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#### CONTACT US

Web: [www.researchaffiliates.com](http://www.researchaffiliates.com)

##### Americas

Phone: +1.949.325.8700

Email: [info@researchaffiliates.com](mailto:info@researchaffiliates.com)

Media: [hewsteam@hewescomm.com](mailto:hewsteam@hewescomm.com)

##### EMEA

Phone: +44.2036.401.770

Email: [uk@researchaffiliates.com](mailto:uk@researchaffiliates.com)

Media: [ra@jpesppartners.com](mailto:ra@jpesppartners.com)

# A Smart Beta for Sustainable Growth

*Chris Brightman, CFA, Mark Clements, PhD, and Vitali Kalesnik, PhD*

Investors have long used the “style box” to diversify their equity portfolios by allocating to a mix of growth and value funds. As intended, diversifying by style has reduced tracking error. Unfortunately, it hasn’t delivered the hoped-for outperformance. While value funds have outperformed the market, growth funds have underperformed.<sup>1</sup>

Value indices are built on strong theoretical foundations and have provided a long history of positive excess returns. Traditional growth indices, constructed as the inverse of value, lack a robust theoretical foundation and have provided

## Key Points

1. *Traditional growth indices, designed as the inverse of value, have delivered negative excess returns and failed to provide faster growth in earnings per share (EPS). Active growth managers, who track growth indices, have likewise underperformed the market.*
2. *Companies that invest aggressively to grow assets and sales despite a low return on capital perform poorly, attributable to negative relative growth in EPS. Companies with a high return on capital and more disciplined growth strongly outperform, attributable to high relative growth in EPS.*
3. *A smart beta growth strategy, by investing in profitable companies with conservative investment practices, can diversify value strategies while delivering a strong positive excess return from sustainably faster growth in EPS.*

a long history of negative excess returns. Even worse for growth investors, active growth managers have delivered underperformance along with high fees.<sup>2</sup>

Can investors find a simple systematic growth strategy to diversify their value funds that also provides a positive excess return? Yes! We show in this article that a smart beta growth strategy—investing in companies with sustainably high earnings-per-share (EPS) growth, as identified by high profitability and conservative investment—can diversify value indices, while also delivering a positive excess return.

## The Failure of Growth Funds

In 1993, Fama and French synthesized previous academic work on the sources of equity returns to create the famous three-factor model: market, value, and size. Soon thereafter, “growth” came to be interpreted as the inverse of value. The logical assumption was that investors, in an efficient market, will set higher stock prices relative to book value in recognition of stronger future growth in EPS.

Following this interpretation, growth indices were created as the inverse of value indices; they were simply indices of expensively priced stocks. We now know, however, that more expensive stocks persistently underperform cheaper stocks. Unsurprisingly, traditional growth indices, inspired by this definition of growth, have duly underperformed.

Active managers endeavor to identify unrecognized or underappreciated companies likely to deliver future growth in EPS that more than compensates for any price premium. Unfortunately for the investors in these funds, active growth managers, much like growth indices, have generally failed to deliver positive excess returns. Active growth managers, on average, underperformed the market by nearly 60 basis points a year from January 1991 to June 2013—and this is before fees!<sup>3</sup>

## Smart Beta

Smart beta seeks to deliver well-researched, systematic sources of excess return through transparent, low-cost investment vehicles. Informed by the Fama–French (2015)

five-factor model, we explain how to create a smart beta growth strategy by combining the two new factors—profitability and investment—Fama and French recently added to their three-factor model.

Today, profitability and investment are well-known factors. The excess returns associated with these factors have been thoroughly documented in earlier papers.<sup>4</sup> In this article, we demonstrate that the fundamental source of the excess returns delivered by profitability and conservative investment can be attributed to *sustainably faster growth in EPS*, the very attribute that growth funds attempt to provide. From this finding, we show these two new factors can be combined to construct a smart beta strategy that delivers persistent outperformance through high growth in EPS.

## Smart vs. Dumb Growth Stocks

To illustrate the intuition supporting the empirical evidence, we explore several examples of smart and dumb growth stocks. The stock of a company with a low return on capital and a management investing rapidly to increase its scale of operations is a dumb growth stock. In contrast, the stock of a company with a high return on capital with a management that demonstrates discipline and skill in capital allocation is a smart growth stock. Our examples look at three points in time: the height of the dot-com bubble (July 1999), the eve of the global financial crisis (July 2007), and more recently, July 2016.

Let's begin with the dumb growth stocks.

