Reports of Value’s Death May Be Greatly Exaggerated
May 14, 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 13.3 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 100th percentile of historical relative valuations), the stage is set for potentially historic outperformance of value relative to growth over the coming decade.

Executive Summary

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The Fama–French value factor, and value investing in general, has suffered an extraordinarily long 13.3 years of underperformance relative to the growth investing style. The current drawdown has been by far the longest as well as the largest since July 1963. 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 March 2020, 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 57-year sample period that coincided with the Nifty Fifty, Iran oil crisis, tech bubble, global financial crisis, and now the COVID-19 pandemic, a value investor is still 4.8 times as wealthy as 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 13.3 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. HML vs. iHML: Spanning Tests, United States, Jul 1963–Mar 2020

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th>Dependent Variable: iHML</th>
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<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<td>4.08</td>
<td>0.68</td>
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<td>(3.21)</td>
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<td>N</td>
<td>681</td>
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<tr>
<td>Adjusted $R^2$</td>
<td>4.8%</td>
<td>74.6%</td>
<td>-0.1%</td>
<td>81.0%</td>
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</tbody>
</table>

Note: The numbers (1)–(6) identify the individual models in the spanning test. In columns (1)–(3), traditional HML is regressed on the market, size, and momentum factors, following Carhart (1997), as well as on 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 the market, size, and momentum factors, as well as on the traditional HML factor. In this case, the alpha for iHML 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.

The regression analysis finds that in the post-2007 period 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 (100th 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

Introduction

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 no longer works 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 of underperformance—over 13 years, and counting—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 changes in 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 variability in factor returns over the past 13.3 years and well over 100% of the cumulative shortfall. This is not particularly surprising given that six stocks, which we describe as the FANMAG stocks, have collectively appreciated more than tenfold since 2007. These stocks comprise about 18% of US stock market capitalization and 60% of the Fama–French growth portfolio as of March 31, 2020. Without the FANMAGs, the performance of the S&P 500 Index over the same period would have cumulatively 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 value stocks appreciate (i.e., trade at higher book-to-price, or B/P, ratios) and move from the value portfolio to the neutral or growth portfolio, only to be replaced with newly unloved value stocks. Migration also occurs when growth stocks become cheaper and fall out of the growth portfolio, to be replaced with new highfliers. Migration is the largest contributor to the relative performance of value versus growth. Our examination of the pre- and post-2007 data shows essentially no difference in migration. Profitability is the third driver of relative performance, because most growth stocks are more profitable, and exhibit faster growth in sales and profits, than most value stocks. Similar to the analysis of migration, we find little evidence of any meaningful change in the contribution of profitability to relative performance over the past 15 years.

Our paper 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 introduce in the second section a return decomposition to study alternative drivers of value’s performance. In the third section, we model the three components of the value premium. In the fourth section, we examine the role of intangibles in the definition of value. In the fifth section, using history as a guide, we study the expected future performance of value conditional on various scenarios of relative valuation. We then examine the expected return from value conditional on a given magnitude of revaluation in the sixth section. Lastly, we offer some concluding remarks and suggestions for future research in the final section.

Our Approach: A Brief Overview

We begin the paper with an analysis of the likelihood of observing a drawdown of -50.0% using the bootstrap method detailed by Arnott et al. (2019). As of end-March 2020, the current drawdown is the largest drawdown observed since June 1963. Our analysis suggests that the probability of observing a drawdown of this magnitude or larger is 5.2%, or roughly 1 out of 20. Whereas a 5.2% 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 (23rd percentile). By March 2020, the spread was very wide, with the value portfolio at its all-time cheapest level (100th percentile) relative to growth. When value is becoming cheaper relative to growth, this naturally leads to value performing poorly relative to growth. The leftover return (which we term the structural alpha) is a combination of the profitability difference and migration.

We estimate structural alpha using a return decomposition and a regression approach. The pre-2007 structural alpha estimate is 6.0% for both methods: the post-2007 estimate is 1.1% using the decomposition method and -1.1% using the regression method. A simplistic interpretation is that the value factor has lost its efficacy. However, 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 typically turns negative. Indeed, at an average of -2.6% over the years when value underperforms, it is even worse than our -1.1% regression coefficient since 2007.

If the structural alpha is 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.” In short, our analysis attributes value’s recent underperformance to two sources: the rising valuations of growth stocks and bad luck. Importantly, 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 23rd to the 100th 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 can neither reject the null hypothesis that the structural alpha is now zero nor that value has the same lofty 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 13-year shortfall in value’s performance and to explain why value will not make a comeback. Some argue that growth is more profitable than value in today’s market environment and will remain so for the foreseeable future. Others argue that the extraordinarily low interest rates over the past 13 years have boosted the profitability of growth stocks, or have boosted the fair net present value for growth stocks relative to value stocks, because their long-term future growth is no longer facing a large discount rate. Our analysis shows little difference in overall profitability of the growth and value investing styles over the two periods. Indeed, while large-cap growth has unsurprisingly been more profitable in the period since 2007, largely due to the FANMAG stocks, small-cap growth has been considerably less profitable since 2007 than before.

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 B/P ratio, are misleading. For example, a company presumably undertakes the creation of intangibles (e.g., research and development, patents, intellectual property, human capital, 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 neutral or 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% per 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, many asset managers were practicing value investing—first as fundamental analysis, later as quantitative 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 high earnings-to-price (E/P) ratio, outperform growth stocks, defined as having a low E/P 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 B/P 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, consisting of 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 weighting each portfolio 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 less favored. Over the 1963–2020 period of our analysis, value is one of the most attractive factors in terms of risk–return characteristics.

In the 13.3 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 March 2020. 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 50% by the end of March 2020. Although the value investor earned 50% less wealth than the growth investor in the 13.3 years since the start of 2007, value did not give back its very large past gains. Even with this large drawdown, the value investor is still 4.8 times as wealthy as the growth investor over the period from July 1963 through March 2020.

Table 1. Major Factor Performance, United States, Jul 1963-Mar 2020

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<tr>
<th>Factor</th>
<th>Year of Discovery</th>
<th>Average Return</th>
<th>Standard Deviation</th>
<th>t-stat</th>
<th>CAPM Alpha</th>
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<tr>
<td>Value</td>
<td>1977/90</td>
<td>3.2</td>
<td>9.8</td>
<td>2.50</td>
<td>4.1</td>
<td>3.23</td>
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<tr>
<td>Size</td>
<td>1975</td>
<td>2.1</td>
<td>10.3</td>
<td>1.52</td>
<td>0.9</td>
<td>0.65</td>
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<td>Operating Profitability</td>
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<td>2.72</td>
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<td>6.4</td>
<td>3.03</td>
<td>3.5</td>
<td>4.33</td>
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<td>Momentum</td>
<td>1989</td>
<td>7.9</td>
<td>14.5</td>
<td>4.09</td>
<td>8.8</td>
<td>4.58</td>
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<tr>
<td>Low Beta</td>
<td>1966</td>
<td>0.6</td>
<td>15.3</td>
<td>0.29</td>
<td>5.0</td>
<td>3.54</td>
</tr>
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</table>

Note: All factors are long–short strategies similar to the HML factor of Fama and French (1993). Source: Research Affiliates, LLC; using data from CRSP/Compustat.

