Factor-based investing: the long term evidence

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Explore Factor Investing Forum

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The Equity Market Risk Premium

- For many years here was a belief that:
  - the equity market risk premium was large (6-7%);

    and
  - exposure to the market (beta) was **the** major source of risk premia (returns in excess of government bonds)
- This idea was central to:
  - portfolio investment decisions
  - portfolio performance measurement
  - corporate (real) investment decisions

Alternative Sources of Risk Premia

- Recently – and not-so-recently (!) – evidence has emerged that there may be significant sources of risk premia ("factors") that are quite different from exposure to the market portfolio
- The factor approach – also called "smart beta" – advocates taking on exposure to these factors and "harvesting" the risk premia.

Investment Management Industry Response to Factor Investing

Industry take-up of Factor Approach is Increasing Strongly (Quotes from a recent Survey)

- "In the 2017 survey, nearly three-quarters of survey respondents have either implemented, are currently evaluating, or planning to evaluate smart beta index products".
- "Just 9% of survey respondents have evaluated smart beta indexes and chosen not to implement any. Clearly, smart beta indexing has become an important part of the industry conversation"

Source: Smart Beta: 2017 global survey findings from asset owners. ftrussell.com

What are “factors”?

A look at the data

The Factor Menu

- Some commonly discussed factors
  - value
  - low risk
  - momentum
  - quality
  - size
  - carry
- But .. many others ..
  - recent article by Lewellen (2015) uses 15
  - Harvey et. al. (2014) document over 200

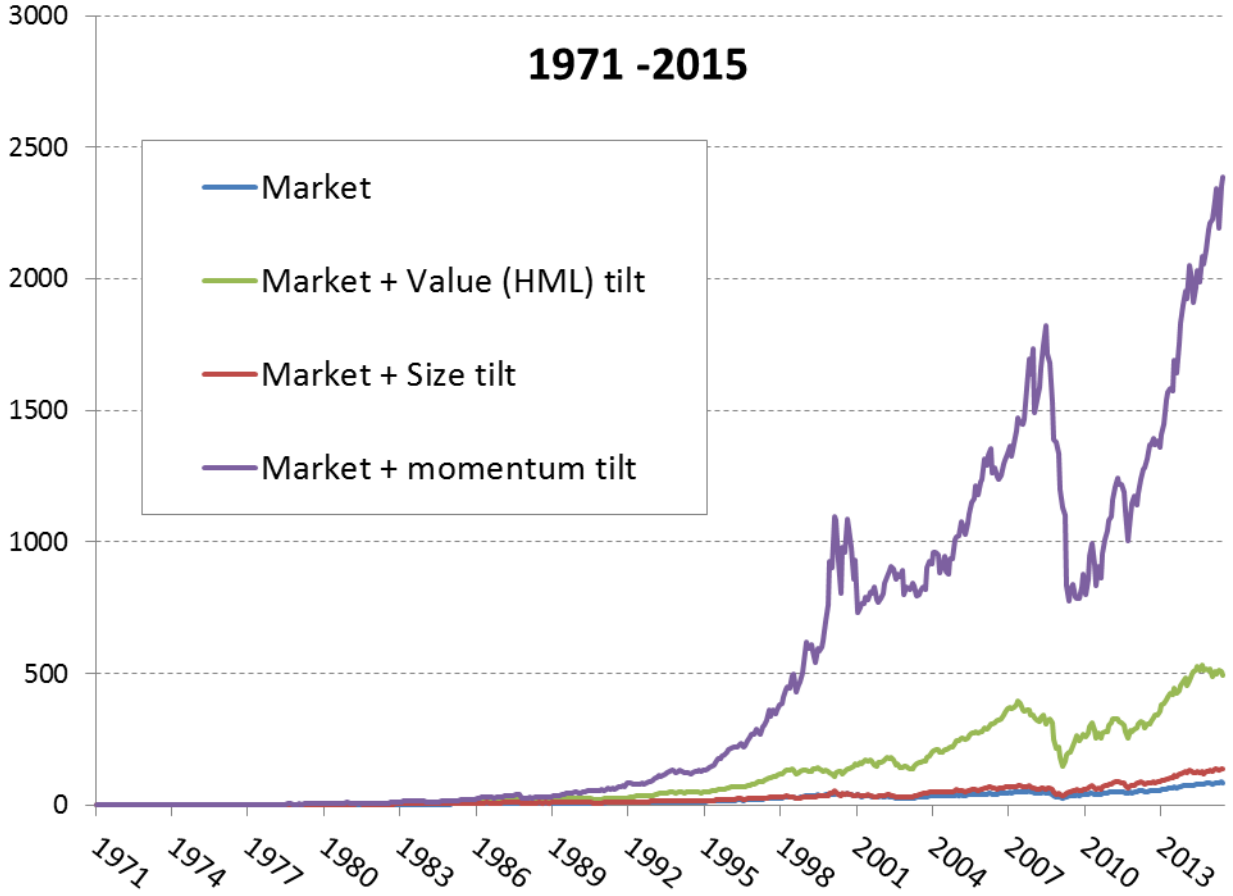
What are (most) factors?

