Reports of Value’s Death May Be Greatly Exaggerated
January 30, 2020
by Rob Arnott, Campbell Harvey, Vitali Kalesnik, Juhani Linnainmaa
of Research Affiliates

Key Points

- Value investing has underperformed relative to growth investing over the last 12 years. The authors examine several popular narratives to explain this relative underperformance, including technological revolution, crowded trade, low interest rates, growth of private markets, and traditional measures of value that ignore internally generated intangible assets. These narratives purport to explain why “this time may be different” and why value’s poor relative performance may be the “new normal.”
- The authors demonstrate that the primary driver of value’s underperformance post-2007 was growth stocks getting more expensive relative to value stocks.
- The authors explore whether book value is the right denominator for value. In today’s economy, intangible investments play a crucial role yet are ignored in book value calculations. They show that a measure of value calculated with capitalized intangibles outperforms the traditional price-to-book measure, particularly post-1990.
- With today’s value vs. growth valuation gap at an extreme (the 97th percentile of historical relative valuations), the stage is set for potentially historic outperformance of value relative to growth over the coming decade.

Executive Summary

The Fama–French value factor, and value investing in general, has suffered an extraordinarily long 12 years of underperformance relative to the growth investing style. The current drawdown has been by far the longest as well as the second largest since July 1963, eclipsed only by the tech bubble from 1997 to 2000. Arnott, Harvey, Kalesnik, and Linnainmaa examine the potential causes of value’s underperformance and provide estimates of value’s performance relative to growth’s performance under different revaluation scenarios over the next decade.

Five stories may play a role in explaining value’s recent underperformance: 1) the value investing style, or factor, could be a product of data mining; 2) structural changes in the market could have caused the value factor to become irrelevant; 3) the value trade could have become crowded; 4) the value factor is becoming cheaper; and 5) a “left-tail” outlier, or simple bad luck.

Because value investing has a long history of strong performance (easily traced back at least to the 1930s by proponents such as Graham and Dodd) and solid economic footing, the authors believe the first story is an unlikely contributor to value’s recent travails. They turn their attention to the other potential stories after they first review value’s historical performance record in comparison to its record over the last decade.

Value’s Historical vs. Recent Performance

The value factor is one of the most studied and academically recognized return premiums. In their historical analysis from July 1963 to September 2019, the authors define the value factor following the Fama–French (1992) definition of high-minus-low (HML) book-to-price (B/P). This method takes the difference between two portfolios, the highest 30% and the lowest 30% of the market by B/P, which are market-capitalization weighted.

Over the period studied, value is one of the most attractive factors in terms of market-adjusted return when compared to the other factors of size, operating profitability, investment, momentum, and low beta. Even with the handful of large drawdowns over the 56-year sample period that coincided with the Nifty Fifty, Iran oil crisis, tech bubble, and global financial crisis, a value investor is still 6.1 times wealthier than a growth investor.
The authors evaluate seven popular narratives that propose to explain a “new normal” for value investing and for why “this time is different.” These narratives are crowded trade, technological revolution, low interest rates, growth of private markets, less migration of value stocks to neutral and growth classifications, internally generated intangibles that are not captured in book value, and value becoming drastically cheaper relative to growth. The authors state that most, excepting the last two, are only weakly supported if at all.

The narratives just described offer various mechanisms to explain value’s recent underperformance. The implications of each story can be best understood by disaggregating the three components of value versus growth: revaluation, migration, and profitability.

**Revaluation** is the relative valuation difference of growth versus value. Explicitly, if growth stocks become more expensive versus value stocks, the process of value stocks’ becoming relatively cheaper means value will underperform growth.

**Migration** in this case is when a value stock becomes more expensive (trades at a higher price-to-book, P/B, ratio) and is reclassified into either the growth or the neutral portfolio, or vice versa as when a growth or neutral stock becomes cheaper and moves into the value portfolio.

**Profitability** has been shown to explain the differences in the valuations of value stocks and growth stocks (Cohen, Polk, and Vuolteenaho, 2003). About half of the information contained in the P/B differences between value and growth stocks can be attributed to the differences in their future profitability, and the persistence in growth stocks’ valuations reflects their expected (15-year) profitability.

The authors find that about 70% of value’s volatility over the last 12 years is explained by revaluation and that over 100% of value’s underperformance relative to growth appears to be due to falling relative valuations. Hence, they conclude that revaluation is the key to understanding why growth stocks have outperformed value stocks.

**Alternative Drivers of Value’s Performance**

Arnott, Harvey, Kalesnik, and Linnainmaa introduce a regression-based model that accounts for the correlations of the three components of the value premium in order to examine what may have changed in 2007 and thus impacted the relative valuation of value compared to growth. The model incorporates an accounting identity decomposition that fully
attributes the changes in relative valuations, between the start and end dates of the data sample, to portfolio returns.

The analysis uses two profitability measures—return on equity and earnings yield—and eight value strategies.

### Table 8. Performance of Alternative Value Definitions, United States, Jul 1963–Sep 2019

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<tr>
<td>HML</td>
<td>5.65%</td>
<td>(3.85)</td>
<td>-3.00%</td>
<td>(-1.16)</td>
<td>3.69%</td>
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<tr>
<td>HML, Small-Cap</td>
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<td>-2.04%</td>
<td>(-0.78)</td>
<td>5.41%</td>
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<td>HML, Large-Cap</td>
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<td>Value-to-Neutral</td>
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<tr>
<td>Sales-to-Price</td>
<td>5.79%</td>
<td>(3.99)</td>
<td>0.59%</td>
<td>(0.30)</td>
<td>4.61%</td>
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<tr>
<td>Dividends-to-Price</td>
<td>1.52%</td>
<td>(1.02)</td>
<td>-1.72%</td>
<td>(-0.69)</td>
<td>0.78%</td>
</tr>
<tr>
<td>Composite</td>
<td>4.93%</td>
<td>(2.91)</td>
<td>-1.34%</td>
<td>(-0.52)</td>
<td>3.51%</td>
</tr>
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Note: Neutral in the value-to-neutral and neutral-to-growth definitions is the 40% of neutral stocks by P/B ratios. Similar to HML both of these definitions are balanced by size. In the portfolios defined by earnings-to-price, sales-to-price, and dividends-to-price ratios we follow the HML convention but with the difference that, instead of P/B, we use the corresponding ratios to form the portfolios. Composite uses the average of the normalized book value, five-year averages of earnings, sales, and dividends; divided by the company market capitalization. For the dividends-to-price ratio-based portfolio we exclude the non-dividend-paying stocks as the first step of portfolio formation to avoid classifying non-dividend-paying stocks as growth stocks. We use five-year averages to make the portfolio definitions less sensitive to cyclical peaks and troughs. We measure the valuations percentiles in June 2007 and June 2019 using the same ratio that we use to form the portfolios. With the earnings-to-price and composite measures, we convert each measure to a percentile rank based on its location in the full-sample distribution.

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

The regression analysis finds that post-2007 two sources account for value’s underperformance: 1) rising valuations of growth stocks and 2) an oversampling of bad luck. The latter result is not surprising given that the analysis covers the exact period during which value underperformed.

### The Role of Intangibles

In today’s economy, intangible investments play a crucial role in a company’s value. The authors explore whether value is mismeasured when using book value, given current US accounting standards that ignore internally created intangible investments. The authors find that a measure of value calculated with capitalized intangibles (iHML) outperforms the traditional P/B measure for the period beginning in the 1990s, which coincides with the internet revolution and the importance of intangible assets.
**What’s Ahead for Value in the 2020s?**

Currently, relative valuations for value stocks are in the far tail (97th percentile) of the historical distribution, which implies that expected returns for the value style or factor are elevated relative to growth. Additionally, the other contributors of migration and profitability to value’s performance should offer a positive net return in the coming years. Although the future expected returns of value compared to growth are favorable, luck (both good and bad) can influence the distribution of outcomes. Thus, while value strategies appear to be very attractive today, this favorable expected return does not guarantee that value will outperform growth over the short run.

*Summarized by Kay Jaitly, CFA*

**Reports of Value’s Death May Be Greatly Exaggerated**

An investment strategy, style, or factor can suffer a period of underperformance for many reasons. First, the style may have been a product of data mining, only working during its backtest because of overfitting. Second, structural changes in the market could render the factor newly irrelevant. Third, the trade can get crowded which leads to distorted prices and to low or negative expected returns. Fourth, recent performance may disappoint because the style or factor is becoming cheaper as the factor plumbs new lows in relative valuation. Finally, flagging performance might be a result of a left-tail outlier, or simple bad luck. If the first three reasons (among others) might imply the style has stopped working and will not likely benefit investors in the future, the last two reasons have no such implications.

Many investors are reexamining their exposure to the value style given the extraordinary span—over 12 years—of underperformance relative to growth investing. Given the long historical record of value investing, and its solid economic foundations (dating back to the 1930s and, less formally, dating back centuries), it is unlikely that the period up to 2007 was a result of overfitting. The three other explanations, however, deserve a deeper examination. It is likely that no one story accounts for the underperformance; it is probably a combination of all three.

The performance of value versus growth is naturally disaggregated into three components: revaluation, migration, and profitability. Revaluation is simply the relative valuation of growth versus value. If growth stocks get relatively more...
expensive than value stocks, the mere process of value becoming cheaper relative to growth means that value will underperform growth. Indeed, revaluation accounts for about 70% of the performance differential over the past 12 years. This is not particularly surprising given that six stocks, which we describe as the FANMAG stocks,1 that comprise about 16% of US stock market capitalization have collectively appreciated nearly tenfold since 2007. Without the FANMAGs, the performance of the S&P 500 Index would have been over 3,000 basis points lower. None of these stocks is a value stock.

The two other performance components are also important. Migration occurs when a value stock becomes more valuable (i.e., trades at a higher price-to-book ratio) and moves from the value portfolio to the neutral or growth portfolio. Migration also occurs when a growth or neutral stock becomes cheaper and drops into the value portfolio. The latter type of migration is a large and reliable contributor to the relative performance of value versus growth. Our examination of the pre- and post-2007 data shows no significant difference in migration. Profitability is the third driver of relative performance, because most growth stocks are more profitable than most value stocks and exhibit faster-rising profits. Similar to the analysis of migration, we find little evidence of any change in the contribution of profitability to relative performance over the past 15 years.

This article is organized as follows. In the first section, we examine the details of the recent period of value’s underperformance relative to its historical performance. We then introduce in the second section a return decomposition to study alternative drivers of value’s performance. In the third section, we examine the role of intangibles in the definition of value. In the fourth section, using history as a guide, we study the expected future performance of value conditional on various scenarios of relative valuation. We offer some concluding remarks and suggestions for future research in the final section.

Our Approach: A Brief Overview

We begin with an analysis of the likelihood of observing a drawdown of –39.1% using the bootstrap method detailed by Arnott et al. (2019). Interestingly, the current drawdown is not as large as the largest drawdown observed in the period June 1963–June 2007. Our analysis suggests that the probability of observing such a large drawdown is 4.9%, or roughly 1 out of 20. Whereas a 4.9% likelihood is low, it is not implausible; a statistical red flag might be a likelihood of 1.0% or less.

