

Choosing between value and growth in mutual fund investing

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Abstract

This article informs investors on the choice between value and growth mutual funds. The well-established value premium demonstrates that, on average, value securities outperform growth securities, suggesting that an investor may be wise to choose value funds. Extant studies, however, suggest that growth funds outperform value funds. We show that value funds indeed outperform growth funds especially in terms of lower realized risk and higher realized terminal wealth, leading us to recommend value funds over growth funds. We argue that previous findings result from a bias against value in some multifactor models. © 2014 Academy of Financial Services. All rights reserved.

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1. Introduction

The well-known value premium argues that value securities, securities with high book-to-market ratios or low price-to-earnings ratios, outperform other securities when raw returns or returns adjusted only for market risk are considered. There is a substantial literature to support this finding, beginning with Basu (1983) studying the relationship between price-to-earnings ratios and returns, and with Rosenberg, Reid, and Lanstein (1985) studying the relationship between book-to-market ratios and returns. These results have been confirmed

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in numerous other studies including the discipline-altering study of Fama and French (1992). Not only has the value premium been persistently reported, it is also large. From July 1926 through December 2012 this premium has averaged an annualized value of 6% based on data from Kenneth French's Web site.

Because of the strong evidence of outperformance by value securities, individual investors and financial planners may wish to consider a preference for value mutual funds relative to growth mutual funds. Indeed, writing in *Forbes*, Clash (1998) argues that investors interested in small-company stocks should invest in small-company value mutual funds on the basis of the superior performance of the Russell 2000 Value Index versus the Russell 2000 Growth Index. Clash suggests that small-firm investors might use index funds to operationalize his recommendation.

Two cautions may be appropriate for financial planners and individual investors considering Clash's recommendations. First, the component stocks in the index funds do not perfectly match the component stocks of the portfolios formed in empirical studies that provide evidence of a value premium. Second, superior performance by an index of value stocks relative to an index of growth stocks does not necessarily indicate superior performance by managed value funds relative to managed growth funds, and many individual investors and planners prefer to invest in managed funds.

Empirical studies heighten the concern that managed value funds might not display the superior performance suggested by the value premium. Piotroski (2000) reports that the value premium results from a subset of value securities and that most value securities underperform the market. Piotroski suggests that with the use of readily available accounting information one can identify those value securities that will outperform.¹ However, are managers of value funds successful in identifying those value securities that will outperform? Extant studies comparing the performance of value and growth mutual funds estimate α using the Fama-French three-factor model and conclude that growth funds outperform value funds. This finding suggests the inability of value fund managers to identify those value securities that will outperform.

In this article, however, we present new empirical evidence supporting the presumption that investors may exploit the value premium through mutual fund purchases especially for small-firm funds and index funds. Our conclusion is, in large part, driven by the lower realized risk of value fund portfolios. We argue that previous finding of superior performance of growth funds results from a bias in estimating mutual fund α s using the three-factor model.

In the next section we discuss the findings of previous studies on the relative performance of value and growth mutual funds. In Section 3, we describe our sample and methodology. We present empirical results in Section 4 in three parts: first, we compare traditional risk and return measures; second, we examine the implications of these results for an investor's end wealth, finally, we reconcile our results with previous studies. In the final section, we offer our conclusion.

2. Previous studies

A considerable literature seeks to inform investors on choices relative to the wide array of mutual fund investment opportunities. Most of the literature concentrates on measuring the

ability of mutual fund managers to “beat the market,” to earn a return greater than justified by the mutual fund’s risk. From Jensen (1968) to Fama and French (2010) these studies have generally concluded that fund managers do not possess market-beating stock selection ability. These conclusions are generally based on asset pricing models that find, on average, negative α s for mutual fund portfolios using the single-factor capital asset pricing model in earlier studies and a multifactor model such as the Fama-French three-factor model in later studies. Writing in this journal, Betker and Sheehan (2013) suggest that practitioners still tend to use single factor models despite the dominant use of multifactor models in academic studies.

In this article we compare the performance of value and growth mutual funds rather than examine the overall market performance of mutual funds. Our contribution is to suggest that investors and financial planners can benefit from the use of value funds relative to growth funds even though recent studies, calculating α s using multifactor models, suggest the opposite. Before presenting our results we summarize the relatively few previous studies that have specifically compared the performance of value and growth mutual funds.²

Shi and Seiler (2002), using the Morningstar classification matrix, build portfolios of value or growth funds that are subdivided into size classification of large, medium, and small firms for a total of six portfolios each containing 30 randomly selected mutual funds. Returns are calculated for each portfolio by equally weighting the returns of the funds over the 10-year period, August 31, 1989 to August 31, 1999. Shi and Seiler find that the average return is higher for the growth mutual fund in each of the three categories and is significantly higher for the large-firm classification. They find that in all three size categories, risk is significantly higher for the growth mutual fund sample relative to the value mutual fund sample. They calculate the Sharpe ratio (using semivariance) for each of the size categories.³ They find that the reward-to-risk ratio is higher for the growth firms in the large funds, but is higher for the value funds in the mid and small cap firms. They conclude that their evidence allows no definitive recommendation for investing in growth versus value mutual funds, and indicate that results may vary over other time periods. It is worthwhile to note that their sample covers a significant portion of the dot.com bubble, where one might expect growth mutual funds to do particularly well.

Davis (2001) compares the performance of growth and value mutual funds using data from the CRSP file for the period 1962 through 1998. Applying the Fama-French three-factor model he identifies funds as value (small) or growth (large) funds by their respective factor loading on the *HML* (*SMB*) factor. Ten mutual fund portfolios are created from the CRSP data set with a univariate sort on the loadings on the *HML* factor. Performance is measured for each portfolio by finding the equally weighted average of the α s of each fund within the portfolio across the sample period. Portfolios formed from funds with a low loading on the *HML* factor are considered growth portfolios whereas portfolios formed from funds with a high loading on the *HML* factor are considered value portfolios. In general, α s are positive for the portfolios of growth mutual funds and negative for the portfolios containing value mutual funds. The portfolio containing the mutual funds with the highest loading on the *HML* factor has a significantly negative α .

