



Global Factor Premiums

(Very) Extensive evidence across time and asset classes

Guido Baltussen, Professor in Finance, Erasmus University Rotterdam,
Head of Factor Investing / Co-Head Quant Fixed Income, Robeco Asset Management



Democratize Quant Conference 2021, March 25th

Global Factor Premiums: How to think about factor premiums?

- > Testing factor-based strategies *across* global markets
 - > Equity, bond, commodity and currency markets
 - > https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3325720



Recent influential academic studies

- > Time-series Momentum, Cross-sectional Momentum, Value
- > Carry, Seasonal and Betting-against-beta (BAB)

TS Momentum

- > JFE, 2012



CS Momentum

- > JF, 2013



Value

- > JFE, 2013



Carry

- > JFE, 2018



Seasonal

- > JF, 2016



BAB

- > JFE, 2014



Global Factor Premiums: Considerable media attention

REKENTHALER REPORT

The 2-Century Investment Mystery

John Rekenhaller · 29 Mar 2019



The Big Picture

There are times, however, when one desires something more complete: a study that might be faulted for using outmoded data, or for bludgeoning what could be caught with a butterfly net, but that will never be accused of being perfunctory. There is no need to test how its results perform out of sample, because there is no out of sample. The study encompasses all.

Such, with only modest exaggeration, is "Global Factor Premiums," or GFP, a Dutch collaboration between a university and asset manager. (Guido Baltussen and Laurens Swinkels of Erasmus University of Rotterdam and Robeco Asset Management; Pim van Vliet of Robeco.) As the authors note, most investment papers start typically around 1980," often focusing "on a single asset class, typically U.S equities." Their ambitions are, to understate the matter, greater.

Global Factor Premiums
63 Pages · Posted 6 Feb 2019

Guido Baltussen
Erasmus University Rotterdam (EUR), Robeco Asset Management - Quantitative Investing

Laurens Swinkels
Erasmus University Rotterdam (EUR), Robeco Asset Management - Quantitative Investing

Pim van Vliet
Robeco Asset Management - Quantitative Investing
Data Written: January 31, 2019

Abstract
We examine 24 global factor premiums across the main asset classes via replication and re-sample evidence spanning more than 200 years of data. Replication yields ambiguous evidence within a unified testing framework with methods that account for p-hacking. The re-sample evidence reveals that the large majority of global factors are strongly present under conventional p-hacking perspectives, with limited out-of-sample decay of the premiums. Further, utilizing our deep sample, we find global factor premiums to be not driven by market, downside, or macroeconomic risks. These results reveal strong global factor premiums that present a challenge to asset pricing theories.

Keywords: Factor premium, Multiple hypothesis testing, P-hacking, Return anomalies, Predictability, Stocks, Bonds, Commodities, Value, Momentum, Trend, Carry, Betting-against-beta, Seasonality

JEL Classification: C11, C12, F31, G11, G12, G15, F219

Suggested Citation:
Baltussen, Guido and Swinkels, Laurens and van Vliet, Pim, Global Factor Premiums (January 31, 2019). Available at SSRN: <https://ssrn.com/abstract=3325228> or <https://doi.org/10.2139/ssrn.3325228>

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Want to profit in the markets? Find a way to live for 200 years, says

@JohnAuthers bloom.bg/2Dhkb6k via @bopinion

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Eternal Market Patience Offers Eternal Rewards

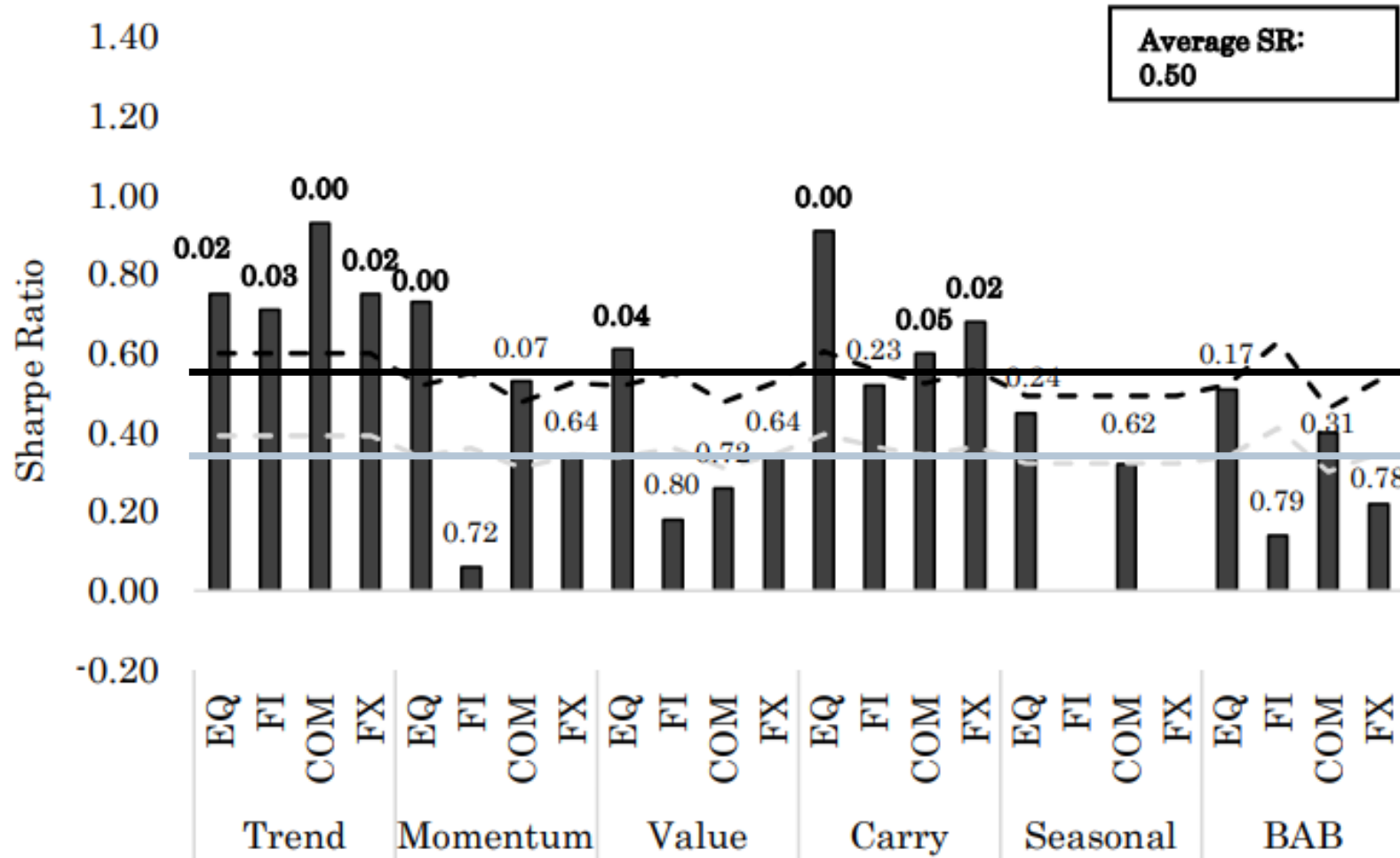
Crunching 200 years of stock, bond, currency and commodity data reveals some shocking results.

