# Passive Investing and the Rise of Mega-Firms

#### by Hao Jiang, Dimitri Vayanos, and Lu Zheng

Discussion by Lorenzo Pandolfi (Univ. of Naples & CSEF)

14th Annual Paul Woolley Centre Conference

June 8, 2022

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Paper on the asymmetric effects of passive index investing

Discussion (14th PWC Conference)

Passive Investing and the Rise of Mega-Firms

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- Paper on the asymmetric effects of passive index investing
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  - 2 the rise of superstar firms
- Key question is: can the former be contributing to the latter?

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- Paper on the asymmetric effects of passive index investing
- It puts together two extremely important and highly topical themes:
  - potential distortionary effects of passive investing
  - 2 the rise of superstar firms
- Key question is: can the former be contributing to the latter?
- Short answer is Yes

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# The growth of passive funds

In recent years passive funds grew substantially



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Passive Investing and the Rise of Mega-Firms

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**1** Develops a **model** in continuous time with heterogenous investors

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# This paper

- **1** Develops a **model** in continuous time with heterogenous investors
- Presents a calibrated example with US data, and show that passive inflows have non-monotonic effects on stock prices depending on firm size

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# This paper

- **1** Develops a **model** in continuous time with heterogenous investors
- Presents a calibrated example with US data, and show that passive inflows have non-monotonic effects on stock prices depending on firm size
- **O** Provides **empirical evidence** in line with the predictions from the model

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Experts, who observe dividends and choose how much to invest in each asset
 (z<sup>\*</sup><sub>1t</sub>)

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- The dividend process has a systematic and an idiosyncratic component

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- The dividend process has a **systematic** and an **idiosyncratic** component

**Interest rate**, r, is exogenous and constant over time

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Market clearing requires:

 $\mu_1 z_{1nt} + \mu_2 z_{2nt} + u_n = \eta_n$ 

and, in equilibrium, the price of stock n depends only on:

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and, in equilibrium, the price of stock n depends only on:

**1** aggregate risk-adjusted supply from experts, *i.e.*, **systematic supply**:

$$\left(\sum_{M} \frac{\eta_m - \mu_2 \lambda \eta'_m - u_m}{\mu_1} b_m\right) (\sigma^s)^2$$

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$$\left(\sum_{M} \frac{\eta_m - \mu_2 \lambda \eta'_m - u_m}{\mu_1} b_m\right) (\sigma^s)^2$$

**2** idiosyncratic supply from experts:

$$\frac{\eta_n - \mu_2 \lambda \eta_n' - u_n}{\mu_1} (\sigma_n^i)^2$$

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When (idiosyncratic or systematic) supply increases, the stock price:

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- drops (standard risk-premium channel)
- e becomes less sensitive to dividend shocks

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When (idiosyncratic or systematic) supply increases, the stock price:

- drops (standard risk-premium channel)
- ecomes less sensitive to dividend shocks
- dividends ∧ ⇒ expected future dividends ∧ ⇒ their volatility ∧ ⇒ experts with a long (short) position want to sell (buy) stocks ⇒ smaller (larger) effect on price

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 Noise traders have exogenous demand for each stock, constant in the number of shares

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 Noise traders have exogenous demand for each stock, constant in the number of shares

 $\Rightarrow$  noise traders are not very noisy: they look like passive investors

following a somewhat different index

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 Noise traders have exogenous demand for each stock, constant in the number of shares

 $\Rightarrow$  noise traders are not very noisy: they look like passive investors following a somewhat different index

Interest rate, r, is exogenous and constant over time

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 Noise traders have exogenous demand for each stock, constant in the number of shares

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2 Interest rate, r, is exogenous and constant over time

 $\Rightarrow$  What if **passive inflows are associated to changes in** r (for instance through contemporaneous bond inflows)?

