
The Systemic Effects of Benchmarking

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Can benchmarking induce trading behavior by asset managers that results in increased risks in financial markets?

Our framework

- We consider an exchange economy with institutional and retail investors, a benchmark and an alternative stock, and short-term borrowing and lending
- The retail investor is myopic
- Institutional investors derive higher utility in states of the world in which the benchmark stock outperforms
- This incentivizes institutional investors to gain higher exposure to the benchmark stock (Basak & Pavlova (2013), Buffa, Vayanos & Wolley (2015), Cuoco & Kaniel (2011))

Our results

- Benchmarking increases the portfolio sensitivities of institutional investors in states of the world in which the benchmark underperforms
- In such states, institutional investors trade large volumes, which raises the retail investor's portfolio tail risk
- Overall, benchmarking is welfare reducing for the retail investor
- However, benchmarking does not affect the long-term performance of any investor
- Our results have important implications for the regulation of the asset management industry (FSOC (2014), Haldane (2014), IMF (2015), OFR (2013))

The economy

- There are three investors of two different types: one *retail* investor (R) and two *institutional* investors (A and B)
- Investor consume and reallocate their portfolios at every point of time according to consumption and portfolio plans $(c_t^j, \pi_t^j)_{t \geq 0}$
- There are two risky stocks, which continuously pay off dividends that may experience Poisson-type jumps
- There is also borrowing and lending among investors at the rate r_t

Investors

- The retail investor is a standard myopic mean-variance optimizer with log-utility
- Institutional investors benchmark against asset 2
- This means that states of the world in which asset 2 outperforms relative to asset 1 are expensive states of the world for institutional investors
 - In such states, it is difficult for institutional investors to beat the benchmark
- States of the world in which asset 2 outperforms relative to asset 1 carry high marginal utility for institutional investors

