

# Quantitative Equities

## The Evolution of Factor Investing

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“An effective factor investing strategy should be both contextual, that is, able to take into account differences across business segments, and adaptable as markets change over time.”

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## Contributors

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## Executive summary

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The next frontier for factor-based investing is to devise strategies with the potential to deliver on investment outcomes and investor needs, rather than just aiming to outperform a benchmark. For example, strategies with a high dividend payout but low volatility may be particularly attractive for investors in the decumulation phase of retirement planning, i.e., through retirement, when they need both income and growth, but cannot take on the full risk of a sudden equity market downturn. Ultimately, what matters is not the labeling of a strategy, but whether it contributes to meeting clients' investment objectives in a risk-managed and cost-effective manner.

### Use factors to invest in stocks, not stocks to invest in factors

- Investors invest in stocks, *not* factors
- Even staunch factor enthusiasts end up buying stakes in individual companies

### Successful factor investing requires a fundamental lens

- What matters to companies' prospects and market value varies greatly by the nature of their businesses; with regard to such issues, quantitative analysts can learn from fundamental investors

### Generically applying factors across different industries is a recipe for sub-optimal outcomes

- As indicators of future performance, factors have different usefulness in different sectors
- Among industrials, where manufacturing plants and equipment may well put a floor on the share price, book value matters more
- Among technology companies, where research and development (R&D) is more important, this factor has less efficacy because intellectual property is not fully reflected in book value
- Given these idiosyncrasies, effective factor investing requires a fundamental lens and the ability to take into account differences across industries

### Markets and industries change over time — factor investing should too

- The “new economy” is increasingly knowledge-based, with wide “moats” protecting profitability margins and market shares due to networking effects and the dominance of global brands
- To remain effective, factor investing strategies must adapt over time to keep up with the changes in businesses, markets and industries

## Which came first? The stock or the factor?

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In the past, investors would own a diversified portfolio of stocks after carefully analyzing their fundamentals. These days, many profess to invest in “factors.”

Factors are characteristics of stocks that help explain volatility and dispersion in their returns. Share prices of stocks with similar factor exposures often move in tandem, which is particularly useful for risk management purposes. Importantly, exposure to certain factors historically has delivered a return premium over the market. Efficient-market adherents have explained this as a reward demanded by rational investors for taking on additional downside risk during bear markets. Other researchers have attributed this return anomaly to a combination of behavioral biases by investors, agency problems in the asset management industry and market-structural limits on arbitrage.<sup>1</sup>

<sup>1</sup> De Boer *et al.* (2016) reviews the literature on factor anomalies and explanations that have been posited.

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Voya uses factors to invest in stocks, rather than using stocks to invest in factors.

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“Factor investing” systematically targets stocks with desirable factor exposures, seeking to earn these expected long-term return premiums. The primary investment styles include defensive, momentum and value; in contrast with “core” investing, which features no style bias (Figure 1). The appeal of such systematic strategies includes their relative simplicity, the ability to evaluate their historical efficacy, their scalability across different segments of the equity market, the ease of customizing to investor needs and wants, and the relatively low cost of implementation.

**Figure 1. A Taxonomy of “Smart Beta”**

	Investment Styles			
	Core	Defensive	Momentum	Value
<b>Objective</b>	Better broad asset class exposure	Reduce exposure to unrewarded risk	Take advantage of market trends	Take advantage of unrecognized potential
<b>Feature</b>	Enhanced diversification	Stocks that tend to perform well in down markets	Stocks whose share price recently did well	Stocks deemed “cheap” on income and balance sheet metrics
<b>Portfolio Construction Approaches</b>	Equal weighting	<ul style="list-style-type: none"> <li>Factor tilt</li> <li>Minimum volatility</li> <li>Risk parity</li> </ul>	Factor tilt	<ul style="list-style-type: none"> <li>Factor tilt</li> <li>Fundamental indexing</li> </ul>
<b>Commonly Targeted Factors</b>	None	<ul style="list-style-type: none"> <li>Low volatility</li> <li>Quality</li> <li>Dividend yield</li> </ul>	Six-to-twelve-month return, possibly risk-adjusted	<ul style="list-style-type: none"> <li>Earnings to price</li> <li>Book to price</li> <li>Dividend yield</li> </ul>

Source: Classification adapted from “A Taxonomy of Beta Based on Investment Outcomes,” De Boer, S., LaBella, M. and Reifsteck, S., The Journal of Index Investing, Summer 2016. Quality refers to profitable companies with stable earnings and low financial leverage that distribute profits to shareholders and invest conservatively.

