Is There Too Much Benchmarking in Asset Management?

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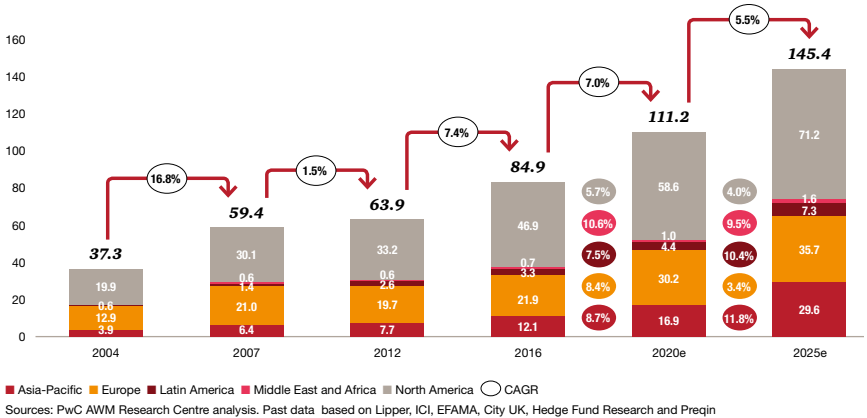
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[*]The views here are those of the authors only and not necessarily of the Bank of England

Global Assets Under Management



Sources: PwC AWM Research Centre analysis. Past data based on Lipper, ICI, EFAMA, City UK, Hedge Fund Research and Preqin

Source: PWC, Asset Management 2020 in Beyond

Benchmarking in Asset Management

- Money managed against leading benchmarks:

S&P 500	$\approx$ \$10 trillion
FTSE-Russell (multiple indices)	$\approx$ \$8.6 trillion
MSCI All Country World Index	$\approx$ \$3.2 trillion
MSCI EAFE	$\approx$ \$1.9 trillion
CRSP	$\approx$ \$1.3 trillion

This Paper

- Proposes a theory of asset management in which benchmarking arises endogenously
- Central friction: moral hazard
  - fund's portfolio choice is unobservable
  - fund manager incurs private cost of running fund
- Benchmarking is optimal from viewpoint of fund investors
  - Insures fund managers against market moves
  - Rewards production of "alpha"

This Paper – General Equilibrium Effect of Contracts

- In general equilibrium, fund managers' contracts have unintended consequences
- While individually small, managers collectively generate "crowded trades"
- Fund investors do not internalize the effects of benchmarking on asset prices
  - impose an externality on each other
- Compare to a socially-optimal contract:
  - **Excessive benchmarking:** The socially-optimal level of benchmarking is lower
  - **Excessive cost of asset management:** The socially-optimal level of costs is lower
  - Benchmark compositions also differ
- A tractable model with closed-form expressions for contracts and prices

Related Literature

- *Optimal contracts (partial equilibrium):*
  Holmstrom (1979), Holmstrom & Milgrom (1987, 1991), Admati & Pfleiderer (1997)

- *Benchmarking and asset prices (exogenous contracts, GE):*
  Cuoco & Kaniel (2011), Basak & Pavlova (2013), Kaniel & Kondor (2013)

- *Benchmarking and corporate decisions (exogenous contracts, GE, production economy):*
  Kashyap, Kovrijnykh, Li & Pavlova (2020)

- *Benchmarking portfolio managers (endogenous contracts, GE):*
  Buffa, Vayanos & Woolley (2014), Cvitanic & Xing (2017), Sockin & Xiaolan (2020), this paper

- *Pecuniary externalities:*
  Gromb & Vayanos (2002), Lorenzoni (2008), Davila & Korinek (2018)

A Two-Period Model: Investment Opportunities

- Two periods, $t = 0, 1$
- N risky stocks, claims to cash flow $\tilde{D} \sim N(\mu, \Sigma)$ at $t = 1$
- $S = (S_1, \ldots, S_N)^\top$ denotes stock prices
- Stocks are in supply of $\bar{x} = (\bar{x}_1, \ldots, \bar{x}_N)^\top$ shares
- A risk-free bond with a zero interest rate
  - infinitely elastic supply