In a bivariate sort, Davis creates nine portfolios based on the value and growth classification, and based on the size classification of large, medium, and small firms. Each of the

classifications is based on the factor loadings on the *HML* and *SMB* factors. As in the univariate sort, α s are determined for each of the nine portfolios. For all size classifications the value portfolio has a negative α and the growth portfolio has a positive α .

Davis (2001, p. 25) concludes that: “Perhaps the biggest disappointment in the past three decades is the inability (or unwillingness) of funds to capture the value premium that has been observed in common stock returns during the period.” We suggest and argue more fully below that the value premium may exist but is obscured by a bias against value inherent in the Fama-French three-factor model.

Chan, Chen, and Lakonishok (2002) calculate average returns for a sample of mutual funds using Morningstar data from January 1979 to December 1997. Although their article explores a wide variety of issues, they do compare the performance of value and growth mutual funds. Consistent with Davis they identify value and growth funds on the basis of the funds loading on the *HML* factor. They also compare value and growth funds for three classifications of size: large cap, mid cap, and small cap. They calculate α by regressing mutual fund returns against the three-factor model and find the average α across fund classifications. Consistent with Davis’ findings, for each of the size categories the α for the growth funds is greater than the α for the value funds. Thus, in contrast to the expectations that an investor might hold given the existence of the value premium, Chan et al. find that growth mutual funds outperform value mutual funds. In this study, in contrast to previous findings, we provide new evidence that supports the proposition that investors may benefit from selecting value mutual funds over growth mutual funds. As described in the next section, our results are based on a larger sample size and a longer sample period than those used in previous studies.

3. Sample and methodology

The purpose of our article is to provide new information for investors choosing between value and growth mutual funds. To do so we make empirical comparisons between the performance of growth and value funds for five separate classifications. First, we gather total index values for the Russell 2000 Value and Growth Indexes, and for the Russell 1000 growth and value indexes, directly from Russell Investments. Data are collected over the period January 1979 (the inception of the Russell indices) through December 2012. We use the total index values, which include dividend payments to calculate monthly returns. On the basis that value and growth index funds, including ETFs, are widely available and are able to reasonably track index returns, we treat the returns to the Russell indices as proxies for returns to index funds. We recognize that such funds were not available from the start of the index data, but such funds are surely available to current investors.⁴

To compare the performance of managed growth and value funds, we acquire monthly returns for value and growth mutual funds from the Morningstar database. We obtain data from the inception of this database through December 2012. Morningstar classifies general purpose equity funds as value (growth) if the fund has low (high) valuations (i.e., low [high] price to earnings ratios and high [low] dividend yields) and slow (fast) growth (i.e., low [high] growth rates for earnings, sales, book value, and cash flow). General purpose funds not

meeting these categories are classified as blended funds. Morningstar also characterizes funds by size as small, mid, and large-firm funds. We compare value and growth funds within each of these three size categories. To provide consistency over time, we include in our sample only those funds that have the same Morningstar classification throughout the sample period.

For each of the three size classifications, we create a value superfund containing all of the value mutual funds available in a given month and a growth superfund containing all of the growth mutual funds available in a given month. We determine the return to each superfund as the equally weighted return of all funds within the superfund.

To ensure statistical accuracy, we require that there are at least 30 individual mutual funds for both value and growth funds before we include either superfund return in our sample. Across all three size groups there are more growth funds than value funds. Thus, for each size grouping our sample begins when there are a sufficient number of value funds and continues through December 2012. Subject to this restriction, the small-firm sample begins in January 1993; the mid-firm sample begins in July 1993; and the large-firm sample begins in August 1984. There are 118,539 (120,375) monthly observations for small-firm (midsize) growth funds and 44,673 (47,921) monthly observations for small-firm (midsize) value funds. The sample size is much higher for the large firm funds both because of the larger sample period and the larger number of observations each month. There are 185,026 monthly observations for the large-firm value funds; and 245,994 monthly observations for the large-firm growth funds.

To summarize, our sample data allow comparisons between value and growth index funds using the Russell 2000 for small firms and Russell 1000 for large firms as proxies for index funds. For these comparisons we have data from January 1979 through 2012. To compare the performance of managed value and growth funds we collect data from the Morningstar data base to build portfolios of value and growth mutual funds. These portfolios are subdivided into small-firm, midsize firm, and large-firm portfolios. Our sample period for these comparisons all begin later than the beginning of the sample period for the index fund portfolios. All sample periods end at December 2012. As shown in the next section these comparisons strongly favor the selection of value funds.

4. Empirical results

In this section we report on the relative performance of value and growth mutual funds across five matching data sets. In the first set of comparisons, we examine risk and return summary measures. We compare average monthly returns, total risk based on realized monthly return variations, and the risk-return tradeoff using the Sharpe ratio. Because mutual fund investors are ultimately interested in wealth creation, and because of potential bias with the arithmetic mean in estimating end wealth, for each of the 10 portfolios we calculate end wealth from an initial investment of \$10,000 at the start of the sample period. Based on the calculated end wealth, we determine the geometric mean return for all 10 portfolios. Results from these tests support the supposition that investors can benefit from the selection of value funds relative to growth funds. Because these results are at variance with previous studies, in the final segment of this section we rationalize the difference between our findings and previous findings.

