

# THE RISE OF PASSIVE INVESTING<sup>1</sup>

Paul Huebner

Stockholm School of Economics  
Swedish House of Finance

Industry talk @ Fondbolagens förening  
December 2024

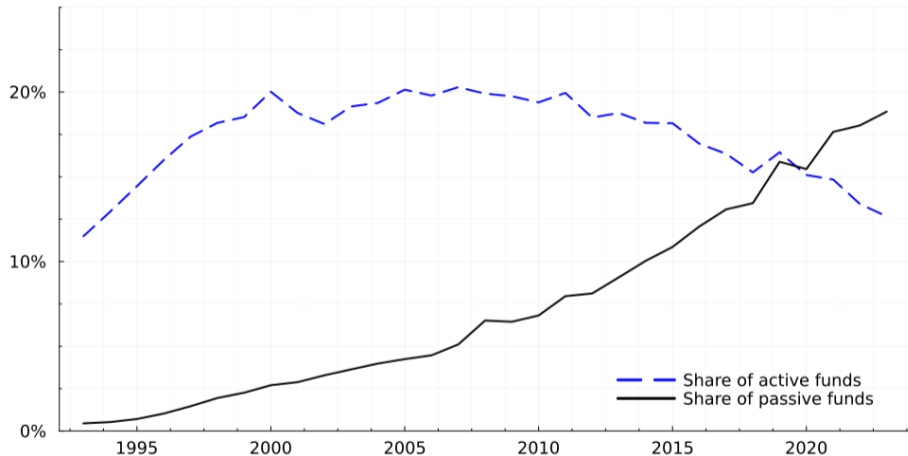
---

<sup>1</sup>Based on “How Competitive is the Stock Market?” with Valentin Haddad (UCLA & NBER) and Erik Loualiche (University of Minnesota)

# OUTLINE

- 1 PASSIVE INVESTING IN THE DATA
- 2 THE ROLE OF COMPETITION FOR THE IMPACT OF PASSIVE INVESTING
- 3 ESTIMATES AND IMPLICATIONS OF THE RISE OF PASSIVE INVESTING
- 4 WHICH STOCKS BENEFIT THE MOST?
- 5 DISCUSSION

# U.S. MUTUAL FUNDS AND ETFs

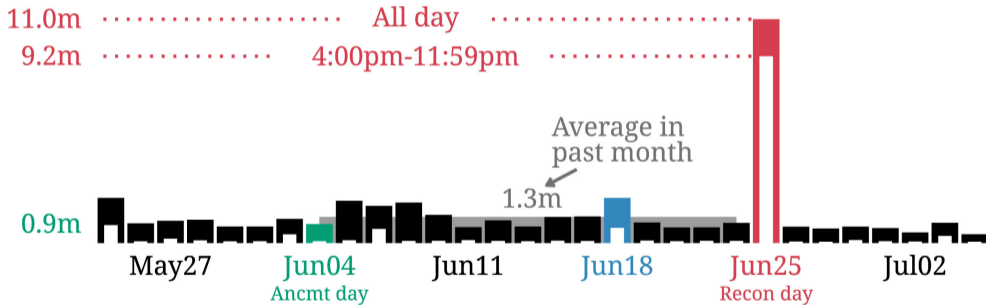


■ Data source: ICI Factbook 2024

■ Passive mutual funds and ETFs are only the tip of the iceberg of passive investing!

# EXCESS RECON DAY VOLUME

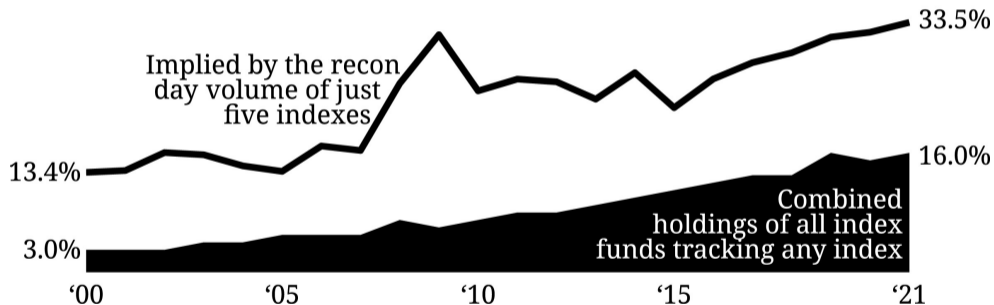
- YETI moved from Russell 2000 to Russell 1000 on June 25, 2021
- large spike of trading volume on reconstitution date (passive funds trade)



- Data source: Chinco and Sammon (2024, Journal of Financial Economics)

## EXCESS RECON DAY VOLUME

- excess recon day volume + weights in index  $\Rightarrow$  infer how much indexing
- 5 indices: S&P 500, S&P MidCap 400, Russell 1000, Russell 2000, Nasdaq 100