Table 2 describes the three deepest and three longest value drawdowns in our almost 57-year sample. The current

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**Figure 1. Value vs. Growth Historical Performance, United States, Jul 1963-Mar 2020**

HML is high (value) minus low (growth) long–short portfolio balanced by size around the median by the NYSE market capitalization. Source: Research Affiliates, LLC, using data from CRSP/Compustat.

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drawdown at -50.0% is the deepest, eclipsing the tech bubble, which at its bottom had a drawdown of -40.7%. The current drawdown span of 13.3 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. That said, if we focus on large-cap stocks, we find two back-to-back drawdowns—the biotech bubble and the tech bubble—interrupted by a scant one-month new high. Combine these two, and this earlier drawdown lasted 14.5 years and left large-cap value investors—briefly!—almost 40% poorer than growth investors.7,8

<table>
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<tr>
<th>Rank</th>
<th>Event</th>
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<th>Bottom</th>
<th>End Date</th>
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<th>Drawdown</th>
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<td>13.3</td>
<td>-50.0%</td>
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<td>Tech Bubble</td>
<td>1998/08</td>
<td>2000/02</td>
<td>2001/02</td>
<td>2.8</td>
<td>-40.7%</td>
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<tr>
<td>3</td>
<td>Iran Oil Crisis</td>
<td>1979/07</td>
<td>1980/11</td>
<td>1982/02</td>
<td>2.5</td>
<td>-27.8%</td>
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Panel A. Deepest Drawdowns

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<th>Rank</th>
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<td>Current</td>
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<td>-50.0%</td>
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<tr>
<td>2</td>
<td>Biotech Bubble</td>
<td>1989/03</td>
<td>1991/12</td>
<td>1993/02</td>
<td>3.8</td>
<td>-25.3%</td>
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<td>3</td>
<td>Nifty Fifty</td>
<td>1970/08</td>
<td>1972/06</td>
<td>1973/04</td>
<td>2.6</td>
<td>-17.3%</td>
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Panel B. Longest-Lasting Drawdowns

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<th>Length in Years</th>
<th>Drawdown</th>
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<tr>
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<td>Current</td>
<td>2007/03</td>
<td>2020/03</td>
<td>NA</td>
<td>13.0</td>
<td>-57.0%</td>
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<tr>
<td>2</td>
<td>Tech Bubble</td>
<td>1993/07</td>
<td>2000/02</td>
<td>2001/03</td>
<td>7.6</td>
<td>-39.4%</td>
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<tr>
<td>3</td>
<td>Biotech Bubble</td>
<td>1986/09</td>
<td>1991/12</td>
<td>1993/07</td>
<td>6.8</td>
<td>-30.6%</td>
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</table>

Panel C. Deepest and Longest-Lasting Drawdowns, Large Cap Only

* These two drawdowns were separated by a single one-month new high for large-cap HML. If combined, they would have represented a drawdown of 14.5 years and 38.9%. Source: Research Affiliates, LLC, using data from CRSP/Compustat.

Is the current value drawdown 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 -50.0% at some stage during a nearly 57-year span?

We use a circular block bootstrap simulation following Arnott et al. (2019) to answer this question. In the simulation, we resample the value factor returns, drawing random six-month blocks of actual long–short HML factor returns from the live historical sample from July 1963 through December 2006. Note that we end the historical sample a month before the current drawdown began, thereby excluding the recent drawdown. We are asking whether prior data might have led us to believe that the drawdown since 2007 was a plausible outcome.

Each simulated sample is 56 years and nine months long, to match the length of the history from July 1963 through March 2020. We repeat this exercise 1,000,000 times. In so doing, we generate 1,000,000 alternative histories, based on random draws from HML value-versus-growth relative returns. We then measure the size of the largest drawdown in each simulated sample, seeking to know how many of the 1,000,000 simulated histories have a drawdown comparable to the 50.0% decline from January 2007 through March 2020.9

We display in Figure 2 the distribution of the largest drawdowns in the simulations. Each bar in this histogram shows how common it is to have a worst drawdown of the indicated magnitude. We would view a 1% or smaller likelihood to be a statistical red flag. In Figure 2, we can see that this latest 50.0% drawdown is an outlier, but by no means an extreme outlier. A drawdown larger than this occurs in 5.2% of our simulations. Moreover, the analysis is biased toward a low probability: we specifically excluded the recent drawdown from the data that we used in the bootstrap simulations. Furthermore, the main reason we are searching for causes of the January 2007–March 2020 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.
Is This Time Different?

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, widely accepted as a legitimate factor throughout the academic and factor investing communities. 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 this factor has been “arbitraged away.” If the crowding narrative is correct, then we should expect that the value premium is structurally impaired for as long as crowding persists. Moreover, value investors’ trades should boost the prices (and valuation multiples) of value companies up, relative to those of growth companies. But, in fact, we’ve seen the opposite.

Technological revolution. In the last decade, we have witnessed the emergence of a vast digital sector, leveraging technological prowess to take over large parts of the macroeconomy. The recent success stories of the FANMAG stocks are captivating. These enterprises have driven many longstanding brick-and-mortar companies out of business. These US-based tech companies are collectively vastly profitable. The combined capitalization of the FANMAG stocks was US$4.59 trillion at the end of March 2020, 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 should have already become even more profitable and faster growing relative to value companies 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 once-ubiquitous Palm Pilot—was spun off by its parent 3Com at a valuation larger than 3Com itself, briefly larger than GM, and far larger than Apple at that time. The ubiquitous and 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, with US$15.0 trillion of government bonds worldwide trading at negative yields as of early August 2019 (Fitzgerald, 2019), declining to US$11.6 trillion at the end of March 2020, according to the BNYDMVU Index. 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 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 very 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 investors. This narrative suggests that private equity 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 private equity, the buying pressure should increase the prices of deep-value stocks when they become and are private equity 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 private equity investors should elevate the prices of certain value stocks before they disappear.

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 value stocks stay cheap and growth stocks stay richly priced, so much less relative-valuation migration is happening. Because migration is a powerful driver of the value effect, usually more than offsetting the growth portfolio’s higher profitability and more-rapid growth, a slowdown in migration could allow the profitability advantage of growth stocks to overwhelm the migration alpha, wiping out the alpha of the value effect.

We hear narratives suggesting several reasons that migration may be slowing. For instance, the more-monopolistic structure of many industries compared to a few decades ago makes 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 the neutral and growth portfolios than in the past (and vice versa, fewer growth stocks migrating to neutral and value classifications).

Intangibles. Book value does not capture intangibles, so B/P may be a bad way to identify cheap or expensive stocks. 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 some value stocks as growth stocks because these companies have smaller assets on their balance sheet 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 the past decade.

