NEWFOUND RESEARCH

All About Factors

What are they? Can we time them? How should we diversify them?

March 2017

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Newfound Case ID: 5600113

About Newfound Research

Founded in August 2008, Newfound Research is quantitative asset management firm based out of Boston, MA.

Investing at the intersection of quantitative and behavioral finance, Newfound Research is dedicated to helping clients achieve their long-term goals with research-driven, quantitatively-managed portfolios, while simultaneously acknowledging that the quality of the journey is just as important as the destination.

Nominated for 2016 ETF Strategist of the Year by ETF.com

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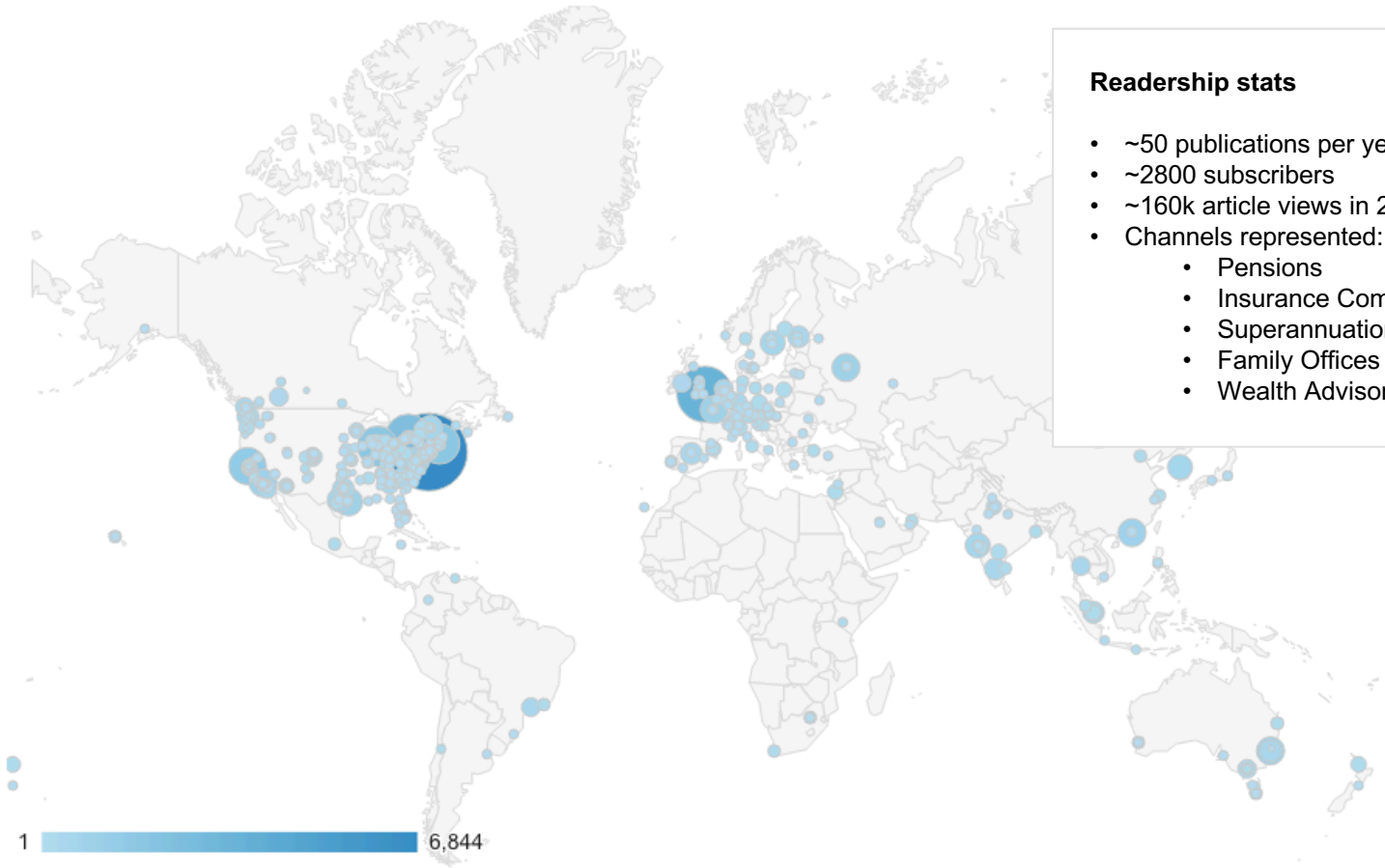

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About Newfound Research

You can sign up to receive or weekly research commentary at

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“If I buy a smart-beta ETF and short the market, am I net long smart?”

As told to Corey Hoffstein by Eric Balchunas, Senior ETF Analyst at Bloomberg Intelligence

Topic #1

So what are factors?

What are factors anyway?

The Standard Capital Asset Pricing Model
A "Single Factor" Model

$$r_p = r_f + \beta\left(r_m - r_f\right) + \epsilon$$

What are factors anyway?

Increased exposure to systematic risk implies increased return

Portfolio Return — Systematic Risk

$$r_p = r_f + \beta\left(r_m - r_f\right) + \epsilon$$

Risk-Free Rate — (Uncompensated) Noise

What are factors anyway?

The goal of active investing…

$$r_p = \alpha + r_f + \beta\left(r_m - r_f\right) + \epsilon$$

SWEET, SWEET "RISK-FREE" *ALPHA*

What are factors anyway?

$$r_p = \alpha + r_f + \beta\left(r_m - r_f\right) + \epsilon$$

Risk free???

What are factors anyway?

Some assumptions we usually make…

$$r_p = \alpha + r_f + \beta\left(r_m - r_f\right) + \epsilon$$

$$\sim N(\mu_m, \sigma_m) \qquad \sim N(0, \sigma_\epsilon)$$

What are factors anyway?

Maybe combine "alpha" with the noise component?

$$r_p = r_f + \beta\left(r_m - r_f\right) + F$$

$$\sim N(\mu_m, \sigma_m) \qquad \sim N(\alpha, \sigma_\epsilon)$$

What are factors anyway?

Exposure to portfolio with "active" return

$$r_p = r_f + \beta\left(r_m - r_f\right) + \beta_a r_a + \epsilon$$

(residual risk)

What are factors anyway?

Fama-French 3-Factor Model

$$r_p = r_f + \beta_m(r_m - r_f) + \beta_{HML} r_{HML} + \beta_{SMB} r_{SMB} + \epsilon$$

"Value"

"Size"

Factor investing is the implementation of systematic portfolio rules in effort to harvest positive active returns.

What are factors anyway?

Aren’t markets efficient?

Where do we expect these “positive active returns” to come from?

What are factors anyway?

1. Risk
2. Behavioral biases
3. Market structure

What are factors anyway?

Risk

Investors are risk averse. Taking on extra risk requires getting extra reward.

Essentially, you're acting as an insurer: collecting a premium so other investors can offload risk.

For that extra risk you bear, you collect a reward.

This does not violate the efficient market hypothesis.

What are factors anyway?

Risk

Commonly cited examples:

The **value premium** comes from buying securities the general market views as being distressed. To hold these riskier securities, you earn a premium.

The **size premium** comes from holding smaller capitalization securities, which are often less liquid. To hold less liquid securities, you earn a premium.

Behavioral bias

Investors exhibit “irrational” cognitive biases that can be exploited by more rational market participants.

Behavioral bias

Commonly cited examples:

The **momentum premium** arises from several cognitive biases, including the anchoring, the disposition effect, and herding.

The **low-volatility premium** arises from an aversion to leverage and the lottery effect.

Market structure

By the way the markets are structured, there may be opportunities to exploit price-insensitive buyers and sellers.

Market structure

Commonly cited examples:

The **fallen angels premium** comes from institutions indiscriminately selling investment grade bonds that have been downgraded.

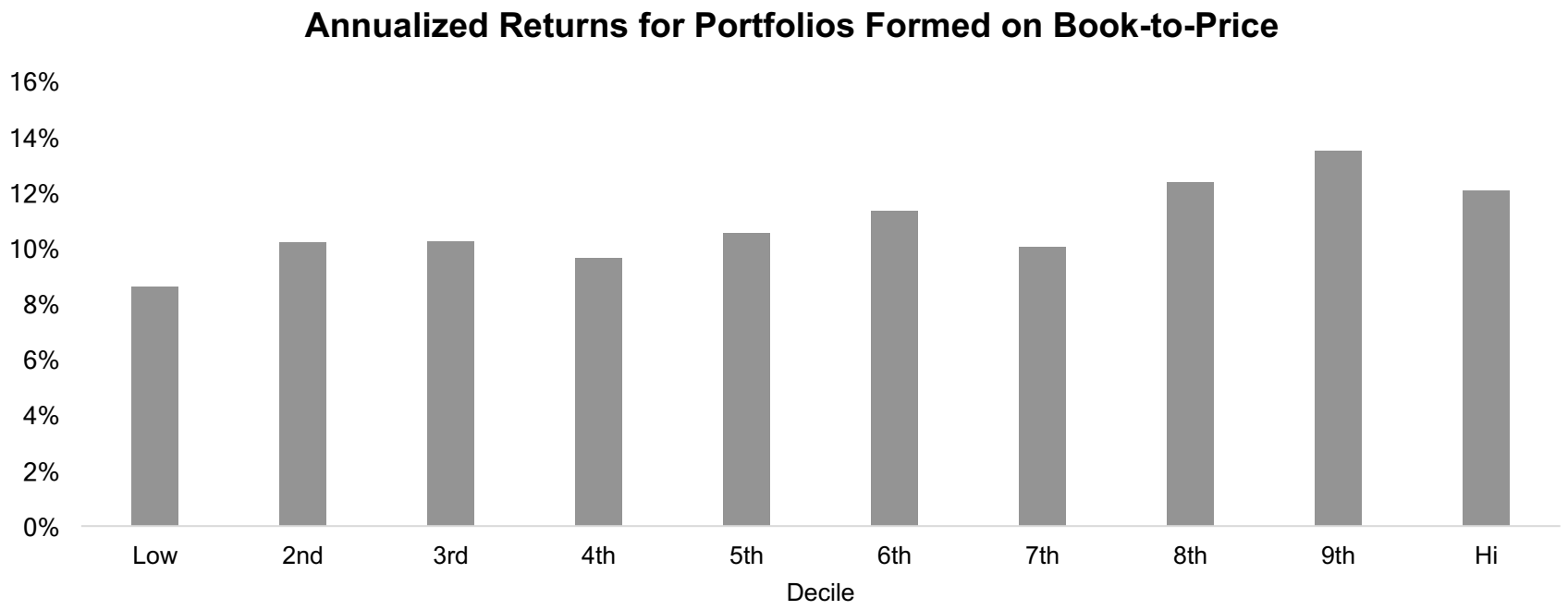
Excess premium found in **dividend swaps** may arise from banks looking to offload dividend exposure.

How do we research factors?

What are factors anyway?

1. Think of a way to rank stocks

What are factors anyway?