We then seek to measure the structural alpha of the value strategy by purging the revaluation component from the value-minus-growth return. Specifically, in 2007, the valuation spread (value minus growth) was narrow, in the top quartile (22nd percentile). By July 2019, the spread was very wide, with the value portfolio in its cheapest decile relative to growth (97th percentile). Such a widening naturally leads to value performing poorly relative to growth. The leftover return (the structural alpha) is a combination of the profitability difference and migration.

In the post-2007 period, we estimate structural alpha between –0.1% and 1.3% (compared to a pre-2007 estimate between 5.1% and 6.4%), depending on the method of estimation. A simplistic interpretation is that the value factor has lost its efficacy. Rather, the estimate is low because the period we analyze—a steep drawdown—is not a random draw. We show that historically whenever value loses money, the regression estimate for structural alpha often turns negative, indeed at –3.6% it is far worse than our –0.1% regression coefficient since 2007.

If the structural alpha is far worse when HML underperforms, why isn’t this captured by the regression coefficient? The answer is surprisingly simple. If we filter on outcomes, such as negative HML return, these can happen because relative valuation is falling, or because the error term in the regression is a left-tail outlier. Simply stated, because of these periods of HML underperformance, we are “oversampling bad luck.”2 In short, our analysis attributes value’s recent underperformance to two sources: the rising valuations of growth stocks and bad luck. Importantly, we estimate that the amount of bad luck required to explain this underperformance is nothing out of the ordinary given the historical ebbs and flows of value.

Our analysis subsumes a number of potential explanations of value’s underperformance. For example, some have said the value trade has become crowded, distorting stock prices so that the factor generates a very small or negative expected return. Crowding should cause the factor to become more richly priced. A drop in the valuation spread between growth and value, from the 22nd to the 97th percentile, however, does not seem consonant with crowding into the value factor.

Likewise, little evidence exists to suggest that the value strategy’s long-run structural alpha has turned negative; in fact, we cannot reject the null hypothesis that value has the same structural alpha that it had before 2007. The main difference between “now” and “then” is the rise in valuations, both for growth relative to value, and for US stocks in general. Unless we choose to assume that the valuation spread between value and growth stocks will continue to widen indefinitely, our analysis suggests value is highly likely to outperform growth in the years ahead.

Many other stories have been told that purport to explain the 12-year shortfall in value’s performance and to explain why
value will not make a comeback. Some have argued that growth will be permanently more profitable than value in today’s market environment. Others have argued that the extraordinarily low interest rates over the past 12 years have boosted the profitability of growth stocks. Our analysis shows little difference in overall profitability of the growth and value investing styles over the two periods, although unsurprisingly large-cap growth has been more profitable in the period since 2007, largely due to the FANMAG stocks.

Another important structural issue we address is the rapid movement from a manufacturing to a service and knowledge economy. In such an economy, there are economic reasons to believe that simple measures of value, such as the price-to-book ratio, are misleading. For example, a company presumably undertakes the creation of intangibles (e.g., research and development, patents, intellectual property, and so forth) because management expects them to add to shareholder value. These investments, however, are typically treated as an expense and are not accounted for as an amortizable asset on the balance sheet, effectively lowering book value by the amount of the intangibles. This accounting treatment leads to the stocks of many companies being classified as growth stocks because of low book values. Many of these stocks would have been classified as value stocks if the value of the internally generated intangible investments had instead been capitalized (thus increasing book value).

We have often argued that, absent an agreed-upon industry-wide measure of value, it is unwise to select a single measure such as book-to-market-value for use in valuation, especially when strong reasons exist to believe that a company’s book-value accounting measures do not accurately represent the company’s financial position. We also believe it makes sense to capitalize intangible investments in order to have the most realistic measure of a company’s capital. Our empirical work shows that if companies had capitalized intangibles, the average annual return of the standard HML (high-minus-low) factor of Fama–French (1993), starting in the 1990s, would have nearly doubled from 1.7% to 3.1% a year.

Value’s Recent Travails

Value investing has deep roots and a long history. The idea of identifying relatively cheap companies for investment purposes is obvious and was in practice long before the first stock markets appeared. Value as a systematic approach to equity investing dates back at least to the 1930s. Graham and Dodd, in their 1934 classic book Security Analysis, laid down the main principles of value investing. They defined the term intrinsic value as capturing the future discounted stream of a company’s cash flows. By comparing the intrinsic value and the market’s value of a company, investors can identify good buying and selling opportunities, which is the core of the value investing process. By the 1930s, asset managers were practicing value investing—first as fundamental analysis, later as quant active, and more recently as systematic smart beta and factor investing strategies—in their efforts to exceed the returns of a cap-weighted market portfolio.

Value is among the most studied and academically recognized factors. Basu (1977) was one of the first to empirically document a value premium by demonstrating that value stocks, defined as having a low price-to-earnings (P/E) ratio, outperform growth stocks, defined as having a high P/E ratio. In the next decade, multiple studies appeared showing that almost any definition of value that uses a fundamentals-to-price ratio produces a comparable return difference between value and growth stocks. Following the studies by Fama and French (1992, 1993), the academic consensus settled on the price-to-book-value (P/B) ratio as the leading definition of value.

The source of the value premium is controversial. One camp led by Fama and French (1992, 1993) views the premium as a compensation for bearing risk, while the other led by Lakonishok, Shleifer, and Vishny (1994) argues that mispricing drives the premium. Although disagreement surrounds the source of the premium, most agree the premium exists and is not an artifact of a data-mining exercise. Indeed, the value effect is present in most asset classes (Asness, Moskowitz, and Pedersen, 2013), it is robust to perturbations in definition, and it does not require high transaction costs to execute (Beck et al., 2016).

Table 1 shows the performance characteristics of the value factor. We define this factor using the Fama–French (1992) method, which equally weights large- and small-cap stocks. We construct two portfolios, the highest 30% and the lowest 30% of the market chosen by book-to-price (B/P) ratio (hence, the factor name HML for high-minus-low B/P) and weighted by market capitalization. Then we take the difference in the performance of the two portfolios. We compare this “factor performance” with the performance of other leading factors, many of which are constructed along similar lines, but use measures other than B/P to differentiate the favored stocks from the least favored. Over the 1963–2019 period of our analysis, value is one of the most attractive factors in terms of risk–return characteristics.
In the 12+ years since 2007, the value factor appears to have reversed its previous course of strong performance. Figure 1 illustrates the performance of the value factor from July 1963 through September 2019. Before December 2006, the value factor experienced steady growth, albeit temporarily interrupted by events such as the Nifty Fifty surge in the early 1970s, the biotech bubble in the early 1990s, and the tech bubble in the late 1990s.

A long portfolio of value companies (defined by high B/P ratios) held from July 1963 through December 2006 would have grown to 9.6 times the value of a long portfolio of growth companies held over the same period, before it contracted 39% by the end of August 2019. In the 12+ years since the start of 2007, although the value investor earned 36% less wealth than the growth investor, value did not give back its very large past gains. Even with this large drawdown, the value investor is still 6.1 times as wealthy as the growth investor over the period from July 1963 through September 2019.

Table 1 describes the three deepest and three longest value drawdowns in our 56-year sample. The current drawdown at –39.1% is the second deepest, lagging the tech bubble by a small margin, which at its bottom had a drawdown of –40.6%. The current drawdown span of 12.8 years is (by a wide margin) the longest-lasting period of value underperformance. The second longest-lasting period of value underperformance was the biotech bubble in the early 1990s, which lasted for a
much shorter 3.8 years from peak to trough to new high. Other definitions of value give surprisingly different results. Although Fama and French equally weight the large-cap and small-cap strategies, if we leave out small-cap stocks and focus on large-cap stocks, the tech bubble drawdown was the longest, lasting over 14 years from late 1986 to early 2000, with the entire shortfall recovered in 16 months. The current drawdown in the large-cap universe is actually the deepest in the entire sample of observations.6, 7

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<td>2001/02</td>
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Is the current episode of value underperformance an “unlucky” outcome, in line with previous periods of disappointment, or is this time truly different? Specifically, if we use the pre-2007 characteristics of value for guidance, how likely are we to see a drawdown of –39.1% within a span of 12 years and nine months? We use a bootstrap simulation following Arnott et al. (2019) to answer this question. In the simulation, we resample the value factor returns 1,000,000 times by drawing six-month blocks of long–short returns using the historical sample up to December 2006, that is, a month before the current drawdown began. Each sample we create matches the length of the actual sample from January 2007 through September 2019. We then record, for each simulated sample, the size of the largest drawdowns, focusing on the three worst episodes.

By counting the frequency of the largest drawdowns, those worse than –39.1%, we can determine how unusual the actual post-2007 realization is. We display in Figure 2 the distribution of the largest drawdowns in the simulations. Only 4.9%, or roughly 1 out of 20, of the simulated samples exceed the 39.1% drawdown. Only 2.7% of realizations exceed the 47.3% drawdown for large-cap-based value. Although 4.9% (or 2.7%) is infrequent, it is not entirely improbable; drawing 1.0% or 0.5% would be much more consistent with a statistical red flag. Moreover, the analysis is perhaps biased toward a low probability: the main reason we are searching for causes of the January 2007–September 2019 drawdown is because value performed so poorly over this period. That is, we are selecting the segment of the data that appears the most atypical.

![Table 2. Value vs. Growth Worst Drawdowns, United States, Jul 1963–Sep 2019](image-url)
The recent value underperformance raises a reasonable question: Is this time different? Put another way, is this the new normal for value investors? Many narratives are being offered to answer this question and they generally fall into one of the following seven categories:

**Crowded trade.** Value is a popular factor. Smart beta (or factor investing) has been one of the fastest growing strategies in terms of attracting asset flows. These flows have led to crowding so that stock prices are elevated and expected returns are consequently small or negative.

If the crowding narrative is correct, then we should expect that the value premium is structurally impaired for the period during which the crowding persists. Moreover, value investors’ trades should push the prices (and valuation multiples) of value companies up, not down, relative to those of growth companies. Empirically, we would expect to have observed over the last 12 years a persistently narrow spread in valuation multiples between value and growth companies.

**Technological revolution.** In the last decade, we have witnessed the emergence of the vast digital sector, which has driven many longstanding brick-and-mortar companies out of business. The recent success stories of the FANMAG stocks are captivating. These US-based tech companies are collectively vastly profitable. The combined capitalization of the FANMAG stocks was US$5.07 trillion at yearend 2019, exceeding the capitalization of every stock market in the world except for those of the United States and Japan. This narrative suggests that in the presence of technological revolution the disruptive new technological leaders can drive outsized monopolistic profits, while the old brick-and-mortar value companies are choked into irrelevance.

If this narrative is correct, then we should expect that value investing may be structurally impaired for a prolonged period of time. Empirically, we should expect that growth companies relative to value companies will permanently become even more profitable than they were historically. We do well to remember, however, that *disrupters themselves can be disrupted*, and often remarkably quickly. During the so-called tech bubble of 2000, Palm—the maker of the ubiquitous Palm Pilot—was spun off by its parent 3Com at a valuation larger than 3Com itself. The massively disruptive Palm Pilot was quickly disrupted by the Blackberry, which was then disrupted by the iPhone.