We examine three dot-com stars—Compaq, Yahoo, and WorldCom—which, like many companies in the late 1990s, were aggressively investing for growth in the new internet-connected economy.

*“Diversifying by style... hasn’t delivered the hoped-for outperformance.”*

### Characteristics of Example High- and Low-Investment Companies

	Company	Investment	Return on Equity	Earnings Yield	Subsequent 5-Year Total Return	Subsequent 10-Year Total Return
July 1999	Market	31.6%	6.3%	4.0%	29.75%	20.79%
	Compaq	57.5%	-24.2%	-6.8%	—	—
	MCI WorldCom	285.9%	-5.7%	-1.6%	—	—
	Yahoo	338.3%	4.8%	0.1%	-15.5%	-63.6%
	Coca-Cola	6.1%	94.2%	4.4%	14.7%	20.8%
	Exxon	-3.6%	14.7%	3.4%	29.6%	124.8%
	Kellogg's	3.6%	56.5%	3.8%	48.8%	87.5%
July 2007	Market	21.0%	10.8%	4.9%	5.5%	-
	Wachovia	35.8%	11.1%	7.9%	—	—
	Merrill Lynch	23.5%	20.9%	10.1%	—	—
	Lehman Brothers	22.8%	21.9%	9.9%	—	—
	Coca-Cola	1.8%	30.0%	4.2%	72.8%	—
	Exxon	5.1%	34.7%	8.4%	14.2%	—
	Kellogg's	1.3%	48.5%	4.9%	10.4%	—
July 2016	Market	11.5%	4.4%	4.6%	—	—
	Tesla	38.4%	-78.6%	-2.8%	—	—
	Facebook	23.0%	8.3%	1.4%	—	—
	Netflix	44.6%	5.5%	0.3%	—	—
	Coca-Cola	-2.1%	28.8%	3.8%	—	—
	Exxon	-3.6%	9.5%	4.2%	—	—
	Kellogg's	0.7%	28.9%	2.1%	—	—

Source: Research Affiliates, LLC, using data from CRSP/Compustat.

Compaq was the largest manufacturer of personal computers in the 1990s.<sup>5</sup> To build scale, Compaq, despite (or because of) falling profits, invested heavily in a series of aggressive acquisitions.<sup>6</sup> These acquisitions failed to produce the hoped-for economies of scale, while the rapid expansion caused quality control problems. We were not able, for example, to write this article on a Compaq machine, because the company was acquired at a fraction of its peak price by Hewlett-Packard in 2002.<sup>7</sup>

Yahoo, in the late 1990s, was expected by the stock market to attain a leading (if not the dominant) place in the exciting new field of web search. Despite little apparent profitability at the time, Yahoo invested aggressively to capture “eyeballs” and traffic. Although web search did become extremely valuable, Yahoo did not. Simply put, Google came along and did search much better.

WorldCom was the second-largest long-distance communication provider in 1999, a position achieved through aggressive acquisitions of technologies and networks. WorldCom financed its (loss-making) growth using rapid stock issuance, large amounts of debt, and some accounting fraud. When investors discovered that the industry had massively overinvested in fiber optic communication infrastructure, the game was up. WorldCom filed for Chapter 11 protection in 2002.

Financials, in the lead-up to the global financial crisis of 2008, are another example of dumb growth. Politicians, the media, and too many investors viewed securitization of mortgage debt as modern financial alchemy. Many of the banks that were among the most aggressive in stuffing their balance sheets with mortgage-backed securities have since failed or been acquired at fire-sale prices, leaving investors high and dry.

## ***“High-profitability and low-investment strategies deliver higher-than-market growth in EPS.”***

Now, let's look at a few examples of smart growth stocks, in particular, Coca-Cola, Exxon, and Kellogg's.

Over the three periods we examine, these companies have consistently ranked at the top of large companies sorted by high profitability and conservative investment. Each has cultivated its competitive advantage to dig a moat around its profitability. The managements of these companies have been careful stewards of their investors' capital. All three slowly and steadily grew to global dominance in their industry.

Yes, of course, we cherry-picked these examples. Nonetheless, these vivid descriptions of dumb-versus-smart growth stocks illustrate empirical facts: companies with high investment, despite low profitability, fail to provide strong returns to shareholders, and in contrast, companies with high profitability, paired with low investment, deliver sustainably high returns.