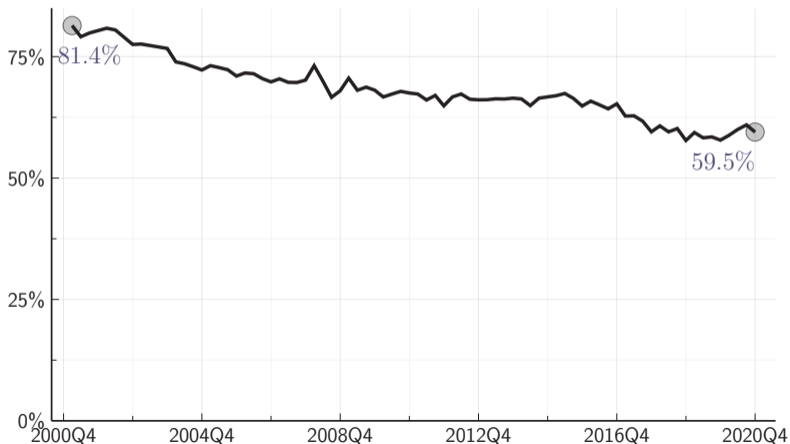


- Data source: Chinco and Sammon (2024, Journal of Financial Economics)

## PASSIVE FROM PORTFOLIOS WEIGHTS

**How does the portfolio of a financial institution line up with market caps?**

→ “A lot” ⇔ passive institution



# OUTLINE

- 1 PASSIVE INVESTING IN THE DATA
- 2 THE ROLE OF COMPETITION FOR THE IMPACT OF PASSIVE INVESTING
- 3 ESTIMATES AND IMPLICATIONS OF THE RISE OF PASSIVE INVESTING
- 4 WHICH STOCKS BENEFIT THE MOST?
- 5 DISCUSSION

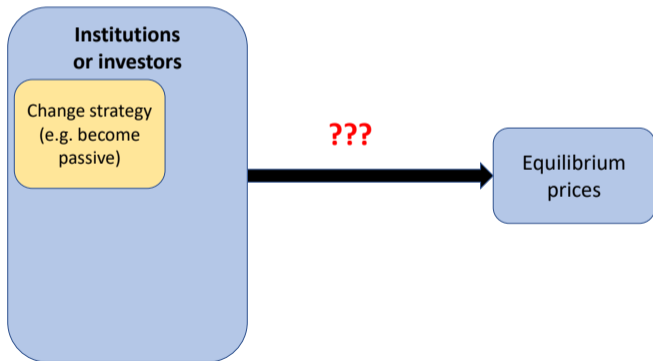
# OUTLINE

- 1 PASSIVE INVESTING IN THE DATA
- 2 THE ROLE OF COMPETITION FOR THE IMPACT OF PASSIVE INVESTING
- 3 ESTIMATES AND IMPLICATIONS OF THE RISE OF PASSIVE INVESTING
- 4 WHICH STOCKS BENEFIT THE MOST?
- 5 DISCUSSION



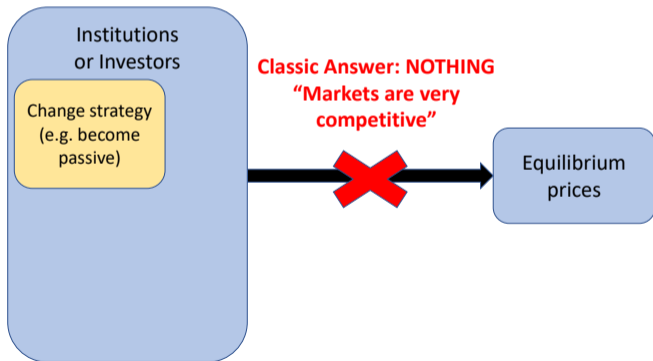
What is the effect of changes in the strategy of **some** institutions on the **equilibrium** behavior of prices?

- The rise of passive investing



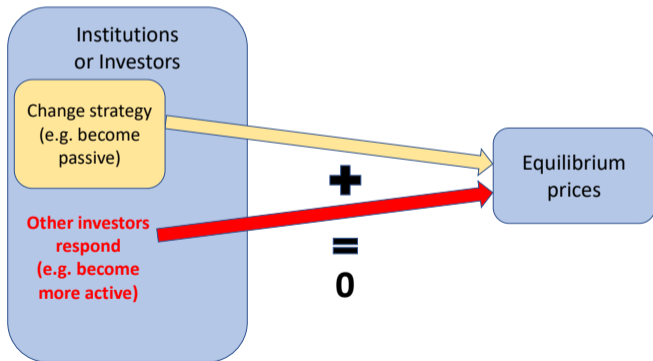
What is the effect of changes in the strategy of **some** institutions on the **equilibrium** behavior of prices?

- The rise of passive investing



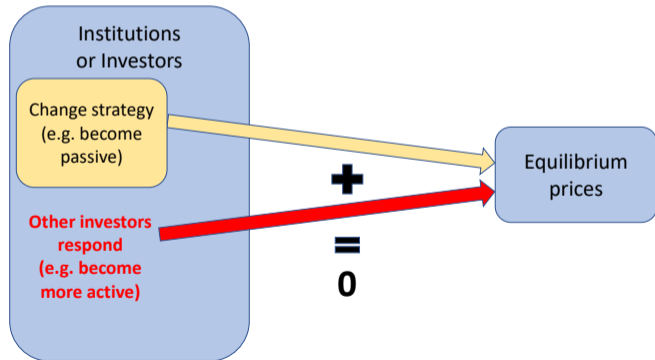
What is the effect of changes in the strategy of **some** institutions on the **equilibrium** behavior of prices?

- The rise of passive investing



What is the effect of changes in the strategy of **some** institutions on the **equilibrium** behavior of prices?

