What's Wrong with Pittsburgh? Delegated Investors and Liquidity Concentration

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The Question

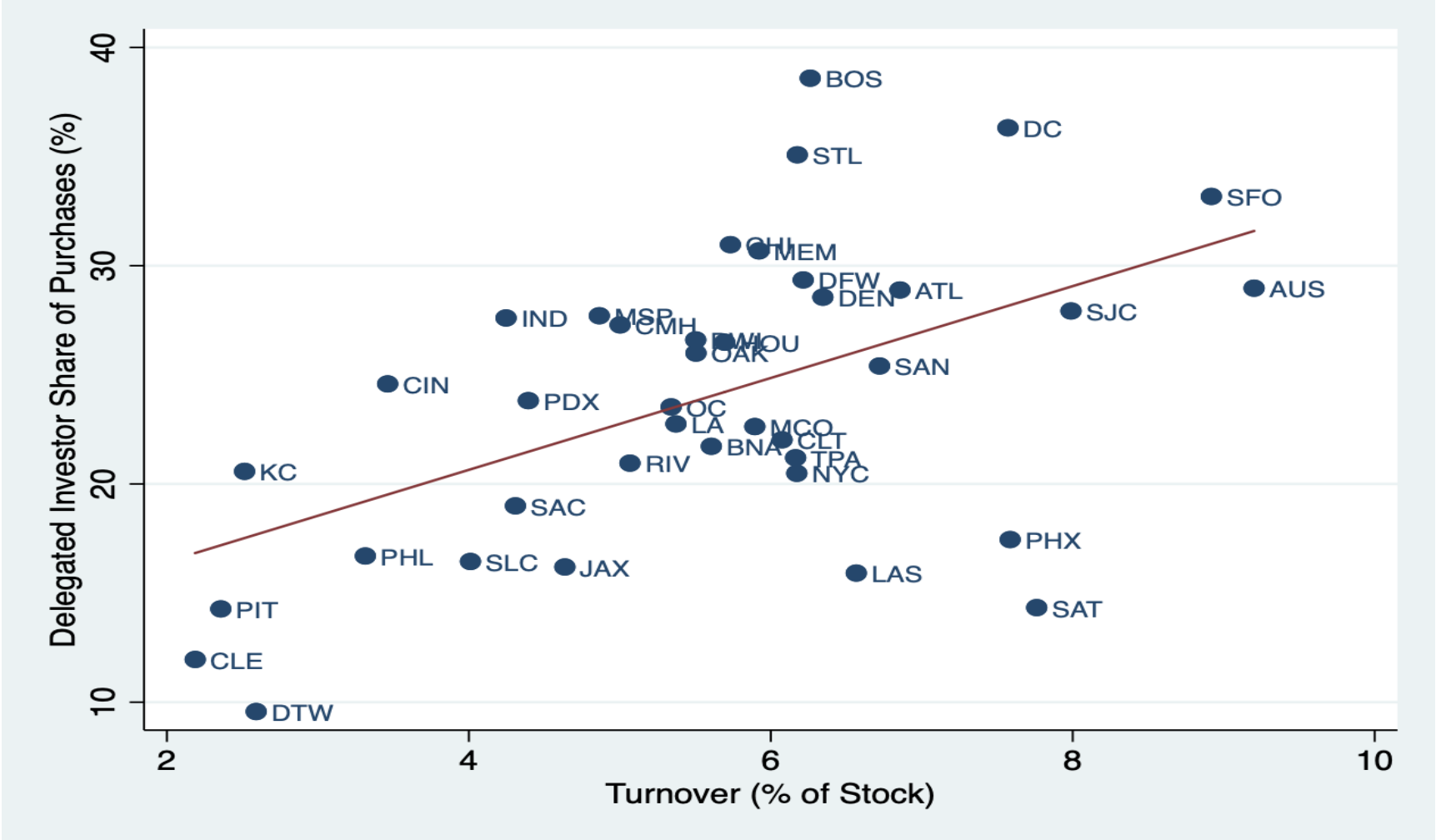
Why don't Delegated Investors like Pittsburgh?