- Most factors are constructed as the difference between the rates of return on two portfolios
  - one held long; and
  - the other held short
- A factor therefore typically represents a **zero net investment** positon
- Any zero net investment position can simply be added to an existing portfolio as a value/size/etc. ... "**tilt**"

Value, Size and Momentum Factors

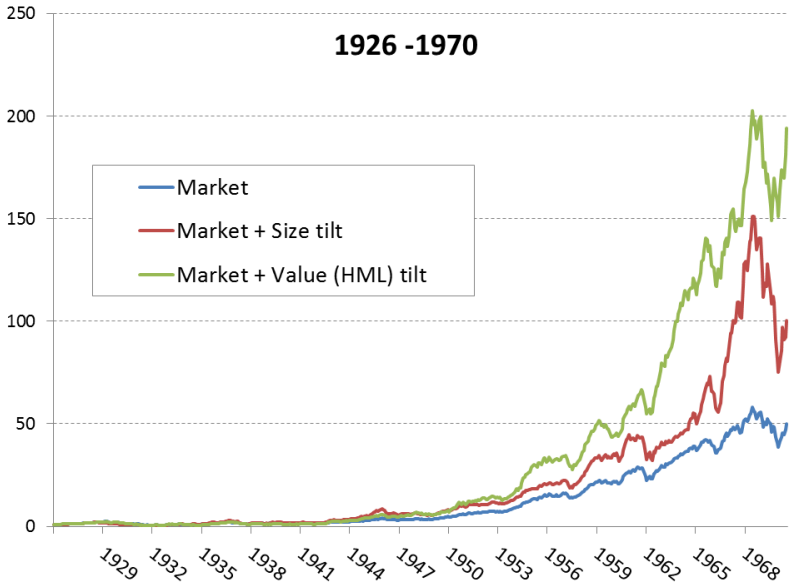
- Value: long value stocks and short growth stock
  - typical measure is book-to-market, but earnings, cash flows, sales also used as measures of fundamental value
- Size: long small stocks and short large stocks
  - typical measure of size: market value of equity
  - small stocks have higher expected returns
- Momentum: long “winners” and short “losers”
  - typical measure: winners (losers) stocks with high (low) returns over past 12-months