While approaches to factor investing vary, ultimately what matters is whether a strategy contributes to meeting clients’ investment objectives in a risk-managed and cost-effective manner.

Figure 1 makes clear that factor investing is merely a subset of the so-called “smart beta strategies,” which are characterized by simple, transparent and rules-based approaches for obtaining equity market exposure that aims to outperform capitalization-weighted indexes. Smart beta also includes strategies aimed at enhanced diversification, addressing the concentration risk of capitalization-weighted indexes (Figure 2). For example, equal-weighted index strategies seek to mitigate concentration risk by reducing exposure to the largest capitalization stocks in an index.<sup>2</sup>

**Figure 2. Concentration Risk: Ten Stocks Comprise More Than One-Fourth of the Russell 1000 Index**

Security Name	Ticker	GICS Sector	Index Weight %
Apple Inc.	AAPL	Information Technology	6.03
Microsoft Corporation	MSFT	Information Technology	4.69
Amazon.com, Inc.	AMZN	Consumer Discretionary	3.89
Alphabet Inc. Classes A,C	GOOGL	Communication Services	2.91
Facebook, Inc. Class A	FB	Communication Services	1.85
Tesla Inc	TSLA	Consumer Discretionary	1.50
Berkshire Hathaway Inc. Class B	BRK.B	Financials	1.23
Johnson & Johnson	JNJ	Health Care	1.17
JPMorgan Chase & Co.	JPM	Financials	1.08
Visa Inc. Class A	V	Information Technology	1.04
Total			25.37

Source: FactSet, data as of 12/31/20.

Russell 1000 index top ten as of 12/31/20.

<sup>2</sup> Arguably, the genesis of smart beta occurred in the late 1980s, when MSCI created GDP-weighted international indexes to mitigate the growing weight of Japan in its standard index, amid concerns about an incipient market bubble.

The categories in Figure 1 are not mutually exclusive: for example, investing in stocks with a high dividend yield can be considered a “defensive value strategy.” This sort of cross-pollination can be useful in building hybrid approaches such as low-volatility equity strategies with an income objective. Moreover, constraints on active exposures and tracking error in portfolio construction can keep performance of a factor-based portfolio closely tracking the core equity market, which remains an important investment consideration for asset allocators.

### Perceived advantages of factor investing spur widespread use

Factor strategies can be designed to meet a variety of needs, such as in the decumulation phase of retirement, when investors need both income and growth but cannot accept the full risk of a sudden equity market downturn.

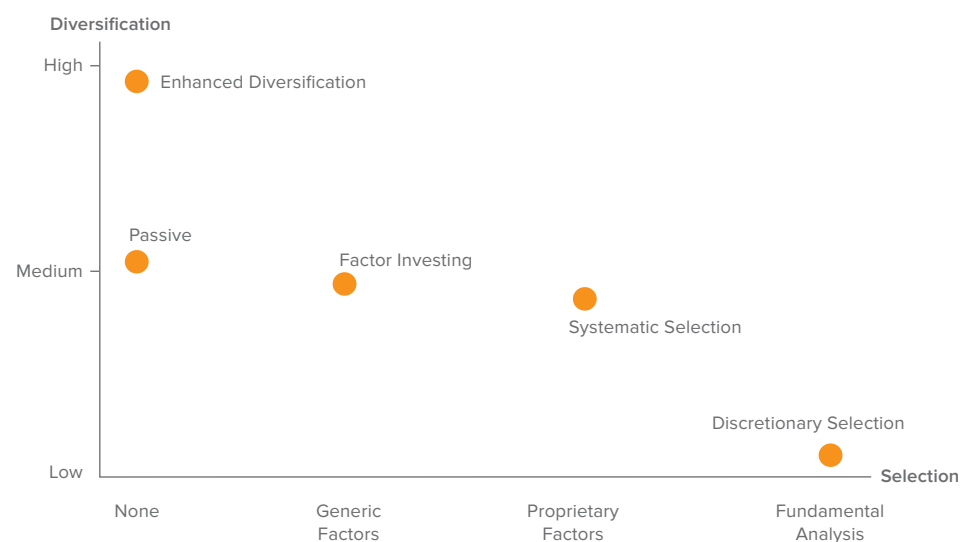
Factor investing is sometimes seen as a lower cost alternative to active management. For example, an influential study of Norway’s Government Pension Fund showed that its poor return during the global financial crisis, as well as its preceding outperformance, were fully explained by factor exposures, hence did not merit the fees paid to its broad line-up of active managers.<sup>3</sup>