**Low interest rates.** In the last decade, we have witnessed an unusually long period of zero or near-zero interest rates,

---

*Figure 2. Histogram of Second-Largest Drawdowns*

Note: We generate 1,000,000 alternative histories by bootstrapping July 1965 through December 2006 value versus growth returns. We use a circular block bootstrap with six-month blocks. Each simulated sample is 12 years and nine months long to match the length of the January 2007 through September 2019 sample. We compute the size of the largest drawdown in each simulated sample and compare it to the size of the actual January 2007–September 2019 drawdown of −39.1%. The spikes in the histogram correspond to the six-month periods in the historical data during which value performed very poorly. Value, for example, lost 28.6% between September 1999 and February 2000. When this six-month period is drawn in a simulation, it often represents the largest drawdown in the simulation. This particular six-month period represents the leftmost spike in the figure.

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

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with US$15 trillion of government bonds worldwide trading at negative yields as of early August 2019 (Fitzgerald, 2019). In the standard Gordon formulation, low interest rates should have a disproportionate valuation impact on longer-duration and lower-yielding assets, unless the low interest rates are driven by a similar-magnitude drop in growth expectations. Liu, Mian, and Sufi (2019) have also suggested that industry leaders can disproportionately benefit from low interest rates to generate outsized monopolistic profits.

- Although the economic mechanism is different, the implications and empirical predictions of this narrative are very similar to those suggested by the technological revolution narrative.

**The growth of private markets.** The number of listed stocks has nearly halved in just 22 years, from over 7,500 in 1997 to less than 4,000 today. While there are many reasons for the decline (which includes the regulatory environment), one narrative suggests that part of the decline may be due to the growth of private equity (PE) investors. This narrative suggests that PE investors buy potentially undervalued stocks and take them out of public markets. This activity leaves fewer value opportunities and lowers the expected return on value.

- This narrative may have some merit, but it appears to suffer from a logical inconsistency. For example, given the growth of PE, the buying pressure should increase the prices of deep value stocks when they become and are the PE targets. So, on the one hand, some stocks that would fall into the value portfolio may disappear, but, on the other hand, the activities of PE investors should elevate the prices of certain value stocks before they disappear. It also bears mention that PE investors seem overwhelmingly focused on technology companies and other growth segments of the market.

**Less migration.** According to this narrative, as the valuation of growth and value diverge, it becomes more difficult for companies to migrate from growth to value and vice versa. A related argument suggests that both the markets and the economy have evolved to a point where much less relative-valuation migration is happening. We hear narratives suggesting that migration may be slowing, in part because of the more monopolistic structure of many industries compared to a few decades ago, making it harder for new companies to gain market share. The more-stable valuations could also, in part, be driven by market participants' increased sophistication, allowing them to more often "get it right" on the relative valuations of most companies.

- If any part of this narrative is correct, then we should observe fewer value stocks migrating to neutral and growth classifications than in the past (and vice versa, fewer growth stocks migrating to neutral and value classifications).

**Intangibles.** The book-to-price ratio does not capture intangibles. According to this narrative, in moving toward a service-based economy, intangibles become the core of a company's ability to generate cash flows. Following current accounting treatment, the book value of equity typically does not include the value of internally generated intangibles, causing B/P to misclassify value stocks as growth stocks because these companies have smaller assets on their balance sheets than they truly have.

- This narrative would not suggest that value investing is structurally impaired. Instead, it suggests that value metrics should be redesigned to capture intangibles as part of a company's capital. If this narrative is correct, we should expect that valuation metrics that capture intangibles would have generated a higher premium relative to metrics that ignore intangibles. This narrative would suggest that, with any reliance on conventional book value as a basis for defining the value factor, the valuation spread between growth and value stocks should have widened considerably over time. The "normal" spread, toward which relative valuation might mean revert, will be very different from past decades.

**Value has become drastically cheaper.** This does not mean that value stocks are cheap in any absolute sense, only that they are unusually cheap relative to growth stocks. By historical standards, both growth and value are expensive relative to past norms. According to this narrative, value stocks can become relatively cheaper or more expensive over time compared to growth stocks as these investment styles come in and out of favor. When the value style is in favor, assets flow in, returns are good, and value becomes expensive based on relative valuation. When the market tide turns, the opposite happens: funds flow out of value stocks, these flows generate negative price pressure, and value becomes relatively cheap as returns fall.

- If this narrative is correct, the falling relative valuation of value stocks versus growth stocks should be a temporary (albeit 12+ years long) headwind to the performance of value. Unless structural reasons exist for growth and value to have even wider valuation differences in future, this narrative would not imply that value is structurally impaired going forward, only that its normal relative cheapness has changed; current relative valuations are a new normal. Empirically, we would observe that recent changes in relative valuations would fully explain the underperformance.
Most of these narratives can be tested. Most, except for the last two, are only weakly supported, if at all.

**Is Value Dead?**

Although the popular narratives propose very different mechanisms for why value has underperformed growth, the implications of the narratives can be described by viewing value factor returns (the performance difference between the value portfolio and the growth portfolio) as emanating from three elements: 1) migration, 2) profitability, and 3) changes in aggregate valuation, or revaluation. If these elements vary over time—for example, if a structural break permanently alters them—then the returns on value investing will vary as well. Using an accounting identity (derivation details are in Appendix A), we can attribute the value factor’s return to these three elements, as follows:

\[
\log(1 + r_t) = \left[ \log\left(\frac{P_t}{B_t}\right) - \log\left(\frac{P_{t-1}}{B_{t-1}}\right) \right] + \left[ \log\left(\frac{B_t}{B_{t-1}}\right) + \log\left(\frac{D_t}{P_t}\right) \right] + \left[ \log\left(\frac{P_{t-1}}{B_{t-1}}\right) - \log\left(\frac{P_t}{B_t}\right) \right]
\]

- **Migration** (stock-level mean reversion). Fama and French (2007) introduced the concept of migration as a term in the return attribution for the performance of value relative to growth portfolios. They examined stocks’ movements across the six portfolios (small-cap value, neutral, and growth, and large-cap value, neutral, and growth) that underlie their value factor, HML, and they attributed most of the value factor’s performance to the mean reversion in the stocks’ style. For example, value stocks, on average, migrate toward the neutral or growth portfolios, and growth stocks, on average, migrate toward the neutral or value portfolios.

- **Profitability**. Cohen, Polk, and Vuolteenaho (CPV) (2003) showed that about half of the information contained in the P/B differences between value and growth stocks is attributable to the differences in their future profitability. CPV found that persistence in growth stocks’ valuations reflects their future expected (15-year) profitability, which tends to support their trading more expensively than value stocks. Profitability partially offsets the migration component. Similarly, Arnott, Li, and Sherrerd (2009) demonstrated a roughly 50% cross-sectional correlation between relative valuation multiples and “fair value” multiples in a discounted-cash-flow model based on subsequent actual performance of a business.

- **Revaluation**. Over long periods, if differences in valuations are stationary—that is, if mean reversion tends toward a reasonably stable normal valuation level—then changes in valuations should not contribute significantly to a factor’s performance. In the short run—and, to be clear, short run can mean decades of a factor’s performance—changes in...
relative valuations of value stocks, relative to growth, can significantly bolster or impede the profitability of value investing. That is, if the average value stock grows more expensive relative to its fundamentals than the average growth stock, this tailwind benefits the value factor.

- We later show that revaluation explains about 70% of the monthly variance in the HML factor’s performance. Based on their studies of equity asset-class performance, Fama and French (2002) and Arnott and Bernstein (2002) suggested that the equity risk premium can significantly benefit or lose from changes in valuations, even when the premiums are measured over many decades. They argue that the returns induced by the changes in the valuations should be purged from the estimates of the risk premium because there is no a priori reason why this component would reappear in the future. Following Arnott et al. (2016), we extend this argument to the estimation of the cross-sectional factor premium.

The migration and profitability components are at the core of the value premium—combined, they form what we call the structural component of the value premium. Because the changes in aggregate valuations cannot trend indefinitely—equivalent to saying that no bubble can last forever—the revaluation component should average roughly zero over a sufficiently long period. That said, relative valuations of value and growth stocks could drift to a “new normal,” and the value factor would as a result earn an abnormal (good or bad) return during this transition period.

We display results of the value factor’s return decomposition in the pre- and post-2007 samples in Table 3. Because our value strategy—HML—is rebalanced annually at the end of June, and because our decomposition uses the observations between rebalancing points, in our analysis we focus on the periods between rebalancing points. Specifically, for the pre-2007 period, we examine the period from July 1963 through June 2007, and for the post-2007 period, we examine the period from July 2007 through June 2019. Unless otherwise specified, we follow this convention for the remainder of the article.

<p>| Table 3. Value Return Decomposition, United States, Jul 1963–Jun 2019 |
|---|---|---|---|---|
| Panel A. Return Decomposition in the Pre-2007 Period |</p>
<table>
<thead>
<tr>
<th>Size</th>
<th>Valuation</th>
<th>Total Return</th>
<th>Revaluation Alpha</th>
<th>Structural Alpha</th>
<th>+ Profitability</th>
<th>+ Migration</th>
</tr>
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<tbody>
<tr>
<td>Small</td>
<td>Growth</td>
<td>12.0%</td>
<td>4.5%</td>
<td>10.1%</td>
<td>20.8%</td>
<td>–10.8%</td>
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<td>Neutral</td>
<td>17.6%</td>
<td>3.2%</td>
<td>14.1%</td>
<td>9.8%</td>
<td>4.3%</td>
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</tr>
<tr>
<td>Value</td>
<td>20.1%</td>
<td>3.0%</td>
<td>17.6%</td>
<td>0.6%</td>
<td>17.0%</td>
<td></td>
</tr>
<tr>
<td>Value – Growth</td>
<td>8.1%</td>
<td>–1.5%</td>
<td>7.5%</td>
<td>–20.2%</td>
<td>27.8%</td>
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</tr>
<tr>
<td>Big</td>
<td>Growth</td>
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<td>2.8%</td>
<td>10.1%</td>
<td>16.6%</td>
<td>–6.5%</td>
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<tr>
<td>Neutral</td>
<td>12.7%</td>
<td>2.2%</td>
<td>10.9%</td>
<td>11.3%</td>
<td>–0.4%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>15.3%</td>
<td>2.9%</td>
<td>12.9%</td>
<td>7.0%</td>
<td>5.9%</td>
<td></td>
</tr>
<tr>
<td>Value – Growth</td>
<td>3.8%</td>
<td>0.2%</td>
<td>2.7%</td>
<td>–9.7%</td>
<td>12.4%</td>
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<tr>
<td>Average</td>
<td>HML</td>
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<td>–0.7%</td>
<td>5.1%</td>
<td>–15.0%</td>
<td>20.1%</td>
</tr>
<tr>
<td>Panel B. Return Decomposition in the Post-2007 Period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Valuation</td>
<td>Total Return</td>
<td>Revaluation Alpha</td>
<td>Structural Alpha</td>
<td>+ Profitability</td>
<td>+ Migration</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Small</td>
<td>Growth</td>
<td>9.1%</td>
<td>2.9%</td>
<td>8.5%</td>
<td>18.7%</td>
<td>–10.2%</td>
</tr>
<tr>
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<td>9.6%</td>
<td>0.3%</td>
<td>9.5%</td>
<td>6.3%</td>
<td>3.2%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>7.4%</td>
<td>–0.5%</td>
<td>10.2%</td>
<td>–5.8%</td>
<td>15.9%</td>
<td></td>
</tr>
<tr>
<td>Value – Growth</td>
<td>–1.8%</td>
<td>–3.4%</td>
<td>1.7%</td>
<td>–24.4%</td>
<td>26.1%</td>
<td></td>
</tr>
<tr>
<td>Big</td>
<td>Growth</td>
<td>11.6%</td>
<td>4.5%</td>
<td>7.7%</td>
<td>13.4%</td>
<td>–5.7%</td>
</tr>
<tr>
<td>Neutral</td>
<td>7.7%</td>
<td>0.2%</td>
<td>8.0%</td>
<td>7.1%</td>
<td>0.9%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>7.1%</td>
<td>–0.5%</td>
<td>8.6%</td>
<td>3.5%</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Value – Growth</td>
<td>–4.5%</td>
<td>–5.0%</td>
<td>0.9%</td>
<td>–9.9%</td>
<td>10.8%</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>HML</td>
<td>–3.1%</td>
<td>–4.2%</td>
<td>1.3%</td>
<td>–17.1%</td>
<td>18.4%</td>
</tr>
</tbody>
</table>