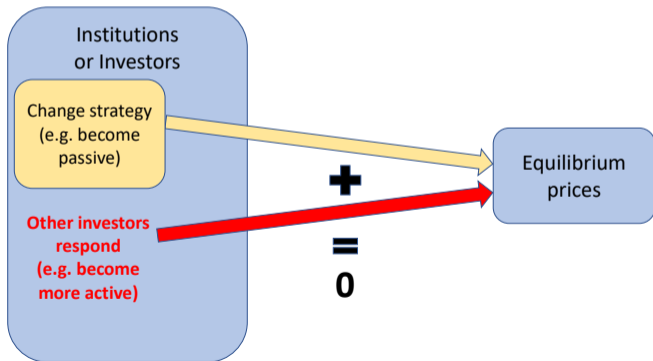
■ The rise of passive investing



→ How large is the strategic response?

What is the effect of changes in the strategy of **some** institutions on the **equilibrium** behavior of prices?

■ The rise of passive investing



→ How large is the strategic response?

→ 2/3 of direct effect

## INVESTOR COMPETITION FRAMEWORK: 2-LAYER EQUILIBRIUM

|                           | Individual Decision  | Equilibrium Condition |
|---------------------------|--|-----------------------|
| Competition for the asset | $d_i = \underline{d}_i - \mathcal{E}_i \times (p - \bar{p})$ | $\int_i D_i(p) = S$   |

### ■ Demand elasticity $\mathcal{E}_i$ :

- ▶ Inelastic markets: more impact of flows on prices: 1% increase in demand creates an  $M_{agg} = \mathcal{E}_{agg}^{-1} \%$  increase in prices
  - in simple theories: more volatility, less price informativeness, less liquidity

## INVESTOR COMPETITION FRAMEWORK: 2-LAYER EQUILIBRIUM

|                           | Individual Decision   | Equilibrium Condition                              |
|---------------------------|---|--|
| Competition for the asset | $d_i = \underline{d}_i - \mathcal{E}_i \times (p - \bar{p})$                | $\int_i D_i(p) = S$                                |
| Competition in strategies | $\mathcal{E}_i = \underline{\mathcal{E}}_i - \chi \times \mathcal{E}_{agg}$ | $\int_i \mathcal{E}_i D_i / S = \mathcal{E}_{agg}$ |

## INVESTOR COMPETITION FRAMEWORK: 2-LAYER EQUILIBRIUM

|                           | Individual Decision   | Equilibrium Condition                              |
|---------------------------|---|--|
| Competition for the asset | $d_i = \underline{d}_i - \mathcal{E}_i \times (p - \bar{p})$                | $\int_i D_i(p) = S$                                |
| Competition in strategies | $\mathcal{E}_i = \underline{\mathcal{E}}_i - \chi \times \mathcal{E}_{agg}$ | $\int_i \mathcal{E}_i D_i / S = \mathcal{E}_{agg}$ |

### ■ Degree of strategic response $\chi$

- ▶  $\chi = 0$ , *no response*: each investor follows independent strategies
- ▶  $\chi \rightarrow \infty$ , "*financial markets are competitive*": any change completely counteracted by investor reaction



## INVESTOR COMPETITION FRAMEWORK: 2-LAYER EQUILIBRIUM

|                           | Individual Decision   | Equilibrium Condition                              |
|---------------------------|---|--|
| Competition for the asset | $d_i = \underline{d}_i - \mathcal{E}_i \times (p - \bar{p})$                | $\int_i D_i(p) = S$                                |
| Competition in strategies | $\mathcal{E}_i = \underline{\mathcal{E}}_i - \chi \times \mathcal{E}_{agg}$ | $\int_i \mathcal{E}_i D_i / S = \mathcal{E}_{agg}$ |

### ■ Degree of strategic response $\chi$

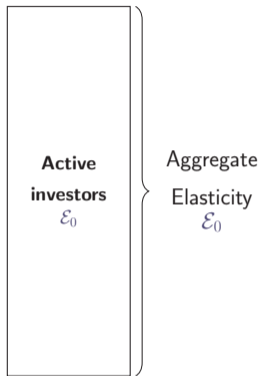
- ▶  $\chi = 0$ , *no response*: each investor follows independent strategies
- ▶  $\chi \rightarrow \infty$ , "*financial markets are competitive*": any change completely counteracted by investor reaction
- ▶  $\chi > 0$ , *some substitution*
- ▶  $\chi < 0$ , *amplification*

# WHAT DETERMINES THE DEGREE OF STRATEGIC RESPONSE?

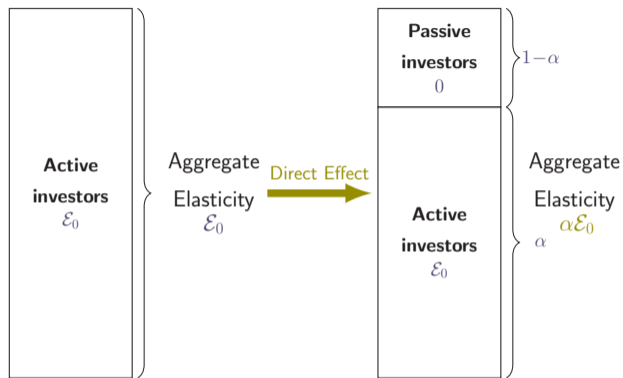
Limits to the ability to have a strategic response (why is  $\chi$  not  $\infty$ ?)