Value has become drastically cheaper. This narrative does not mean that value stocks are cheap in an 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 headwind (albeit 13 years and counting) 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, excepting 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 disaggregating value factor returns (the performance difference between the value portfolio and the growth portfolio) into three constituent parts: 1) migration, 2) profitability, and 3) changes in aggregate valuation, or revaluation.11 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 (the details of the decomposition and derivation are available)

\[
\text{HML Return} = \text{Revaluation} + \text{Profitability} + \text{Migration}
\]

The three elements in the decomposition have the following interpretations:

**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.12 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. 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 B/P 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.13

**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 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.14 They argue that the returns induced by the changes in the valuations should be purged from the estimates of the risk premium because no a priori reason exists to explain 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.

Table 3 displays the results of the value factor’s return decomposition in the pre- and post-2007 samples.15 Because our value strategy (HML) is rebalanced annually at the end of June, and because our decomposition uses the observations between rebalancing points, our analysis 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 March 2020.16 Unless otherwise specified, we follow this convention for the remainder of the article.
Consistent with the prior literature, we observe that growth stocks on average are more profitable and growing faster than value stocks. On average, because growth stocks are more profitable and faster-growing than value stocks, the profitability difference contributed -13.2% a year to the value-minus-growth return in the pre-2007 period. Over the same period, the migration component, at 19.2% a year, more than compensated for the difference in profitability. Combining the profitability and migration components, we observe a structural value premium of 6.0% a year, which is very near the average HML premium return of 6.1%; revaluation played very little role in this 44-year span.

<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>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Growth</td>
<td>8.4%</td>
<td>1.2%</td>
<td>7.2%</td>
<td>17.9%</td>
<td>-10.8%</td>
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<tr>
<td></td>
<td>Neutral</td>
<td>14.4%</td>
<td>1.3%</td>
<td>13.1%</td>
<td>9.1%</td>
<td>4.0%</td>
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<tr>
<td></td>
<td>Value</td>
<td>16.8%</td>
<td>1.3%</td>
<td>15.5%</td>
<td>0.3%</td>
<td>15.3%</td>
</tr>
<tr>
<td>Value – Growth</td>
<td>8.5%</td>
<td>0.1%</td>
<td>8.4%</td>
<td>-17.7%</td>
<td>26.0%</td>
<td></td>
</tr>
<tr>
<td>Big</td>
<td>Growth</td>
<td>9.3%</td>
<td>1.2%</td>
<td>8.2%</td>
<td>15.2%</td>
<td>-7.0%</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>11.1%</td>
<td>1.0%</td>
<td>10.1%</td>
<td>10.7%</td>
<td>-0.5%</td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>13.2%</td>
<td>1.4%</td>
<td>11.7%</td>
<td>6.4%</td>
<td>5.4%</td>
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<tr>
<td>Value – Growth</td>
<td>3.8%</td>
<td>0.3%</td>
<td>3.5%</td>
<td>-8.8%</td>
<td>12.4%</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>HML</td>
<td><strong>6.1%</strong></td>
<td><strong>0.2%</strong></td>
<td><strong>6.0%</strong></td>
<td><strong>-13.2%</strong></td>
<td><strong>19.2%</strong></td>
</tr>
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Panel B. Return Decomposition, Jul 2007–Mar 2020

<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>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Value – Growth</td>
<td>-4.1%</td>
<td>-4.5%</td>
<td>0.4%</td>
<td>-22.8%</td>
<td>23.2%</td>
</tr>
<tr>
<td>Big</td>
<td>Value – Growth</td>
<td>-6.8%</td>
<td>-8.6%</td>
<td>1.8%</td>
<td>-9.0%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Average</td>
<td>HML</td>
<td><strong>-5.4%</strong></td>
<td><strong>-6.6%</strong></td>
<td><strong>1.1%</strong></td>
<td><strong>-15.9%</strong></td>
<td><strong>17.0%</strong></td>
</tr>
</tbody>
</table>

Panel C. Full-Span Return Decomposition, Jul 1963–Mar 2020

<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>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Value – Growth</td>
<td>5.6%</td>
<td>-1.0%</td>
<td>6.6%</td>
<td>-18.8%</td>
<td>25.4%</td>
</tr>
<tr>
<td>Big</td>
<td>Value – Growth</td>
<td>1.4%</td>
<td>-1.8%</td>
<td>3.2%</td>
<td>-8.9%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Average</td>
<td>HML</td>
<td><strong>3.5%</strong></td>
<td><strong>-1.4%</strong></td>
<td><strong>4.9%</strong></td>
<td><strong>-13.8%</strong></td>
<td><strong>18.7%</strong></td>
</tr>
</tbody>
</table>

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

In the post-2007 sample, the profitability and migration components are close to their values in the pre-2007 sample. The profitability differential widens from -13.2% to -15.9%, while the migration effect narrows from 19.2% to 17.0%. 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 only weakly 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 1.1% versus 6.0%, but is still positive and economically meaningful.

Revaluation contributed -6.6% to the return, down from 0.2% before 2007. As a result, the total value premium flips from 6.1% in the first 44 years to an annualized shortfall averaging -5.4% in the last 13 years. Since 2007, well over 100% of the shortfall of value relative to growth is a consequence of value becoming cheaper relative to growth. Put another way, it took value cheapening by 6.6% per year to create a performance shortfall of 5.4% per year. In the most recent 13-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).
The relative valuation is the ratio of B/P for the growth portfolio to B/P for the value portfolio. If the B/P ratio of the growth portfolio is 0.4, and the B/P ratio of the value portfolio is 2, then the relative valuation is 0.20. The median relative valuation is 0.21, which means that growth stocks are, on average, about 4.8 times more expensive than value stocks, when measured by B/P.

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

When we put the performance and the revaluation charts together, the short-term movements of the two appear to be joined at the hip. In the short run, the revaluation component (changes in the B/P 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 last nearly 57 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 was 9.9 times as expensive as value at the peak of the dot-com bubble) to 0.09 at end-March 2020 (point E, when growth is over 11 times as expensive as value). 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 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 (March 2020), the value factor lost a cumulative 50.0% in performance, or -5.4% per year. From July 2007 to March 2020, the relative valuation moved from 0.23, which is relatively expensive at the 23rd percentile of the distribution, to 0.09, at the bottom percentile. At the current valuation level, growth stocks trade at about 11 times the valuations of value stocks. The relative valuation has been close to this level only in two episodes over the nearly 57-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 -6.6% per year and turned the 1.1% structural alpha into the –5.4% per year realized value premium.

**Modeling 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 impact of changes in relative valuations on the portfolio returns, between the start and endpoint of the portfolio observations. 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 τ + 1. Let’s assume also that the average 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) and no change in the underlying fundamentals, 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 τ. Some of the small value stocks may have moved into the small neutral category, 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 even from the previously excluded tiny stocks. Suppose, for example, that the group of small value stocks that we bought last year earned just 8%. The 2% gap between the 10% valuation change and the 8% return we experienced is due to what we call migration.

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

\[ \Delta m_t = \left[ \frac{\bar{P}_t}{\bar{P}_{t-1}} - 1 \right] \]

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. 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? Table 4 presents the estimates from this linear regression (estimated using annual data from July 1963 through March 2020).
To illustrate the issue, suppose we invest in a portfolio with a valuation ratio of P/B and this valuation ratio increases by 10% (we switch to P/B from our usual B/P notation to match the notation in the formula). 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 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 \((1 + 10\%) \cdot (1 - 3\%) - 1 = 6.7\%\).

