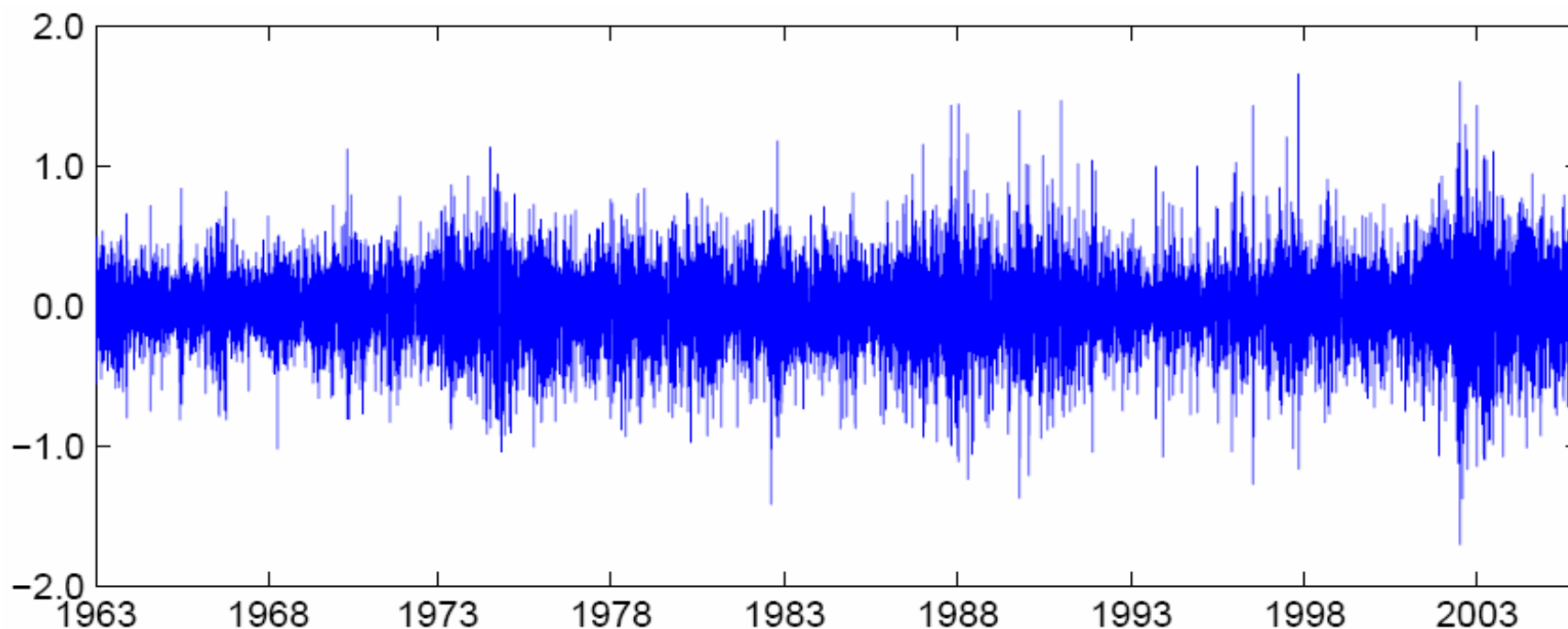
$$\Delta ILLIQ_{i,d} = a + \beta_i \Delta ILLIQ_{m,d} + \varepsilon_{i,d}$$

- Data

- NYSE/AMEX stocks for 1963-2005
- \$2 minimum price, 100 valid observations per year