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

Consistent with the prior literature, we observe that growth stocks on average are more profitable than value stocks. On average, the profitability difference contributed –15.0% a year to the value-minus-growth return in the pre-2007 period. Over the same period, the migration component, at 20.1% a year, more than compensated for the difference in profitability. Combining the profitability and migration components, we observe a structural value premium of 5.1% a year. In this computation, a headwind of revaluation contributed –0.7% over the 44 years ending June 2007. The structural and revaluation components add up approximately to the 5.9% average value premium for the pre-2007 period, but they do not add up exactly to the total returns reported in Table 3 because we approximate log returns with simple returns. In Appendix
A, in which we report the decomposition results for log returns, the decomposition is exact.

In the post-2007 sample, the profitability and migration components are close to their values in the pre-2007 sample. This similarity suggests that the narratives about a radical change in the profitability of growth relative to value and of a slowing in the migration between growth and value are not supported by the data. Furthermore, despite the slightly smaller magnitudes of both profitability and migration, the migration component still easily overcomes the profitability difference between value and growth. Their sum, the structural alpha, is distinctly smaller than before 2007, at 1.3% versus 5.1%, but is still positive and economically meaningful.

Revaluation contributed –4.2% to the return, down from –0.7% before 2007. As a result, the total value premium flips from 5.9% in the first 44 years to an annualized shortfall averaging –3.1% in the last 12 years. Since 2007, well over 100% of the shortfall of value relative to growth is due to value becoming relatively cheaper. Put another way, it took value cheapening by 4.2% a year to create a performance shortfall of 3.1% a year. In the most recent 12-year period, the revaluation component appears to be the key to understanding why growth stocks outperformed value stocks.

Figure 3 illustrates the evolution of the cumulative value premium (solid line, left axis), which is the same as in Figure 1, and the value–growth relative valuation (dotted line, right axis).

Figure 3. Value vs. Growth Performance and Relative Valuations, United States, Jul 1963–Sep 2019

The relative valuation is the ratio of P/B for the value portfolio to P/B for the growth portfolio. If the P/B ratio of the value portfolio is 0.5, and the P/B ratio of the growth portfolio is 2.5, then the relative valuation is 0.2. The median relative valuation is 0.21, which means that growth stocks are, on average, about 4.8 times more expensive than value stocks measured by P/B.

As Figure 3 shows, however, the relative valuations of value and growth stocks fluctuate widely over time.

When we combine the performance and the revaluation charts, the short-term movements of the two components appear to be joined at the hip. In the short run, the revaluation component (changes in the P/B of value relative to growth) is the dominant driver of the value portfolio’s performance relative to growth. Over the long run, however, the two diverge. This divergence suggests that the value premium is driven by structural alpha and is not a lucky discovery due to a highly transitory revaluation component. We observe what seems to be a pronounced trend, which may reflect the waning relevance of classically defined book value as a valuation metric. That said, even a very substantial trend over the past 56 years amounts to only a 0.8% negative annualized slope—and the valuation spreads at the start and end of the series.
could be abnormally high or low.

The relative valuation in 1963 (point A in Figure 3) is a little higher than the time-series median of 0.21. The relative valuation varies from 0.31 (point B, when value was only 3.2 times as expensive as growth after the Nifty Fifty bubble burst) to 0.10 (point C, when growth stocks were 10.4 times as expensive as value at the peak of the dot-com bubble). A decline in relative valuations characterizes every episode when value substantially underperforms growth. That is, every time value stocks lag growth stocks by a meaningful margin, a key driver of the lag is value stocks becoming cheaper relative to growth stocks.

Over the period we examine in our decomposition, which starts at point D (July 2007) in Figure 3 and runs to point E (June 2019), very close to the most recent low point in value’s relative performance, the value factor lost a cumulative 36.3% in performance, or –3.5% a year. From July 2007 to June 2019, the relative valuation moved from 0.23, which is relatively expensive at the 22nd percentile of the distribution, to 0.12 at the 97th percentile. At the current valuation level, growth stocks trade at about 8 times the valuations of value stocks. The relative valuation has been wider only in two episodes over the 56-year history of our analysis: the peak of the dot-com bubble and the nadir of the global financial crisis. Our decomposition indicates that the change in the relative valuation from point D to point E contributed –5.2% a year and turned the 2.5% structural alpha into the –3.1% a year realized value premium.

Modelling the Three Components of the Value Premium

We examine what may have changed in 2007 and how that could impact the relative valuation of value compared to growth by introducing a regression-based model that accounts for the correlations of the three components of the value premium.

Estimating a Revaluation Model. The accounting identity decomposition fully attributes the changes in relative valuations, between the start and endpoint of the portfolio observations, to the portfolio returns. The full attribution would be more intuitive if the strategy had little turnover; that is, the stocks the portfolios hold next year are the same as they hold today. In the presence of turnover, however, the stocks held in the strategy portfolios do not fully benefit (or suffer) from the revaluations of the value and growth stocks.

To illustrate, suppose we track the valuation of a group of small value stocks from year to year . Assume also that the valuation of these stocks increases by 10%. In the case of no migration (i.e., every stock in the small value portfolio today is in the small value portfolio next year, and there are no new entrants), a strategy that holds this group of small value stocks will gain 10% from the change in valuation. In the presence of migration, however, the 10% change in valuation will not apply to all of the portfolio held at year ; some of the small value stocks may have moved into the small neutral category and some big neutral stocks may have moved into the small value category, while some new stocks may have entered the small value stock universe from the large stock universe or from the previously excluded tiny stocks.

In the decomposition, the revaluation term is still 10%, but now the migration term accounts for the difference in the change in valuation. In the presence of migration, however, the 10% change in valuation will not apply to all of the stock held at year ; some of the small value stocks may have moved into the small neutral category and some big neutral stocks may have moved into the small value category, while some new stocks may have entered the small value stock universe from the large stock universe or from the previously excluded tiny stocks.

We take this turnover effect into account by estimating the average relationship between the revaluation component and the value (HML) factor’s return. Specifically, we define the independent variable as the revaluation term from the preceding decomposition as

\[ \Delta bm_i = \left( \frac{r_{v_t}^{v}}{r_{g_t}^{g}} - 1 \right) \]

\[ \Delta bm_i = \left[ \frac{r_{v_t}^{v}}{r_{g_t}^{g}} - 1 \right] \]

and use the full sample to run a regression with HML as the dependent variable. We account for serial correlation in the data by computing Newey–West standard errors with one annual lag. The estimates from this linear regression (estimated using annual data from June 1963 through June 2019) are as follows:
Setting aside the technical details, this regression provides an answer to the simple question: If the valuations of value stocks relative to those of growth stocks change, what is the average return of HML? What is it then we are trying to estimate? To illustrate the issue, suppose we invest in a portfolio with a valuation ratio of P/B and this valuation ratio increases by 10%. The change in the valuation ratio alone does not tell us how much the stock’s price changed; we would need to know the change in the book value of equity, the denominator, to back out the change in price, the numerator. For example, if we know the book value of equity remained unchanged at B, then the price must have changed by the full 10%. Or, if we know the book value of equity decreased by 3%—which, by itself, would increase the valuation ratio—then the price must have changed by only \((1 + 10\%) \times (1 + -3\%) - 1 = 6.7\%\).

The regression resolves this ambiguity by measuring the average relationship between valuation changes and price changes. Specifically, the regression slope of 0.78 means that when the valuations of value stocks increase by 10% relative to those of growth stocks, HML on average returns 7.8%. The regression also shows that revaluations have a significant link to the returns of HML. The \(R^2\) of 62% means that changes in the relative valuations of value and growth stocks explain approximately two-thirds of the variance in the HML factor’s returns.

How do we interpret the estimate of 0.78 for the post-2007 sample? As shown in Table 3, the revaluation term averages –4.2% a year over this period. Taking the estimate together with the regression estimates, we attribute approximately 0.78 x (-4.2%) = –3.4% a year to a headwind created by rising valuations. Because the average loss for HML each year over this period was 3.1%, our back-of-the-envelope computation suggests that revaluation alone accounts for all of value’s negative returns from July 2007 through June 2019. The regression also shows that most of the variation in the HML factor’s return can be explained by changes in the revaluation term. That is, by knowing what happens to the relative valuations of value and growth stocks, we can explain approximately two-thirds of the variation in how well the value strategy performs.

Table 4 shows the regression estimates separately for the pre- and post-2007 samples as well as for the full sample. The association between the return of HML and revaluation is quite similar around the 2007 breakpoint: the estimated slope is 0.77 before 2007 and 0.73 after. We are tempted to interpret the intercepts from these regressions as estimates of counterfactual returns on value; that is, how should the value strategy have performed in the absence of any revaluation? In the pre-2007 sample, this intercept is 6.4%; in the post-2007 sample, it is –0.1%. Although the post-2007 sample has only 12 data points and is not significant, the estimate raises a further issue. Does the estimate imply that value would have earned nothing even in the absence of the 4.2% downward revaluation each year? If this interpretation is correct, should we expect zero structural alpha going forward?

This interpretation is overly simplistic. HML revaluation and HML return are not the same because of the relative-growth component. If revaluation is downward, and the value portfolio has slower growth in book value than the growth portfolio, then the HML return will actually be worse than the downward revaluation. Therefore, the –0.1% structural alpha is artificially depressed by this asymmetry.
values of the dependent variable. In this case, we choose the most recent 12-year period precisely because value performs so poorly. Although value’s poor performance may result in part from revaluation headwinds—perhaps as much as two-thirds of the variation, according to Table 4—we are almost certainly oversampling negative residuals, or bad luck, in terms of the profitability and migration components, as opposed to finding persistently lower structural alpha. The issue is that we are focusing on the last 12 years precisely because of the poor performance of value, which is likely in part due to negative residual outliers.22

We demonstrate this issue in Table 5 by introducing an explicit, but comparable, selection bias into the pre-2007 data. Specifically, we split the data into years in which the HML factor’s return is positive or negative. In these regressions the intercept is positive and statistically significant when HML does well, and negative and statistically significant when HML does poorly. This result is not surprising. Because value’s performance, in part, emanates from the differences in profitability and migration rates, its performance net of revaluation is still, on average, poor if we insist on studying a period during which value underperforms—the migration and profitability components do well when we look at years in which value outperforms. More importantly, because we use the pre-2007 period in this analysis—a period during which the unconditional structural alpha is positive at 6.4%—we know that the negative measured structural alpha in the underperforming periods is not evidence of broken structural alpha. Rather, it is a sign that when we select periods during which value underperforms, we are oversampling bad luck.