- Costly information acquisition (Grossman Stiglitz 1980)
- Investment mandates
- Imperfect knowledge of others' behavior
- Partial equilibrium thinking (Eyster Rabin 2005, Greenwood Hanson 2014)
- *Complementarity* ( $\chi < 0$ ): Liquidity (Kyle 1989), peer effects (Hong Kubik Stein 2004, Reddit)

# IMPACT OF THE RISE IN PASSIVE INVESTING

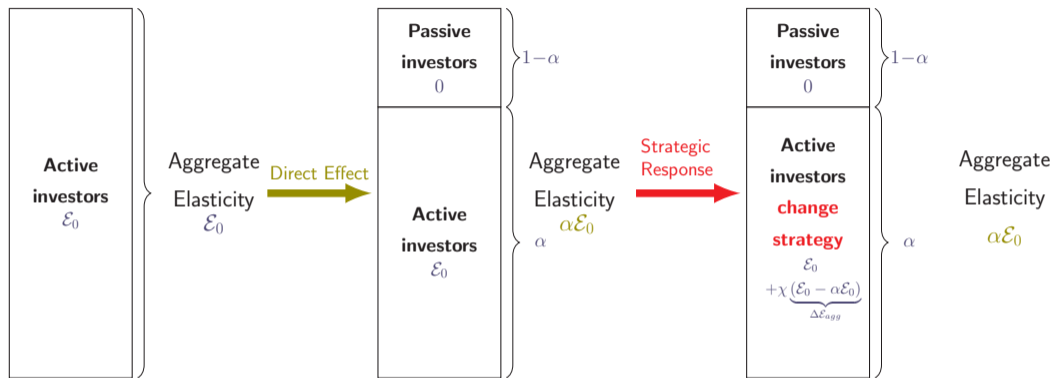


# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$ 
  - ▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\mathcal{E}_{NEW} = \alpha\mathcal{E}_0 = 70\% \times \mathcal{E}_0$

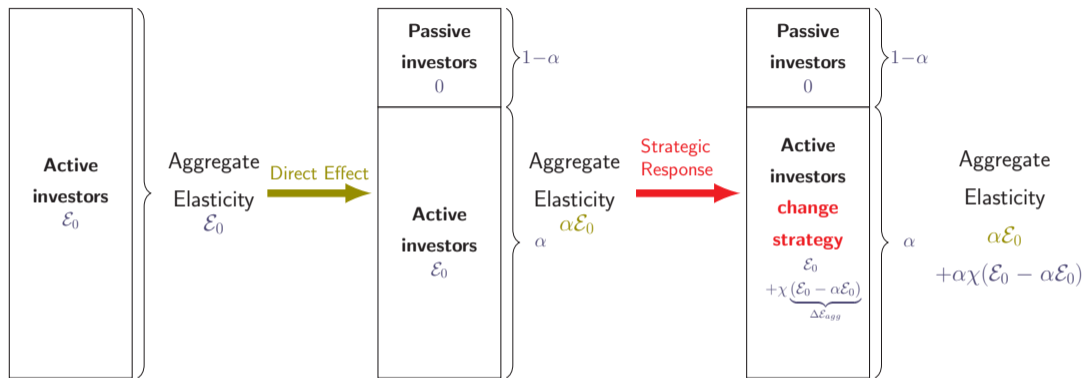
# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

- ▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\mathcal{E}_{NEW} = \alpha\mathcal{E}_0 = 70\% \times \mathcal{E}_0$

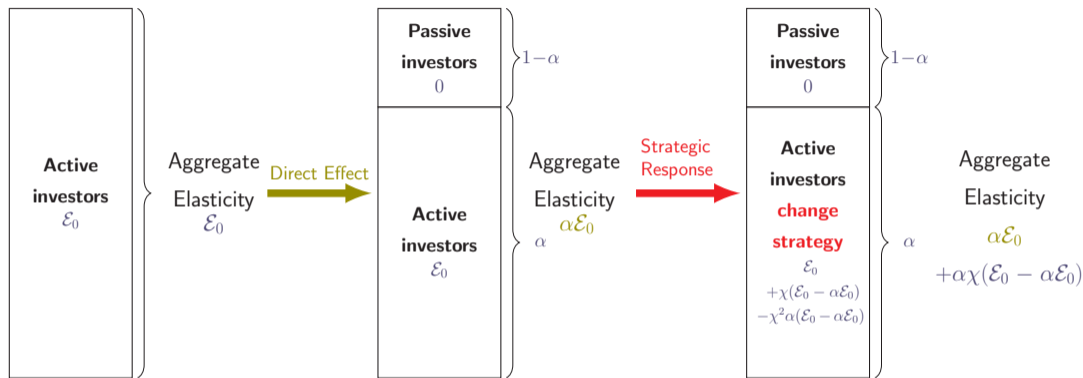
# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

- ▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\mathcal{E}_{NEW} = \alpha\mathcal{E}_0 = 70\% \times \mathcal{E}_0$

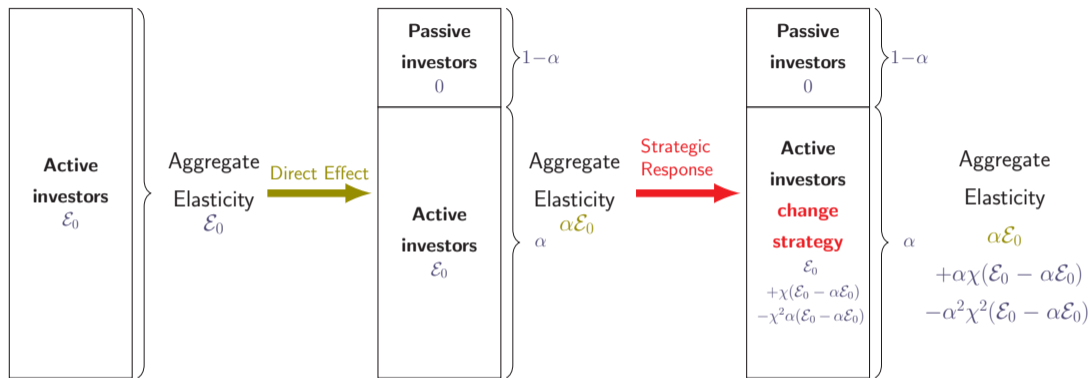
# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

- ▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\mathcal{E}_{NEW} = \alpha\mathcal{E}_0 = 70\% \times \mathcal{E}_0$

# IMPACT OF THE RISE IN PASSIVE INVESTING

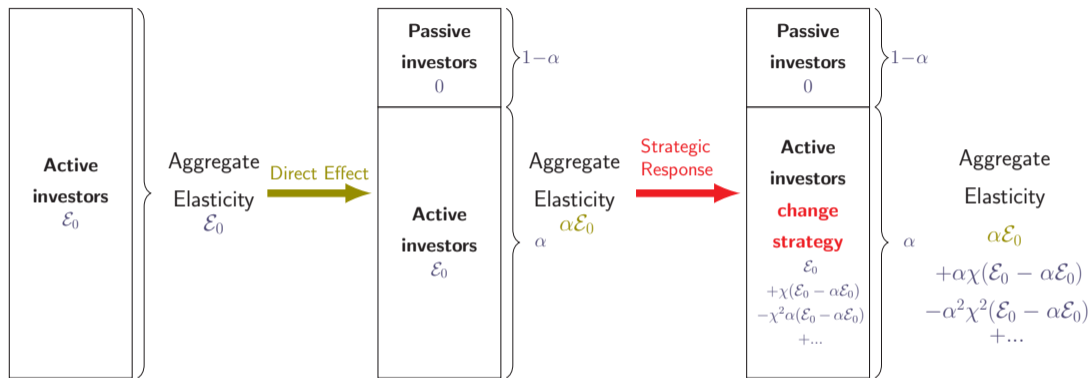


■ Empirical increase in fraction of passive investors:  $\alpha = 70\%$

▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\varepsilon_{NEW} = \alpha\varepsilon_0 = 70\% \times \varepsilon_0$



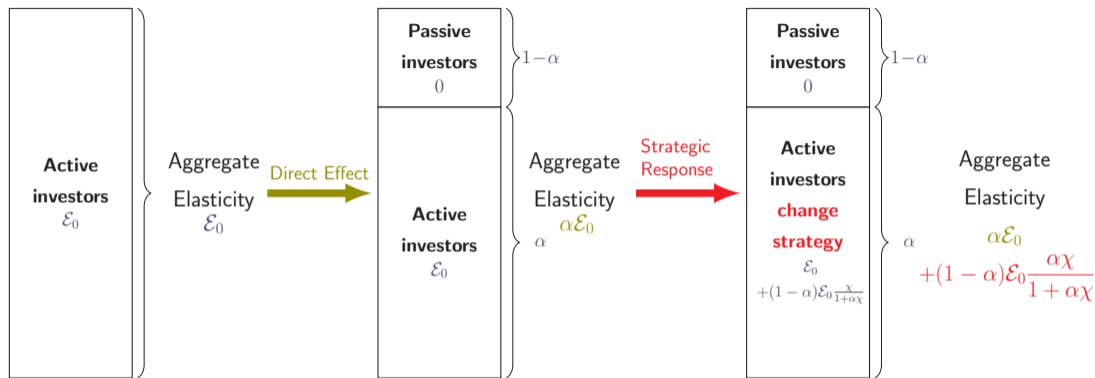
# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\varepsilon_{NEW} = \alpha\varepsilon_0 = 70\% \times \varepsilon_0$

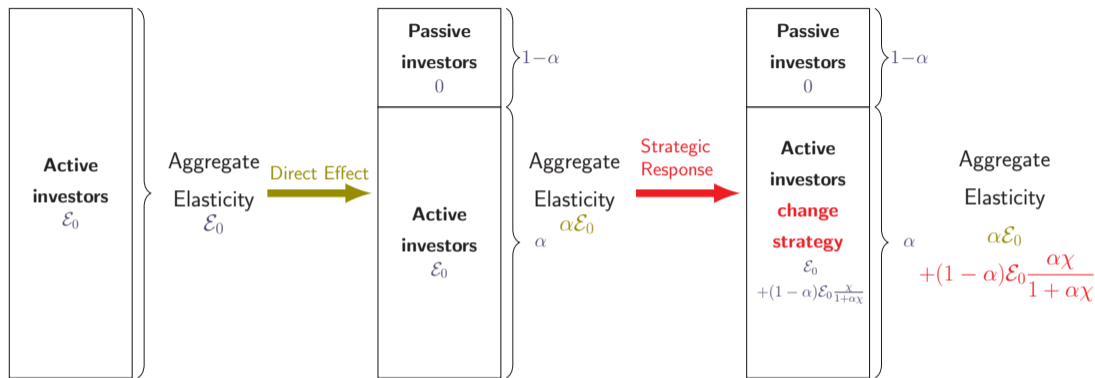
# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

- ▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\varepsilon_{NEW} = \alpha\varepsilon_0 = 70\% \times \varepsilon_0$

