

The Journal of Portfolio Management

VOLUME 42 NUMBER 1

www.ijpm.com

FALL 2015

Fact, Fiction, and Value Investing

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While recently confronting the myths surrounding momentum investing (Asness et al. [2014]), we discovered two things. First, there is as much confusion about value investing as there is about momentum investing. Second, if we debunk the mythology around momentum investing, some will get the wrong impression: that defending momentum means denigrating value. Even experienced investors often seem to wrongly assume that one cannot simultaneously believe in both value and momentum investing.

Value is the phenomenon in which securities that appear cheap, on average, outperform securities that appear to be expensive. The value premium is the return achieved by buying (being long in an absolute sense or overweight relative to a benchmark) cheap assets and selling (shorting or underweighting) expensive ones. The existence of the value premium is a well-established empirical fact. It is evident in 87 years of U.S. equity data, in more than 30 years of out-of-sample evidence from original studies, in 40 other countries, in more than a dozen other asset classes (Asness, Moskowitz, and Pedersen [2013]), and even dating back to Victorian England.¹

Importantly, our definition of value investing is the highly diversified, academic

version of value (though many practitioners also follow it). We do not focus on concentrated value-based stock picking, which we discuss further in one of our sections. In addition, our starting point is pure value, meaning price relative to some fundamental, such as book value, based solely on quantifiable measures. We do not further adjust it for other qualities for which an investor might pay more, such as faster growth or more profitable firms. (Some call this “growth at a reasonable price,” though obviously we are generalizing beyond just growth.) Later in this article we address the interplay between pure value and value that considers other qualities.

Value strategies have had a long and storied history in financial markets. They date back to the late 1920s and are often credited to Benjamin Graham and David Dodd, who advocated a form of value investing that involved buying profitable but undervalued assets—a double condition which, again, is an important distinction from what we call “pure value.” Indeed, value investing has been an important part of the equity investment landscape for the better part of the last century, and likely for far longer albeit undocumented. (Somewhere there must have been a Roman saying: “I came, I saw, I purchased at a low multiple.”)

Despite all of this, much confusion

about value investing remains. Value's opponents propagate some of this confusion in an attempt to disparage the strategy. Intentionally or not, some of those who explicitly or implicitly advocate for value also spread confusion. One notable, pure-value investor even claims not to be!

We have organized this article by identifying a number of facts and fictions about value investing that need clarification. We show that value works best with other factors, which can still be consistent with risk-based explanations for value; that it is best measured by multiple value-related variables, rather than just a single variable such as book value relative to price; that it offers exactly what the recently popular investing approach called fundamental indexing does; and that it has a weak effect among large-cap stocks, especially relative to other factors that hold up in both large- and small-cap stocks. The fictions we attempt to clarify include the false notion that value investing is only effective in concentrated portfolios; that it is a passive strategy; that it is a redundant factor in the face of newly emergent academic factors (namely, Fama and French's new investment and profitability factors); and that it is only applicable in a stock-picking context. Finally, we will take on the commonly held belief that value is solely compensation for risk, yet somehow not a scary strategy, and that a continued future value premium can only be consistent with a risk-based, efficient-markets view of the world. We certainly do not reject efficient markets, but note that value's prior and continued success can occur in a world of efficient markets, inefficient markets, or the likely truth that lies somewhere in between. In each of these worlds, value is subject to time variation and hard to envision disappearing.²

As in our prior article on momentum, we address the facts and fictions of value investing using published and peer-reviewed academic papers, and conduct tests using the most well known and straightforward, publicly available data³ in U.S. equity markets.⁴

Finally, the topics we address include value investing's positive and negative attributes. We consider ourselves among value investing's strongest proponents, particularly when value is used in combination with some other factors—such as momentum and, more recently, profitability. Our discussion is not at all meant to denigrate a strategy that we believe is a cornerstone of good investing. Instead, it is merely an attempt to see the pros, cons, and even ancillary beliefs more clearly.

FICTION: VALUE INVESTING IS AN IDIOSYNCRATIC SKILL THAT CAN ONLY BE SUCCESSFULLY IMPLEMENTED WITH A CONCENTRATED PORTFOLIO

We focus on the highly diversified, systematic version of “value investing,” not concentrated, value-based, idiosyncratic stock picking. Yet some argue that a successful value investor must apply value in a concentrated portfolio, deeply understanding each and every security in order to uniquely identify cheap stocks. Warren Buffett, often characterized as a value investor, certainly makes this claim. To quote Mr. Buffett, “Diversification is protection against ignorance. It makes little sense if you know what you are doing.”

As Buffett states, his common investment theme is to find “discrepancies between the value of a business and the price of that business in the market.” He applies this philosophy to a handful of stocks that he deeply investigates and understands, holding them in a concentrated portfolio for the long term. He's obviously done it incredibly well.

But Benjamin Graham, who Buffett credits as a mentor, actually believed in the long-term evidence in favor of a diversified portfolio, as opposed to a portfolio based on a few concentrated positions. In *The Intelligent Investor* (revised in 1973), he writes, “In the investor's list of common stocks there are bound to be some that prove disappointing. . . . But the diversified list itself, based on the above principles of selection, plus whatever other sensible criteria the investor may wish to apply, should perform well enough across the years. At least, long experience tells us so.”

But does Warren Buffett's lengthy, remarkable performance prove that an idiosyncratic value process dominates a systematic one? As the saying at the University of Chicago goes, “the plural of anecdote is not data.” Warren Buffett is to value investing what comedian George Burns, who smoked 10 to 15 cigars a day for 70-plus years, is to the health effects of smoking.⁵ Should Burns' experience mean that we ignore the evidence that smoking kills? Unless you own the magazine *Cigar Aficionado*,⁶ the answer is clearly no. Strong, long-term evidence from a wide variety of assets shows that a systematic value strategy can deliver good long-term returns. That Warren Buffett was able to successfully pick individual cheap stocks should not derail that notion. Academic and practitioner evidence shows that

diversified portfolios of cheap (on pure value measures) securities healthily outperform their more expensive brethren, all without the need to pick the handful of best ones—and take on the ex ante danger of doing so.

Of course, the systematic versus idiosyncratic value investing concepts are not mutually exclusive. An investment professional who is very good at persistently identifying idiosyncratic cheap positions deserves a lot of credit. But a manager who is able to systematically invest in a group of cheap securities can also capture a positive long-term source of returns. An investor looking to invest in one of these two approaches should consider both as a way to diversify the process that generates the returns to value, as long as that investor is confident that the returns generated by both processes are indeed persistent. In our view, the diversified, systematic process provides greater comfort in this regard, but that does not mean that a concentrated value process could not also add value over time.

The point is certainly not to denigrate Buffett's approach or his record, but to emphasize that value investing encompasses more than Buffett's version. In fact, we can think of these two things separately. The returns of a diversified portfolio of value stocks over their more expensive counterparts are available to any who choose to pursue them, and should be available at a reasonably low fee. Picking the exactly right small handful of value stocks may or may not be possible, but attempting to do so comes with both additional downside dangers and upside returns, and usually comes with a higher fee if purchased in the world of active management.

In this article, we extoll and also critically examine the diversified value-investing process, pointing out that it exists largely separately from the ability to build highly concentrated portfolios, but without necessarily dismissing that possibility. At the very least, we hope to convince the reader that these two investment philosophies are not mutually exclusive or indeed even in competition with one another.

FICTION: VALUE IS A PASSIVE STRATEGY BECAUSE IT IS RULES-BASED AND HAS LOW TURNOVER

Although we differentiate between systematic value investing and Buffett-style concentrated active stock picking, we often hear that what we call system-

atic value is a passive strategy. In particular, some claim that value is passive, much like the strategy of buying and holding the equity market index. The implication is that a value strategy does not make active choices and is therefore not active management.

Our own view is that anything that deviates from the market portfolio, which weights assets in proportion to their market values, is active by definition, because the market portfolio is the only portfolio that everyone can hold simultaneously. A portfolio that deviates from market weights, on the other hand, must be balanced by other investors who are willing to take the other side of those bets. For every value investor who selects cheap value stocks, there must be an investor on the other side who is underweight value and overweight expensive growth stocks. Everyone cannot tilt toward value at the same time.

