

# Financial Intermediaries and Demand for Duration

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# Outline

- Intro
- Motivation
- Data & Methodology
- Empirical Results
- Conclusion

# This paper in a nutshell

## Research Question

- Who **seeks long-term cash flows** in the stock market?  
e.g., we often assume “*pension funds are long-term investors*”  
Are they *always* so in the equity market?
- Moreover:  
Does demand for long-term cash flows change over time?  
If yes, what drives its time variation?

## What we do

- Study **demand for long-term** cash flows of financial intermediaries

## What we find

- Significant *time variation* in demand for long-term cash flows
- Financial constraints affect demand  
more binding constraints  $\implies$  long-duration demand  $\downarrow$

# Motivation

# Positioning

- Increasing interest on institutional investors' portfolio choice:

- demand system asset pricing

e.g., Koijen-Yogo (2019), Koijen-Richmond-Yogo (2023),  
Huebner-Haddad-Loualiche (2022)

- Financial Intermediaries do matter for asset prices:

- their balance sheet affect market prices

e.g., Adrian-Etula-Muir (2014), He-Kelly-Manela (2017), Haddad-Muir (2022)

- typically regarded as *long-term investors* (unconditionally)

## This paper:

→ Do financial intermediaries demand long-term cash flows in equity?

→ How balance sheet constraints impact investors' demand?

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# Data & Methodology

# Data

1980:Q1 - 2022:Q2 sample

- CRSP/Compustat
- 13F (Thomson Reuters)
  - NY Fed Primary Dealers**
  - Banks**
  - Insurances**
  - Pension Funds**



## Summary Stats

Summary Holdings: Full Sample						
			AUM (\$MM)		N. stocks	
	N. investors	% market	median	p90	median	p90
Primary Dealers	63	10.13	14,169	133,220	1,503	2,722
Banks	594	15.50	412	9,176	198	1,051
Insurances	158	5.13	816	16,511	157	1,175
Pension Funds	114	5.51	3,023	24,281	438	1,468
Total	929	36.26	711	21,990	227	1,541

# Methodology (I)

Goal : study demand for long-term cash flows in equity

→ need a proxy for **stock-specific** “cash flow maturity”

- Equity Duration following Goncalves (2021)

▶ Validation

$$Dur_{j,t} = \sum_{h=1}^{\infty} h \cdot \frac{e^{-dr_{j,t} \cdot h} \mathbb{E}_t[PO_{j,t+h}]}{ME_{j,t}}$$

- where:

- $\mathbb{E}[CF_{t+h}]$  as VAR(1) on accounting variables
- Finds  $dr_{j,t}$  who matches market prices
- Get  $Dur_{j,t}$

▶ State vector

▶  $dr_{j,t}$

▶ More

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## Methodology (II)

- Intertemporal-CAPM (e.g., Merton, 1973; Goncalves, 2021)

Portfolio choice of an agent with *H*-period horizon (and  $H \rightarrow \infty$ ):

$$\rightarrow w_{i,t}(n) = A_{i,t} \cdot \mathbb{E}[r_{mkt,t+1}] + B_{i,t} \cdot \underbrace{\mathbb{E}[r_{t+1 \rightarrow t+H}]}_{\text{hedging}}$$

Long-term investors demand:

1. “market portfolio”
2. hedge *reinvestment risk*<sup>1</sup>

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<sup>1</sup>i.e., unfavorable shifts in future investment opportunities.

## Methodology (III)

- Demand System (Kojien-Yogo, 2019):

$$\rightarrow \frac{w_{i,t}(n)}{w_{i,t}(0)} = \exp \left\{ \alpha_{i,t} + \theta_{0,i,t} me_t(n) + \theta_{mkt,i,t} \beta_t^{mkt}(n) + \theta_{dur,i,t} dur_t(n) \right\} \epsilon_{i,t}(n)$$

where:  $me_t$  ( $dur_t$ ) is log market equity (duration)

- Validation check:

▶ Latent Demand

**Gormsen-Lazarus (2022)** : *a single duration factor subsumes traditional characteristics*

- Estimation follows Kojien-Richmond-Yogo (2022):
  - IV for  $me_t$  excluding Household sector
  - GMM across four quarters  
(Shrinkage estimation if  $\leq 2,000$  holdings within four quarters)

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# Empirical Results

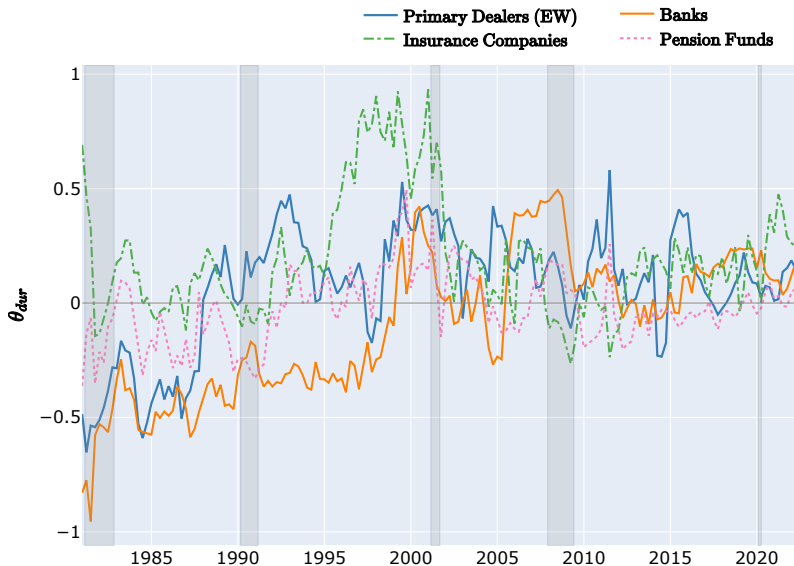
# Empirical Results - Validation Exercise

Demand for equity duration by **Target-Date Funds** w/ different “time-to-maturity”

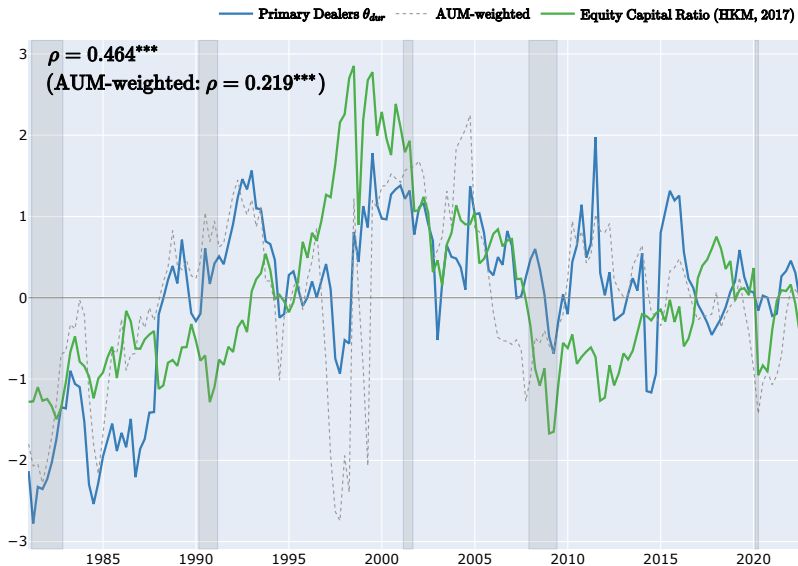




# Fact 1: Time-Series Variation



# Time Series Variation: Primary Dealers



## Time Series Variation and Intermediaries' Capital

$$\theta_{dur,t} = \alpha + \delta \eta_{t-1} + \gamma \sigma(dur)_{t-1} + u_t, \text{ for each intermediary type}$$