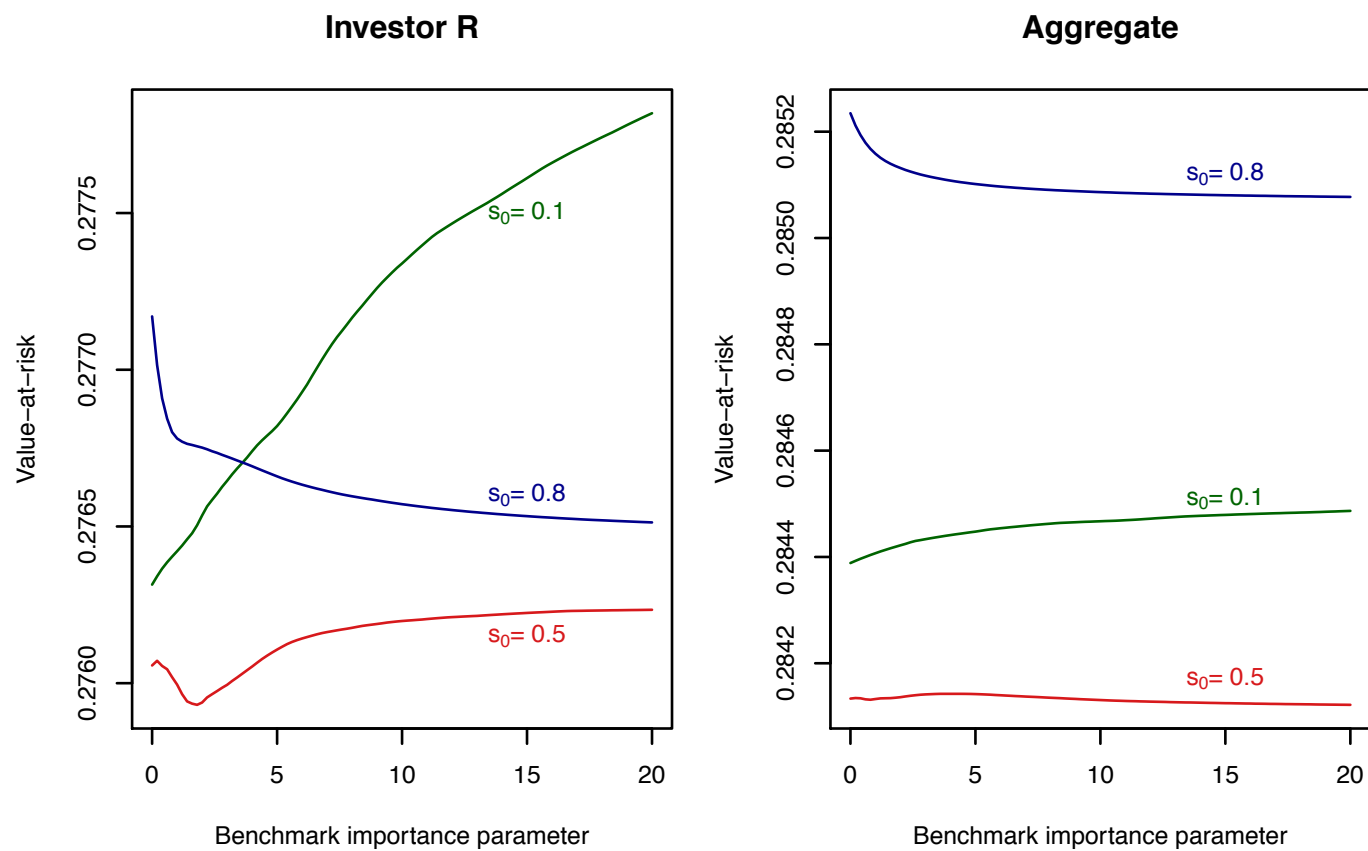
Institutional investors

- In order to capture these effects, we assume that institutional investor $j \in \{A, B\}$ solves the following optimization problem subject to her budget constraint:

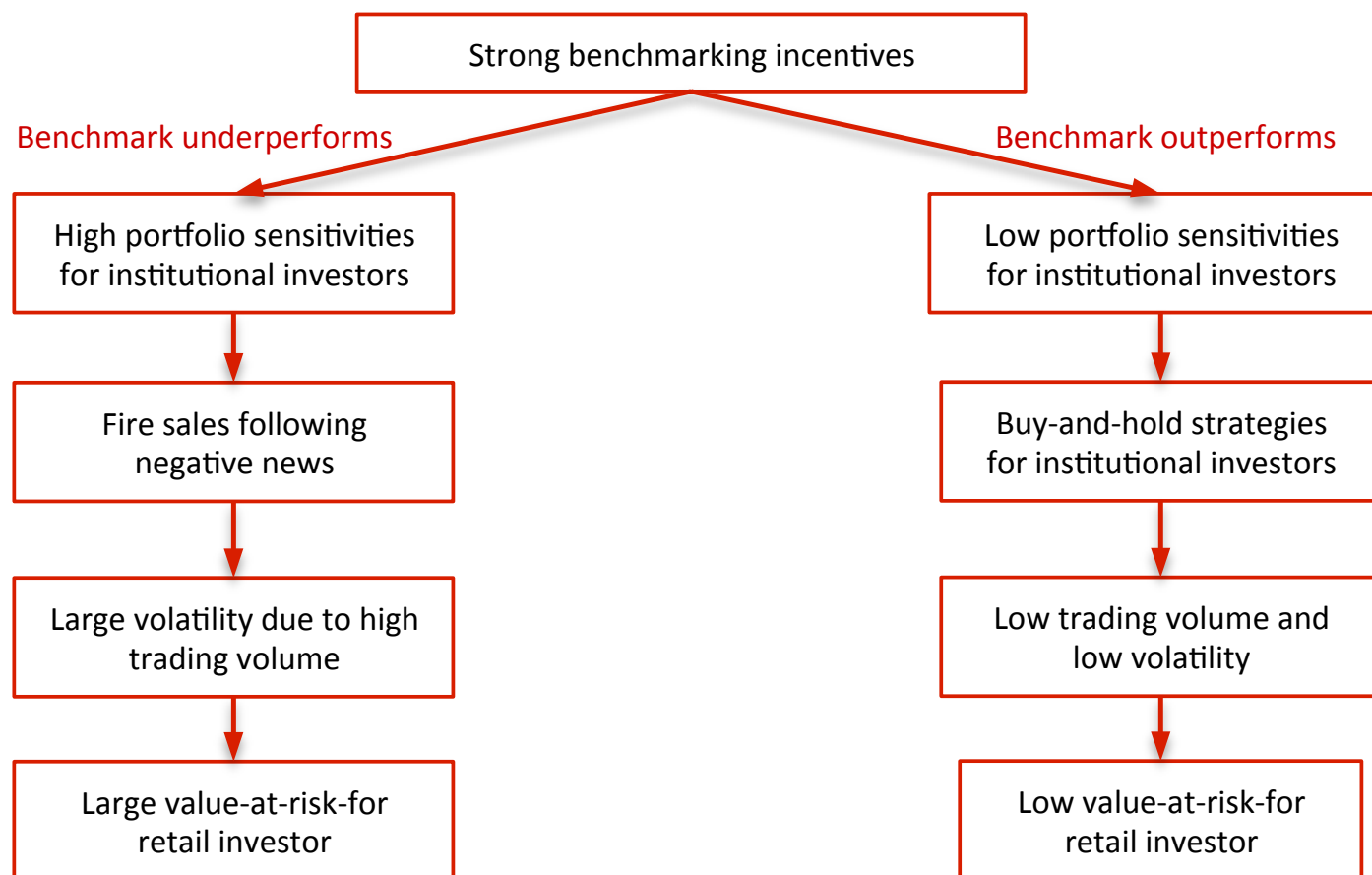
$$\sup_{(c_t^j, \pi_t^j)_{t \geq 0}} \mathbb{E} \left[\int_0^\infty e^{-\rho_j t} (1 + I_j s_t) \log c_t^j dt \right]$$