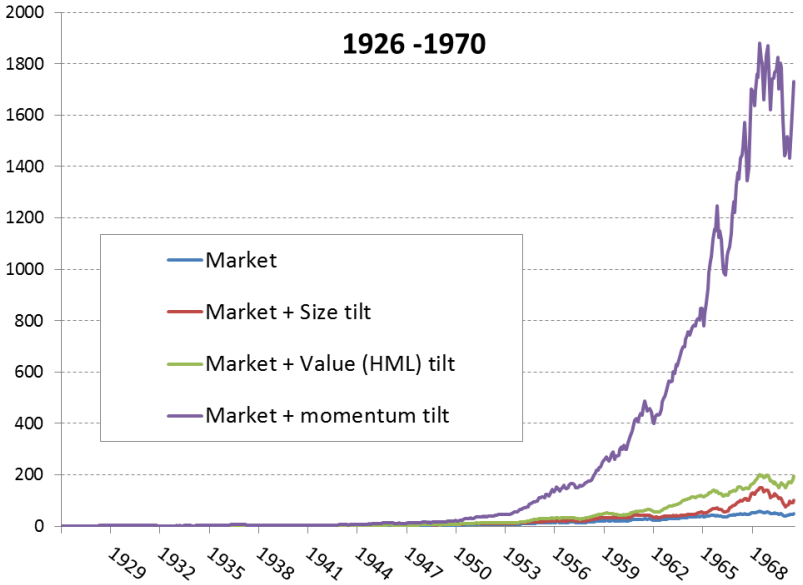
Value, Size and Momentum since 1971 (US)



Data: Ken French's website

And in the early part of the 20th C (US)