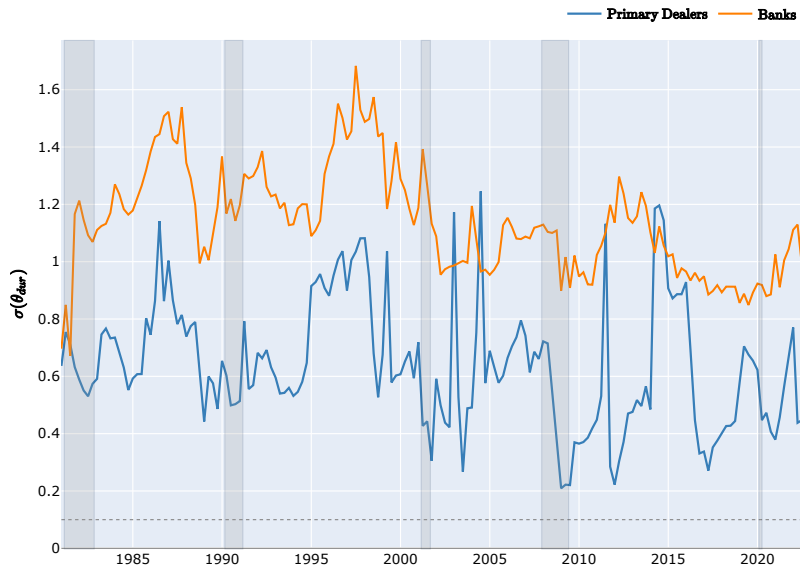
Avg. Duration Demand and Intermediary Constraints				
	Primary Dealers	Banks	Insurances	Pension Funds
$\eta_{t-1}$	0.086*** (0.024)	0.092*** (0.033)	0.128*** (0.041)	0.048*** (0.015)
$\sigma(dur)_{t-1}$	1.103*** (0.304)	1.586*** (0.352)	-0.247 (0.470)	0.408*** (0.151)
$N$	166	166	166	166
$R^2$	0.360	0.486	0.207	0.257

## Time Series Variation and Intermediaries' Capital

$$\theta_{dur,i,t} = \alpha_i + \delta \eta_{t-1} + \gamma \sigma(dur)_{t-1} + u_{i,t}, \text{ for each intermediary type}$$

Duration Demand: Panel Regression				
$\theta_{dur,t}$	Primary Dealers	Banks	Insurances	Pension Funds
$\eta_{t-1}$	0.052 (0.033)	0.058* (0.031)	0.169*** (0.048)	0.041 (0.035)
$\sigma(dur)_{t-1}$	0.542 (0.389)	1.071*** (0.331)	-0.060 (0.404)	0.317 (0.292)
Manager FE	✓	✓	✓	✓
$N$	2,605	16,457	5,625	4,901
$Adj R^2$	0.297	0.425	0.275	0.142

## Fact 2: Cross-Sectional Variation



## Cross-Sectional Variation

For 1992Q1-2020Q4 manually match: Thomson Reuters (*mgrno*) to Compustat (*cusip*)

$$\theta_{dur,i,t} = \alpha_i + \delta \mathbb{1}_{\{High \eta_{t-1}\}}_{i,t} + \gamma \sigma(dur)_{t-1} + u_{i,t}$$

Demand for Duration		
	(1)	(2)
High $\eta_{t-1}$	0.157** (0.063)	0.130** (0.061)
$\sigma(dur)_{t-1}$		0.907*** (0.239)
Manager FE	✓	✓
N	29,658	29,658
Adj $R^2$	0.389	0.393

# Conclusion

- We study a demand-system with equity duration (I-CAPM)  
→  $\theta_{dur}$  : demand for long-term cash flows in the stock market
- Time variation in  $\theta_{dur}$
- Explore the link between:  
demand for long-term cash flows *and* **intermediaries' constraints**

when constraints are binding  $\Rightarrow \theta_{dur} \downarrow$

(pro-cyclical demand for long-term cash flows)

- Channel: gambling for resurrection? More to do on this...