The regression resolves this ambiguity by measuring the average relationship between valuation changes and price changes. Specifically, the regression slope of 0.78 says that when the valuations of value stocks increase by 10% relative to those of growth stocks, 

\[
HML \text{ on average returns } 7.8\%.
\]

The regression also shows that revaluations have a significant link to the returns of HML. The \(R^2\) of 65% means that changes in the relative valuations of value and growth stocks explain nearly two-thirds of the variance in the HML factor’s returns.

How do we interpret the estimate of 0.66 for the post-2007 sample? As Table 3 shows, the revaluation term averages -6.6% per year over this period. Taking the estimate together with the regression estimates, we attribute approximately 0.66 \(x\) (-6.6%) = -4.4% per year to a headwind created by rising valuations. Because the average loss for HML each year over this period was 5.4%, our back-of-the-envelope computation suggests that revaluation alone accounts for almost all of value’s negative returns from July 2007 through March 2020. The regression also reveals 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 nearly two-thirds of the variation in how well the value strategy performs.

Table 4 also 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 0.76 before mid-2007 and 0.66 thereafter. In the pre-2007 sample, this intercept is 6.0%; in the post-2007 sample, it is -1.1%.

It is tempting to interpret the intercepts from these regressions as estimates of the (counterfactual) returns on value, if valuations had remained unchanged. Although the post-2007 sample has only 13 data points and the near-zero intercept is not significant, does the estimate imply that value would have earned nothing even in the absence of the 6.6% 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. The -1.1% intercept, an alternative estimate for the structural alpha, is artificially depressed by this asymmetry.

When we explicitly analyze drawdowns, we are introducing selection bias by picking the sample to analyze based on the values of the dependent variable. In this case, we are studying the most recent 13-year period precisely because value performs so poorly. Although value’s poor performance may result in part from revaluation headwinds—nearly two-thirds of the variation and nearly 100% of the cumulative total drawdown, as shown in 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 13 years precisely because of the poor

<table>
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<tr>
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<tbody>
<tr>
<td>Revaluation</td>
<td>0.76 (10.03)</td>
<td>0.66 (3.21)</td>
<td>0.78 (10.21)</td>
</tr>
<tr>
<td>Alpha</td>
<td>6.0% (5.41)</td>
<td>-1.1% (-0.47)</td>
<td>4.6% (4.12)</td>
</tr>
<tr>
<td>N</td>
<td>44</td>
<td>13</td>
<td>57</td>
</tr>
<tr>
<td>Adjusted (R^2)</td>
<td>65.8%</td>
<td>54.7%</td>
<td>65.0%</td>
</tr>
</tbody>
</table>

Source: Research Affiliates, LLC, using data from CRSP/Compustat.
performance of value, which is likely in part due to negative residuals.\textsuperscript{25}

We demonstrate this issue 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, reported in Table 5, 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 \textit{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 estimate of the structural alpha is positive at 6.0%—we know that the negative 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.

In this sense, the -1.1\% intercept for the most recent 13 years is actually a somewhat surprising outcome. If the estimated structural alpha in the negative return years for HML pre-2007 was -2.6\%, as reported in Table 5, and set the stage for a powerful 7.2\% structural alpha when HML turned positive, then the results for the 13.3 years beginning January 2007 are arguably 1.5\% better than they should have been. This suggests that the -1.1\% estimate for the structural alpha in this most recent period materialy 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. It also suggests that when HML turns positive, we can arguably expect a very robust alpha.

Although this mechanism is intuitive, an important question remains: Is the intercept of -1.1\% in the post-2007 period evidence of exceptionally improbable bad luck or just ordinary bad luck that we might expect to encounter when we examine any drawdown? We examine this question by using an alternative bootstrap scheme, as illustrated in Figure 4.

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\frac{3}{4} 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 is more than one such drawdown, 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 2020. Finally, we regress these peak-to-trough returns against the revaluation terms and retain the intercepts. Figure 4 shows the distribution of these intercepts.

We can see that when we use random draws from a 44-year span with a true intercept of 6.0\% and focus on decade-long bear markets in value relative to growth, the regression intercept is above 6.0\% in only 5.2\% of the random samples. \textit{Indeed, the measured intercept is quite often negative.} The actual intercept of -1.1\% shown in Table 4 lies at the 25\textsuperscript{th} percentile of the regression results \textit{when we draw from a distribution with a true intercept of 6.0\%}. 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 \textit{net} of the revaluation effects would often be even more underwhelming than it was in the actual data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>HML &lt; 0</th>
<th>Unconditional</th>
<th>HML &gt; 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revaluation</td>
<td>0.29</td>
<td>0.76</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>(2.93)</td>
<td>(10.03)</td>
<td>(2.78)</td>
</tr>
<tr>
<td>Alpha</td>
<td>-2.6%</td>
<td>6.0%</td>
<td>7.2%</td>
</tr>
<tr>
<td></td>
<td>(-1.50)</td>
<td>(5.41)</td>
<td>(4.71)</td>
</tr>
<tr>
<td>N</td>
<td>15</td>
<td>44</td>
<td>29</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>38.3%</td>
<td>65.8%</td>
<td>42.9%</td>
</tr>
</tbody>
</table>

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

\textsuperscript{25} Page 16, © 2020 Advisor Perspectives, Inc. All rights reserved.
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 soaring valuations of growth stocks relative to value. These increasing valuations created a headwind that accounted for all of value’s losses over the past 13 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 value’s 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, then value’s theoretical poor performance in that period would have required almost the same amount of bad luck as in the post-2007 period.

**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. Table 6 reports the year-over-year rates of stock migration between the six portfolios that compose the HML factor (small-cap growth, small-cap neutral, small-cap value, large-cap growth, large-cap neutral, and large-cap value). We show the estimates separately for the pre- and post-2007 samples.

Panels A and B track the percentage of stocks originating in each of the six portfolios that remain in the same portfolio the next year (along the diagonal) and the percentage that moved to one of the other portfolios in the following year. We restrict the sample to stocks that existed as publicly traded firms in both (current and next) years. As a result, each row in Panels A and B sums to 100%. We highlight the big (large-cap) growth portfolio for illustrative purposes. For example, in the pre-2007 period, 78% of the stocks in the big growth portfolio in year \( t \) remain in that portfolio following the rebalance in year \( t+1 \); 22% moved to another portfolio, typically big neutral or small growth. After 2007, 82% of these stocks stay put in the big growth portfolio in the following yearly rebalance, and 18% migrated in the following year.

Panel C reports the differences in the migration rates between the pre- and post-2007 tables. The biggest change, a difference of 4% highlighted in Panel C, is that the big growth portfolio experienced slightly less migration over the post-2007 period. Big growth stocks are “stickier,” that is, they remained in the big growth category slightly more reliably than in the pre-2007 period. The difference is somewhat meaningful in economic terms, but not remotely statistically significant.

Apart from this one minor (but important) exception, the pre- and post-2007 migration numbers are surprisingly similar, with all differences statistically insignificant. The root-mean-square average change in migration rates is very small at 1.35%. These estimates confirm that the migration of stocks from one style, or classification, to another has not materially slowed;
this driver of the structural value premium remains quite robust.