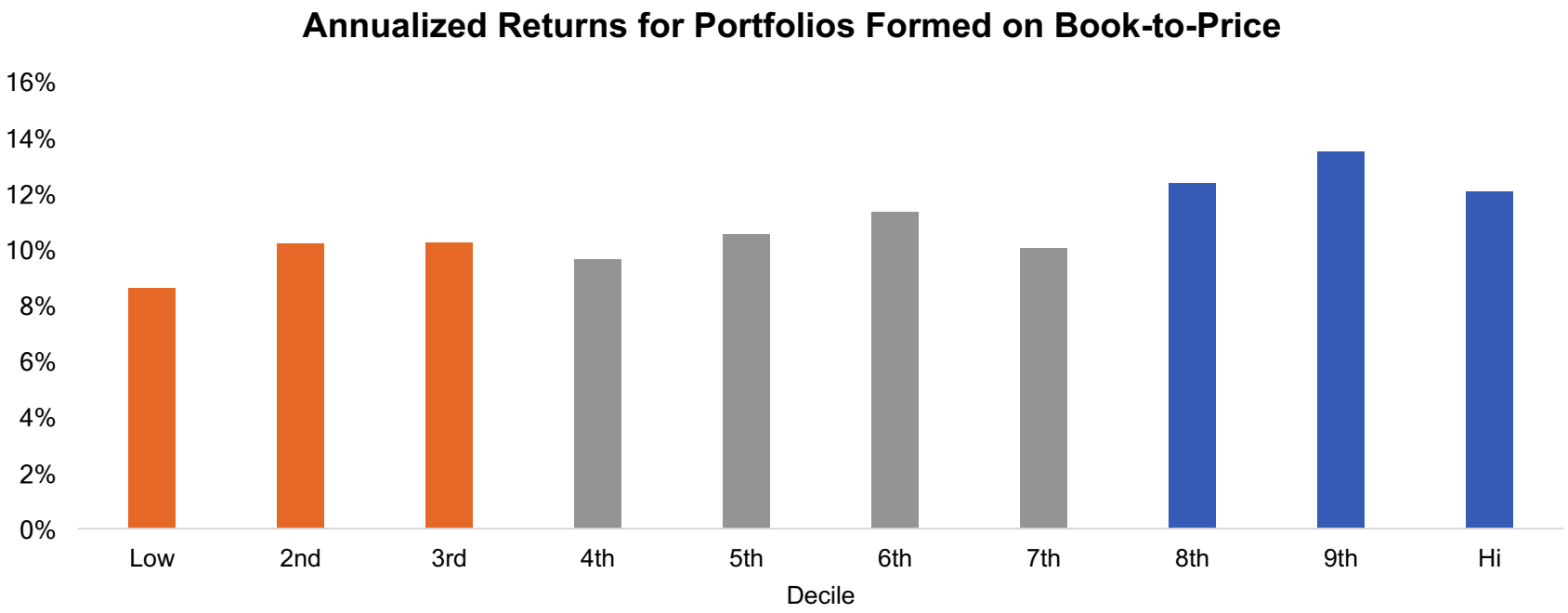
Source: Kenneth French Data Library; Calculations by Newfound Research. Past performance is no guarantee of future results.

What are factors anyway?

1. Think of a way to rank stocks

2. Buy the top-ranked stuff; short sell the bottom-ranked stuff.

What are factors anyway?



Source: Kenneth French Data Library; Calculations by Newfound Research. Past performance is no guarantee of future results.

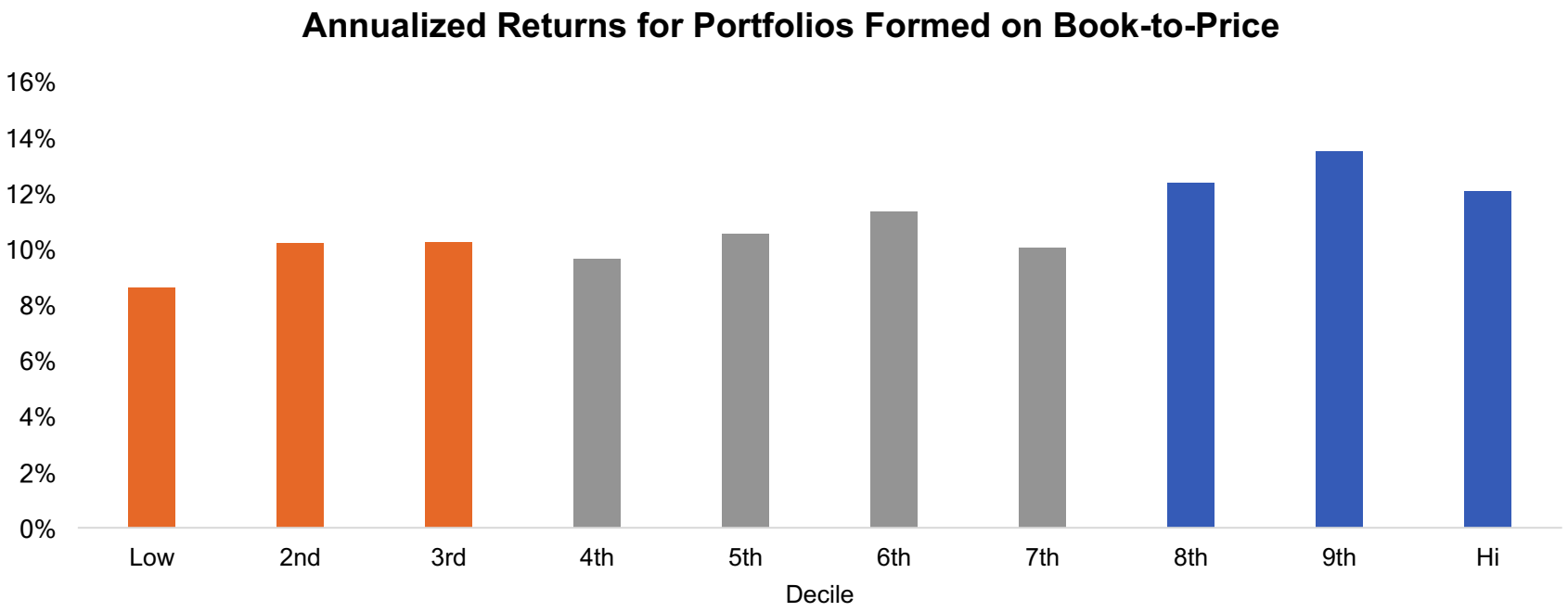
What are factors anyway?

1. Think of a way to rank stocks

2. Buy the top-ranked stuff; short sell the bottom-ranked stuff.

3. ***Profit?***

What are factors anyway?



Average: 9.68%

Average: 12.63%

Source: Kenneth French Data Library; Calculations by Newfound Research. Past performance is no guarantee of future results.

What are factors anyway?

Why does research focus on long/short approaches?

- *Any* portfolio can be thought as of the market portfolio plus a long/short portfolio
- Allows us to focus on the long/short to quantify value-add.

What are factors anyway?

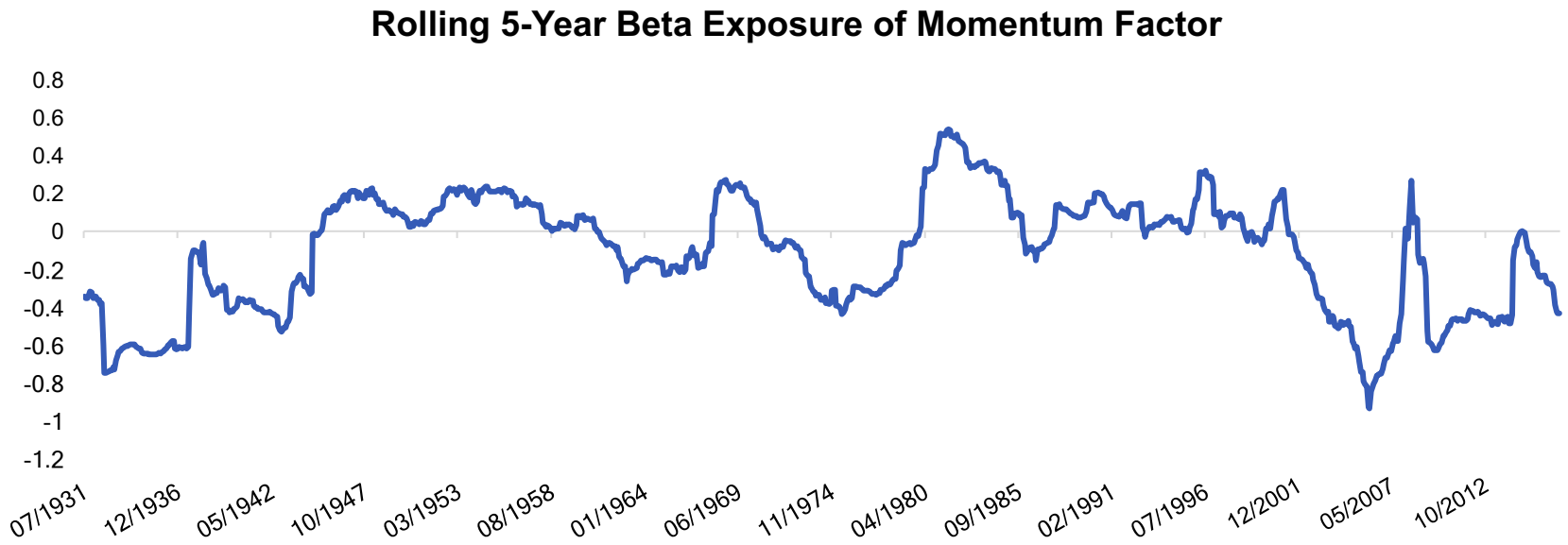
Why “dollar neutral” long/shorts?

- Self-financing
- Easy to calculate

What are factors anyway?

Dollar neutral is *not* beta neutral.

(This means that some factors may unintentionally incorporate implicit beta timing…)



Source: AQR; Calculations by Newfound Research.

What are factors anyway?

Commonly recognized equity factors:

- Value
- Size
- Momentum
- Low-Volatility / Anti-Beta
- Profitability / Quality

What are factors anyway?

Value

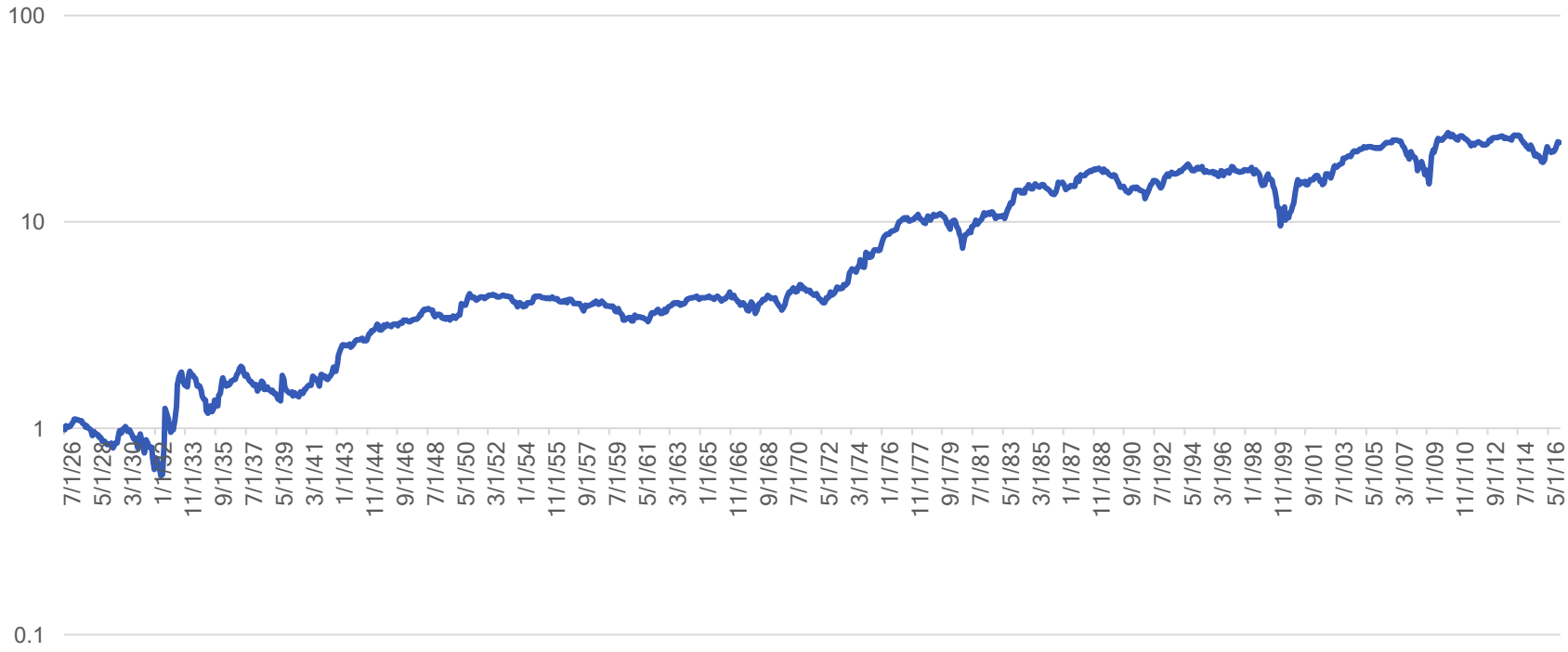
Sort stocks based on price-to-book; buy the “cheapest” stocks and short sell the “expensive” stocks.

Theory as to why it works:

- Higher systematic (business cycle) risk
- Investor loss aversion

What are factors anyway?