- Here, $s_t = \frac{D_{2,t}}{D_{1,t} + D_{2,t}}$ is the fraction of dividends attributed to the benchmark
- $I_j > 0$ parametrizes the importance of the benchmark in the utility of institutional investors
- This formulation ensures tractability because general equilibrium quantities can be computed in semi-closed form (Martin (2013))

Value-at-risk of retail investor



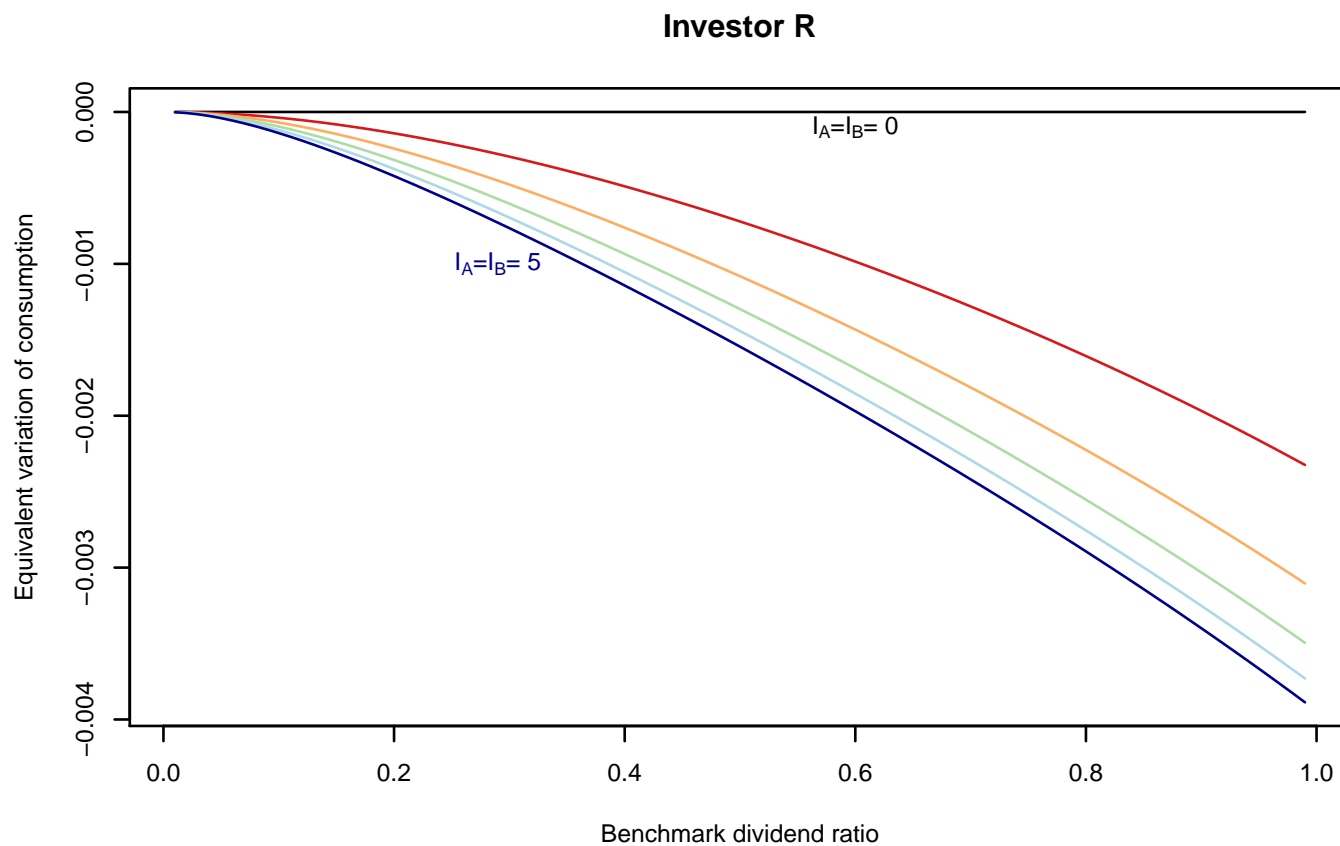
Economic mechanism



Survival

- All investors survive in the long run $t \rightarrow \infty$ if at least one dividend process has positive expected growth rate
- In this case, the most patient investor dominates in terms on relative wealth as $t \rightarrow \infty$ (Yan (2008))
- Benchmarking does not affect the long-run performance of our investors, and tail risk does not materialize

