Explaining the Recent Failure of Value Investing

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ABSTRACT

It is widely believed that the long-standing and highly popular *value investing strategy*—investing in low-valued stocks and selling short high-valued equities—lost its edge in the past 10-12 years. The reasons for this putative failure of value investing elude investors and academics, making it a challenge to assess the likelihood of the return of value investing to its days of glory. Based on extensive data analysis we show that value investing has generally been unprofitable for almost 30 years, barring a brief resurrection following the dotcom bust. We identify two major reasons for the failure of value investing: (1) accounting deficiencies causing *systematic* misidentification of value, and particularly of glamour (growth) stocks, and (2) fundamental economic developments which slowed down significantly the reshuffling of value and glamour stocks (mean reversion) which drove the erstwhile gains from the value strategy. We end up by identifying the type of companies (stocks) that may still generate gains from value investing.

Explaining the Recent Failure of Value Investing

1. *Introduction*

Value investing is about finding diamonds in the rough—going long on low-valued ("value") stocks and shorting highly-valued ("glamour") equities, thereby capturing companies whose stock prices are temporarily undervalued or overvalued by investors, relative to fundamentals. The price reversals of these misvalued stocks drive the gains from value investing. The value investment strategy yielded excess (abnormal) returns for decades, leading to the proliferation of "value funds" and strategies offered to investors, yet around 2007, the strategy appears to have lost its magic. A google search of the "death of value investing" and related morbid terms yields hundreds of articles, including in *Forbes, Barrons*, *The Wall Street Journal*, *Seeking Alpha*, *Bloomberg*, and *Financial Times*. *The Economist* (October 27, 2018, p. 71), under the title "The agony of the value investor," quoted a prominent value fund manager informing investors: "Our results have been far worse than we could have imagined." Another manager wrote: "The market is telling us we are wrong, wrong, wrong about almost everything." And yet, all those self-flagellations by value managers and the value obituaries by media pundits don't really resolve the main questions concerning investors:

- Why did value investing, which yielded steady excess returns for decades, abruptly lose its edge around 2007? And, even more importantly,
- Is the recent funk of the value strategy temporary, or a long-term fall from grace? Is "value dead," or can it be resurrected?

We will answer both questions by showing, based on extensive data analysis, that flaws in the accounting for intangibles, combined with fundamental economic shifts, have undermined the value strategy.

2. *The value strategy in brief*

The value strategy is often traced to Ben Graham[1], and is based on the premise that among low-valuation (out-of-favor) stocks are many *undervalued* ones, relative to fundamentals, due to investors' overreaction to bad news, such as an accounting scandal or an unexpected loss. Once investors realize the undervaluation, the share prices of the undervalued stocks will rise and revert to intrinsic value. Accordingly, investing in low-valuation stocks—aptly termed "value stocks"—should yield above market returns. A similar argument can, of course, be made about high-valuation stocks, which likely include *overvalued* equities, bound to fall in price over time. Shorting the highly-valued equities—known as growth, or glamour stocks—should also yield excess returns. Thus, a combined strategy of "long on value and short on glamour"—the "value strategy"—should provide turbo excess returns.

Indeed, academic research consistently documented excess returns to the value strategy, until the past 10-12 years. Lakonishok et al. (1994), for example, reported that investing every year (on June 30) in the 30% of the stocks with the *lowest* market-to-book ratio—"value stocks"—and selling short the 30% of the stocks with the highest market-to-book ratio—the "glamour stocks."— yielded over the period 1968–1989 a mean annual return of 6.3%, and a whopping 34.4% for a rolling three-year holding period. A similar value strategy, also based on the market-to-book ratio, is the HML (high minus low) methodology introduced by Fama and French (1992, 1993). It differs slightly from Lakonishok et al. (1994) in that the long-short portfolios were determined after first, dividing the sample firms into large and small by median market capitalization (thereby adjusting for firm size), and then investing in the 30% lowest value stocks and shorting the 30% highest valued stocks, of both large and small firms. The Fama-French HML strategy averaged almost 5%

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[1] See, Graham, Benjamin, 1949, *The Intelligent Investor*, Harper & Brothers, New York.

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annually during the 1930-1989 period. Their papers (1992; 1993), not unexpectedly, drew considerable attention, getting almost 33,000 academic citations by June, 2019, one of the highest citation counts in the finance literature. The HML classification also became a standard control factor (arguably, for risk) in studies examining abnormal stock returns. Based on the superior performance of the value strategy, value funds offered to investors proliferated.

While value investing is premised on identifying stocks whose prices understate their intrinsic value and those who overstate it, there is no universally accepted way of implementing the value strategy, leading to multiple value measures used in practice and academic research.[2] For example, in addition to the book-to-market ratio, Lakonishok et al. (1994) examined cash flow and earnings to market value. Piotroski (2000) and Mohanram (2005) advance value strategies that add "quality" parameters to the book-to-price (B/P) ratio. Obviously, we cannot examine all the value indicators used by researchers and investors. To keep our analysis focused and readily interpretable, we primarily identify value and glamour stocks by the market-to-book ratio, since it is the most frequently used indicator by researchers (Lakonishok et al., 1994; Fama and French, 1992 & 1993; Kok et al., 2018; Ball et al. 2019.), and by investment institutions (Russell Value Stocks, S&P, and MSCI Value indexes).[3] For robustness check, we also examine another popular value indictor—the Price-Earnings ratio.

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[2] MSCI comments: "Value investing is premised on identifying stocks whose prices seem to understate their intrinsic value. While many institutional investors may agree with that premise, implementation of value-index strategies differs widely." See https://www.msci.com/documents/1296102/1339060/Factor+Factsheets+Value.pdf

[3] In addition, S&P and MSCI use sales/price ratio and enterprise value to cash flow ratio (EV/CFO), respectively. See https://us.spindices.com/documents/methodologies/methodology-sp-us-style.pdf and http://www.ftse.com/products/downloads/Russell-US-indexes.pdf

We follow Fama-French (2003) in computing the value strategy returns because their methodology adjusts for firm size and has been subjected to most academic rigor, as is evident from their high citation count.[4]

3. *The recent failure of the value strategy*

It's instructive to examine the 10-year growth of a dollar invested in the Fama-French value strategy at the beginning of each decade, from the 1970s to the present. Note that this is a hedged investment since we both buy and sell equal values of low market-to-book stocks and high market-to-book stocks. Figure 1 presents each decade's cumulative return from this annually-updated long-short value strategy. Thus, for example, a dollar invested in the long-short portfolio on January 1, 1970 yielded by the end of the decade $2.02 (102% return), and a dollar invested on January 1, 1980 yielded by decade-end $1.75 (75% return). (The term investment is a misnomer here because one dollar of stocks is bought while another dollar of stocks is sold short.) These were obviously attractive returns.