Table 1 Monthly percentage returns: Value vs. growth

	Mean	Variance	Sharpe ratio
(A) Index funds			
Russell 2000 Value	1.169	25.99	22.93%
Russell 2000 Growth	0.966	45.09	14.39%
Test-statistic	1.245 [†]	1.729 [‡]	3.153 [§]
(<i>p</i> -value)	(0.106)	(0.000)*	(0.002)
Russell 1000 Value	1.040	18.61	24.11%
Russell 1000 Growth	0.970	25.85	19.08%
Test-statistic	0.511 [†]	1.388 [‡]	1.654 [§]
(<i>p</i> -value)	(0.305)	(0.000)	(0.098)
(B) Morningstar funds			
Managed small value	0.899	23.649	18.09%
Managed small growth	0.834	41.552	12.54%
Test-statistic	0.276 [†]	1.757 [‡]	1.438 [§]
(<i>p</i> -value)	(0.391)	(0.000)	(0.075)
Managed mid value	0.815	20.541	17.58%
Managed mid growth	0.814	36.001	13.16%
Test-statistic	0.005 [†]	1.753 [‡]	1.157 [§]
(<i>p</i> -value)	(0.498)	(0.000)	(0.161)
Managed large value	0.811	16.122	20.19%
Managed large growth	0.838	24.894	16.80%
Test-statistic	-0.204 [†]	1.544 [‡]	1.157 [§]
(<i>p</i> -value)	(> 0.5)	(0.000)	(0.124)

* A *p*-value of 0.000 indicates that the *p*-value is nonzero, but smaller than 0.0005.

[†] $H_0: \mu_{\text{value}} = \mu_{\text{growth}}$; $H_A: \mu_{\text{value}} > \mu_{\text{growth}}$.

[‡] $H_0: \sigma_{\text{value}}^2 = \sigma_{\text{growth}}^2$; $H_A: \sigma_{\text{value}}^2 < \sigma_{\text{growth}}^2$.

[§] $H_0: SR_{\text{value}} = SR_{\text{growth}}$; $H_A: SR_{\text{value}} > SR_{\text{growth}}$. The statistical test is based on Opdyke (2007).

4.1. Comparisons of monthly returns: Arithmetic mean, return variance, Sharpe ratio

Comparisons of monthly mean returns, variance of monthly mean returns and Sharpe ratios across the five matched portfolios are shown in Table 1. In four of the five comparisons the average return is greater for the value portfolio. None of the comparisons, however, provide a statistically significant difference in mean returns between the value and growth mutual fund portfolio. Consistent with Clash's (1998) recommendation, the largest return difference between value and growth is found in the small-firm index funds as proxied by the Russell 2000 Index returns. The small-firm annualized fund provides a difference in monthly return that annualizes to $\sim 2.5\%$ over the period January 1979 through December 2012. This annualized difference is certainly a considerable amount if compounded over a long-term investment period. However, this difference is less than the amount of the value premium reported on the Ken French Web site,⁵ suggesting that the composition of value and growth index funds do not match the composition of portfolios used to measure the value premium in academic studies. Thus, although it appears that investors are able to benefit from the value premium by choosing value index funds over growth index funds, the difference in the returns from these funds is not as great as suggested by the value premium reported in academic studies.

The difference between value and growth in the Russell 1000 (large-firm) Index is less

than the difference found in the Russell 2000 (small-firm) Index, suggesting that an investor seeking to exploit the value premium may wish to do so by investing in small firm securities. This difference across firm size is also evident in the managed mutual funds. The excess return of value versus growth is greatest for the small-firm managed mutual funds. For midsize managed funds the returns are almost identical for value and growth; and for the large-firm managed funds the mean return is actually larger for growth rather than value. The value investor does better concentrating on small firms.

In addition to the difference in performance of value and growth across firm size, the advantage of value over growth varies greatly between index funds and managed funds. For small-firm index funds the annualized value premium is 2.46% whereas that for the managed funds is less than 0.78%. The annualized difference for the large-firm index funds is 0.84% in favor of value while the large-firm managed growth actually has a slightly higher average return than does the large-firm managed value funds.⁶ Thus, our earlier warning concerning Piotroski's finding that most value securities underperform the market seems to have merit. Value fund managers are not able to outperform growth funds by the same margin as do the index funds.⁷ Of course, this finding could result from the relative skills of growth fund managers. Still, overall value funds on the whole have higher reported mean returns than growth funds.

Investors are concerned about both risk and return. The value premium emphasizes the benefit of higher average return from investing in value, but value has a much stronger advantage relative to growth in terms of lower risk within our sample. As shown in Table 1, in every comparison the risk, as measured by variance in monthly returns, is higher for the growth portfolios. As with returns, the advantage with regard to risk for value investing is strongest for small-firm securities. For both the managed portfolios and the index portfolios the variance in monthly returns in the small-firm growth portfolio is almost twice the variance for the value portfolio. For the other managed portfolios the monthly return variance is more than 50% higher than that for the growth portfolios. In all cases, the monthly return variance is significantly lower for the value portfolio with a p -value = 0.000. Because risk is always significantly lower for value and because return is generally higher, in mean-variance criterion value beats growth! Consistent with this observation, as shown in Table 1, the Sharpe ratio measuring the risk-reward tradeoff is always higher for the value portfolio.

The advantage of value over growth is primarily because of lower risk. Therefore, one might argue that investors tend to be more concerned with return than risk as measured by variance in return. However, we assert that financial planners guiding investors are not as concerned with monthly average returns as they are concerned with the end wealth of the investors. In that regard, as we show in the next section, the lower variance of value portfolios provides a significant advantage in terms of achieving end wealth goals.

4.2. *End wealth comparisons*

In the previous section we have made five sets of comparison between value and growth mutual funds finding generally higher means and significantly lower variance in returns for the value funds. These results lead us to argue that investors ought to prefer value funds relative to growth funds. We recognize, however, that investors may be more concerned with

Table 2 Bias in comparative arithmetic mean from differences in return variation

Year	Investment A		Investment B	
	Return	End wealth	Return	End wealth
0	NA	\$10,000	NA	\$10,000
1	−10%	\$9,000	−50%	\$5,000
2	10%	\$9,900	50%	\$7,500
3	3%	\$10,197	21%	\$9,075
Arithmetic mean	1%		7%	
Variance	0.69% sq.		17.65% sq.	
Geometric mean	0.65%		−3.18%	

return than risk. We further argue that the ultimate concern for investors and financial planners is end wealth. Investors are concerned about the amount that they will have in their retirement account or any other account when they plan to use it. Financial planners know that determination of this amount relies on calculation with geometric means rather than arithmetic means. Financial calculators use the geometric mean to calculate end wealth of a lump sum investment or periodic investments as in an annuity. Therefore, the crucial consideration should not be the arithmetic mean as is generally reported by mutual funds and as reported in Table 1.