# Heterogeneity in Demand

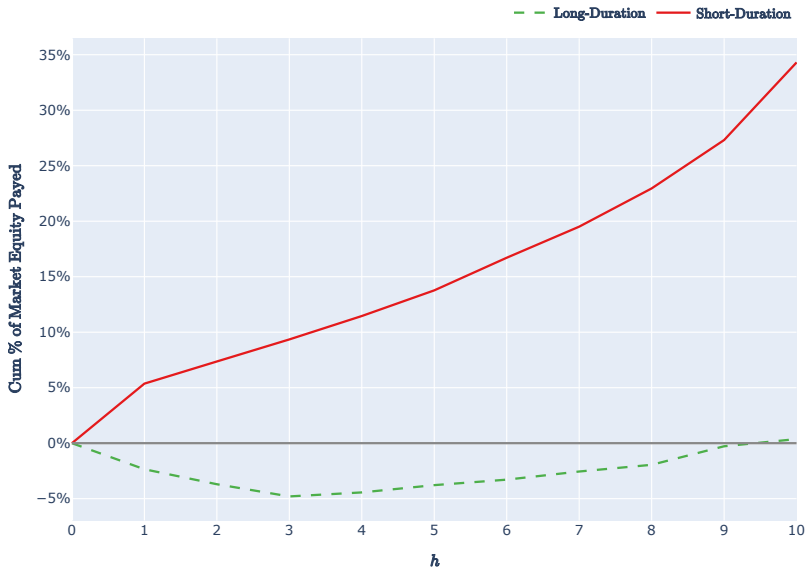
Model investors preference as function of equity capital ratio:

$$\ln \frac{w_{i,t}(n)}{w_{i,t}(0)} = \alpha_{i,t} + \theta_{me} me_t(n) + (\theta_{mkt,g}^{(0)} + \theta_{mkt,g}^{(1)} \eta_{t-1,g}) \beta_{mkt,t}(n) + (\theta_{dur,g}^{(0)} + \theta_{dur,g}^{(1)} \eta_{t-1,g}) dur_t(n) + u_{i,t}(n)$$

Heterogeneity in Demand Coefficients				
	Primary Dealers	Banks	Insurances	Pension Funds
$\theta_{dur} \times \eta_{t-1}$	0.091** (0.041)	0.177*** (0.024)	0.036 (0.038)	0.004 (0.028)
$\theta_{mkt} \times \eta_{t-1}$	-0.082*** (0.020)	-0.055*** (0.012)	-0.072*** (0.016)	-0.055*** (0.015)
Manager-Time FE	✓	✓	✓	✓
<i>N</i>	2,785,546	6,198,498	1,997,622	2,864,040
<i>Adj R</i> <sup>2</sup>	0.441	0.234	0.225	0.462



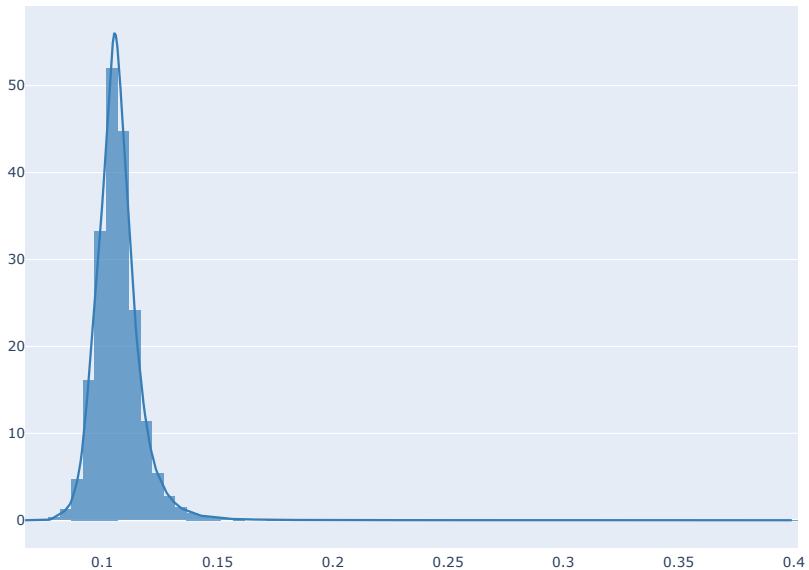
# Equity Duration Validity [▶ Back](#)



