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# Evidence-based Investing


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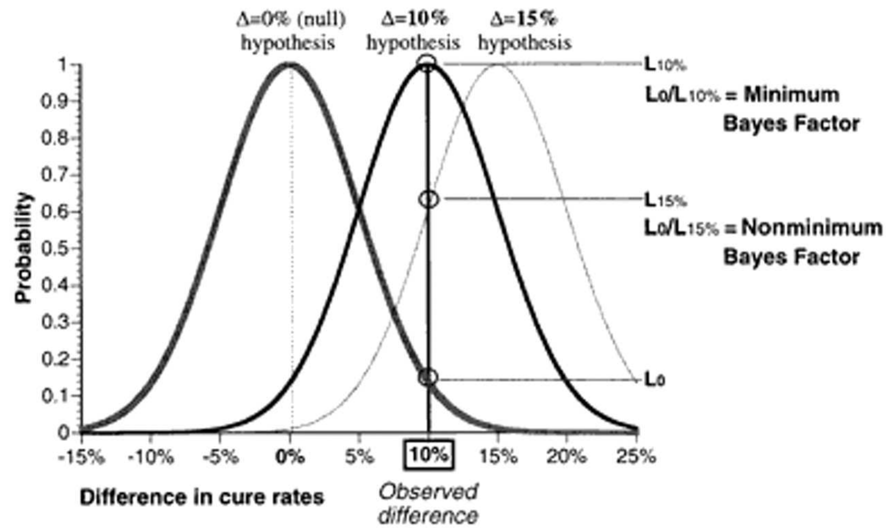
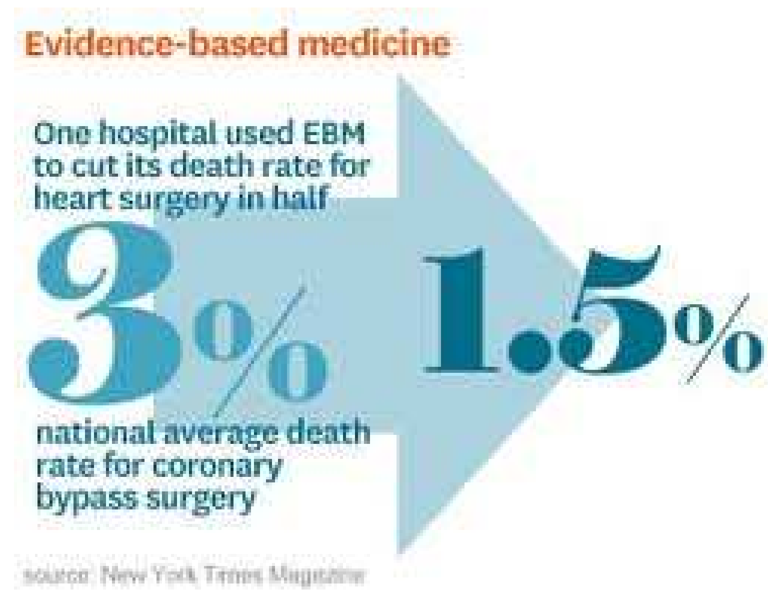
# Evidence-Based Practice

- In complex environments learning is difficult because lag between action and response, and response signal may be noisy.
- Medicine is perfect example of complex but also highly relevant field.
- To cope with complexity, evidence-based medicine (EBM) has been embraced.
- EBM incorporates quantitative methodology in the “art” of clinical practice to objectively gauge the effectiveness of treatments.
- EBM has driven a transformation of clinical practice in medicine.



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# Case for Evidence-Based Investing?

- **Investments is a complex, and highly relevant field too and evidence-based practice is expected to be useful to help investors learn to make better decisions.**

- **It seems that investors are becoming more critical in making decisions**
  - Design investment process of professional investors under scrutiny during aftermath of financial crisis

- **Important questions:**
  - Is there value added of active investment management?
  - Can some active managers systematically outperform passive benchmark indexes?
  - Can the return of winner funds be replicated with passive index funds?

- **However, important decisions are often still based on anecdotes and rituals**

# Conventional wisdoms regarding value of active management

- **Most investors are better off buying low-cost index funds in developed markets**
  - Majority of funds underperforms market

- **Active management has no incremental value in developed markets**
  - Developed markets are typically information-efficient; strong competition among asset managers in developed markets

- **Active management has more value in less efficient markets, e.g., small caps, emerging markets, hedge funds**

- **Active risk budget is best spent in inefficient market segments (approach often referred to as Yale model)**

- **Yale model versus Norges model (Factor Investing)?**

# Robeco study on performance of active investment funds

- **Robeco set up large-scale empirical study to critically assess these conventional wisdoms**

- **Main findings:**
  - Added value of active management is not correlated to market efficiency
  - The potential extra return of active management is larger for markets with a large breadth
  - Market breadth is not constant over time
  - Large portion of fund outperformance comes from factor premium exposures (evidence supporting Norges model)

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# Setup Robeco study

**Robeco performed large international study across multiple asset classes over 1991-2009 to evaluate active fund performance:**