In addition, the inherent transparency of factor investing lends itself well to exchange-traded funds, which offer the benefit of daily liquidity. A wide range of smart beta strategies thus has been offered as ETFs, whose widespread acceptance has led to the strategies’ exponential growth in recent years.

While factor investing may be on the rise, its use predates strategies marketed as such, and even the academic literature on the subject. Following the principles of Graham and Dodd, active investors have used “valuation” considerations at least as far back as the 1930s, long before professors Fama and French included book-to-price in their influential three-factor model of stock returns in 1992. In the 1970s and 1980s, Bar Rosenberg created the Barra factor risk models. Market participants picked up on the alpha-delivering potential of those models long before academics accepted them. Similarly, famed trader Jesse Livermore rode price trends nearly a century before Jegadeesh and Titman documented their efficacy in 1993.

Taken in this historical context, factor investing can be seen as a systematizing of insights developed by fundamental investors. It is therefore not surprising that systematic factor strategies may emulate the performance of overly diversified discretionary investors. Arguably, the potential added value of fundamental stock pickers in a diversified, multi-asset portfolio is to take concentrated positions in stocks for which they have strong conviction of a high, idiosyncratic payoff. In contrast, factor investors diversify to mitigate stock-specific risks, for which they have no expectation of being rewarded (Figure 3).

**Figure 3. Dimensions of Active Management**



Source: Voya Investment Management.

<sup>3</sup> See Ang *et al.* (2009), study commissioned by the Norwegian Ministry of Finance.

The efficacy of factors changes over time — factor strategies need to change, too.

## Limitations of factor investing

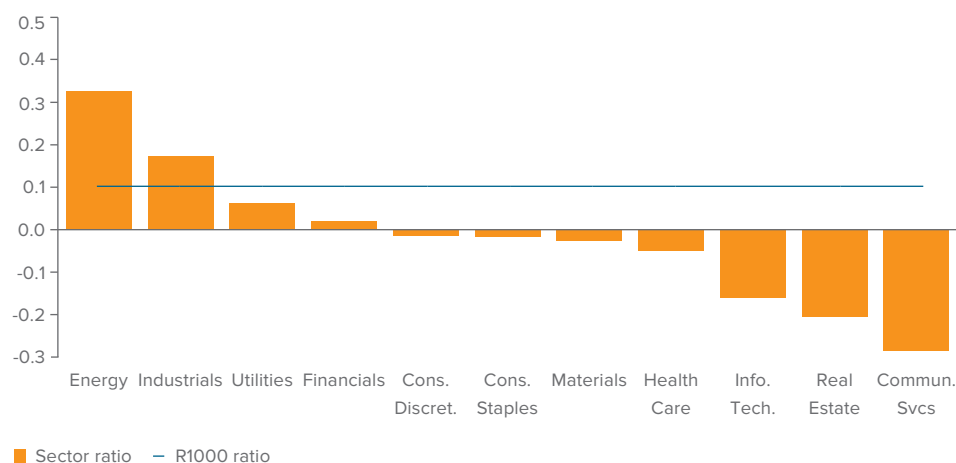
Investors should be mindful, however, that factors are crude metrics. Importantly, they are not directly investable — even staunch factor enthusiasts end up buying stakes in individual companies. What matters to those companies' prospects and market value very much varies by the nature of their businesses; with regard to such issues, quantitative analysts can learn something from fundamental investors.