### Alternative Examination of Profitability

Growth companies’ valuations reflect their higher average profitability. Many of the postmortem 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 between pre- and post-2007 samples.

Table 7 shows the average portfolio return on equity (ROE) and average sales growth for each of the growth, value, and neutral portfolios in the year following portfolio construction. When the individual portfolios are averaged and differenced in the same way the HML factor is constructed, we find that the growth stocks are actually less profitable than they used to be (as are value stocks). Yet the average ROE difference between value and growth is almost the same before and after 2007: -11% versus -12%.

### Table 6. Migration Rates Pre- and Post-2007, United States, Jul 1963–Mar 2020

<table>
<thead>
<tr>
<th>Current Portfolio</th>
<th>Portfolio Next Year</th>
<th>Small</th>
<th>Neutral</th>
<th>Value</th>
<th>Small</th>
<th>Neutral</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Growth</td>
<td>69%</td>
<td>23%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Growth</td>
<td>Small</td>
<td>15%</td>
<td>57%</td>
<td>24%</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>2007</td>
<td>Value</td>
<td>3%</td>
<td>18%</td>
<td>77%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Growth</td>
<td>Big</td>
<td>6%</td>
<td>2%</td>
<td>0%</td>
<td>78%</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Neutral</td>
<td>Value</td>
<td>1%</td>
<td>4%</td>
<td>2%</td>
<td>12%</td>
<td>69%</td>
<td>11%</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></td>
</tr>
</tbody>
</table>

Note: Each row in Panels A and B totals to 100%. Any deviation is due to rounding. Source: Research Affiliates, LLC, using data from CRSP/Compustat.

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The average growth rate for both growth and value stocks has also slowed materially from the pre-2007 norms. Growth stocks are not growing any faster than they were before 2007 and value stocks’ growth has slowed to a crawl; the difference in growth rates has, if anything, narrowed. These data fundamentally challenge the narrative that growth companies have become more profitable, or faster growing, than in the past.

The Trouble with Intangibles

Whether we use the accounting decomposition or the regression-based model, the changes in relative valuations for the value portfolio versus the growth portfolio explain most or all of value’s bleak performance over the most recent 13-year period. At the same time, some of our findings indicate a possible reduction in structural alpha for value, as defined by book-to-price (B/P) ratio, in the post-2007 period. The structural alpha falls from 6.0% to +/- 1.1%, depending on which estimation method we use. In neither case, however, do we observe a negative structural alpha remotely as large as the headline 5.4% negative return for the HML factor since July 2007.

The detailed examination of migration suggests that large-cap growth companies experienced marginally lower rates of migration by about four percentage points. As we explain in the next section, while all definitions of value experienced underperformance in the post-2007 period, value defined by the B/P ratio 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 offer (perhaps) better performance potential than the growth stocks of the past. The magnitude of the effect, however, is only enough to diminish the value premium and is not sufficient 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 low B/P ratios. Should we interpret this as bad news for value investing?

The B/P ratio is just one of many ways to define value. Intrinsic value is another definition, introduced in 1934 by Benjamin Graham and David Dodd. Graham and Dodd specifically cautioned against the use of B/P 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 tangible capital locked in bricks and mortar and in financial assets such as cash and other securities. In today’s economy, a company’s intangible assets—patents, brands, software, human capital, customer relationships, and so forth—are often 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?

Let’s assume that companies will not spend a penny for research and development (R&D) nor any avoidable selling, general, and administrative (SG&A) expenditures, unless they expect to earn their money back within a decade. Accordingly, following Peters and Taylor (2017), we capitalize all R&D expenditures as knowledge capital and apply a 30% share of SG&A expenditures as capital related to human capital, brand, and a company’s distribution network. These sums are added to book value much as if the expenditures were used to buy a building. We capitalize both R&D and SG&A expenditures as knowledge capital and apply a 30% share of SG&A expenditures as capital related to human capital, brand, and a company’s distribution network. These sums are added to book value much as if the expenditures were used to buy a building. We capitalize both R&D and SG&A...
expenses by applying the perpetual inventory method.\textsuperscript{31}

**Figure 5** plots the ratio of capitalized intangible capital to the book value of equity for all publicly traded companies in the United States. We show the equally weighted average for the growth, neutral, and value portfolios (selected on the basis of B/P, not intangibles-adjusted B/P), as well as the market average, from 1963 to 2020.

In the last three years, the ratio of intangible capital for the average US company approaches 100\% of tangible book value. As of 2020, even for value stocks, intangible capital exceeds 50\% of the tangible book value, and for the average growth stock, intangibles have exceeded book value for nearly 20 years. It is very clear that book value is a tired, outdated metric for identifying value or growth stocks.

From an accounting viewpoint, book value can only capture the value of intangibles through contributed capital, or goodwill, in a corporate acquisition.\textsuperscript{32} From a value-investing viewpoint, apart from such “backdoor” inclusion of intangibles, book value obviously excludes most of the value of a company’s intangibles. This makes the B/P ratio vulnerable to misclassifying intangibles-heavy companies as expensive and tangible asset-heavy companies as cheap. The structural alpha associated with a conventional B/P-based HML value factor may have decreased over time, along with the valuation of the value portfolio relative to the growth portfolio, because this measure increasingly misclassifies some value firms as growth firms, and vice versa.

**Figure 5. Average Magnitude of Intangible Assets Relative to Tangible Assets, United States, Jul 1963-Mar 2020**

![Graph showing the average magnitude of intangible assets relative to tangible assets from 1963 to 2020.](https://example.com/graph5)


What if we define the value factor based on a measure of company capital that includes both tangible and intangible capital? To answer this question, we construct an iHML factor following the same rules we use to construct the regular HML factor, with only one change. Instead of using the book-to-market ratio to define value, we use the ratio of the previously described intangibles-adjusted book value to market value (iBook to Market) to define our value factor.

**Figure 6** plots the cumulative performance, defined as the performance difference between the newly constructed value portfolio relative to the performance of the newly constructed growth portfolio, for the HML and iHML factors.
In the full sample, iHML, the factor based on intangibles-adjusted B/P, outperforms the traditional value factor by 1% per year, but most of this difference accrues after 1980. The two definitions of value are more-or-less equally effective up to this date. 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 than in the 2000s.

Many low B/P growth stocks, if they are investing heavily in intangibles, are not nearly as expensive after we make this change. A few even switch to the value portfolio! Reciprocally, some value stocks that are disinvesting in their future look surprisingly expensive on this intangibles-adjusted metric; some even move into the growth portfolio (not because they are pursuing growth, but because they are expensive). Once we incorporate intangibles into our book value measure, the 13-years-and-counting drawdown for value from 2007 to 2020 becomes a far less daunting (albeit very nearly as large at -37.6%) 4-year drawdown, 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 March 2020 the value of iHML would have been $8.75 compared to $4.80 for traditional HML. An iHML value investor would be 9½ times wealthier than an iHML growth investor, whereas a conventional HML value investor would be just 7 times wealthier than an 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% significance level). Table 8 reports these results. With conventional B/P, the coefficients for market (beta) and size are negative, suggesting that value has a low-beta and large-cap bias on average over time. With iHML, incorporating intangibles, the signs flip and the coefficients become slightly more neutral, suggesting that iHML value has a mild high-beta and small-cap bias.
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 that is based on the B/P ratio and balances the portfolio by size. The same observation holds true for other value definitions.