Market Liquidity Variations

Figure 1a

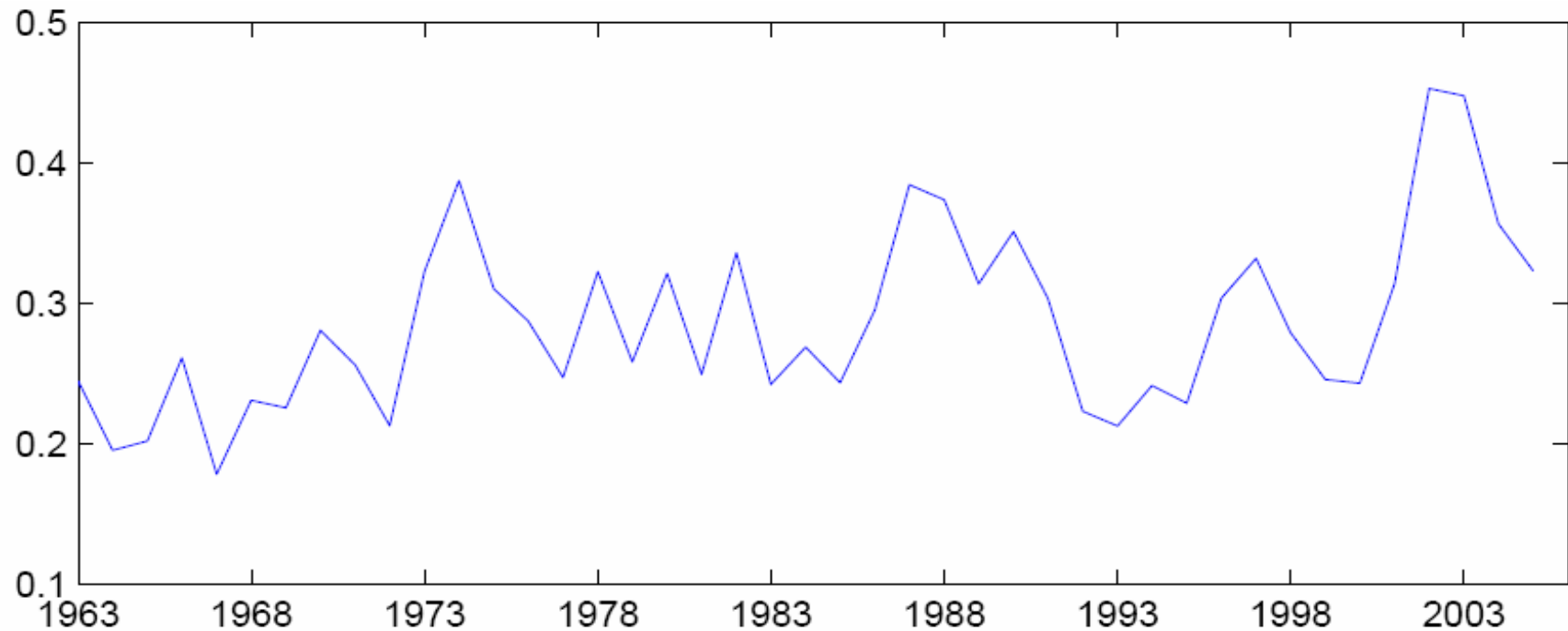


(a) Market Liquidity Variation: $\Delta ILLIQ_{m,d}$

➤ Spikes correspond to recognizable events

Volatility of Market Liquidity

Figure 1b

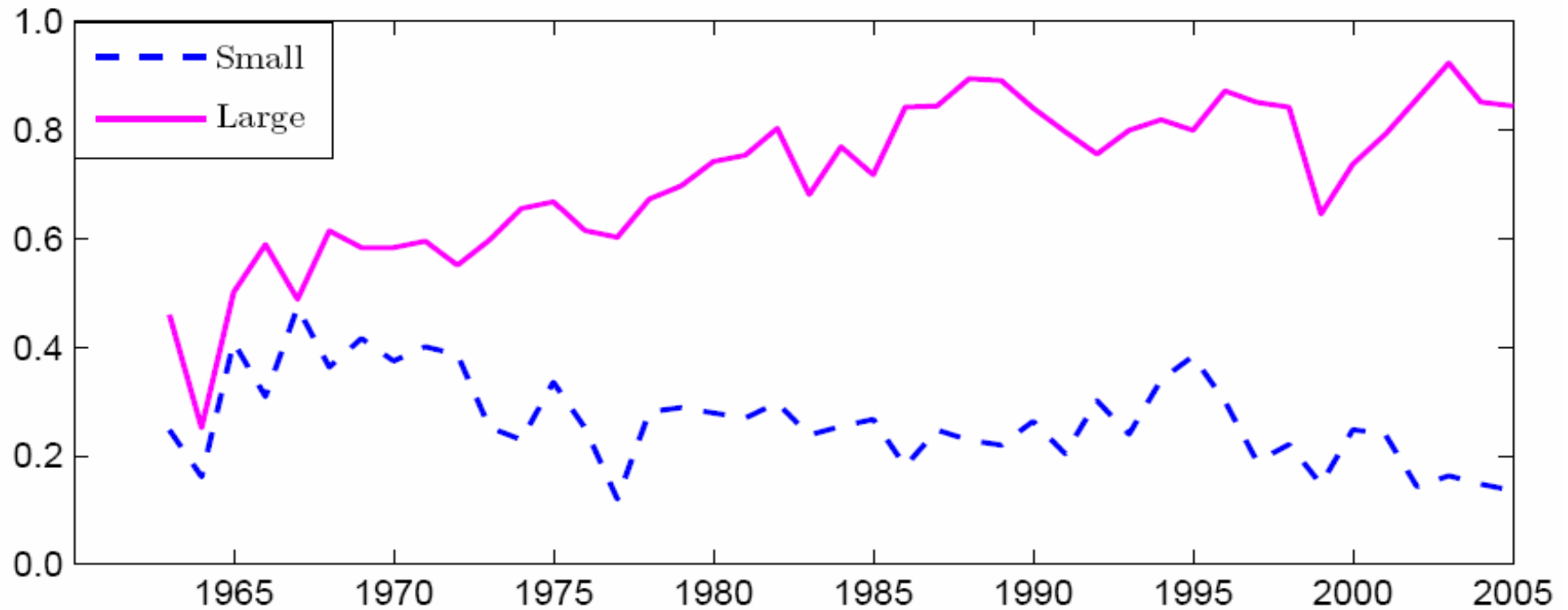


(b) Volatility of $\Delta ILLIQ_{m,d}$

- The volatility of market liquidity has not decreased over time

Liquidity Commonality of Large and Small firms

Figure 2a

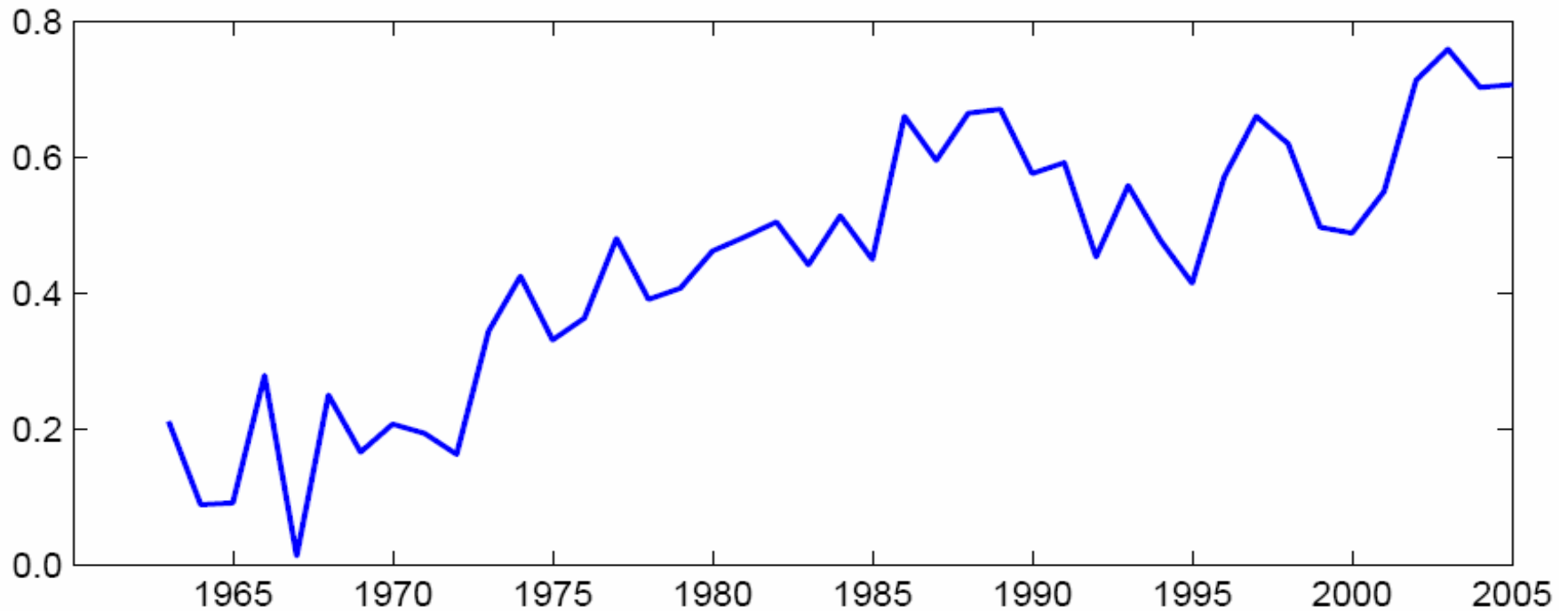


(a) Liquidity Beta for Small and Large Firms

- Large firms have become more liquidity common; small firms less liquidity common

Commonality Spread

Figure 2b