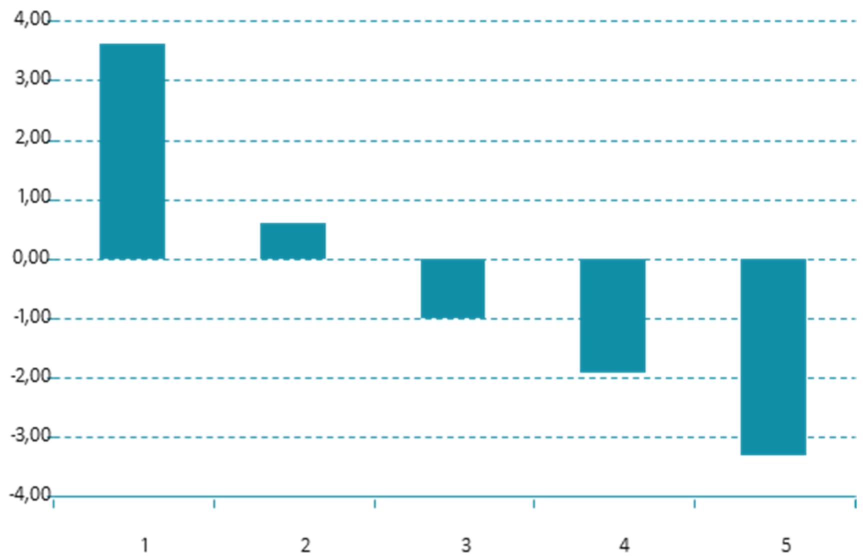
- US equity (subcategories: small & large, value & growth), European equity, Asian equity, Emerging markets equity
- US REITs
- EUR government bond, EUR credit bond, US high-yield bond funds
- Based on Morningstar data
- Methodology consistent with academic standard

**Research update with extended dataset (containing US Treasuries, US credit bonds, hedge funds, and global equity funds) yields consistent results**

# U.S. Equity funds show performance persistence

- **Results Robeco study for US equity consistent with authoritative academic studies**
  - Strong persistence in fund performance; return spread between winner and loser funds is 7% per annum

- **Outperformance of winner funds is roughly 3.6% per annum relative to market index**
  - Return spread winners-losers cannot be attributed to differences in market risk or expenses



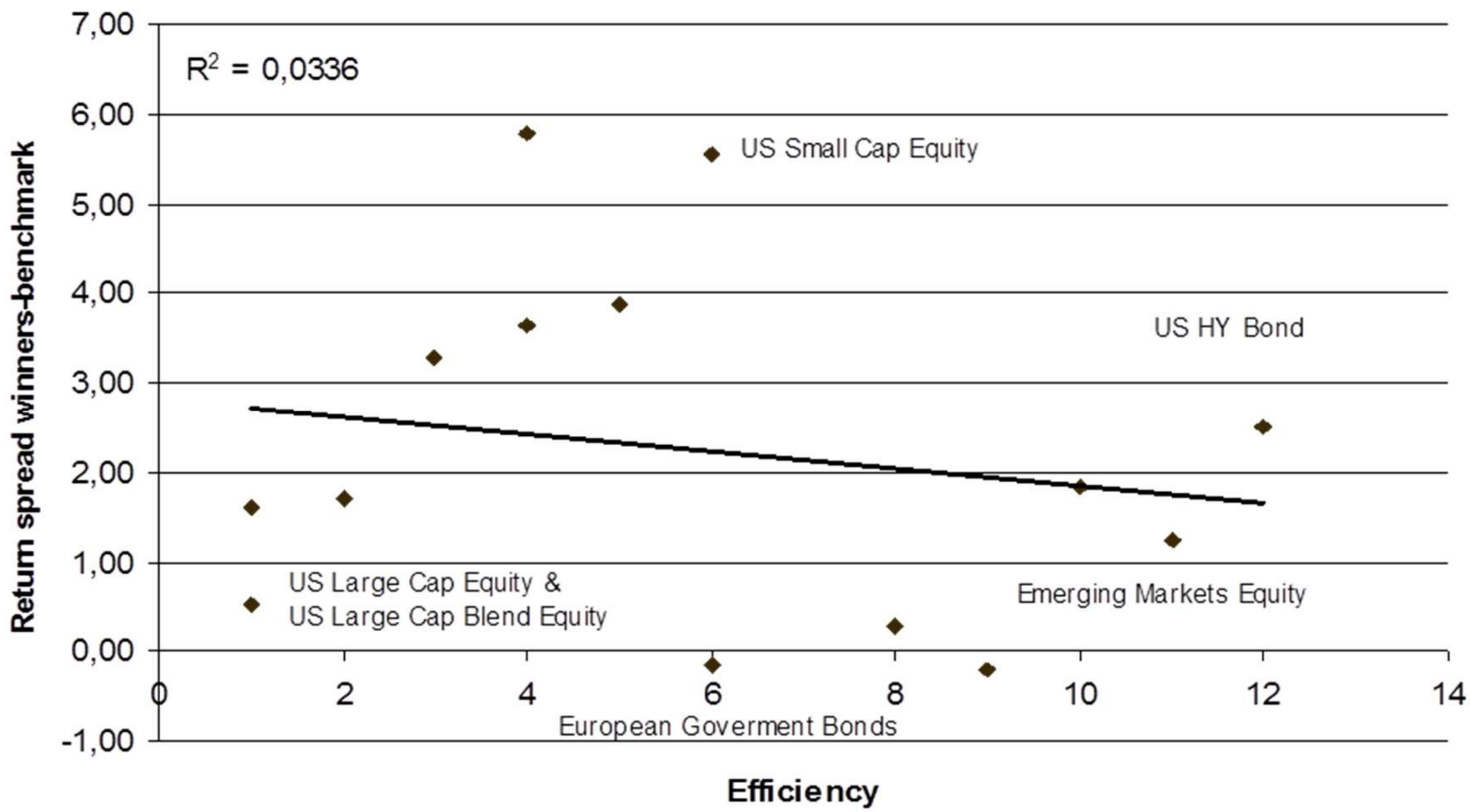
# Testing relation outperformance and market efficiency