Some might argue that our definition of passive is too narrow, and that a better definition is this: a passive strategy is one that follows simple rules and has low turnover. However, simple counter-examples show that this is not an appropriate definition. For example, consider a single-stock portfolio that buys and holds that stock in perpetuity. Imagine a company employee putting all of her wealth in that stock. By this definition, we would consider this a passive portfolio, even though it is clearly a concentrated, idiosyncratic, and active bet in one firm. We would consider Buffett's portfolio passive under this definition, too, because his turnover is even lower than that of a typical diversified, systematic value strategy. When single-stock portfolios and Warren Buffett fall under the definition of "passive," the definition seems flawed.

The rules-based portion of this definition also fails. High-frequency traders who trade in microseconds are by definition rules-based, but we would be hard-pressed to call them passive investors.

Quite frankly, we think the debate between active and passive management is just semantics. The main issues facing investors are relatively simple: what they are buying (i.e., long-term expected returns with correlation properties that are valuable to their portfolio), at what price, and whether there are good reasons, either risk or behavioral, to believe these returns will persist. Whether products are active or passive is irrelevant, so long as they add value to a portfolio after cost.

We believe that a fairly priced, systematic, disciplined, rules-based, and low-turnover portfolio exposed to value (and to other factors as well) is a great investment, no matter what you call it—and we would call it active.

FACT: “FUNDAMENTAL INDEXING” IS ONLY SYSTEMATIC VALUE INVESTING

Some acclaimed value investors, such as Buffett, are actually not pure value investors, because they also consider other quality measures. Before getting to that, we must first address the flip side of this issue: pure value investors who claim they are not pure value investors.

We have seen investment products with names such as “fundamental indexing” and others that are labeled “smart beta,” but are just simple systematic tilts away from an index and toward value investing. That’s great. We object only when people claim that their simple value tilts are something more or (even worse) a new discovery Asness [2006] and Arnott [2006].

Fundamental indexing’s violations of this have been particularly acute, with claims that it is related to value investing, but somehow different and better.⁷ We see various theories about why value (or fundamental indexing) works, many of which are reinventions that are treated as new, despite the fact that academics have long considered noise and mispricing as potential reasons for value’s long-term success. They further obfuscate the subject, looking for points of distinction from value investing where none exist.

Fundamental indexing works by weighting stocks according to various fundamentals—book value, dividends, cash flows, sales, earnings, etc.—as opposed to market capitalization, which is the weight in traditional index funds. Fundamental indexing proponents correctly point out that if prices contain errors (and they do, of course) then by definition an index based on market capitalization overweights the too expensive and underweights the too cheap. Weighting by fundamentals creates an investment product that is less prone to this potential bias. Also, unlike some popular but impractical alternatives, such as equal-weight indices, it creates an investment product that is deep, liquid, and investable.

But when fundamental index proponents say that fundamental indexing is more than value investing, they add confusion and hide the truth. An equation illustrates the point. In a fundamental index (FI) based on one measure (e.g., book value), the weight of stock i held in the fundamental index is a function of its weight in a traditional market capitalization weighted index and its relative price-to-book ratio, as follows:

$$FI_i = MKT_i \times (P/B_{MKT} / P/B_i)$$

Here FI_i is the weight of the stock in the fundamental index, MKT_i is its weight in the traditional index weighted by market capitalization, P/B_{MKT} is the price-to-book ratio of the market-cap-weighted index, and P/B_i is the price-to-book ratio of firm i . Forming a fundamental index over multiple measures, which we find preferable to a single measure, complicates the mathematics but doesn’t change the spirit.⁸ The weight of firm i in the fundamental index is a direct function of relative valuations, as measured by the price-to-book ratio of firm i and the market itself.

Remember, value strategies have been around forever (e.g., Graham and Dodd [1934], Victorian England) and systematic value strategies have been studied in depth since at least the mid-1980s (e.g., Rosenberg, Reid, and Lanstein [1985] and Fama and French [1992]), and likely far longer. When posed this way, few investors would say that systematically overweighting stocks with low price-to-book ratios and underweighting stocks with high price-to-book ratios, versus a capitalization-weighted index using a simple formula, is anything other than a pure value strategy.

To see what the data say about this, we run a regression using monthly data from Kenneth French’s website and the backtest of fundamental index in large-capitalization U.S. stocks from 1962 through early 2014 (available on Bloomberg).⁹ The left side measures by how much the fundamental index beats the cap-weighted market over this period, which we expect to be positive, by subtracting the returns of the cap-weighted market portfolio from the monthly FI backtest. The right side is the HML factor: the return spread between a diversified portfolio of stocks with low price-to-book ratios and stocks with high price-to-book ratios. To our knowledge, no one disputes that HML is pure value. The results, with t -statistics in parentheses: an intercept of -4 basis points per annum (-0.10), $+0.37$ loading on HML (35.2), and a 66% R-squared.

The results show that the fundamental index delivers no additional average returns beyond its value returns, as measured by Fama and French’s HML factor. The intercept is -4 basis points, showing that, after adjusting for pure value using Fama and French’s HML factor, FI underperforms by 4 basis points. This is statistically no different from zero, as indicated by the -0.10 t -statistic. The enormous 35.2 t -statistic on HML and the very high R-squared testifies to the strong relationship between FI and value. Adding other factors

or changing the stated factors (e.g., using Asness and Frazzini's [2013] version of HML, adding momentum and size factors, defining value more broadly than does HML using multiple measures, as fundamental indexing does, etc.) can change the results, moving the intercept in either direction, but the very tight relationship with value remains.¹⁰

For example, Asness and Frazzini [2013] find that the Fama–French value factor unnecessarily lags price in its formation and propose an alternative version of HML that uses up-to-date prices rebalanced monthly. FI rebalances annually and uses up-to-date prices when it does so; Fama and French's HML uses a six-month price lag in rebalancing. On this dimension, therefore, FI is somewhere between Fama and French and Asness and Frazzini. When we add the Asness and Frazzini version of HML (called HML-DEV, after that article's title) to the regression (*t*-statistics in parentheses), we see an intercept of –6 basis points per annum (–0.20), +0.21 loading on HML (14.7), +0.18 loading on HML-DEV (14.8), and a 75% R-squared.

As its design suggests, fundamental indexing comes out almost dead in the middle of these two HML constructs, with *t*-statistics of approximately 15 on both and an improved R-squared of 75%, up from 66% on just Fama and French's HML alone. (The R-squared is 75%, even though the fundamental index is formed on four value measures and HML and HML-DEV are formed on just on one.) The intercept also drops another 2 basis points to –6 basis points, but is still not reliably different from zero. (If we simply regressed the average of HML and HML-DEV, we get a *t*-statistic of 43.3—even more impressive than the earlier value of 35.2.)

Again, specific results will of course vary, based on specific regressors. But the core result—that FI loads gigantically on value—is very robust. A value strategy may be better or worse, as shown by a positive or negative alpha to a value index such as the Russell 1000 value, for example, but it is still a value strategy if the loading and R-squared are large. We can have reasonable arguments about whether a *t*-statistic of 2.0 or 3.0 is a standard of significance, but not about the significance of a *t*-statistic of 35 or 43. The R-squared is certainly not 100%, because different choices were made in constructing the fundamental index versus building HML. Fundamental indexes use multiple measures of value, while both forms of HML use only a price-to-book ratio. Does that make one value and the other not? Of

course not, though some have claimed otherwise.¹¹

To be clear, there is room for many fairly priced value strategies. We believe in the value effect and do not consider it our private sandbox. Fundamental indexing does several things we like in a value strategy: it uses multiple measures, uses up-to-date prices when rebalancing, and does some implicit timing based on the size of valuation differences across stocks that we find intuitively appealing, even though it historically adds only modest benefit. It is a clear, simple, even clever way to explain and implement value investing.

Still, it is obvious that Fundamental indexing is only a systematic value strategy, and a simple one at that. It is not unrelated to value (the story 10-plus years ago) or related to, but still different from value (the story now). It is exactly value. Fundamental index proponents are free to argue why their version of value is better.

The arguments that fundamental indexing is not value, and pure value at that, should end. Fundamental indexing is literally a simple value tilt. It is time for us all to acknowledge that. Then we can get on with arguing over whose value portfolio is better.

FACT: PROFITABILITY CAN BE USED TO IMPROVE VALUE INVESTING AND STILL BE CONSISTENT WITH A RISK-BASED EXPLANATION FOR VALUE

Some have argued that using profitability, or other quality measures, to enhance a value strategy is inconsistent with a risk-based, efficient-markets view of the world. We don't believe that is necessarily true. The efficient-markets hypothesis (EMH) states that all information should be incorporated into prices, so that any return predictability must be about risk premia. Nowhere does the EMH state that all firms should have the same price or the same price multiple, such as book-to-price ratio.