(b) Difference in Liquidity Beta Between Large and Small Firms

Time-Trend Tests

Table 2b

- Stochastic time-trend tests reject unit-root process
- Deterministic time-trend tests show different patterns across size groups

Panel B: Deterministic Time Trend: $\beta_t = a + \delta t + \epsilon_t$

Firms	a			$\delta(\times 10^3)$		
	Estimate	<i>T</i> -statistic	<i>P</i> -value	Estimate	<i>T</i> -statistic	<i>P</i> -value
1 (small)	0.347	10.32	< .001	-3.668	-2.99	0.005
2	0.367	7.46	< .001	0.084	0.04	0.968
3	0.362	6.20	< .001	3.168	1.25	0.217
4	0.410	10.56	< .001	4.957	3.26	0.002
5 (large)	0.507	15.02	< .001	9.406	6.66	< .001
5 minus 1	0.160	4.88	< .001	13.07	9.53	< .001

Liquidity Commonality and Institutional Ownership

Table 3

Panel A: All Types of IO		Panel B: Decomposition of IO Type				
	IO	Size	Bank + Insurance	Investment Company + Independent Advisors	Other	Size
1 (small)	77.35		-553.2	106.2	798.1	
	[3.03]		[-1.09]	[1.38]	[2.00]	
	57.58	0.018	-562.4	188.6	497.5	-0.072
	[2.04]	[0.19]	[-1.10]	[1.97]	[1.46]	[-1.00]
3	12.26		2.603	17.76	35.35	
	[8.00]		[0.44]	[4.04]	[2.64]	
	10.99	0.026	0.983	16.30	33.21	0.035
	[6.59]	[2.36]	[0.17]	[3.64]	[2.52]	[1.90]
5 (large)	0.731		0.029	2.490	1.206	
	[6.82]		[0.10]	[3.63]	[2.80]	
	0.150	0.142	-0.555	1.789	-0.008	0.174
	[2.30]	[7.58]	[-1.90]	[2.54]	[-0.01]	[17.50]

