Value and Growth, Theory and Practice

A fallacy that value beats growth.

John S. Brush

This research proposes a value-based theoretical justification for most factors in common use. The factors cluster into two groups defining the accepted investment styles of value and growth. Using equal-weighted combinations of grouped factors defining generic value and generic growth, we correct a widespread misconception that value beats growth.

We explore the holding-period and time series properties of extreme-decile style spreads. Although we cannot forecast style spreads, style spread mean and perhaps standard deviation do not vary with time. Using realizable, low-turnover, transaction cost-adjusted strategies, we offer empirical examples of returns available for pure value and pure growth. We compare the approach of splitting funds between the two negatively correlated styles and a competitive blended approach.

The optimal mixed or blended strategies substantially outperform their equal-weighted universe return, which in turn outperforms the cap-weighted S&P 500. Only by avoiding cap-weighted portfolios are the results possible.

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OVERVIEW AND PLAN

For more than two decades, we have been uniquely placed to observe the factors actually used by hundreds of portfolio managers. Consideration of those factors that actually work has led us to seek an underlying theory consistent with empirical reality. A review of previous work demonstrates the current confusion over the definition of growth as a style. Given that factors are naturally grouped into two styles, value and growth, we use generic value and growth

models to attack an incorrect characterization of growth and examine the models' different holding-period effectiveness and time dynamics. We also demonstrate the practical use of these simple models (with transaction costs) to explore the combined benefits of using value and growth.

REVIEW OF PREVIOUS WORK

The identification of factors and their grouping into styles has not been a smooth or graceful process. Haugen and Baker [1996] provide a well-referenced review of the factor controversy. They formulate a model with 50 potential factors. There are three sources or factors that predict future stock performance that are widely accepted as fact: price or size (Fama and French [1992]); some accounting measures, e.g., book value and earnings; and price momentum (Jegadeesh and Titman [1993]).

Haugen and Baker suggest that interpretation of these apparent facts falls into three categories: 1) They are spurious and suspect for various statistical reasons, rejected out of hand because they violate market efficiency concepts; 2) they are proxies for some unknown or undiscovered riskiness measure; or 3) they are potentially exploitable mistakes, indications that investors do not value stocks properly. The latter point is the implicit assumption of active money management: that factors exist, measurable or more subjective, that a manager can use to identify mispriced stocks, which in turn leads to returns above index.

In a recent overview of value and growth research Chan and Lakonishok [2004] follow H & B's outline of the major issues in the factor discussions. Chan and Lakonishok, however, focus almost exclusively on the testing of value factors. They make no mention of the Jegadeesh and Titman [1993] work on price growth. Like H & B they make no mention of expectations measures. They also ignore their own work on price growth and earnings surprise eight years earlier where Chan, Jegadeesh, and Lakonishok [1996] established that these two factors deliver return, controlling for value.

Chan and Lakonishok follow the widespread convention of defining growth as bad value. The most attractive stocks are called value stocks, defining the value style, and the least attractive overvalued stocks define the growth style.

This idea is disconnected from reality. In our work with portfolio managers, we never have seen a growth manager sorting through overpriced value stocks to build a portfolio. Practitioners have long known that growth is not defined as bad value. Thorp [2006], for example, reports eight-year results for a number of screens based on widely known value and growth factors and their performance both as pure strategies and as combined screens.

THEORY OF STOCK VALUE

Assume that stocks are valued by two measures. One is based on currently observed activity, a second on prospective change in activity. Measured in dollars, these measures can be called V for current activity (value) and ΔV for prospective change in activity (growth). For comparison of stocks, normalize by price so that two stocks with identical V/P or $\Delta V/P$ ratios are seen as equivalent in value or growth.

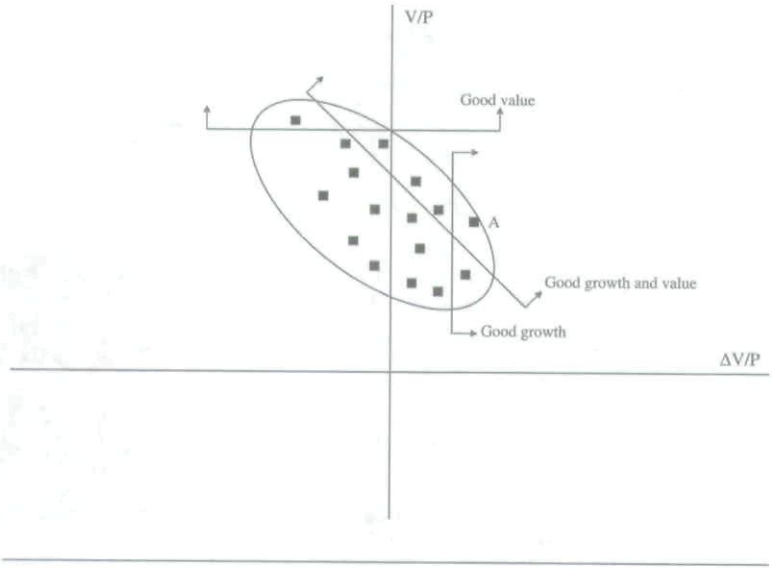
Suppose investors combine value and growth as measured by V/P and $\Delta V/P$, accepting lower current value for the prospect of higher prospective growth. If there is universal agreement on V and ΔV by all participants, even in the presence of noise, noise is quickly identified, and prices move quickly to eliminate any mispricing—no profit opportunities exist. As time passes, even if consensus V, ΔV, perceptions are perfect, V and ΔV will change as new information arrives. Prices quickly adjust.