A case in point is the aforementioned book-to-price, a valuation factor built for the industrial age. Figure 4 shows its efficacy for selection among U.S. large capitalization stocks since 1985, by sector. The factor has worked well for energy stocks, for which the book value of reserves is indeed a key consideration in their valuation. It has shown some relevance for industrials and utilities, where manufacturing plants and equipment may well put a floor on the share price. In contrast, among sectors driven by innovation such as information technology and communication services, stocks that looked attractively priced based on the book value of their assets historically have underperformed meaningfully.

The reason is related to outdated accounting practices tailored to “old economy” industries. While capital expenses are treated as investments that add to a stock's asset base, funds spent on research and development (R&D) are treated as expenses and not reflected in book values. Similarly, advertising campaigns for consumer-facing companies are expensed when they may contribute to building a strong “brand value” to lever well into the future. For many healthcare stocks, both R&D and marketing contribute to considerable intangible assets not represented on GAAP-conforming balance sheets. Recent academic research confirms that capitalizing historical R&D and advertising expenses in the calculation of book-to-price enhances its efficacy for stock selection.<sup>4</sup>

**Figure 4. The Efficacy of Factor Investing Varies Across Sectors**

Annualized Sharpe ratio of long top 20% and short bottom 20% by book to price ratio: Jan. 1985–Dec. 2020, equal-weighted long and short sleeves, sector-relative evaluation



Source: Data as of 12/31/20, from FactSet (returns, GICS, Russell 1000 index constituents) and Axioma (book to price and industry classification when GICS missing), analysis by Voya Investment Management.

<sup>4</sup> See Lev and Srivastava (2019), who elaborate on many of the shortcomings of GAAP-based valuation metrics that we flag in this insight.



Book-to-price, long the workhorse of academic finance, is now rejected even by its original proponents.

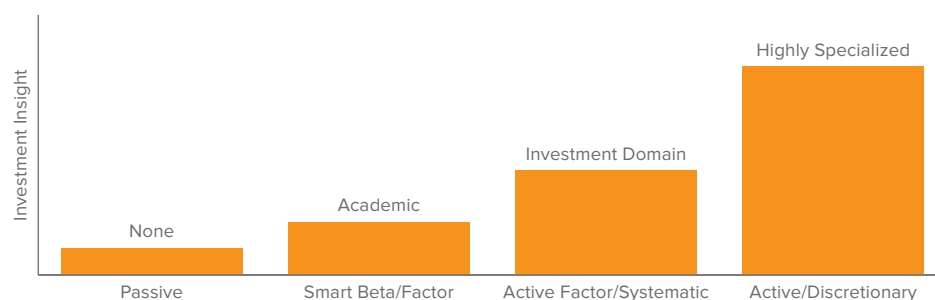
Accounting issues plague the book-to-price factor in other ways:

- Its adverse performance for real estate investment trusts (REITs) is caused by the mandatory depreciation of real estate holdings eating away at their book value, while fair market values may have increased. This issue also affects companies with heavy real estate holdings, such as department store chains. The proper measure of accounting for stocks' real estate holdings is by their estimated net asset value
- Its surprising irrelevance for differentiating future returns among financials is likely related to the subjectivity and misaligned incentives of valuing ever more complex financial instruments. For example, banks were slow to take write-offs ahead of the global financial crisis. Such subjectivity increasingly impacts the financial statements in any line of business, in ways both old (allowances for merchandise returns by retailers) and new (the impact of climate change on reinsurers and assets "stranded" by carbon pricing for energy companies and miners)
- Premiums paid for mergers create intangible goodwill on companies' balance sheets. Given the tendency of serial acquirers to overpay, these may well have to be written off in the future. Accordingly, academic research has shown that goodwill negatively predicts future stock returns<sup>5</sup>
- Stock buybacks of successful companies, typically at higher prices than the nominal value of the shares when first issued, have mechanically led to negative book values of equity for some well-known firms. Research has shown that valuation metrics based on retained earnings rather than contributed capital are better predictors of future stock returns<sup>6</sup>

Book-to-price has long been the workhorse of academic finance, but is now even rejected by its original proponents. After changes in the market environment since the original research, and adding new growth and profitability factors to their asset pricing model, Fama and French's original definition of this value factor was no longer found to have delivered a return premium historically.<sup>7</sup> The investment industry, however, has been slower to adapt. Billions of dollars are invested in active indexes that indiscriminately use this factor across all sectors<sup>8</sup> even though this stock selection criterion is irrelevant for a growing swath of the market.