➤ Liquidity commonality increases with institutional ownership

Divergence of Systematic Liquidity and Institutional Ownership

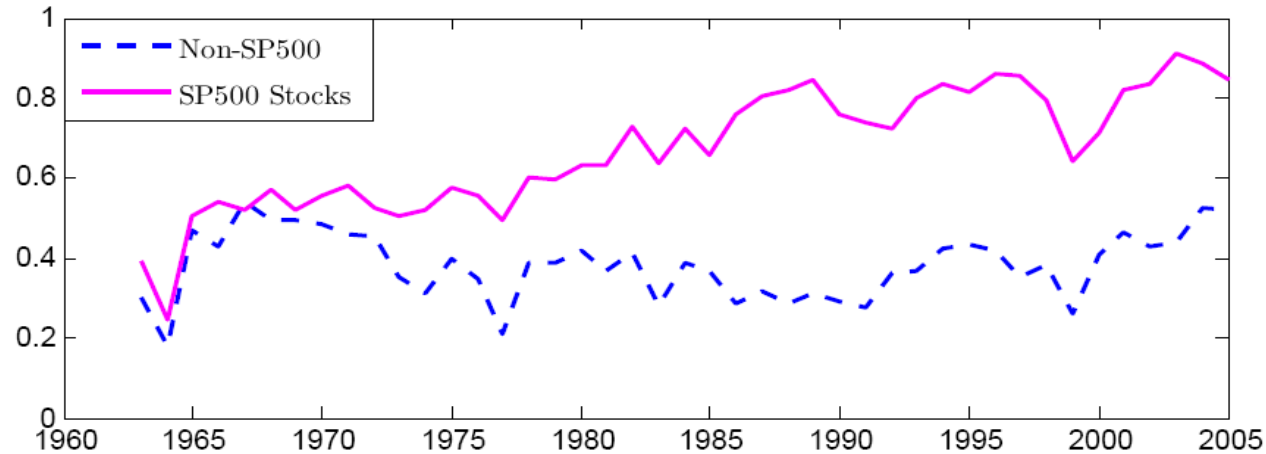
Table 4

$$\beta_{large,t} - \beta_{small,t} = a + \delta \cdot t + \gamma \cdot (IO_{large,t-1} - IO_{small,t-1}) + \varsigma \cdot (Size_{large,t-1} - Size_{small,t-1}) + \omega_t$$

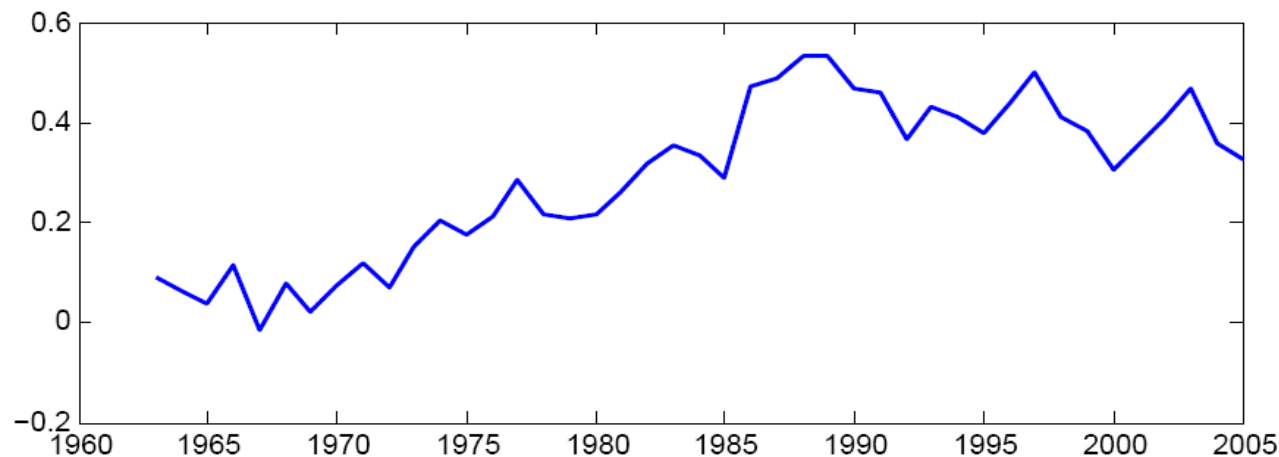
	Intercept	Trend ($\delta \times 10^3$)	IO (γ)	Size (ς)	<i>AdjR</i> ²
Trend Only	0.492 [12.62]	6.337 [2.25]			0.187
All IO Types (1981-2005)	0.218 [1.88]	0.812 [0.21]	2.765 [2.22]		0.297
All IO Types (1981-2005)	0.358 [0.77]	2.338 [0.38]	2.857 [2.41]	-0.035 [-0.35]	0.268
All IO Types (1981-1998)	0.143 [0.34]	-0.630 [-0.11]	2.445 [1.96]	0.027 [0.29]	0.070
Bank and Insurance Company	-0.034 [-0.07]	7.554 [1.47]	6.160 [1.71]	0.044 [0.46]	0.032
Investment Company and Independent Investment Advisors	0.274 [0.65]	-11.51 [-1.20]	6.264 [2.11]	0.012 [0.13]	0.099
Other	0.253 [0.63]	3.756 [0.76]	9.214 [1.77]	0.027 [0.29]	0.044

Liquidity Commonality and Index Firms

Figure 4



(a) Liquidity Beta of SP500 and Non-SP500 Stocks



(b) Difference in Liquidity Beta Between SP500 and Non-SP500 Stocks



What are the implications?