If V and ΔV are not perfect, but close, there will still be no profit opportunities, but there will be more rapid revision of V and ΔV as time passes. Aside from considering value and change in value separately, this is the efficient market hypothesis with perfect agreed-upon information, swift price adjustment to shifting perceptions, and no excess returns possible.

In the real world, there is no universal agreement on V and ΔV. Two different investors with different V and ΔV definitions face different dispersions of V/P and $\Delta V/P$. (See Exhibit 1.) Each will see profit opportunities in selling overvalued and buying undervalued stocks. Since observed prices are set by the interaction of all investors, an individual can't affect prices much. This means that apparent profit opportunities seen by one investor can be implemented without much price impact. These apparent opportunities will pay off only if observed dispersions are corrected in the future.

A typical investor sees individual stocks as dots forming a downward-sloping cloud, as in Exhibit 1. The noted positive direction edges appear to include underpriced stocks. They are underpriced because the individual's value metric is different from the aggregate or because noise has driven prices down (not up). The investor can't tell which case applies. As time passes, an

EXHIBIT 1
Value/Growth Trade-Off



individual investor whose V and ΔV metric is closer to the perfect metric than the consensus will see profits from exploiting apparent outliers.

As a specific example, suppose a V, ΔV, aware individual in a market that ignores growth observes stock A in Exhibit 1. Although it is fairly priced by the market for value, our investor expects future growth and sees it as underpriced by his ΔV/P metric and takes a long position in the stock. Next-period earnings rise as expected. The current earnings-sensitive market revises V upward. The price of A increases to bring it into balance with other V/P ratios.

Our investor with a V, ΔV, perception closer to the true V, ΔV, profits from his insight. If stock A were growth-attractive because of noise, V would not change next period, but the noise, if corrected, still leads to profit.

Some participants may not be using V, ΔV, at all or not react to V, ΔV, opportunities as aggressively as others. Examples are index managers, those considering tax consequences of changes, those seeking corporate control as a reason for ownership, and those holding large-cap stocks for tracking error control. Constraints and policy can inhibit quick action to take advantage of observed mispricing opportunities. Varying transaction costs, differing decision and portfolio reevaluation periods, and differing time formation periods for assessing change in V and ΔV will slow down reactions and permit inappropriate prices to persist. Recognizing that some investors take more time than others to adjust V/P and ΔV/P is an admission that price changes may persist.

In the case of growth, incomplete ΔV/P definitions based only on measurable factors are blind to non-quantifiable shifts in future prospects. These non-measurable factors will reveal themselves as seemingly anomalous price trends as market participants tuned into these more subjective shifts act on them and force price adjustments.

To an outside observer, it might look as if such investors are just chasing price trends. Some price trends are simply the evidence of adjustment to non-quantifiable, but nonetheless important, factors. Some may be due to slow revision of V and ΔV perceptions.

The upper area of Exhibit 1 is the area to find underpriced stocks based purely on value. The area to the upper right is the location of underpriced stocks based on growth. Jointly attractive stocks are on the upper right-hand edge.

If in one period the extremes of underpriced value are adjusted by price rise, then a few of the extremes of overpriced growth stocks may also rise. Measured by spreads, value and growth may take turns working and failing.

TESTABLE PREDICTIONS FROM THEORY

To summarize the theory: V/P and ΔV/P are separate measures of static and dynamic value that combine to fix a stock's overall value. There is a negative V/P, ΔV/P, trade-off. With the mix of varying-objective market participants, and frictions in the recognition of adjustment to new information, investors whose value metrics are closer to the ideal than the consensus will see over- and undervalued stocks as outliers—outliers that will prove profitable over time.

Testable predictions include:

1. Factors that predict excess return are approximations of the perfect measures and ought to be correlated in ranking and subsequent performance with one another by their common link to perfect V or ΔV.
2. V and ΔV grouped factors should be negatively correlated with each other.
3. Time dynamics of adjustment to observed outliers may generate cyclical success and failure periods of V and ΔV.