In fact, the use of profitability to enhance value strategies can be consistent with an efficient- or inefficient-markets view of the world. By cleaning up valuation ratios to identify which firms have low (high) book-to-price ratios because they are more (less) profitable rather than less (more) risky, profitability helps identify the riskiest (highest expected return) assets from an efficient-markets perspective. From an inefficient-market scenario, profitability helps find the most underpriced assets with the best hopes for higher future

returns. Put simply, under either hypothesis not all firms should have the same book-to-price ratios, and measures such as profitability can help remove the variation in book-to-price ratio that comes with variation in quality rather than in expected return. Both stories provide a role for profitability in making valuation ratios more informative.

Graham and Dodd advocated the use of profitability and other quality measures to clean up value. Although Graham (and perhaps Dodd) was more systematic than Buffett, neither were pure value investors as we use the term here. Witness the main criteria for security selection from *The Intelligent Investor* (revised in 1973): 1) adequate size; 2) a sufficiently strong financial condition; 3) continued dividends for at least the past 20 years; 4) no earnings deficit in the past 10 years; 5) 10-year growth of at least one-third in per-share earnings; 6) stock price no more than 1.5 times net asset [book or balance sheet] value; and 7) price no more than 15 times average earnings over the past three years.

Most definitions would consider only the last two criteria valuation metrics. In our view, the others are useful in identifying growing, high-quality companies.¹² In fact, these criteria for security selection are consistent with Peter Lynch's (the portfolio manager of Fidelity's flagship Magellan fund) concept of growth at a reasonable price (GARP).

Not all stocks should necessarily sell at the same valuation ratios. That pure value investing ignores this truism and still works so well is a testament to its power as an investment tool. A very good strategy can survive a little noise.¹³ However, an investor can do even better by recognizing that valuation ratios do not need to be treated exactly the same. Using measures of earnings quality or profitability can identify the cheap and profitable firms that can give a portfolio an even bigger boost.

Value and growth strategies such as profitability and momentum are not incompatible in theory. What do the data say? Exhibit 1 reports the annualized Sharpe ratios of value (HML), momentum (UMD), and profit-

ability (Fama and French's RMW), as well as various combinations. As profit measures are only available beginning in July 1963, the results cover 1963 to 2014 and in each case use the long-short version of the factor.

As the exhibit shows, a simple 60/40 combination of value with profitability improves value's Sharpe ratio from 0.46 to 0.58 over this time period. Further, a 60/40 combination of value with momentum results in an even bigger improvement in Sharpe ratio, to 0.79. Importantly, as the last column of Exhibit 1 shows, with a one-third equal weighting of value, momentum, and profitability, the improvement in Sharpe ratio is even higher, at 0.84.¹⁴ Hence, a value portfolio's Sharpe ratio almost doubles when we combine it with growth like strategies, such as momentum and profitability. Interestingly, using a simple optimizer to choose positive weights and maximize the portfolio's Sharpe ratio gives us weights that are close to one-third in each category.¹⁵

Although adding measures such as profitability to improve a value strategy can still be consistent with an efficient-markets/risk-based view, that story works best if profitability is both negatively correlated with value and does not itself carry a positive premium. For example, all else being equal, a negative correlation with the value factor should imply a negative expected return, so if the return is zero or not as negative as expected, it can add significant diversification benefits. Profitability (and especially momentum) is strongly negatively correlated with value. However, its returns are not zero or less negative than expected; instead, they are strongly positive. This, of course, makes profitability (and momentum) an even more valuable factor to add to value, a fact that is difficult to reconcile from an efficient-markets point of view. If profitability is merely cleaning up value—something consistent with both risk and behavioral theories—then its solo efficacy should be flat or neutral. Yet profitability has a strong positive return premium. For those who take a risk-based view of the value premium, this presents a challenge, as expensive, high-quality stocks also enjoy a positive

EXHIBIT 1 Combining Value with Momentum and Profitability

	Value	Profitability	Momentum	60/40 Val/Prof	60/40 Val/Mom	33/33/33 Val/Mom/Prof
Sharpe ratio	0.46	0.42	0.57	0.58	0.79	0.84

premium.¹⁶ Our view is that most of these factors work for a combination of reasons—risk and behavioral—and these results fit nicely into that paradigm.

For both systematic, diversified value managers and concentrated value managers, adding profitability measures as another bona fide factor can greatly improve a portfolio, which neither proves or disproves that value is consistent or inconsistent with efficient markets. Clearly, value does not work best alone. Far from it. Combining it with other economically intuitive and empirically strong factors, such as profitability and momentum, builds the best portfolio.

FICTION: VALUE IS “REDUNDANT”

Fama and French [2014] advance a new five-factor model (FFM) that adds a profitability factor (RMW) and an investment factor (CMA) to their 1993 three-factor model. Similarly, Asness, Frazzini, and Pedersen [2014] advance a model that adds a composite quality factor that contains both profitability and investment-related factors that are commonly considered part of a firm’s quality.

The FFM claims that HML, that stalwart value factor, is redundant, in the sense that it adds nothing beyond the other four factors in explaining returns. This caused enough of a stir that Fama and French decided to write about it, explaining “When we say that HML is redundant, what we mean is that its average return is fully captured by its exposures to the other factors of the five-factor model. This means HML has no information about average returns that is not in other factors, so we do not need HML to explain average returns.”¹⁷ Should we stop considering the facts and fictions related to value investing and concentrate instead on just the other four factors? Should we stop building investment products with value investing as a core feature? We argue no.

In principle there is nothing wrong with the implication that there are better ways to measure and capture the value effect, as proxied by HML, such as a combination of profitability and investment. It would not mean that value is useless, but that its efficacy could be fully captured in other ways. However, we do not believe value is redundant in even this way. Our reason has to do with two things we have already discussed: 1) the Fama–French HML factor’s use of a highly lagged price and 2) momentum, the one missing factor that Fama and

French have never embraced in their academic work.

Fama and French [2014] explicitly omit momentum, despite the overwhelming evidence that it contributes to explaining returns and is itself not captured by the other five factors, while simultaneously keeping value, despite their own evidence showing that their other factors drive out value. It’s ironic that the momentum factor they left out resurrects the most famous factor associated with them—value—and is also consistent with a long-standing view that value and momentum are best viewed together, as a system. (See Asness et al. [2014], Asness, Moskowitz, and Pedersen [2013], Asness and Frazzini [2013], Asness [1997], and Asness et al. [2015].) Failure to do so can result in erroneous conclusions and poorer investment decisions. Value’s apparent redundancy in the five-factor world is one example.

Two things that are related to viewing value and momentum together resurrect HML within the new Fama and French five-factor model. The first is the decision to explicitly include both a momentum factor and a value factor in the model. The second is the decision to construct that value factor by using timely price measures, a seemingly small change that has sizeable consequences.

Exhibit 2 replicates the Fama and French results, where other factors seemingly make HML redundant, as in the first panel of table 6 in Fama and French’s [2014] working paper. The table reports results of regressing the monthly returns on each of their factors individually from July 1963 through December 2013. We ask whether a linear combination of the other factors can essentially replicate a factor. A factor so spanned is redundant.

The first row of Exhibit 2 replicates Fama and French, though we report the intercept in percent per annum.

Each row reports the regression coefficients, with *t*-statistics below in parentheses. The first column reports the intercept or alpha from the regressions; the last column reports the R-squared. If the intercept is reliably different from zero—e.g., statistically significant at a reasonable level of confidence, usually means having an absolute *t*-statistic value greater than 2—then the dependent variable factor in question contributes more to explaining returns than do the other four factors. If the intercept is statistically no different from zero, then the other four factors span or subsume the factor in question, making the factor redundant.

EXHIBIT 2

Replicating the Fama and French Five-Factor Model (Table 6) and Resurrecting Value

	Intercept	RMRF	SMB	RMW	CMA	UMD	R-squared
HML	−0.48% (−0.46)	0.01 (0.37)	0.02 (0.81)	0.23 (5.38)	1.04 (23.03)		52%
HML	0.52% (0.51)	−0.01 (−0.35)	0.03 (1.04)	0.24 (5.96)	1.03 (23.37)	−0.11 (−5.92)	54%
HML-DEV	0.23% (0.15)	0.06 (2.04)	0.00 (0.11)	−0.02 (−0.30)	0.95 (14.24)		28%
HML-DEV	4.87% (4.74)	−0.01 (−0.32)	0.03 (1.15)	0.07 (1.60)	0.89 (20.01)	−0.52 (−27.31)	68%

As the first row shows, HML is redundant in this particular model, which may be a surprise.