Welfare impact



Summary

- Benchmarking may induce trading behavior by institutional investors that exposes a retail investor to tail risk
- Benchmarking increases the portfolio sensitivities of institutional investors in states of the world in which the benchmark underperforms
- In such states, institutional investors trade large volumes, which raises the retail investor's portfolio volatility
- There is no impact on the long-term performance of our investors
- However, benchmarking is welfare reducing for the retail investor

References

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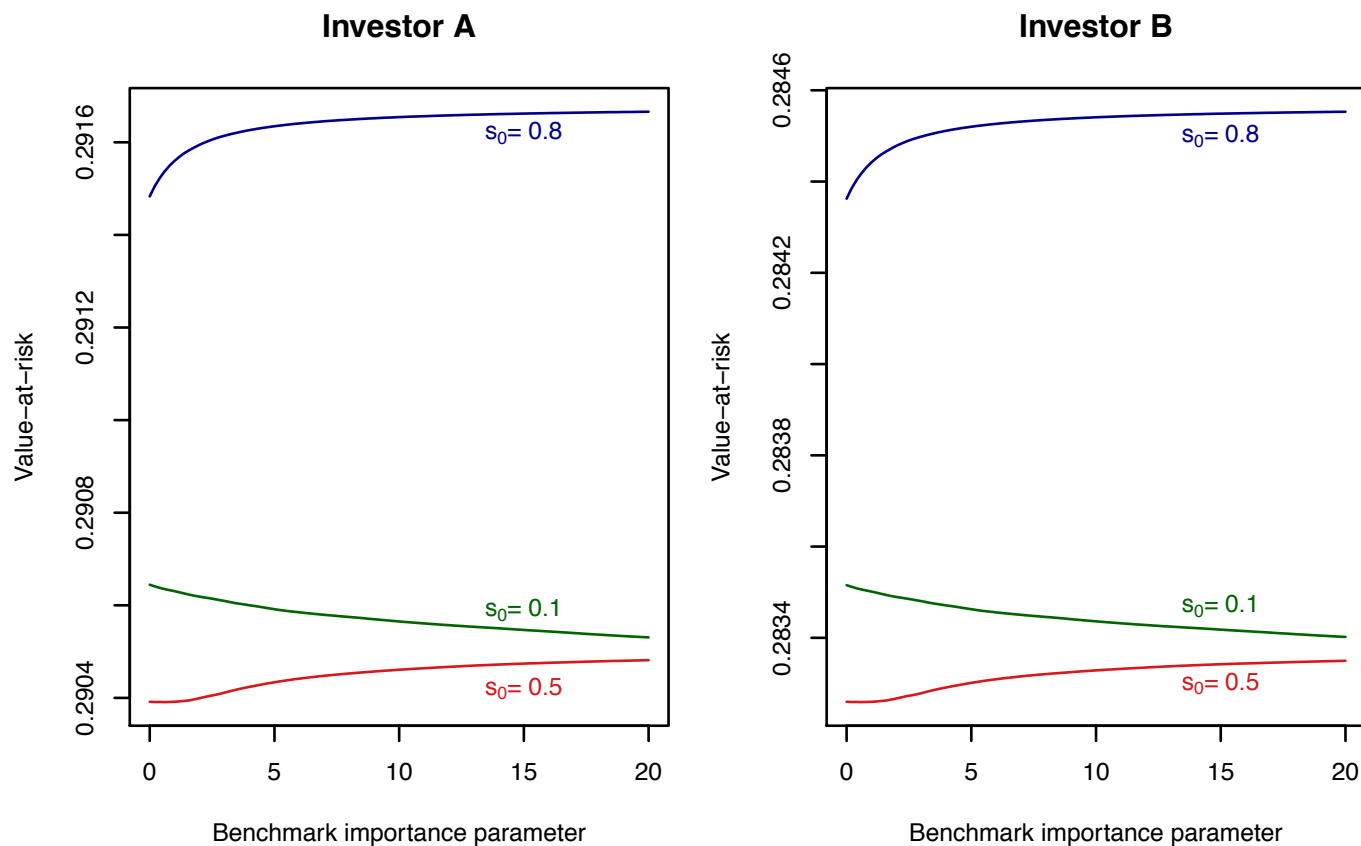
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Equilibrium