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If r also  $\searrow$  there may be an additional effect on stock prices that depends on  $\beta_n$ 

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Solution Volatility of dividends per share increases with the level of dividends

Discussion (14th PWC Conference)

Passive Investing and the Rise of Mega-Firms

Image: A match the second s

Olatility of dividends per share increases with the level of dividends ⇒ may be realistic if firms that grow keep the number of shares constant: do they? Recently, many superstar companies did stock splits (including Amazon, Google, Apple, and Tesla)

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Olatility of dividends per share increases with the level of dividends
 ⇒ may be realistic if firms that grow keep the number of shares constant: do they? Recently, many superstar companies did stock splits (including Amazon, Google, Apple, and Tesla)
 I would discuss more this assumption and possibly provide evidence that

large companies have more volatile dividends per share

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# Calibrated example

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Passive Investing and the Rise of Mega-Firms

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# Calibrated example

Calibrated example with data on US public companies

# Calibrated example

Calibrated example with data on US public companies

Firms are split into **5 size groups** 

Image: A match the second s
# Calibrated example

Calibrated example with data on US public companies

Firms are split into **5 size groups** 

**Non-experts' initial wealth** is 10% of total wealth and then rises six-fold

Discussion (14th PWC Conference)

Passive Investing and the Rise of Mega-Firms

Image: A match the second s

# Calibrated example

Calibrated example with data on US public companies

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- **Non-experts' initial wealth** is 10% of total wealth and then rises six-fold
- Noise traders, when present, demand 40% of the available supply of half of the stocks

The loading on the systematic factor is  $b_n = \overline{b} - (m-3)\Delta b$  and is (inversely) correlated with size

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# Main results

Table 2: Percentage Price Change Following Flows into Passive Funds.

Size Group	Increase in Market Participation		Switch from		
	All Stocks   Size Groups		Active to Passive All Stocks Size Groups		
	in Index	3-5 in Index	in Index	3-5 in Index	
1 (Smallest)	6.51	6.33	0	-0.64	
2	5.60	5.29	0	-1.16	
3	5.44	5.67	0	0.96	
4	6.54	7.57	0	3.78	
5 (Largest)	7.71	9.84	0	6.90	

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- Yet, when moving from med-size to large stocks, it is not the CAPM beta that matters but rather a modified beta that gives more weight to the covariance between the index and the stock that is due to the idiosyncratic component of dividends
- The modified β is higher for large stocks, for which the idiosyncratic part of the covariance is larger

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# Volatility

	Baseline Return Volatility	Change in Return Volatility				
Size Group		Increase in Market Participation		Switch from Active to Passive		
		All Stocks	Size Groups	All Stocks	Size Groups	
		in Index	3-5 in Index	in Index	3-5 in Index	
1 (Smallest)	21.12	-0.04	-0.04	0	0	
2	18.19	0.11	0.10	0	-0.03	
3	16.01	0.22	0.23	0	0.06	
4	13.98	0.39	0.46	0	0.27	
5 (Largest)	11.58	0.65	0.83	0	0.63	

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- Quantitatively, the effect of stock prices may look small if compared to the estimates by Gabaix and Koijen (2022), according to which a flow that is 1% of the value of equities increases the value of the stock market by 5%

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- Quantitatively, the effect of stock prices may look small if compared to the estimates by Gabaix and Koijen (2022), according to which a flow that is 1% of the value of equities increases the value of the stock market by 5%
- The demand from noise traders is very high: 40% of the total supply of half of the stocks. What if one considers a smaller demand by noise traders?
- Would probably emphasize more the results on the switch from active to passive rather than the increase in participation

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# The growth of passive funds



Discussion (14th PWC Conference)

Passive Investing and the Rise of Mega-Firms

June 8, 2021 17 / 24

# Empirical part

Discussion (14th PWC Conference)

Passive Investing and the Rise of Mega-Firms

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#### Firm and stock-level data from CRSP and Compustat

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- Firm and stock-level data from CRSP and Compustat
- **Fund-level quarterly data** from CRSP (ETFs) and ICI (mutual funds)