4. The extreme edges up and to the right of outliers in Exhibit 1 should show a mix of noise and temporarily incorrect mispricing for factors or models that are closer to true than the consensus market perceptions.

FACTOR SELECTION

The factors presented here are selected by a two-stage process. Twenty years ago we surveyed dozens of portfolio managers and learned what measures they used to help them choose stocks. We then selected the factors that generated adequate return spreads in the previous 15 years. They have generally continued to work over the subsequent 20 years.

Exhibit 2 displays the ten factors identified. Many were widely reported in the literature; some were proprietary; and one (price momentum) was controversial. For the purposes of this study we have used unveiled versions of the proprietary factors.

We classify factors as *static* or *dynamic* on the basis of level or change in level. The static measures use 12-month trailing or anticipated values, are widely known, and require no elaboration. The dynamic factors are less widely known.

SEP is change in quarterly earnings over four quarters, divided by price. LEP is change in earnings over three years, divided by price. ER is a weighted, multimonth past change in upward less downward revisions, divided by number of estimates. ES is the most recently reported earnings amount less the consensus estimate at the time of the report, divided by the consensus estimate. (ES and ER are included only from 1984 on; analyst estimate data prior to 1980 are not widely available.) PM is 12-month past price change.

Most value managers will agree that the static factors describe their style. Most growth managers will perhaps more reluctantly recognize the dynamic measures as the basis of their style.

When we first checked in 1997, we found that the two groupings were strongly supported by their rank correlations. (The exception was the LEP factor, which has attributes of both value and growth.) Indeed, the rank correlations compel the groupings.

Rank correlations in two prior seven-year periods reveal that value factors have stable pairwise rank correlations ranging from 0.4 to 0.6. Growth factors are slightly less correlated with each other: 0.1 to 0.5. Both categories exhibit 0.0 to negative 0.3 correlations with opposite style factors, as predicted by our theory.

For testing factors and models, we use a monthly database consisting of the 1,500 largest stocks by capitalization and liquidity, redefined yearly. We reconstruct 10 economic sectors as they were at the time as best we can.

DOES VALUE BEAT GROWTH?

The correlation clustering of factors into two sets corresponding with recognizable styles suggests pure style models. For simplicity, we use simple equal-weighted models. We re-rank equal-weighted factor scores to identify extreme composite deciles. Using these generic models, Exhibit 3 illustrates the excess return of the best and worst half of each universe.

By the conventional academic definition associating growth with bad value, value beats growth by 5.75 percentage points annualized at monthly holding, shrinking to roughly half at longer holding periods. This simply shows that good value beats bad value, not growth.

Growth is better characterized by the real-world evidence of the use of growth factors. It is apparent from Exhibit 3 that good growth beats good value at one- through twelve-month holding periods, with value beating growth by a thinner edge at 24- through 36-month periods.

To test factor effectiveness we use extreme deciles. Exhibit 4 illustrates the annualized excess first and tenth decile returns of the two generic style models at one- through thirty-six-month unrebalanced holding periods. Growth discrimination is clearly superior to value at short holding periods.

Comparing these results to other practitioner screens, Thorp [2006] reports monthly rebalanced long results

EXHIBIT 2
Ten Factors

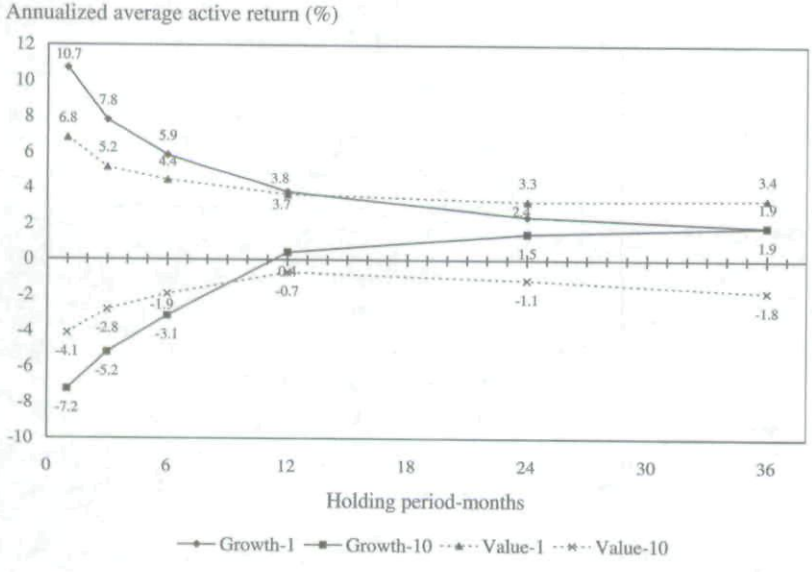
Value (Static Measures)	*Growth (Dynamic Measures)*
Dividend-to-price (DP)	Short-term change in earnings-to-price (SEP)
Earnings-to-price (EP)	Long-term change in earnings-to-price (LEP)
Cash flow-to-price (CP)	Estimate revisions (ER)
Expected future earnings-to-price (EEP	Earnings surprise (ES)
Book value-to-price (BP)	Price momentum (PM)