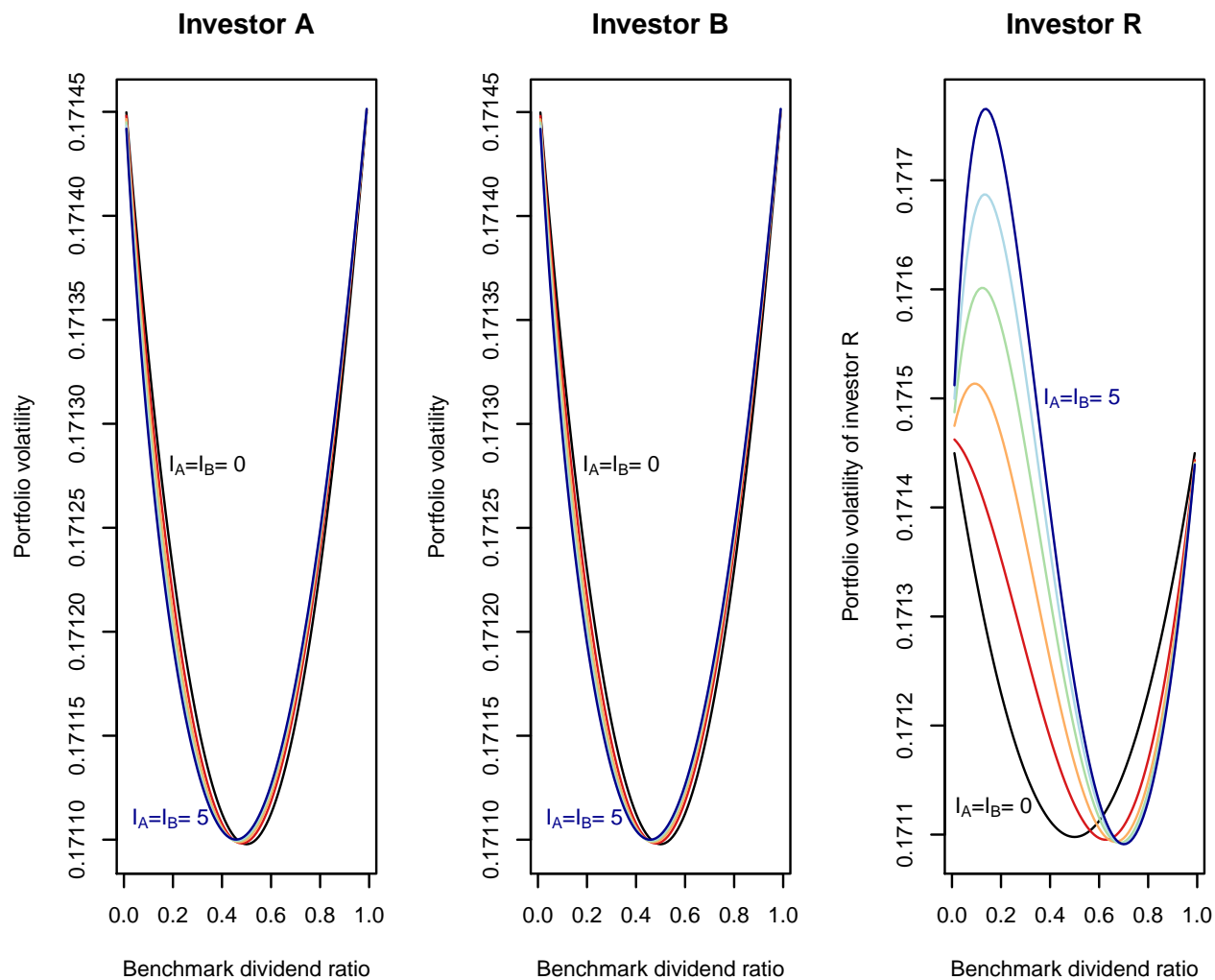
- Stocks 1 and 2 are in positive supply of one unit
- Investor j owns a fraction α^j of wealth at time 0: $W_0^j = \alpha^j W_0$
- General equilibrium quantities are computed semi-analytically using a variant of the methodology of Martin (2013)