Because end wealth is the ultimate concern for an investor, the geometric mean is more relevant in comparing the times series returns of two investment alternatives than the arithmetic mean. The difference between the spread of the arithmetic means and the spread of the geometric means between two return time series provides important implications for an investor. As shown below, there is a direct connection between return variability and the difference in the spreads of arithmetic and geometric means of return time series. A lower variability in returns results in less variability in the base that determines returns used to calculate arithmetic mean returns. Thus, a time series return with low variability will have a smaller difference between arithmetic mean and geometric mean than will a series with a higher variability in returns. Given the direct association between the geometric mean and end wealth, we assert that the lower variation in returns of the value funds provide these funds with a critical advantage in providing higher end wealth to the investor. The advantage in end wealth for the value funds is greater than one would predict using the arithmetic means.

To illustrate the impact of return variation on end wealth, in Table 2 we present a hypothetical example of return streams for Investment A and Investment B. Assume that Investment A has a return series that consists of returns of −10%, 10%, and 3%; and Investment B has a return series that consists of returns of −50%, 50%, and 21%. The return series for A has an arithmetic mean return of 1% and a variance of 0.69% squared. The return series for B has an arithmetic mean return of 7% and a *SD* of 17.65% squared. The higher arithmetic mean return for series B inaccurately suggests a greater return for investing in B at the cost of a greater risk. In fact, if \$10,000 was invested in Asset A, the end wealth would be \$10,197. A similar investment in Asset B would result in an end wealth of \$9,075. The comparative geometric means of 0.65% for Asset A and −3.18% for Asset B more correctly reflect the wealth creation experienced by the investor. Note, the end wealth is not affected by the ordering of the return series. The reason Investment B has a lower end wealth despite

Table 3 End wealth, geometric means, and arithmetic means: Value vs. growth

Fund type	End wealth value	End wealth growth	Geometric value	Geometric growth	Arithmetic value	Arithmetic growth
Russell 2000	\$668,991	\$198,328	1.04%	0.73%	1.17%	0.92%
Russell 1000	\$464,694	\$302,601	0.95%	0.84%	1.04%	0.97%
Small managed	\$61,772	\$42,073	0.76%	0.60%	0.90%	0.83%
Mid managed	\$50,965	\$41,381	0.69%	0.61%	0.82%	0.81%
Large managed	\$118,992	\$112,095	0.73%	0.71%	0.81%	0.84%

The geometric and arithmetic means are calculated on a monthly basis. End wealth results from the investment of \$10,000 in each fund beginning with the first month of data availability and ending December 2012. For the Russell funds the sample period begins January 1979. The beginning of the data for the managed firms is: August 1984 for the large-firm portfolio, January 1993 for the small-firm portfolio and July 1993 for the mid-sized portfolio.

having a greater arithmetic mean is because of the larger return variation in Investment B. The greater variation in the returns for Investment B causes greater fluctuations in the base used to calculate returns. As a result, the calculated arithmetic mean return for Investment B will be upwardly biased, which results in a misleading indication concerning the relative wealth creation between Investment A and Investment B. The comparative geometric means correctly predict the difference in end wealth.⁸

The same relationship illustrated by the hypothetical Investment A and Investment B exists in the very real comparisons between value and growth mutual funds. The higher variation in returns for the growth funds causes a greater fluctuation in the base value used to calculate returns for the growth funds. This results in an upward bias in any end wealth prediction for growth funds versus value funds using the arithmetic mean. Thus, we calculate end wealth for each of the 10 funds in our sample and then calculate geometric means to provide comparisons between value and growth investing.

For each of the five value funds and each of the five growth funds we invest \$10,000 at the first of the month for which data becomes available. Thus, for the index funds the investment begins January 1979, and for the managed funds the investment begins August 1984 for the large-firm funds, January 1993 for the small-firm funds, and July 1993 for the midsize firm funds. In each case we keep the proceeds fully invested through December 2012. For all five comparisons the end wealth in the value fund is greater than the end wealth in the growth fund. Not surprisingly the biggest difference in end wealth occurs for the small-firm funds and the index funds.

As shown in Table 3, the investment of \$10,000 in the Russell 2000 Value fund accrues to \$668,991 as compared with an end wealth of \$198,328 for the same investment in the Russell 2000 Growth fund. Any investor who heeded Clash's advice to invest in a small-firm value index fund at the beginning of our sample period would have surely have been pleased with the choice of value over growth. The value investor has 3.37 times as much end wealth as the growth investor. Surely, any investor would consider this difference significant. Unfortunately, we know of no statistical test to confirm a significant difference in end wealth or corresponding geometric means. The end wealth for the Russell 1000 value fund is more than 50% larger than for the Russell 1000 growth fund. Furthermore, the end wealth for the