Digging more deeply into the HML regression results, we see that HML is not explained by or strongly related to RMRF or SMB, whose coefficients/betas/factor loadings are near zero. However, HML has large and significant exposure to RMW, the profitability factor, and an absolutely gigantic exposure to CMA, the investment factor (with a beta of 1.0 and a *t*-statistic of 23). This eliminates HML's alpha. After accounting for positive covariance with profitability (cheaper firms are more profitable firms, on average) and conservative investing (cheaper firms invest more conservatively, on average), there is no intercept left. In fact, it is even a tad negative.

This means that HML can be reconstructed and is better explained by a combination of RMW and CMA. But is the reverse true? Can some combination of HML and RMW explain CMA? Or a combination of CMA and HML explain RMW? The answer is no, as separate analysis shows.¹⁸

This does not mean that value is an ineffective solo strategy—far from it. It simply means that, after accounting for the two new factors, value does not add additional returns.

The next row of Exhibit 2 adds the momentum factor, UMD, to the regression. Because HML is negatively correlated with UMD (*t*-statistic of −5.92), and UMD is a positive return factor, HML's alpha increases by 1% annually. That is enough to flip its sign, but not enough for it to reach statistical significance. HML is not quite as redundant as before, but isn't resurrected, either.

To save value, we must change it. Fama and French's industry-standard HML construction uses

annual June rebalancing, employing book-to-price ratio as the valuation measure to decide “H” and “L,” with both book and price taken as of the prior December. Both book and price are six months old at portfolio formation and are 18 months old by the time the portfolio is next rebalanced. The initial six-month lag ensures that an investor has information in real time when forming a portfolio; as a result, the backtested results don't suffer from look-ahead bias.

As we discussed earlier, the researcher chooses which price to use. Fama and French used price and book numbers from the same date, so they match in time. Asness and Frazzini [2013] argue for a mismatch in book and price timing for two reasons. First, if you knew only that price had fallen dramatically (and vice versa, for all these examples) since you last had an accurately time-matched book-to-price ratio, you would guess that the book-to-price ratio went up, because book does not tend to move as much as price. Second, a properly constructed value strategy is naturally negatively correlated with momentum. A six-month price lag that grows to 18 months before the next rebalance throws away much of this natural, elegant, and intuitive negative correlation.

After making these arguments, Asness and Frazzini [2013] construct an alternative to Fama and French's HML by preserving all aspects of their methodology, but letting the portfolio rebalance monthly, using last month's price to scale book values. In the third row of Exhibit 2 we show the results of re-running the regression by replacing Fama and French's HML with HML-DEV. For the most part, the result is a non-event. HML-DEV experiences an intercept that is not radically different from that found by using Fama-French HML and is still no different from zero. It is now insignifi-

cantly positive instead of insignificantly negative, so it is still redundant.

Timely value, or HML-DEV, now has an economically and statistically large intercept, even with a very large loading on the positive CMA factor. The negative correlation with the successful momentum factor is that powerful. Again, value and momentum are best thought of as a system. They are both strong alone, but are much stronger together due to their negative correlation, which shows up most clearly when value is defined with timely prices.

However, when we add momentum back in the fourth row of Exhibit 2, we see meaningfully different results, all from doing two simple things.

Fama and French's latest five-factor model may be a useful way to summarize the known playing field of factors, and it brings some very good things to the table. However, for reasons we do not find compelling, it leaves out momentum. With no change necessary to the value factor, it is absolutely compelling to add momentum back, creating a better six-factor model. But as we have argued for some time, the value factor can be made timelier. Doing so makes momentum even stronger, and the value factor, rendered distressingly redundant by the five-factor model, is suddenly and clearly resurrected.

Strong proponents of pure value may rejoice at this news, but at the same time they must face the irony that it was momentum that rescued them.

FACT: VALUE INVESTING IS APPLICABLE TO MORE THAN JUST CHOOSING STOCKS TO OWN OR AVOID

Can value really be applied outside of equities? To many, value is a concept that applies exclusively to stocks, in part because most of the academic literature and evidence has focused on stocks and, relatedly, because the most common way people measure value is by some ratio of accounting value to market value, such as the book-to-market equity ratio. Because accounting values are nonexistent in other asset classes, such as bonds, commodities, currencies, etc., value is often thought not to apply to those assets.

We can think more broadly about value investing's goal: to identify cheap versus expensive assets. If we can measure cheapness and expensiveness in other

asset classes, we can form a value portfolio in other asset classes. There are many reasonable ways to measure value, including the reversal of long-term past returns. And, as every asset has a measurable return, this is at least one measure of value we can use for any asset class.

In other asset classes, we can also form direct fundamental value measures. For instance, in bonds a measure of value is the real bond yield, or yield on a bond minus expected inflation. For currencies, deviations from purchasing power parity (PPP), as proxied by the price of a basket of goods in two countries relative to their exchange rate, might also indicate cheapness and expensiveness, as in the long run exchange rates should converge to PPP across countries.

Using some of these value measures, Asness, Moskowitz, and Pedersen [2013] document significant value return premia in bonds, country equity index futures, commodities, currencies, and equities globally from 1972 to 2011. They find not only a reliable value premium in each asset class, but a positive correlation of value strategies across asset classes. Interestingly, the value strategy correlations are higher than passive exposures to the asset classes themselves, indicating that value strategies in different asset classes using different measures, but tied together by the same theme of identifying cheap versus expensive assets, are capturing a similar phenomenon. In other words, cheap assets in one asset class move with cheap assets in other asset classes, bonded by an overall value effect that pervades all of these markets.

Value is more than a narrowly defined, equity-only concept and can be applied more broadly to any asset class. The implication is that we can create more robust and diversified value strategies that deliver better, more stable performance. Asness, Moskowitz, and Pedersen [2013] show that a diversified value strategy applied across all asset classes more than doubles the Sharpe ratio of a U.S. equity-only value strategy, such as HML. Moreover, combining value with momentum across all asset classes improves an overall portfolio by substantially more.

Regardless of whether we take advantage of these global (across geography and asset class) results, they are out-of-sample tests of the original U.S. results, which makes us more confident that both value and momentum are effective alone and even more effective together, a robust feature of the data and not an artifact of data mining.

FACT: VALUE CAN BE MEASURED IN MANY WAYS, AND IS BEST MEASURED BY A COMPOSITE OF VARIABLES

Simple intuition tells us that this should be true. The opposite idea—that a single measure of anything is optimal, given estimation error, data mining concerns, and absent any strong theory—seems at best remote and most likely false.

Nevertheless, the data put this statement to the test. In academia, the predominant way to measure value is to use the book value of a firm’s equity relative to its market value, referred to as the book-to-market ratio, or expressed per share as the book-to-price ratio. Fama and French [1992, 1993, 1996, 2008, and 2012] have used this particular measure of value in a series of articles. However, we know of no theoretical justification for it as the true measure of value, versus other reasonable competitors. In fact, Fama and French [1996] use a variety of fundamental-to-price ratios, such as the earnings-to-price ratio and cash flow-to-price ratio, and other measures of value, such as dividend yield, sales growth, and even reversal of the past five-year returns.

The results are consistent across measures, and the portfolios constructed from different value measures yield highly correlated returns. Exhibit 3 reports summary statistics on HML-style portfolios formed using different value measures to rank stocks. These portfolios are taken from Kenneth French’s website and pertain to the top 30% of stocks (value stocks) minus the bottom 30% of stocks (growth stocks) based on book-to-market equity ratio (BE/ME), earnings-to-price ratio (E/P), cash flow-to-price ratio (CF/P), dividend yield (D/P), and negative past five-year returns.

Though there is some variation in returns across the different measures, all of the HML-style portfo-

lios based on different value measures produce positive returns and are highly correlated.