Preferences	$\rho_A = 0.03$	$\rho_B = 0.02$	$\rho_R = 0.01$
	$I_A = I_B \in [0, 100]$		
Dividends	$\mu_1 = 0.0753$	$\mu_2 = 0.08$	$\lambda = 0.05$
	$\sigma_1 = 0.1715$	$\sigma_2 = 0.17$	$J_1 = 0$
	$J_2 = -0.1$	$D_{1,0} = 2$	$D_{2,0} \in [0.01, 10]$
Initial Wealth	$\alpha^A = 0.375$	$\alpha^B = 0.375$	$\alpha^R = 0.25$

Value-at-risk of institutional investors

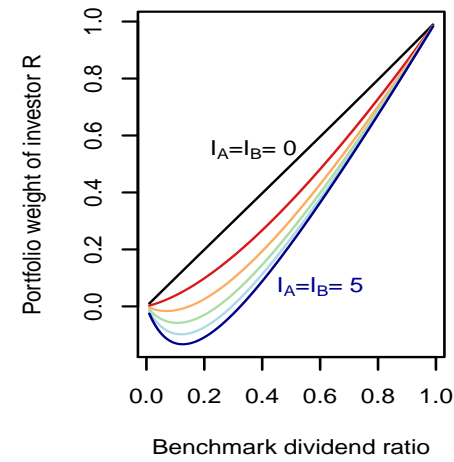
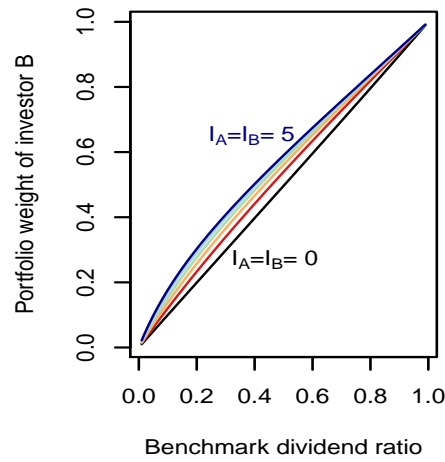
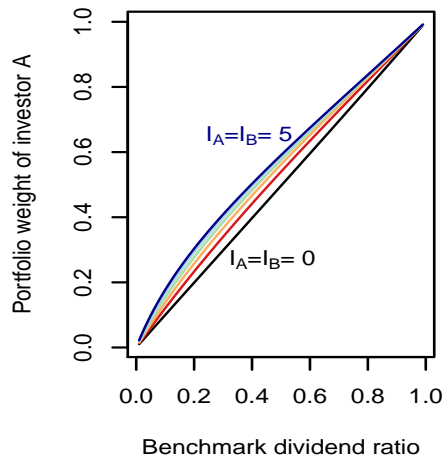