- **Outperformance of winner funds is related to three proxies for market efficiency:**
  - Variance ratio
  - Ljung-Box serial correlation statistic
  - Non-parametric test for random walk

- **Performance is also related to three proxies for market breadth:**
  - Market return dispersion
  - Average fund tracking error
  - Diversification effect in markets

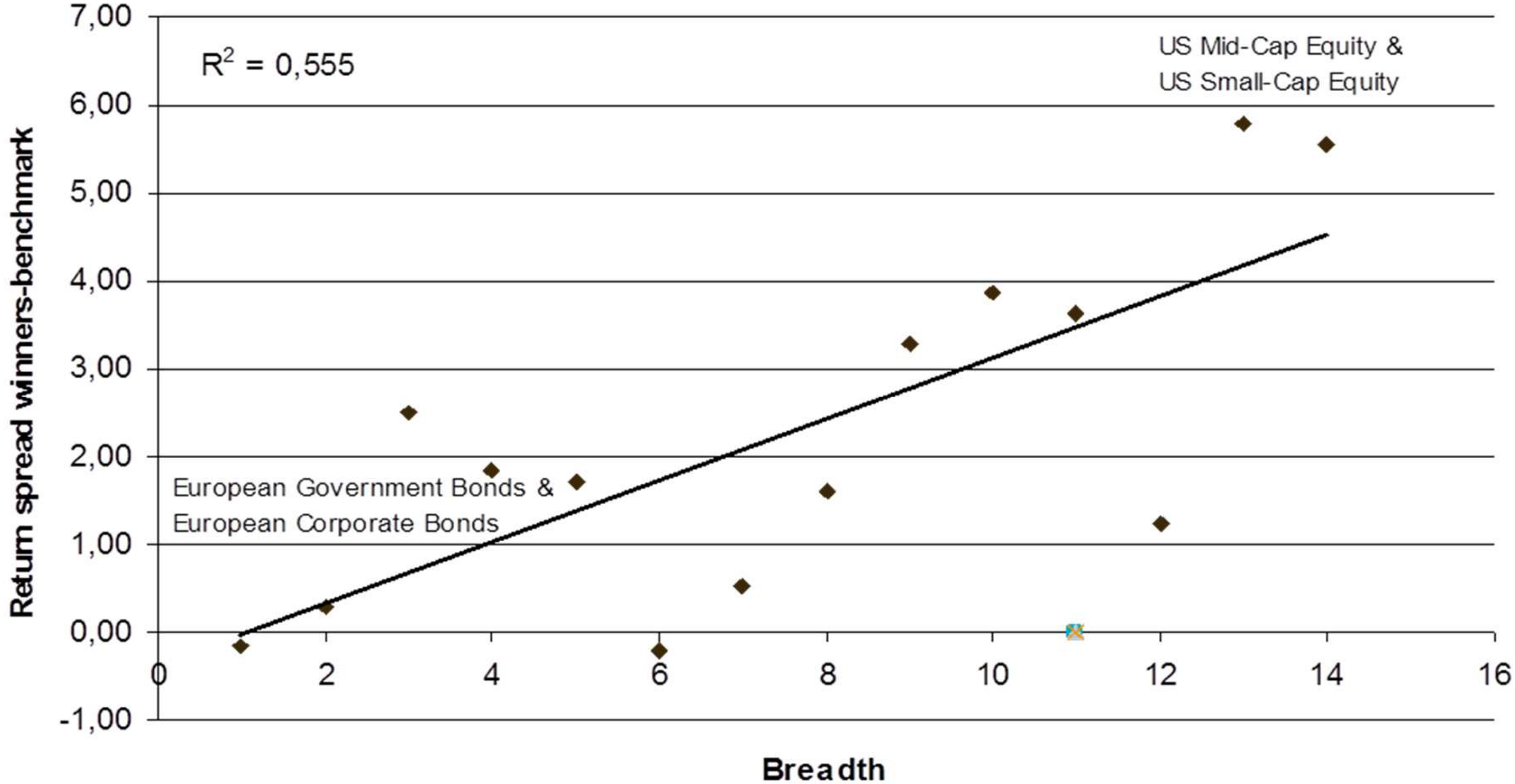
- **Outperformance is measured relative to market ETFs**