However, this seems to have been the "swan song" of value investing: From 1989 on, the strategy faltered, mainly because of the tech bubble of the 1990s which elevated the valuations of

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[4] We follow Fama and French (2003) to classify firms into the value and glamour categories. Stock returns and accounting data are obtained from CRSP and Compustat, respectively. All firms traded on NYSE, Amex, and NASDAQ are initially included. Delisted stock returns are taken from CRSP. Book value for computing the book-to-market ratio is taken from $t-1$ financials statement for June to December fiscal year end and $t-2$ for January to May firms. Negative book value firms are excluded. The numerator, market value of equity, is obtained for the end of year $t-1$. Portfolios are formed in June 30 of year t. All firms are divided into six equal groups [two groups by market value and three groups by market-to-book (highest 30%, middle 40%, and lowest 30%)]. Portfolios with the highest (lowest) 30% market-to-book are called glamour (value). Monthly returns are for each portfolio from July 1 of year t to June 30 of year t+1, value weighted, based on market value as of June 30 of year t. HML returns are computed as one-half the returns from going long on large and small value portfolios, and one-half the returns from shorting large and small glamour portfolios. We use SAS code obtained from WRDS (Wharton Research Data Services) to identify stocks by HML classification (https://wrds-www.wharton.upenn.edu/pages/support/applications/risk-factors-and-industry-benchmarks/fama-french-factors/).
    Fama-Frech HML strategy is originally based on the book-to-market ratio. We use in this paper the inverse term market-to-book ratio due to its greater familiarity. Since our sample is restricted to positive book value firms, the ranking of stocks is not affected using either metric.

glamour companies till the end of the decade, thereby rendering the "short" part of the strategy a losing proposition. A dollar invested in the strategy at the beginning of the 1990s would lose 10% by the end of the decade. Moving forward in Figure 1, the first few years of the 2000s saw a brief resurgence of the value strategy, driven primarily by the success of shorting glamour stocks, due to the burst of the tech bubble: Prices of erstwhile glamour (growth) companies plummeted—Nasdaq fell in 2000 by 55%—and 17% of the small glamour companies failed altogether and were delisted. Shorting all those losers substantially boosted the long-short value strategy, leading to good performance until 2006. The flight from the collapsing tech to the more stable value stocks in those years further boosted the value strategy.

The good performance of the value strategy in the early 2000s apparently looms large in the minds of relatively young investors who started investing in the 21st century, making it so hard for them to fathom the "demise of value" since 2007. However, as Figure 1 makes clear, the value strategy had already lost much of its potency in the late 1980s, and yielded negative returns in the 1990s, barring a brief resurgence in 2000-2006. This then leads to our rephrased question: What caused value investing to lose its consistent edge by the late 1980s?

Figure 1: Growth in Value of One Dollar Invested in the Long-Short Value Strategy on Jan 1 of the First Year of Each Decade, 1970-2018


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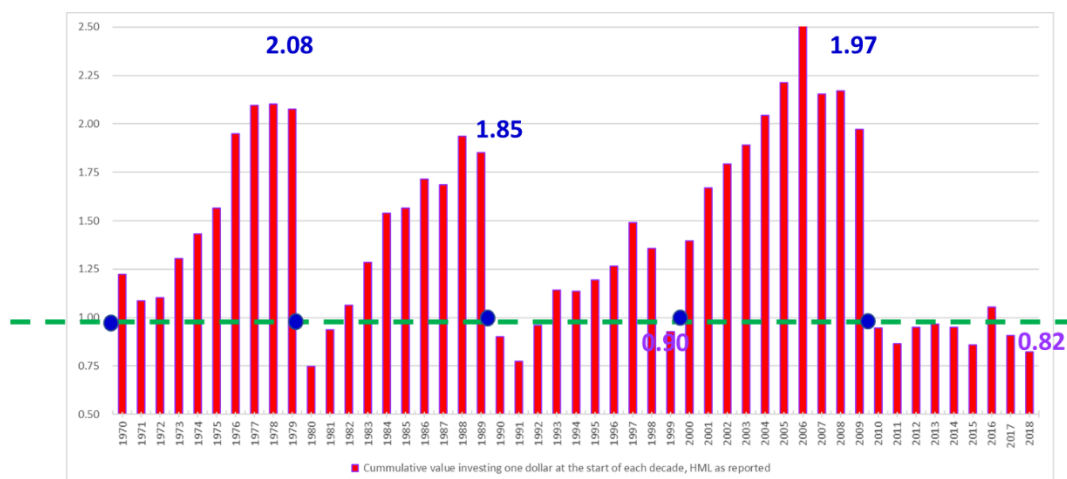
4. *Accounting deficiencies adversely affected value investing*

As is well-known to students of accounting 101, book value (equity)—the denominator of the market-to-book ratio—is measured with considerable error. Many asset values on the balance sheet are not updated to reflect their current values, and earnings—whose cumulative, retained portion is included in book value—reflect systematic accounting biases ("conservatism") and value-irrelevant (one-time) items. But an increasing source of book value mismeasurement is the immediate expensing in income statements of all investments in internally-generated, value-creating, intangibles, such as R&D, IT, brand development, and human resources. This expensing of intangibles, which are obviously investments intended to generate future profits, leading to their absence from book values. This omission of major investments from book values started to have a major effect on financial data (book values, earnings) from the late 1980s, due to the growth of corporate investment in intangibles, as evidenced in Figure 2. This book value mismeasurement was a major contributor to the failure of value investing which started in the late 1980s, recall Figure 1.

In Ben Graham's time and up to the late 1980s, corporate investments were primarily in *tangible* (physical) assets (property, plant, equipment, structures, airplanes, etc.), which are capitalized (considered assets) by accounting rules and, therefore, fully reflected (net of depreciation) in companies' book values (equity). This inclusion of most corporate investments in book values was reflected, among other things, by the median market-to-book ratio of public companies which hovered around 1.0 until the mid 1980s. Accordingly, market values, being lower or higher than the book values, often reflected under- or overvaluation of stocks. From then on, however, a far-reaching transformation of corporate business models took place: Investment in *tangible* resources increasingly gave way to *intangible* assets, as demonstrated by Figure 2,

presenting the U.S. private sector's annual rates of tangible and intangible investment, relative to gross value added.[5] Currently in the U.S., the intangible investment rate of the corporate sector is roughly *twice* that of the tangible investment rate, and the gap keeps growing.[6] In absolute terms, the U.S. annual intangible investment surprassed $2 trillion in 2017.[7]

Figure 2: Investment Rates in Tangible and Intangible Assets (Investment Relative to Private industry Gross Value Added), Private Industries 1977–2017
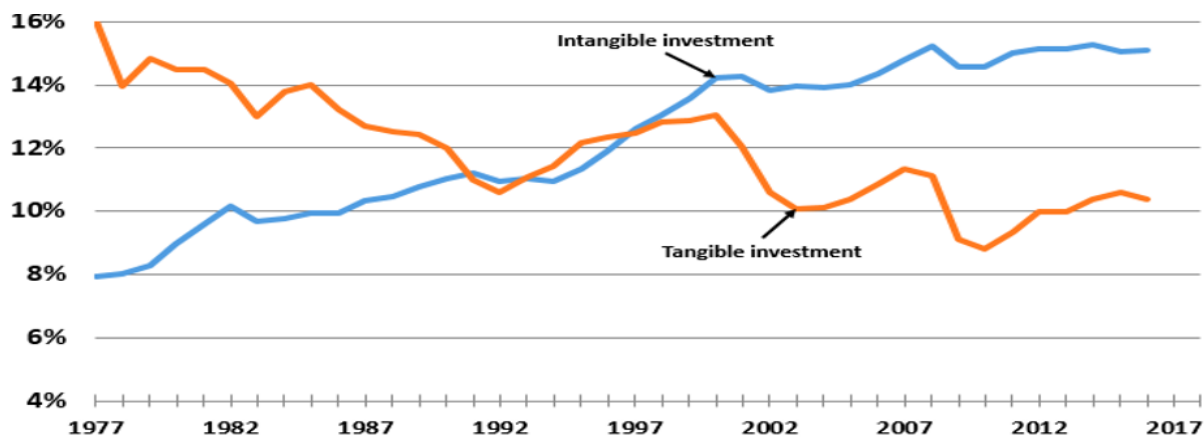
Back to the value strategy, a firm investing heavily in R&D, IT, brands, or business processes (e.g., customer recommendation algorithms), may appear to be an overvalued company, due to its understated denominator of the market-to-book ratio, whereas in reality its valuation isn't excessively high when book value is properly measured. Furthermore, two similar companies, one generating its intangibles internally by developing patents, for example, whereas the other acquiring patents from other firms, will have substantially different market-to-book ratios because the former's book value is significantly smaller than the latter's. Same with the Price-Earnings ratio. Reported earnings of companies with increasing investments in intangibles are understated,

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[5] Figure 2 is from Corrado and Hulten (2010), and kindly updated by the authors' request.
[6] Enache and Srivastava (2018) report a similar pattern from analyzing company-level data.
[7] Intangible investments in other countries lag considerably behind the U.S. China comes second at about $700 billion annually, and Northern European countries at $100-200 billion each. Most other countries have negligible investment in intangibles.

due to the immediate expensing of intangibles, leading to overstated PE ratios. Given the vast and increasing size of corporate intangible investments, the misspecification of book values and earnings is substantial and growing, and is represented, among other things, by a median market-to-book ratio of close to 3.0 in 2018.[8] Some observers may contend that value strategies relying on cash flows overcome the above accounting deficiency. However, cash flows too are calculated after the deduction of intangibles, and therefore, do not solve the accounting-deficiency discussed above.