Value



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

What are factors anyway?

Size

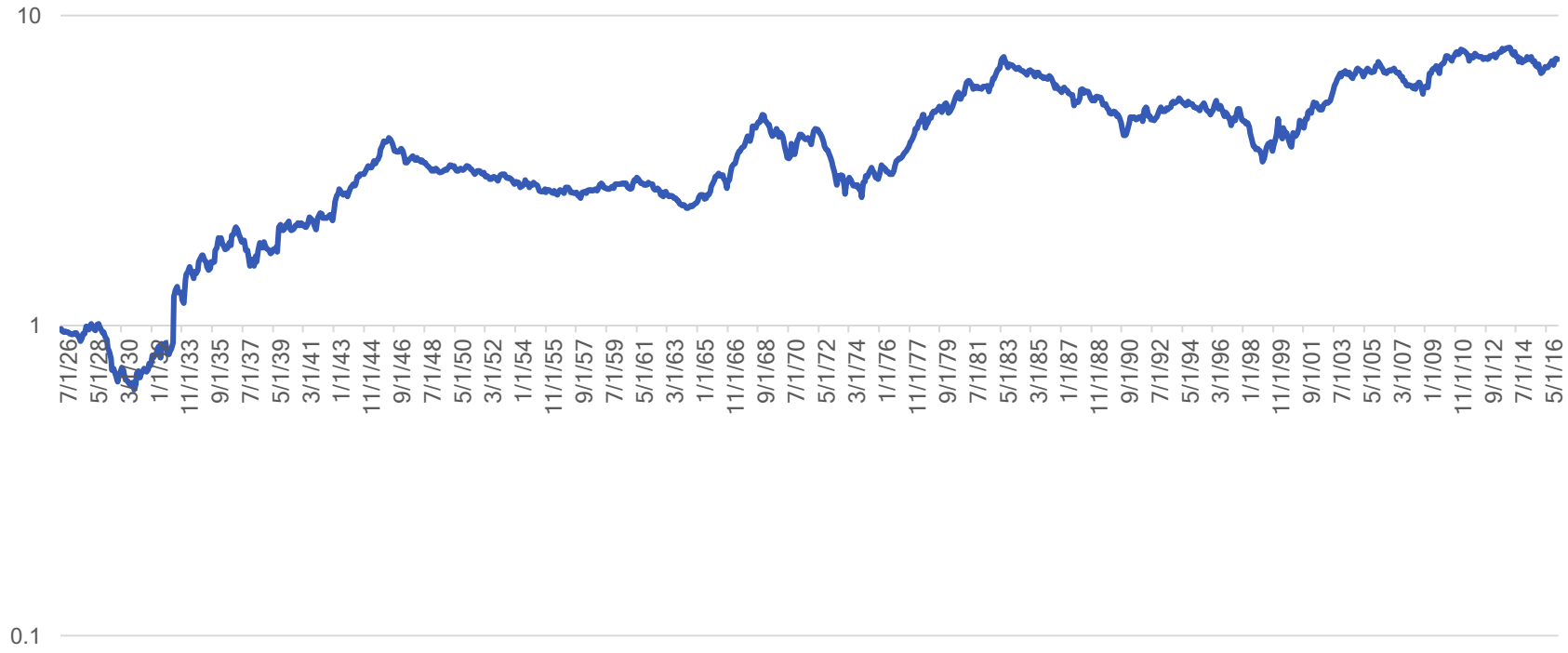
Sort stocks based on market capitalization; buy the “smallest” stocks and short sell the “largest” stocks.

Theory as to why it works:

- Higher systematic (business cycle) risk
- Liquidity risk

What are factors anyway?

Size



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

Momentum

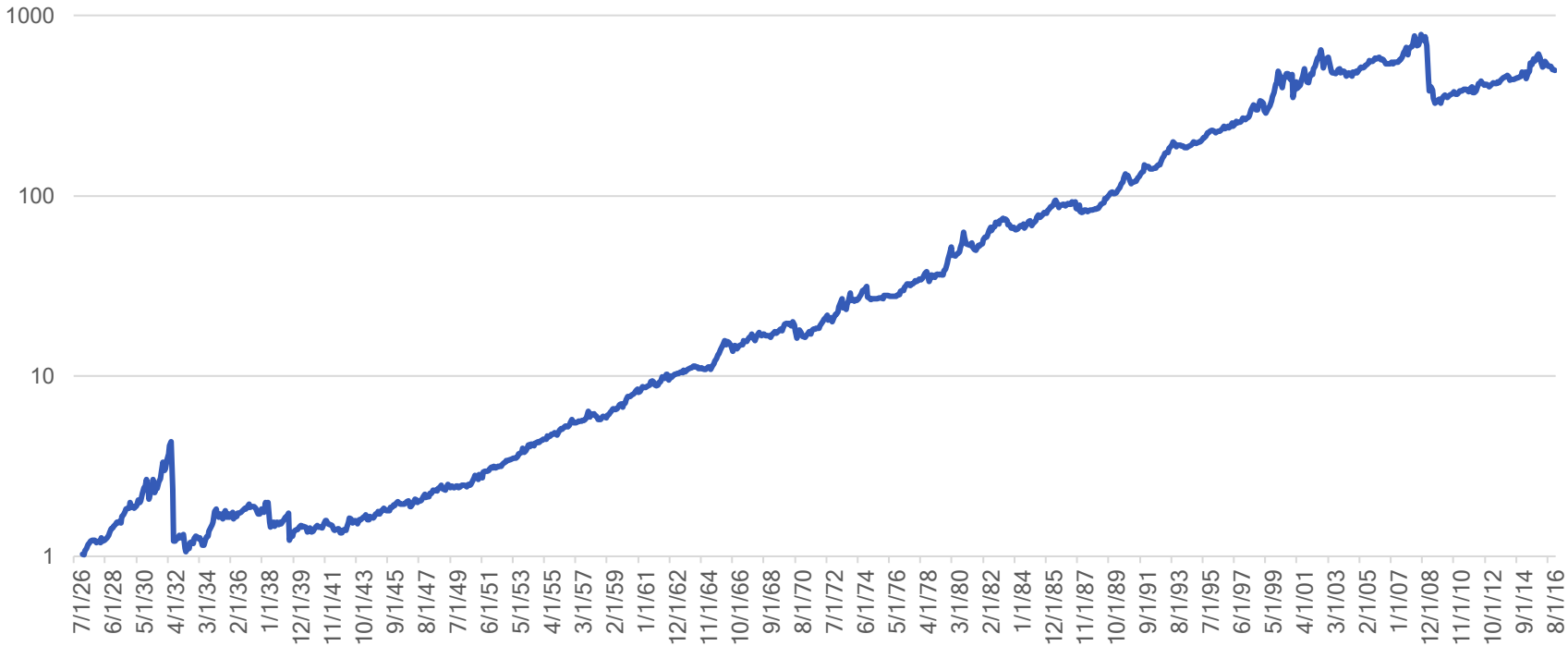
Sort stocks based on prior return; buy the recent “outperforming” stocks and short sell the “underperforming” stocks.

Theory as to why it works:

- Under-reaction and over-reaction to information (caused by disposition effect, information anchoring, and herding)

What are factors anyway?

Momentum



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

Low-Volatility (Anti-Beta)

Sort stocks based on prior realized volatility (beta); buy the “low-volatility” stocks and short sell the “high-volatility” stocks.

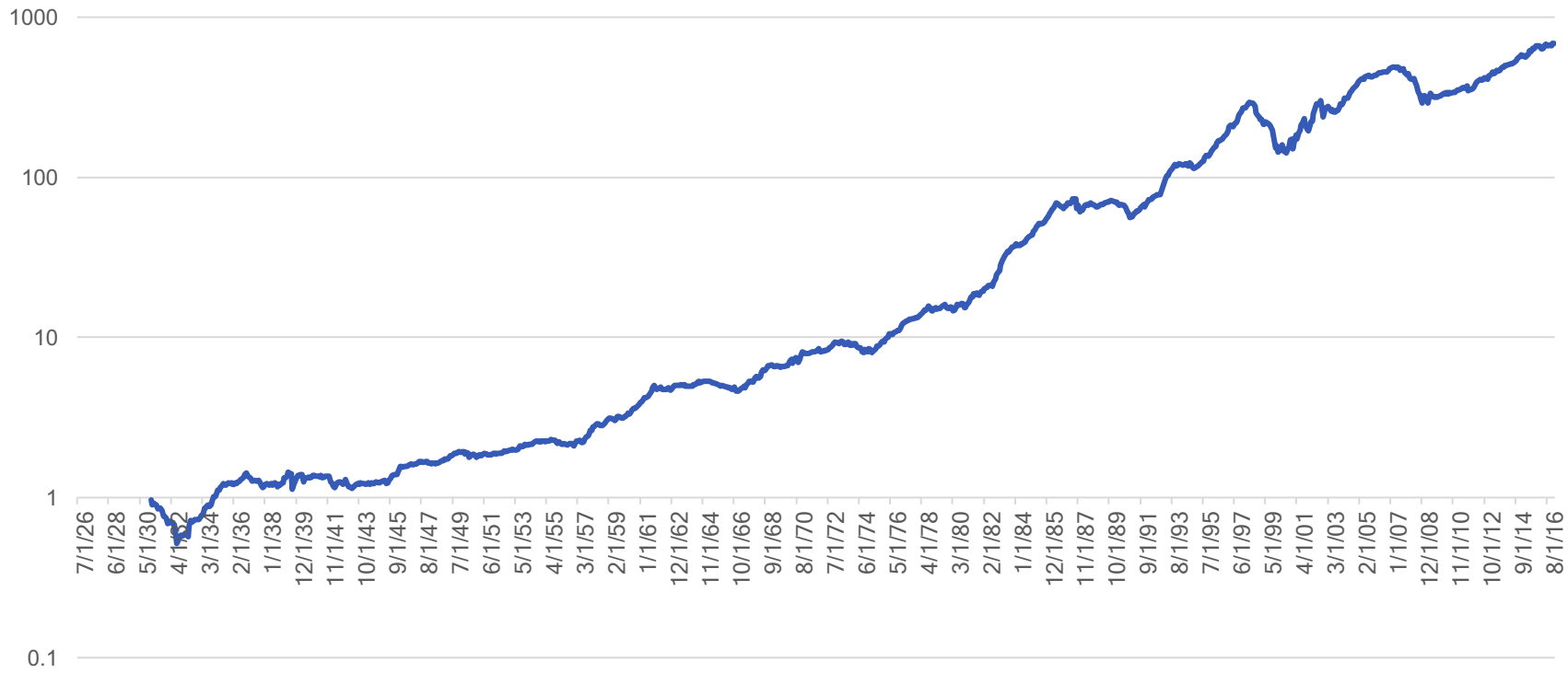
Theory as to why it works:

- Lottery effect
- Leverage aversion

(Note: Some researchers construct this long/short as beta neutral, not dollar neutral)

What are factors anyway?