[bloomberg.com](https://www.bloomberg.com)

> 10,000
downloads

Global Factor Premiums: Original 'evidence'

Sample of about 1981-2011

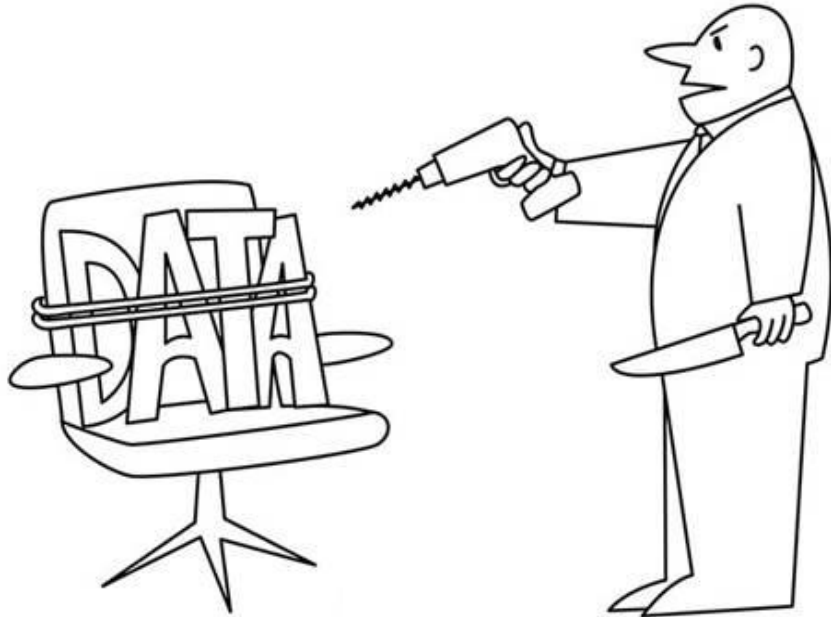


p-hacking?

Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

This information is included solely for illustrative purposes to show empirical data related to quantitative allocation variables and does not represent the performance of any Robeco investment strategy.

Concerns with factor research: P-hacking...



Torture the data
until they confess

P-hacking...

© 2013 Ted Goff



“You can’t keep adjusting the data to prove that you would be the best Valentine’s date for Scarlett Johansson.”



P-hacking seems omnipresent in science...

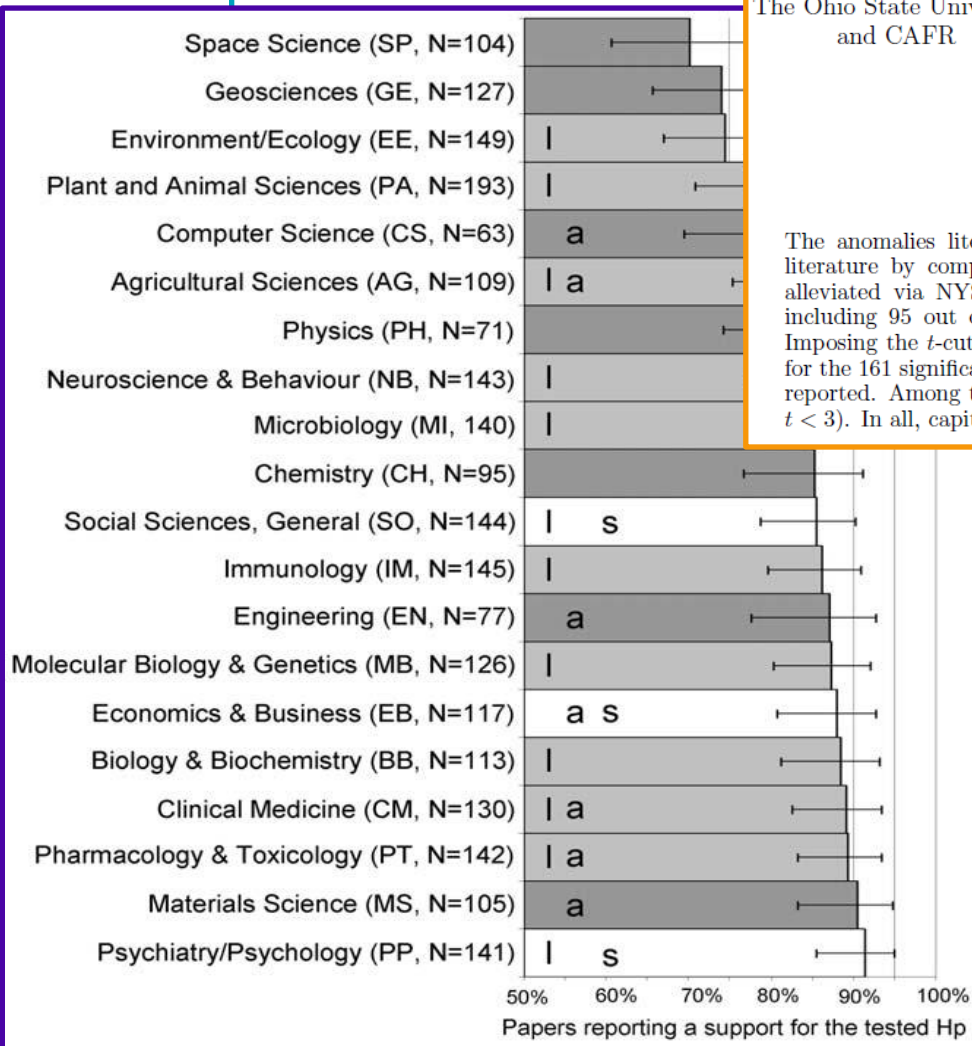
Is Economics Research Replicable? Sixty Published Papers from Thirteen Journals Say “Usually Not”

Andrew C. Chang* and Phillip Li†

September 4, 2015

Abstract

We attempt to replicate 67 papers published in 13 well-regarded journals using author-provided replication files that include both data and code. In our sample, 29 of 35 papers (83%) that are required to provide data and code replication files, and other journals do not. Aside from 6 papers that use confidential data, we obtain replication files for 29 of 35 papers (83%) that are required to provide data and code replication files, compared to 11 of 26 papers (42%) that do not. We successfully replicate the result of 22 of 67 papers (33%) without contacting the authors. Excluding those that use confidential data and the 2 papers that use software we do not have, we replicate 29 of 59 papers (49%) with assistance from the authors. In fact, we are able to replicate less than half of the papers in our sample even with the authors' assistance. We assert that economics research is usually not replicable. We provide recommendations on improving replication of economics research.