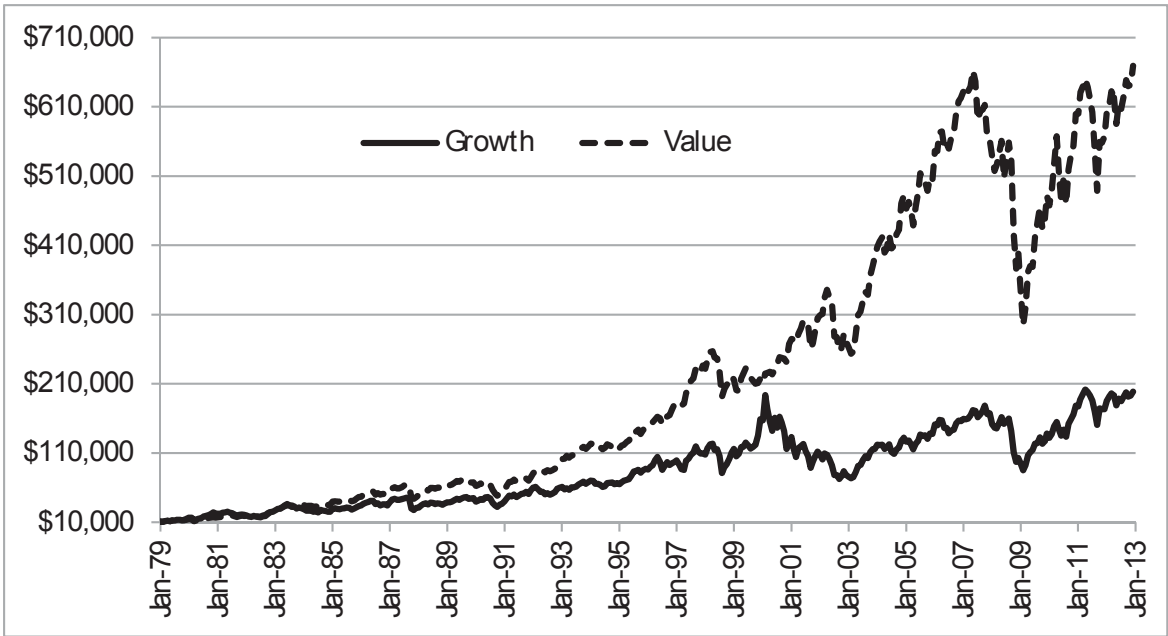


Fig. 1. Increase in invested wealth: Russell 2000 Growth Index versus Russell 2000 Value Index (January 1979 through December 2012).

small-firm managed value fund is nearly 50% higher than the end wealth for the small-firm managed growth fund.

Figs. 1 and 2 show the growth in wealth for value funds relative to growth funds for the small-firm index funds and the small-firm managed funds, respectively. The relative growth

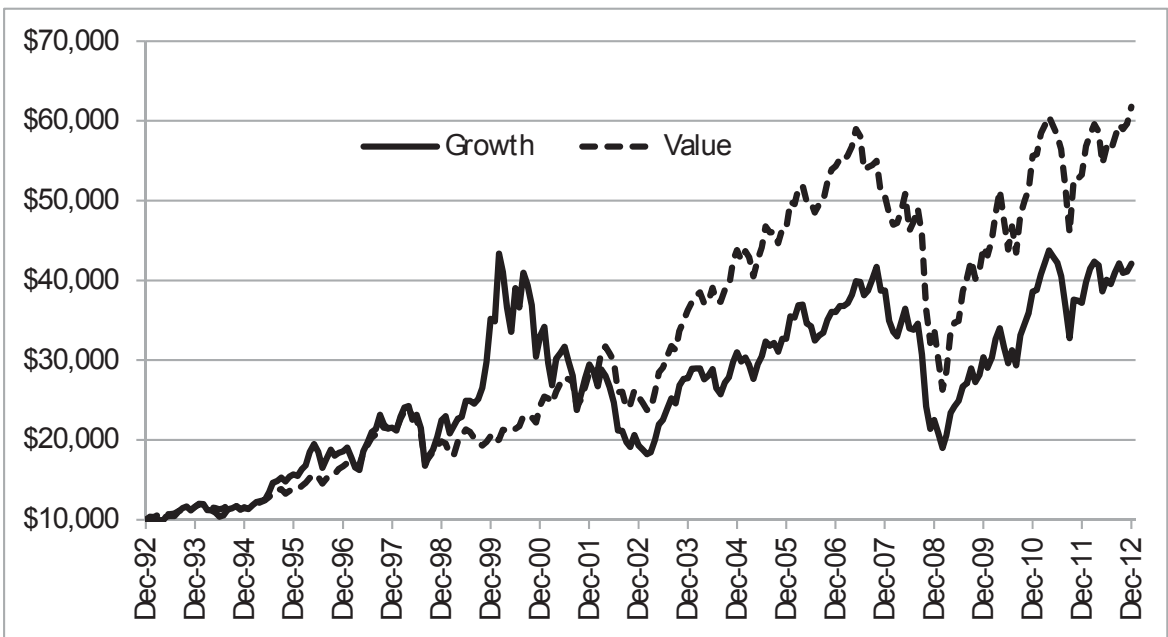


Fig. 2. Increase in invested wealth: Portfolio of Small-Firm Managed Growth Funds versus Portfolio of Small-Firm Managed Value Funds (January 1993 through December 2012)

in wealth varies over time. For example, growth funds did very well in the 1990s during the dot.com bubble. Indeed, the invested wealth for the small-firm managed growth funds exceeds the invested wealth of the small-firm managed value funds throughout the 1990s. However, that advantage was more than offset during the following decade. The small-firm index fund comparison experiences a similar pattern, but the longer investment history for this comparison results in the invested amount for the value fund always being greater than the invested amount held in the growth fund. In both comparisons we include a decade where growth funds experienced unusually high returns and value funds continue to outperform growth funds in terms of accumulated wealth.

For all five comparisons, the higher end wealth in the value funds corresponds to a higher geometric mean. The difference in the geometric mean, which accurately measures end wealth considerations, between value and growth funds is always larger than the difference found in the arithmetic means. The geometric mean reflects the lower return variance for the value fund and the arithmetic mean does not. We make two observations with regard to this difference. For the small-firm index funds, using actual returns shows the end wealth of the value portfolio to be 3.37 times the end wealth of the growth portfolio. Applying the geometric mean duplicates this difference. If, however, one would use the monthly arithmetic mean to compound wealth, the resulting end wealth of the value portfolio is only 2.26 times that of the growth portfolio. Comparisons of arithmetic mean returns do not fully represent the difference in end wealth, which should be the main concern for the mutual fund investor. A second observation underlying the bias found in comparisons of arithmetic means is provided by the large-firm managed funds. The monthly arithmetic mean is larger for the managed large-firm growth fund than for the managed large-firm value fund. Consequently, one might expect end wealth for an investment in managed large-firm growth funds to be greater than for a similar investment in managed large-firm value funds. As shown in Table 3, this is not the case. The end wealth for the value fund is greater than the end wealth for the growth fund, albeit by a modest amount. Because the arithmetic mean is higher for the growth fund, predictions of end wealth using the arithmetic mean would suggest a greater end wealth for the growth fund. However, forecasts using the geometric mean would correctly predict a higher end wealth for the value fund as the geometric mean of the managed large-firm fund portfolio is greater for the value fund than for the growth fund. Crucially, end wealth comparisons suggest that investors ought to choose value over growth. This conclusion is at variance with studies reviewed earlier in the article and in the next section we rationalize this difference.