Low-Volatility (Anti-Beta)



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

Quality (Profitability)

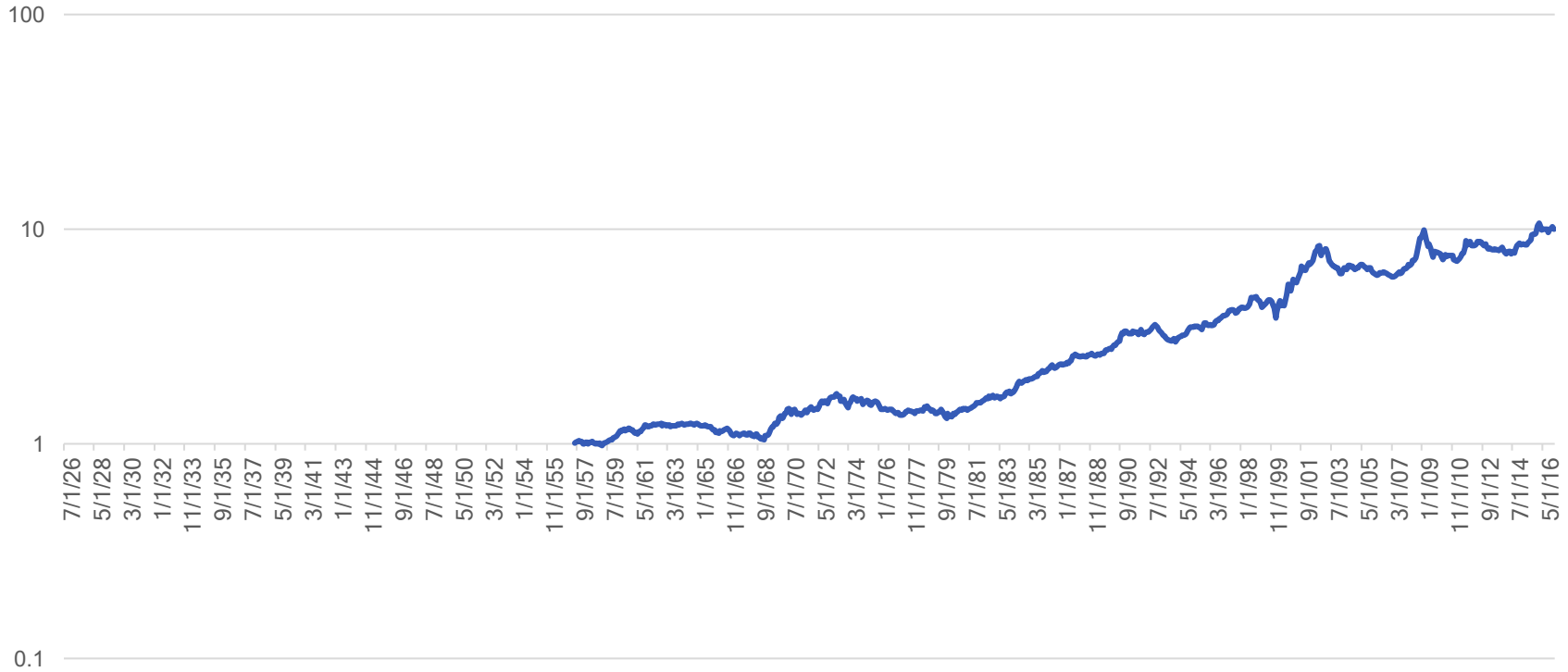
Sort stocks based on balance sheet quality (e.g. profitability); buy the "high quality" stocks and short sell the "low quality" stocks.

Theory as to why it works:

- Errors-in-expectations

What are factors anyway?

Quality (Profitability)



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

That's it?

This sounds really, really easy…

What are factors anyway?

Some things that make factor investing difficult…

1. Is the factor actually data-mined garbage?
2. Can *we* stick with the factor?
3. How do we actually implement it?

Dealing with data-mining

What are factors anyway?

What is “data-mining”?

A million monkeys with a million keyboards and infinite time will eventually produce Shakespeare.

A million analysts with a million Bloombergs…

What are factors anyway?

Levi and Welch (2014) examined *600* published factors.

49% produced zero-to-negative premia out-of-sample.

Whoops.

What are factors anyway?

Swedroe and Berkin's framework for sustainability:

- Persistent over time
- Pervasive across geographies
- Investable
- Intuitive

We'd add:

- Simple

Sticking with factors

What are factors anyway?

"If it was easy, everybody would do it."

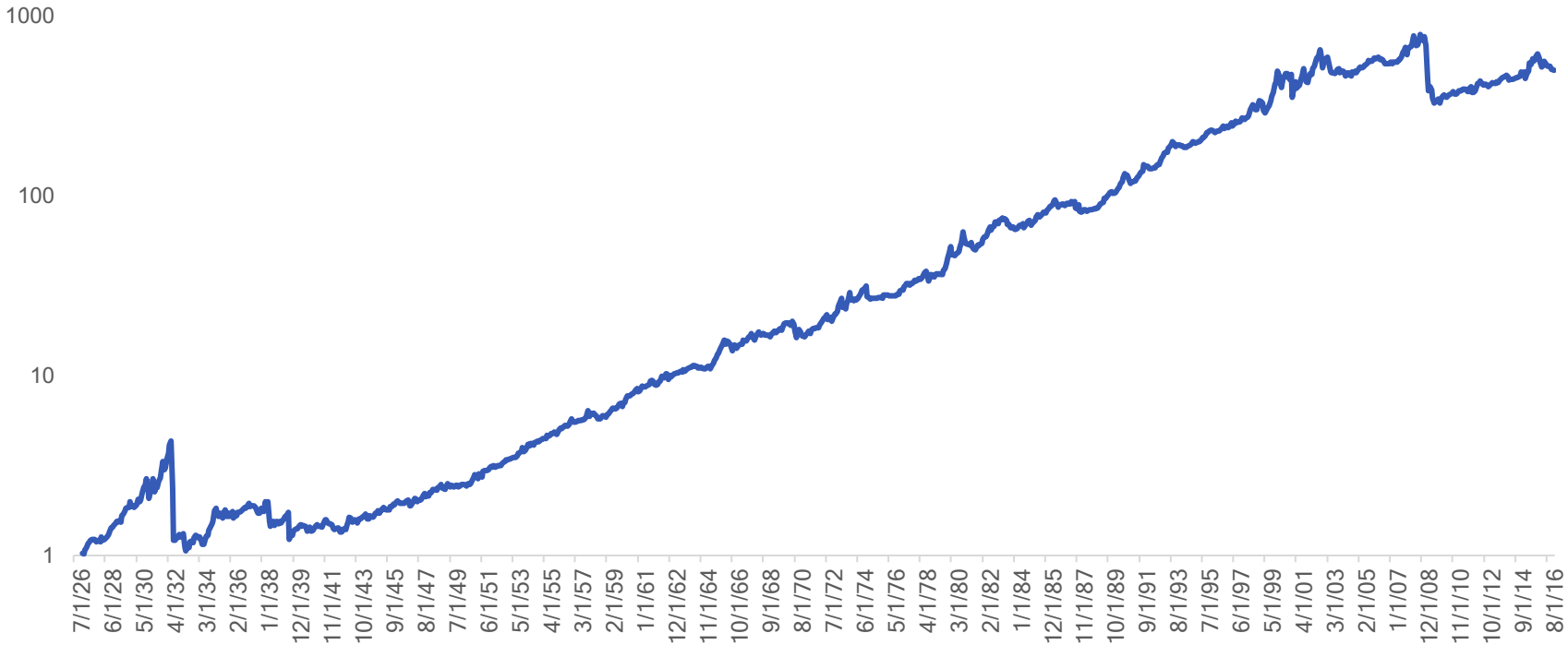
What are factors anyway?

Often the *method* is easy…

Sticking with it is hard.

What are factors anyway?

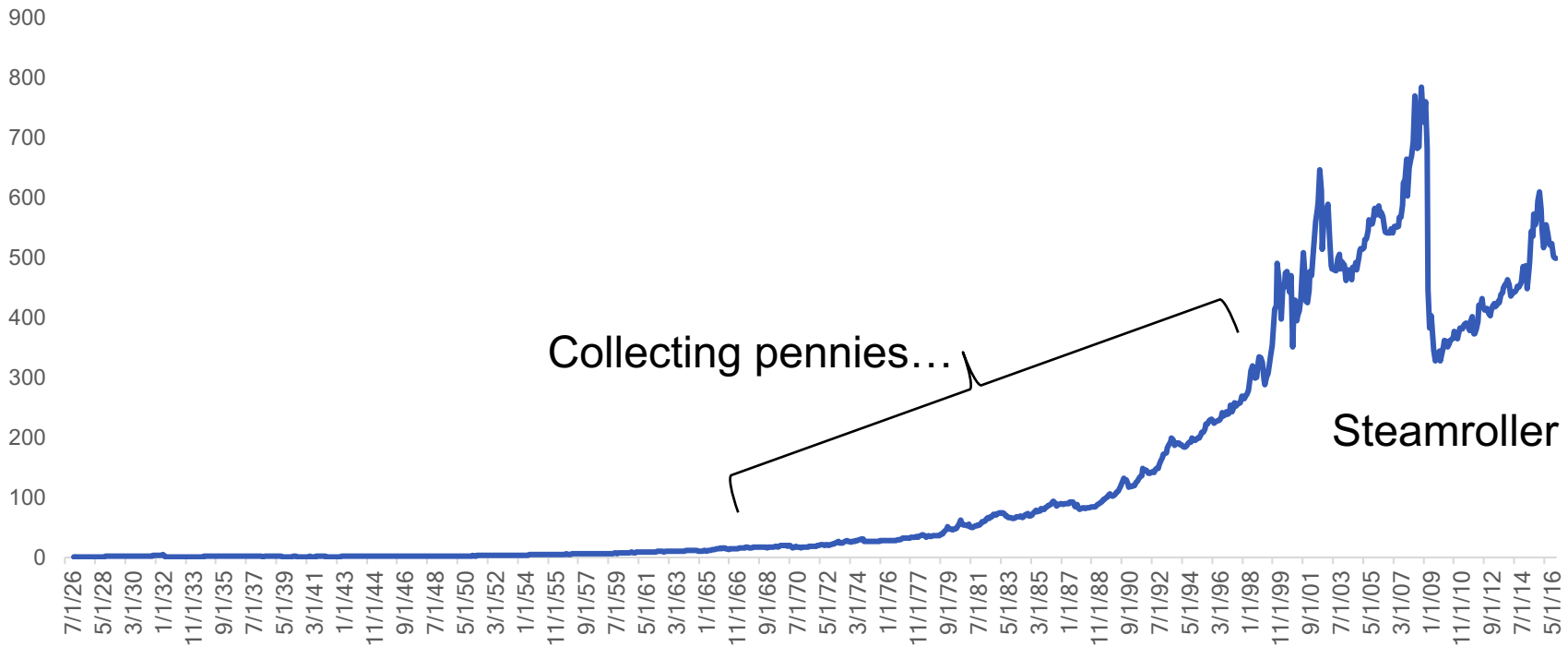
Momentum (Log Scale)



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

What are factors anyway?

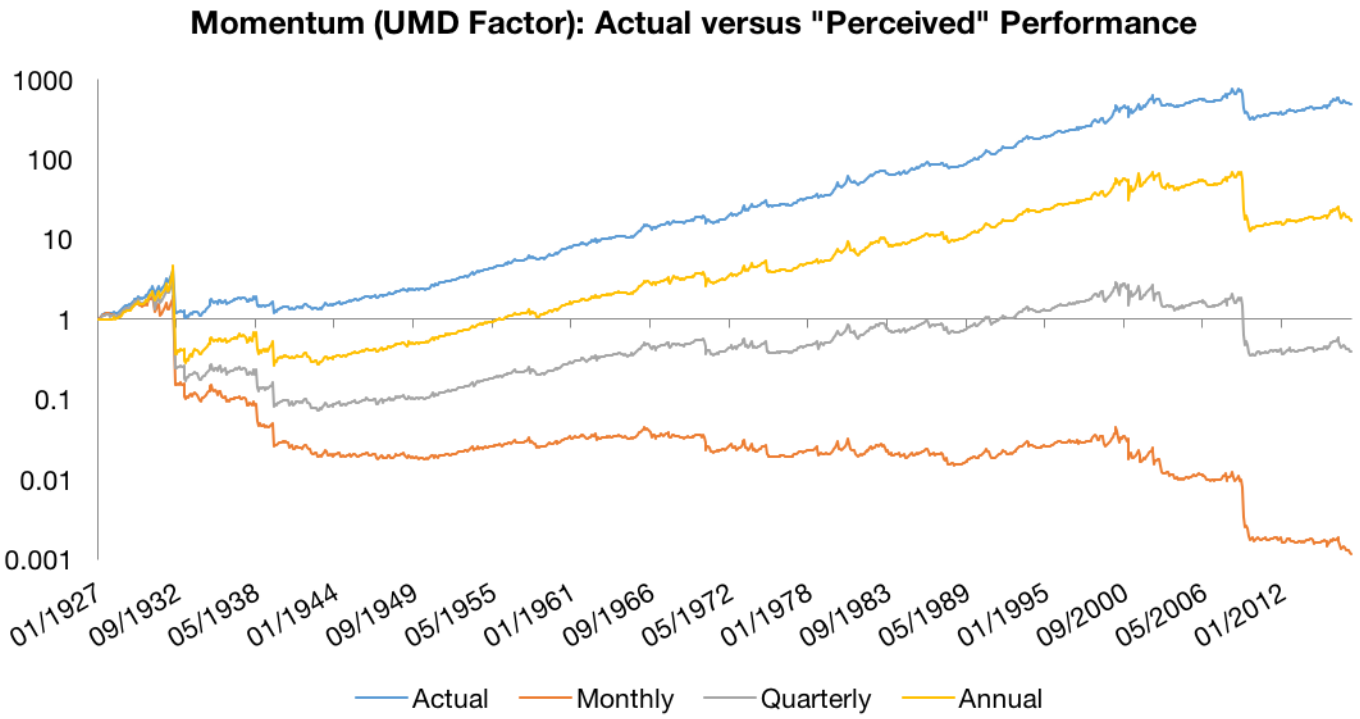
Momentum (Linear Scale)



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

What are factors anyway?