Portfolio volatilities

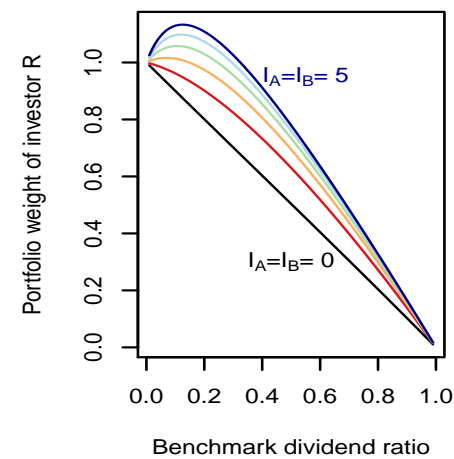
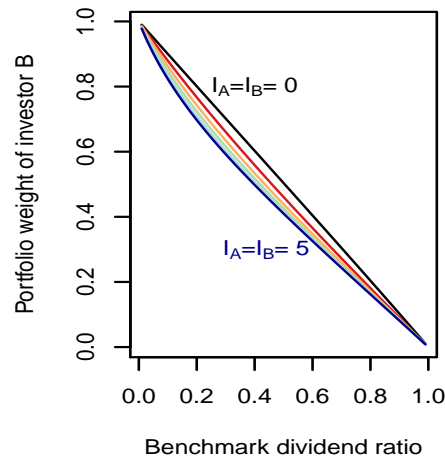
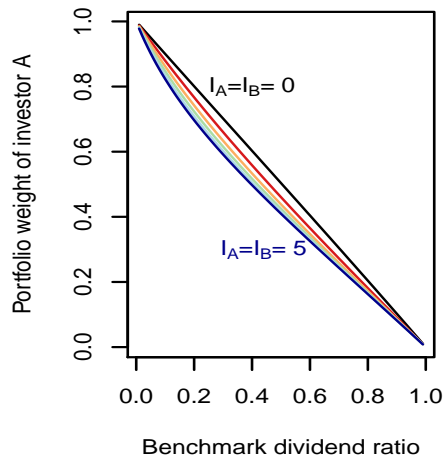