- **How about stock returns?**
 - Common aggregate determinants of liquidity beta and return beta (Table 5)
 - Systematic versus idiosyncratic risk
- **Diversification of risk and liquidity**

Systematic Liquidity and Systematic Risk

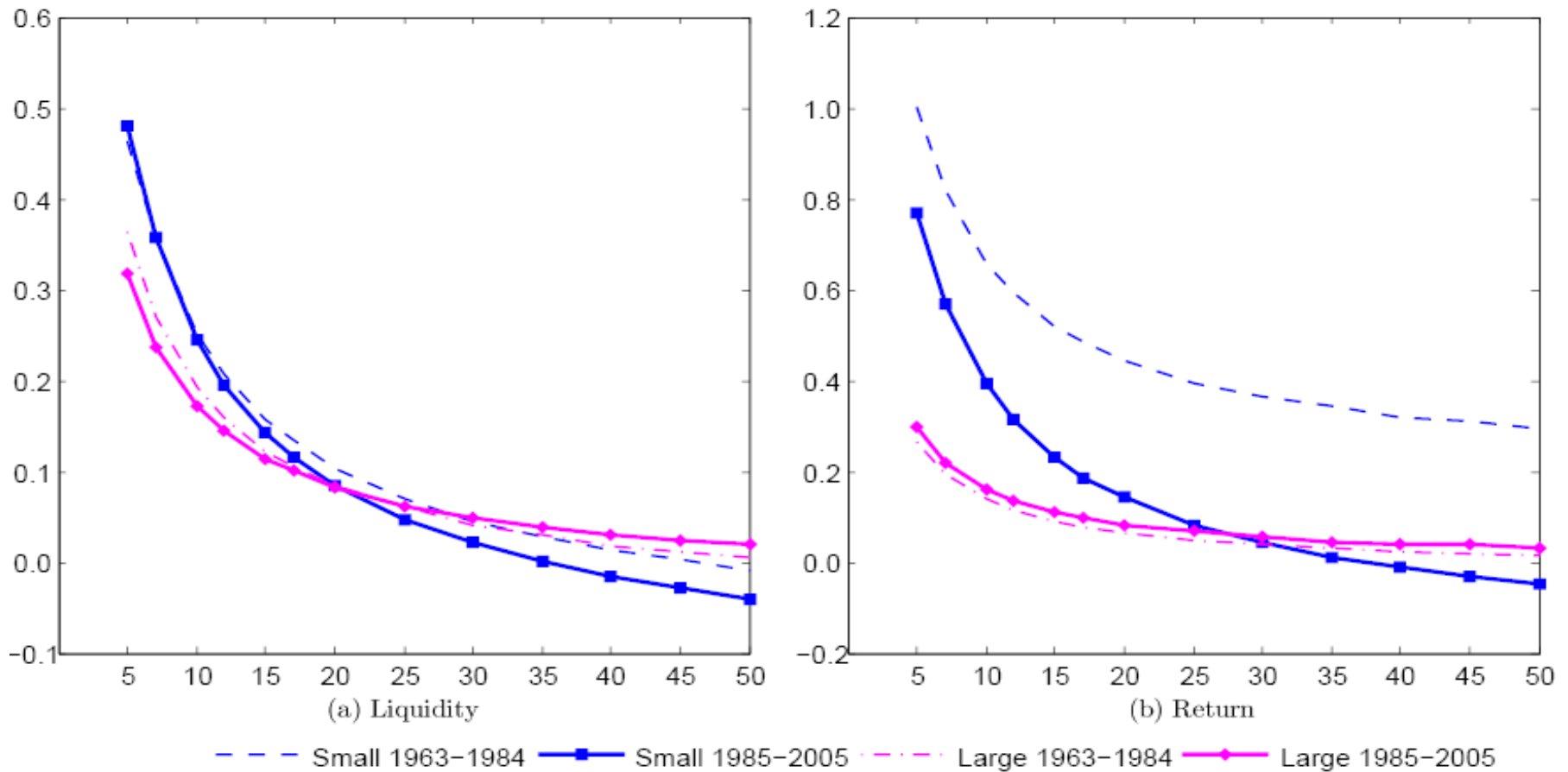
Table 6

Panel A: $\beta_{ret,t} = a_b + \delta_b t + e_{b,t}$					
Firms	$\delta(\times 10^3)$				R^2
	Estimate	T -statistic			
1 (small)	-22.377	[-10.33]			0.81
2	-12.596	[-2.58]			0.31
3	-7.478	[-1.77]			0.18
4	-3.821	[-1.71]			0.15
5 (large)	1.653	[2.50]			0.19