The last column of the exhibit reports an HML-style portfolio using a composite (simple equally weighted average) of all value measures. As the table indicates, using a composite of value measures results in a more stable portfolio, as indicated by the lowest volatility relative to all of the individual measures. Comparing the traditional HML portfolio, based on BE/ME only, to the HML-style portfolio, based on the composite of all five value measures, the average returns remain about the same, but the composite HML portfolio’s volatility is 20% lower, resulting in a modestly higher Sharpe ratio, even though the correlation between them is 0.9.¹⁹

It is worth noting that the valuation ratios, such as BE/ME, E/P, and CF/P, deliver better and more robust results than more tenuous measures, such as negative past five-year returns and dividend yield. This makes sense, as past returns do not contain any information about a firm’s fundamentals and because many firms (see Fama and French [2001]) increasingly do not pay dividends. Hence, we would expect both of these measures to perform worse than the other valuation ratios. A simple composite of just the three other valuation ratios would generate a strategy that produces an average 4.5% return per year with an annualized Sharpe ratio of 0.48.

Not only is the book-to-market ratio not the only measure of value, but an average of multiple measures results in a somewhat better and more stable portfolio. This is intuitive. Each individual measure has error in it (due to accounting mis-measurement, missing accounting items for some firms, and random errors), so an average of measures helps reduce noise. Frazzini et al. [2013] and Israel and Moskowitz [2013] also show that multiple measures of value produce more stable value portfolios that deliver higher Sharpe ratios, higher

EXHIBIT 3
Single vs. Multiple Measures of Value

1951–2014	HML Based on					5-Year Return	Composite
	BE/ME	E/P	CF/P	D/P			
Average	3.6%	5.3%	4.5%	1.8%		2.5%	3.5%
Stdev	9.9%	9.8%	9.9%	11.5%		8.2%	8.1%
Sharpe ratio	0.36	0.54	0.45	0.15		0.30	0.43
Correlation to BE/ME	1.0	0.8	0.8	0.6		0.5	0.9

information ratios, and more robust returns. As with any systematic process, unless theory dictates preferring one metric to all others, an average of sensible measures is generally the best, most robust approach.

There is an additional advantage to using multiple measures, which relates to the ability to reduce errors. A strategy's out-of-sample performance is usually better (i.e., more closely matched to the backtest) when we use an average of multiple measures. As with any specific data sample, we will always find some measures that work particularly well in sample and some that do not (e.g., E/P versus D/P in Exhibit 3). However, without theory telling us a priori why one measure should outperform another, this is largely due to chance. As a consequence, we would not expect that same measure to outperform out of sample. Taking an average of multiple measures guards against picking one particular measure over others because it happened to work well in one particular sample. In other words, it helps prevent data mining by extracting more of the signal and avoiding overfitting errors.

In Exhibit 4 we report the Sharpe ratios of each value measure separately by decade, from 1951 to 2014. The highest Sharpe ratio in each decade is highlighted in grey, while the lowest is highlighted in black. Since we know ex post that E/P produced the highest Sharpe ratio and D/P produced the lowest, over the full period E/P should have stronger decade-by-decade performance than D/P, which it does. However, as the table shows, E/P produced the highest Sharpe ratio in only two decades: the first two (1951 to 1960 and 1961 to 1970). Over the last four decades, a different value metric produced the highest Sharpe ratio each time, including D/P from 1981 to 1990, which is the lowest

Sharpe ratio value strategy over the full period. This is just an informal (though informative) way to see that attempting to choose the best single measure from theoretically similar ones is both dangerous and unproductive over the long term.

On the other hand, looking across all measures of value in each decade, we see times when all value measures do better or worse. For instance, 1961 to 1970 was a great time for value, no matter how it was measured. The years from 1991 to 2000 were not very good for value in general. Consequently, the composite index of all five value measures, reported in the last column, is better able to capture the true variation in value's returns by averaging out the errors and idiosyncrasies associated with any singular measure.

However you identify value, cheap assets outperform expensive ones. No single measure of value is demonstrably better than another. An average of multiple measures is typically best.

FACT: BY ITSELF, VALUE IS SURPRISINGLY WEAK AMONG LARGE-CAP STOCKS

Many academic studies show that return predictability is stronger among smaller stocks, which is true for value, too, and for some potentially good reasons.²⁰ However, value's return predictability as a standalone factor is fairly ineffective among large stocks.

From French's data we can see how different large- and small-cap value are, and how weak the large-cap results are. Exhibit 5 looks at "HML small," which goes long cheap and short expensive only among small stocks, "HML large," which does the same among large caps, and repeats the results for regular HML, which

EXHIBIT 4

Sharpe Ratios of Different Value Measures by Decade

	B/M	E/P	CF/P	D/P	5-Year Return	Composite
1951–1960	0.28	1.16	0.82	0.08	-0.83	0.51
1961–1970	0.78	1.02	0.86	0.34	0.77	0.85
1971–1980	0.51	0.33	0.54	-0.11	0.37	0.35
1981–1990	0.44	0.29	0.26	0.48	0.04	0.37
1991–2000	0.01	0.39	0.03	-0.15	0.74	0.20
2001–2014	0.28	0.39	0.45	0.30	0.29	0.45
	Highest	Lowest				

is simply the average of the portfolio returns of HML small and HML large. We report the portfolios' average market-adjusted returns over four sample periods: 1) the longest period for which French provides data on HML (July 1926 to July 2014), 2) the out-of-sample period beginning in July 1926 and ending in December 1962, covering the out-of-sample period before the start date of many of the original academic studies on value, including Fama and French's seminal papers [1992, 1993] on the three-factor model, 3) the period from January 1963 to December 1981 largely covering the in-sample period of the academic studies of Rosenberg, Reid, and Lanstein [1985] and Fama and French [1992, 1993], and 4) the period from January 1982 to July 2014 covering the out-of-sample period after the original value studies. We also include *t*-statistics on the significance of the average returns to formally test whether they are reliably different from zero.

Over the entire sample period, the market-adjusted return to value within small-cap stocks is a significant 5.5% per annum, but within large cap it is an insignificant 1.7% per annum (in other words, not reliably different from zero).

Looking at the sub period results, the only period in which there seems to be a significantly positive HML premium among large-cap stocks is the in-sample period from 1963 to 1981, when the bulk of the original academic work on value took place. Over both out-of-sample periods— prior to these studies, from 1926 to 1962, and after these studies, from 1982 to 2014—there is no evidence for a healthy value premium among large-cap stocks. Even over the entire 88-year sample period that includes the in-sample evidence, HML among large-cap stocks does not yield significantly positive returns.²¹

This may come as a surprise to some readers who remember the original academic studies using data from 1963 to the early 1980s, where large-cap value does seem to work. However, after further review, revisiting the data, and updating the analysis, there is no strong stand-alone value premium among large caps. Perhaps there never was.

Pushing this a bit further also reveals something not generally appreciated about the construction of HML, the benchmark by which most researchers measure value. HML, which is an equally weighted combination of HML small and HML large, by construction gives much more weight to small than a simple passive

EXHIBIT 5 Large- and Small-Cap Returns of Value

Sample	Value Premia (Market-Adjusted Returns)		
	HML Small	HML Large	HML
1926–2014	5.5	1.7	3.6
(<i>t</i> -stat)	(4.07)	(1.16)	(2.81)
1926–1962*	2.5	0.1	1.3
(<i>t</i> -stat)	(1.14)	(0.06)	(0.63)
1963–1981	6.6	6.0	6.3
(<i>t</i> -stat)	(3.15)	(2.52)	(3.14)
1982–2014*	9.2	1.7	5.5
(<i>t</i> -stat)	(4.78)	(0.93)	(3.15)

*Out-of-sample periods from the original academic studies.

cap-weighted value portfolio would, leading to better looking results. The last column of Exhibit 5 shows that HML looks alive and well in every period except 1926 to 1962, even though small-cap HML performed well. Although HML is touted and used as a benchmark and often thought of as a passive portfolio, it is actually a monthly rebalanced, equally weighted portfolio of small-cap HML and large-cap HML, in which giving 50% weight to small-cap HML significantly overweights exposure to small-cap value relative to a cap-weighted value benchmark. Furthermore, because the risk of small-cap stocks is higher than that of large caps, the exposure to small caps is even greater and more imbalanced from a risk perspective. A purely cap-weighted value portfolio with market-cap weights would look much like HML large, as the large stocks would dominate in cap-weighting. This does not reveal a significant return premium over the full sample period. It would likely look slightly better, as it would have very small, but positive, exposure to smaller stocks.

Despite the weakness of the large-cap results, we are still big proponents of value investing, even among large-cap stocks. Large-cap value's weak stand-alone evidence should not be confused with value's very valuable contribution to a portfolio, particularly one with momentum or profitability in it, as we showed earlier.