# IMPACT OF THE RISE IN PASSIVE INVESTING

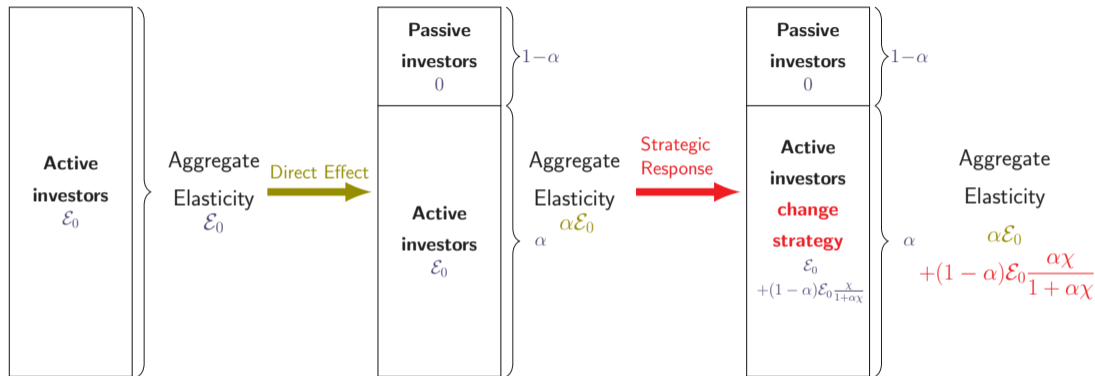


- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

- ▶ No strategic response ( $\chi = 0$ ): proportional reduction,  $\varepsilon_{NEW} = \alpha\varepsilon_0 = 70\% \times \varepsilon_0$
- ▶ "Perfectly competitive financial markets" ( $\chi \rightarrow \infty$ ): nothing happens,

$$\varepsilon_{NEW} = \alpha\varepsilon_0 + (1-\alpha)\varepsilon_0 = \varepsilon_0$$

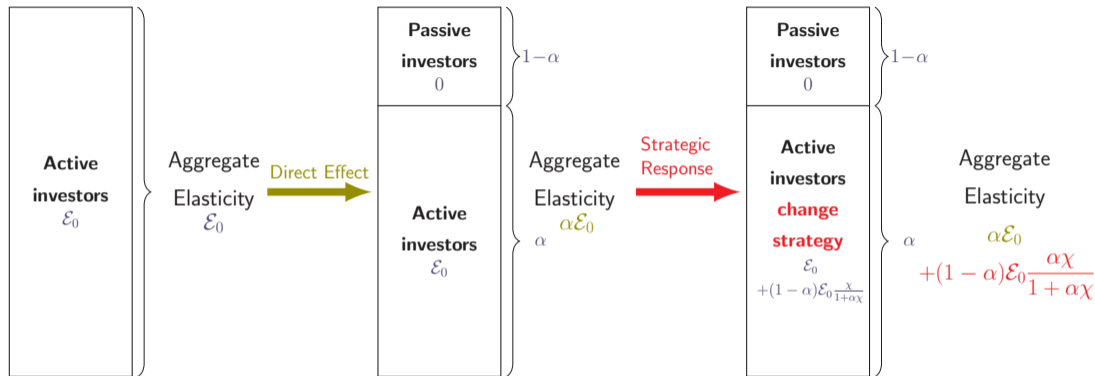
# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

▶ Identify the *constant* degree of strategic response using the cross-section  $\rightarrow \chi = 30/$

# IMPACT OF THE RISE IN PASSIVE INVESTING



- Empirical increase in fraction of passive investors:  $\alpha = 70\%$

▶ Identify the *constant* degree of strategic response using the cross-section  $\rightarrow \chi = 30/$

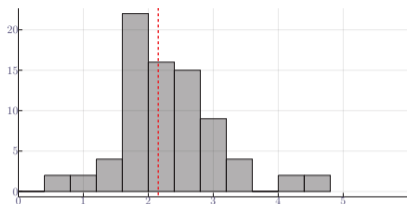
$\Rightarrow \mathcal{E}_{NEW} = 90\% \times \mathcal{E}_0$  (vs 100% with full response and 70% without strategic response)

# OUTLINE

- 1 PASSIVE INVESTING IN THE DATA
- 2 THE ROLE OF COMPETITION FOR THE IMPACT OF PASSIVE INVESTING
- 3 ESTIMATES AND IMPLICATIONS OF THE RISE OF PASSIVE INVESTING
- 4 WHICH STOCKS BENEFIT THE MOST?
- 5 DISCUSSION

## ESTIMATES OF STRATEGIC RESPONSE $\chi$

- Degree of strategic response  
estimate stable over time,  $\chi = 3$



- Substantial individual response: The same investor responds less to price movements for assets with more aggressive investors than assets with less aggressive investors
  - ▶ If all other investors are more elastic by 1, lower my elasticity by 3
- Far from “competitive financial markets”,  $\chi \ll \infty$ 
  - ▶ In simple calculation, needed  $\chi > 18$  to compensate 90% of direct effect

# THE RISE OF PASSIVE INVESTING



■ Fraction of active investors down from 81% to 59% from 2001 to 2020



# THE RISE OF PASSIVE INVESTING

**What does the model predict about the effect of this trend?**

# THE RISE OF PASSIVE INVESTING

## What does the model predict about the effect of this trend?

- Aggregate elasticity equilibrium:

$$\mathcal{E}_{agg,k} = \underbrace{|A_k|}_{\text{fraction active}} \times \underbrace{\mathbf{E}(\mathcal{E}_{ik} | i \in A_k)}_{\text{avg. active elasticity}} \times \underbrace{\frac{1}{1 + \chi|A_k|}}_{\text{general equilibrium}}$$