More recently, Tesla, Facebook, and Netflix are examples of companies with an aggressive level of investment combined with a low return on capital. Are these companies poised to be the next Apple and Google, or will they go the way of Compaq, Lehman, and WorldCom? We have no specific information about the future prospects of these high-flying market darlings, but history teaches that, on average, companies with a low return on capital, paired with aggressive investment, have provided poor returns to investors.<sup>8</sup>

## **Growth of What?**

An effective growth strategy should, presumably, provide higher-than-average growth in EPS, so a logical question is, which factor strategies are most likely to deliver high

EPS growth? We explore this question using a simple total real-return decomposition:

$$\text{Total Real Return} = \text{Dividend Yield} + \text{Change in Valuation} \\ + \text{Growth in Real EPS}$$

Given that this relationship holds as an identity from the definition of total return, we can apply it to any factor strategy in order to decompose its fundamental drivers of return.<sup>9</sup> We apply the return decomposition to the following factors:

1. Value vs. Growth (both traditionally and academically defined)
2. High Profitability vs. Low Profitability
3. Low Investment vs. High Investment
4. High Profitability and Low Investment vs. Low Profitability and High Investment

To construct each of the strategies, we select the 30% of stocks scoring high and low on these four characteristics, then capitalization-weight the stocks to form portfolios. Following the academic literature, we construct portfolios that are an equally weighted blend of portfolios formed in the large-cap and small-cap stock universes.<sup>10</sup> We also include results for “traditional” value and growth index strategies by simulating strategies using the Russell Value and Growth Index methodologies.

All the strategies we examine represent known sources of excess returns from published and replicated factors. No surprise, therefore, that the top-line strategies outperform those at the bottom. Our new and interesting information comes from examining the drivers of these returns.

Both the traditional growth factor strategy (expensive stocks) and the growth index underperform the market by an economically significant amount, and the amount of the former is also statistically significant. Growth, as traditionally defined, provides a lower dividend yield, negative

## Performance Characteristics of Strategies and Factor Portfolios, Jan 1968–Mar 2017

*Panel A. Decomposition of Factor Portfolio Log Real Returns in Excess of the Market-Capitalization-Weighted Benchmark*

Portfolio Strategy	Log Excess Real Return	Return from Dividends	Growth in Valuation	Growth in Real EPS
Traditional Value Index*	1.28%	0.88%	0.30%	0.10%
Traditional Growth Index*	-0.83%	-0.70%	-0.06%	-0.06%
<i>Difference</i>	<b>2.11%</b>	<b>1.58%</b>	<b>0.36%</b>	<b>0.17%</b>
Value (P/B)	2.04%	0.89%	0.29%	0.86%
Growth (P/B)	-1.72%	-0.91%	-0.41%	-0.40%
<i>Difference</i>	<b>3.76%</b>	<b>1.79%</b>	<b>0.70%</b>	<b>1.26%</b>
High Profitability	0.64%	-0.26%	-0.61%	1.51%
Low Profitability	-1.68%	-0.29%	2.13%	-3.51%
<i>Difference</i>	<b>2.32%</b>	<b>0.04%</b>	<b>-2.74%</b>	<b>5.02%</b>
Low Investment	2.01%	0.37%	0.49%	1.15%
High Investment	-2.03%	-0.63%	-0.47%	-0.93%
<i>Difference</i>	<b>4.05%</b>	<b>1.01%</b>	<b>0.96%</b>	<b>2.08%</b>
High Profitability/Low Investment	2.29%	0.39%	0.36%	1.53%
Low Profitability/High Investment	-2.54%	-0.68%	-0.22%	-1.64%
<i>Difference</i>	<b>4.83%</b>	<b>1.07%</b>	<b>0.58%</b>	<b>3.17%</b>

*Panel B. Correlations Between Value-Add of Strategies and Factor Portfolios*

	Traditional Value	Traditional Growth	Value	Growth	High Profitability	Low Investment	High Prof., Low Inv.
Traditional Value Index	1.00						
Traditional Growth Index	-0.82	1.00					
Value	0.78	-0.72	1.00				
Growth	-0.91	0.83	-0.81	1.00			
High Profitability	-0.17	0.45	-0.24	0.19	1.00		
Low Investment	0.48	-0.62	0.46	-0.46	-0.51	1.00	
High Profitability/Low Investment	0.52	-0.54	0.36	-0.48	-0.16	0.75	1.00

Source: Source: Research Affiliates, LLC, using data from CRSP/Compustat.

\* These strategies are based on the Russell 1000 Value Index and Russell 1000 Growth Index methodologies and select stocks from the top 1,000 by market capitalization according to a composite value/growth score calculated using book-to-price ratio, five-year sales per share growth, and two-year EPS growth. Stocks are weighted by the product of this score and market capitalization, and rebalanced annually.