Exhibit 6 separately looks at small- and large-cap value in combination with momentum. Even though the small-cap value strategy has the higher Sharpe ratio, it is still greatly improved by combining it with momentum, raising the Sharpe ratio from 0.48 to 0.82. Large-cap value, which by itself only generates a 0.25 Sharpe ratio, combined with large-cap momentum produces a robust

EXHIBIT 6

Sharpe Ratios of Value and Momentum Combinations in Small and Large Caps (January 1927 – July 2014)

Small Cap			Large Cap		
HML	UMD	60/40 HML/UMD	HML	UMD	60/40 HML/UMD
0.48	0.49	0.82	0.25	0.49	0.65

0.65 Sharpe ratio, which is not so far off the combination of value and momentum for small caps.²² In other words, combining value with momentum and viewing them as a system, gives similar results for small- and large-cap stocks. More importantly, the results are quite strong for large cap. Once again, momentum rides to value's rescue!

FICTION: VALUE'S EFFICACY IS THE RESULT OF A RISK PREMIUM, NOT A BEHAVIORAL ANOMALY, AND IS THEREFORE IN NO DANGER OF EBBING

There are two parts to this. First is the assertion that value is a risk premium, meaning that a value strategy delivers attractive long-term returns by taking a compensated risk in a rational market. Though we certainly don't argue against this as part of the story, we argue that the evidence is far from conclusive. The academic community continues to debate this notion, and our best guess is that both risk and behavioral causes are at work.

The second part is that value (and presumably any risk premia) will not disappear in the future. Even if value is a risk premium, that does not mean it could not disappear in the future. Conversely, behavioral anomalies do not have to disappear. The second part of the statement does not necessarily follow, regardless of whether we consider value a risk premium or a behavioral anomaly.

It is important to acknowledge the lively and healthy debate regarding value's economic explanation. No model of value is so compelling that a consensus exists for its explanation. Risk-based stories center on the value premium as compensation for bearing some type of systematic risk and going through periods, often prolonged, of underperformance. Value suffering from 1998 to 2000 during the technology run-up, the Great

Depression, and the global financial crisis, could support the risk-based story, especially during the last two examples, as these were particularly painful times.²³ Fama and French have suggested that distress risk may be related to value's risk premium, where value stocks have a higher beta on some market wide distress factor. Evidence for this theory is somewhat mixed, as Campbell, Hilscher, and Szilagyi [2011] point out. Furthermore, Novy-Marx [2012] argues that the results on firm profitability and its interaction with value provide a real challenge to the distress risk story. We have hit on this earlier. If value is purely a distress premium, a chance to be paid to mitigate that distress by buying stronger, more profitable companies would be odd. Typically, you must pay to alleviate risk, not get paid. If profitability were a negative return that hedged value, that would be a more consistent story. In addition, the notion of distress is hard to reconcile with the evidence on value effects in commodities, for example, where it is difficult to think of what "distress" means.

The behavioral theories focus on investor mis-reaction to information that causes temporary mispricing. A leading story originally suggested by DeBondt and Thaler [1985] and Lakonishok, Shleifer, and Vishny [1994] and later formalized by Daniel, Hirshleifer, and Subrahmanyam [1997], is that investor overreaction drives the value premium. The idea is that value stocks are neglected stocks that investors have fled from and now shun, while growth stocks are glamour stocks toward which investors have irrationally stampeded, causing value stocks to be underpriced and growth stocks to be overpriced. This story, though it was formulated previously, is often seen to be buoyed by the technology boom and bust of the late 1990s to early 2000s and the corresponding bust and boom in value.

Academics from the camp that emphasizes rational, risk-based, efficient markets continue to wage war with academics from the camp emphasizing behavioral, irrational, and inefficient markets over what drives the value premium. The jury is still out on which of these explanations better fit the data; indeed, the 2013 Nobel Prize committee split the prize between the two camps.²⁴ Even so, almost all participants agree that the data are undeniable: value offers a robust return premium that's highly unlikely to be the random result of data mining. In our view, both theories have some truth, as is likely the case with most other premia. The world is rarely so bright-lined that one theory is correct and the other

completely wrong. Elements of both risk and behavior are likely present.

To make things more interesting (or more complicated, depending on your perspective), if both explanations contain important elements of the truth, nothing says that the mix is constant through time. For instance, inefficiency-based behavioral reasons may have driven much of the period from 1999 to 2000, when value suffered and then soared, both at historic levels. That could be the exception that proves the rule. The important point, however, is that both theories offer good reasons to expect the value premium to persist in the future.

If value is a risk premium, however, would that imply that we do not expect it to disappear? (Consider the questions's subtext as well: if not for risk, then would it disappear?) Just because something is related to risk—and we reiterate that this is far from certain for value—does not guarantee it will not be greatly reduced. If risks or the compensation for risk changes, then so will the expected returns to that risk. Critics of efficient markets have long mistaken time-varying risk premia for a refutation of the idea of risk premia based on efficient markets. As long as risks and tastes for risks do not change, then and only then will the premium remain stable and long-lived. It might be perfectly reasonable to believe that these risks will not change, or will change slowly, but then we should state that this is our assumption. It is false to claim that something will not change, diminish greatly, or (in the extreme) disappear just because it is risk.

Conversely, if value is due to mispricing rather than to risk, it does not follow that the returns to value would necessarily and eventually disappear. For mispricing to disappear, either investor biases would have to disappear, or enough capital willing to take the other side would have to dominate trading. Efficient markets proponents often claim the latter will naturally happen, but there are impediments, such as limits of arbitrage and the more general arguments in Fama and French [2007] that prevent it from happening, and there is no reason to think that irrational investors will not stay irrational enough to keep the mispricing going. (In fact, mispricing can get worse!) As long as the biases, behaviors, and limits to arbitrage remain relatively stable, the premium will also be stable. During the 1999–2000 technology episode,²⁵ while most investors either bought into tech prices hook, line, and sinker or thought them

irrational, still others thought we were witnessing the rational arbitraging away of the formerly effective value strategy. Of course, rarely has an observation been so backwards. Value was not being arbitraged away; it was being ignored! And this episode happened many years after academics discovered value and eons after Graham and Dodd, with more and better information available to the whole market.

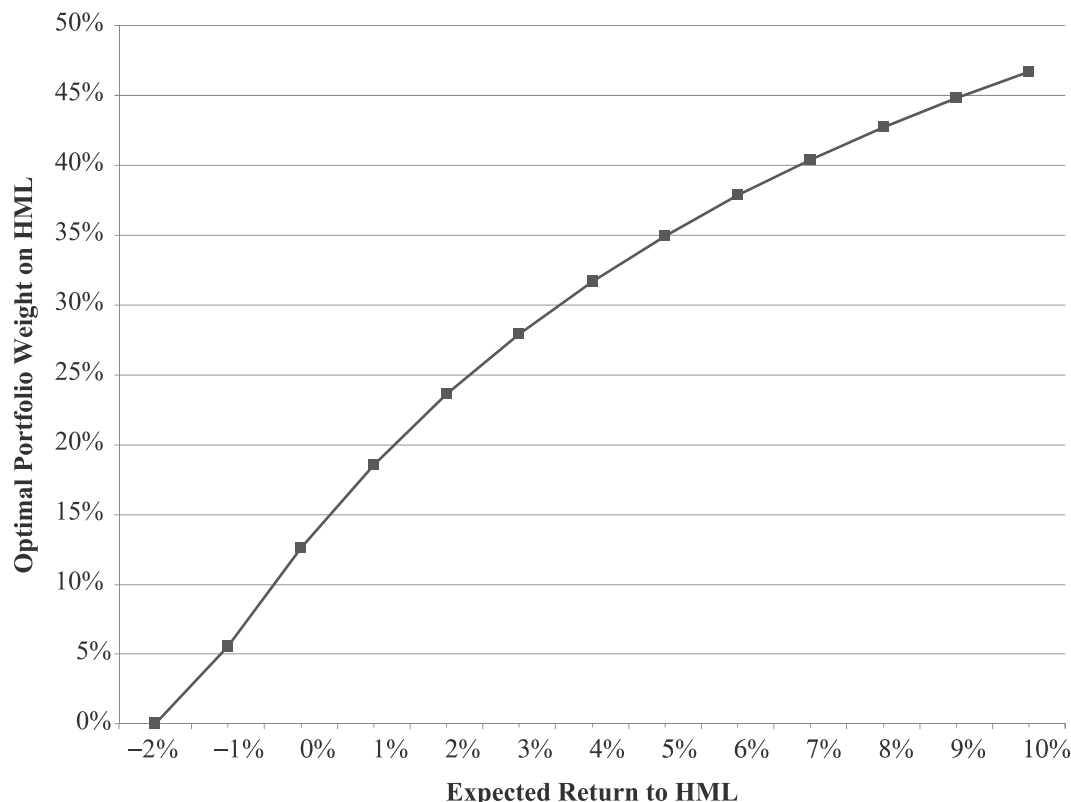
To be clear, our point is that both risk-based and behavioral stories provide plausible reasons to expect a continued value premium in the future. Evidence from more than a century of data in plenty of out-of-sample periods, in dozens of financial markets and different asset classes, and with no signs of getting weaker, despite investor knowledge of value investing going back at least three decades (see Israel and Moskowitz [2013], who show no degradation in value's returns), is further testament that the value premium is not likely to disappear soon.