Replicating Anomalies

Kewei Hou*
The Ohio State University
and CAFR

Chen Xue†
University of Cincinnati

Lu Zhang‡
The Ohio State University
and NBER

June 2017 §

Abstract

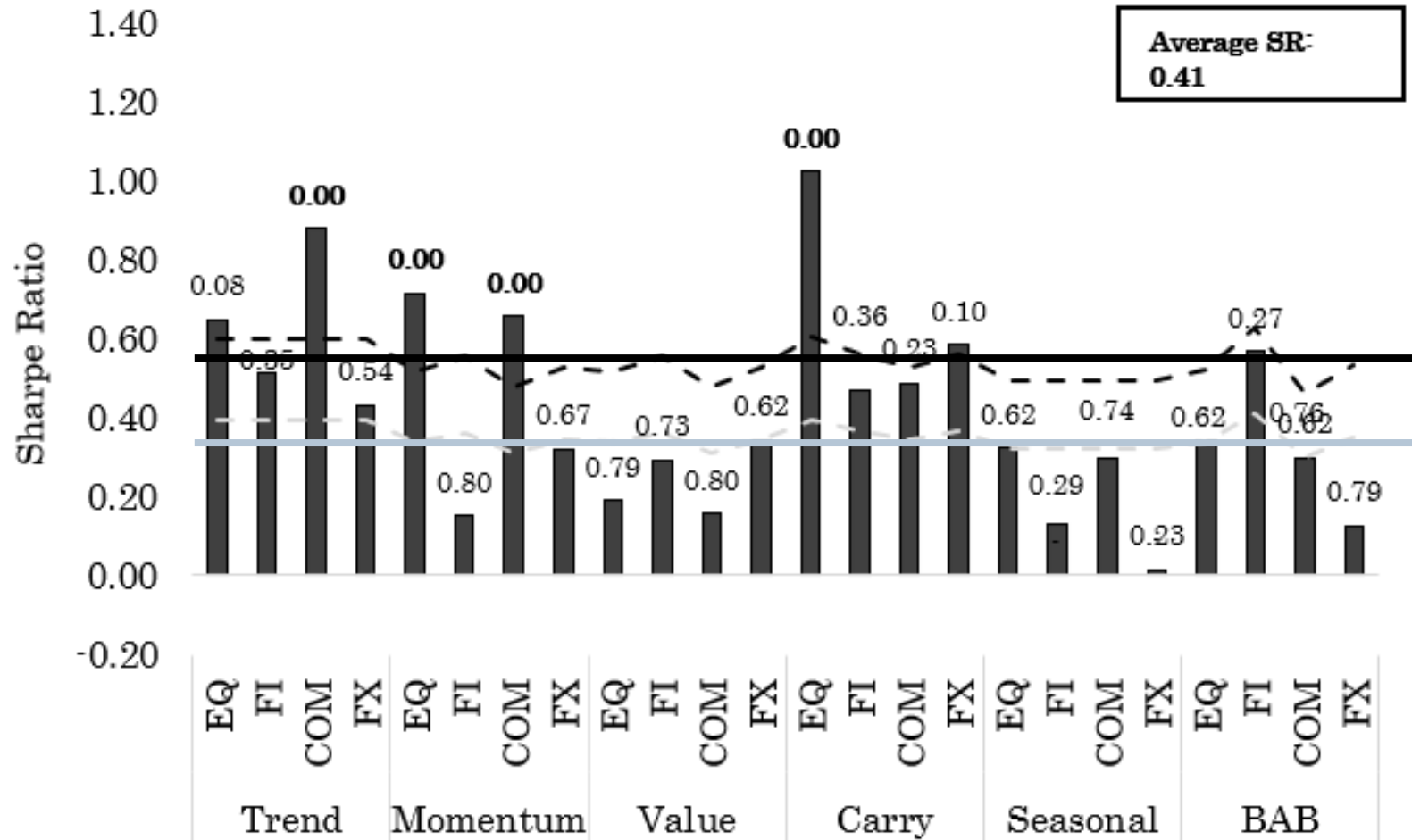
The anomalies literature is infested with widespread p-hacking. We replicate this literature by compiling a large data library with 447 anomalies. With microcaps alleviated via NYSE breakpoints and value-weighted returns, 286 anomalies (64%) including 95 out of 102 liquidity variables (93%) are insignificant at the 5% level. Imposing the *t*-cutoff of three raises the number of insignificance to 380 (85%). Even for the 161 significant anomalies, their magnitudes are often much lower than originally reported. Among the 161, the *q*-factor model leaves 115 alphas insignificant (150 with *t* < 3). In all, capital markets are more efficient than previously recognized.

Solution: Replication and out-of-sample evidence



Global Factor Premiums: Replication evidence

Sample of about 1981-2011



Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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Public stock market investing since 1604 in the Netherlands



Amsterdam Stock Exchange

- > Picture from the 17th century (left)
- > Euronext as of 21st century (right)

London, New York and others soon followed

Historical markets are in many respects comparable to current markets...

Investors invested internationally at reasonable costs

- > Yes, transaction costs were higher
- > Yes, information travelled slower

Still, investors were reasonably well informed and could trade internationally

- > Historical transaction costs seem limited (e.g. Koudijs, 2014)
- > Investor sophistication was also higher than often assumed (e.g. Lowenfeld, 1902)

And arbitrage players were well active..

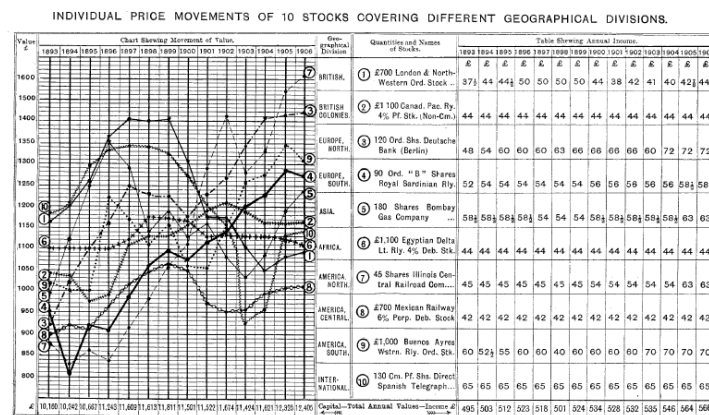
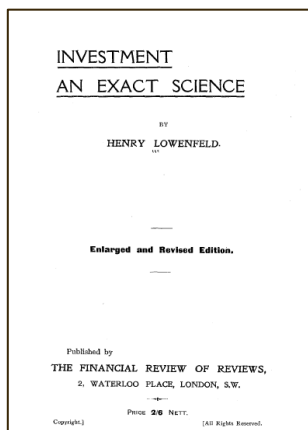
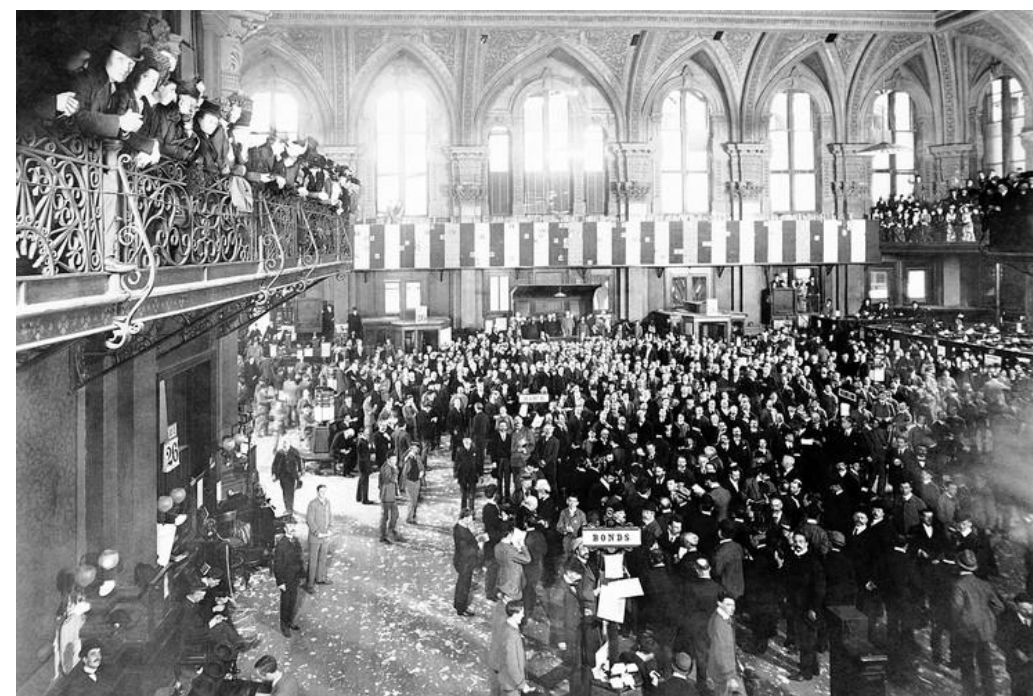
Wall Street, 1889: The Telegraph Ramps Up Trading Speed

It Takes Less Than 30 Seconds for the Price of the Latest Trade to Travel Between Boston and the NYSE

By *Jason Zweig*

July 7, 2014 4:45 p.m. ET

NEW YORK—The floor of the New York Stock Exchange is one of the most advanced technology centers on Earth.



Source: <http://viking.som.yale.edu/will/investments/lowenfeld.pdf>, Wall Street Journal.