5. *Reversing the expensing of intangibles*

We run an experiment to show how the accounting mismeasurement of book value could affect the returns from value strategy by recomputing companies' book values after *capitalizing* the expensed intangible investments. The essence of our capitalization procedure is as follows: For every public company and year, we capitalize (consider as an asset) its annual R&D expense, and amortize the cumulative *R&D capital* (the sum of the capitalized past annual R&D expenses), according to industry-specific R&D amortization rates reported in Li and Hall (2018). The annual amortization of the R&D capital thus replaces the expensing of current R&D outlays in firms' income statements, and, importantly, the unamortized R&D capital—an asset—is added to book value.

We also capitalize a part of SG&A (sales, general & administrative) expenses, following Enache and Srivastava (2018), since many non-R&D intangible investments, such as in brands, IT, business processes, and human resources are included in SG&A expenses in the income statement. However, SG&A also includes regular expenses, such as sales commissions and administrative salaries. Following Enache and Srivastava (2018), we separate expenses from

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[8] The wholesale expensing of intangibles also renders many firms ineligible for inclusion in our value strategy because of their *negative* book values.

intangible investments in SG&A by running for every industry and year a cross-sectional regression of SG&A expenses on current revenues (scaled by total assets) and two dummy variables representing losing firms and sales-decreasing companies. The portion unexplained by current revenues in this regression equation represents the average amount of intangibles included in SG&A, for that firm and year. We match a firm to its industry progressively by four-digit, three-digit, two-digit, or one-digit SIC code, depending on data availability, to estimate the regressions.[9] We thus maintain a rolling stock of the capitalized intangibles in SG&A expenses, and amortize the capitalized amount over three years.

Using this methodology, we adjusted the book values of all firms by adding to the reported (GAAP) values both the unamortized R&D and SG&A capitals. We then recomputed companies' market-to-book ratios, using the adjusted book values. We note that additional firms were included in the feasible set of value and glamour stocks as their book values turn positive by the capitalization. Importantly, firms' market-to-book ranks changed significantly after capitalization, causing substantial reassignments of firms to value and glamour portfolios. Finally, we recalculate the returns to the *adjusted value strategy*. The impact of our book value intangibles adjustment is quite dramatic. The recalculation of book values changed significantly the composition of the top and bottom 30% of companies ranked by market-to-book. For example, in 2017, for the top 30% (glamour) companies, 455 firms changed classification after capitalization (255 enter and 200 leave, of an initial total of 921), and 524 companies (271 enter and 253 leave, of an initial total of 929) changed classification in the bottom (value) 30% category. Thus, roughly 40-60% of value and glamour stocks changed classification due to our intangibles book value adjustments in recent years. These major changes had a significant effect on the returns from the value strategy.

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[9] The empirical procedure requires at least 15 firm-year observations by industry.

Figure 3 portrays the effect of our book value adjustments on the returns of the long-short value strategy. The red (left) bars in each year are the returns from the original, unadjusted market-to-book classification, whereas the blue (right) bars represent the returns from the adjusted methodology. While our book value adjustment didn't change much of the strategy's performance in 1970s, when intangible investments were low, it began to yield improved returns in the 1980s, when intangibles gained prominence (see Figure 2). All in all, in 34 out of the 39 years examined, 1970-2018, the returns from the adjusted value strategy were *higher* than those of the conventional strategy (based on GAAP-reported book values), and in most years the adjusted returns were *substantially higher*.

Figure 3: Cumulative Returns to the Original and Adjusted Value Strategy in Each Decade, 1970-2018
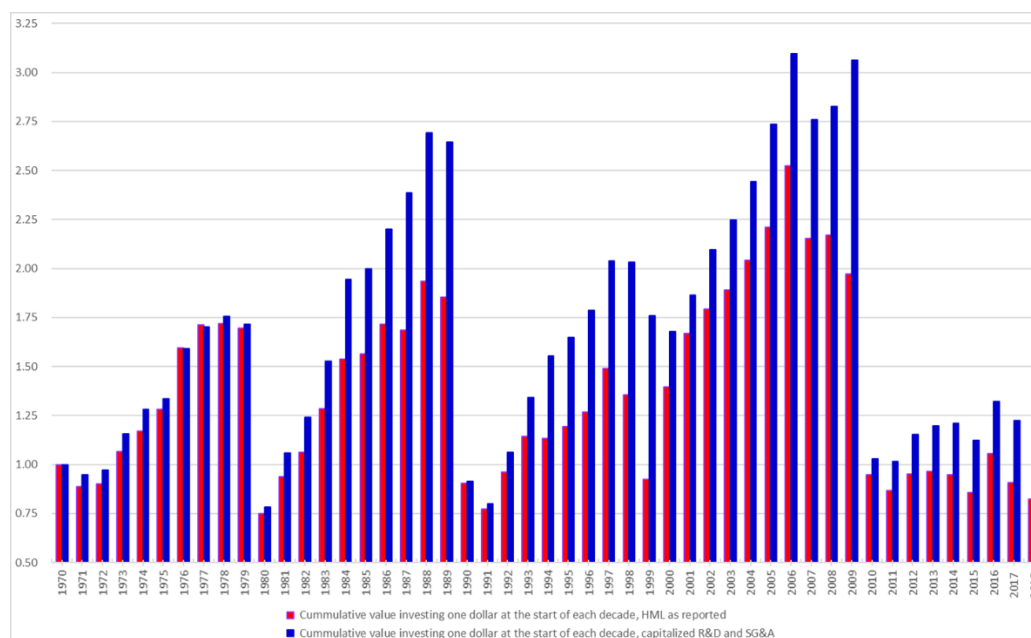
Thus, for example, in the 1980s, while a dollar invested in January 1, 1980 in the conventional strategy grew to $1.75 by decade-end, a dollar invested by the adjusted strategy grew to almost $2.86, a 68% difference! Strikingly, in the 1990s, when the conventional value

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investment underperformed the market, the adjusted methodology doubled the original investment at decade-end. The differences in investment gains continued to be substantial in the early 2000s, and even in the recent period, 2010-2018, when the conventional value strategy lost its edge and yielded negative returns, the adjusted strategy still generated reasonably positive gains. Thus, and this is reported here for the first time, the adjustment of book values for the glaring accounting deficiencies of intangibles expensing could have quite a dramatic effect on the long-short value strategy throughout the past four decades.

The effect of our intangibles book-value adjustments are, as expected, more pronounced for glamour than for value stocks, since most glamour (highly-valued) companies are intangibles-intensive. And among glamour stocks, our adjustments had a larger effect on small than on large companies, since small, high-growth glamour firms tend to invest heavily in intangibles, causing their reported book values to be highly misspecified. Our adjustments thus improve significantly the identification of overvalued (relative to fundamentals) glamour stocks. The intangibles adjustments were less consequential for value stocks, many of which don't invest much in intangibles. The additional gains from our book value adjustments in the long-only, pure value strategy (no shorting) were modest in the 1990s, very large during 2000-2009, and essentially vanished thereafter.[10]

So, while the conventional (GAAP) mismeasurement of book value explains a great deal of the failure of value investing, it doesn't completely resolve the issue as far as the past 10-12 years are concerned. Even with our book value adjustments, the long-short, and more so the long-only strategies underperformed the market significantly since 2007.