5 minus 1	24.030	[12.79]			0.82

Panel B: $\beta_{ret,t} = a_b + \delta_b t + \theta_b \beta_{liq,t} + e_{b,t}$					
Firms	$\delta(\times 10^3)$		θ		R^2
	Estimate	T -statistic	Estimate	T -statistic	
1 (small)	-18.126	[-10.35]	1.159	[4.76]	0.88
2	-12.745	[-5.07]	1.772	[4.83]	0.72
3	-12.120	[-8.41]	1.466	[6.91]	0.75
4	-9.099	[-5.85]	1.065	[5.58]	0.58
5 (large)	-1.263	[-1.27]	0.310	[4.16]	0.45
5 minus 1	13.602	[4.19]	0.798	[4.46]	0.88

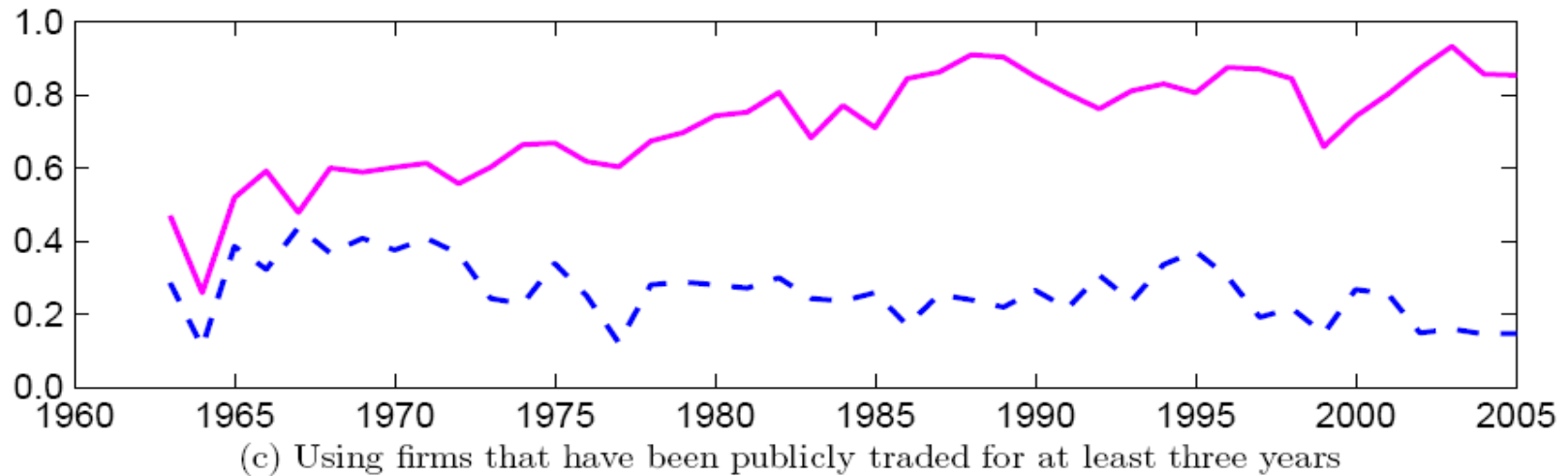
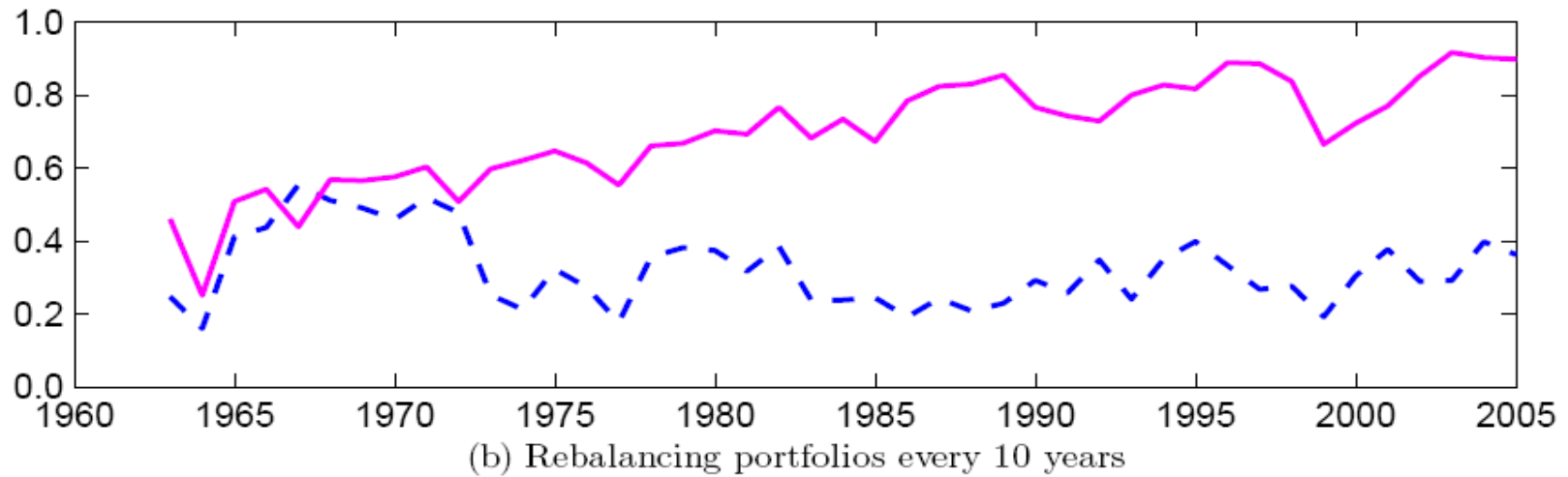
Implications for Diversification