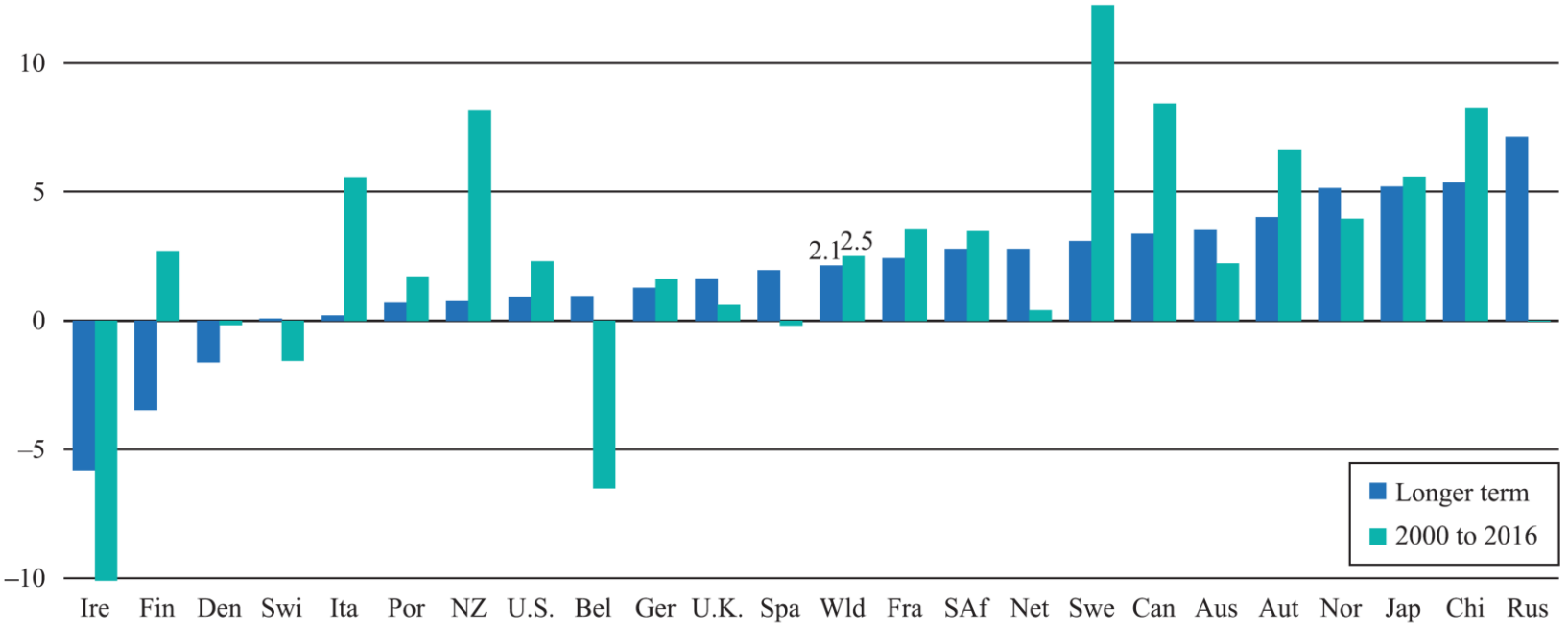


Data: Ken French's website

- There is even evidence of momentum that goes back over 200 years!

International evidence

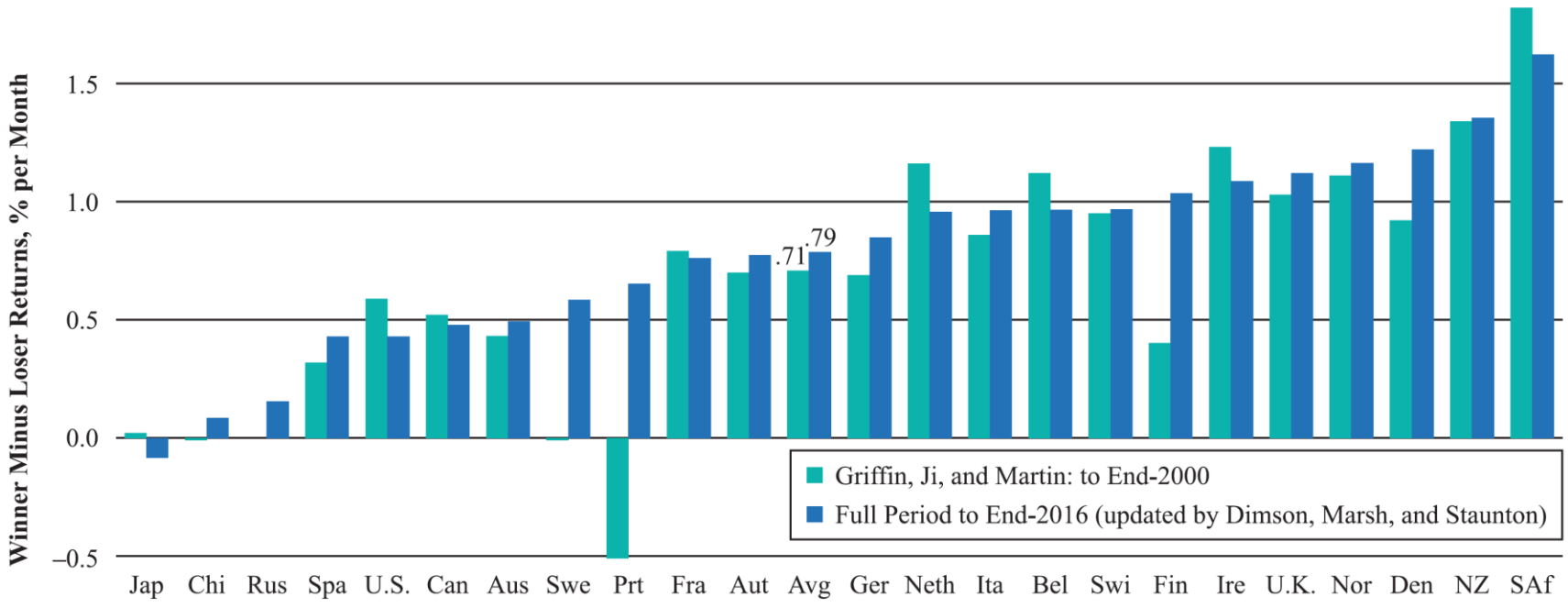
Annualised Value Premium in 23 Countries 1975-2016



Source: MSCI Value and Growth indexes.