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[10] Since the long-only, pure value strategy is not a hedged investment, we consider the investment returns net of the market return in each year.

6. *From Market-to-Book to Price-to-Earnings*

To generalize our findings we replicated the tests conducted so far with the market-to-book ratio using another popular valuation metric: the *price-earnings* (PE) ratio. Figure 4 portrays the year-by-year gains from investing in the 30% *lowest* PE stocks (after adjusting for firm size) and shorting the *highest* PE stocks at the beginning of each decade. The picture emerging from using the PE metric resembles closely that of the market-to-book ratio in Figure 1, except that with the PE, the 1990s were also profitable. Figure 4 also juxtaposes the PE annual returns over the MB returns and shows a high correlation (89%) between the two, with a higher volatility to the PE returns.

Figure 4: High Correlation between HML Returns of PE and MB value Strategies
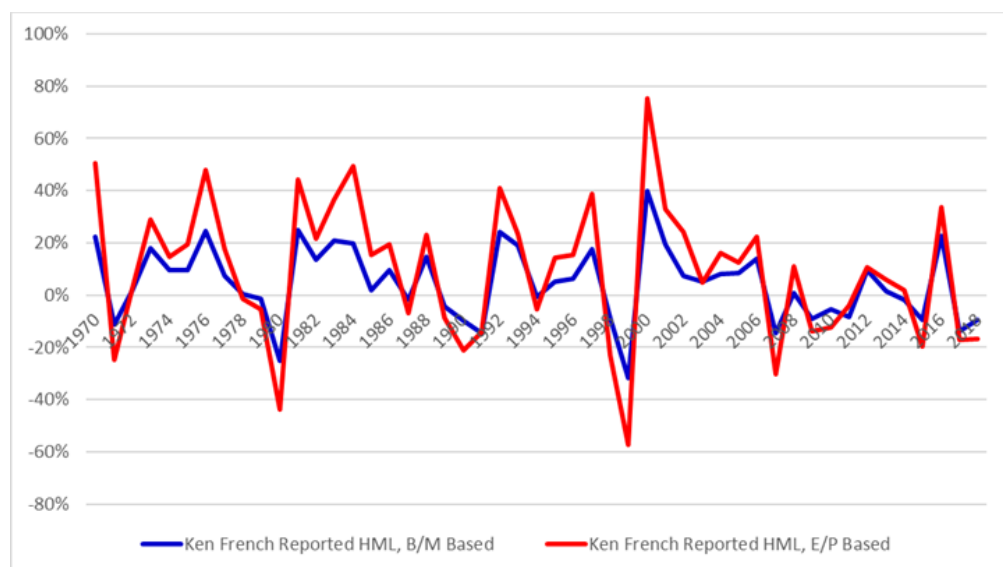
We also adjusted the *earnings* of the price-earnings ratio for the intangibles' capitalization: adding back to earnings the annual R&D expense and the part of SG&A related to intangibles, and subtracting from earnings the *annual amortization* of the R&D and SG&A capitals. As expected, the effect of intangibles' capitalization on earnings was substantially lower than that on book

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values (Section 5), but it nevertheless improved the overall returns from the PE strategy, relative to the returns from unadjusted PE ratio (Figure 5).

Figure 5: Cumulative Returns to the Original and Adjusted PE-based Value Strategy in Each Decade, 1970-2018
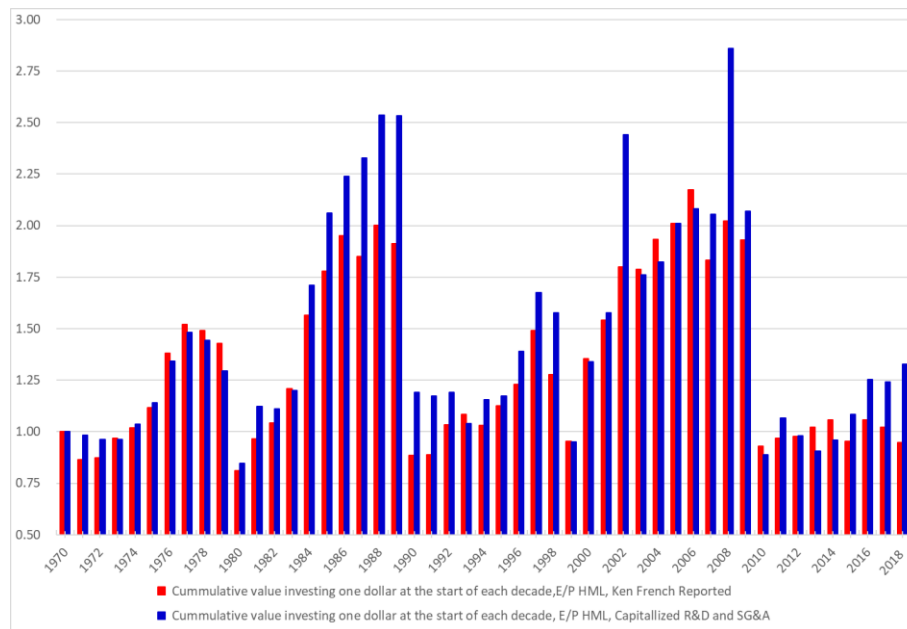
In any case, whether guided by the MB ratio or the PE ratio, the recent 10-12 years returns from value investing were unusually low, leading us to continue the quest for the reasons for the recent failure of value investing.

7. *The value strategy and mean reversion*

From a statistical point of view, the gains from value investing derive from the *mean reversion* of the highest (glamour) and lowest (value) ranked stocks. When ranked by the market-to-book ratio (or by alternative rankings, like price-to-earnings), some of the highly ranked stocks will drop in value over time; being ranked at the top they can only remain at the top, or drop down due to deteriorating operations (a sales decline), or from other revisions in investor valuations. This mean reversion from the top generates the gains from shorting glamour stocks. Similarly,

some of the lowest ranked (value) stocks will experience price increases, due to improved operations or other factors and escape the lowly value class, thereby generating the gains from investing in value (out-of-favor) stocks.

The mean reversion of value and glamour stocks isn't unique to capital markets. In fact, mean reversion is ubiquitous to many phenomena in life, yet often misunderstood or overlooked. Whenever subjects are ranked by a score, such as people ordered from highest to lowest levels of blood cholesterol, or investment funds ranked from top to bottom on performance, some of the observations at the top and bottom ranks will revert to the mean observation over time.[11]

The reason for mean reversion is that the specific ranking of a subject at a point in time, say a football team, is due to *systematic* (fundamental) factors, such as players' talent and size of fan base, as well as to *random* (transitory) factors, like injuries. Overtime, the transitory factors average out, and the subjects ranked at the top and bottom revert to the mean. Similarly, value and glamour stocks are ranked at the bottom and top due to systematic factors, like a strong patent portfolio or a weak product mix, as well as to random (transitory) factors, such as a contract cancellation, or an SEC inquiry. The random (transitory) factors will average out over time, leading to mean reversion of both value and glamour stocks. The *extent* and *speed* of mean reversion is determined by the relative size of the random to fundamental factors—the larger the relative size of random to fundamentals, the stronger and quicker the mean reversion.[12]

Lakonishok et al.'s (1994) explanation of the consistent gains from value investing as driven by investors' "extrapolation bias"—misinterpreting a recent, temporary good/bad sales or earnings streak as a long-term trend—essentially argues that investors exaggerate the effect of the

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[11] On mean reversion in the investment context, see Mauboussin (2012).