Finally, what if value did disappear?²⁶ Despite all of the theory and evidence to the contrary, suppose that value had a zero expected return going forward. It would still be a valuable investment tool, so long as the other major risk premia or anomalies remain viable, because of value's tremendous diversification benefits when combined with other factors, such as momentum or profitability.

Following Asness et al. [2014], but applied to value instead of momentum, we run simple optimizations that maximize the Sharpe ratio of a portfolio combining market (RMRF), size (SMB), value (HML), and momentum (UMD). Exhibit 7 shows value's optimal weight as a function of value returns, while holding constant the other factors' expected returns and the correlations between factors at their long-term averages from 1927 to 2014. Using the average value premium observed in the full sample, the optimization would place about 33% of a portfolio in HML. Moreover, the exhibit shows that even in the extreme case, where we assume a zero return for value, the optimal portfolio still places a significant positive weight on value (about 13%). The logic is simple. Because momentum is a good strategy and value is significantly negatively correlated with it, we would expect value to lose money, and the fact that it breaks even makes it a valuable hedge. The diversification benefits are so great that even a zero expected return would be valuable to a portfolio. Even

EXHIBIT 7

Optimal Weight Frontier for Value



assuming that the value premium goes away but the momentum premium remains, we think this is strong testimony to the power of diversification across negatively correlated strategies.

Another point that is often missed is that not every investor can (or should, if it's a risk) hold or tilt toward value. Remember, all investment must by definition aggregate to the market. For every value investor, there must be a growth investor willing to take the other side. If everyone decided to tilt toward value stocks and away from growth stocks, then the value premium would cease to exist.

For both explanations of the value premium, therefore, the other side of the trade is a key component. In the behavioral stories, it is clear that those who suffer from behavioral biases chase the glamorous growth stocks and neglect the fallen value stocks. As long as enough of them survive, the value premium remains intact. For the risk-based explanation, the answer lies

in investors who do not want to bear the risk associated with value, or (more accurately) those who would pay not to bear it. That is, investors who are long value get a risk premium, like an insurance premium, from those who are willing to pay for this insurance because they are naturally short or underweight value. Of course, to fully understand this insurance-based explanation, we must fully understand the catastrophe that some investors are rationally insuring against.

This then begs the question: if a manager offering value to its clients believes that value is related to risk, why not also offer a growth fund for those wishing to bear less of this risk? In other words, if HML provides a risk premium to investors willing to bear value's risk, should they not also offer HML to the other set of investors who are willing to pay to eliminate this risk? To our knowledge, no one explicitly does.

The jury is still out as to whether the value premium exists because of risk or behaviorally based expla-

nations, and we believe the truth is likely a combination of the two. Both theories give a plausible reason to expect a value premium to persist.

CONCLUSION

It's been around practically forever and formally studied for at least 30 years, but there is still a lot of confusion surrounding value investing. Now that you have seen the evidence, know where to find it, and can replicate it yourself, we hope the truth behind value investing will be clearer.

As we said before, if one wants to challenge the evidence, that is fine, too. As always, if someone discovers something challenging or enlightening versus what we have shown, we welcome it and wish to understand it.

In dispelling the myths about momentum in our earlier article, and in detailing the facts and fictions about value in this one, we end up even stronger believers in both factors, and in particular their efficacy when used together.

ENDNOTES

We thank Phil DeMuth, Antti Ilmanen, Sarah Jiang, Johnny Kang, Samuel Lee, Dori Levanoni, John Liew, Lasse Pedersen, Scott Richardson, Rodney Sullivan, Laura Serban, and Daniel Villalon for useful comments and suggestions.

The views and opinions expressed herein are those of the authors and do not necessarily reflect the views of AQR Capital Management, its affiliates or employees.

¹See Chabot, Ghysels, and Jagannathan [2015], who show evidence of a value effect using dividend yield in U.K. stocks going back to the 1860s.

²Wondering what didn't make the list? We have two honorable mentions: 1) value is better for taxable investments than are other factors (such as momentum) and 2) value has a lot more evidence behind it than do other factors. Both of these are fiction and covered extensively in Asness et al. [2014], who write from the perspective of momentum investing.

³Kenneth French's data library (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html) provides returns for market (RMRF), small (SMB), value (HML), momentum (UMD), profitability (RMW) and investment (CMA) factors, including separate returns for both long and short sides and for large- and small-capitalization securities, all of which we use in this article. AQR's data library (<https://www.aqr.com/library/data-sets>) provides

returns for an improved value factor (HML-DEV) using timelier price data, which we use in this article.

⁴Our results are extremely robust when ported to other countries. We invite others to verify this claim.

⁵We attribute a similar analogy to John Cochrane, from a speech about Warren Buffett and market efficiency in honor of Eugene Fama's 2013 Nobel Prize. It also appears in print in Cochrane and Moskowitz [2015].

⁶*Cigar Aficionado* published an article in 1994 that made quite a claim: "Comedian George Burns is not only a living legend, he's living proof that smoking between 10 and 15 cigars a day for 70 years contributes to one's longevity." Or, as Mr. Burns put it, "If I'd taken my doctor's advice and quit smoking when he advised me to, I wouldn't have lived to go to his funeral." Of course, there is a good chance that they were joking. We certainly hope so...

⁷For example, Arnott, Hsu, and Moore [2005] say "A Fama-French three-factor regression shows that the Fundamental Indexes have factor exposure to the value factor." Of course, we would argue that "have factor exposure" is a giant understatement!

⁸This formula originally appeared in Asness [2006]. Arnott, Hsu, and West [2008] also present this formula. While they concede it shows that "in any snapshot in time" fundamental indexing is "pure value," they go on and try to explain why it is not pure value because it is a different amount of pure value at different times.

⁹"FTSE RAFI US 1000 Total Return Index" with Bloomberg code "FR10XTR Index."

¹⁰As Arnott, Hsu, and West [2008] noted, this type of regression compares a long-only portfolio to a long-short portfolio, potentially and probably biasing it against the long-only portfolio. That's precisely why we subtract the market return from the left side of the regression. However, Arnott, Hsu, and West make similar comparisons when they say, "It's striking to note that the 0.3 percent Fama-French alpha on Table 10.3 soars to 1.1 percent in the Fama-French-Carhart analysis. This is 1.1 percent of return, which is *utterly* unexplained in a Fama-French-Carhart model!" Ignoring the hyperbole and the fact that the intercept is by definition "utterly unexplained" by the model on the right, we think this increase in intercept is real and happens for precisely the reason Asness and Frazzini [2013] documented. They are right in that the intercept is positive, but they imply that it comes from something to do with FI, not the more mundane improvement found in any value strategy that rebalances with current prices.

¹¹Some claim that FI is not "value" as it apparently beats the Russell 1000 Value index, which is the straw man here standing in as the only pure "value" strategy. The Russell 1000 Value is an odd beast, as it is not purely based on

price; it also considers specific measures of growth. We don't know anyone who considers it the only definitional standard for value. Even if it were the value standard, beating it only implies that you may have a *better* value strategy, not something different from value.

¹²Frazzini, Kabiller, and Pedersen [2013] found that Buffett bought cheap stocks, as defined by pure value measures, but he also bought low-risk and high-quality (i.e., profitable, stable, growing, and with high payout ratios) stocks. Accounting for these factors helps explain a large part of Buffett's performance.

¹³When you sort stocks only on a measure such as price-to-book ratio and prefer the cheaper ones, you implicitly state that firms should all sell for the same price-to-book ratio, so the cheaper ones must be more attractive. Can you identify the systematic characteristics that should lead us to rationally pay more or less for some firms? We argue that profitability and others pass this test. We also argue that pure value's effectiveness says that, though you can improve by accounting for quality measures, the cross-sectional differences in expected returns that pure value identifies are large enough to survive the sub-optimal act of ignoring them.