Momentum
("Adjusted" for pain from losses being 2x pleasure from gains)



Source: AQR; Calculations by Newfound Research. Past performance is no guarantee of future results.

What are factors anyway?

In fact, for a factor to work, we'd posit it *has* to be hard to stick with?

Why?

What are factors anyway?

Arithmetic of Active Management

- Weighted average return of market participant performance *is* the market return.

- Therefore, out-performance is a “zero sum” game.

What are factors anyway?

Let's assume the factor returns are easy to harvest…

- The approach is viewed as "free money"
- More people will adopt the approach
- Money inflows will drive up prices and valuations
- Increased valuations will drive down forward expected returns
- Out-performance opportunity converges towards zero

What are factors anyway?

With factors…

Weak hands “fold” and pass the alpha to the strong hands with the fortitude to “hold.”

What are factors anyway?

High returns attract investors	Negative returns lead to out-flows
Short-term self-fulfilling cycle of further out-performance.	Out-flows cause a short-term self-fulfilling cycle of further out-flows
High valuations cause return expectations to turn negative	Excess out-flows cause return premiums to turn positive

What are factors anyway?

Bad News

By this logic, no disciplined investment approach (e.g. factors) can outperform all the time.

To work in the long-run, there has to be pain in the short-run.

What are factors anyway?

Good News

By the same logic, no disciplined investment approach can *under*perform all the time either.

(If an approach always *underperforms,* we can invert to create an *outperforming* strategy, which we just said can't exist.)

Topic #2

Implementation Matters

What are factors anyway?

Implementation details to deal with…

1. How do we actually define the factor?
2. Going from self-financing long/shorts to long-only portfolios

What are factors anyway?

Consider the **value factor.** Some common ways to define "value":

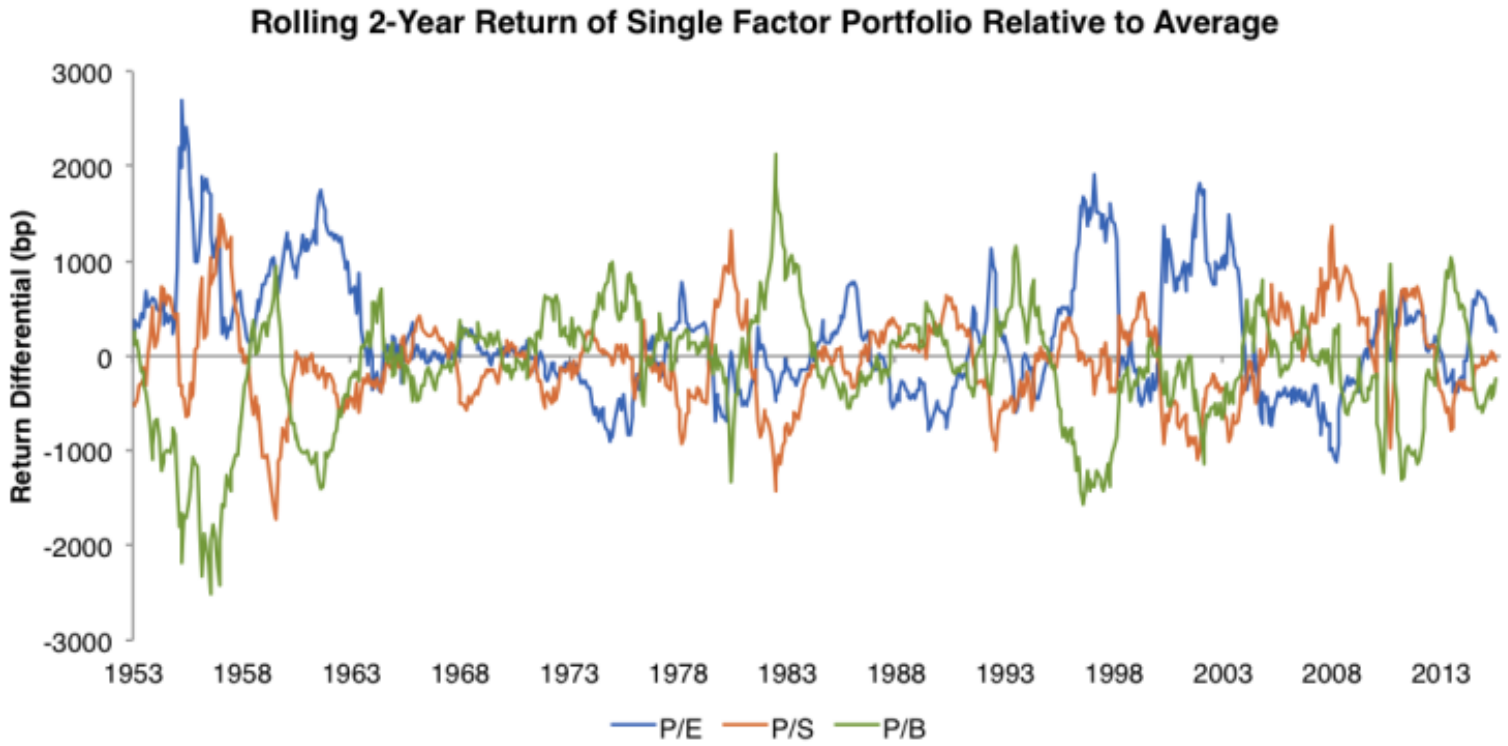
- Price-to-book
- Price-to-earnings
- Price-to-sales

	Price-to-Book	Price-to-Earnings	Price-to-Sales	Market
Ann. Return	13.9%	15.3%	14.4%	10.8%
Ann. Volatility	16.0%	15.6%	14.9%	14.9%
Sharpe Ratio	0.60	0.70	0.67	0.43

Source: Data from Kenneth French Data Library; Calculations by Newfound Research.

What are factors anyway?

In the long run, they have all worked. In the short run, your mileage may vary.



Source: Data from Kenneth French Data Library; Calculations by Newfound Research.

What are factors anyway?

Where are we spending our active risk?
Security level? Sector level?

Some **Low-Volatility** implementations

- The PowerShares S&P 500 Low Volatility ETF (SPLV)
- The SPDR SSGA US Large Cap Low Volatility ETF (LGLV)
- The iShares Edge MSCI Min Vol USA ETF (USMV)

What are factors anyway?

Some **Low-Volatility** Implementations

- **The PowerShares S&P 500 Low Volatility ETF (SPLV)**
- The SPDR SSGA US Large Cap Low Volatility ETF (LGLV)
- The iShares Edge MSCI Min Vol USA ETF (USMV)

Method

- Rank S&P 500 stocks based on trailing 12-month realized volatility
- Pick top 100 with lowest realized volatility
- Weight based on inverse proportion to realized 12-month volatility

What are factors anyway?

Some **Low-Volatility** Implementations

- The PowerShares S&P 500 Low Volatility ETF (SPLV)
- **The SPDR SSGA US Large Cap Low Volatility ETF (LGLV)**
- The iShares Edge MSCI Min Vol USA ETF (USMV)

Method

- Assign stocks from the Russell 1000 to their respective 10 sectors
- Rank stocks within their sector based on trailing 60-month realized volatility
- For each sector, pick the lowest volatility stocks until total free float market cap reaches 30% of the sector total
- Weight each stock in proportion to its inverse realized 60-month variance (i.e., 1 / volatility squared), constrained to the lesser of 5% or 20x the index weight.

What are factors anyway?

Some **Low-Volatility** Implementations

- The PowerShares S&P 500 Low Volatility ETF (SPLV)
- The SPDR SSGA US Large Cap Low Volatility ETF (LGLV)
- **The iShares Edge MSCI Min Vol USA ETF (USMV)**

Method

- Optimization-based
- Re-weight holdings in MSCI USA Index to create minimum-volatility portfolio subject to sector and security-level constraints.

What are factors anyway?

They can't *all* be right, can they?

- **SPLV:** The "vanilla" low-volatility approach.
- **LGLV:** Asness, Frazzini, and Pedersen (2014) find evidence to support the approach while De Carvalho, Zakaria, Lu and Moulin (2014) find that sector-neutral, low-volatility approaches may actually be more efficient at harvesting alpha than non-sector neutral approaches.
- **USMV:** De Carvalho, Lu, and Moulin (2012) find that the key factor exposures in a minimum variance portfolio is low beta and low residual volatility stocks. So despite a more opaque construction methodology, USMV should tap into the same low volatility factor as SPLV and LGLV.

What are factors anyway?

Finally, let's talk about these long/short portfolios again…

Academically they are nice to work with. Practically, they can cause problems in creating "long-only" factor-tilted portfolios.

What are factors anyway?

Simple Example

	Weight			Weight			Weight
A	30%	+	*A*	-100%	=	*A*	-70%
B	70%		*B*	100%		*B*	170%
Market Portfolio			*"Dollar-Neutral" Long/Short*			*Portfolio with shorting and leverage*	

What are factors anyway?

The problem with going long-only: the short side can be constrained by how much you can reduce a position to zero.

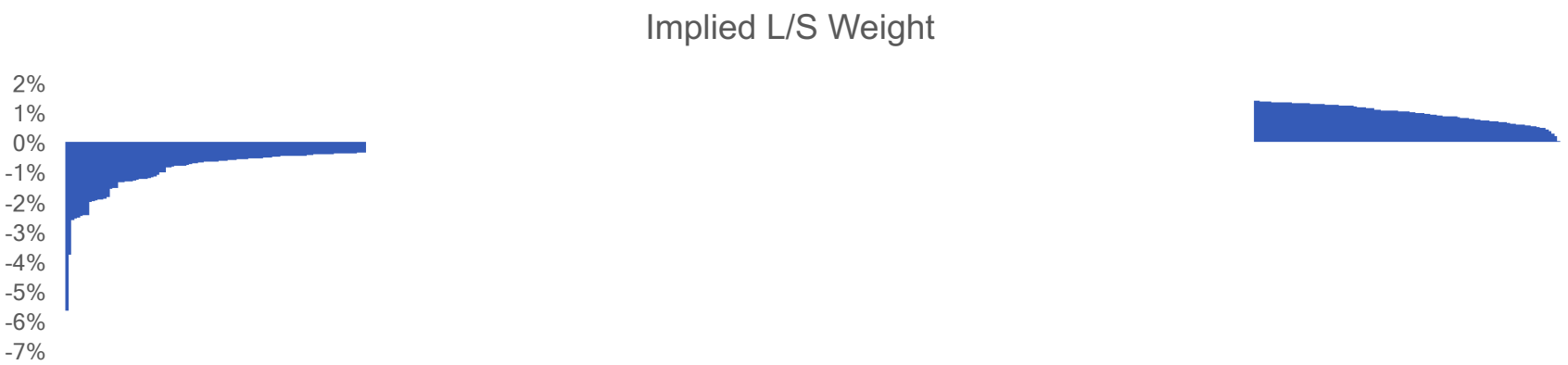
Why does it matter?

- Which side of the factor creates the most value: the long or short side?
- Are there important interaction effects between the long and short sides?

What are factors anyway?

Example: Hypothetical "size" factor example:

- Short the top 20% of S&P 500
- Long the bottom 20% of S&P 500
- Positions are market-cap weighted
- Sides are held dollar-neutral



Source: State Street; Invesco; Calculations by Newfound Research; Implied long/short portfolio calculated on 3/17/2017.

What are factors anyway?

But when we try to "overlay" this long/short on the S&P 500, we hit a problem:

- AAPL *wants* to be -5.66% of short leg
- AAPL is only 3.66% of the S&P 500.