Source: Elroy Dimson, Paul Marsh and Make Staunton, "Factor Based Investing: The Long Term Evidence", *Journal of Portfolio Management*, Special Issue, 2017

Returns from a 6/1/6 Momentum Strategy in 23 Countries 1975-2016 (per month)



Sources: Griffin, Ji, and Martin [2003] WML returns to 2000; Dimson, Marsh, and Staunton [2008] WML returns after 2000. All WML returns are 6/1/6 with 20% and 80% breakpoints.

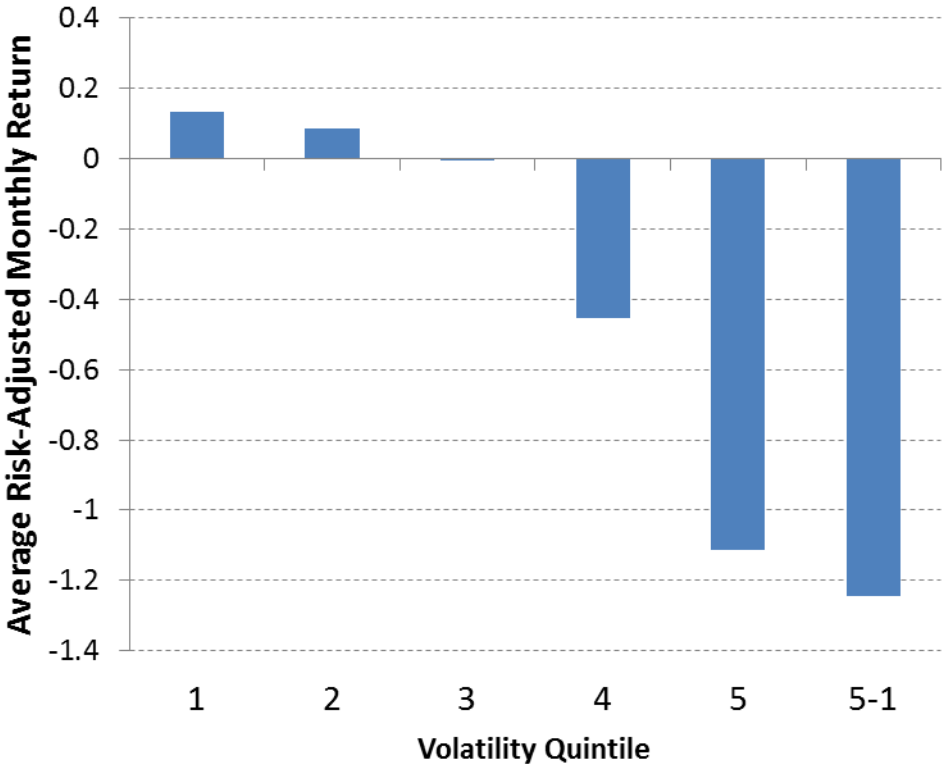
Source: Elroy Dimson, Paul Marsh and Make Staunton, "Factor Based Investing: The Long Term Evidence", *Journal of Portfolio Management*, Special Issue, 2017

Other Factors

Low Risk I: Idiosyncratic risk

- Two closely related effects: low volatility and low beta:

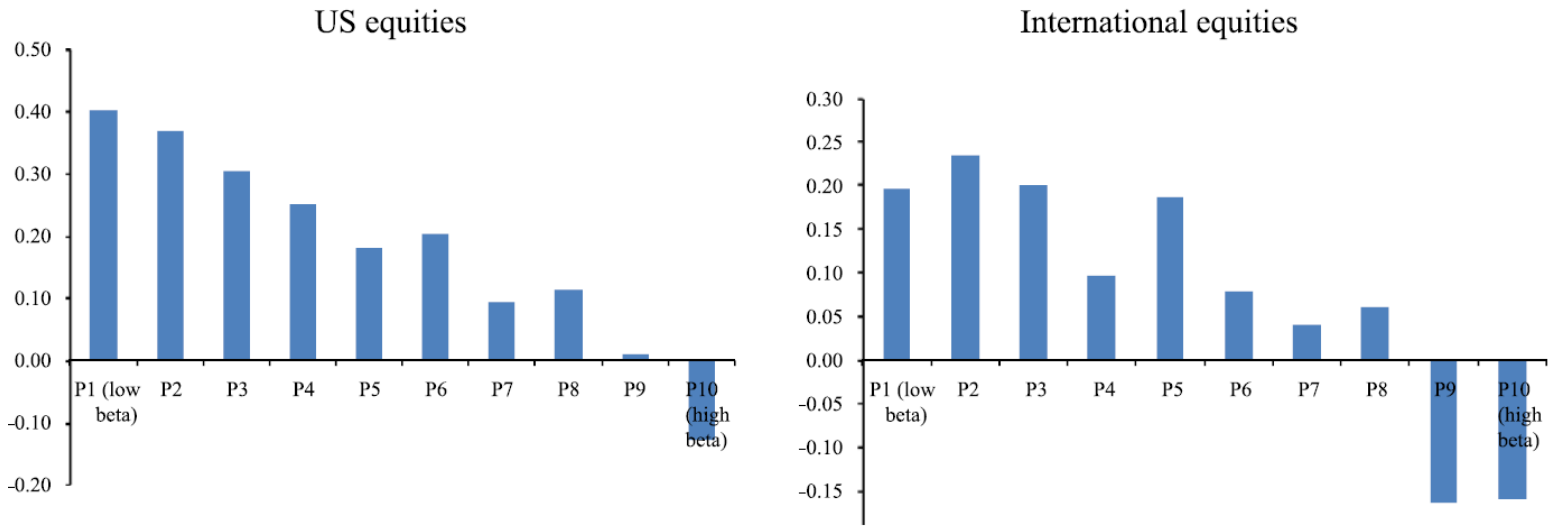
  - **low volatility**: long stocks with low idiosyncratic risk and short stocks with high idiosyncratic risk
  - evidence for US and internationally



Source: Ang, Andrew and Hodrick, Robert J. and Xing, Yuhang and Zhang, Xiaoyan, High Idiosyncratic Volatility and Low Returns: International and Further U.S. Evidence (January 2008). NBER Working Paper No. w13739. Available at SSRN: https://ssrn.com/abstract=1086991

Low Risk II: Buy low beta and sell high beta

- BAB factor: holding low beta stocks and short high beta stocks in zero beta, self-financing combination
- BAB Sharpe ratio: 0.78



Note: The alphas are computed using a four-factor returns model

Source: Frazzini, A., Pedersen, L.H., "Betting against beta", Journal of Financial Economics (2013)

Quality (Defensive)

- Stocks ranked on the basis of “quality” measures:
  - high profitability
  - low leverage
  - stable earnings
  - etc.
- Quality factor is difference between return on portfolio of “quality” stocks and return on portfolio of “junk” stocks

Carry

- Carry: buy high yield asset and sell low yield asset (e.g., currency)
  - yield difference is return if prices didn't changes

Indices with “fundamental” weights

Russell Fundamental U.S. Large Company Index

Company	Weight
ExxonMobil Corp.	5.04%
Chevron Corp.	2.42%
AT&T Inc.	2.02%
Microsoft Corp.	1.95%
ConocoPhillips	1.92%
General Electric Co.	1.56%
Bank of America Corp.	1.44%
Proctor & Gamble Co.	1.44%
Wal-Mart Stores Inc.	1.39%
JPMorgan Chase & Co.	1.30%
	20.49%

Russell 1000 Index (Traditional Market-Cap Index)

Company	Weight
Apple Inc.	2.77%
ExxonMobil Corp.	2.37%
Microsoft Corp.	1.65%
Google Inc.	1.59%
General Electric Co.	1.53%
Johnson & Johnson	1.35%
Chevron Corp.	1.27%
Proctor & Gamble Co.	1.17%
JPMorgan Chase & Co.	1.16%
Wells Fargo & Co.	1.15%
	16.02%

- Use weights based on fundamentals such as book value, earnings, sales, employment etc.
- Introduced by Rob Arnott of Research Affiliates.