Figure 5



Robustness to Firm Age and Size

Figure 4



Systematic Component Measured by R^2

Table 7

Panel A: $R_{liq,t}^2 = a + \delta t + e_t$					
Firms	$\delta(\times 10^3)$				R^2
	Estimate	T -statistic			
1 (small)	-0.136	[-3.21]			0.30
2	-0.002	[-0.02]			< 0.01
3	0.289	[1.57]			0.15
4	0.488	[2.57]			0.25
5 (large)	1.116	[3.62]			0.29
5 minus 1	1.252	[4.11]			0.36

Panel C: $R_{ret,t}^2 = a_r + \delta_r t + \theta_r R_{liq,t}^2 + e_{r,t}$					
Firms	$\delta(\times 10^3)$		θ		R^2
	Estimate	T -statistic	Estimate	T -statistic	
1 (small)	-0.426	[-1.02]	5.253	[2.94]	0.47
2	0.113	[0.33]	6.143	[11.97]	0.56
3	-0.345	[-0.90]	4.788	[9.86]	0.64
4	-0.572	[-1.44]	4.366	[7.24]	0.66
5 (large)	-1.256	[-2.13]	3.335	[8.84]	0.82
5 minus 1	0.046	[0.12]	2.844	[12.82]	0.93



Robustness Tests

- Divergence of liquidity commonality during extreme liquidity days (Figure 3)
- Different market models (Figure 6)
- Industry effects (Table 8)



Summary and Conclusions

- The divergence of liquidity commonality has increased over time
Large firms' liquidity is more systematic; small firms' is less systematic
- The divergence can be explained by trends in institutional ownership
- Similar divergence is found in stock returns
- Implications for diversification: US market is more fragile to unanticipated liquidity events