- Beautiful natural landscape
- Two world class universities
- Health care hub
- Multiple major sports teams
- 44% of its millennials have college degrees (Frey, 2018), 15th highest share of 100 US cities

And yet, the share of delegated investors in Pittsburgh Commercial Real Estate (CRE) purchases is just 14%

- Ranks 37 out of the 39 MSAs in the sample on share of CRE purchases by delegated investors

This paper: Delegated Investor Share vs. Trade Frequency



1. Document this relationship
2. Show delegated investors prefer markets with more turnover
3. Use an OTC search model to explain it

The Explanation: Intutition

In CRE, delegated investors have higher liquidity needs (i.e., more frequent valuation shocks) than direct investors

- Empirically, I show that delegated investors have shorter holding periods consistent with higher liquidity needs
- Main reason is likely principal-agent conflict between investors and managers

Knowing this, delegated investors *ex ante* concentrate their investments in markets with more frequent transactions

- Give up an illiquidity premium in yields

The dominance of delegated investors in certain markets further propagates turnover in these markets

- "Liquidity begets liquidity"

Why do we Care?

- Path dependence of definition of institutional quality asset means allocations to alternatives will likely be slow to change
  - Low allocations to alternatives not necessarily inefficient
  - Increases in share of capital managed by delegated managers likely to continue going to publicly-traded equity
- Inability of a city to attract capital of delegated investors affects the types of properties there
  - Delegated investors also differ in the size of their investments
  - Path dependence in urban design
- Quantify illiquidity premia in CRE

Data

- Covers 39 MSAs, 2001-2015
- Property types included: Office, industrial, and retail
- Sample dicated by data availability
- From Real Capital Analytics (RCA):
  - All property transactions
  - Cap rates at MSA-level by property type
- Denominator for trade frequency: Stock of CRE in square feet from CBRE
- Trade Frequency: % of property stock transacting per year (in square feet)
  - results quite similar using dollar volume assuming average psf of existing stock

Buyer Classification

Classify according to buyer name

- Standardized by RCA

Classify all buyers with at least 5 transactions

- Covers 73% of purchases by $ volume, 46% of transactions by number
- Concern with accuracy of classification with smaller buyers

Remaining buyers are simply "SMALL"

Delegated Managers

Key distinction: Managing other people's money

- Agency frictions between investors and managers give rise to more frequent valuation shocks
  - redemption requests
  - maximum holding period
  - compensation payment contingent on liquidation

Benchmark definition of delegated investor includes:

- Private equity fund
- Investment manager
- Bank
- Pension fund

REITs in own category due to legal requirement on holding period

Holding Periods of Direct and Delegated Investors

Not Sold by End of Sample = 15

	mean	p25	p50	sd	min	max	n
2001-2015 Purchases							
Direct	11.7	8	15	5.2	0	15	29,372
Delegated	11.1	6	15	5.4	0	15	14,872
All	11.5	7	15	5.3	0	15	44,244
2001-2003 Purchases Only							
Direct	9.9	4	12	5.4	0	15	2,933
Delegated	8.0	3	6	5.3	0	15	1,289
Total	9.3	4	10	5.4	0	15	4,222

Unconditionally, delegated investors have holding periods about 2 years shorter on average

