Variation in Liquidity and Costly Arbitrage

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Puzzle

- The level of liquidity affects asset returns, e.g. share turnover by Datar, Naik, and Radcliffe (1998), dollar trading volume by Brennan, Chordia, and Subrahmanyam (1998)
- Agents care about the risk associated with fluctuations in liquidity.
- Hypithesis: the second moment of liquidity should be positively related to asset returns.

Puzzle

Chordia, Subrahmanyam, and Anshuman (2001): a negative and surprisingly strong cross-sectional relationship between stock returns and the variability of dollar trading volume and share turnover.

Summary

- A model shows that arbitrageurs limit their exposure to stocks with high variation in liquidity.
  - Model prediction: Mispricing is severe in stocks with high variation in liquidity.
  - Empirical: The turnover volatility (TURNVOL)-return relation is negative among overpriced stocks (difficult to short stocks) but positive among underpriced stocks.

- Solve the puzzle: *Costly arbitrage* and *arbitrage asymmetry* (due to the short sale constraints) together explain for the negative relationship between variation in liquidity and average returns.

Comments

1. Limits to arbitrage
2. Puzzle
3. Arbitrage asymmetry
4. Other Comments

Comment 1: Limits to arbitrage

Lam and Wei (2011) list 10 proxies of limits to arbitrage

- Idiosyncratic volatility (robust test)
- Analyst coverage
- Analyst forecast dispersion
- Stock price
- Bid-ask spread
- Institutional ownership (Nagel, 2005)
- Amihud illiquidity: absolute return-to-volume
- Dollar trading volume
- .....

Concern and Suggestion

Is variation in liquidity an additional limits to arbitrage factor after accounting for these?
Do more robust tests with other major limits to arbitrage proxies.

Comment 2: Puzzle (US)

- Hou, Xue, and Zhang (2018) replicate 452 anomalies in the U.S.. They show that volatility of turnover and dollar trading volume is positively related to stock returns, but insignificant.

	NYSE-VW		NYSE-EW		All-VW		All-EW	
	H-L	t	H-L	t	H-L	t	H-L	t
Coefficient of variation of share turnover, Chordia, et al. (2001)								
Cvt1	0.12	0.82	0.33	1.81	0.04	0.25	0.40	2.47
Coefficient of variation of dollar trading volume, Chordia, et al. (2001)								
Cvd1	0.08	0.57	0.30	1.58	0.03	0.20	0.32	1.77

Table 1: Average Returns of the High-Low deciles, Jan 1967 - Dec 2016

Concern and Suggestion

Does the puzzle exist in the US with single portfolio analysis?
Except for Fama-MacBeth regressions, do single portfolio analysis.

Comment 2: Puzzle (China)

- The puzzle exists in China.
- Qiao (2018) construct anomalies in China's A-share market, and find that volatility of turnover and dollar trading volume is negatively and significantly related to stock returns.
- Limits to arbitrage in China are more severe, and short sales on individual stocks are almost not allowed.

	All-VW		All-EW	
	H-L	t	H-L	t
Variation of share turnover, Chordia, et al. (2001)				
turnvol1	-0.89	-2.11	-1.08	-3.01
Variation of dollar trading volume, Chordia, et al. (2001)				
dtvvol	-1.50	-2.80	-2.41	-5.32

Table 2: Average Returns of the High-Low deciles in China, Jan 2000 - Dec 2017

Comment 3: Arbitrage Asymmetry

- With arbitrage asymmetry, only if the negative TURNVOL effect is stronger for overpriced stocks, the overall TURNVOL-return relation is negative.
- The absolute values of TURNVOL High-Low spread for overpriced stocks and underpriced stocks are similar, only with the difference of 0.26% (marginally negative).
- Arbitrage asymmetry is not strong in double portfolio analysis.

	L	2	3	4	H	H-L
Most	-0.04	-0.01	0.43	0.39	0.50	0.53
Underpriced	(-0.49)	(-0.15)	(4.98)	(3.37)	(2.96)	(2.87)
Most	-0.21	-0.21	-0.42	-0.58	-1	-0.79
Overpriced	(-1.63)	(-1.52)	(-3.56)	(-4.98)	(-7.36)	(-4.20)

Table 3: Risk-adjusted Returns of portfolios on mispricing and TURNVOL, Jan 1966 - Dec 2016

Comment 3: Arbitrage Asymmetry

- Robustness test with daily TURNVOL seems not robust.

	L	2	3	4	H	H-L
Most	-0.04	0.04	0.17	42	0.54	0.59
Underpriced	(-0.55)	(0.46)	(2.02)	(4.09)	(3.77)	(3.40)
Most	-0.42	-0.39	-0.53	-0.41	-0.75	-0.34
Overpriced	(-3.33)	(-3.16)	(-4.48)	(-3.59)	(-5.51)	(-1.84)

Table 4: Risk-adjusted Returns of portfolios on mispricing and daily TURNVOL, Jan 1980 - Dec 2016

Concern

Arbitrage asymmetry disappears.

Arbitrage asymmetry is a key point to explain the puzzle.

Other Comments: Mispricing Scores

- 11 return anomalies that survive adjustment for the FF 3 factors are used to measure mispricing scores by Stambaugh, Yu, and Yuan (2012, 2015) and Stambaugh and Yuan (2017).

- Four of them are priced investment and profitability factors in the Fama and French (2015) five factors and the Hou, Xue, and Zhang (2015) q factors.
  - Gross profitability
  - Asset growth
  - Return on assets
  - Investment-to-assets

Suggestion

Update mispricing scores with anomalies cannot be explained by Fama and French 5 or 6 factors.

Other Comments: Microcap Firms

- Small firms tend to have higher TURNVOL.
- Small firms tend to be overpriced.
- Small firms tend to be less easily shorted.
- Small firms tend to have higher cross-sectional dispersion of returns and anomaly variables (see Fama and French, 2008).

Concern and Suggestion

Whether the result hinges importantly on including small firms?
Robustness tests without microcap firms.

Overall

- A new perspective to link the second moment of liquidity to costly arbitrage
- An interesting paper
- Enjoy reading it
- More robust results may be provided