[12] Michael Jordan was ranked for many years at the top of professional basketball players: a record 50 appearances on the cover of Sports Illustrated. This absence of mean reversion was due to the fact that the random element in Jordan's performance was negligible relative to his fundamental, exceptional talent.

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random element in a stock's ranking (e.g., perceiving a temporary sales increase as a long-term one). The quick reversals of past sales and earnings trends documented by Lakonishok et al. (1994), corroborated investors' misinterpretation of temporary effects (past growth) for permanent ones (future long-term growth).

Accordingly, an understanding of the failure of value investing in the past 12 years should start with exploring changes in the extent and speed of the mean reversion of value and glamour stocks.[13]

8. *The surprising slowdown of stocks' mean reversion*

We measure stocks' mean reversion in three ways: rank correlation, length of stay in the value or glamour categories, and large stock price upticks and downticks. Rank correlation indicates the correlation of a stock's market-to-book rank (relative to all stocks) at the end of a given year, with its rank in the previous year. Fast mean reversion is reflected by *low* rank correlation. Figure 6 portrays the grouped annual rank correlations of large value and glamour stocks, during 1989-2018. It is evident that the rank correlations of both value and glamour stocks *increased* quite substantially during 2007-2018, and are now the highest since the 1970s. For both groups the rank correlations increased from the late 1980s, with glamour stocks jumping from 45-47% to 60% in 2007-2018. This substantial increase in rank correlation reflects a significant *slowdown* of the mean reversion of both value and glamour stocks during 2007-2018. Hence the low gains from value investing.

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[13] We focus in the subsequent analyses on the 50% largest value and glamour stocks, since our adjusted strategy yielded above-market returns for the small value and glamour stocks. Since the returns from the value strategy presented in this paper are *value-weighted* by capitalization, large stocks have a dominant effect on the returns of the total sample (large and small stocks).

Figure 6: Increase in Rank Correlation of Market-to-Book Ratio for Value and Glamour Stocks, 1970-2018
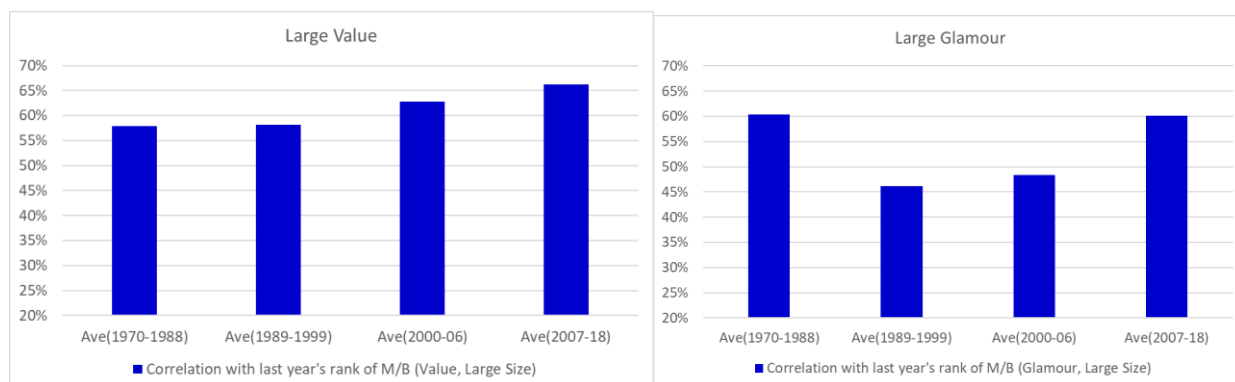
Our second mean reversion measure is the length of stay of a particular stock in the value or glamour portfolios. The longer the stay, the lower the mean reversion. Figure 7 shows substantial increases in the average length of stay: Value stocks increased from 2.5 years, on average, during 1989-2006 to 3.3 years in 2007-2018 (a 32% increase), while for glamour stocks the increase was from 3.5 to 4.5 years (a 28% increase). These increases of length of stay in category corroborate the substantial slowdown of stocks' mean reversion in recent years.

Figure 7: Increases in Length of Stay in the Same Portfolio Category, 1970-2018
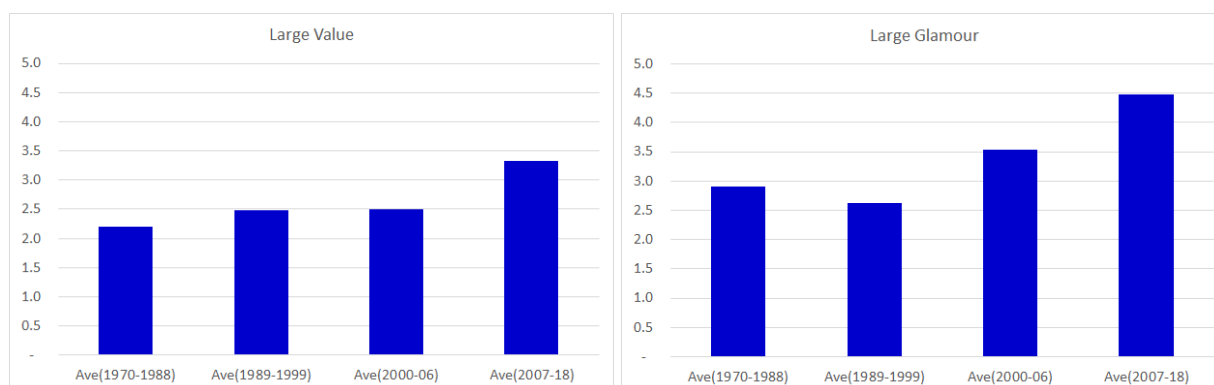
Our third measure of mean reversion is the one most directly related to the gains from value investing: it reflects the frequency of large (10% or more) stock price *upticks* for value stocks and

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downticks for glamour stocks. These upticks and downticks are, of course, driven by the mean reversion of value and glamour stocks, and they generate the gains from the long-short value investing strategy. Figure 8 presents the periodic annual percentages of 10% or more upticks (for value) and downticks (for glamour stocks). In both cases, the price-change frequency during 2007-2018 was *substantially lower* than in previous periods: the 10% or more upticks for value stocks decreased from 22% annually during 2000-2006 to just 10% in 2007-2018 (a 55% decrease), and the downticks frequency for glamour stocks decreased from 18% annually in 2000-2006 to 10% in 2007-2018. Note that these substantial decreases in upticks and downticks in the recent period are not the result of a general decrease in stock volatility in recent years. For example, the percentage *downticks* of 10% or more of value stocks, in fact, *increased* during 2007-2018 (not presented in the figure).