4.3. Reconciling current and previous results

We have made five sets of comparisons between value and growth funds with comparisons divided between index and managed funds and by firm size. In four of the five comparisons the average return is greater for value, but in none of the five comparisons is the difference statistically significant. In all cases value funds have significantly lower variance in monthly returns. Thus, on the basis of mean-variance comparisons value funds must be judged superior to growth funds. We also show that the lower variance is associated with higher end wealth for value funds relative to growth funds. Thus, the superior performance

for value funds is driven in large part by the significantly lower variation in returns, that is, lower total realized risk. As cited above, Chan et al. (2002) and Davis (2001) reach the conclusion that growth beats value by examining risk-adjusted returns (α s) calculated using the Fama-French three-factor model. Their conclusions depend on the three-factor model's measurement of systematic risk. This places our argument in the seemingly dubious position of preferring measures of total risk rather than systematic risk. We defend this position with two arguments. First, we argue that on a realized basis, total risk rather than systematic risk is the appropriate measure of risk for any investor.⁹ Second, we argue that risk-adjusted returns calculated using the Fama-French three-factor model are biased against value portfolios and biased in favor of growth portfolios.

Our position preferring total risk versus systematic risk seems at odds with modern portfolio theory. A basic insight of this theory is that only systematic risk, measured by factor loadings on systematic risk factors, should be considered in measuring risk of securities considered for inclusion into a well-diversified portfolio. Total risk is deemed an inappropriate measure because the idiosyncratic portion of total risk will be eliminated in a well-diversified portfolio. However, how do investors judge the performance of a portfolio held over time? Are investors concerned about the systematic risk in a portfolio as measured by its factor loadings? Or, are investors concerned about the amount of return variation realized? This question is paramount to asking whether investors are concerned about returns predicted by a model or realized returns. Obviously, investors care about realized returns. We submit that likewise investors are concerned about realized risk rather than expected risk. Realized risk is appropriately measured by variation in returns.

Because realized risk is the ultimate concern of investors, portfolio systematic risk measurements are useful in determining expected returns and risk-adjusted returns (α) only if these measures correlate with variations in return.¹⁰ A corollary to this relationship is that an estimate of risk-adjusted return must be based on the absolute value of a factor loading because it is the absolute value of the factor loading that determines variation in return in response to a systematic factor. For ease of illustration we provide an example using the well-known capital asset pricing model (CAPM), a single factor asset-pricing model where the only systematic risk is the market risk. Consider a portfolio long in the market index. This portfolio would have a β of 1. Now, consider a portfolio short in the market index. This portfolio would have a β of -1 . These two portfolios would have exactly the same realized risk. The variation in returns, thus the risk, would be the same for these two portfolios. Only the sign of the returns would be different between the two portfolios. The relative realized returns between the two portfolios would depend on whether market return is on average positive or negative.

Although a short position is generally required to have a negative market β , assets may have positive or negative β s for their loading on the *HML* factor of the three-factor model. In fact, value portfolios load positively and growth portfolios load negatively on the *HML* factor. The positive loading by value portfolios on the *HML* factor will increase expected return for these portfolios and consequently decrease the estimated α s. In contrast, the negative loading by growth portfolios on the *HML* factor will decrease expected return for these portfolios and consequently increase the estimated α s. Indeed this relationship is why previous studies measuring α s using the Fama-French three-factor model find growth funds

outperforming value funds while our results clearly show that the opposite is true. In the appendix we discuss in detail this bias against value that creates the erroneous conclusion that growth beats value.

5. Conclusion

In this article we provide investors with information concerning the relative performance of value and growth funds. The well-known value premium suggests that fund investors ought to favor value over growth. We make five sets of comparisons. We use data from the Russell 2000 and Russell 1000 Indexes to proxy the performance of value and growth index funds. Additionally, we gather data from the Morningstar database to compare the performance of managed mutual funds across three size classification. In four of the five comparisons, value funds have higher average returns, but in none of the comparisons is the difference statistically significant. Comparisons of realized risk, however, are always statistically significant and always favor value fund. Thus, on the basis of superior performance in terms of mean-variance analysis, our study suggests that fund investors ought to indeed favor value. In addition, we show that the end wealth for investing using historic returns is always higher for value funds than for growth funds and that this difference is greater than which would be computed using arithmetic means. These results are because of the significantly lower variance in returns of the value funds relative to growth funds.

Although we argue that mutual fund investors ought to favor value funds, consistent with the well-documented value premium, we find that the benefit to investing in value funds is less than would be expected by the size of the value premium reported in empirical studies. Further, we find that the benefit of value investing is greater for index funds than for managed funds and that the benefit of value investing is greater for small-firm funds than for large-firm funds. Indeed, there is very little difference observed in our sample between the end wealth of managed large-firm value funds and managed large-firm growth funds. Finally, we show that the findings of previous studies that suggest investors would find better performance in growth funds results from an intrinsic bias in multifactor models against value portfolios.

Notes

- 1 Piotroski finds that the use of nine accounting data points allows the selection of outperforming value securities over the period 1976 through 1996. Woodley, Jones, and Reburn (2011), however, find that Piotroski's methodology is not successful over the period 1997 through 2008.
- 2 Classification of funds between value and growth funds is a relatively new phenomenon. Early studies such as Carhart (1997) and Gruber (1996), when comparing across types of mutual funds, use various categories of growth funds. For example, Carhart compares aggressive growth, long-term growth, and growth and income funds.
- 3 Shi and Seiler indicate that, unfortunately, the Sharpe ratio allows no statistical comparison. Since the publication of their article, Opdyke (2007) has developed a test for comparing Sharpe ratios, which we use in this article.