Note: Each strategy's total real return is decomposed into return from dividends, growth in valuation, and growth in real EPS. Nominal earnings are deflated using the seasonally adjusted Consumer Price Index for All Urban Consumers from the Federal Reserve Bank of St. Louis. Real EPS are measured as the trailing five-year average real earnings divided by current shares outstanding. The price-to-earnings valuation ratio used in the valuation growth component uses the same real EPS measure with nominal prices deflated. We compute log returns so that the components of each strategy's return sums to the strategy's total return. In the table, we report these log returns in excess of the log return from a market-capitalization-weighted benchmark portfolio.

**“This smart beta growth strategy displays relatively low correlation with value.”**

valuation change, and negative relative growth in EPS.<sup>11</sup> A possible explanation is over-extrapolation by investors of past earnings growth.

Active growth managers do not aim to deliver such a dumb growth strategy to their investors, yet the average growth manager's positive correlation with this growth factor may explain their average underperformance.<sup>12</sup>

Unlike the dumb growth provided by expensive stocks, profitability actually delivers higher growth in EPS. Like expensive stocks, profitability also provides negative correlation of excess returns with value. Unfortunately, high profitability, like expensive stocks, experiences negative excess returns from lower dividend yields and depreciation of valuations.

Companies with low investment deliver faster growth in EPS. The low-investment portfolio also benefits from higher dividend yields and from appreciation of valuations. With each component of return contributing to excess return, the low-investment strategy convincingly outperforms the market.

Finding that low investment produces high growth in EPS seems counterintuitive. Doesn't high investment create subsequent growth? Here we should ask, growth of what? Aggressive investment often delivers rapid growth in sales and assets, but slow or negative growth in EPS.

How does a company grow its scale faster than the competition? What investment approach builds the marginal plant, delivers the newest product, expands into new markets, and/or acquires the competitor? The answer can be a lower profitability hurdle for investment. Rapid growth in the scale of a business often comes at the cost of dilution in EPS and a lower return to shareholders.

## Who Benefits?

We have shown that the stocks of companies that engage in aggressive investment have slower growth in EPS and produce a poorer return for shareholders. Why would a company's management aggressively expand its low-profitability businesses to the detriment of shareholders? One answer is empire building.

To explore whether empire building may explain overinvestment, we regress CEO compensation on the company's total assets, controlling for profitability and starting valuation. Our results from this regression illustrate the incentive faced by CEOs to grow the scale of their companies.<sup>13</sup>

In the most recent fiscal year, for the median level of CEO compensation, a \$1 billion increase in total assets is associated with an additional \$500,000 in annual compensa-

### CEO Compensation of Russell 3000 Firms on Total Assets, Return on Equity, and Price-to-Book Ratio, Most Recent Fiscal Year

Dependent Variable: Log of CEO Compensation	Firms: 2,206	Adjusted R <sup>2</sup> : 33%	
	Coefficient	t-stat	Median (level)
Log of CEO Compensation			\$4,136,915
Log of Total Assets	0.33	32.28	\$2,363 (mil.)
Return on Equity	0.00	1.14	8.9%
Price-to-Book Ratio	0.01	4.07	2.4

Source: Research Affiliates, LLC, using data from Bloomberg.

tion. A doubling of assets is associated with an additional \$1 million in annual compensation. Clearly, CEOs have an incentive to increase the scale of their companies.

## Sustainable Smart Growth

We observe that both high-profitability and low-investment strategies deliver higher-than-market growth in EPS. What happens if we combine the two? Such a smart growth strategy combines the best features of the high-profitability and low-investment portfolios, investing in companies with high EPS growth and high dividend yield to deliver sizable excess returns.

This smart beta growth strategy also displays relatively low correlation with value. While not negatively correlated—as in the case of a growth strategy constructed as the inverse of value—the low correlation implies ample opportunity to diversify value strategies. Investors are buying more than just exposure to value companies whose earnings tend to rebound after periods of low earnings growth.

Companies that place growth in the scale of their business above the interests of their shareholders would seem to be failing a basic test of corporate governance, the “G” in ESG (environmental/social/governance). Rapid and unprofit-

able growth in the scale of a business may fail the test of environmental sustainability as well. How much environmental damage might we avoid if we reduced corporate empire building by investing more carefully? This subject suggests opportunity for additional research.