#### Empirical part

- Firm and stock-level data from CRSP and Compustat
- **Fund-level quarterly data** from CRSP (ETFs) and ICI (mutual funds)
- Measure fund holdings:  $IndexFund_t = \frac{IndexAssets_t}{S\&P500_t}$ , and flows as  $Flow_t = IndexFund_t - IndexFund_{t_1}$  (or  $\frac{Flow}{S\&P500_t}$ )

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- Estimate the following regressions:

 $SMB_{SPi,t} = \alpha_{i,j} + \gamma_{i,j,contemp} \times Flow_{j,contemp,t} + \gamma_{i,j,past} \times Flow_{j,past,t} + \epsilon_{i,j}$  $\Delta Concentration_t = \alpha_j + \gamma_j \times Flow_{j,contemp,t} + \epsilon_{j,y}$ 

Discussion (14th PWC Conference)

# Size results

	(1)	(2)	(3)	(4)
	$SMB_{SPew}$	$SMB_{SPvw}$	$SMB_{SPew}$	$SMB_{SPvw}$
$Flow_{1,contemp}$	-25.47	-23.13		
	(-3.13)	(-2.93)		
$Flow_{1,past}$	5.77	4.44		
11	(1.06)	(0.84)		
Flow <sub>2,contemp</sub>		· · · ·	-17.95	-14.91
,			(-2.04)	(-1.75)
$Flow_{2,past}$			14.01	13.32
1			(2.21)	(2.17)
Intercept	0.0358	0.0360	0.0118	0.0103
-	(1.80)	(1.87)	(0.73)	(0.65)
Observations	76	76	76	76
R-squared	0.131	0.114	0.123	0.108
Full Sample	Υ	Υ	Υ	Υ
High VIX				

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# Concentration

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Dispersion$	$\Delta HHI$	$\Delta Dispersion$	$\Delta HHI$	$\Delta Dispersion$	$\Delta HHI$
$Flow_{1,contemp}$	0.0282 (2.97)	0.104 (2.97)	(0.0271) (2.89)	0.100 (2.96)	0.0268 (2.84)	$\begin{array}{c} 0.0992 \\ (2.91) \end{array}$
$L.SMB_{SPew}$		~ /	-2.29e-05 (-0.18)	-2.19e-05 (-0.05)		~ /
$L.SMB_{SPvw}$				~ /	-4.55e-05 (-0.35)	-0.000108 (-0.23)
Intercept	-3.99e-05 (-2.47)	-0.000151 (-2.53)	-3.46e-05 (-2.09)	-0.000130 (-2.18)	-3.37e-05 (-2.03)	-0.000127 (-2.12)
$\begin{array}{c} \text{Observations} \\ R^2 \end{array}$	$\begin{array}{c} 76 \\ 0.106 \end{array}$	$\begin{array}{c} 76 \\ 0.112 \end{array}$	$75 \\ 0.107$	$75 \\ 0.110$	$75 \\ 0.109$	$75 \\ 0.112$

Panel A: Flow<sub>1,contemp</sub>

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  - 3 Look at volatility as an additional outcome
  - Test whether the effect is symmetric for inflows and outflows (is it so in the model?)
  - **6** Get some **exogenous flows**

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Fund flows can be endogenous to large firms' performances

Discussion (14th PWC Conference)

Passive Investing and the Rise of Mega-Firms

Image: A math a math

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- Large firms do well → index and index funds do well → investors invest more into index funds
- But also, some shocks (covid-19) increase passive fund flows and benefit large, more resilient firms over small firms
- Think about some quasi experimental setting, i) Russell 1000/2000 cutoff? ii) stock inclusions/exclusions, or contemporaneous presence in different indices?

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## Conclusions

- The paper is extremely interesting and topical
- The model describes an intuitive mechanism which however delivers non-obvious predictions
- I would mostly suggest:
  - discussing a bit more some modeling choices
  - b doing a calibrated exercise more in line with actual data
  - extending the empirical part, trying to identify exogenous flows
- (Maybe out of the scope of paper) Can the model say something on how indices should be constructed to minimize distortions: is value-weighting the best way? Would caps (as in bond indices) alleviate the distortion ?

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