<table>
<thead>
<tr>
<th>Table 5. Revaluation Model: Alphas Conditional on HML</th>
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<tbody>
<tr>
<td><strong>Independent Variable</strong></td>
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<tr>
<td></td>
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<tr>
<td>Revaluation</td>
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<tr>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Adjusted R²</td>
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</table>

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

In this sense, the −0.1% structural alpha for the most recent 12 years is actually a surprisingly good outcome. If structural alpha in the negative return years for HML pre-2007 was −3.6%, which set the stage for a powerful 8.3% structural alpha when HML turned positive, then the results for the 12 years post-2007 are arguably 3.5% better than they should have been. This suggests that the −0.1% structural alpha in this most recent period materially understates the likely structural alpha over a full HML cycle, including as many up as down years for value, what we call long-term structural alpha.

Although this mechanism is intuitive, an important question remains: Is the intercept of −0.1% in the post-2007 period evidence of exceptionally improbable bad luck or just the ordinary bad luck we might expect to encounter when we examine any drawdown? We examine this question using an alternative bootstrap scheme.

In this analysis, our goal is to create a set of simulated drawdowns that resemble the post-2007 drawdown, but to do so by resampling the pre-2007 data. Specifically, we first take the annual July 1963–June 2007 data with the HML returns and revaluation terms and create 1,000,000 simulated samples. Each sample length is 56 years. Within each sample, we identify all drawdowns that last longer than 10 years. If there are no such drawdowns, we discard the sample, and if there are many such drawdowns, we retain the one that comes the closest to matching the magnitude of the actual post-2007 drawdown. Within each drawdown, we then focus on the period from peak to trough. The purpose of this step is to mimic the actual data of value’s fall from its peak in 2007 to its trough in 2019. Finally, we regress these peak-to-trough returns against the revaluation terms and retain the intercepts. We plot the distribution of these intercepts in Figure 4.
We can see that when we use random draws from a 44-year span with a true intercept of 6.4% and focus on decade-long bear markets in value relative to growth, we almost never get a regression intercept above 6.4%. Indeed, the measured intercept is quite often negative. The actual intercept of -0.1% in Table 4 lies at the 36.6th percentile of the regression results when we draw from a distribution with a true intercept of 6.4%. This analysis tells us that if we take the pre-2007 value-versus-growth returns and find drawdowns that approximately resemble the actual post-2007 drawdown, value’s performance net of the revaluation effects would often be just as underwhelming as what it was in the actual data.

Taken together, Table 4 and Figure 4 attribute value’s poor performance in the post-2007 period to two sources. The first is the systematic underperformance from rising valuations of growth stocks. These increasing valuations created a headwind that accounted for all of value’s losses over the past 12 years. The second source of value’s poor performance is that we, in effect, oversample bad luck because we are not attempting to explain value’s performance over a randomly chosen period; we are attempting to explain precisely the recent span in which performance stands out as particularly weak. Our bootstrap analysis indicates that, when we account for this selection bias, the post-2007 period does not stand out. Had we experienced a similar drawdown in the pre-2007 data, almost the same amount of bad luck would have been required then as well.

**Alternative Examination of Migration.** Fama and French (2007) demonstrated that stocks’ migrations from one style to another, from value to neutral or growth, for example, are the core of the value premium. Convenient for our purposes, the post-2007 period is completely out of sample relative to the original study. In Table 6, we show the year-over-year rates of stock migration between the six portfolios that compose the HML factor. We show the estimates separately for the pre- and post-2007 samples.
In Panels A and B, we track the percentage of stocks originating in each of the six portfolios that remains in the same portfolio the next year (e.g., pre-2007, 77% of stocks in the small value portfolio in the current year remained in the small value portfolio the next year, and post-2007, 79% of stocks in the small value portfolio in the current year remained in the small value portfolio the next year). Each row in Panels A and B sums to 100%. We restrict the sample to stocks that existed in both (current and next) years as publicly traded firms.

Panel C reports the differences in the migration rates between the pre- and post-June 2007 migration rates. The biggest change, a difference of 4% highlighted in Panel C, is that the big growth portfolio has experienced slightly less migration over the post-2007 period. That said, the pre- and post-2007 migration numbers are surprisingly similar, with all differences statistically insignificant. These estimates confirm that the migration of stocks from one style, or classification, to another has not materially slowed down and that this driver of the structural value premium appears quite robust.

### Alternative Examination of Profitability

Growth companies’ valuations reflect their higher average profitability. Many of the post-mortem narratives about value have centered on growth companies being potentially more permanently profitable than value companies. The accounting decomposition reveals no economically significant difference in the profitability term.

---

### Table 6. Migration Rates Pre- and Post-2007, United States, Jul 1963–Jun 2019

#### Panel A. July 1963–June 2007

<table>
<thead>
<tr>
<th>Current Portfolio</th>
<th>Portfolio Next Year</th>
<th>Small</th>
<th>Growth</th>
<th>Neutral</th>
<th>Value</th>
<th>Big</th>
<th>Growth</th>
<th>Neutral</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>69%</td>
<td>23%</td>
<td>5%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>15%</td>
<td>57%</td>
<td>25%</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>3%</td>
<td>18%</td>
<td>77%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>6%</td>
<td>2%</td>
<td>0%</td>
<td>78%</td>
<td>13%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>1%</td>
<td>4%</td>
<td>2%</td>
<td>12%</td>
<td>70%</td>
<td>11%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>0%</td>
<td>1%</td>
<td>6%</td>
<td>1%</td>
<td>24%</td>
<td>68%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

#### Panel B. July 2007–June 2019

<table>
<thead>
<tr>
<th>Current Portfolio</th>
<th>Portfolio Next Year</th>
<th>Small</th>
<th>Growth</th>
<th>Neutral</th>
<th>Value</th>
<th>Big</th>
<th>Growth</th>
<th>Neutral</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>67%</td>
<td>23%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>13%</td>
<td>60%</td>
<td>24%</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>2%</td>
<td>17%</td>
<td>79%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>4%</td>
<td>2%</td>
<td>0%</td>
<td>82%</td>
<td>12%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>0%</td>
<td>5%</td>
<td>2%</td>
<td>15%</td>
<td>67%</td>
<td>11%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>0%</td>
<td>1%</td>
<td>8%</td>
<td>1%</td>
<td>24%</td>
<td>67%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

#### Panel C. Differences in the Pre- and Post-June 2007 Migration Rates

<table>
<thead>
<tr>
<th>Current Portfolio</th>
<th>Portfolio Next Year</th>
<th>Small</th>
<th>Growth</th>
<th>Neutral</th>
<th>Value</th>
<th>Big</th>
<th>Growth</th>
<th>Neutral</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>-1%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>-2%</td>
<td>3%</td>
<td>-1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>-1%</td>
<td>-1%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>-2%</td>
<td>-1%</td>
<td>0%</td>
<td>-4%</td>
<td>-1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>-2%</td>
<td>-1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>-1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Each row in Panels A and B totals to 100%.
Source: Research Affiliates, LLC, using data from CRSP/Compustat.
between the pre- and post-2007 samples.

In Table 7, we show two profitability measures: return on equity (ROE) and earnings yield (E/P). The largest difference we observe between the pre- and post-2007 periods is for the large-cap growth and small-cap growth portfolios. Whereas the historical average ROE for large and small growth portfolios was 19% and 16%, respectively, leading up to 2007, these metrics are 25% and 6%, respectively, in the post-2007 era. Large growth has been 30% more profitable in recent years than before, while small growth has been 60% less profitable. Other than these two outlier portfolios, the profitability estimates for the pre- and post-2007 periods are similar. When the individual portfolios are averaged and differentiated in the same way the HML factor is constructed, we find the average ROE difference between value and growth is almost the same before and after 2007: −11% versus −12%.

Also, the post-2007 period is characterized by a roughly 50% drop in earnings yields across the board, reflecting the broad upward revaluation of markets over the last 50 years, but the ratio of the yields has stayed relatively unchanged. The data do not support the narrative that growth companies have become permanently more profitable.

### Table 7. Pre- and Post-2007 Profitability, United States, Jul 1963–Jun 2019

<table>
<thead>
<tr>
<th>Portfolio Type</th>
<th>Pre-2007 Return on Equity</th>
<th>Post-2007 Return on Equity</th>
<th>Pre-2007 Earnings Yield</th>
<th>Post-2007 Earnings Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>18%</td>
<td>16%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>Neutral</td>
<td>11%</td>
<td>9%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Value</td>
<td>7%</td>
<td>4%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>Small Growth</td>
<td>16%</td>
<td>6%</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>Small Neutral</td>
<td>10%</td>
<td>6%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>Small Value</td>
<td>5%</td>
<td>1%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Big Growth</td>
<td>19%</td>
<td>25%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Big Neutral</td>
<td>12%</td>
<td>12%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Big Value</td>
<td>8%</td>
<td>7%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>HML</td>
<td>−11%</td>
<td>−12%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Note: H/L reports the ratio of the metrics for the high and low portfolios.
Source: Research Affiliates, LLC, using data from CRSP/Compustat.

**Alternative Definitions of Value.** The observation that value has underperformed and that the bulk of the underperformance has been associated with a significant change in relative valuations is not limited to HML—the popular long–short definition of value which is based on the price-to-book ratio and which balances the portfolio by size. The same observation holds true for other value definitions.

In Table 8 we display the performance characteristics for eight alternative value strategies. For all but one definition—based on sales-to-price ratio—value underperformed growth in the post-2007 period. Also, for all but one definition—based on dividend-to-price ratio—value underperformance was associated with value starting at somewhat expensive relative valuations in June 2007 and ending at very cheap relative valuations in June 2019.
We can make a few more-detailed observations regarding the post-2007 period from examining alternative value definitions:

- HML large-cap experienced the largest underperformance (−3.96% a year) in the post-2007 period. It also experienced one of the largest movements in relative valuations of 82 percentage points from the 12.6th to 94.7th percentile.
- Even though the value-to-neutral and neutral-to-growth underperformance is almost identical, the valuation change for neutral-to-growth is the largest at 87 percentage points moving from the 10.6th to 98th percentile. The 98th ending percentile is the largest at June 2019, implying that large-cap growth relative to neutral trades today at some of the most expensive multiples in its history.
- Among the strategies for which we compare the value-versus-growth performance, the P/B ratio–based strategy, HML, suffered the worst drawdown. Whereas HML underperformed by −3.00% a year, the earnings-to-price, sales-to-price, dividends-to-price and their composite strategies underperformed on average by only −0.7% a year. Even the worst of these four strategies—the dividends-to-price strategy—performed considerably better with a return of −1.72% a year.