In long-only implementation, we can only get *64%* of the long/short factor applied.

What are factors anyway?

What if instead of doing an overlay, we buy *just* the long leg?

Creates leg sizing mismatch:

- 100% exposure to the long leg
- Still only 64% of the short leg

What are factors anyway?

Worse, a “buy the long leg” implementation for more dynamic factors can create unintentional timing of short-leg exposure.

What are factors anyway?

Extreme example:

	Desired Long/Short Exposure	Implemented Long-Only Exposure	Implied Exposure	
			Long-Leg	Short-Leg
T=0	Long Small-Cap / Short Large-Cap	Bottom 20%	100%	64%
T=1	Long Large-Cap / Short Small-Cap	Top 20%	100%	3.5%

The devil is in the implementation details…

Topic #3

Can we “time” factor exposure?

Can we time factors?

First, what do we mean by “timing”?

There are two types:

- Relative: “There are better things to be in.”
- Absolute: “I just shouldn’t be in this thing.”

Relative Timing

Can we time factors?

Abstract for a paper I co-authored in early 2016 and submitted to the NAAIM Wagner Award competition.

When outperformance fixation
leads to large inflow temptation:
premiums erode,
investors unload,
enabling factor rotation!

(We didn't win.)

Can we time factors?

Rotation Type #1: “Switching”

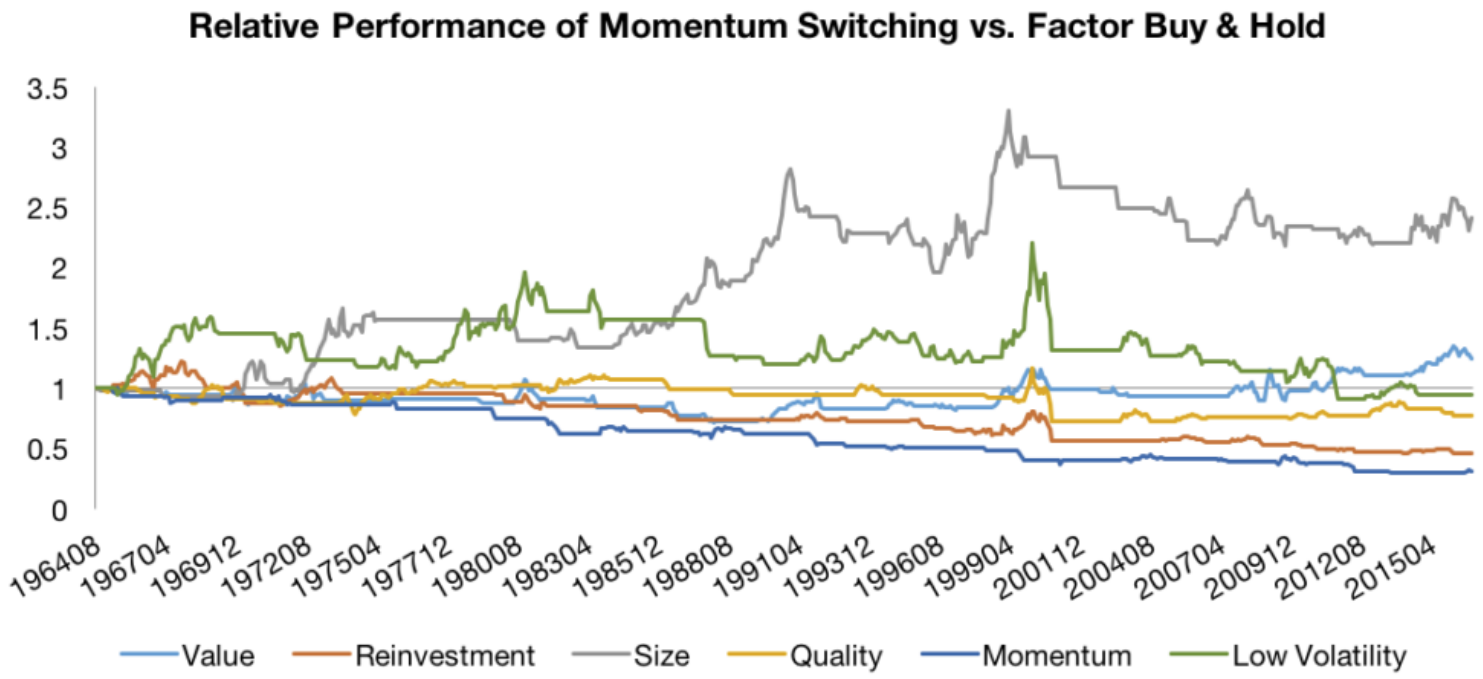
Idea: Factors go through cycles; can we switch between the “good” and “bad” side of factors to time them?

	Positive Side	Negative Side
Value	Cheap	Expensive
Size	Small	Large
Quality	High	Low
Momentum	Winners	Losers
Beta	Low Volatility	High Beta

Can we time factors?

Rotation Type #1: "Switching"

Results using a momentum-based approach? Generally poor.



Source: Data from Kenneth French Data Library; Calculations by Newfound Research.

Can we time factors?

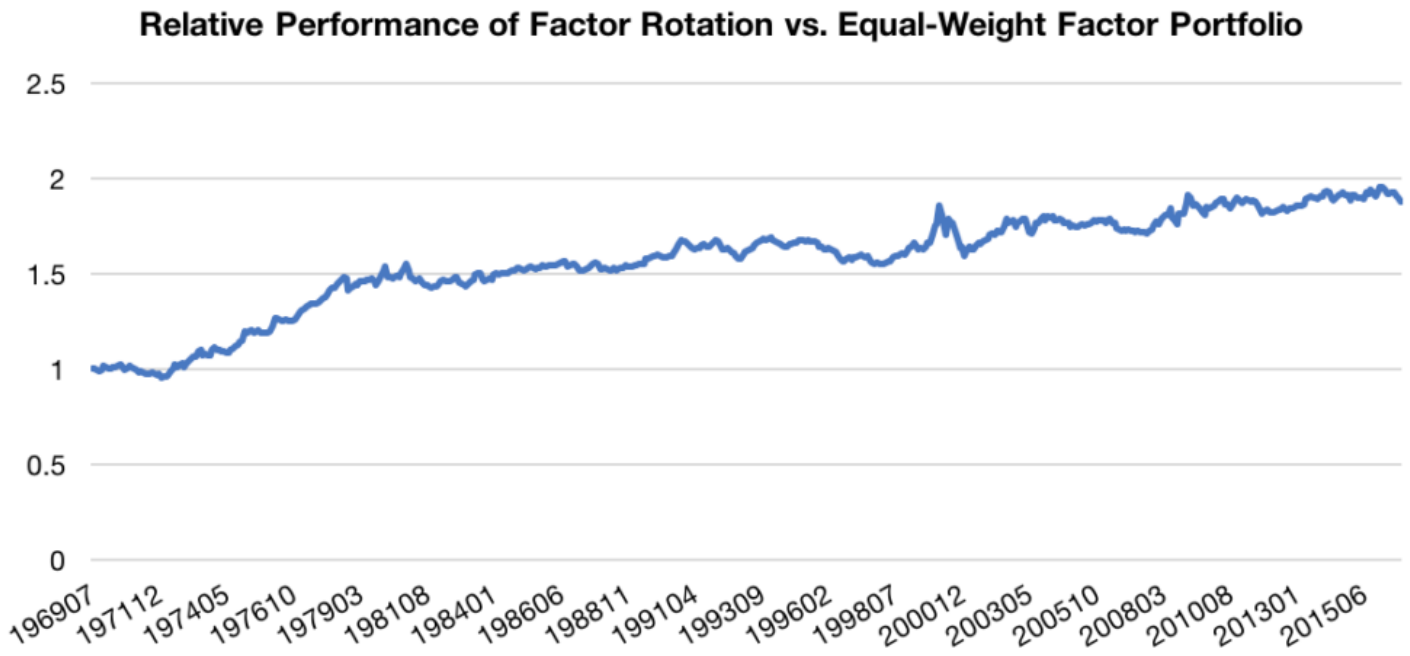
Rotation Type #2: “Relative”

Idea: The positive sides go through outperformance at different periods.
Can we tilt towards those showing recent outperformance and away from those showing underperformance?

Can we time factors?

Rotation Type #2: “Relative”

Results using a momentum-based rotation approach? It works. *(But is it worth the headache?)*



Source: Data from Kenneth French Data Library; Calculations by Newfound Research.

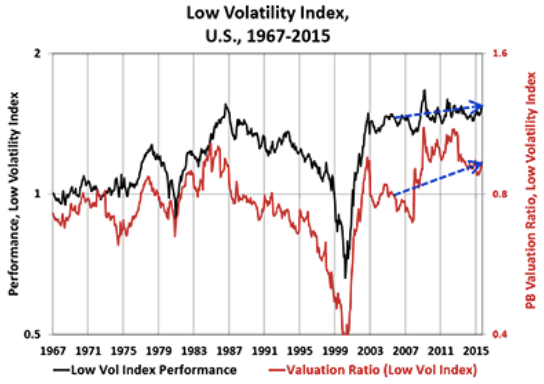
Absolute Timing

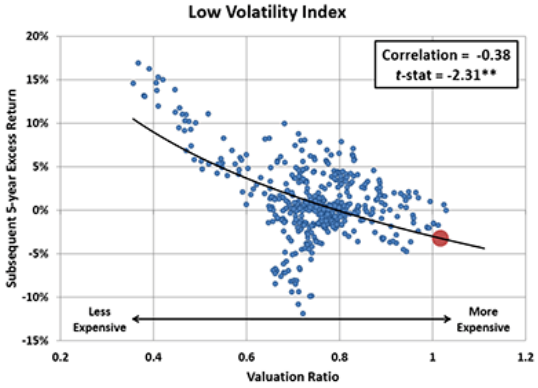
Can we time factors?

Rob Arnott
Research Affiliates

February 2016 – *How Can "Smart Beta" Go Horribly Wrong?*

- Some factor returns (e.g. low volatility) are overstated due to long-term, un-repeatable valuation multiple expansion.
- Current valuations vs. historic levels for some factors are over-extended, portending lower future returns if not an outright "factor crash." *Caveat emptor!*





Can we time factors?

Cliff Asness
AQR

April 2016 – *The Siren Song of Factor Timing*

- Using value-spreads to time factors is not particularly useful.
- Which value measure you use completely changes your answer.
- No matter the measure, value spreads are within "normal" levels – not like we saw in the dot-com bubble for the value factor.
- *Resist the urge to time factors!*

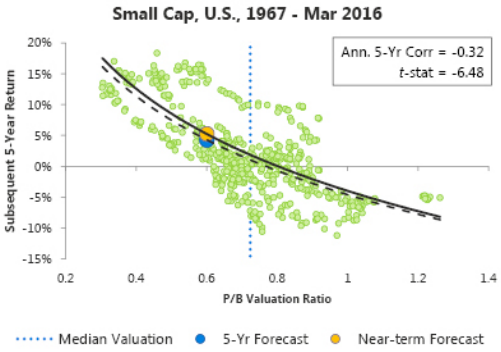
Note: This is all very ironic because it was Asness who in 2000 introduced the very idea of using value spreads to time the value factor.

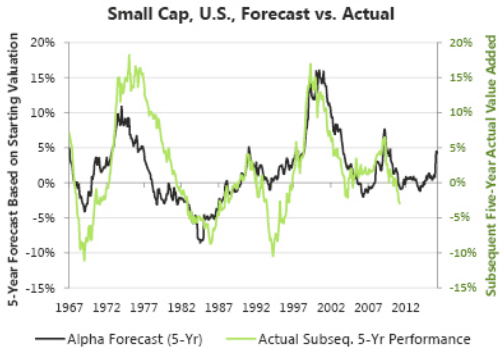
Can we time factors?

Rob Arnott
Research Affiliates

June 2016 – *To Win with "Smart Beta" Ask If the Price Is Right*

- Relative valuation does a good job of predicting subsequent 5-year performance for U.S. equity factors.





- Tested "out-of-sample" against international factors. *"In Developed ex US and emerging markets, across most horizons, relative valuations and future returns have overwhelmingly negative relationships."*

Can we time factors?