Table 9 displays the performance characteristics for five aspects of the HML (B/P-based) value metric and five alternative value strategies. These include iHML (which was introduced in the previous section), earnings-to-price (E/P) ratio, sales-to-price (S/P) ratio, dividends-to-price (D/P) ratio, and a composite that equally weights the relative B/P, E/P, S/P, and D/P in measuring a stock’s relative cheapness for constructing the growth, neutral, and value portfolios.

For every definition of value we examine, value underperformed growth in the post-2007 period. Also, for all but one definition, the one based on the D/P ratio, value’s underperformance was associated with value having neutral to expensive relative valuations in June 2007 and having bottom-decile relative valuations in March 2020. A few more-detailed observations from examining alternative value definitions include:

- The large-cap half of the HML factor experienced the largest underperformance, -5.6% per year, in the post-2007 period, accompanied by a huge move in relative valuations from the 13th percentile to the 100th percentile.
- The value-to-neutral and neutral-to-growth factors have similar underperformance (and combined match the HML underperformance). The value-to-neutral factor is long the 30% of stocks with the highest B/P ratios and short the 40% of stocks in the middle of the B/P distribution. The neutral-to-growth factor is long the neutral stocks and short the 30% of stocks with the lowest B/P ratios. The valuation change for the neutral-to-growth definition matches the move for large-cap HML from the 13th to the 100th percentiles. The ending percentile implies that the growth portfolio trades today at extreme valuations, roughly matching the three-month period from March 2000 through May 2000.
- The traditional B/P-based HML strategy suffered the worst drawdown, underperforming by -4.7% per year, whereas the five alternative strategies reported in the bottom half of the table fared much better. iHML cuts that shortfall in half, but even the adjustment of book value to include intangibles does not fare as well as the E/P or S/P value factor models. The underperformance from January 2007 through March 2020 ranges from -1.0% per year for the S/P-based value factor to -3.1% per year for the composite, which was clearly hurt by including traditional HML in its process.

Table 8. HML vs. iHML: Spanning Tests, United States, Jul 1963–Mar 2020

<table>
<thead>
<tr>
<th>Dependent Variable: HML</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>Dependent Variable: iHML</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha, ann. (t-stat)</td>
<td>3.22</td>
<td>4.08</td>
<td>0.68</td>
<td>4.20</td>
<td>4.30</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>Market (t-stat)</td>
<td>-0.14</td>
<td>-0.11</td>
<td>-0.02</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size (t-stat)</td>
<td>-0.15</td>
<td>-7.81</td>
<td>0.17</td>
<td>11.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Momentum (t-stat)</td>
<td>-0.03</td>
<td>-2.42</td>
<td>-0.04</td>
<td>-4.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value–HML (t-stat)</td>
<td>0.95</td>
<td></td>
<td></td>
<td>0.80</td>
<td>50.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value–iHML (t-stat)</td>
<td></td>
<td></td>
<td></td>
<td>N 681</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>4.8%</td>
<td>74.6%</td>
<td>-0.1%</td>
<td>81.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The numbers (1)–(6) identify the individual models in the spanning test. In columns (1)–(3), traditional HML is regressed on the market, size, and momentum factors, following Carhart (1997), as well as on iHML. When iHML is included, the alpha is not significantly different from zero, implying that iHML subsumes HML. In columns (4)–(6), HML is the dependent variable and is regressed on the market, size, and momentum factors, as well as on the traditional HML factor. In this case, the alpha for iHML 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.

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What to Expect from Value?

Over the last 13.3 years, the relative valuation of HML (value versus growth) moved from the 23rd percentile to the 100th (lowest) percentile. This revaluation explains more than 100% of value’s underperformance and 70% of its monthly variability. Today, the relative valuation of the HML value factor is very close to the most attractive valuation level in history, which occurred at the peak of the tech bubble in 2000. Given the historical relationship between value’s return and valuation levels, what return can we reasonably anticipate from the expected value premium in the years ahead? Should we expect a rebound like the ones after the tech bubble of 1999–2000, the global financial crisis, or the Nifty Fifty of 1972–1973? We can gauge the forward-looking expected return estimates of the value premium by using the revaluation-migration-profitability decomposition.

We cannot, of course, simply assume a revaluation return to the historical median and keep the other components at their historical average. As discussed earlier, the three terms in the decomposition correlate significantly. Over the 1963–2020 sample, the correlation between the profitability and revaluation terms is -0.33, between the profitability and migration terms is -0.44, and between the revaluation and migration terms is -0.06. These negative correlations mean that when the HML factor benefits from revaluation tailwinds, lower profitability and migration terms typically offset some of these tailwinds. The question we want to answer is: What is the expected return on HML conditional on any given magnitude of 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 introduce in this paper. We can directly regress the HML return on revaluation and use the estimates from the model to make predictions about the factor’s performance.

Historically, relative HML and iHML valuations have shown a tendency to mean revert. A regression of the B/P-relative HML valuation against the year-earlier valuation has an intercept of -0.41 (t-stat = -2.55) and a slope of 0.73 (t-stat = 6.84). The slope roughly corresponds to a rapid 2.2-year half-life mean-reversion rate. 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? Table 10 displays the estimated results.

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 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.

### Table 9. Performance of Alternative Value Definitions, United States, Jul 1963–Mar 2020

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>t-stat</td>
<td>Average</td>
<td>t-stat</td>
</tr>
<tr>
<td>HML, Book-to-Price</td>
<td>5.7%</td>
<td>3.88</td>
<td>-4.7%</td>
<td>-1.75</td>
</tr>
<tr>
<td>HML, Small-Cap</td>
<td>7.5%</td>
<td>4.35</td>
<td>-3.9%</td>
<td>-1.44</td>
</tr>
<tr>
<td>HML, Large-Cap</td>
<td>3.8%</td>
<td>2.47</td>
<td>-5.6%</td>
<td>-1.71</td>
</tr>
<tr>
<td>Value-to-Neutral</td>
<td>2.4%</td>
<td>3.43</td>
<td>-2.1%</td>
<td>-1.17</td>
</tr>
<tr>
<td>Neutral-to-Growth</td>
<td>3.3%</td>
<td>2.73</td>
<td>-2.6%</td>
<td>-1.88</td>
</tr>
<tr>
<td>iHML, iBook-to-Price</td>
<td>6.2%</td>
<td>4.78</td>
<td>-2.3%</td>
<td>-0.88</td>
</tr>
<tr>
<td>Earnings-to-Price</td>
<td>5.3%</td>
<td>3.09</td>
<td>-1.7%</td>
<td>-0.73</td>
</tr>
<tr>
<td>Sales-to-Price</td>
<td>5.8%</td>
<td>4.01</td>
<td>-1.0%</td>
<td>-0.48</td>
</tr>
<tr>
<td>Dividends-to-Price</td>
<td>1.5%</td>
<td>1.02</td>
<td>-2.7%</td>
<td>-1.08</td>
</tr>
<tr>
<td>Composite</td>
<td>4.9%</td>
<td>2.87</td>
<td>-3.1%</td>
<td>-1.16</td>
</tr>
</tbody>
</table>