The Trouble with Intangibles

Whether we use the accounting decomposition or the regression-based model, the changes in relative valuations for the value portfolio relative to the growth portfolio explain the bulk of value’s bleak performance over the most recent 12-year period. At the same time, several findings indicate a possible reduction in structural alpha for value, as defined by price to book, in the post-2007 period:

- The decomposition suggests a 3.8%–5.2% reduction in structural alpha.
- The detailed examination of migration suggests that large-cap growth companies experienced marginally lower rates of migration by about four percentage points.
- The detailed examination of profitability suggests that large-cap growth has experienced a higher-than-average profitability (ROE of 25% versus 19% in the pre-2007 sample), but small-cap growth shows the opposite effect, with sharply lower profitability than in the past (6% versus 16%).
- While all definitions of value experienced underperformance in the post-2007 period, the P/B ratio–defined value showed the worst performance.

None of these changes is statistically significant, although they lend mild (but conflicting) support to the narrative that growth stocks of today are (perhaps) somewhat better than the growth stocks of the past, however the magnitude of the
effect is only enough to diminish the value premium, not to kill or reverse it. When we examine these narratives, the common theme is that current economic conditions are good for growth companies, that is, companies with high P/B ratios. Should we interpret this as bad news for value investing?

The P/B ratio is just one of many ways to define value. Intrinsic value is another definition, introduced in 1934 by Graham and Dodd. Graham and Dodd specifically cautioned against the use of P/B as a substitute for intrinsic value (emphasis added):

In general terms [intrinsic value] is understood to be that value which is justified by the facts, e.g., the assets, earnings, dividends, definite prospects, as distinct, let us say, from market quotations established by manipulation or distorted by psychological excesses. But it is a great mistake to imagine that intrinsic value is as definite and as determinable as is the market price. Some time ago intrinsic value (in the case of common stock) was thought to be the same as “book value,” i.e., it was equal to the net assets of the business, fairly priced. This view of intrinsic value was quite definite, but it proved almost worthless as a practical matter because neither the average earnings nor the average market price evinced any tendency to be governed by book value.

Book value captures the traditional capital locked in cash, bricks, and mortar. In today’s economy, a company’s intangible assets—patents, brands, software, human capital, customer relationships, and so forth—are at the core of its ability to generate and maintain profit margins. Is there a better, more-objective measure of a company’s assets, including its intangibles? Following Peters and Taylor (2017), we capitalize research and development (R&D) expenditures as knowledge capital, and apply a fraction of selling, general, and administrative (SG&A) expenditures as capital related to the human capital, brand, and distribution network.

In Figure 5, we report the fraction of the capitalized intangible capital to the total capital of an average company. Total capital includes both intangible capital and physical capital, the latter defined as the book value of property, plant, and equipment. Figure 5 plots the ratio of the intangible capital to the sums of intangible and physical capital for all publicly traded companies in the United States. We equally weight these observations and calculate this ratio separately for companies classified as value and growth based on their P/B ratio.

As of June 1998, the fraction of intangibles for the average US company reaches 50%, fully equal to tangible book value, and for growth companies the fraction is somewhat higher. The issue then, from a value investing viewpoint, is that book value obviously captures very little of the value of the intangibles. From an accounting viewpoint, book value can only
capture the value of intangibles through contributed capital. This makes the P/B ratio vulnerable to misclassifying intangibles-heavy companies as expensive and traditional assets–heavy companies as cheap. The structural alpha associated with P/B may in turn have decreased over time, because this measure increasingly misclassifies some value firms as growth firms, and vice versa.

What if we were to define value as the measure of a company's capital that includes both physical and intangible capital? To answer this question, we construct an iHML factor following the same rules we used to construct the regular HML factor, with only one change. Instead of using the book-to-market ratio to define value, we use the total q defined as the firm’s total market value (book value of debt plus market value of equity) divided by the sums of intangible and physical capital. In this terminology, q stands for Tobin’s (1969) q, which relates to a firm’s investment decisions: if a firm’s market value exceeds the replacement cost of its capital, the firm should invest more. Peters and Taylor (2017) explore the extent to which the investment-q relationship grows stronger when the q measure accounts for intangible assets. We examine how the same adjustment alters the performance of value investing. Figure 6 plots the cumulative performance—the difference between the performance of the value portfolio relative to the performance of the growth portfolio—for the HML and iHML factors.

![Figure 6. HML and iHML Performance, United States, Jul 1963–Jun 2019](image)

In the full sample, iHML—the factor based on B/P, adjusted for intangibles—outperforms the traditional value factor by 0.9% a year, but almost all of this difference is in the second half of our 56-year span. The two definitions of value are more-or-less equally effective before the late 1980s. When the share of intangible capital was less than 20% of a company’s capital, value’s performance was not sensitive to the inclusion of intangibles. Beginning in the 1990s, when the internet revolution reduced the relevance of book value for large segments of the economy, iHML value beat growth by a larger margin than classically defined HML, and by far more in the 2000s.

From 1990 onward, the iHML version of value outperformed the traditional value portfolio by 1.5% a year. Some high P/B growth stocks are not nearly as expensive once we make this change. In fact, the 12-years-and-counting drawdown for value from 2007 to 2019 becomes a far less-daunting five-year drawdown for value once we incorporate intangibles into our book value measure, with the last new high for value relative to growth occurring in mid-2014 instead of early 2007.

If one US dollar was invested in each strategy at the end of June 1963, by the end of June 2019 the ending value of iHML

---

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

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would have been $10.50 compared to $6.10 for traditional HML. An iHML value investor is 10½ times wealthier than an
iHML growth investor, whereas the conventional HML value investor is just 6 times wealthier than the HML growth investor.
The iHML strategy subsumes HML, but not vice versa. Once we control for HML and other traditional factors, including
momentum, the outperformance of the iHML factor, relative to HML, is marginally statistically significant (at the 5% signification level). These results are reported in Table 9. Note the coefficients for market (beta) and size. With
conventional B/P, the coefficients are negative, suggesting that value has a low beta and large-cap bias on average over
time. With iHML and the incorporation of intangibles, the signs flip and the coefficients become a bit more neutral,
suggesting that iHML value has a mildly high beta and small-cap bias.

<table>
<thead>
<tr>
<th>Dependent Variable: HML</th>
<th>Dependent Variable: iHML</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha, ann.</td>
<td>(1) 4.75</td>
</tr>
<tr>
<td>(t-stat)</td>
<td>(2.88) (3.81)</td>
</tr>
<tr>
<td>Market</td>
<td>–0.17 (-0.07)</td>
</tr>
<tr>
<td>(t-stat)</td>
<td>(-7.05) (-7.08)</td>
</tr>
<tr>
<td>Size</td>
<td>–0.15 (-7.70)</td>
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<td>(t-stat)</td>
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</tr>
<tr>
<td>Value-HML</td>
<td>0.94 (38.68)</td>
</tr>
<tr>
<td>(t-stat)</td>
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<tr>
<td>Momentum</td>
<td>–0.03 (-2.44)</td>
</tr>
<tr>
<td>(t-stat)</td>
<td>(-2.44) (-1.62)</td>
</tr>
</tbody>
</table>

Table 9. HML vs. iHML: Spanning Tests, United States, Jul 1963–Jun 2019

<table>
<thead>
<tr>
<th>N</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>672</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

Note: The numbers (1)–(6) enumerate the individual models in the spanning test. In columns (1)–(3), traditional HML is regressed on market, size, and momentum as well as iHML. When iHML is included, the alpha is not significantly different from zero implying that iHML subsumes HML. In columns (4)–(6), iHML is the dependent variable and is regressed on market, size, and momentum as well as on traditional HML. In this case, the alpha is significant at the 5% level under the assumption of a single hypothesis test. This is consistent with iHML subsuming HML, but not the opposite.

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

It is important to note that iHML, just like traditional HML, would have experienced a significant setback over the last five years, as illustrated in Figure 6. iHML has underperformed by 32% from its peak in May 2014 through June 2019, not much better than the 36% drawdown of HML from its peak in December 2006 to the same endpoint of June 2019. Including intangibles does little to insulate against the peril of revaluations: iHML, just like its traditional counterpart, suffered from the same revaluation headwind. Going forward, incorporating intangibles in the definition of the value factor would help protect the structural alpha because a measure that includes intangibles runs a lower risk of misclassifying value stocks as growth stocks, and vice versa.

What to Expect from Value?

Over the last 12 years, the relative valuation of value and growth moved from the 21st percentile to the 97th percentile. This revaluation explains most of value’s underperformance. Today, the relative valuation level is close to the most attractive valuation level in history at the peak of the tech bubble in 2000. Given the historical relationship between value’s return and valuation levels, what is the future expected value premium? Should we expect a rebound like the one we saw after the tech bubble of 1999–2000 or after the Nifty Fifty of 1972–1973? We can gauge the forward-looking expected estimates of the value premium using the profitability-migration-profitability decomposition.

We cannot, of course, simply assume a revaluation return to the historical median and keep the other components at their historical averages. As discussed earlier, the three terms in the decomposition correlate significantly. Over the 1963–2019 sample, the correlation between the profitability and revaluation terms is −0.44, between the profitability and migration terms is −0.31, and between the revaluation and migration terms is −0.21. These negative correlations mean that when...
the HML factor benefits from revaluation tailwinds, lower profitability and migration terms typically offset some of these tailwinds.

We want to answer the question: What is the expected return on HML\textit{conditional} on a particular revaluation? Conveniently, if we use historical data as a guide and model the conditional expected returns using a linear regression, this problem is equivalent to the regression model we have already introduced. We can directly regress the HML return on revaluation and use the estimates from the model to make predictions about the factor’s performance.\textsuperscript{31}

Historically, relative HML and iHML valuations have shown a tendency to mean revert. In a regression of the B/P relative to the HML valuation against the year-earlier valuation, we get an intercept of $–0.41$ ($t$-value $= –2.54$) and a slope of $0.73$ ($t$-value $= 6.85$). The slope roughly corresponds to a rapid 2.2-year half-life mean-reversion rate.\textsuperscript{32} These are average historical tendencies, which never play out exactly. A more interesting exercise is to ask the question: What would the HML return be in a year when a specific scenario is realized? We display the estimated results in Table 10.\textsuperscript{33}

At this time, quite a bit of prospective premium is stored in the value factor due to the current abnormally wide valuation dispersion between value and growth stocks. PIMCO coined the term \textit{stored alpha} as a way of explaining why they as an investor stay the course in adversity and buy assets that have had poor past performance. The value locked up in value—its stored alpha—is a vivid example.

Full reversion to the median, if it happened overnight, would require value to beat growth by 45%. If this were to happen over several years, the structural alpha of the value factor would add to this every year, generating an even-larger gain (although a lower annualized gain). Even a move to the historical 75\textsuperscript{th} percentile, half-way between the cheapest-ever and median valuations for value relative to growth, would imply 34% relative performance for value over growth. A modest improvement from the current 96.7\textsuperscript{nd} percentile to the 95\textsuperscript{th} percentile would result in alpha of about 9.0%. Finally, even if valuations were to stay at current levels, the model suggests a positive 5.1% premium, driven largely by structural alpha.

Suppose the “value is dead” narrative is correct, at least for the next few years. What if relative valuation spreads between growth and value stocks become even wider than the current relative-valuation ratio? Because of the presence of structural alpha, it would take a further valuation decline from the current 96.7\textsuperscript{nd} percentile to at least the 98\textsuperscript{th} percentile over the next year in order for value to have a zero or negative premium. Finally, a return to the extreme historical valuation spread reached at the height of the tech bubble in March 2000 when growth was about 10 times as expensive as value would cost investors about 20%.