Investors

- Direct investors (fraction λ_D)
- Fund (or portfolio) managers (fraction λ_M)
- Fund investors (fraction λ_F), who delegate investment to fund managers
  - Fund investors cannot observe managers' portfolio choice
- All investors have CARA utility over final wealth (compensation):

$$-E\exp(-\gamma W)$$

Value Added of Fund Managers

- Performance of direct investor's portfolio x: $R = x^\top(\tilde{D} - S)$
- Fund performance:

$$R = \underbrace{\Delta^\top x}_{\text{"alpha"}} + x^\top(\tilde{D} - S) + \epsilon \qquad \epsilon \sim N(0, \sigma_\epsilon)$$

- Interpretation of Δ:
  - Securities lending
  - Crossing trades: lowering transaction costs
  - Liquidity provision
- Fund managers incur private cost $\psi^\top x$ of managing risky assets ($\psi \geq 0$)
- Interpretation of private cost ψ: acquiring information about liquidity needs; managing sec lending; seeking opportunities to cross trades

▸ Alternative specification with effort

Fund Managers

- Compensation contract:

$$w = \hat{a}R + b(R - R_{benchmark}) + c = \underbrace{(\hat{a} + b)}_{\equiv a} R - bR_{benchmark} + c$$

  - R – performance of the fund
  - $R_{benchmark} = \theta^{\top}(\tilde{D} - S)$ – performance of benchmark
  - $\hat{a}$ – sensitivity to absolute performance
  - b – sensitivity to relative performance
  - c – independent of performance (e.g., based on time-0 AUM)
  - $a \equiv \hat{a} + b$ – "skin in the game"

- The contract parameters a, b, c, and θ are endogenous, chosen by the fund investors

- Evidence: Ma, Tang, and Gomez (2019) ▸ More evidence

Direct Investors' and Managers' Problems

- Direct investor's problem:

$$\max_x -E\exp\left\{-\gamma\left[\left(x_{-1}^D\right)^\top S + x^\top(\tilde{D}-S)\right]\right\} \Leftrightarrow$$

$$\max_x\ x^\top(\mu - S) - \frac{\gamma}{2}x^\top\Sigma x \ \Rightarrow\ \boxed{x^D = \Sigma^{-1}\frac{\mu - S}{\gamma}}\ \text{(mean-variance portfolio)}$$

- Manager's problem:

$$\max_x\ ax^\top(\Delta - \psi/a + \mu - S) - b\theta^\top(\mu - S) + c - \frac{\gamma}{2}\left[(ax - b\theta)^\top\Sigma(ax - b\theta) + a^2\sigma_\varepsilon^2\right]$$

$$\Rightarrow \boxed{x^M = \Sigma^{-1}\frac{\Delta - \frac{\psi}{a} + \mu - S}{a\gamma} + \frac{b\theta}{a}}\ \text{(fund's portfolio)}$$

  - Manager pays full private cost ψ, receives benefit $a\Delta$
  - Riskfree portfolio for the manager is $x = \frac{b\theta}{a}$ (benchmark)
  - Risk aversion modified by the "skin in the game" parameter a

Asset Prices

- Market clearing: $\lambda_D x^D + \lambda_M x^M = \bar{x}$
- With portfolio managers, asset prices are

$$S = \mu - \gamma\Sigma\Lambda\bar{x} + \underbrace{\gamma\Sigma\Lambda\lambda_M \frac{b\theta}{a}}_{\substack{\text{price pressure due} \\ \text{to benchmarking}}} + \Lambda \underbrace{\lambda_M \frac{\Delta - \frac{\psi}{a}}{a}}_{\text{alpha chasing}}$$

  where $\Lambda = \left[\frac{\lambda_M}{a} + \lambda_D\right]^{-1}$ modifies the market's effective risk aversion
- While individually small, managers collectively have price impact

Privately Optimal Contracts

- Fund investor's problem

$$\max_{a,b,\theta,c} -E\exp\{-\gamma[W_0 + R(x^M) - (aR(x^M) - bR_{benchmark} + c)]\}$$

$$\text{s.t.} \quad x^M = \Sigma^{-1}\frac{\Delta - \frac{\psi}{a} + \mu - S}{a\gamma} + \frac{b\theta}{a} \qquad (IC)$$

$$U^M \geq \underline{U} \qquad (PC)$$

- Fund investors (and portfolio managers) take prices as given
- **Proposition 1 (Benchmarking).** Benchmarking is optimal, $b > 0$.