Note: In the value-to-neutral and neutral-to-growth definitions, neutral refers to the middle 40% of stocks by B/P ratio. Recall that value comprises the 30% of stocks with the highest B/P ratios, and growth comprises the 30% of stocks with the lowest B/P ratios. In the portfolios defined by intangibles-adjusted HML, E/P, S/P, and D/P ratios, we follow the HML convention: 30% value, 40% neutral, and 30% growth in each of the large-cap and small-cap universes, equally weighting the respective large-cap and small-cap results for each of the value, growth, and neutral portfolios. We average earnings, sales, or dividends over the previous five years so that the portfolio definitions will be less sensitive to cyclical peaks and troughs. The composite factor equally weights relative B/P, relative E/P, relative S/P, and relative D/P ratios, then constructs the growth and value portfolios using the HML convention. For the rightmost columns, we measure the valuation percentiles in June 2007 and March 2020 using the same ratio used to form the portfolios. The D/P results differ starkly from the others, because we exclude all zero-yielding stocks, which have experienced the most extreme action in the growth sector over roughly the past 23 years.

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

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Full reversion to the median, if it happened overnight, would require value to beat growth by 65%. 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 75th percentile, halfway between cheapest-ever and the median valuation for value relative to growth, would imply 53% relative performance for value over growth. A modest improvement from the current 100th percentile to the 95th percentile would result in alpha of about 28%. Finally, even if valuations were to stay at current levels, the model suggests a positive 4.6% premium, driven solely by structural alpha.

Table 10. Forward-Looking Expected Return Scenario Analysis, Conditional on Revaluation

<table>
<thead>
<tr>
<th>Directional Change</th>
<th>Scenario End Point</th>
<th>Relative Valuation</th>
<th>Log-Relative Valuation z-score</th>
<th>Historical Percentile Rank</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanding Relative Valuations</td>
<td>Zero Premium</td>
<td>0.094</td>
<td>-3.91</td>
<td>Beyond 100%</td>
<td>0%</td>
</tr>
<tr>
<td>No Change</td>
<td>Stay at 100%-ile</td>
<td>0.100</td>
<td>-3.63</td>
<td>100%</td>
<td>5%</td>
</tr>
<tr>
<td>Contracting Relative Valuations</td>
<td>Move to 95%-ile</td>
<td>0.135</td>
<td>-2.16</td>
<td>95%</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>Move to 90%-ile</td>
<td>0.154</td>
<td>-1.55</td>
<td>90%</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>Move to 75%-ile</td>
<td>0.187</td>
<td>-0.60</td>
<td>75%</td>
<td>53%</td>
</tr>
<tr>
<td></td>
<td>Move to 50%-ile</td>
<td>0.216</td>
<td>0.10</td>
<td>50%</td>
<td>65%</td>
</tr>
<tr>
<td>Starting Levels:</td>
<td>0.100</td>
<td>-3.63</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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 decline over the next year, from the current bottom-percentile valuation to yet another new low, at a relative valuation of 0.094 or lower, in order for value to have a zero or negative premium.

We think full reversion to the mean is unlikely in the handful of years ahead, but not impossible. From the peak of the tech bubble in early 2000, to the peak for value stocks in early 2007, HML appreciated from the then-cheapest percentile to the 23rd percentile—well past the median—in just seven years. That said, we do not expect this outcome.

Conclusion

Many narratives purport to explain why “this time is different,” why value may be 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 HML value has suffered a -50.0% drawdown is the collapse of relative valuations. Over the drawdown period, relative valuations have moved from the 23rd to the bottom percentile.

Our analysis focuses on another explanation—bad luck, in the form of an out-of-favor market becoming cheaper and of oversampling a period of negative residuals. Our initial bootstrap analysis, which does not account for changes in valuations, suggests that the current drawdown is 5% 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 25.6%; a very ordinary amount of bad luck seems to suffice 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 less reliant on intellectual property and other intangibles. 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 after 1990. Nevertheless, this improved measure of value has also recently suffered a sharp drawdown.
Overall, relative valuations are in the far tail of the historical distribution. If, as history suggests, there is any tendency for mean reversion, the expected future returns for value, by almost any definition, are elevated. Indeed, we show that even if the relative valuation remains in the current bottom percentile, the other contributors (migration and profitability) should offer a positive overall return. That said, we would like to 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. Although 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. In this appendix 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. The decomposition we derive holds as an identity for the portfolios’ log returns. In Table 3 in which we decompose the HML factor’s return (not the log return), it holds as an approximation.

Notation:

\begin{align*}
    r_t &= \text{return from time } t - 1 \text{ to time } t \text{ on the portfolio formed at time } t - 1; \\
    D_t &= \text{dividend distributions from time } t - 1 \text{ to time } t \text{ from the portfolio formed at time } t - 1; \\
    P_{t-1} &= \text{portfolio-weighted market capitalization at time } t - 1 \text{ of the portfolio formed at time } t - 1; \\
    B_{t-1} &= \text{portfolio-weighted book value of equity at time } t - 1 \text{ of the portfolio formed at time } t - 1; \\
    B_t &= \text{portfolio-weighted book value of equity at time } t \text{ of the portfolio formed at time } t - 1; \\
    P_t &= \text{portfolio-weighted market capitalization at time } t \text{ of the portfolio formed at time } t - 1; \\
    P_{t+} &= \text{portfolio-weighted market capitalization at time } t \text{ of the portfolio formed at time } t; \\
    B_{t+} &= \text{portfolio-weighted book value of equity at time } t \text{ of the portfolio formed at time } t; \\
\end{align*}

With this notation, a return on a portfolio can be represented as
This decomposition holds as an identity for a portfolio’s log returns.

Appendix B. Historical Distribution of Relative Valuations

Table 10 provides 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 4. 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 4 and use the Epanechnikov kernel with optimal bandwidth.\textsuperscript{42} 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 March 2020 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. Apart from Saudi Aramco, which has less than 2% of its shares held by the public, these latter two stocks are, for the moment, the two most valuable companies in the world and the only public 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 (“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; Stattman (1980) and Rosenberg, Reid, and Lanstein (1985) documented the value effect for the B/P ratio; and Naranjo, Nimalendran, 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.

1. Other definitions of value give surprisingly different results. Fama and French equally weight the large-cap and small-cap strategies, but if we leave out small-cap stocks and focus on large-cap stocks, the tech bubble drawdown lasted over 13 years from late 1986 to early 2000, with the entire shortfall recovered in 16 months. 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.

2. 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 13.3-year span is at the very bottom of the current drawdown. Thus, the final duration number is guaranteed to be longer than 13.3 years.

3. The HML value factor lost 28.0% between September 1999 and February 2000. Any simulation that includes this six-month span as one of its random draws will show a worst drawdown of at least this magnitude. Two of these drawdowns back to back, however, would be only 48.2%, not quite matching the most recent 50.0% drawdown.