**Conclusion**

Many narratives purport to explain why “this time is different,” that value is structurally impaired. These narratives include the new-normal interest rate environment, growth of private markets, crowding, and technological change, among others. We examine these explanations and find insufficient evidence to declare a structural break.

We offer a simple model that decomposes the returns of value relative to growth. The framework attributes the relative performance to three components: migration, profitability, and change in relative valuation. Our evidence suggests that migration (e.g., individual value stocks becoming growth stocks) and profitability are not materially changed over the pre- and post-2007 periods. These two components are a net positive contributor to the value premium and we refer to them as structural alpha. The reason value has suffered a $–39\%$ drawdown is the collapse of relative valuations. Over the drawdown period, relative valuations have moved from the 22\textsuperscript{nd} to the 97\textsuperscript{th} percentile.
Our analysis focuses on another explanation—bad luck. Our initial bootstrap analysis, which does not account for the changes in valuations, suggests that the current drawdown is 4.9% probable given the historical data. While this 1-in-20 outcome is relatively improbable, it seems insufficiently improbable to declare a structural break. And when we modify the bootstrap to account for the changes in relative valuations, this probability increases 36.6%; a very ordinary amount of bad luck seems sufficient to explain why value has underperformed growth.

We also address the important issue of the measurement of value. The classic measure of value, which uses the book value of equity, was designed at a time when the economy was much more oriented toward manufacturing. In today’s economy, intangible investments play a crucial role, yet these investments when internally created are ignored in book value calculations. We capitalize intangibles and show that this measure of value outperforms the traditional measure, particularly post-1990. Nevertheless, this improved measure of value is similar to the classic definition in that it, also, has recently suffered a substantial drawdown.

Overall, relative valuations are in the far tail of the historical distribution. This implies that the expected returns are elevated. Indeed, we show that even if the relative valuation remains in the 97th percentile, the other contributors (migration and profitability) should offer a positive overall return. That said, let us emphasize two important points. First, the percentiles are backward looking; it is possible to cross into unexplored territory. Second, returns are very noisy. While expected returns of value relative to growth are high, the role of luck (both good and bad outliers, not explained by our simple model) creates a wide distribution of outcomes over shorter spans, even over the next five years. While value strategies seem (almost) as attractive as they have ever been, an elevated expected return is not a guarantee that value must outperform growth in the short run.

Appendix A. Return Decomposition Details

In the section “Is Value Dead?” we decompose a portfolio’s return into three parts: the revaluation, profitability, and migration components.

We derive this decomposition by starting from the definition of log returns. We then show the decomposition results for the value and growth portfolios’ log returns as well as for log HML. This decomposition holds exactly for a stock’s or a portfolio’s log return. To apply this decomposition to the HML factor, we first approximate the simple return on a portfolio as

\[ r_t \approx \left[ \frac{P_t}{B_t} - 1 \right] + \left[ \frac{B_t}{B_{t-1}} \right] \left( 1 + \frac{D_t}{P_t} \right) - 1 + \left[ \frac{P_{t-1}}{P_t} - 1 \right] \]

Fama and French (1992) constructed their value factor, HML, as a strategy that is long, with equal weights, a small value portfolio and a big value portfolio, and is short, again with equal weights, a small growth portfolio and a big growth portfolio. Letting SV, BV, SG, and BG denote these four portfolios, respectively, we can decompose the HML factor’s return as

\[ HML_t = \frac{1}{2}(r_t^{SV} + r_t^{BV}) - \frac{1}{2}(r_t^{SG} + r_t^{BG}) \]

\[ \approx \left[ \frac{1}{2} \left( \frac{P_t^{SV}}{B_t^{SV}} + \frac{P_t^{BV}}{B_t^{BV}} \right) - \frac{1}{2} \left( \frac{P_t^{SG}}{B_t^{SG}} + \frac{P_t^{BG}}{B_t^{BG}} \right) \right] + \ldots \]

In Table 3 in which we decompose the HML factor’s return (not the log return), it holds as an approximation.

Notation:

- \( r_t \) = return from time \( t - 1 \) to time \( t \) on the portfolio formed at time \( t - 1 \);
- \( D_t \) = dividend distributions from time \( t - 1 \) to time \( t \) from the portfolio formed at time \( t - 1 \);
- \( P_{t-1} \) = portfolio-weighted market capitalization at time \( t - 1 \) of the portfolio formed at time \( t - 1 \);
- \( B_{t-1} \) = portfolio-weighted book value of equity at time \( t - 1 \) of the portfolio formed at time \( t - 1 \);
- \( P_t \) = portfolio-weighted market capitalization at time \( t \) of the portfolio formed at time \( t - 1 \);
\( P_t = \) portfolio-weighted market capitalization at time \( t \) of the portfolio formed at time \( t; \)

\( B_t = \) portfolio-weighted book value of equity at time \( t \) of the portfolio formed at time \( t; \)

With this notation, a return on a portfolio can be represented as

\[
\log(1 + r_t) = \\
= \log \left( \frac{P_t + D_t}{P_{t-1}} \right) \\
= \log \left( \frac{P_t \cdot (1 + D_t/P_t)}{P_{t-1}} \right) \\
= \log \left( \frac{P_t}{P_{t-1}} \right) + \log \left( 1 + \frac{D_t}{P_t} \right)
\]

\[
= \log \left( \frac{P_t}{P_{t-1}} \right) + \log \left( 1 + \frac{D_t}{P_t} \right) + \log \left( \frac{B_t}{B_{t-1}} \right) - \log \left( \frac{B_t}{B_{t-1}} \right) + \log \left( 1 + \frac{B_t}{B_{t-1}} \right) - \log \left( \frac{B_t}{B_{t-1}} \right) \\
= \left[ \log \left( \frac{P_t}{P_{t-1}} \right) + \log \left( 1 + \frac{D_t}{P_t} \right) \right] + \left[ \log \left( \frac{B_t}{B_{t-1}} \right) - \log \left( \frac{B_t}{B_{t-1}} \right) \right] + \left[ \log \left( 1 + \frac{B_t}{B_{t-1}} \right) - \log \left( \frac{B_t}{B_{t-1}} \right) \right] \\
= \left[ \log \left( \frac{P_t}{P_{t-1}} \right) - \log \left( \frac{B_t}{B_{t-1}} \right) \right] + \left[ \log \left( \frac{B_t}{B_{t-1}} \right) + \log \left( 1 + \frac{D_t}{P_t} \right) \right] + \left[ \log \left( \frac{P_t}{P_{t-1}} \right) - \log \left( \frac{B_t}{B_{t-1}} \right) \right] \\
= \left[ \log \left( \frac{P_t}{P_{t-1}} \right) - \log \left( \frac{P_{t-1}}{B_{t-1}} \right) \right] + \left[ \log \left( \frac{B_t}{B_{t-1}} \right) + \log \left( 1 + \frac{D_t}{P_t} \right) \right] + \left[ \log \left( \frac{P_t}{P_{t-1}} \right) - \log \left( \frac{P_t}{B_{t-1}} \right) \right] \\
= \left[ \log \left( \frac{P_t}{P_{t-1}} \right) - \log \left( \frac{P_{t-1}}{B_{t-1}} \right) \right] + \left[ \log \left( \frac{B_t}{B_{t-1}} \right) + \log \left( 1 + \frac{D_t}{P_t} \right) \right] + \left[ \log \left( \frac{P_t}{B_{t-1}} \right) - \log \left( \frac{P_t}{B_{t-1}} \right) \right]
\]

This decomposition holds as an identity for a portfolio’s log returns. For the purposes of Table 3, we use this identity to obtain an approximate decomposition of a portfolio’s simple returns. We then apply these approximations to the four portfolios included in the HML factor—small value, big value, small growth, and big growth—to decompose the HML return into the three components. Because of the approximation step, the three components on the right-hand side in Table 3 do not exactly add up to the HML return.

Table A1 decomposes the return on log HML to avoid the approximation step. We define log HML as

\[
\log HML_t = \frac{1}{2} \left( \log(1 + r_t^{PV}) + \log(1 + r_t^{BV}) \right) - \frac{1}{2} \left( \log(1 + r_t^{SG}) + \log(1 + r_t^{BG}) \right)
\]

With this definition, the decomposition holds as an identity: the three components on every row add up to the return of the portfolio (or log HML). Although this decomposition holds as an identity, the results of the decomposition are less interpretable as returns on long–short portfolios, unlike the approximate decomposition in Table 3.
Appendix B. Historical Distribution of Relative Valuations

In Table 10 we provide forward-looking expected returns for the value strategy or factor, HML, under different scenarios. These scenarios relate to possible future changes in relative valuations. In this computation the scenarios correspond to movements in the theoretical distribution of valuation ratios. To understand the need for defining this theoretical distribution, consider the realized historical distribution of valuations shown in Figure 3. If we were to refer to this realized distribution in our scenario analysis, we would have to conclude, for example, that relative valuations can never fall below 0.1; this was the point at the peak of the dot-com bubble at which growth stocks were the most expensive relative to value stocks. The realized distribution of valuations should be viewed, however, as just one draw from the theoretical distribution of valuations. It is conceivable, for example, that growth stocks could have become even more expensive.

In our scenario analysis, we assume that the historical distribution is a single draw from the theoretical distribution and, assuming that the theoretical distribution remains unchanged, we estimate the theoretical distribution of valuations using kernel density estimation. We take the realized distribution of valuations from Figure 3 and use the Epanechnikov kernel with optimal bandwidth. This method can be viewed as fitting a smooth “density” over the historical histogram of valuations; it fills the gaps and makes educated guesses about the distribution outside the highest and lowest historical valuations. Figure B1 plots the density (Panel A) and the relative valuation percentiles (Panel B) for this (estimated) theoretical distribution of valuations. It also places the July 2007 and July 2019 relative valuations on this distribution. The chart in Panel A illustrates that most of the historical observations of relative valuations (about 70% of historical observations) are concentrated between the values of 0.17 and 0.25 (and 90% observations between the values of 0.13 and 0.27). Outside this 70% range, the historical observations have quite fat tails in both directions.
Endnotes

1. The FANMAG stocks combine the so-called FANG stocks (Facebook, Amazon, Netflix, and Google) with the winners from the tech bubble of 20 years ago, Apple and Microsoft, which are, for the moment, the two most valuable companies in the world and the only two companies worldwide with a market value over US$1 trillion.

2. We use the term luck to refer to anything not captured by our regression models. It’s no different from anything else in finance. When our error term is negative, the sample is more likely to be negative. So, negative sample outcomes will include an abnormal proportion of negative errors. We know full well that these episodes can be driven by anything
and everything missing from our very simple model! Keep in mind that our model captures 70% of the variability in HML returns, but 30% of the variability is driven by other independent variables and by random noise, which—when negative—we collectively refer to as bad luck.

3. For example, around the turn of the 15th century, Jakob Fugger (known as Fugger the Rich) accumulated vast wealth by lending to troubled businesses and countries, then cherry picking their most discounted assets as repayment when his debtors could not repay.