Cliff Asness
AQR

June 2016 – *My Factor Philippic*

- Directionally agrees on which factors are expensive and which are cheap, but nowhere near as extreme as Arnott.
- Arnott's method of regression overstates the use of value-spread timing, particularly for high-turnover factors.
    - Having a crystal ball and knowing that valuations contract for small-cap stocks over the next five years is meaningful because the small-cap universe remains fairly static.
    - Using that same crystal ball to see that valuations will contract for a momentum strategy over the next five years is less meaningful because the securities held could be 100% different. Is the contraction due to value changes or just different holdings?

Can we time factors?

Cliff Asness
AQR

June 2016 – *My Factor Philippic (Cont.)*

- Significant disagreement as to whether long-term factor returns are *real* or based on valuation-spread changes.

  Arnott forgets to account for “frictions” in his analysis!

  - Portfolio turnover
  - Changes in fundamentals (but not price)

Can we time factors?

Rob Arnott
Research Affiliates

September 2016 – *Timing "Smart Beta" Strategies? Of Course! Buy Low, Sell High!*

- Factor timing based on value works! (But should be done sparingly, as it might increase concentration risk.)
- Anecdotal evidence of "performance chasing" seen in asset owners is a form of market timing.
- Based on returns alone, performance chasing smart beta is a drag; contrarian timing a boon.
- Buying the cheapest factors outperforms a diversified, equal-weight factor portfolio.
- Using a valuation-based approach to timing *does not* double down on the value factor, since valuations are measured for each factor relative to past valuations.

Can we time factors?

Cliff Asness
AQR

March 2017 – *Contrarian Factor Timing is Deceptively Difficult*

- *"In multiple online white papers, Arnott and co-authors present evidence in support of contrarian factor timing based on a plethora of mostly inapplicable, exaggerated, and poorly designed tests that also flout research norms."*
- That said, value-spreads at *extreme* levels (think value 1999-2000) should be an eyebrow raiser.
- But we *agree* on performance chasing problems with factors. Chasing strong results is a recipe for disaster.
- That said, "mild positive power" does not make a good timing strategy.
- You're still better off just diversifying.

Topic #4

Diversifying Factors

Diversifying factors

Turns out, we can’t even agree on how to diversify factors.

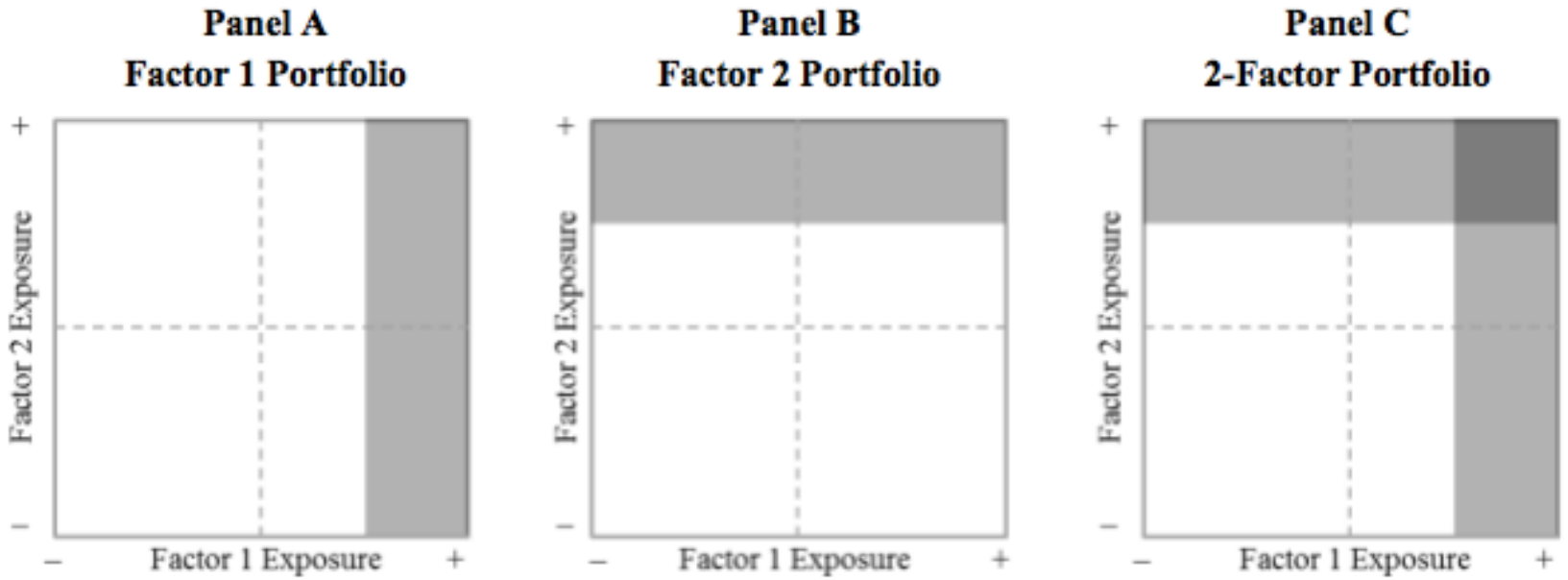
The Composite Approach

Diversifying factors

Approach #1: Composite

- Also known as “portfolio blend.”
- Give factor scores to each security.
- Build individual portfolios for each factor (e.g. choose securities with top scores for that factor).
- Blend portfolios together as sleeves.

Diversifying factors



Source: Ghayur, Heaney, and Platt (2016)

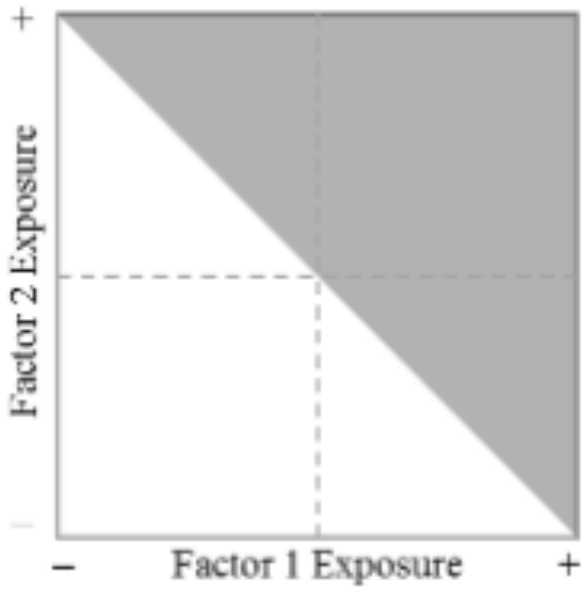
The Integrated Approach

Diversifying factors

Approach #2: Integrated

- Also known as “signal blend.”
- Give factor scores to each security.
- Blend factor scores together to create a single composite score.
- Create factor portfolio using composite score (e.g. choose securities with top composite score).

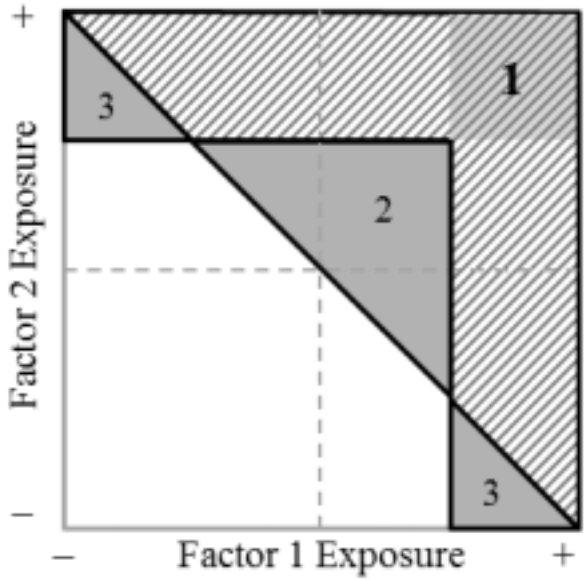
Diversifying factors



Source: Ghayur, Heaney, and Platt (2016)

Comparing Approaches

Diversifying factors



Area 1: In both

Area 2: In integrated
but *not* in composite

Area 3: In composite
but *not* in integrated

Source: Ghayur, Heaney, and Platt (2016)

Diversifying factors

General Arguments for *Composite*

- Composite approach is more transparent.
- Factor research has been on single factors without enough evidence about potential *interaction* effects.
- Factor alphas decay at different horizons so composite signal will be driven by highest turnover factor.

Diversifying factors

General Arguments for *Integrated*

- Composite portfolios can create inefficient *canceling out* effects in Area 3.
- Integrated approaches can introduce implicit leverage, allowing you to use the same dollar to invest in multiple factors simultaneously.

Capital Efficiency

Diversifying factors

Are integrated portfolios *actually* more capital efficient?

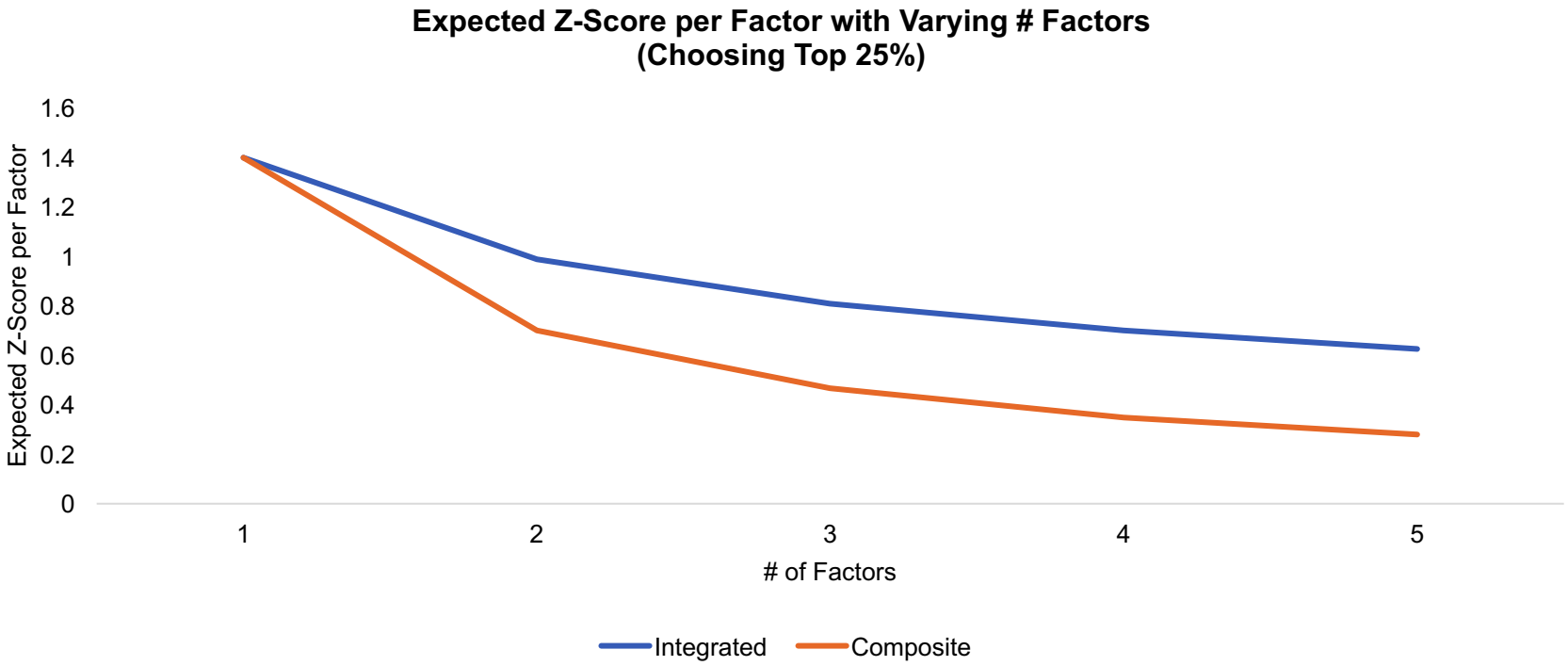
Analytical research performed by Newfound[1]:

- Assume securities have assigned z-scores for each factor.
- Build composite portfolio by equal-weighting top X% of securities for each factor based on z-score.
- Build integrated portfolio by summing z-scores and equal-weighting the top X% of securities based on composite z-score.
- "Capital efficiency" is measured as expected aggregate portfolio z-score per factor.