Building a deep historical database of factors...

Equity, bond, commodity and currency market data since 1800

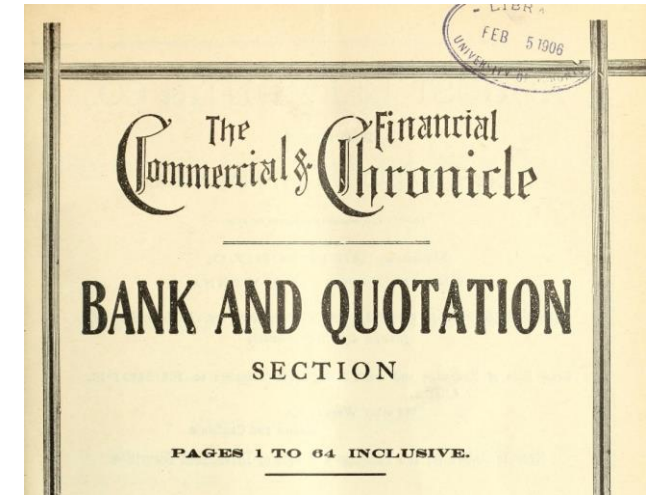
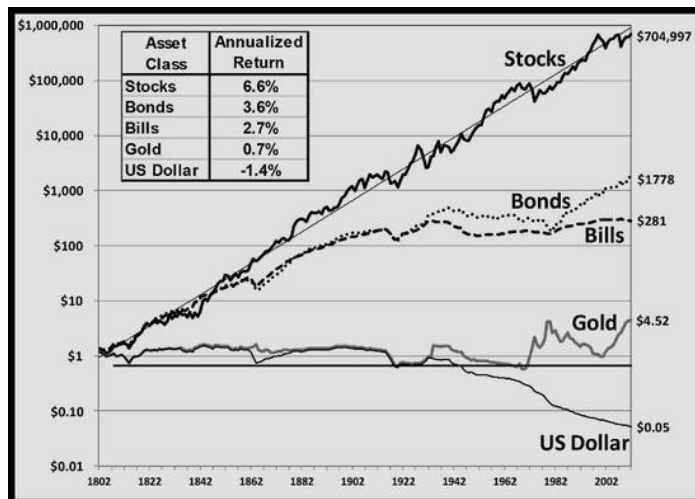
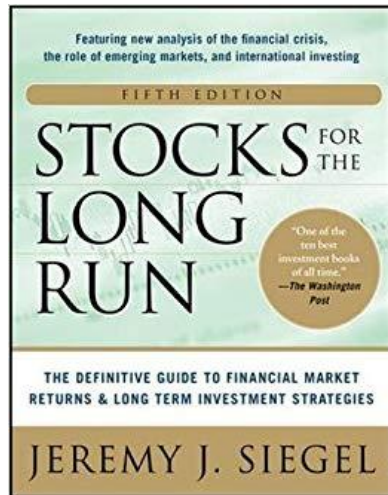
GLOBAL FINANCIAL DATA™



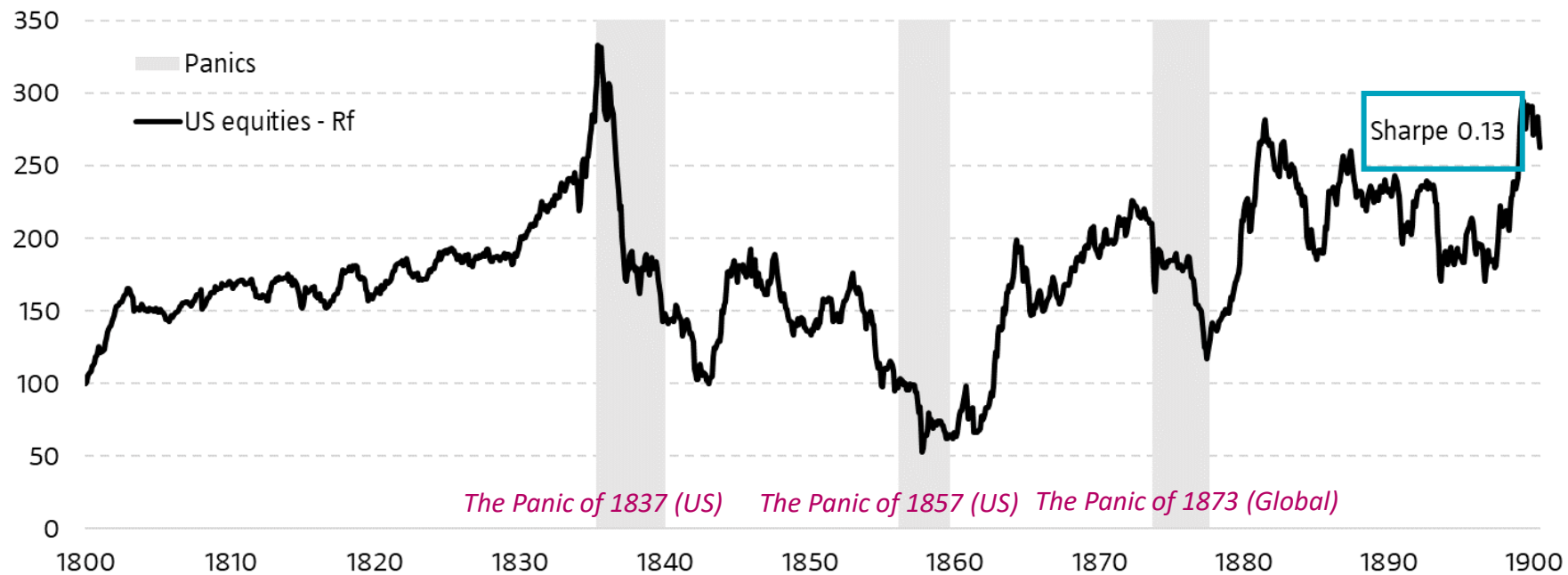
JULY, 1891.] RAILROAD STOCKS AND BONDS. 123

Subscribers will confer a great favor by giving immediate notice of any error discovered in these Tables.