## Conclusion

Growth managers strive to pick the next Google or Microsoft and to be rewarded with outsized profits as these new star companies rise to become tomorrow’s behemoths. The poor average performance of growth funds demonstrates that consistently identifying such stocks *ex ante* isn’t easy. Companies with rapidly expanding EPS too often trade at expensive valuations. For every Google, there are many also-rans.

We demonstrate a systematic method of growth investing that avoids the slower growth in EPS and negative excess returns of traditional growth strategies. By investing for sustainable growth, as indicated by profitable companies with disciplined investment, investors can diversify their value strategies, while achieving faster growth in EPS and positive excess returns. Our research points to a smart beta strategy that aims for sustainable growth.

## Endnotes

1. For instance, see Exhibit 2 in Hsu, Myers, and Whitby (2016).
2. See Jones and Wermers (2011) and Barras, Scaillett, and Wermers (2010).
3. According to Hsu, Myers, and Whitby (2016), growth managers as a group have generated an average annualized return of 8.4% over the period January 1991–June 2013, whereas the S&P 500 Index has generated a 9.0% average return over the same period.
4. Two main explanations are offered for why these new factors deliver superior performance. The first is a risk-based explanation that argues if companies continue to be highly profitable while engaging in relatively minimal investment, it must be because they face a high cost of capital; otherwise, why wouldn't they invest? A high cost of capital implies that these companies are somewhat riskier, so investors must be compensated for the risk in the form of higher expected returns. The second explanation is behavioral, and argues that profitability is persistent, but investors do not fully realize this; therefore, the persistence of profitability is not fully reflected in current prices. The behavioral explanation for the investment factor is that investors tend to extrapolate high growth in assets into high growth in earnings and, thus, tend to overpay for the earnings growth.
5. See Rivkin and Porter (1999).
6. The largest of these, Digital Equipment Corporation, was acquired at a then-record price of just over \$9 billion.
7. Compaq was acquired by Hewlett-Packard (HP) in 2002. Gurrib (2015) shows that Compaq's shareholders benefited more than HP shareholders from higher EPS from the merger. We find it unlikely, however, that this one-time increase in EPS from the merger adequately compensated Compaq shareholders who experienced negative returns in 1999 and 2000 as well as forgone earnings yield as a result of imprudent acquisitions. WorldCom filed for Chapter 11 bankruptcy in 2002; unambiguously, shareholders were worse off as a result. In either case, shareholders paid a multiple for future growth and returns that were not realized.
8. We are fans of Elon Musk and his vision for self-driving electrical cars, colonizing Mars, the Hyperloop, and so forth, but in July 2017, as we are completing this article, the capitalization of Tesla is almost 45% larger than the valuation of Ford, with much lower output and much lower profits. Are we certain that Tesla will grow to dominate the very competitive automobile market as the stock is currently priced? Or is everyone such a fan of Elon Musk that they are willing to pay top dollar for participating in his projects and underestimating the risk?
9. Further information is provided in the appendix.
10. In the appendix, we provide results for the large-cap and small-cap portfolios, along with the details of our portfolio construction.
11. This may seem counterintuitive, however, considering the return decompositions of the large-cap and small-cap universes, which we provide in the appendix. We find that within the large-cap universe, the earnings growth contribution is as expected: positive for growth and negative (or at least negligible) for value. Within the small-cap universe these relationships are reversed, and the small-cap effect dominates the blended portfolios in the table "Decomposition of Log Real Returns of Large-Cap and Small-Cap Factor Portfolios in Excess of Benchmark." One possible explanation for the negative contribution from earnings growth among small growth companies is that these small companies tend to have more uncertain and volatile earnings. If investors over-extrapolate future earnings growth of these small firms, their stock price will be bid up relative to their book value and realized earnings growth will subsequently create a negative drag on returns as earnings mean revert from an unsustainable level. For small-cap value companies, depressed earnings rebound from a smaller base over the holding period, so that earnings growth contributes positively to returns.
12. Using data from Hsu, Myers, and Whitby (2016), we regress the AUM-weighted average one-month mutual fund returns for growth managers in excess of the risk-free rate on a Fama-French three-factor model plus momentum. We find that the growth managers have a large negative ( $-0.26$ ) and statistically significant ( $t$ -stat of  $-12.91$ ) loading on the Fama-French value factor.
13. This regression is by no means meant to be conclusive; in particular, because it is based on just one cross-section of data and does not account for how these relationships may have changed over time. The regression is only meant to illustrate the incentive to grow assets that is faced by CEOs and that may create unintended consequences for investors.

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