Portfolios weights for stocks

Benchmark stock

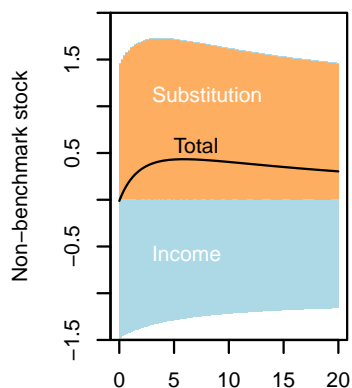


Alternative stock

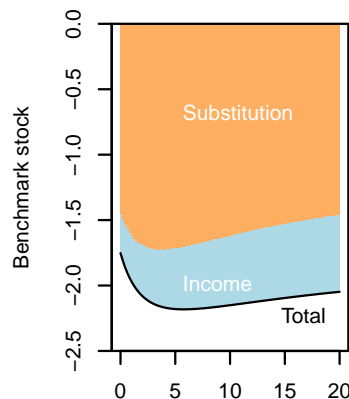


Fire sales

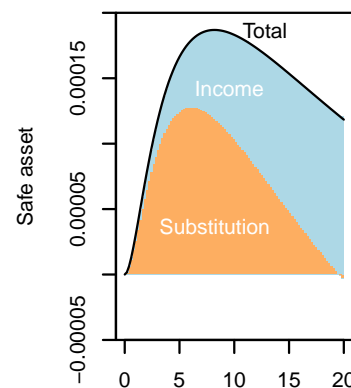
Investor A



Benchmark importance parameter

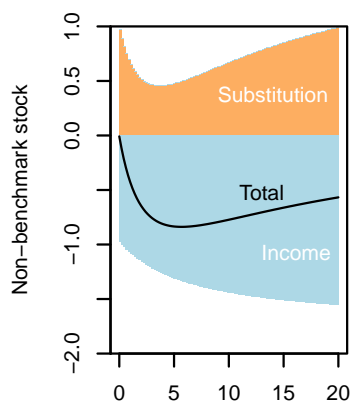


Benchmark importance parameter

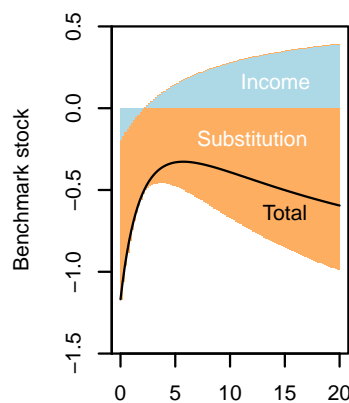


Benchmark importance parameter

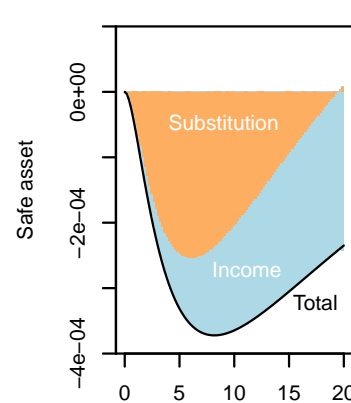
Investor R



Benchmark importance parameter

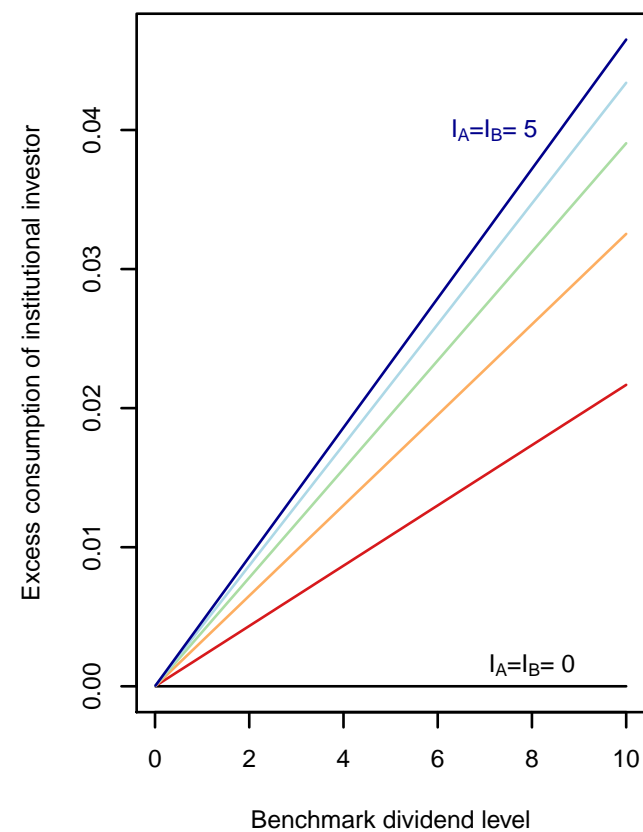
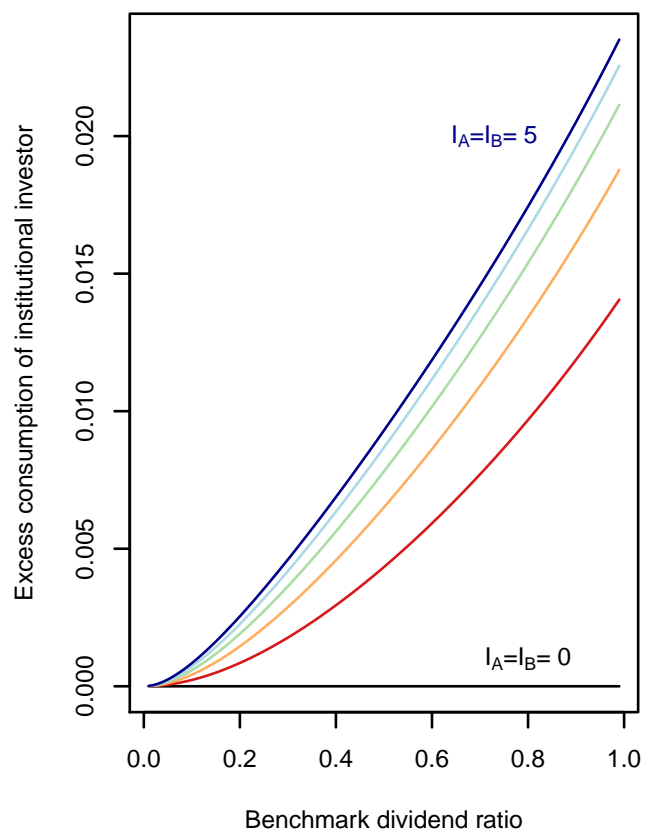


Benchmark importance parameter



Benchmark importance parameter

Excess consumption of institutional investor



Relative consumption of institutional investor