The Role of Benchmarking

- Contracts involve a tradeoff between incentives and risk sharing
- Recall fund manager's optimal portfolio

$$x^M = \Sigma^{-1} \frac{\Delta - \frac{\psi}{a} + \mu - S}{a\gamma} + \frac{b\theta}{a}$$

- Higher "skin-in-the-game" a induces the manager to invest more in stocks with higher abnormal returns – boost alpha
- But higher a exposes the asset manager to more risk
- Benchmarking shields the manager from some of the risk, $b > 0$
- Adjusting benchmark weights θ fine-tunes incentive provision for different stocks

Social Planner's Problem

- Fund investors do not internalize the effects of contracts on prices, thereby imposing a pecuniary externality on other agents
- Social planner's problem: Details

$$\max_{a,b,\theta,c} \omega_F U^F + \omega_D U^D$$

subject to manager's participation constraint and *IC*

$$x^M = \Sigma^{-1} \frac{\Delta - \psi/a + \mu - S(a, b\theta)}{a\gamma} + \frac{b\theta}{a}$$

- Set ω_F and ω_D to eliminate redistribution effects[1]
  - isolates the effect of pecuniary externality, which leads to inefficiency

[1] Equivalent to allowing the planner to use transfers

Socially- vs. Privately-Optimal Contracts

Proposition 2 (Too Much Benchmarking) In the equilibrium with the socially-optimal contract, both a and b are lower than in the privately-optimal one:

$$a^{social} < a^{private},\ b^{social} < b^{private}.$$

- To incentivize portfolio managers to generate higher returns, fund investors use incentive contracts ($a > 1/2$ and $b > 0$)
- This pushes up prices, reduces returns, and thus reducing the marginal benefit of incentive provision for everybody else
- Planner recognizes this and opts for less incentive provision and less benchmarking

Crowded Trades and Excessive Costs

- **Proposition 3** Compared to the equilibrium with the privately-optimal contract, in the equilibrium with the socially-optimal contract

  (i) asset prices are lower, $S^{social} < S^{private}$, and hence expected returns are higher

  (ii) fund managers' costs are lower, $\psi^\top x^M_{social} < \psi^\top x^M_{private}$

- contributes to the debate on whether costs of asset management are excessive and are justified by the returns

Socially- vs. Privately-Optimal Benchmark Weights

- Both privately- and socially-optimal benchmarks put larger relative weights (θ_i) on stocks with higher value added $\Delta - \psi$ and/or higher private costs ψ (keeping $\Delta - \psi$ fixed)
  - Incentive problem is most severe for stocks with higher $\psi \Rightarrow$ for a fixed (or larger) $\Delta - \psi$, higher-cost stocks have a larger weight

- **Proposition 4** Suppose that Assumption 1 holds. Then $\theta^{private}$ underweights assets with higher value-added $(\Delta - \psi)$ and overweights assets with higher costs (ψ) compared to θ^{social}.
  - Incentive provision is less effective from the planner's viewpoint

- Planner puts less weight on the incentive-provision role of $b\theta$ (driven by ψ) and more weight on its risk-sharing role (driven by $\Delta - \psi$)

Regulatory Relevance

- Current debate on regulation of fund managers in the UK and the EU focuses on optimal "pay at risk," i.e., our skin in the game a
- Our model is not designed to provide numbers, but we can say that a alone is not sufficient. Welfare can go up or down when only a is restricted.
- When managers are risk averse, need to think about both a and b
- Crowded trades are a problem that the planner needs to correct
- Thinking only about altering incentives of fund managers, without the pecuniary externalities compensation contracts create, is incomplete