Smart beta is sometimes described as a "third pillar of investing between passive and active." In our view, there is potentially a "fourth pillar" to complete the edifice: "systematic, active factor investing," (Figure 5) with proprietary factor definitions and efficient portfolio implementation intended to outperform generic factor indexes.

**Figure 5. Different Strategies Rely on Varying Degrees of Investment Insight**



Source: Voya Investment Management.

<sup>5</sup> Liu *et al.* (2019). Ironically, intangible goodwill may include a component of acquired intellectual property, unlike the home-grown type which is not represented on the balance sheet.

<sup>6</sup> See Ball *et al.* (2019). At the time of writing, McDonalds is a case in point.

<sup>7</sup> See Fama and French (2015), though Hou *et al.* arguably beat them to that punch in pre-publication versions of their 2015 paper.

<sup>8</sup> As of 12/31/19, examples include single-factor and multi-factor indexes offered by MSCI, S&P and RAFI. By "active," we refer to any index that is not capitalization-weighted.

Incorporating fundamental insight potentially makes factor strategies more effective.

## Supplementing factors with fundamental insight

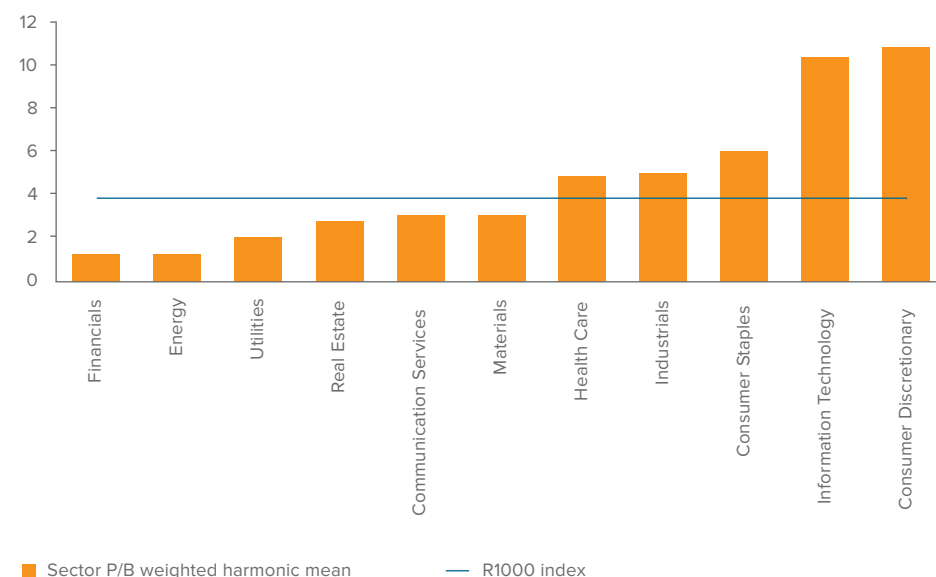
The “new economy” is increasingly knowledge-based, with wide “moats” protecting profitability margins and market shares due to networking effects and the dominance of global brands. Fortunately, the same technological and societal trends driving changes in the market environment also allow redefining “value” accordingly.

For example, patent databases shed light on firms’ intellectual property while social media chatter helps measure companies’ brand relevance, allowing for better assessment of a business’ intangibles. Financial databases provide better information to investors about loan delinquencies for banks, as well as the cash flow from REIT property portfolios. Increasingly common environmental, social and governance (ESG) disclosures shed light on the non-financial balance sheet of companies. The key challenge to investors is defining the numerator of valuation ratios to better reflect business prospects than the generic value factors prevalent today. Importantly, it is exactly intangibles such as innovation that may provide the catalysts for beaten-down value stocks to reverse their fortunes.