RAILROADS. For explanation of column headings, &c., see notes on first page of tables.	Miles of Road.	Date of Bonds.	Size, or Par Value.	Amount Outstanding.	INTEREST OR DIVIDENDS.			Bonds—First Pay. When Due.	Stocks—Last Dividend.
					Rate per Cent.	When Payable.	Where Payable, and by Whom.		
St. Louis Southern—Common stock	.....	.....	\$100	\$16,500,000	.....	.....	.....	.....	.....
Preferred stock 5 per cent non-cumulative	.....	.....	100	20,000,000	.....	.....	.....	.....	.....
1st mort. certificates, \$16,500 p. 10, g. old	.....	1891	1,000	20,000,000	4 e.	M. & N. Y., Central Trust Co.	Nov. 1, 1889	Nov. 1, 1889	.....
2d M. income cert., for \$10,000,000 non-cum.	.....	1891	500 &c.	8,000,000	4 e.	J. & J.	After '90, when earned.	Jan. 1, 1897	.....
Car tracts	.....	.....	.....	602,848	.....	.....	.....	.....	.....
St. Louis Van. & Terra H.—1st M. a. f. guar. not dr. e.	158	1867	1,000	1,899,000	7	J. & J. N. Y., Central Trust Co.	do	May 1, 1893	.....
2d mort. stk. fund, not dr'n (\$1,600,000 guar.) e.	158	1868	1,000	2,600,000	7	M. & N.	do	July 5, 1887	.....
St. Paul & Duluth—Common stock	.....	.....	.....	4,660,297	3 & 15 st	N. Y., Of. 32 Nassau St.	do	Mich. 2, 1891	.....
1st mortgage	.....	.....	.....	190	.....	.....	.....	.....	.....
Preferred 7 per cent stock and scrip	.....	.....	.....	187	.....	.....	.....	Aug. 1, 1931	.....
2d mortgage	.....	.....	.....	167	.....	.....	.....	Oct. 1, 1917	.....
Taylor's Falls & Lake Sup.—1st M. gn. a. f. not dr. e.	21	1884	1,000	210,000	6	J. & J.	do	Jan. 1, 1914	.....
Duluth Short L. 1st M. guar. cum. a. f. not dr. e.	25	1886	1,000	500,000	5	M. & N.	do	Sept. 1, 1916	.....
Stillwater & St. Paul 1st mort., g. not guar.	12	1870	.....	262,500	7	J. & D.	do	Dec. 1, 1900	.....
St. Paul & Northern Pac.—See Great Northern	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul & Northern Pac.—Stock (\$10,000,000 authorized)	184	.....	100	6,250,000	1 1/2	Q. - Y. N. Y., Office, 35 Wall St.	May 1, 1891	.....	.....
Western R.R. Minn. 1st M. g. l. covered by gen. M.	60 1/2	1877	1,000	428,000	7	M. & N. N. Y., Winslow, L. & Co.	May 1, 1907	.....	.....
General mortg., guar., land gr. (\$10,000,000 a. f.)	214	1883	1,000	7,985,000	6 g.	Various	do	Feb. 1, 1923	.....
San. Act. & Grossmont Pass—1st M. g. r. at 110 e.	152	1885	1,000	1,730,000	6 e.	J. & J. Jan. 1, 1890, coup. last pd.	Jan. 1, 1916	.....	.....
1st M. exten. gold (\$12,000 p. m.) red. at 110 e.	372	1886	1,000	4,473,000	6 e.	J. & J. Jan. 1, 1890, coup. last pd.	July 1, 1926	.....	.....
2d M. g. income for 5 years, \$8,000 per mile e.	115	1888	1,000	1,725,000	6 e.	A. & O. Apr. 1, 1890, coup. last pd.	Oct. 1, 1908	.....	.....
Rolling stock lease warrants	639	1888	.....	1,046,000	5 g.	A. & O.	None paid.	Oct. 1, 1913	.....
Sandusky Mansfield & Newark—Re-organized stock	116	.....	50	1,068,832	3 1/2	Feb. 1. Moss N. Bk., Sand'ky, O.	Feb. 1, 1891	.....	.....
1st M. int. gn. under lease by B. & O. and Cent. O. e.	116	1869	1,000	2,300,000	7	J. & J. N. Y., Union Trust Co.	Jan. 1, 1909	.....	.....



US stock market in the 19th century...



Whig cartoon (1837 US)



Bank run (1857 US)

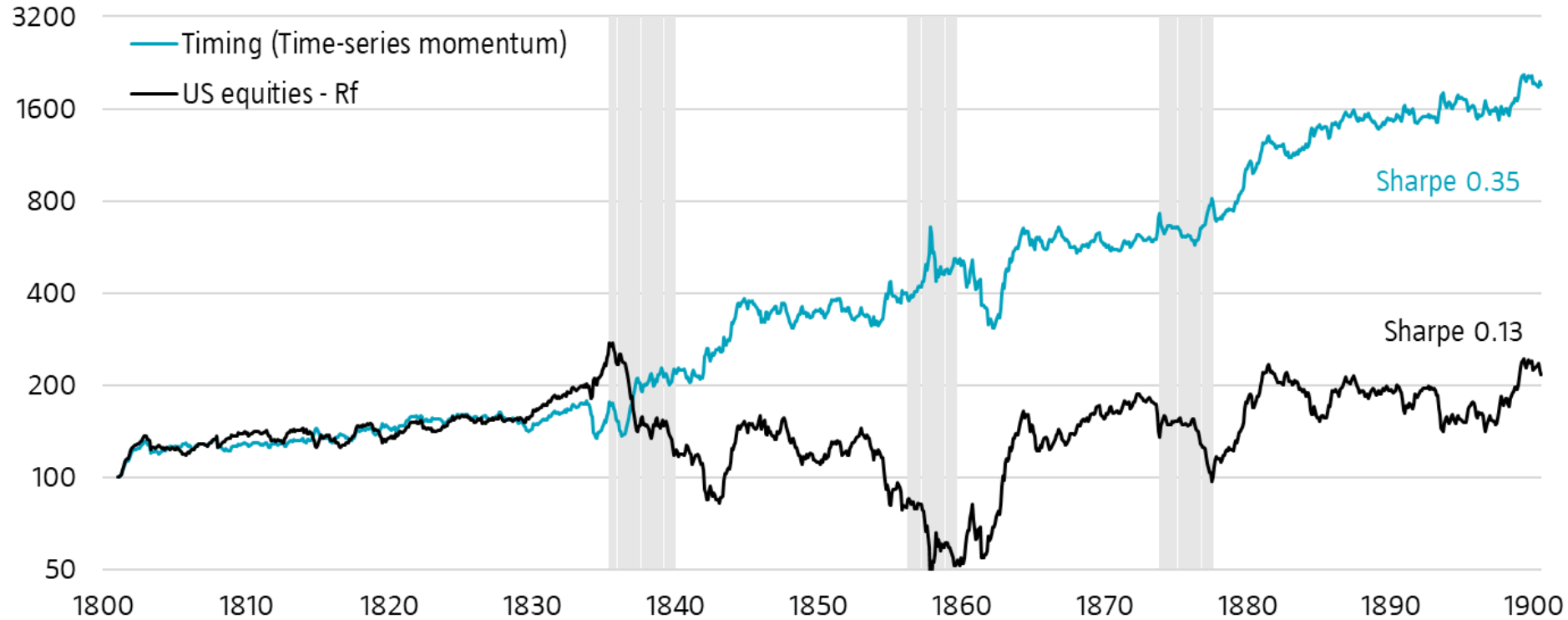


Vienna market crash (1873 Austria)

Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

This information is included solely for illustrative purposes to show empirical data related to quantitative allocation variables and does not represent the performance of any Robeco investment strategy.

Time-Series momentum: US stock market 19th century



Time-Series (12-1M) momentum beats equities

- > TS Momentum: Sharpe Ratio 0.35 (t-stat 3.5)
- > Equity premium: Sharpe ratio 0.13 (t-stat 1.3)

Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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Time-Series momentum: 'Global' Equity markets