Figure 8: Decrease in Price Downticks for Glamour Stocks and Upticks for Value Stocks, 1970-2018
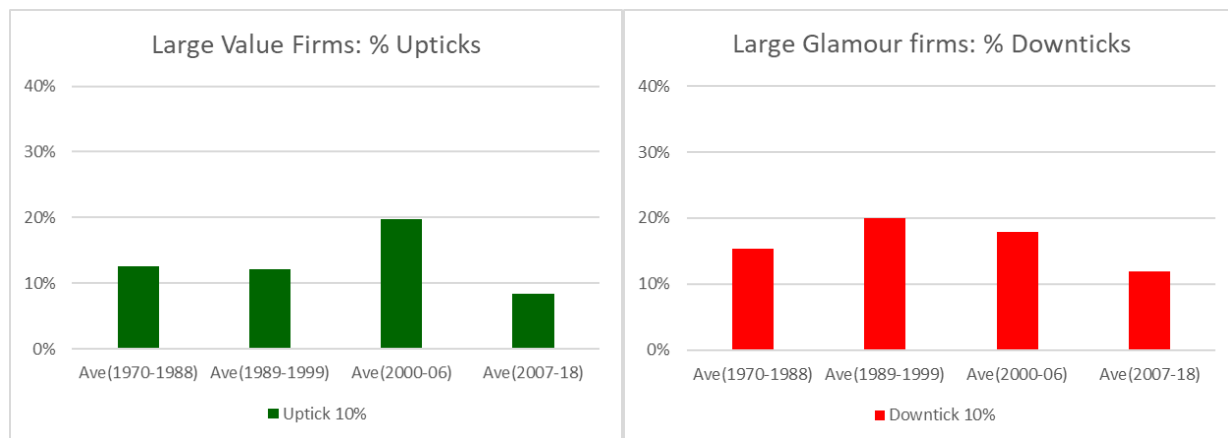
Thus, all our measures indicate a substantial slowdown of the mean reversion of both value and glamour stock in the past 12 years, accounting for much of the decline of the profitability of value investing. But this, of course, is a statistical explanation, raising the question of the economic

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developments which caused the mean reversion slowdown. Understanding these developments will enable us to address the essential question whether the recent demise of value investing is a transitory or a long-term phenomenon.

9. *What caused the slowdown of stocks' mean reversion?*

It's not a coincidence that the failure of value investing started in 2007—the first year of the recent financial crisis. The 2007-2009 crisis and the subsequent deep recession had a devastating and prolonged effect on the performance of several industries, particularly in the financial sector, as well as firms relying on consumers' demand, driving those industries and firms to the ranks of value (low valuation) firms, and keeping them there. The two major adverse effects of the financial crisis were the sudden contraction of bank lending and the sharp fall in consumer demand. Hogan (2019, pp. 1-2) writes on the former: "One mystery of the slow recovery [post recession] is why lending failed to respond to expansionary monetary policy. Bank lending declined dramatically during the crisis, and despite the period of very low interest rates since, lending has failed to recover…Instead, banks appear to have *permanently decreased lending* relative to their other activities… Thus, bank loans have been persistently low since the financial crisis despite high demand for loans during this period." (Emphasis ours).

The prolonged decline of bank lending had a direct, adverse effect on the performance of banks, most relying on lending as a major source of profits and growth, and an indirect effect on low-valuation firms which rely on bank lending to finance investment in innovation and growth (R&D, IT, acquisitions), being unable to issue stock due to their low valuation. Those "value firms" were cutoff of much needed equity and bank financing sources to improve operations and escape the low-valuation trap. Many of those firms were also hit by the second major effect of the financial crisis: the prolonged decline in consumer demand.

Former Fed Chairman, Ben Bernanke, in a detailed survey of the crisis-related economic research (2018) concluded: "A substantial body of evidence now suggests that such [credit] factors are important for the behavior of households, firms, and financial intermediaries… More specifically, the empirical portion of this paper has shown that the financial panic of 2007-2008, including the runs on wholesale funding and the retreat from securitized credit, *was highly disruptive to the real economy* and was probably the main reason that the recession was so unusually deep… In particular, it seems plausible that the weakening of household balance sheets… was a significant headwind to recovery." (pp. 58-59, emphasis ours). Similarly, Mian et al. (2013) reported that the collapse in house prices during the Great Recession caused a sharp drop in consumer demand by households. Relatedly, Authers and Leatherby (2019) showed that household debt hasn't recovered even after a full decade, leading to painful consequences, such as the demand decrease and income-inequality increase; the only increase occurred in the student debt.

The combination of the prolonged contraction of bank lending and the falling of consumer demand, post-recession, drove industries and individual firms to the ranks of "value" (low valuation) companies and largely kept them there for the past 10-12 years. It's not surprising, therefore, that during the past decade the five leading industries of value firms were: banking, retail, insurance, wholesale, and utilities, accounting for roughly 50-60% of large value companies.

The causes of the significant slowdown in mean reversion during the 12-year period, 2007-2018 and the consequent failure of value investing should now be clear. Value firms, since the financial crisis, experienced exceptional operational difficulties: their profitability plummeted relative to previous periods (and relative to glamour companies), as is made clear by Figure 9, portraying for both value and glamour firms their median return-on-equity (ROE), and the return

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on net operating assets (RNOA), both fundamental measures of enterprise profitability. The profitability trends of value and glamour firms couldn't have been more different. Whereas, glamour firms experienced in 2007-2018 their highest profitability since 1970, value firms sustained in 2007-2018 their worst profitability. Other profitability indictors were consistent: for example, the percentage of firms reporting annual losses was highest for value firms during 2007-2018 (and lowest for glamour companies, not presented in graphs). Thus, by practically any measure of operating performance the profitability of value firms deteriorated sharply since the financial crisis, and remained at a historically low level up to the present.

Figure 9: Increase (Decrease) in ROE and RNOA for Glamour (Value) Stocks, 1970-2018
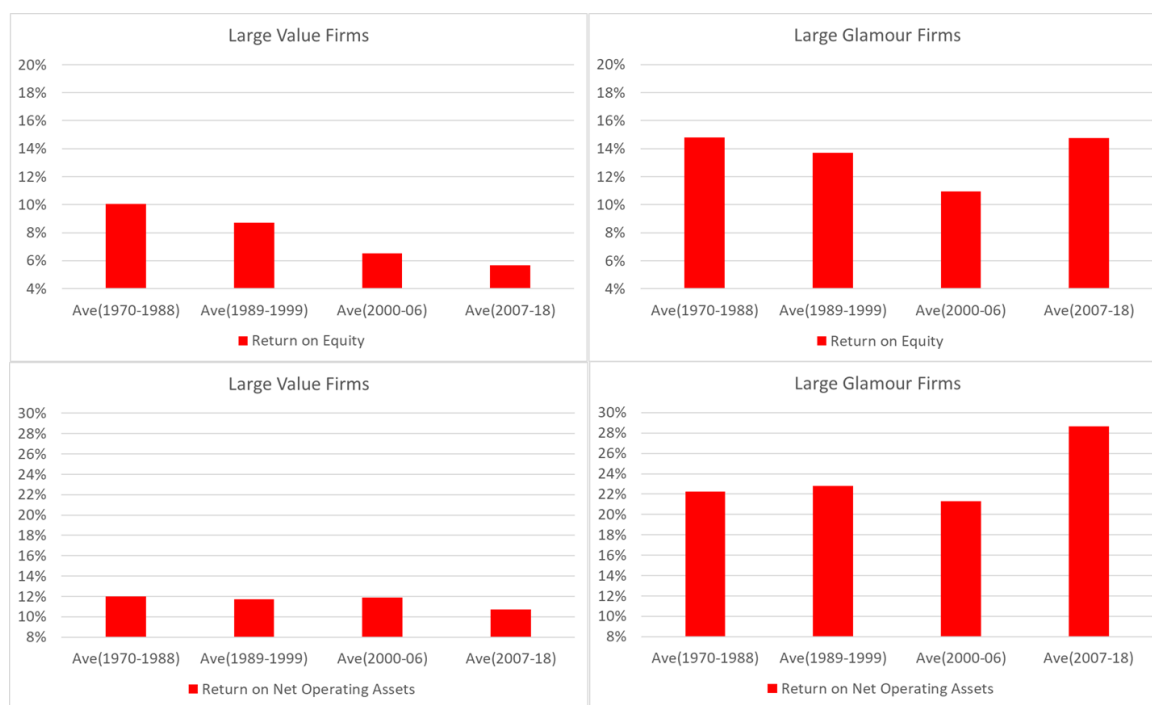
This poor profitability precluded most value firms from improving their performance by investing in innovation and growth (R&D, IT, brands, acquisitions). Such crucial investments require massive funding (the average large glamour company invests now close to $1 billion a year in R&D) which most value firms couldn't afford. R&D investments, for example, require ample

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internal funds generation because external funds for R&D, especially debt, are difficult to come by because of R&D's uncertain outcomes, severe asymmetric information problems, and lack of collateral value (Hall 2002). Figure 10 shows that the internal funds of value firms (earnings minus dividends) were, on average, *negative* during 2007-2018. A historical low. Without internal funds, and with very limited access to the stock and debt markets, most value firms were unable in recent years to pick themselves up and rise in performance and value.[14] Investment in this group of poor performers, trapped in low-valuation, was therefore a losing proposition during 2007-2018.