- 4 For example Vanguard offers index mutual funds tracking the Russell 1000 and 2000 value and growth indices. Among the ETF funds tracking the Russell indices are the iShares Russell 2000 Value ETF and the iShares Russell 2000 Growth ETF.
- 5 For the period January 1979 through December 2012, the value premium is an annualized 5.25% according to the Ken French Web site.
- 6 As noted in our sample description the sample time period differs for the index funds and managed funds.
- 7 Our results suggest that value fund managers are inefficient in selecting stocks within the value sector. These results are consistent with the finding of Brooks and Porter (2012) that from 1994 through 2005, mutual fund managers lost potential gain from sector selection because of poor stock selection.
- 8 This relationship is also illustrated by the historic comparisons between large-firm equity returns and small-firm equity returns as reported in the Ibbotson SSBI Classic Yearbook (2013). Ibbotson reports that the annual arithmetic mean is 16.5% for small-firm equities and 11.8% for large firm equities. The higher return for the small-firm equities is associated with a much higher *SD* in annual returns: 32.3% for small-firm equities and 20.2% for large-firm equities. Because of this disparity in variability of returns, the difference in arithmetic means provides a poor gauge for the difference in wealth creation from investing in the two assets. This difference is appropriately measured by the geometric means that are reported to be much closer by Ibbotson. The geometric mean for small-firm equities is 11.9% and the geometric mean for large-firm equities is 9.8%.
- 9 In support of this position, we note that reports of historic risk-return tradeoffs by assets classes, such as found in Ibbotson's yearbooks, use measure of realized risk such as *SD* of annual returns.
- 10 We conclude that value portfolios are less risky than growth portfolios based on realized risk. Although the portfolios used in our sample are sufficiently large to eliminate firm specific risk the question may arise as to how value or growth would covary with more general portfolios. However, to measure the general impact of covariance with other securities, surely the most appropriate measure is covariance with the market measured by market β . As reported in the appendix, in all five comparisons that we make between value and growth portfolios, the loading on the market factor is higher for growth than for value. On this basis, covariance considerations would reinforce the conclusion that value is less risky than growth.
- 11 We do not assert that this bias is the sole reason for the difference in relative total risk and α s between the value and growth portfolios. We note that in all five comparisons, the growth portfolios have a higher market risk, but this should be reflected in both total risk and α s. Part of the difference in total risk may be because of a systematic risk factor not captured by the three-factor model that affects growth portfolios more than value portfolios. Of course, there are a number of extensions of the three-factor model that seek to include other risk factors. One should also consider the possibility that growth securities include more idiosyncratic risk. Consistent with recent studies (see, e.g., Fu [2009]), idiosyncratic risk may not be completely eliminated in the portfolios that we investigate.

- 12 A similar bias exists against small-firm portfolios, but small-firms securities have more total risk than large-firm securities. Indeed, Betkar and Sheehan (2013) find the largest difference between the α s computed by single factor and multi-factor models to occur for small-firm value portfolios.
- 13 Complete results for all regressions are available from the authors upon request.

Appendix

Fama and French (1992) observe the value premium and assume that value firms have higher returns as compensation for higher risk. Subsequently, Fama and French (1993, 1996) develop the widely used Fama-French three-factor model, shown below in Eq. (1), which adjusts returns for this presumed risk. Applying this model, Chan et al., (2002) and Davis (2001) conclude that growth outperforms value. Our findings, however, dispute the assumption within the three-factor model that value is riskier than growth and hence dispute the conclusion reached by these studies. We will show that this bias against value when using the three-factor model creates the erroneous conclusion that growth beats value.¹¹

According to the Fama-French three-factor model, the exposure of security i to systematic risk is measured by the security's loadings on: market excess return ($R_m - R_f$); a portfolio long in value securities and short in growth securities (HML); and a portfolio long in small-firm securities and short in large-firm securities (SMB):

$$(R_i - R_f)_t = \alpha_i + \beta_{mi}(R_m - R_f)_t + \beta_{Hi}(HML)_t + \beta_{Si}(SMB)_t + \varepsilon_t . \quad (1)$$

By construction, this model assigns greater systematic risk to value portfolios because value portfolios tend to load positively on the HML factor. Therefore, despite the lower realized risk that we document for value funds, when α is calculated for value funds using the three-factor model, value funds are penalized for presumed greater risk by the model's construction. We do not deny that a security's responsiveness to the HML factor creates return variation. However, this responsiveness should be, as argued in the body of this article, measured by the *absolute* value of the factor loading. Posit a growth portfolio with a negative loading that has the same absolute value as a positive loading of a value portfolio. These two portfolios have exactly the same measured absolute responsiveness to the HML factor. Thus, these two portfolios will experience exactly the same impact on return variation resulting from the HML factor. However, the impact from the HML factor on expected (required) return will be positive for the value portfolio and negative for the growth portfolio. Thus, the impact from the HML factor on risk-adjusted return (α) will be positive for the growth portfolio and negative for the value portfolio. This differential impact provides a strong bias toward assigning superior performance to the growth portfolio. We illustrate this bias by calculating α s for our 10 sample portfolios using the systematic risk factors included in the three-factor model.

We first use only the market and SMB factors to calculate α s for the growth and value portfolios. We then recalculate α s using the HML factor as well. In Table 4 we report the results using the Russell 1000 value and growth index portfolios.