4. For example, Barbee et al. (1996) documented the value effect for the price-to-sales ratio; Statman (1980) and Rosenberg, Reid, and Lanstein (1985) documented the value effect for the P/B ratio; and Naranjo, Nimaleendran, and Ryngaert (1998) showed the value effect for the dividend yield. Jacobs and Levy (1988) demonstrated that many different definitions of value are related and that they produce correlated returns.

5. The equal weighting of small- and large-cap stocks introduces a weighting anomaly in which the largest-cap stocks in small value and small growth portfolios receive a weighting six to eight times the weight of the smallest-cap names in the large value and large growth portfolios.

6. An alternative composition based on measures of book to price, earnings to price, dividend yield, and sales to price and limited to large-cap stocks produced a 14-year drawdown from 1986 to 2000, even longer and deeper than the current value bear market, followed by a very rapid recovery.

7. Unlike the previous episodes, which we measure peak to trough to new high, the current period of underperformance is not over, which will make the recent drawdown and eventual recovery even more remarkable. The end of the latest 12.8-year span appears (so far) to be only one month beyond the bottom of the drawdown. Thus, the final duration number is guaranteed to be longer than 12.8 years.

8. The idea to decompose the return of equity factors into structural and revaluation alpha was first introduced by Arnott, et al. (2016). This exact decomposition is original to that article.

9. An awareness of the migration concept dates back to the early days of the Russell growth and value indices, launched in 1979. By the early 1980s, hedge funds began forecasting migration ahead of the annual June rebalance and trading in advance of the changes in index composition. These changes occur, for example, as value stocks come into vogue and become priced (and so recategorized) as growth stocks, while growth stocks can fall out of favor so that their valuation multiples fall and thus be recategorized as value stocks. The value index therefore replaces the stocks with newly elevated valuation multiples with stocks that are newly cheaper, creating an instantaneous “pop” upward in the B/P or E/P ratio of the index, and the opposite happens in the growth index, at every annual rebalance.

10. Bill Sharpe remarked at the time that substituting actual subsequent profits into a discounted-cash-flow model to measure long-ago historical fair values for companies is simply “clairvoyant value,” which Arnott, Li, and Sherrerd (2009) embraced as the title of their paper. ALS also showed that the companies that deserved higher multiples generally had higher multiples, but the companies with higher multiples were priced for more good news than subsequent history actually delivered. So while there was a 50% correlation between relative valuations and fair value, there was a reciprocal ~50% correlation between relative valuations and subsequent stock performance (IRR). The market paid a premium for (mostly) the right companies, but (mostly) overpaid for growth and underpaid for value. With relative valuations as stretched as they are today, we will need to see a sharp break from historical experience for the growth stocks to out-grow the value stocks by enough to justify the current relative valuation levels.

11. One of our favorite examples is the 50-year performance of stocks relative to bonds from 1950 to 1999. After stocks beat bonds by 7.9% a year over this period, we began to hear the “Why bother with bonds?” conversation. For the 50-year period ending 1999, almost exactly half of stocks’ outperformance was due to the dividend yield plummeting from 8.0% to 1.1% (as the Shiller P/E ratio soared from 10.5 to 44 times 10-year average real earnings). Meanwhile, as interest rates rose, the 10-year bond yield increased from 1.9% to 6.6%, sapping bond returns by about 0.5% a year. So, absent upward revaluation of stocks and downward revaluation of bonds, the 7.9% “risk premium” turns out to have been just 3.5%. An excess return of 3.5% is still highly profitable, but it is less than half of what many investors were expecting at the peak of the tech bubble.

12. Value stocks were slightly more expensive relative to growth stocks at the end of June 2007 than they were at the end of June 1963. The average revaluation term in Table 3 is negative because we compute averages of simple annual returns. In Appendix A we show the decomposition results using log returns instead of simple returns. In our analysis the average revaluation term is +0.2% a year.

13. We compute the relative valuations each month by constructing a monthly rebalanced version of HML. The signal is the book value of equity from a fiscal year that ended at least six months earlier divided by the market value of equity lagged by six months. This signal matches the signal of the canonical, annually rebalanced HML: when HML rebalances at the end of June in year \( t \), the book value of equity is from the fiscal year that ended in yeat \( t-1 \), and the market value is from the December of year \( t-1 \). By defining this monthly version of HML, we can match the HML valuations at the rebalancing points, while still tracing out valuations at a monthly frequency. An alternative method for constructing a timely measure of value (and valuations) is “Devil’s HML,” which divides the lagged book value of equity with the current price (Asness and Frazzini, 2013). We use the standard HML because of its prominence in both academic and practitioner literature.

14. In accordance with Fama and French (1993), the value portfolio equally weights its component large and small value
portfolios, and the growth portfolio equally weights its component large and small growth portfolios.

15. We report relative-valuation summary statistics, such as median or values at specific percentiles, using the monthly observations of relative valuations. The monthly observations relative to the annual observations have a natural upward bias due to average migration between the rebalancing points. For the attribution analysis, we use the annual observations, which are not biased by the migration.

16. We obtain the slope by regressing the log valuation ratio on the annualized time trend. We interpret the slope to mean, on average, the valuation has been declining by about 0.8% a year over the 56-year sample.

17. Point B in Figure 3 is the point at which Basu (1977) first documented the value premium.

18. This differs from the 39.1% drawdown discussed earlier, because here the period is from July 2007 through June 2017, instead of the peak-to-trough drawdown from February 2007 through August 2017.

19. The historical relative-valuation levels have a very dense distribution around the median and have quite fat tails in both directions, which explains why even with a significant move in terms of percentile, from the 50th—median—to the 22nd percentile, the relative valuation only increased from 0.21 to 0.23. We illustrate the relative-valuation historical distribution in Appendix B.

20. The regression models the relationship between the HML return and the changes in the relative valuations of value and growth stocks—that is, the relationship modeled is not about the price change. The regression slope of 0.78 is inclusive of dividends: if we know the change in relative valuations, the model predicts that the HML return, not the price change, is 0.78 times this change.

21. We also use similar regressions to examine the performance of two alternative value strategies—value relative to neutral and neutral relative to growth—and find that the results are symmetric.

22. The residuals from the linear regression add to zero by definition. If we condition on the realization of the dependent variable as we do when we select periods based on value’s performance, we bias the estimated intercept. To see why, suppose that the model generating the data is \( y_t = \alpha + \beta x_t + \epsilon_t \), where \( \epsilon_t \) is a innovation. Suppose further that \( \alpha = 0 \) and that the average \( \epsilon_t \) in our sample is zero. If we select observations in which \( y_t < 0 \), it has to be that either \( \beta x_t < 0 \) or \( \epsilon_t < 0 \). That is, when we condition on the realization of \( y_t \), we indirectly condition on the realized value of the innovation, \( \epsilon_t \). We call this mechanism “oversampling bad luck”: the average, in the resulting sample is negative. If we take the observations in which \( y_t \) is negative and estimate a linear regression, the estimated intercept becomes negative; because the linear regression’s residuals add to zero, we push the average negative innovation into the intercept. This problem is akin to the problem that Fama and MacBeth (1973, p. 615) encountered when sorting stocks into portfolios by estimated betas: “Forming portfolios on the basis of ranked \( \hat{\beta}_t \) thus causes bunching of positive and negative sampling errors within portfolios. The result is that a large portfolio \( \hat{\beta}_p \), would tend to overstate the true \( \beta_p \), while a low \( \hat{\beta}_p \) would tend to be an underestimate.”

23. Dividends-to-price ratio as the definition of value is atypical because the short portfolio is dominated by the companies not paying dividends, many of which are not necessarily expensive companies. This is the reason why we exclude the companies with no dividends as the first step of our definition of the dividends-to-price–based portfolio. Beck et al. (2016) documented that, out of many different value definitions, the dividend-to-price strategy has one of the worst long-term performance characteristics on a non-risk-adjusted basis. When adjusted for market risk, this strategy has one of the most attractive performance characteristics. The lack of movement in the relative valuations in the post-2007 period for the dividend-to-price strategy may be partly explained by the increasing popularity of the reach-for-the-yield and low-beta strategies.

24. The accounting decomposition suggests a 5.1% - 1.3% = 3.8% reduction in structural alpha, and the regression-based decomposition suggests a 5.1% - (-0.1%) = 5.2% reduction.

25. Following Peters and Taylor (2016) we capitalize R&D expenses by applying the perpetual inventory method to a company’s past R&D: \( G_{it} = (1 - \delta)G_{it-1} + R&D_{it} \), where \( G_{it} \) is the end-of-period stock of knowledge capital for company \( i \), \( \delta \) is the industry-specific discount rate, and is the real company R&D expenditures during the year. We apply the Bureau of Economic Analysis (BEA)—estimated discount rates for R&D for different industries. Examples of R&D expenses include patents, software, and internal knowledge development costs. The R&D capitalized measure could be interpreted as the replacement cost of the knowledge capital. Similarly, we capitalize a fraction of SG&A. Just like with R&D, the capitalized SG&A expense could be interpreted as the replacement cost for recreating brand awareness, training costs to build human capital, and so forth.

26. Ball et al. (2019) discussed the meaning of the book value of equity from an accounting perspective. The two main components of the book value of equity are contributed capital and retained earnings. Contributed capital represents the net contribution of capital from the company’s shareholders through initial or seasoned public offerings in excess of share repurchases, and retained earnings are the earnings accumulated since the company’s inception less accumulated dividends.

27. The idea that a firm’s investment should respond to \( q \) was first introduced by Hayashi (1982).

28. We thank Ryan Peters and Lucian Taylor for providing the firm-level estimates of intangible capital. Because these data end in December 2017, we end the iHML sample in June 2019 to avoid using unduly stale accounting
In the post-1989 sample, the spanning results are even stronger: alpha on test (3) becomes negative at −0.31% and on test (6) goes up to 1.57%. In the post-1989 sample, the t-value on test (6) is 1.91; the reduction from the full sample t-value of 2.21 is driven entirely by the reduction in the sample size by about half (the full-sample equivalent-value would have been 2.64).

These are our own estimates not reported separately. The results are available on request.

The expected return on HML conditional on a particular draw of revaluation is

\[ E[HML_t | \text{Revaluation}_t] = E[\text{Revaluation}_t + \text{Profitability}_t + \text{Migration}_t | \text{Revaluation}_t], \]

where, on the right-hand side we apply the accounting identity we developed. This conditional expectation simplifies to

\[ E[HML_t | \text{Revaluation}_t] = \text{Revaluation}_t + E[\text{Profitability}_t | \text{Revaluation}_t] + E[\text{Migration}_t | \text{Revaluation}_t]. \]

In order to estimate the HML return given a particular realization of revaluation, we need to have an expectation of how the profitability and migration terms perform conditional on this revaluation.

A slope less than 1.0 would be associated with mean reversion, a slope greater than 1.0 would be associated with momentum, and a slope not significantly different from 1.0 would imply no autocorrelation.

In the scenario analysis shown in Table 10, we consider movements in an estimated theoretical distribution of relative valuations. The realized distribution of valuations, shown in Figure 3, is viewed as one draw from this theoretical distribution. We provide additional details in Appendix B.

See, for example, Henderson and Parmeter (2015) on kernel density estimation and the Epanechnikov kernel.

References