Figure 10: Retained Earnings of Value and Glamour Firms, 1970-2018
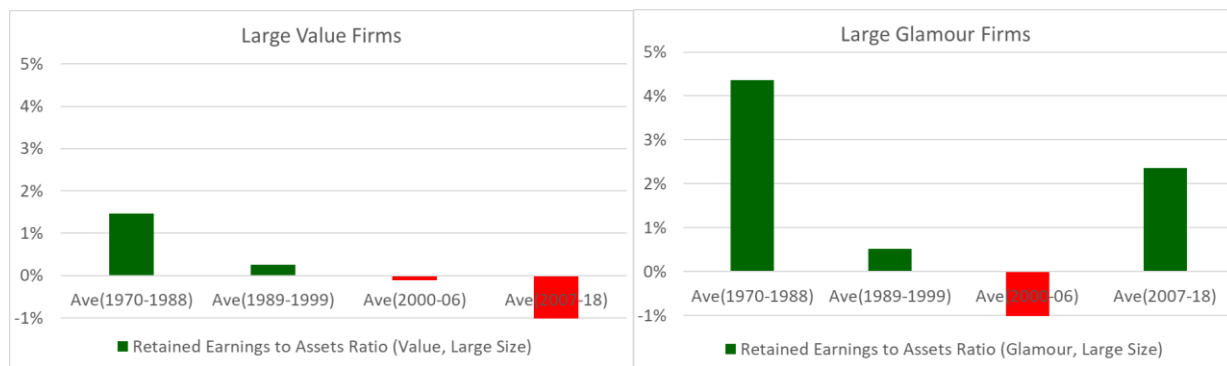
## 10. *Glamour firms' different experience*

The economic experience, post-crisis, was very different for glamour companies. The three leading industries of these companies were: business services (primarily software), pharmaceuticals (including biotech), and electronics. The business models of firms in these industries are largely based on scalable intangible assets (compare the revenue generation potential of patents or software with that of a rental property or a retail store), strongly protected by patents and brands. First-mover advantages, network externalities, and platforms and ecosystems built around entrenched customer relationships further enhanced the performance of many glamour

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[14] During 2007-2018, less than 1% of value firms issued stock annually.

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firms, as evidenced in Figure 9. Glamour firms, flush with cash and with easy access to capital markets, due to their attractive business models, have no problems raising funds to maintain a high investment level in tangible and intangible assets.

Glamour companies are highly rewarded by investors, as made clear by Figure 11, showing the dramatic increase of investors' valuation of intangible assets, and the large valuation gap between intangible and tangible valuations.[15] Many of the large glamour companies also enjoy strong entry barriers to their proprietary business models, keeping them at the top for long periods of time, as evidenced by the increasing rank correlation (Figure 6) and their longer stay in the high valuation portfolio (Figure 7).

Figure 11: Investors' Valuation of Tangible and Unreported Intangible Assets, 1970-2018

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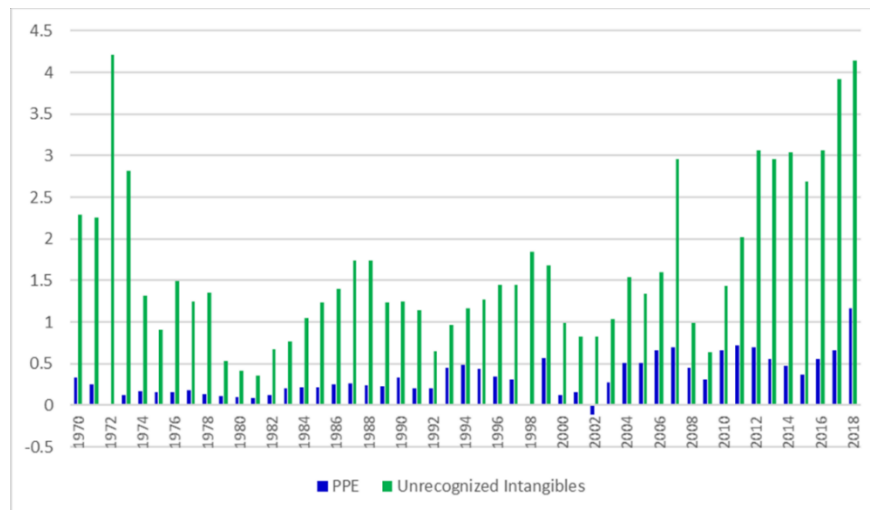
[15] We estimated investors' valuation of the intangibles which aren't shown as assets on the balance sheet: internally-generated R&D, IT, brands, business processes, etc., and term them unrecognized intangibles, as follows: *UnrecogIntan* is the amount of the estimated unamortized stock of R&D and SG&A (see Section 4). We ran the following regression by year to estimate investors' valuation of property, plant, and equipment (*PPE*) and *UnrecogIntan*:

$$SharePrice_{i,t} = \beta_{1,i} + \beta_{2,i} \times \frac{Cash_{i,t}}{CommonShares_{i,t}} + \beta_{2,i} \times \frac{AccountsReceivable_{i,t}}{CommonShares_{i,t}} + \beta_{3,i} \times \frac{Inventory_{i,t}}{CommonShares_{i,t}}$$
$$+ \beta_{4,i} \times \frac{PPE_{i,t}}{CommonShares_{i,t}} + \beta_{5,i} \times \frac{RecogIntang_{i,t}}{CommonShares_{i,t}} + \beta_{6,i} \times \frac{UnrecogIntan_{i,t}}{CommonShares_{i,t}} + \beta_{7,i} \times \frac{Liabilities_{i,t}}{CommonShares_{i,t}}$$
$$+ \beta_{8,i} \times NYSE\_Index_{i,t} + \varepsilon_{i,t}$$

The coefficients β_4 and β_6 are investors' estimated valuation of tangible and intangible assets, and shown in Figure 11.

The high displacement rate of glamour firms up to the financial crisis—generally known as "creative destruction"—which drove the past gains from shorting these stocks, gave way to increased stability of glamour companies. Just consider the leaders of the software, pharma, telecom, electronics, Internet service providers, and media industries; these companies are at the top of their industries for decades. Creative destruction and industry disruption seems to have little effect on Microsoft, Pfizer, Apple, Amazon, and the like. Shorting these companies was obviously a futile exercise. Thus, the increased stability at both the top and bottom of stock valuation ranks—due to different economic and technological reasons—robbed value investing of its previous gains.

Importantly, the serious financial constraints on value firms, (bottom 30%), and to a somewhat lesser extent on the middle 40% of firms, prevented these companies from spending large amounts of money on R&D, brand development, and technology, required to unseat the top, glamour firms from their coveted position. Thus, the considerable reshuffling of glamour companies pre-financial crisis, driving the gains from shorting these firms, dwindled significantly in recent years.

This then explains the failure of value investing since 2007. A striking bifurcation developed between value and glamour firms: Most value companies now operate in regulated industries (banks, insurance, and utilities), or in low valuation, tangible asset-rich sectors (retailers, transportation). Escaping this low-valuation group requires massive investments in intangibles and acquisitions, and often a radical restructuring of business models, which most value firms can't afford. Findings diamond in the rough of this group is increasingly challenging. Glamour firms, in contrast, operate intangibles-based business models which enable longevity and high profitability. Shorting these enterprises is a losing proposition.