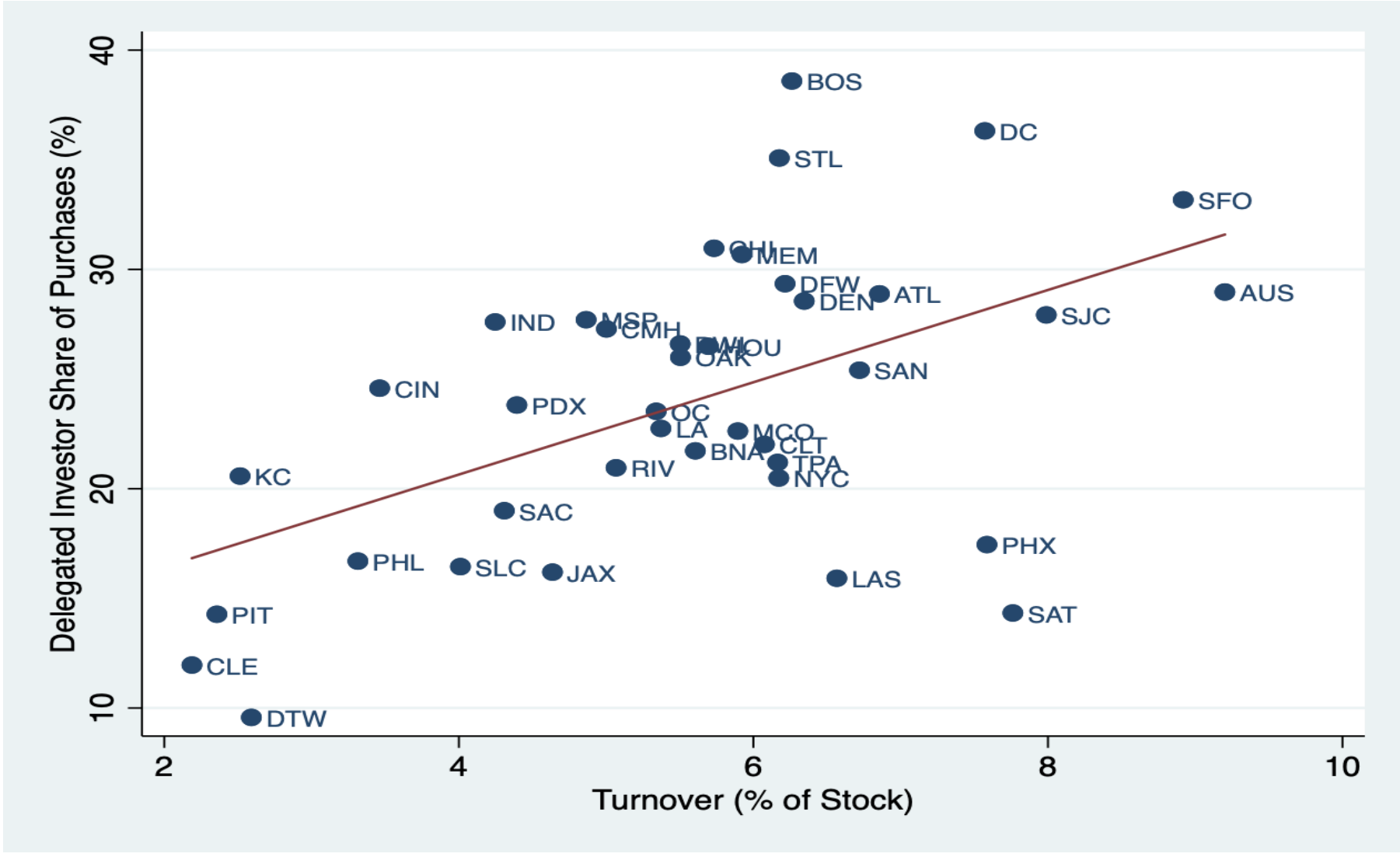
Tobit Regressions of Holding Periods

	(1)	(2)	(3)	(4)
delegated	-0.64***	-0.66***		-0.48***
invm			-0.32***	
pefu			-1.09***	
bank			-0.30**	
pens			0.11	
QScoreLocal		1.29***	1.28***	0.99
QScoreNat		0.25	0.19	0.047
Observations	44,244	35,521	35,521	2,018
Purchase Yrs Inc.	2001-15	2001-15	2001-15	2001-03
Year FEs	Yes	Yes	Yes	Yes
Benchmark Controls	No	Yes	Yes	Yes
Buyer Size Quints	No	Yes	Yes	No
Pseudo-R^2	1.9%	2.4%	2.4%	1.6%

Benchmark Controls: MSA FEs, Property Size, Property Type, Property Age

Delegated Investor Share vs. Trade Frequency

Aggregated to MSA Level from Individual Years



Alternative Explanations

1. Large cities: Delegated investors only are interested in the largest cities
   - control for MSA population

2. Risk and tenant quality: Delegated investors want "credit" tenants
   - share of employment in an MSA in publicly traded firms (*pubempshare*) from YTS
   - log of assets of publicly traded firms with HQ in the MSA (*logfirmassets*) from Compustat

3. Economic fundamentals: Delegated investors are better at picking cities with better long-term growth prospects
   - share with college degree (*college*)
   - diversification across industries (*emp_HHI*)
   - overall level of competition among firms (*estsperemp*)
   - MSA-level GDP growth (*gdpgrowth*)

Delegated Investor Shares and Trade Frequency: Multivariate Correlations

Dependent variable is delegated investor share in an MSA-year

	(1) *delshare*	(2) *delshare*	(3) *delshare*	(4) *delshare*	(5) *delshare_sell*
tf	1.74***	1.52***	1.56***	1.60***	0.91***
pubempshare		0.36*		0.34*	-0.11
logfirmassets			1.35*		
emp_HHI		-178	-152	-130	-225**
estsperemp		-34.1	28.5	3.11	114
college		0.50***	0.34**	0.51***	0.49***
gdpgrowth				-0.10	
Observations	578	578	578	541	578
R^2	23.4%	26.9%	27.1%	29.1%	22.6%
Year FEs	Yes	Yes	Yes	Yes	Yes
Pop Quintiles	No	Yes	Yes	Yes	Yes

Do Delegated Investors Prefer Higher Turnover Cities?