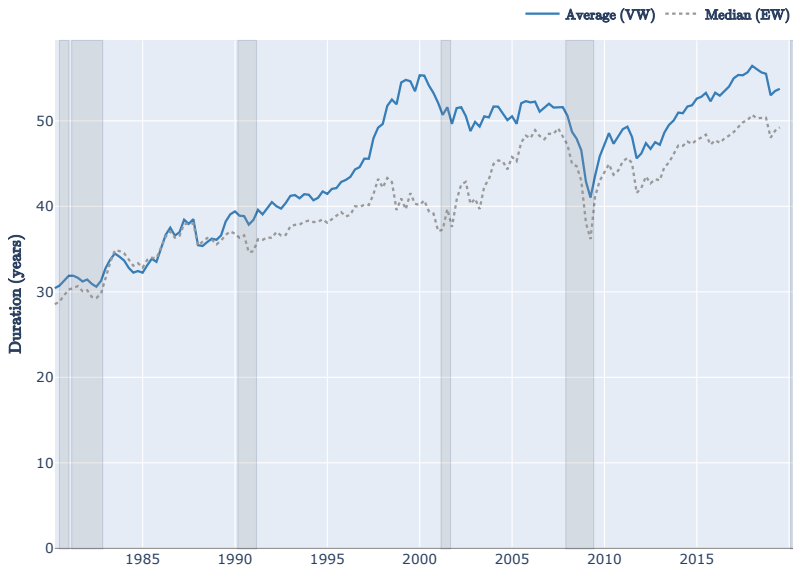
## State-Vector for Equity Duration [▶ Back](#)

- 12 CPI-deflated accounting variables + 1 constant
  - clean surplus profitability,
  - book equity growth,
  - book to market,
  - payout yield,
  - sales yield,
  - asset growth,
  - sales growth,
  - ROE,
  - gross profitability,
  - market leverage,
  - book leverage,
  - cash holdings.
  
- Variable construction follows standard choice in the literature

# Distribution of $dr_{j,t}$ [▶ Back](#)



# Equity Duration Time Series [▶ Back](#)



## Equity Duration (Goncalves, 2021) [▶ Back](#)

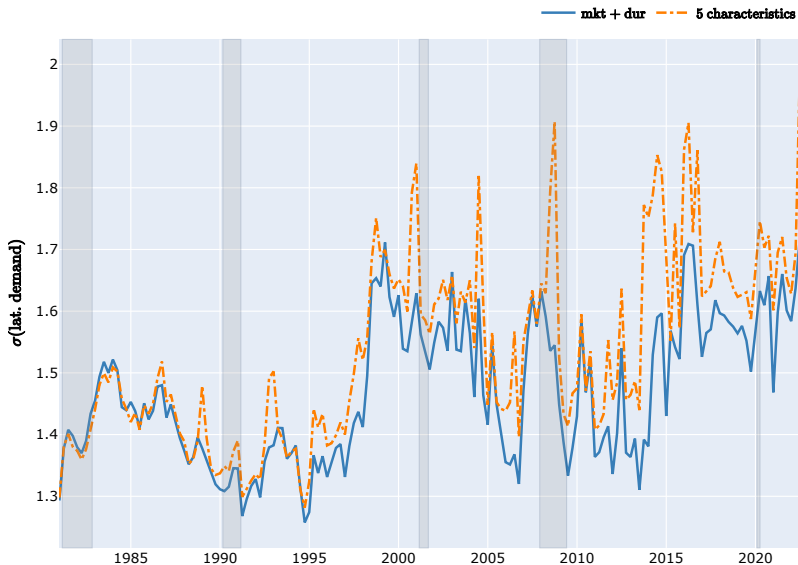
- Stocks'  $j$  payouts in  $t$ :  $PO_{j,t} = \text{dividends} + \text{repurchases} - \text{issuances}$
- $ME_{j,t} = \sum_{h=1}^{\infty} \mathbb{E}_t[PO_{j,t+h}] \cdot e^{-h \cdot dr_{j,t}}$
- Where  $\mathbb{E}_t[PO_{j,t+h}]$  depends on state-vector  $s_{j,t+h}$  (assumed to follow a VAR(1))

$$s_{j,t} = \Gamma s_{j,t-1} + u_{j,t}, \quad \text{where: } u_{j,t} \sim \mathcal{N}(0, \Sigma)$$