¹⁴We note again that these findings are robust to testing in other countries, and for use in other asset classes where appropriate. (Momentum always has an analogy for other asset classes; profitability sometimes does.)

¹⁵Of course, these returns are to long-short portfolios and before trading costs, taxes, and other practical costs an investor might face. However, the diversification benefits of combining value with momentum and profitability also extend to trading costs and tax considerations, and to long-only portfolios, particularly when viewed versus a neutral benchmark (see Frazzini, Israel, and Moskowitz [2012] and Israel and Moskowitz [2012]). After taxes and trading costs, the historically optimal portfolio has still been far from pure value, including sizeable weights to momentum and profitability.

¹⁶Perhaps for this reason, some use profitability (and momentum) as a screen rather than as a separate factor in their investment process. We covered this ground in our last article on momentum, so we will only rehash the highlights here. Either you believe in these other factors and so want to use them effectively, or you do not believe in them and do not want to use them at all. Adding only a little bit of a factor via screens is inconsistent with both positions and only optimal under restrictive conditions that are wildly inconsistent with the data. Even if you only believe in a factor "a little," the proper action would be to give it a little weight in creating your desired portfolio, not to use it as a screen.

¹⁷See the Fama/French Forum hosted by Dimensional: "Q&A: What Does It Mean To Say HML Is Redundant?" (<http://www.dimensional.com/famafrench/questions-answers/qa-what-does-it-mean-to-say-hml-is-redundant.aspx>.)

¹⁸For more detail, see the post at <https://www.aqr.com/cliffs-perspective/our-model-goes-to-six-and-saves-value-from-redundancy-along-the-way>.

¹⁹Regressing each measure on the market, size, and momentum factors, again from Ken French's website, yields a similar superiority for the composite with the *t*-statistic of its alpha, or intercept from the regression, being higher than those of all single-value-measure portfolios. In addition, all of the value portfolios exhibit similarly negative correlations with the momentum factor, highlighting the fact that different value measures also yield similar results in terms of their relationship to other factors, such as momentum.

²⁰Penman et al. [2013] argue that the accounting system encourages firms to reflect risky activities through deferrals and accruals that depress current earnings during risky times and create a wedge between earnings and book multiples, where book values help identify risky stocks. The importance of book values increases where earnings growth is higher and more uncertain, as in small stocks.

²¹For a more detailed study on this topic, see Israel and Moskowitz [2013], who find that the value premium is virtually non-existent among large stocks.

²²In fact, resurrecting large cap value is quite easy. Merely adding 20% of momentum to large cap value bumps the Sharpe ratio up from 0.25 to 0.40.

²³Those selling value strategies as a risk-based factor should emphasize these bad periods. Put differently, it would be a heroic marketing technique to call something "risk" while presenting no evidence of risk. That would be like telling your investors they get to earn the insurance premium, but will never have to pay. That is a fairy tale. If we says something is entirely risk-based, we should also explain why it is sometimes excruciating, even life threatening.

²⁴Asness and Liew [2014] give a thorough discussion of this from both academic and practitioner perspectives.

²⁵Some of the paper's authors are old enough to have been systematic value investors during this period!

²⁶If the returns to value did disappear over time, a value investor would benefit as the returns converged to zero. Unless you believe the returns have already gone away (which, of course, we do not), you should not be concerned about this long-term possibility. In fact, you might welcome it.

REFERENCES

- Arnott, R. "An Overwrought Orthodoxy." *Institutional Investor*, December 2006: 36-41.
- Arnott, R., J. Hsu, and P. Moore. "Fundamental Indexation." *Financial Analysts Journal*, (2005), pp. 83-99.
- Arnott, R., J. Hsu, and J. West [2008]. *The Fundamental Index*. New Jersey: John Wiley & Sons, 2008.
- Asness, C. "The Interaction of Value and Momentum Strategies." *Financial Analysts Journal*, Vol. 53, No. 2 (1997), pp. 29-36.
- . "The Value of Fundamental Indexing." *Institutional Investor*, October 2006, pp. 94-99.
- Asness, C., and A. Frazzini. "The Devil in HML's Details." *The Journal of Portfolio Management*, 39 (2013), pp. 49-68.
- Asness, C., A. Frazzini, and L. Pedersen. "Quality Minus Junk." Working paper, AQR Capital Management, 2014.
- Asness, C., and J. Liew. "The Great Divide over Market Efficiency." *Institutional Investor*, March 2014.
- Asness, C., T. Moskowitz, and L. Pedersen. "Value and Momentum Everywhere." *Journal of Finance*, Vol. 68, No. 3 (2013), pp. 929-985.
- Asness, C., A. Iilmanen, R. Israel, and T. Moskowitz. "Investing with Style." *Journal of Investment Management*, Vol. 13, No. 1 (2015), pp. 27-63.
- Barberis, N., A. Shleifer, and R. Vishny. "A Model of Investor Sentiment." *Journal of Financial Economics*, 49 (1998), pp. 307-34.
- Campbell, J., J. Hilscher, and J. Szilagyi. "Predicting Financial Distress and the Performance of Distressed Stocks." *Journal of Investment Management*, Vol. 9, No. 2 (2011), pp. 1-21.
- Chabot, B., E. Ghysels, and R. Jagannathan. "Momentum Trading, Return Chasing, and Predictable Crashes." Working paper, Northwestern University, 2015.
- Cochrane, J. and T. Moskowitz, eds. *The Fama Portfolio*. University of Chicago Press, 2015 (forthcoming).
- Daniel, K., D. Hirshleifer, and A. Subrahmanyam. "A Theory of Overconfidence, Self-Attribution, and Security Market Under- and Over-Reactions." *Journal of Finance*, 53 (1997), pp. 1839-1885.
- DeBondt, W., and R. Thaler. "Does the Stock Market Overreact?" *Journal of Finance*, Vol. 40, No. 3 (1985), pp. 793-805.
- Fama, E., and K. French. "The Cross-Section Of Expected Stock Returns." *Journal of Finance*, 47 (1992), pp. 427-465.
- . "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, 33 (1993), pp. 3-56.
- . "Disappearing Dividends: Changing Firm Characteristics Or Lower Propensity To Pay?" *Journal of Financial Economics*, Vol. 60, No. 1 (2001), pp. 3-43.
- . "Disagreement, Tastes, And Asset Prices." *Journal of Financial Economics*, Vol. 83, No. 3 (2007), pp. 667-689.
- . "Multifactor Explanations of Asset Pricing Anomalies." *Journal of Finance*, Vol. 51, No. 1 (1996), pp. 55-84.
- . "A Five-Factor Asset Pricing Model." Working paper, University of Chicago, 2014.
- Frazzini, A., R. Israel, and T. Moskowitz. "Trading Costs of Asset Pricing Anomalies." Working paper, University of Chicago, 2012.
- Frazzini, A., R. Israel, T. Moskowitz and R. Novy-Marx. "A New Core Equity Paradigm." White paper, AQR Capital Management, 2013.
- Frazzini A., D. Kabiller, and L. Pedersen. "Buffett's Alpha." Working paper, AQR Capital Management, 2013.
- Graham, B. *The Intelligent Investor*, 4th ed. New York: Harper, 1973.
- Graham, B., and D. Dodd. *Security Analysis*, New York: McGraw Hill, 1934.
- Israel, R., and T. Moskowitz. "How Tax Efficient Are Equity Styles?" Working paper, University of Chicago Booth School of Business, 2012.

———. “The Role of Shorting, Firm Size, and Time on Market Anomalies.” *Journal of Financial Economics*, Vol. 108, No. 2 (2013), pp. 275-301.

Lakonishok, J., A. Shleifer, and R. Vishny. “Contrarian Investment, Extrapolation, and Risk.” *Journal of Finance*, 49 (1994), pp. 1541-1578.

Novy-Marx, R. “Is Momentum Really Momentum?” *Journal of Financial Economics*, Vol. 103, No. 3 (2012), pp. 429-453.

Penman, S., F. Reggiani, S. Richardson, and A. I. Tuna. “An Accounting-Based Characteristic Model for Asset Pricing.” Working paper, Columbia University, 2013.

Rosenberg, R., K. Reid, and R. Lanstein. “Persuasive Evidence of Market Inefficiency.” *The Journal of Portfolio Management*, Vol. 11, No. 3 (1985), pp. 9-16.

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