# Outperformance across markets uncorrelated to efficiency



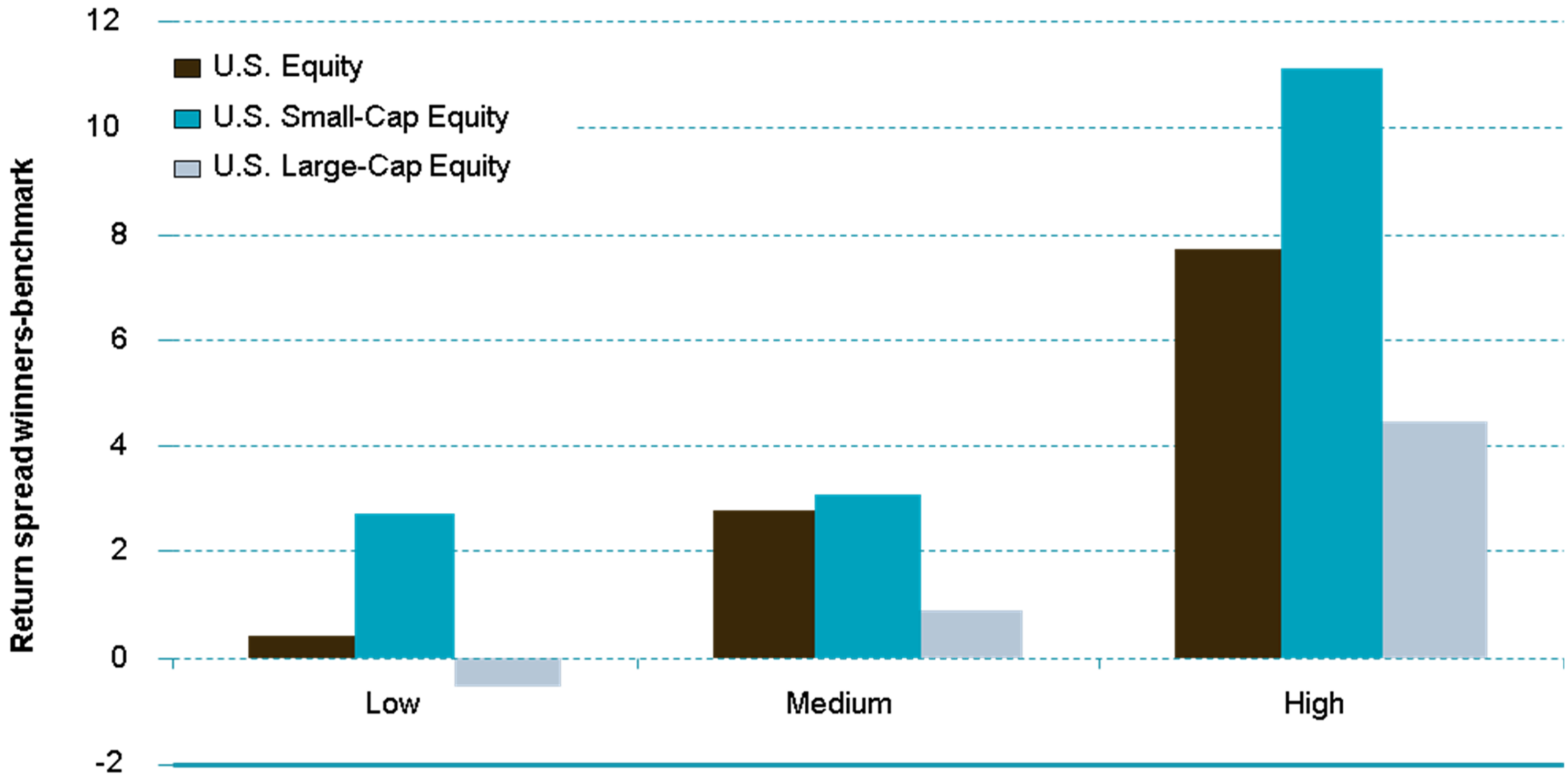

X-axis: left = efficient, right = inefficient

# Market breadth determines differences in outperformance across markets




X-axis: left = small breadth, right = large breadth

# High market breadth indicates larger outperformance over time



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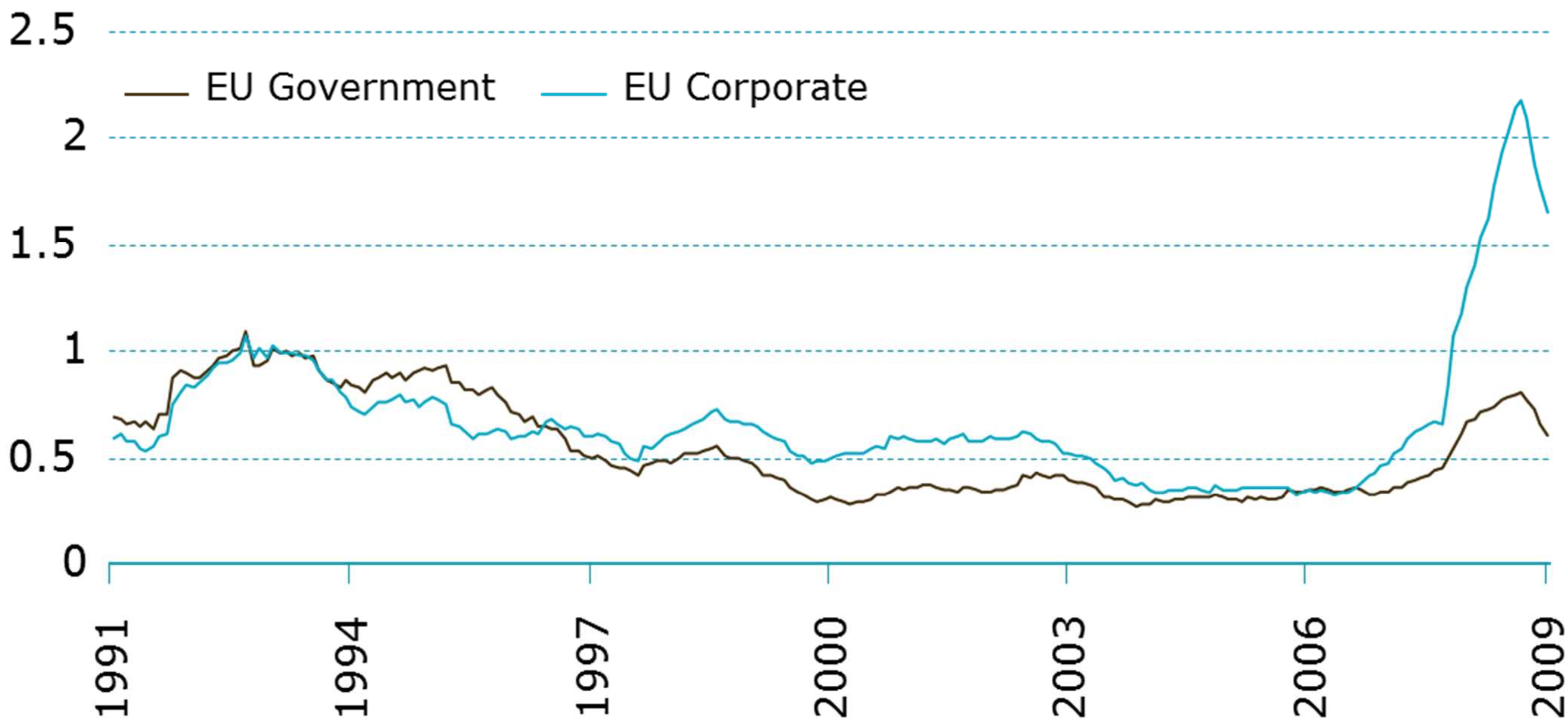
# Market breadth is not constant over time



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# Largest portion of value-added active management can be attributed to factor premium exposures

- **Top decile of US Equity funds shows outperformance of 4.20% per annum**
- **Large portion of outperformance can be attributed to factor premiums (i.e., low-volatility, value, momentum)**
- **Consistent with Ang, Goetzmann & Schaefer (2009) study for Norwegian Reserve Fund GPFG**
  - Active management of GPFG has added value
  - This added value can be attributed to implicit exposures to systematic factor premiums (betas), which arise from bottom-up manager selection
  - Recommendation: top-down approach to harvest factor premiums intentionally and efficiently