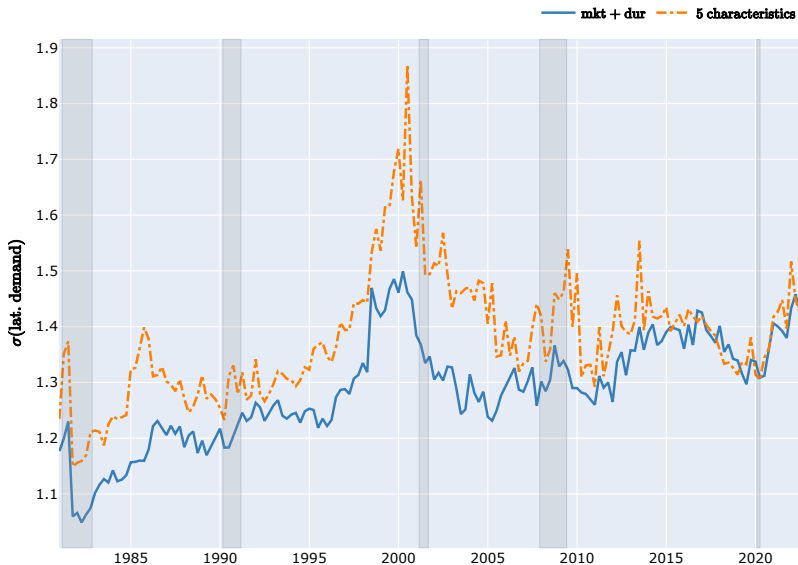
- Estimating VAR(1) parameters  $\rightarrow \mathbb{E}_t[PO_{j,t+h}] \forall h = 1, \dots$
- Finds  $dr_{j,t}$  who makes hold:  $ME_{j,t} = \sum \mathbb{E}_t[PO_{j,t+h}] \cdot e^{-h \cdot dr_{j,t}}$

$$\rightarrow Dur_{j,t} = \sum_{h=1}^{\infty} h \cdot \frac{e^{-dr_{j,t} \cdot h} \mathbb{E}_t[PO_{j,t+h}]}{ME_{j,t}}$$

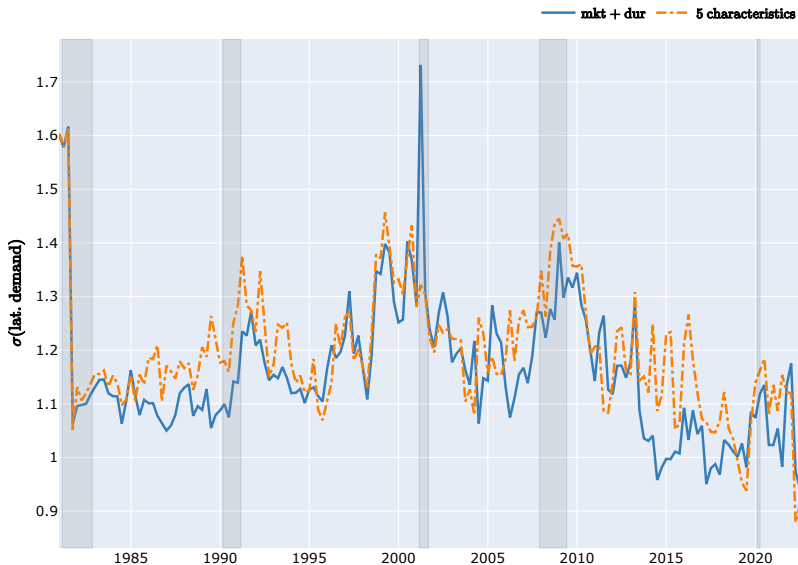
# $\sigma$ (latent demand) - Primary Dealers [▶ Back](#)



# $\sigma$ (latent demand) - Banks [▶ Back](#)



# $\sigma$ (latent demand) - Insurance Companies [▶ Back](#)





# $\sigma$ (latent demand) - Pension Funds [▶ Back](#)