A key consideration for relative valuation strategies is the definition of proper peer groups. For instance, the energy sector generally trades much closer to book value than information technology (Figure 6). Using book-to-price only for security selection within sectors mitigates this inherent bias, as in the analysis above and some factor indexes, but may be insufficiently granular. For instance, the asset-light software and services segment within the information technology sector would appear structurally more expensive than hardware and semiconductors on this valuation metric, but it would be unlikely to consistently represent an inferior investment opportunity.

**Figure 6. Book Value as a Factor Can Skew Investment Searches Toward Certain Sectors**

Price to book ratios of Russell 1000 index sectors



Source: FactSet, R1000 sector P/B weighted harmonic means as of 12/31/20.

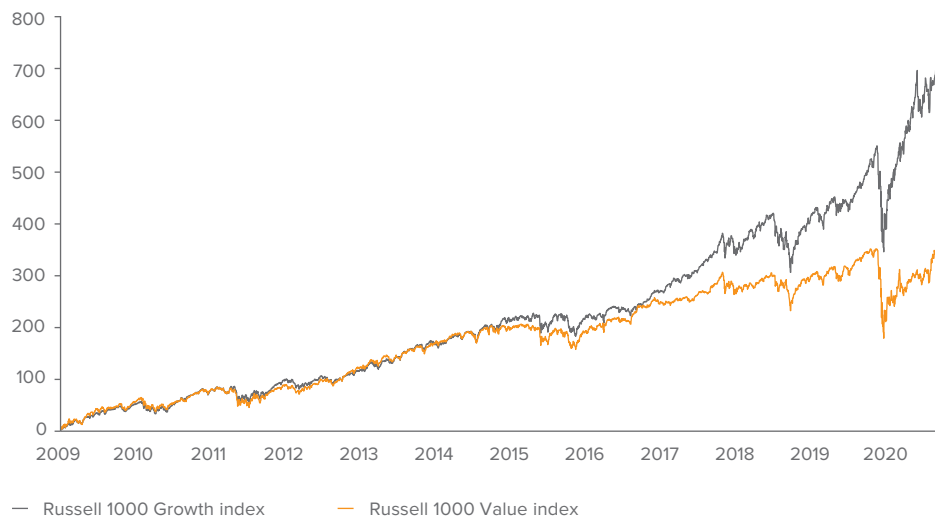
## Focus on outcomes

The next frontier is to devise factorbased strategies with potential to deliver desired outcomes for investors.

Despite more than half a decade of underperformance by value investing (Figure 7), rumors of its demise might be premature, since price does matter. Fundamentally, there are two components to any investment: a stake in a business and the amount paid for it. If the history of human behavior is any guide, investors will remain prone to overpaying for the shiny but distant growth prospects of “glamor stocks,” and will show less interest in more established, but unexciting firms.

**Figure 7. In the Current Bull Market, Growth has Strongly Outperformed Value**

R1000V and R1000G total return: month-over-month percent change



Source: Data as of 12/31/20, from the Frank Russell Co., analysis by Voya Investment Management.

To be effective, we believe factor investing strategies should be both contextual, i.e., able to take into account differences across business segments, and adaptable as markets change over time. It should reflect the many insights that can be gotten from fundamental investors as to what differentiates the prospects of stocks within a specific industry. In our view, integrating such fundamental stock-selection insights into a systematic strategy through careful research and targeted data acquisition is what constitutes a truly effective factor investment strategy. In short, Voya constructs factors to systematically invest in stocks, rather than using stocks to load on factors.

The next frontier for factor-based investing is to devise strategies with the potential to deliver on investment outcomes, rather than just aim for outperforming a benchmark. For instance, strategies with a high dividend payout but low volatility may be particularly attractive for investors in the decumulation phase of retirement planning, i.e., through retirement, when they need both income and growth, but cannot take on the full risk of a sudden equity market downturn. Ultimately, what matters is not the labeling of a strategy, but whether it contributes to meeting clients' investment objectives in a risk-managed and cost-effective manner.



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