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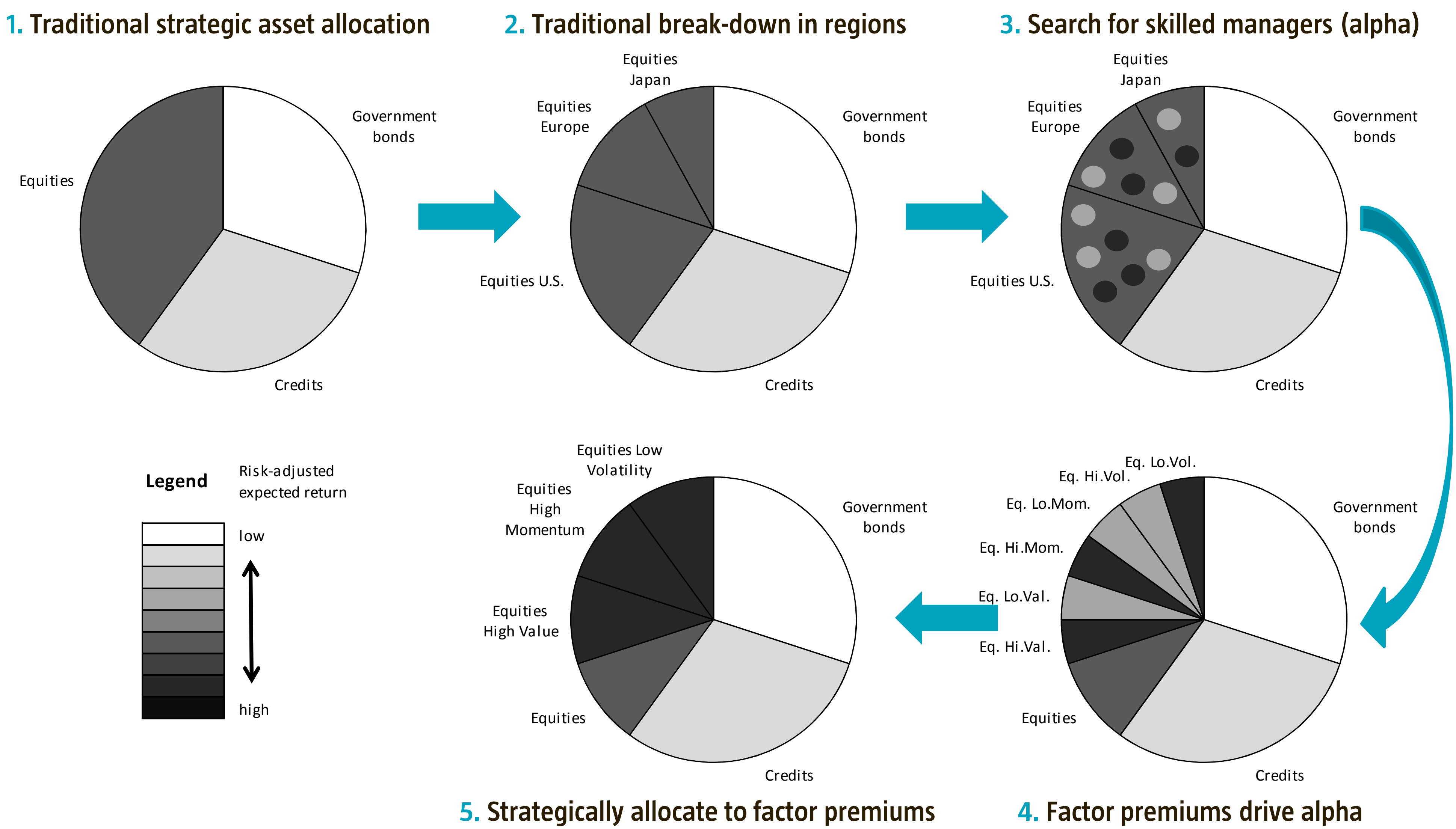
# Factor Investing Framework



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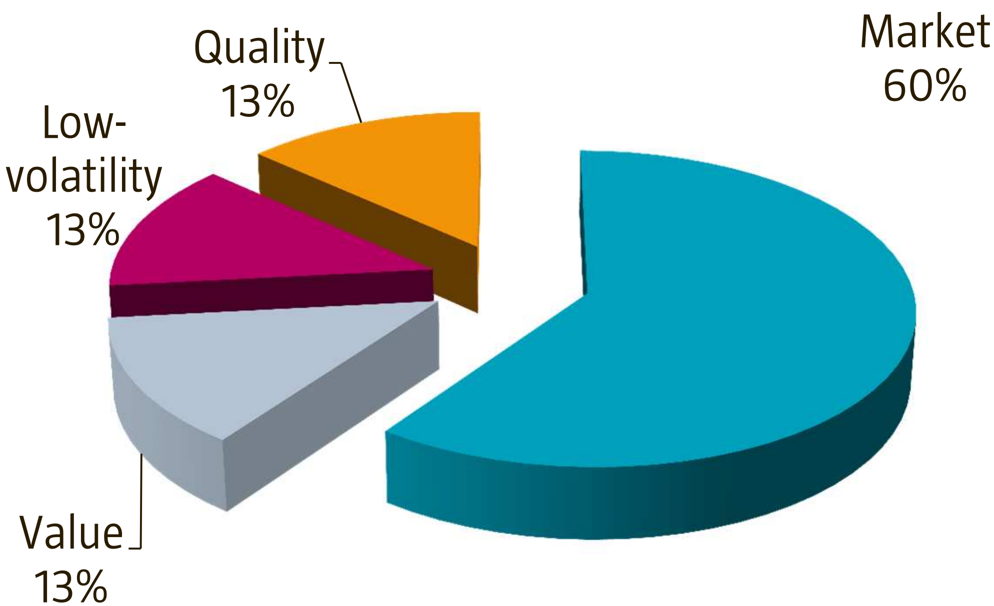
# Examples of investors engaging in factor investing

PGGM

## Strategic Equity Portfolio




pka

| Examples of return sources in PKA's new equity portfolio | |
|---|---|
| **Source of return** | **Risk premium/effect** |
| Traditional beta | Developed markets risk premium |
| | Emerging markets risk premium |
| | Frontier markets risk premium |
| | Small-cap risk premium |
| Alternative beta | Low volatility effect |
| | Dividends risk premium |
| | Implied volatility risk premium |
| | Factor risk premia/effects such as value, momentum and quality |
| | Merger arbitrage risk premium |
| | Liquidity event risk premium |
| | Other tactically traded risk premia |