- Effect of change in active share:

- ▶ Assuming random investors switch:

$$\frac{d \log \mathcal{E}_{agg}}{d \log |A|} = \frac{1}{1 + \underbrace{\chi}_3 \underbrace{|A|}_{68\%}} = 33\%$$

# THE RISE OF PASSIVE INVESTING

## What does the model predict about the effect of this trend?

- Aggregate elasticity equilibrium:

$$\mathcal{E}_{agg,k} = \underbrace{|A_k|}_{\text{fraction active}} \times \underbrace{\mathbf{E}(\mathcal{E}_{ik} | i \in A_k)}_{\text{avg. active elasticity}} \times \underbrace{\frac{1}{1 + \chi|A_k|}}_{\text{general equilibrium}}$$

- Effect of change in active share:

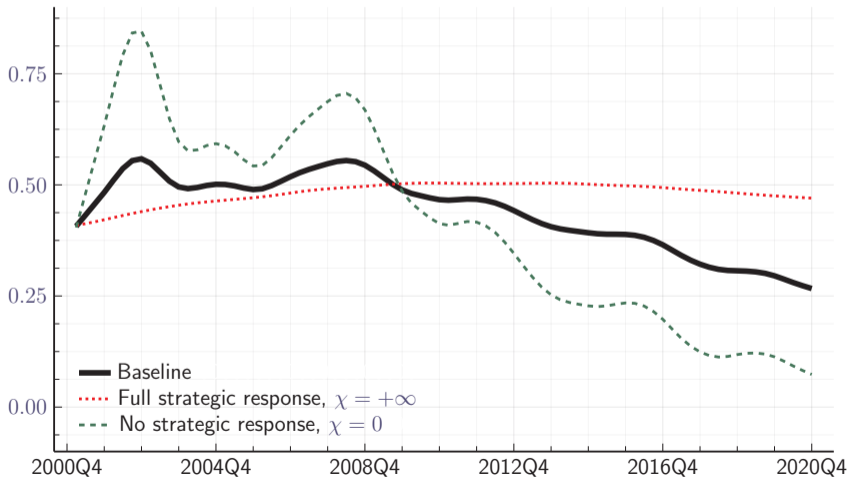
- ▶ Assuming random investors switch:

$$\frac{d \log \mathcal{E}_{agg}}{d \log |A|} = \frac{1}{1 + \underbrace{\chi}_3 \underbrace{|A|}_{68\%}} = 33\%$$

Elasticities drop by  $33\% \times 32\% \simeq 11\%$

# COUNTERFACTUAL IMPACT OF PASSIVE

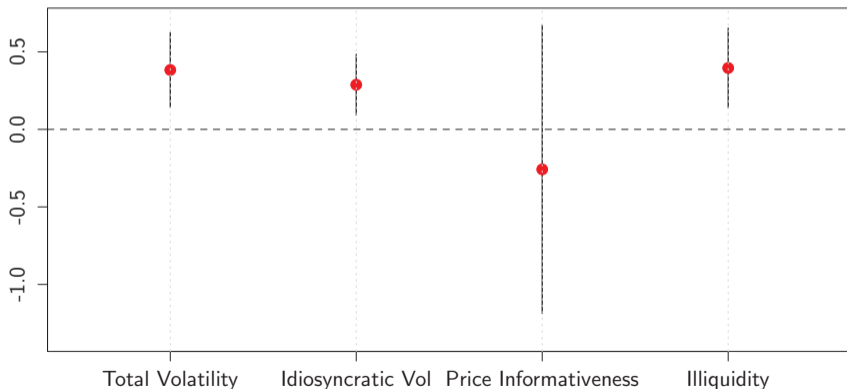
What would have been the effect of passive investing based on different levels of competition?



## IMPLICATIONS FOR ASSET PRICES

The rise of passive investing decreased elasticities by 11%

elasticity  $\downarrow \Rightarrow$  volatility  $\uparrow$ , price informativeness  $\downarrow$ , illiquidity  $\uparrow$



# OUTLINE

- 1 PASSIVE INVESTING IN THE DATA
- 2 THE ROLE OF COMPETITION FOR THE IMPACT OF PASSIVE INVESTING
- 3 ESTIMATES AND IMPLICATIONS OF THE RISE OF PASSIVE INVESTING
- 4 WHICH STOCKS BENEFIT THE MOST?
- 5 DISCUSSION

## WINNERS AND LOSERS FROM PASSIVE FLOWS

**Have all stocks benefited equally from the rise of passive investing?**

## WINNERS AND LOSERS FROM PASSIVE FLOWS

**Have all stocks benefited equally from the rise of passive investing?**

→ **Large Cap** stocks have potentially benefited the most!



# WINNERS AND LOSERS FROM PASSIVE FLOWS

**Have all stocks benefited equally from the rise of passive investing?**

→ **Large Cap** stocks have potentially benefited the most!

- 1 Large passive indexers (e.g., Blackrock, Vanguard) don't exactly hold the market portfolio  
→ they are overweight in large cap stocks. . . Why?

# WINNERS AND LOSERS FROM PASSIVE FLOWS

**Have all stocks benefited equally from the rise of passive investing?**

→ **Large Cap** stocks have potentially benefited the most!