1. See https://blog.thinknewfound.com/2016/10/capital-efficiency-multi-factor-portfolios/

Diversifying factors

Result? Under this setup, integrated portfolios are always just as – if not significantly more – capital efficient than composite portfolios.



Source: Newfound Research

Diversifying factors

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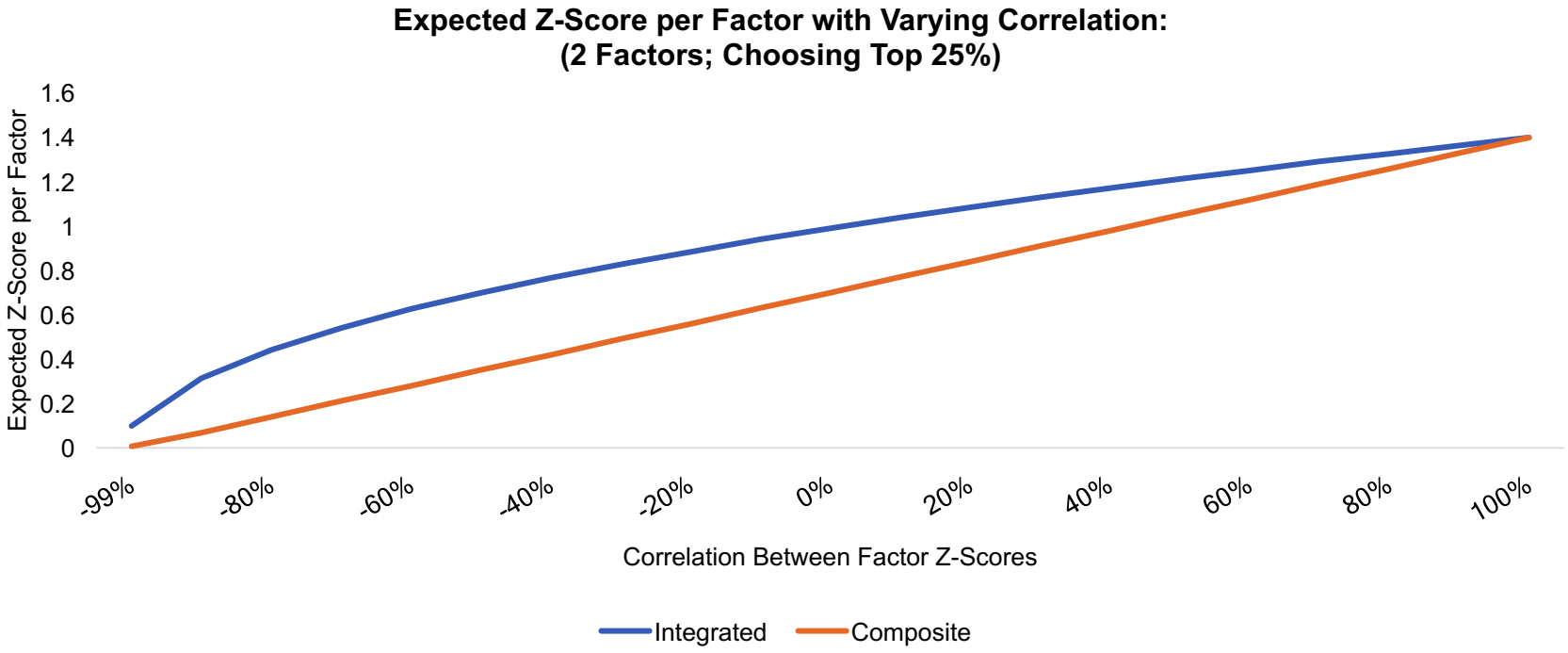


Source: Newfound Research

Interaction Effects

Diversifying factors

Research from AQR (Fitzgibbons, Friedman, Pomorski, and Serban (2016))

- Theoretical: Simulation-based; momentum and value; assume equal style efficacy ; equal-weight holdings; match # of stocks held by each approach

- Empirical: MSCI World; 1993-2015; value and momentum; constraints: 80% of active risk budget spent *in* industry and 20% *across* industries.

Diversifying factors

Theoretical Results (Assuming Tracking Error of 2.5%)

Figure 2a: Impact of Correlation Types

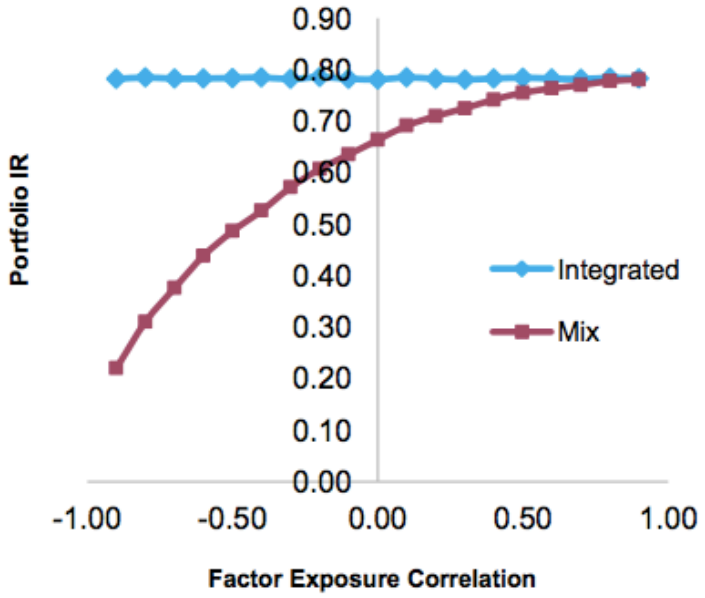
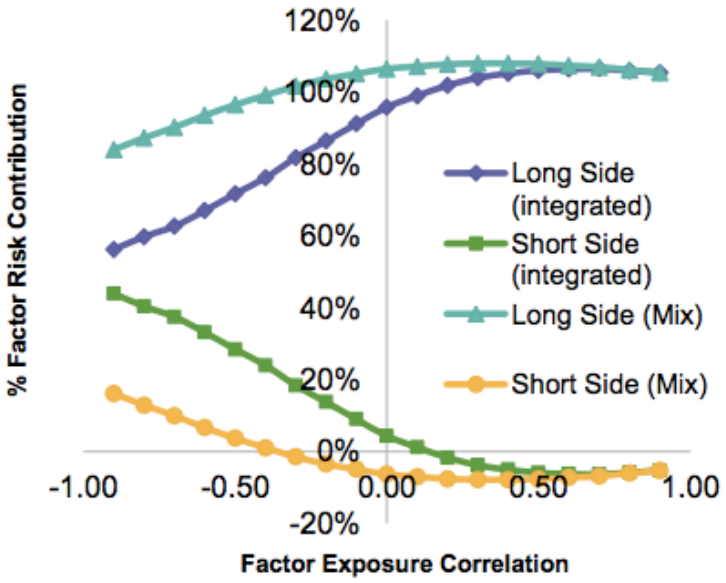


Figure 2b: Correlation and % of Factor Risk Coming From Long and from Short



Source: Fitzgibbons, Friedman, Pomorski, and Serban (2016)

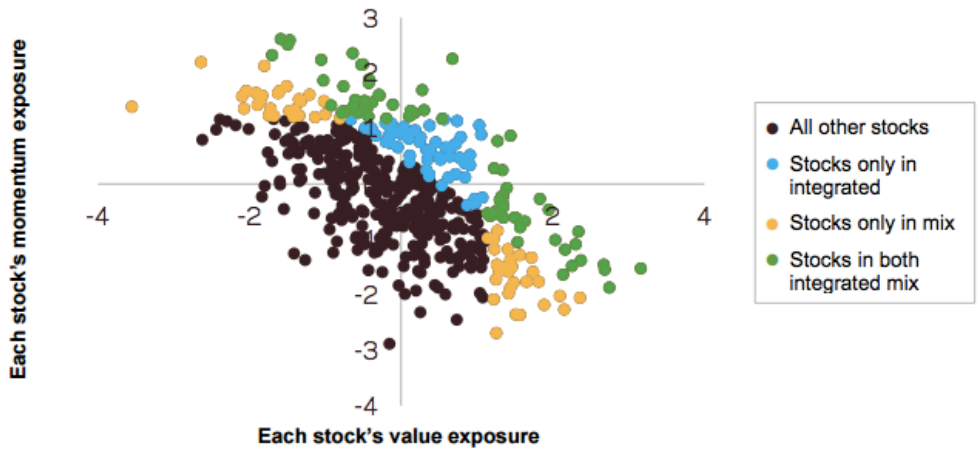
Diversifying factors

Empirical Results (Assuming Tracking Error of 4%)

Panel B: Various groupings of stocks: Alphas versus the cap-weighted market

	Yellow stocks (mix only)	Blue stocks (integrated only)	Green stocks (in both portfolios)
Average number of stocks	253.6	178.3	164.1
Alpha to MSCI World	1.4%	3.2%	4.2%
t-statistic	(0.96)	(3.09)	(3.67)
Average Weight in the respective portfolio	52%	45%	

Figure 1d: Comparing mix, integrated portfolio



As predicted, Area 3 stocks Exhibit less alpha than Areas 1 & 2

Source: Fitzgibbons, Friedman, Pomorski, and Serban (2016)

Case closed?

Diversifying factors

Empirical research from the ActiveBeta team at Goldman Sachs Asset Management:

- Test U.S. equity portfolios built from momentum and value factors from 1979-2016.
- Focus on *factor-equivalent* portfolios (i.e. composite and integrated portfolios with the same overall factor exposure).
- Two tests: “low concentration” and “high concentration” exposure.

Diversifying factors

Low Concentration Test Results

Annualized Active Returns for Value/Momentum Quadrants

Value \ Momentum	Low Q1	Q2	Q3	High Q4	*Q4-Q1*
High Q4	1.8	2.3	1.8	6.2	*4.3*
Q3	-2.4	-2.5	-0.4	1.7	*4.1*
Q2	-2.4	-2.5	0.9	1.9	*4.3*
Low Q1	-11.6	-6.2	-2.2	3.8	*15.4*
Q4-Q1	*13.4*	*8.5*	*4.0*	*2.3*	

Source: Ghayur, Heaney, and Platt (2016)

This is almost the *exact opposite* result that integrated proponents claim should happen.

Interaction effects in areas of offsetting exposures may actually be beneficial…

Diversifying factors

High Concentration Test Results

Still **positive interactive effects in Area 3** … but too much **idiosyncratic risk taken on in Area 1** for the composite approach.

	Value Exposure Contribution	Momentum Exposure Contribution	Average Active Return	Active Return Contribution	Active Risk Contribution
Signal Blend					
Shared Securities	0.43	0.52	4.62%	2.13%	3.48%
Securities Held Only in Signal Blend	0.31	0.29	3.76%	1.42%	2.35%
Securities Not Held	0.13	0.14	-0.74%	0.63%	1.03%
Portfolio Blend					
Shared Securities	0.70	0.84	4.62%	3.42%	6.19%
Securities Held Only in Portfolio Blend	0.08	0.04	4.38%	0.61%	1.34%
Securities Not Held	0.09	0.10	-0.49%	0.43%	0.82%

Source: Ghayur, Heaney, and Platt (2016)

Sweeping Generalizations

Diversifying factors

Integrated portfolios should be more “capital efficient” than composite approaches.

Diversifying factors

Empirical evidence supporting the theoretical arguments about “canceling out” effects are mixed.

Diversifying factors

At low-to-moderate target factor exposures, a composite approach can offer a higher information ratio due to beneficial interaction effects.

Diversifying factors

At higher target factor exposures, composite approaches require too much idiosyncratic risk.

This is all to say nothing of the many other impactful portfolio construction decisions…

In conclusion…

Conclusion

Factors are systematic approaches to investing that seek to harvest excess return arising either from (1) risk, (2) behavioral biases, or (3) market structure inefficiencies.

Conclusion

We want to look for simple, robust, and pervasive factors approaches.

Conclusion

Even if they work, they are going to be tough to stick with.

(That's what makes them work!)

Conclusion

Academic research does not necessarily transfer to practice: implementation details matter.

Conclusion

The jury is still out on factor timing.

Conclusion

You’re probably better off just diversifying your factor exposure.

Conclusion

The jury is still out on how to diversify.

(You should probably do it anyway.)

Thank you.

Q&A?

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