*Source: NRPN Feb-Mar 2012*

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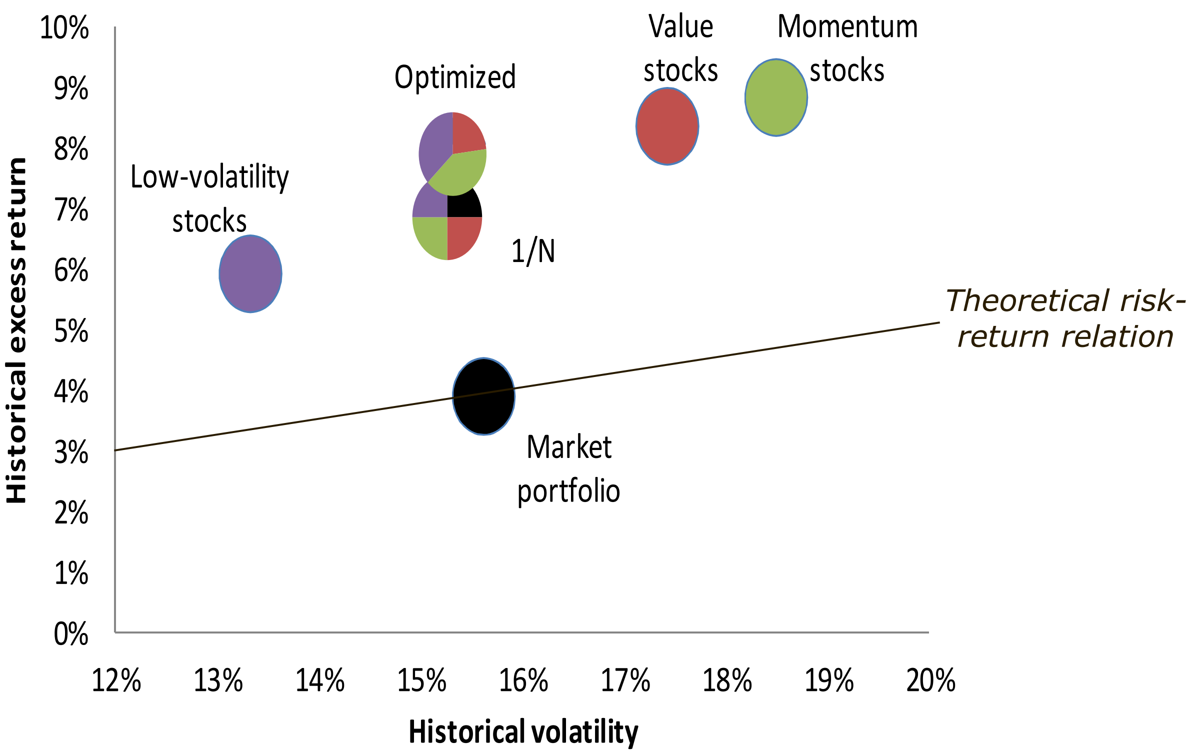
# Robeco study: large profits to Factor Investing




## Strategic Allocation to Premiums in the Equity Market

David Blitz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Investors tend to focus on harvesting the risk premiums offered by traditional asset classes when making their strategic investment decisions. An abundance of literature, however, shows that various other premiums may be captured in financial markets. Examples are the well-known value and momentum premiums, which have been found to be present within many asset classes (see, e.g., Asness, Moskowitz, and Pedersen [2009] for a good overview). In a recent article, researchers from MSCI Barra argue that significant efficiency gains may be realized by expanding the traditional investment opportunity set based on asset classes with such premiums (Bender et al. [2010]). In the same spirit, a key recommendation of finance professors, asked by Norway's Government Pension Fund to evaluate its investment performance, is that the fund should seek explicit exposure to various non-standard premiums next to the risk premiums offered by established asset classes (Ang, Goetzmann, and Schaefer [2009]).

Inspired by these studies, we examine if it indeed makes sense for investors to include nontraditional premiums in the strategic asset mix and how such an investment approach can be implemented in practice. We focus our analysis on the allocation to premiums directly related to the equity market. We find that the theoretically optimal allocation to various premiums in the equity market is sizable, even when using highly conservative assumptions regarding their future expected magnitudes. We next argue that it should be a strategic decision to allocate to these premiums, rather than a decision that can be postponed to some later stage of the investment process. Finally, we discuss the pros and cons of two ways of obtaining exposure to nontraditional premiums in practice, specifically passively managed index funds versus actively managed quant funds.

### PREMIUMS IN THE EQUITY MARKET

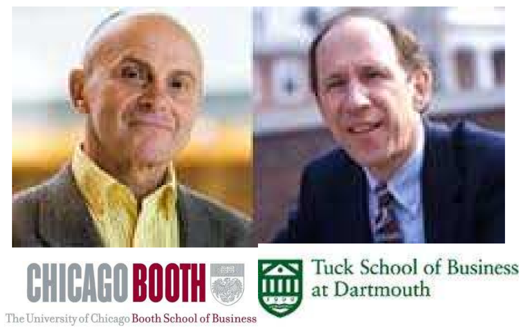
Investors typically include equities in their strategic asset allocation to earn the expected equity premium. Empirical research supports the existence of such a premium by showing that, historically, equities have offered a higher average return than a risk-free investment in Treasury bills or Treasury bonds. However, empirical research has also shown that more return premiums may be captured in equity markets. Examples include the size premium (Banz [1981]), the value premium (Fama and French [1992]), the momentum premium (Jegadeesh and Titman [1993]) and the low-volatility (or low-beta) premium (Black, Jensen, and Scholes [1972]).[1] In the literature, the existence of these premiums is widely acknowledged, and the debate has moved from whether these premiums exist to why they exist. One stream of literature argues