TS Mom 1800-1900

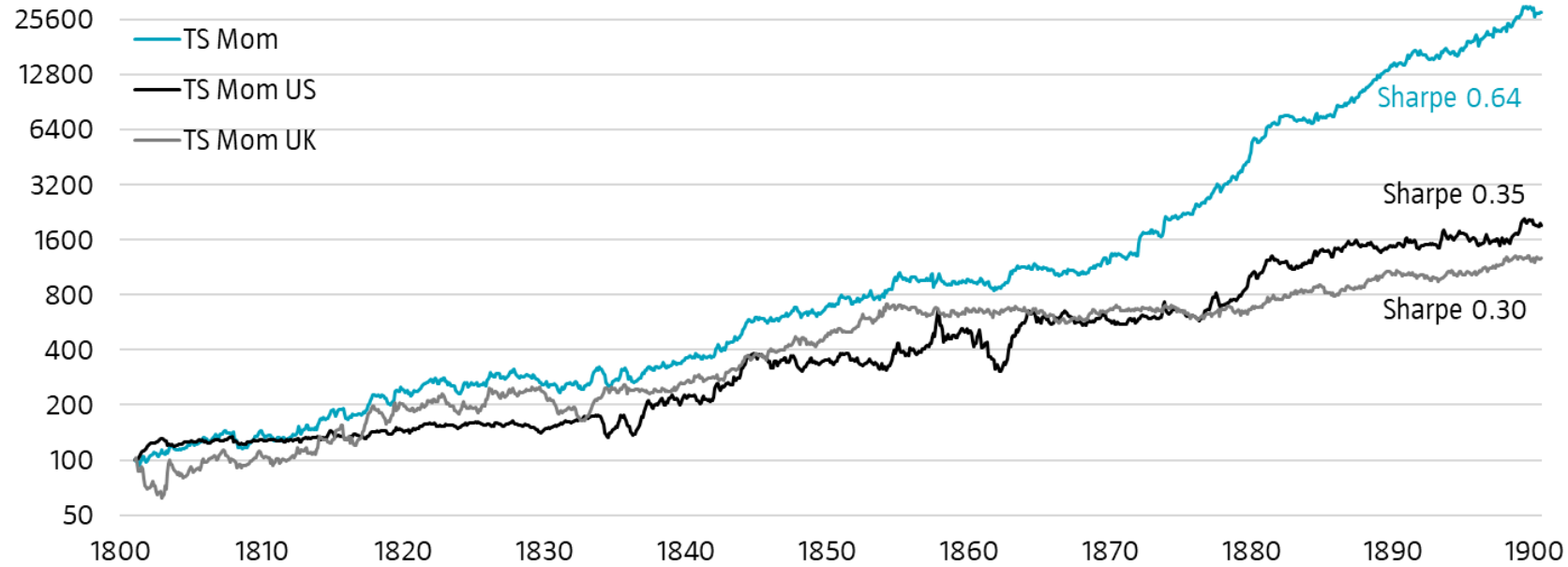


Sharpe ratio

0.35

0.30







0.64



Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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Testing over 24 factor/asset-class combinations across 217 years of data...

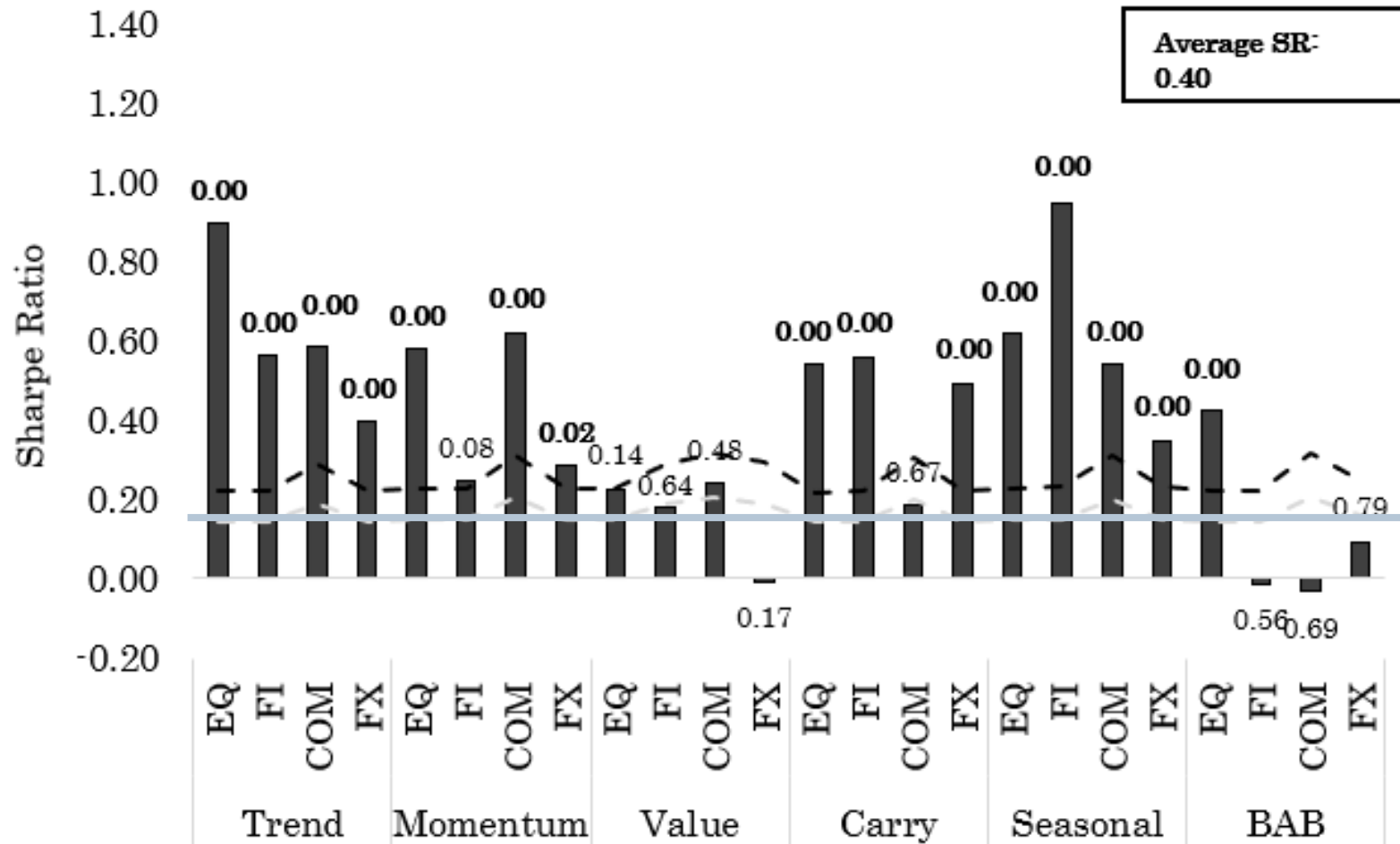
						
1800-1900						
Sharpe ratio	TS Mom	CS Mom	Value	Carry	Seasonal	BAB
Equities	0.64	?	?	?	?	?
Bonds	...	?	?	?	?	?
Currencies	...	?	?	?	?	?
Commodities	...	?	?	?	?	?
Global markets	...					

Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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Global Factor Premiums: Out-of-sample evidence