Conclusion

In a world where generating "alpha" is costly for asset managers, we show:

- Benchmarking is optimal
- Privately-optimal level of benchmarking exceeds socially-optimal level
- Private incentive provision is excessive
- Prices are lower in the social equilibrium
  - Trades are less crowded
  - Asset management cost is lower
- Optimal benchmark is different from market portfolio
  - The weights depend importantly on the potential for abnormal returns and the cost of generating them

Social Planner's Problem in More Detail

Planner takes into account that prices are affected by contracts and solves Back

$$\max_{a,b,c,\theta,x,x^D} \omega_F U^F + \omega_D U^D$$

$$\text{s.t.} \quad U^M \geq u_0 \qquad (PC)$$

$$x = \Sigma^{-1}\frac{\Delta - \psi/a + \mu - S}{a\gamma} + \frac{b\theta}{a} \qquad (IC)$$

$$x^D = \Sigma^{-1}\frac{\mu - S}{\gamma} \qquad \textit{(direct investors' demand)}$$

where

$$U^F = \left(x^F_{-1}\right)^\top S + x^\top(1-a)\Delta + z^\top(\mu - S) - \frac{\gamma}{2}\left[z^\top \Sigma z + (1-a)^2\sigma_\varepsilon^2\right] - c$$

$$U^M = x^\top(a\Delta - \psi) + y^\top(\mu - S) - \frac{\gamma}{2}\left[y^\top \Sigma y + a^2\sigma_\varepsilon^2\right] + c$$

$$U^D = \left(x^D_{-1}\right)^\top S + \left(x^D\right)^\top(\mu - S) - \frac{\gamma}{2}\left(x^D\right)^\top \Sigma \left(x^D\right)$$

- The dependence of S on a and $b\theta$ in the IC (M's demand function) creates an inefficiency

Empirical Evidence (US Mutual Funds)

Panel A: Summary statistics of compensation structures

	# of Obs.	*% of Sample*
Total	9,452	100%
Fixed salary	122	1.29%
Non-fixed salary	9,330	98.71%
Performance pay	7,278	77.00%
Advisor-profit pay	4,949	52.36%
AUM pay	2,031	21.49%
Deferred compensation	2,683	28.39%

Source: Ma, Tang and Gomez (2019)

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Empirical Evidence (US Mutual Funds)

Panel D: Statistics on the relative weight of bonus vs. base salary

Cases with Bonus/Salary ratio reported	*Observations*	*%*
Bonus/Salary < 100%	165	30.4%
100% ≤ Bonus/Salary ≤ 200%	218	40.1%
Bonus/Salary > 200%	160	29.5%
Total	543	100.0%

Cases with implied information on Bonus/Salary ratio	*Observations*	*%*
Bonus may exceed the base salary	1,394	36.8%
Multiple times the base salary	465	12.3%
Significant/material/substantial portion of total comp.	1,709	45.0%
Strong bonus potential/generous bonus	224	5.9%
Total	3,792	100.0%

Source: Ma, Tang and Gomez (2019)

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Alternative Specification with Effort

- Value generated by the fund

$$R = e\Delta^\top x + x^\top(\tilde{D} - S) + \epsilon \qquad \epsilon \sim N(0, \sigma_\epsilon^2)$$

- Fund managers incur private cost $\frac{\phi}{2}e^2$ for exerting effort ($\phi > 0$)
- Effort e is necessary for generating abnormal return, but unobservable to the fund investors

back

First Best

Suppose that x is observable

- Optimal contract: $a = 1/2$, $b = 0$
- Demand:
$$x^{FB} = \Sigma^{-1} \frac{\Delta - \psi + \mu - S}{\gamma/2}$$
- Prices:
$$S^{FB} = \mu - \gamma\Sigma\bar{x} + 2\lambda_M(\Delta - \psi)$$
- Facing $a = 1/2$ and $b = 0$, if the manager chose x privately, she'd choose
$$x = \Sigma^{-1} \frac{\Delta - 2\psi + \mu - S}{\gamma/2} < x^{FB}$$

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