* Blitz (2012), Strategic Allocation to Premiums in the Equity Market, *Journal of Index Investing*
** Graph based on U.S. large-cap equity data, sample period 1963:07–2009:12

# A critical look at the evidence

- **Main evidence supporting Factor Investing is basically the work of Prof. Fama and French**
- **Also, there seems to be an Appeal to Authority with authoritative investors engaging in Factor Investing**




- **However, some important questions still need to be answered:**
  - Are Factor Premiums robust to trading frictions?
  - Are the premiums still present over publication?
  - Do investors that engage in Factor Investing have an increased probability to outperform?

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# Do Factor Investing funds earn excess returns?

**Recent study by Huij and van Gelderen (2013):**

- **Sample of 6,800+ U.S. equity mutual funds back to 1990**
- **Data from Morningstar and Prof. French**
- **Return-based Style Analysis to identify which funds engage in Factor Investing**
  - Focus on low-risk, small cap, and value styles
- **Outperformance measured relative to U.S. market – corrections for risks and statistical noise**

- **Comparison  Factor Investing funds vis-a-vis other funds**
- **Performance over recent time period (post-2000)**

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# Empirical results (1)

## Distribution of fund alphas for entire sample

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9% | 6% | 9% | 12% | 13% | 14% | 11% | 8% | 5% | 5% | 3% | 4% |
| | | **64%** | | | | | | **36%** | | | |

- In the long run 36% of all funds can outperform the market

# Empirical results (2)

## Distribution of fund alphas for entire sample

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9% | 6% | 9% | 12% | 13% | 14% | 11% | 8% | 5% | 5% | 3% | 4% |
| 64% | | | | | | 36% | | | | | |

## Distribution of fund alphas for funds that do not engage in Factor Investing

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10% | 7% | 13% | 17% | 17% | 16% | 10% | 5% | 2% | 1% | 1% | 1% |
| 80% | | | | | | 20% | | | | | |

- For funds that do not engage in Factor Investing the succes ratio is only 20%

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# Empirical results (3)

## Distribution of fund alphas for funds that do not engage in Factor Investing

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10% | 7% | 13% | 17% | 17% | 16% | 10% | 5% | 2% | 1% | 1% | 1% |
| 80% | | | | | | 20% | | | | | |

## Distribution of fund alphas for low-risk funds

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7% | 4% | 6% | 7% | 17% | 12% | 13% | 11% | 6% | 6% | 5% | 7% |
| 53% | | | | | | 47% | | | | | |

- For low-risk funds the succes ratio is close to 50%

# Empirical results (4)

## Distribution of fund alphas for funds that do not engage in Factor Investing

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10% | 7% | 13% | 17% | 17% | 16% | 10% | 5% | 2% | 1% | 1% | 1% |
| **80%** | | | | | | **20%** | | | | | |

## Distribution of fund alphas for small cap funds

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9% | 4% | 4% | 5% | 7% | 10% | 11% | 12% | 9% | 10% | 7% | 11% |
| **39%** | | | | | | **61%** | | | | | |

- For small cap funds the succes ratio is over 60%

# Empirical results (5)

## Distribution of fund alphas for funds that do not engage in Factor Investing

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10% | 7% | 13% | 17% | 17% | 16% | 10% | 5% | 2% | 1% | 1% | 1% |
| 80% | | | | | | 20% | | | | | |

## Distribution of fund alphas for value funds

| smaller than -5% | -5 to -4% | -4 to -3% | -3 to -2% | -2 to -1% | -1 to 0% | 0 to 1% | 1 to 2% | 2 to 3% | 3 to 4% | 4 to 5% | larger than 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5% | 1% | 2% | 6% | 7% | 13% | 12% | 16% | 10% | 10% | 6% | 12% |
| 34% | | | | | | 66% | | | | | |

- For value funds the succes ratio is over 65%

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# Main findings & conclusions

- **Since the 1990s, a substantial number of funds is engaging in factor investing (low-risk 6%, 30% small cap, 20% value)**

- **Factor Investing funds do significantly better than their peers:**
  - 0.6-0.7 standard deviations above average fund
  - Net alpha of 56 to 119 basis points
  - Success ratio of average funds is around 36% (!); success ratio of Factor Investing funds is 61-67%

- **Factor Investing funds also exhibit outperformance over second sample period after public dissemination of academic results**

# Conclusions

- Strong (international) empirical evidence of performance persistence
- There is no positive relation between market inefficiency and alpha
- Instead, alpha potential is larger in markets with more breadth
- Strategic allocation to factor premiums seems a more effective approach to design an investment portfolio
- Empirical evidence supports effectiveness of factor investing

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