Sample of about 1800-1980

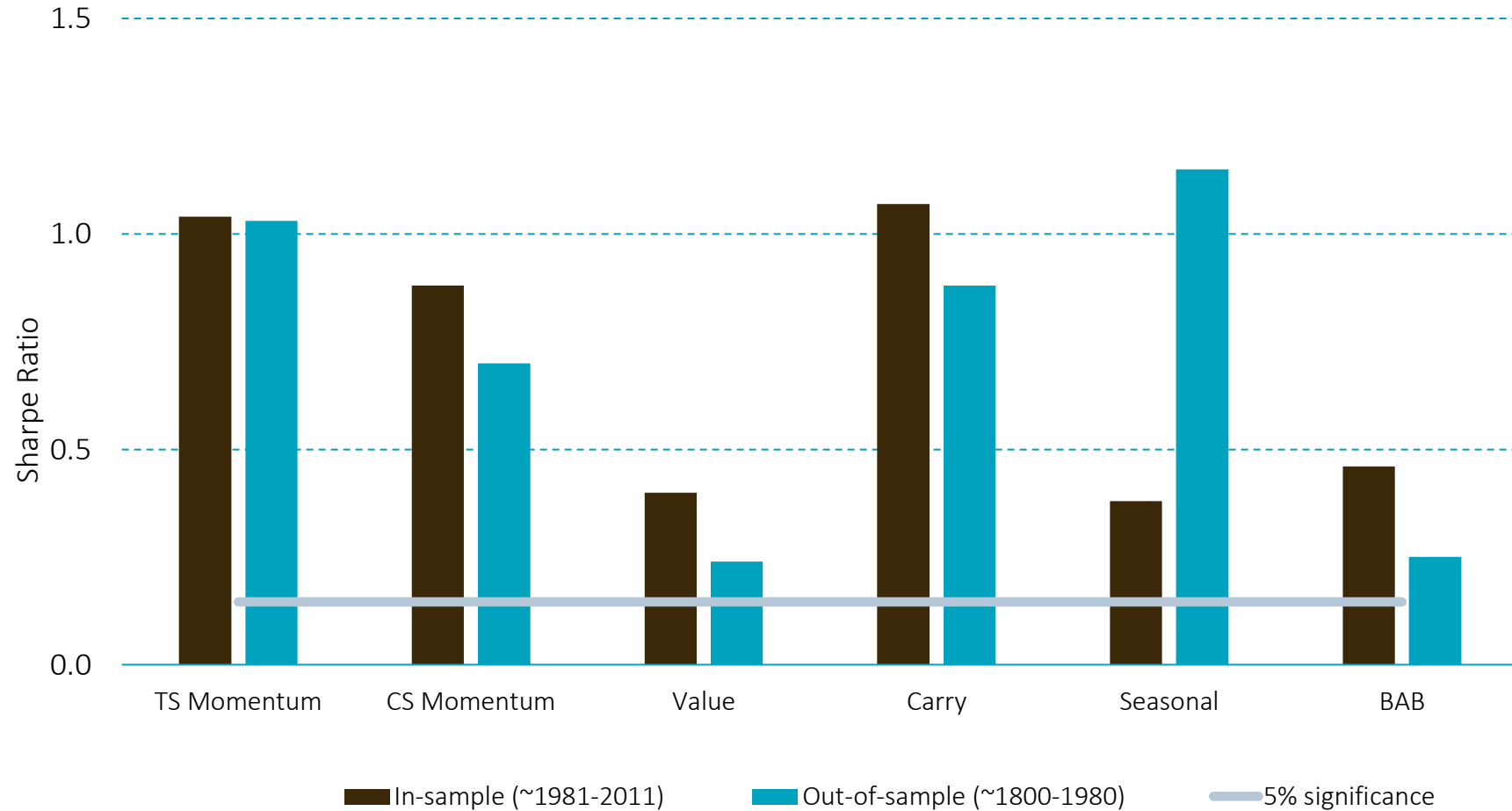


Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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Global Factor Premiums: Significant, sizable and persistent

Replication versus out-of-sample evidence



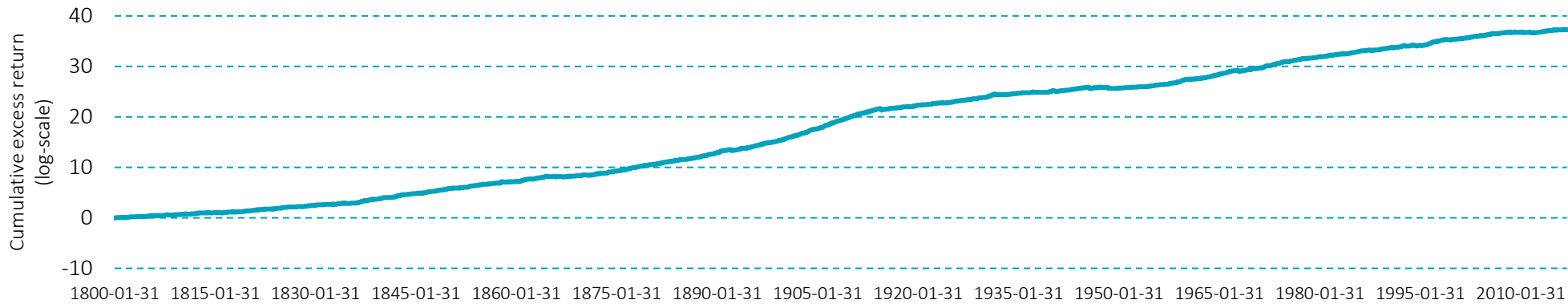
Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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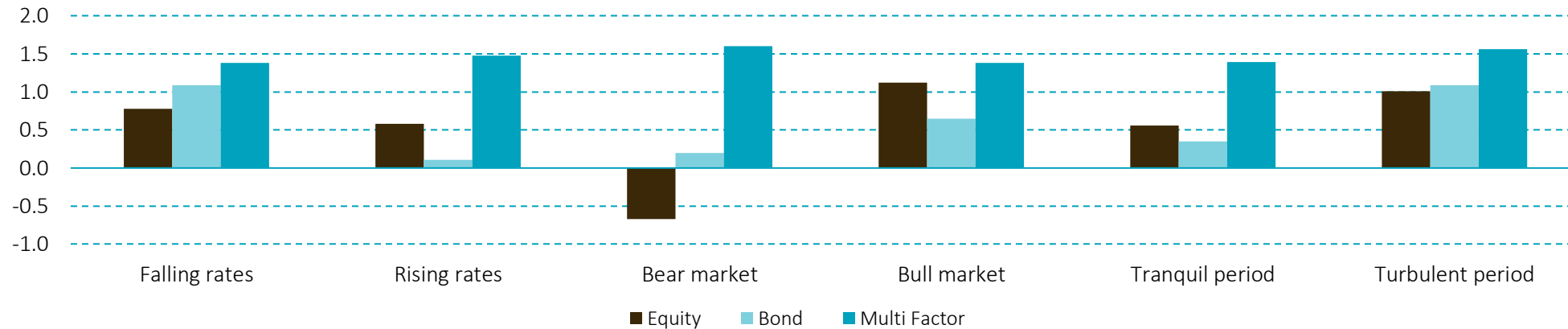
Global Factor Premiums: Are they explained by risk?

No, not really...

Multi-Factor Multi-Asset: Consistent & stable outperformance since the 1800's



Multi-Factor Multi-Asset portfolios: Positive performance across economic / market scenario's



Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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Key takeaways

1. Global Factors are robustly present for >200 years, offering persistent returns over the long-run
2. Global Factor Premiums seem not a reflection of market, macro or downside risks
3. Factor-based investing offers sizable long-run opportunities for investors



Appendix

Defining the Global Factor Premiums...

1. **TS Momentum** 12-1-month past return
2. **CS Momentum** 12-1-month past return
3. **Value** Equities: Dividend (12 month) / Price
Government bonds: Real yield
Currencies: Absolute and Relative 5yr PPP
Commodities: 5-year price reversal
4. **Carry** Equities: Future implied dividend yield*
Government bonds: 10-year -/- 3-month yield
Currencies: Nominal 3-month interest rate differential
Commodities: Slope of the futures curve
5. **Seasonal** 20-year historical monthly return
6. **BAB** 36-month asset-class market beta

Evaluated across equity (index!), bond, commodity and currency markets

*Prior to existence of equity futures: We regress the dividend yield implicit in the total versus price return indices in each month on monthly dummies over the past five years to predict the dividend yield for the month ahead, and subsequently subtract the risk-free rate.