Table 4 Factor loadings and risk-adjusted returns: Russell 1000 Value and Growth Indices (January 1979 through December 2012)

Portfolio	Risk-adjusted return— α (p -value)	Market β (p -value)	SMB β (p -value)	HML β (p -value)
(A) Excess market and <i>SMB</i> loadings				
Growth	−0.099% (0.096)	1.193 (0.000)*	−0.090 (0.000)	—
Value	0.092% (0.235)	0.888 (0.000)	−0.053 (0.037)	—
(B) Excess market, <i>SMB</i> , and <i>HML</i> loadings				
Growth	0.074% (0.059)	1.036 (0.000)	−0.171 (0.000)	−0.325 (0.000)
Value	−0.079% (0.215)	0.925 (0.000)	0.027 (0.209)	0.320 (0.000)

Factor loadings result from regressing portfolio returns on the Fama-French three-factor model, as shown below. The coefficients and p -values reported in Panel A result from regressing returns only against the market and *SMB* factor. The coefficients and p -values reported in Panel B result from regressing returns against all three factors.

$$(R_i - R_f)_t = \alpha_i + \beta_{mi}(R_m - R_f)_t + \beta_{Hi}(HML)_t + \beta_{Si}(SMB)_t + \varepsilon_t.$$

* A p -value of 0.000 indicates that the p -value is nonzero, but smaller than 0.0005.

As shown in Panel A of Table 4, if α is calculated using the market and *SMB* factors alone, the estimated α is positive for the value index, albeit insignificantly different from zero. The α for the growth index is negative with p -value = 0.096. Thus, based upon the results from applying the market and the *SMB* factors, the comparative measures are consistent with the very real advantage of the value index.

Panel B of Table 4 shows the impact of including the *HML* factor. There is little change in the factor loadings on the market and *SMB* factors, but there is a dramatic change in the α for the value portfolio. As expected, the growth and value portfolios have opposite signs for the factor loadings on the *HML* factor. Value loads positively on *HML* and growth loads negatively on *HML*. Thus, the value portfolio, which had a positive α without the *HML* factor, now has a negative α . The growth portfolio, which had a negative α without the *HML* factor, now has a positive α with a p -value = 0.059.

The switch from a positive α to a negative α for the value portfolio is directly related to the loading on the *HML* factor. The positive loading on the *HML* factor causes an increase in the expected return for the value portfolio, which decreases the risk-adjusted return (α). The switch from a negative α to a positive α for the growth portfolio is also directly related to the loading on the *HML* factor. The negative loading on the *HML* factor causes a decrease in the expected return for the growth portfolio, which increases the risk-adjusted return (α).

In the case of the Russell 1000, the loadings on the *HML* factor for the value and growth portfolios have approximately the same absolute values but with different signs. Because of the difference in sign, risk-adjusted return is increased for growth but decreased for value. Thus, the exposure to the *HML* factor would have the same impact on total risk for both portfolios, but would reduce the α for the value portfolio relative to the growth portfolio. Application of the three-factor model biases results against value and in favor of growth.¹²

Table 5 Influence of *HML* factor on comparative risk-adjusted returns: Value and growth portfolios

Portfolio	Two-factor model	Three-factor model	
	Risk-adjusted return— α s (<i>p</i> -value)	Risk-adjusted return— α s (<i>p</i> -value)	<i>HML</i> β (<i>p</i> -value)
(A) Russell 1000			
Growth	−0.099% (0.096)	0.074% (0.059)	−0.325 (0.000)
Value	0.092% (0.235)	−0.079% (0.215)	0.320 (0.000)
(B) Russell 2000			
Growth	−0.179% (0.140)	−0.138% (0.264)	−0.078 (0.071)
Value	0.022% (0.039)	−0.099% (0.140)	0.598 (0.000)
(C) Managed small firms			
Growth	−0.020% (0.903)	−0.030% (0.895)	0.004 (0.944)
Value	0.210% (0.129)	−0.090% (0.258)	0.581 (0.000)
(D) Managed mid firms			
Growth	−0.060% (0.722)	0.010% (0.942)	−0.151 (0.005)
Value	0.110% (0.382)	−0.090% (0.346)	0.434 (0.000)
(E) Managed large firms			
Growth	−0.160% (0.009)	−0.060% (0.228)	−0.215 (0.000)
Value	−0.040% (0.573)	−0.150% (0.020)	0.243 (0.000)

See notes on Table 4.

Because our focus is on the impact of the *HML* factor, and in the interest of space, we limit our discussion on the other four groupings of funds to a summary of the changes in risk-adjusted returns from adding the *HML* factor to the market and the *SMB* factors. Table 5 reports these changes in α s and shows the loadings of the portfolios on the *HML* factor.¹³

As reported in Table 5, when using only the market and the *SMB* factors, α is negative for the growth portfolios in all five cases and is significantly negative at the 1% level for the large-firm Morningstar sample. When the three-factor model is applied, the loading on the *HML* factor is negative in all but one case for the growth portfolio. In the cases where the loading on the *HML* factor is negative for the growth portfolios, the estimated α increases and becomes positive in two cases. The inclusion of the *HML* factors biases results in favor of growth portfolios.

In all cases, when only the market and the *SMB* factors are applied, the value portfolios have higher estimated α s than the growth portfolios. In four of the five cases, the estimated α for the value portfolios is positive, albeit in only one of the cases is α significantly positive. Inclusion of the *HML* factor causes a radical shift in these comparisons. In all five cases the loading of the value portfolio on the *HML* factor is positive, reducing the α for the value portfolio. When the three-factor model is applied, in all five cases the estimated α for the

value portfolio is negative and less than the estimated α for the growth portfolio. The inclusion of the *HML* factors biases results against value portfolios.

To the extent that systematic risk associates with variability in any factor, measurement of that factor risk ought to accurately predict that factor's impact on realized risk. Thus, if variability in a portfolio long in value stocks and short in growth stocks (*HML* portfolio) impacts portfolio risk, measurement of this impact ought to correctly predict the impact on realized risk. The construction of the three-factor model implies that exposure to the *HML* factor increases risk for portfolios with value securities and decreases risk for growth securities. However, we have shown that value portfolios whether indexed or managed have significantly less realized risk than growth portfolios. The application of the three-factor model produces this result because in this model the sign of the factor loading matters and it should not. It is the absolute value of the factor loading that impacts risk regardless of the sign. One should not use the three-factor model to make comparisons between value and growth portfolios because of the inherent bias against value.

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