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11. *Escaping the Value Predicament*

For investors intent on finding diamonds in the rough of value, out-of-favor companies, it would be instructive to identify the attributes of value companies which rose in valuation in recent years and escaped the value trap. We address this question by distinguishing between firms in the large "value" category (trapped), from 2008 to 2017, that remained in that category and those that moved up to the medium (40%) and high (30%) market-to-book ratio categories, while retaining large size. We performed this separation by a statistical Logit regression which focuses on a large number of company and performance attributes, and highlights the attributes which significantly (in a statistical sense) distinguished between the trapped (in "value") and escaped companies.[16] Estimates from this Logit regression are presented in Table 1. Variables with significance level (right column) lower than 0.05 (5%) are generally regarded as statistically significant.

Table 1: Logit Regression to Distinguish Characteristics of Large Value Companies which Remained in the Same Category From those that Rose to Higher Market-to-Book Ratio Categories, 2008-2017

Variable	Coefficient	Standard error	Significance
Intangibles to Assets	1.664	0.45	<.01
Capex (net of depreciation) to Assets	4.686	1.64	<.01
Percent Contribution to Sales from Acquisitions	0.082	0.74	0.91
Last Three Year's Sales Growth	1.694	0.37	<.01
Industry Change	-0.044	1.31	0.97
Debt to Assets	1.199	0.34	<.01
Free cash Flows to Assets	2.110	1.02	0.04
Share Repurchase to Assets	6.182	2.12	<.01
Dividend Payments to Assets	7.352	3.32	0.03
Cash to Assets	-0.067	0.62	0.91
Age Since Listing	-0.001	0.00	0.86
Return on Equity	0.004	0.02	0.83
Loss	-0.485	0.14	<.01
Log of Assets	-0.193	0.05	<.01
Year and Industry fixed effects	Yes		
Number of observations	2,338		
Number of observations with value = 1	730		
Likelihood Ratio	423 significant at <.0001		

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[16] All continuous variables were winsorized at 1% and 99% by year to remove the effect of outliers.

The following attributes were found to significantly distinguish between the break-outs and those that stayed behind:

- *Intangible investment* (R&D, IT, brands, etc.) relative to total assets. Escapees had a substantially higher intangible investment rate than firms which stayed behind.

- *Net capital investments* (Capex) relative to total assets. Escapees also had a substantially higher capital investment (net of depreciation) than those staying behind.

- *Steady sales growth*. Essentially, a successful business model.

- *Debt raised* to total assets. Escapees raised substantially more debt than others, apparently to finance their investments.

- *Size* (total assets). The negative coefficient of (log) assets indicates, surprisingly, that larger firms had a *lower* likelihood of escaping the value category.

- *Loss*. Firms reporting losses were, unsurprisingly, less likely to escape.

- *Recapitalization*. Firms that could reduce their equity base by share repurchases had a higher likelihood of escaping value.

Not less interesting are some of the variables which failed to distinguish those that escaped from companies which stayed behind. Corporate acquisitions, presumably made in order to escape the low market-to-book class, appear largely ineffective, either due to overpayment for target, and/or strategic misfit. An industry change also appears to be ineffective. Overall, internal investments in traditional intangibles, like R&D, brands, information technology, and tangible investments, as well as the lesser visible investments in organization capital, or management, were the main drivers of growth in market value. Recent economic research clearly shows that
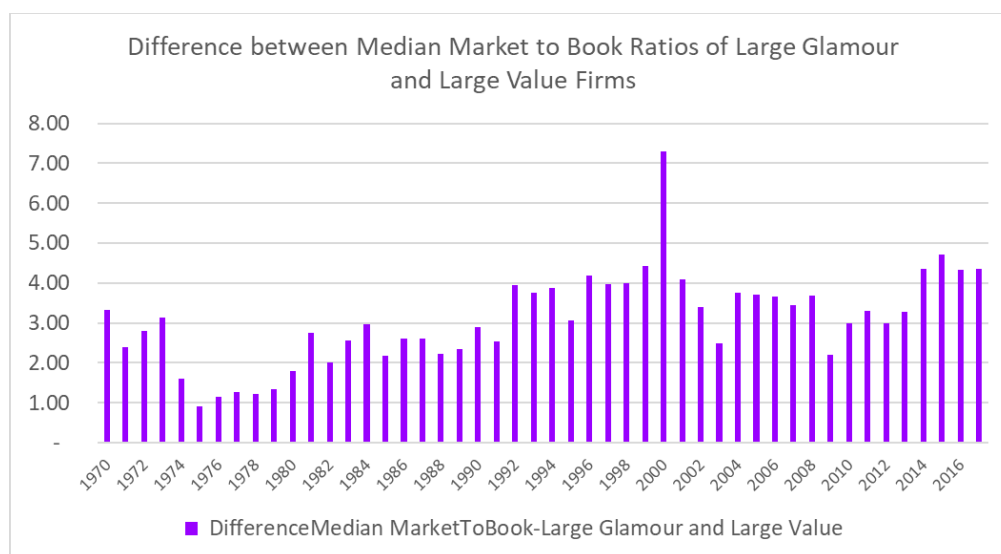
differences in managerial practices account for a large share of variation in firms' performance.[17] Unique business processes (recommendation algorithms, AI), employee incentive devices, and managerial control and monitoring systems are major drivers of breaking out of the low-capitalization crowd. A working business model (sales growth) was a key to success, and being able to raise debt to finance investments was helpful. So, value firms aren't entirely doomed to stay in the trap; innovation and reinvestments are key to rising in value.

12. *Finally, will value investment rebound?*

This is the question at the core of the value enigma: Will value investing soon return to its days of glory? Every month, like September 2019, where value beats glamour, raises the hopes of value investors. Will it last? Note that we move here from the solid grounds of factual analysis which guided our discussion so far, to the shaky realm of speculation. But even here some facts are useful. Some investors pin their hopes of a value rebound on believing that value stocks are now much cheaper than in past periods, and therefore ripe for growth. Figure 12 (our final exhibit) begs to differ: it displays the annual differences between the median market-to-book ratios of large value and glamour stocks. At least by this yardstick, it doesn't appear that value stocks are now much cheaper than glamour (growth) stocks. In fact, the current differences between the medians of the market-to-book ratios of value and glamour stocks in Figure 12 aren't significantly larger than those that prevailed in the late 1990s and early 2000s.

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[17] See J. Van Reenen, J. 2018. Increasing differences between firms: Market power and the macro-economy. Available at
https://www.kansascityfed.org/~/media/files/publicat/sympos/2018/papersandhandouts/jh%20john%20van%20reenen%20version%2020.pdf?la=en

Figure 12: Difference in Median Market to Book Ratios of Value and Glamour Stocks, 1970-2018

What else could resurrect the value strategy? An unusual improvement in the performance and valuation of financial institutions (banks and insurance companies) will do the trick, but how likely is this to happen soon?[18] The alternative is a significant improvement in the performance of non-financial value firms such as retail, oil, wholesale, and utilities. To rise significantly in value, trapped value companies require large investments, which, as we have shown above, most value firms can't afford. Finally, a collapse of glamour (high valuation) companies will resurrect the long-short value investing, as it did in the early 2000s (see Figure 1). What's the likelihood of this to happen? Restrictive laws and regulations adversely affecting internet and pharmaceutical companies—proposals currently advanced by some presidential aspirants—will hit the values of many glamour companies. Overall, though, the above scenarios don't seem to us highly likely in the short-median terms.

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[18] Warren Buffett apparently believes in a resurgence of bank stocks. *The Wall Street Journal* (August 14, 2019) reported that Berkshire Hathaway holds nearly $100 billion in financial-services stocks.

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