- Large passive indexers (e.g., Blackrock, Vanguard) don't exactly hold the market portfolio
  - they are overweight in large cap stocks. . . Why?
  - Popularity of tracking S&P 500 index versus CRSP Value-Weighted index

# WINNERS AND LOSERS FROM PASSIVE FLOWS

**Have all stocks benefited equally from the rise of passive investing?**

→ **Large Cap** stocks have potentially benefited the most!

**1** Large passive indexers (e.g., Blackrock, Vanguard) don't exactly hold the market portfolio

→ they are overweight in large cap stocks. . . Why?

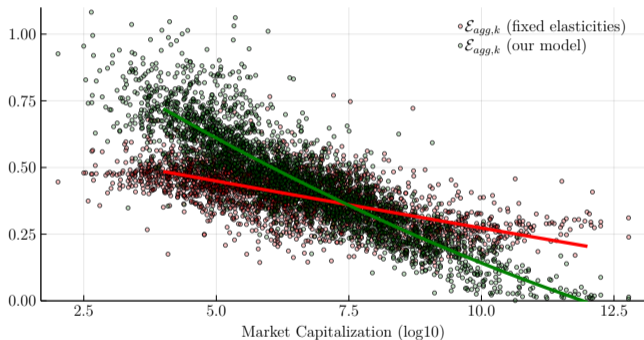
→ Popularity of tracking S&P 500 index versus CRSP Value-Weighted index

**2** 1% flow to Apple moves the price more than 1% flow to small cap stock

→ Surprising! Why?

# ESTIMATES OF AGGREGATE ELASTICITY BY STOCK

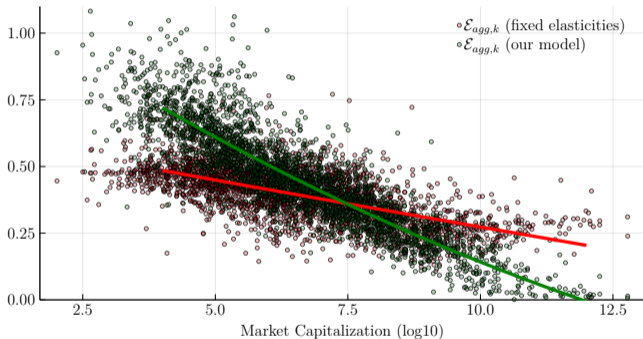
Remember: **Lower elasticity = Higher price impact** of flows



- **Elasticities are low  $\approx 0.4$ :**  
consistent with previous studies
- **Size effect:** less willing to adjust positions with large weights

# ESTIMATES OF AGGREGATE ELASTICITY BY STOCK

Remember: **Lower elasticity = Higher price impact** of flows



- **Elasticities are low  $\approx 0.4$ :**  
consistent with previous studies
- **Size effect:** less willing to adjust positions with large weights

**Does this mean there is a bubble in large cap stocks?**

→ I don't know. But conditions are conducive to (permanently?) elevated valuations.

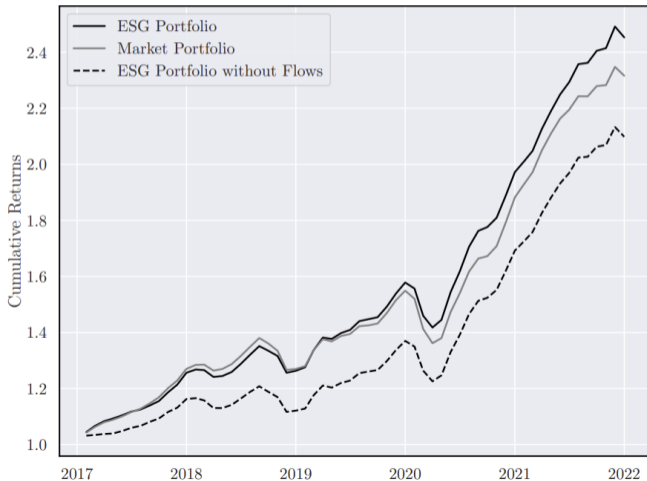
## ESG FLOWS (SOURCE: VAN DER BECK, 2024)

**Are large caps the only winners from flows?**

# ESG FLOWS (SOURCE: VAN DER BECK, 2024)

## Are large caps the only winners from flows?

→ No! ESG portfolios have benefited substantially from flows



## TAKEAWAYS

- Passive investing has increased: exact number depends on how broad a definition you use
- **Competition**  $\chi$ : useful statistic to understand the impact of passive investing
- **Stock market far from the “perfectly competitive ideal”**,  $\chi = 3 \ll \infty$ 
  - ▶ Dampen direct effects by 2/3
- **Rise of passive investing leads to 10% more inelastic markets**
  - ▶ Effect on cross-section of stocks: elasticity  $\downarrow \Rightarrow$  volatility  $\uparrow$ , price informativeness  $\downarrow$ , liquidity  $\downarrow$
- **Large caps** are the winners of the rise of passive investing
  - ▶ Fuels concerns over “bubbles” in large cap stocks



# OUTLINE

- 1 PASSIVE INVESTING IN THE DATA
- 2 THE ROLE OF COMPETITION FOR THE IMPACT OF PASSIVE INVESTING
- 3 ESTIMATES AND IMPLICATIONS OF THE RISE OF PASSIVE INVESTING
- 4 WHICH STOCKS BENEFIT THE MOST?
- 5 DISCUSSION