Summary of Excess Returns from Main Factor Strategies

	Value	Momentum	Carry	Defensive
Annual excess return	2.9%	8.3%	8.7%	5.8%
Volatility	10.0%	10.0%	10.0%	10.0%
Sharpe ratio	0.29	0.83	0.87	0.58
Correlation to equities	0.00	−0.03	0.20	−0.31
Correlation to 60% equities/40%	−0.01	−0.02	0.22	−0.29

Note: Style measures are composite measures across asset classes and are scaled to have 10% annualised volatility

- Also, returns to these strategies, although they appear very different are correlated.

Source: Asness, Ilmanen, Israel and Moskowitz, "Investing with Style", *Journal of Investment Management*, Vol. 13, No. 1, (2015), pp. 27–63

On average value and momentum are negatively correlated

- This is important
- WHY?
  - because BOTH provide a positive risk premium
  - it means that we can find a (positive) combination of Value and Momentum that will have a higher Sharpe ratio that either separately.

EIGHT BIG Questions for Investors considering the Factor Approach

1. Future risk premia

- Will the factor risk premia that we have seen in the past continue?
  - no escape from judgement
  - factor approach “more passive” than stock picking

    but
  - still involves judgement about the future

2. Which factors should we choose?

- The Financial Economics literature has looked at a huge number of factors
- Harvey et. al. (2014) count over 240 (listed here)
- And these are just the ones that got reported
- The “desk draw problem”

Source: Harvey, C and Yan, L, “Evaluating Trading Strategies”, of Portfolio Management, 2014, Vol. 40, No. 5: pp. 108-118,

Which factors?

- There has been some useful recent research on this question that suggests that beyond a certain relatively small number (5-10) there is little added value in exposure to further factors

3. What explains all this?

- At present there are no broadly accepted theoretical explanations as to WHY there should be a premium for exposure to value, momentum (particularly) and the rest
  - many possible explanations but do we actually understand this? NO!
- Should you care about the fact that we don't understand this?
  - YES!

Without a theory it's difficult to know what to make of the factor premia

- Economists care a lot about this sort of thing!
- So do physicists:

  It is a good rule not to put overmuch confidence in a theory until it has been confirmed by observation.

  Sir Arthur Eddington (1882-1944) English astronomer and physicist. (Solar eclipse 1919)

- and, he continues:

  it is also a good rule not to put overmuch confidence in the observational results … until they have been confirmed by theory.

4. Will factor risk premia decline as more people adopt the factor approach?

- Don’t understand what type of risks the premia are compensating for
  - so it’s difficult to know if premia likely to decline
- But, quite possible that as more people buy particular factor exposures, expected returns may be lower

Next .. the risks

5. Have we seen the worst of the factor risks in past data?

- Because we don't have a good explanation for the risk premia, we don't have a good way of thinking about the type and severity of risk that each factor represents
  - our only guide to the risk is past data and this is necessarily an incomplete guide
- Things that we haven't seen in the data do happen!
  - Black swans
  - and .. the Cascadia fault ..