Global Factor Premiums: Portfolio Construction

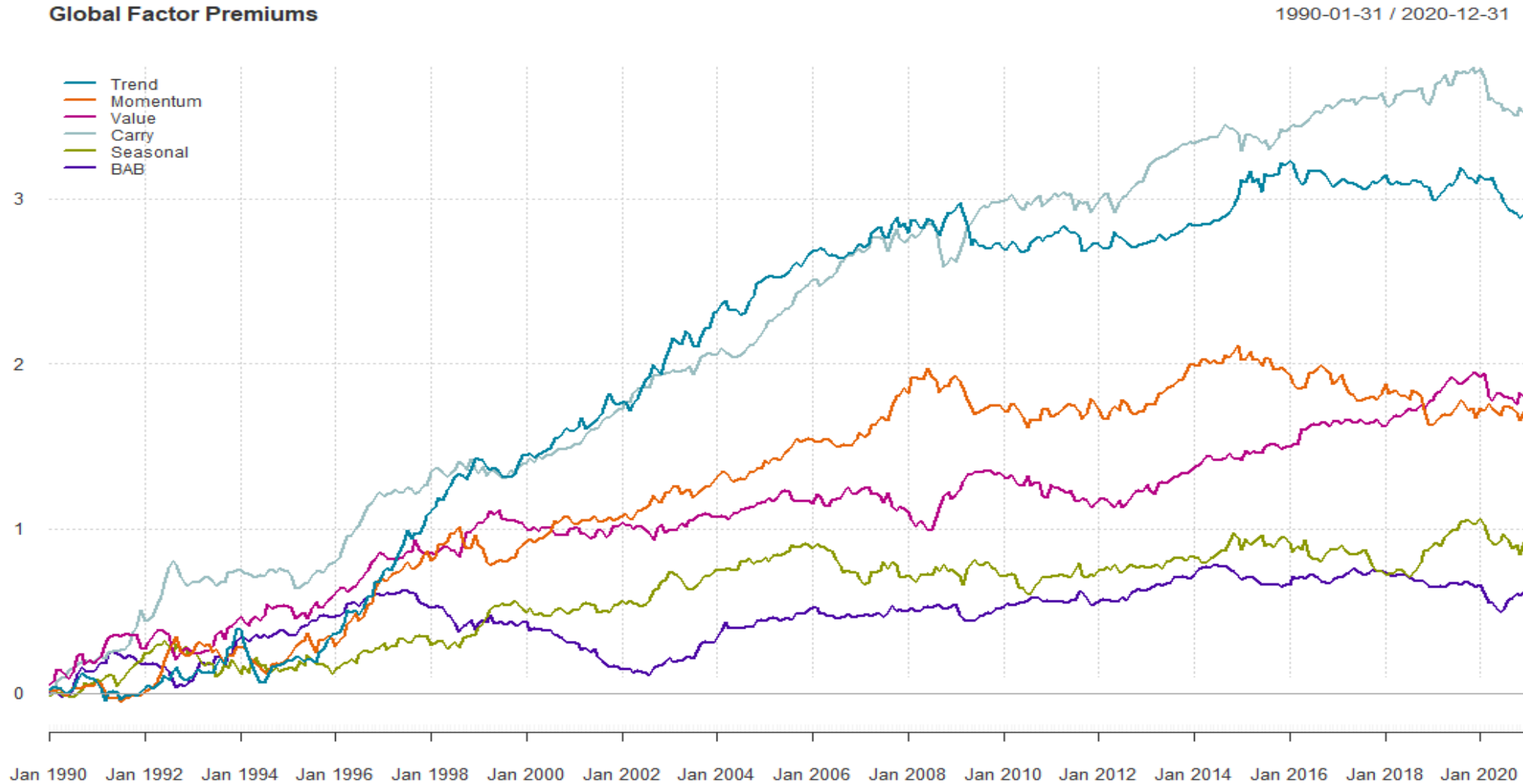
- > Portfolio construction method for each asset-class factor:

$$w_t^i = z_t \cdot \left(\text{Rank}(S_t^i) - \frac{N_t + 1}{2} \right),$$

with w_t^i the weight of asset i at time t , S_t^i the factor signal, N_t the number of assets in the cross-section, and z_t a scaling factor to ensure that the portfolio sums to zero.

- To create equal-risk positions, we scale each asset by its 3-year return volatility and each asset-class factor by its 10-year return volatility
- For multi-asset factor portfolios, we equally weight the asset-class factors
- We rebalance the factor portfolios each month
- Returns of all long-short portfolios are expressed in US dollars
- We exclude hyperinflation periods (ex-ante > 50% p.m. inflation, Cagan 1956)

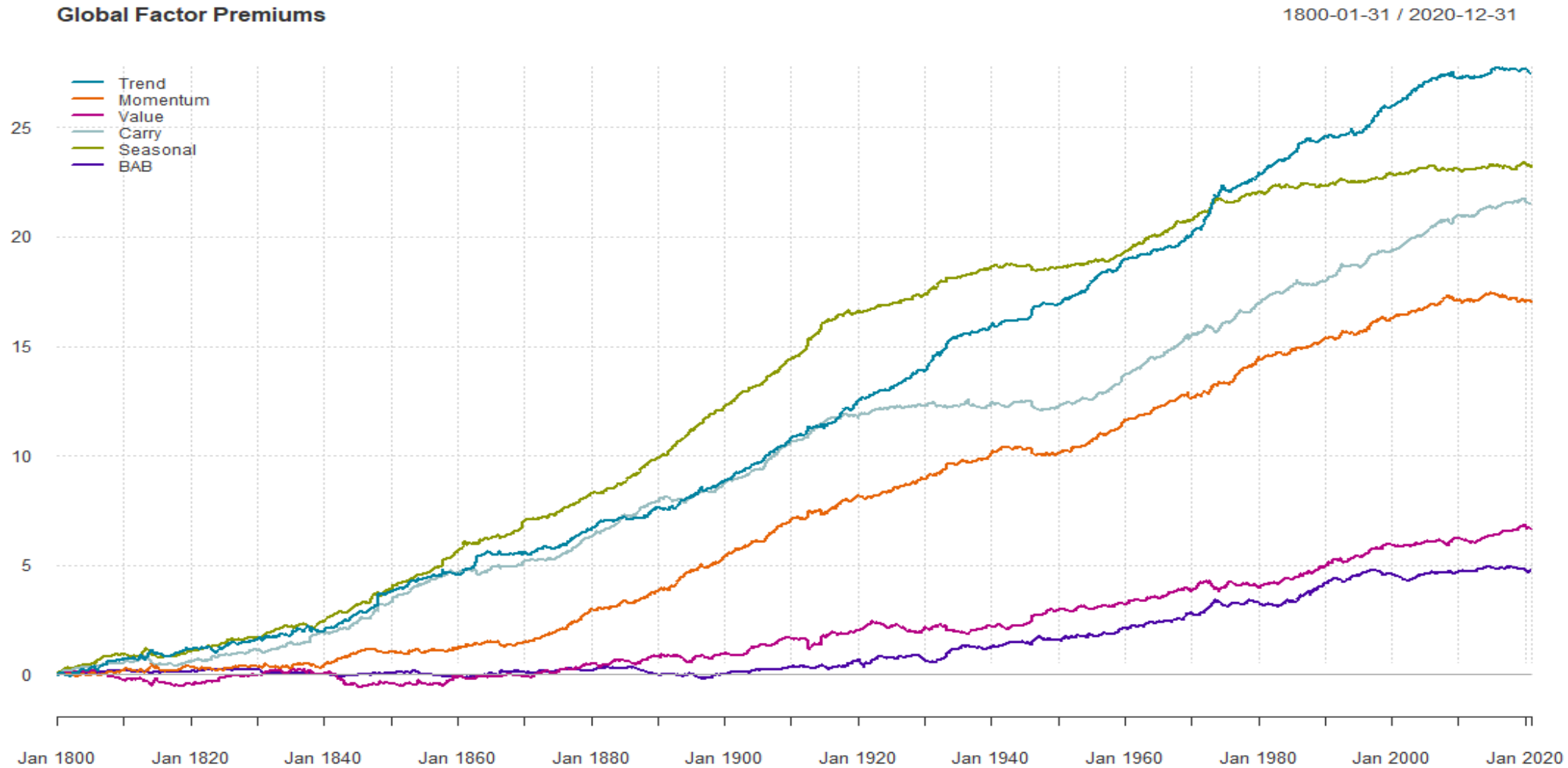
An update of GFP based on 2020...



Source: Baltussen, Swinkels and Van Vliet, 2020, Journal of Financial Economics, forthcoming.

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