4. As of the end of March 2020, 3,508 firms were publicly traded on the NYSE, AMEX, and Nasdaq.

5. The idea of decomposing 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.

6. 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 began 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, and as growth stocks fall out of favor causing their valuation multiples to fall and are thus recategorized as value stocks. The value index therefore replaces the stocks that have newly elevated valuation multiples with stocks that are newly cheaper, creating an instantaneous “pop” upward in the B/P and E/P ratios of the index, and the opposite happens in the growth index, at every annual rebalance.

7. Bill Sharpe remarked at the time that substituting actual subsequent profits into a discounted cash–flow model, in order to measure long-ago historical fair values for companies is simply clairvoyant value, which Arnott, Li, and Sherrerd (2009) embraced as the title for three papers on the topic. They also showed that the companies deserving of higher multiples generally had higher multiples, but the companies with higher multiples were priced for more good news than subsequent history actually delivered. While a roughly 50% correlation existed between relative valuations and fair value, a reciprocal −50% correlation was observed between relative valuations and subsequent stock performance (measured using IRR). The market paid a premium for (mostly) the right companies, but (mostly) overpaid for their subsequent growth and overly discounted (underpaid) for the disappointments of the value stocks. With relative valuations as stretched as they are today, a sharp break from historical experience will be required for growth stocks to outgrow value stocks by enough to justify current relative-valueation levels.

8. One of our favorite examples is the 50-year performance of stocks relative to bonds from 1950 through 1999. After stocks beat bonds by 7.9% per year over this period, we began to hear the “Why bother with bonds?” narrative in the 2000s, reminiscent of today’s “Why bother with value?” 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, market prices relative to the 10-year average for real earnings, soared from 10.5 to 44 times). Meanwhile, as interest rates rose, the 10-year bond yield increased from 1.9% to 6.6%, sapping bond returns by about 0.5% per 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.

1. Except for the last period, each annual observation in our sample runs from the end of June in year \( t \) to the end of June in year \( t+1 \). A firm’s book value of equity in June of year \( t+1 \) is the value the firm reported for the fiscal year that ended in year \( t \) (Fama and French, 1993). By the end of March 2020, most US firms had already reported their earnings for fiscal years ending prior to December 2019. Therefore, we already know the June 2020 numbers for these firms. For the data that underlies the values reported in Table 3, we construct the hypothetical June 2020 observation using the set of firms for which we know end-of-June book value of equity.

2. 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 year \( t-1 \), 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 the “HML devil,” 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.

3. 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.

4. 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.

5. 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% per year over the almost 57-year sample.

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

7. 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 percentiles, from the 50th—median—to the 25th percentile, the relative valuation only increased from 0.21 to 0.23. We illustrate the relative-valuation historical distribution in Appendix B.

8. 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.

9. 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.

10. 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 \( y_i = a + b^* x_i + e_i \), where \( e_i \) is an innovation. Suppose further that \( a = 0 \) and that the average \( e_i \) in our sample is zero. If we select observations in which \( y_i < 0 \), it has to be that either \( b^* x_i < 0 \) or \( e_i < 0 \). That is, when we condition on the realization of \( y_i \), we indirectly condition on the realized value of the innovation, \( e_i \). We call this mechanism “oversampling bad luck”: the average \( e_i \) in the resulting sample is negative. If we take the observations in which \( y_i \) 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 \( \hat{\beta}_p \) 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.”

11. It would not be appropriate to calculate these measures for the year prior to portfolio construction, because they at least indirectly contribute to the selection of the assets in the first place. It is reassuring to note that, after selection, the growth stocks are indeed more profitable and faster growing than the value stocks.

12. This test of profitability differences addresses the narrative about a potentially different economic regime and the narrative about industry leaders benefiting disproportionately from the low interest rate environment. Separately, we test sensitivity of HML to both levels and contemporaneous changes in interest rates on both monthly and annual frequencies. Because interest rates are slow moving, these regressions may suffer from some degree of Stambaugh bias. Having said that, in all cases we find no statistically significant relationship (with the \( t \) stat less than 1).

13. The accounting decomposition in Table 3 suggests a 6.0% − 1.1% = 4.9% reduction in structural alpha, and the regression-based decomposition in Table 4 suggests a 6.0% − (−1.1%) = 7.1% reduction.

15. Following Peters and Taylor (2017) 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. The perpetual inventory method requires assumptions about the initial stocks of knowledge (R&D) and organization (SG&A) capital at the time of the IPO. We follow Peters and Taylor (2017, Appendix B.2) and construct these initial stocks by using average pre-IPO growth rates.

16. It is arbitrary to capitalize 100% of R&D and 30% of SG&A expenditures, and no less arbitrary to choose a 10-year subsequent amortization span for these expenditures. It will be an interesting topic for future research to gauge which metrics perform best in producing a better HML value factor or in predicting future profits, and whether optimal settings for these metrics vary by industry, sector, or country. We find it a striking result that our first effort to introduce intangibles into book value leads to a 50% improvement in the efficacy of HML over the past 40 years.

17. 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.

18. 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 \( t \)-stat on test (6) is 1.91. The reduction from the full sample \( t \)-stat of 2.21 is driven entirely by the reduction in the sample size by about half (the full-sample equivalent \( t \)-stat would have been 2.64).

1. Defining value as the D/P ratio is atypical, because, in addition to value exposure, it also leads to risk reduction because high-dividend payers tend also to be very low-risk companies. Beck et al. (2016) documented that, of many different value definitions, the D/P strategy has one of the worst long-term performance characteristics on a non-risk-adjusted basis. When adjusted for market risk, however, the strategy has one of the most attractive performance characteristics. The lack of movement in relative valuations for the D/P strategy in the post-2007 period may be partly explained by an increasing demand for yield and low-beta strategies over this period.

2. The relative valuation of iHML moved from the 39\textsuperscript{th} percentile to the 99\textsuperscript{th} percentile over the same 13.3-year period. The similarity in the movements in the relative valuations of HML and iHML suggests that the omission of intangible characteristics. The lack of movement in relative valuations for the D/P strategy in the post-2007 period may be partly explained by an increasing demand for yield and low-beta strategies over this period.

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

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

\[
E[HML_t | \text{Revaluation}_{it}] = E[\text{Revaluation}_{t} + \text{Profitability}_{t} + \text{Migration}_{it} | \text{Revaluation}_{it}].
\]

If we apply the accounting identity we developed, the conditional expectation simplifies to

\[
E[HML_t | \text{Revaluation}_{it}] = \text{Revaluation}_{it} + E[\text{Profitability}_{t} | \text{Revaluation}_{it}] + E[\text{Migration}_{it} | \text{Revaluation}_{it}],
\]

that is, 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.

5. 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.

6. In the scenario analysis shown in Table 10, we consider movements in an estimated theoretical distribution of relative valuations. The realized distribution of valuations from July 1963 through March 2020 is viewed as one draw from this theoretical distribution. We provide additional details in Appendix B.

7. We compute these predictions using the model reported in the third column of Table 4. This regression gives the estimated association between HML and the revaluation term between 1963 and 2020.

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

References


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