MSA-Level relationship between delegated investor share and trade frequency is jointly determined

Conditioning on property characteristics and MSA fundamentals, is a delegated investor more likely to purchase in cities with higher trade frequency?

To answer: Probit regression where dependent variable $= 1$ if purchase is by delegated investor, 0 if by direct investor

Key measures of trade frequency:

- *tf*: Avg trade frequency in an MSA-year
- *tfavg_bytype*: Avg trade frequency in an MSA-property type (averaged over all years)
- *tfavg_firsthalf*: Avg trade frequency in an MSA in the first half of the sample

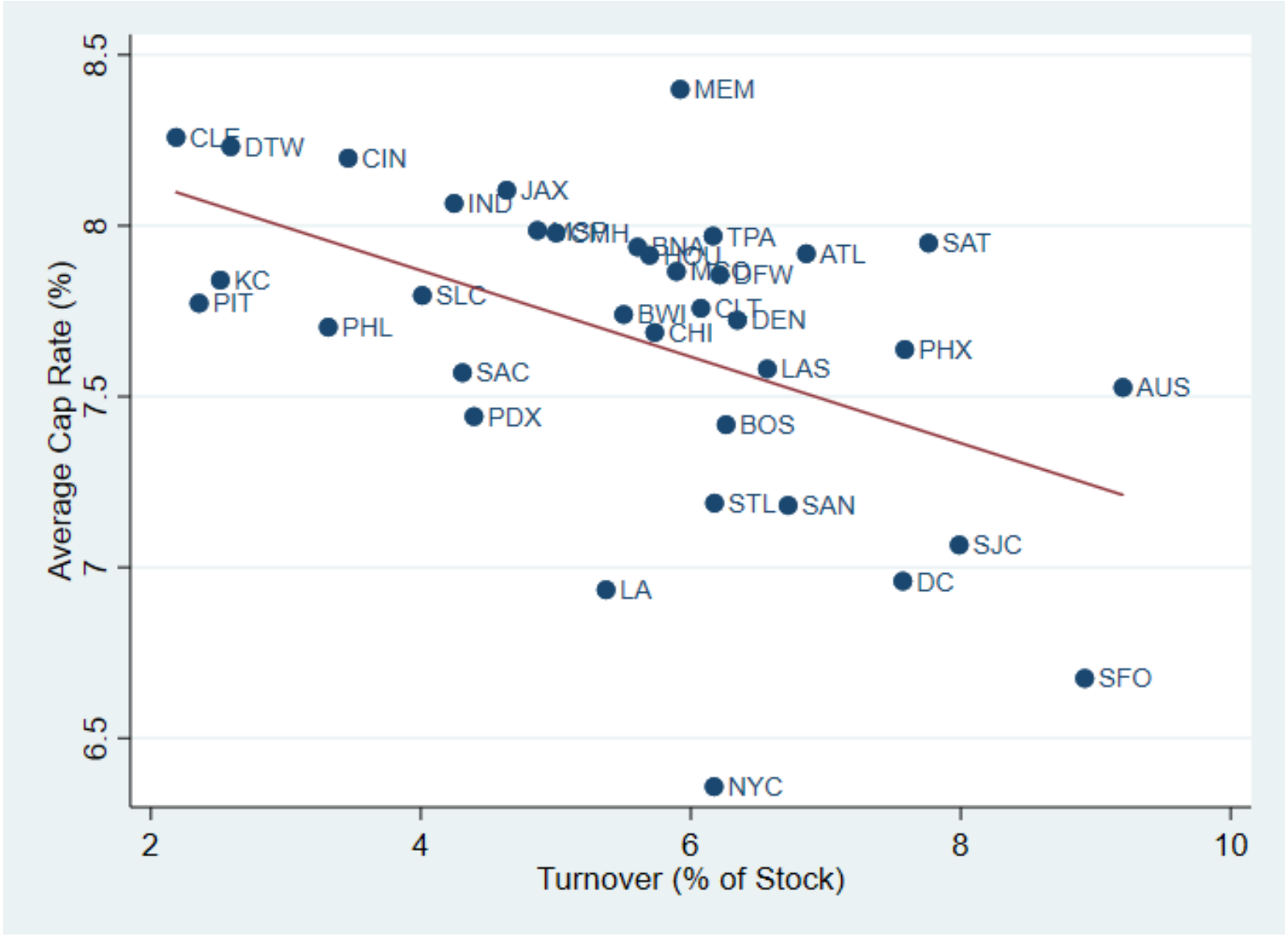
Delegated Investors Prefer Higher Trade Frequency Cities