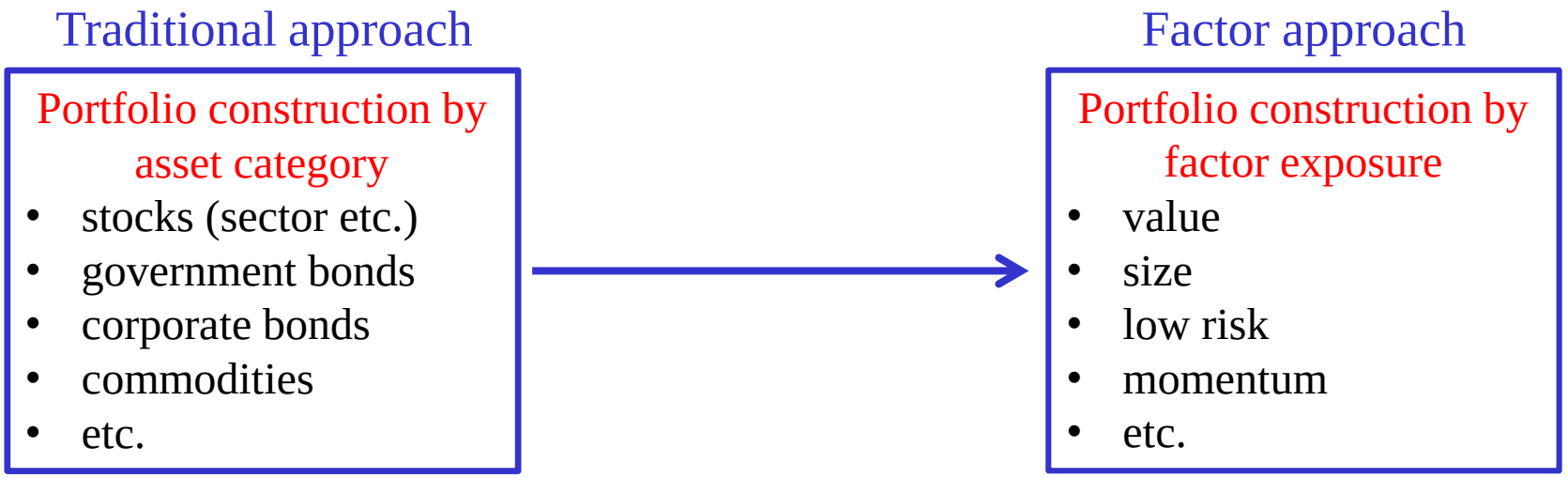
The Cascadia Fault

- Major fault running from north of San Francisco up to north of Vancouver
- Produces earthquakes of around 9 on the Richter scale (vs. around 8 for San Andreas)
- Average time between Cascadia earthquakes is **243** years BUT .. last earthquake was in 1700 (**318** years ago!) and no written record.
- **Discovered in mid-1980s: before then major risk with no data**

Implementation ….

6. Should we allocate our portfolio by asset type or by factor exposure?

- A “pure factor” approach would say that we should allocate to factors rather than to specific asset types



- How far along this path does it make sense to go?

7. How do we apply this approach to other asset classes?

- The great majority of research on factors has been on equities
  - some evidence of presence of related factors – particularly value and momentum – in other assets (currencies, government bonds and commodities) and other geographies
- But relatively little work so far on factor exposure of non-equity assets

8. What about transaction costs?

- Almost all the independent statistical evidence on factor risk premia comes from academic research
- Data available to academics does not usually allow them to reflect accurately the impact of transactions costs on returns
- Presence of transaction costs will affect factor construction
- Extremely important issue that can only be effectively addressed by practitioners

Where are we now?

- Should we just ignore all of this? No.
  - there too much data to ignore

    and
  - it's part of the industry (c.f. the FT/Russel survey)
- Is it data mining?
  - difficult to square consistency of results across assets and geographies with data mining
- What explains the return premia?
  - if compensation for risk, what is the character of the risk?

Finally: Better benchmarks

- When factor risks are better understood, we should customise benchmarks so they are better adapted to investor needs
  - just as we do with overall market exposure
- Fund sponsors:
  - should decide on factor exposures

    and
  - should not pay active management fees to achieve these

Thank you!