Dependent variable = 1 if purchase is by a delegated investor, 0 if direct

tf	0.019		
tfavg_bytype		0.016**	
tfavg_firsthalf			0.041**
pubempshare	-0.0050	-0.0053	0.012
emp_HHI	-1.53	-0.33	9.17**
estsperemp	-5.16	-4.90	-2.80
college	0.0055	0.0072*	-0.00033
occrate_bytype	0.014**	0.017***	0.027***
rentgr_bytype	-0.0018	-0.0015	-0.0003
QScoreLocal	0.71***	0.73***	0.83***
QScoreNat	-0.10	-0.14	-0.30**
Observations	34,983	34,966	19,404
Pseudo-R^2	9.2%	9.2%	8.8%

Other controls: Year FEs, property type age & size quintiles, MSA population quintiles

Dividend Yields are Higher in Low Turnover Cities



Consistent with small illiquidity premium

The Explanation: Market Segmentation by Liquidity Preferences

Simplifed Version of Vayanos and Wang (2007)

Markets (Cities):

- Two markets $i = 1$ and $i = 2$ that are *ex ante* identical
- Supply of asset in each market is fixed at $0 < S < 1$
- Assets in each market pay dividend of 1 per period
  - Riskless

Investors

- Each period a set of investors is "born" (enters the economy)
- When an investor enters the economy, it values the asset at its full dividend (1 per period) but does not own the asset
  - Buyers
- Buyers meet sellers randomly at rate λ
- Investors randomly get shocks at rate κ that make them have a holding cost x of owning the asset
  - Liquidity shocks
  - Value dividend at only $1 - x$
  - Become sellers after shock if hold the asset

Investors

- Investors are born heterogeneous in how frequently they will get this valuation shock, i.e., each investor has a different κ
- Mass of investors that are born with κ is $f(\kappa)$, κ is distributed continuous uniform on $[\underline{\kappa}, \overline{\kappa}]$
- Must choose which of the two markets to search in
- Once an investor has sold the asset, or becomes a low valuation agent that does not own the asset, he exits the economy

Clientele Equilibrium

Lemma 1 of Vayanos and Wang (2007): there is a unique value of κ, κ^*, such that

- All investors with $\kappa \geq \kappa^*$ enter one market
- All investors with $\kappa < \kappa^*$ enter the other market

Also exist continuum of 'symmetric' equilibria wherein prices for the assets in the two markets are the same

Welfare is higher under clientele equilibrium

Search Model with Investor Heterogeneity

Calibrated to match volumes and cap rates

	Data: US Cities			Model	
	All	High Turnover Markets	Low Turnover Markets	High Turnover Market ($\kappa > \kappa^*$)	Low Turnover Market ($\kappa \leq \kappa^*$)
Avg. Cap	7.63%	7.51%	7.74%	7.51%	7.73%
Turnover	5.54%	6.85%	4.30%	6.80%	4.28%
Del. Share	23.2%	20.5%	26.0%		
N	39	19	20		
Months to Sell				8.92	11.65
κ^*				0.056	
Illiqudity Premium (bp)				206	228

Conclusions

Key facts:

- Delegated investors have shorter holding periods than direct investors
- Cities where delegated investors dominate have high turnover

Model with heterogeneity in investors' preferences over liquidity can explain MSA-level facts

Model indicates that illiquidity premium for CRE relative to perfectly liquid asset is $\approx$ 200 basis points

What's wrong with Pittsburgh is that CRE does not trade frequently enough

Broader implication: What makes an asset appropriate for delegated investors is the concentration of other delegated investors in that market

Vayanos, D. and T. Wang (2007): "Search and Endogenous Concentration of Liquidity in Asset Markets," *Journal of Economic Theory*, 136, 66–104.