EXHIBIT 3
Generic Value and Growth 50% Style Universes

		Holding Periods					
		1 month	3 months	6 months	12 months	24 months	36 months
Value	Best 50%	2.71	2.80	1.80	1.04	1.05	1.21
	Worst 50%	-3.06	-2.30	-1.99	-1.26	-1.30	-1.53
Growth	Best 50%	4.25	3.18	2.33	1.14	0.66	0.41
	Worst 50%	-4.89	-3.59	-2.66	-1.37	-0.80	-0.49

Annualized excess returns, 1,500 stocks, 1971-2004.

EXHIBIT 4
Style Spreads by Holding Period



over the past eight years, reaching the same conclusion: Growth beats value at short holding periods. He displays 18 value strategies with an annual average 19% return, while eight growth strategies average 22% return.[1]

We find that, at longer horizons, value persists while growth deteriorates, so that their spreads are reversed at 12-month holding periods and beyond. This is similar to the universe-half results noted earlier.

STYLE EFFECTIVENESS FLUCTUATION

The time series of first-tenth decile spread (effectiveness) of the two generic models appears in Exhibit 5. No transaction costs are imposed, and monthly returns are linked to yearly. The fluctuation of effectiveness is very similar to that seen in the capitalization-weighted Russell 3000 Value and Growth indexes.[2]

Chan and Lakonishok's Table 8 displays an optimized value model whose spread results closely match Exhibit 5. The average and standard deviation of the annualized results are displayed. Yearly correlations appear for 1971-1997 and 1998-2004.

The value and growth models often make extreme sector and group bets, but the same general picture of negative correlation (actually nearly identical) of spread fluctuation remains for low-turnover sector-neutral long versions of the generic pure style models below. The same correlation fluctuation pattern is evident within 10 economic sectors for virtually all 10 factors before 1998, so the dynamic fluctuation in style effectiveness is apparently not caused by fluctuating sector success or popularity. Correcting spreads for beta and size bets, we find the corrected model fluctuation mimics the uncorrected. The fluctuation is not beta- or size-driven.

In almost every year, either valuation or growth generates a potentially profitable spread. Forecasting spreads in advance would be very profitable. Despite considerable effort, we are unable to find a way to forecast the spread in advance, or even explain it well contemporaneously or retroactively, using the usual (and some unusual) suspects as variables.[3]

Value/growth correlations from 1972 through 1997 and 1998 through 2004 as seen in Exhibit 5 are of opposite sign and both statistically persuasive. To investigate the style details of the dot-com era, we recast Exhibit 5 data as a scatterplot graph in Exhibit 6.

The dot-com up and down years reverse the normal pattern of negative correlation. The departure from the historical negative correlation seems to be caused more by value failure and bounce-back rather than by a growth

EXHIBIT 5
Style Effectiveness Fluctuation

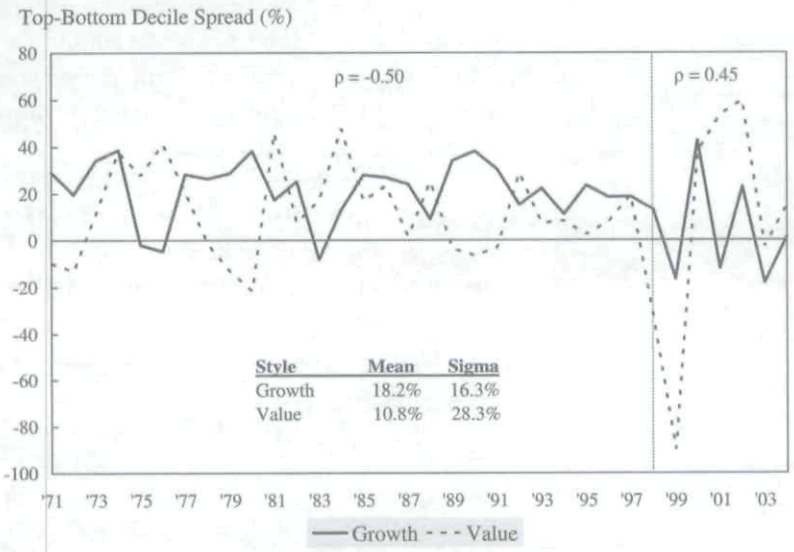
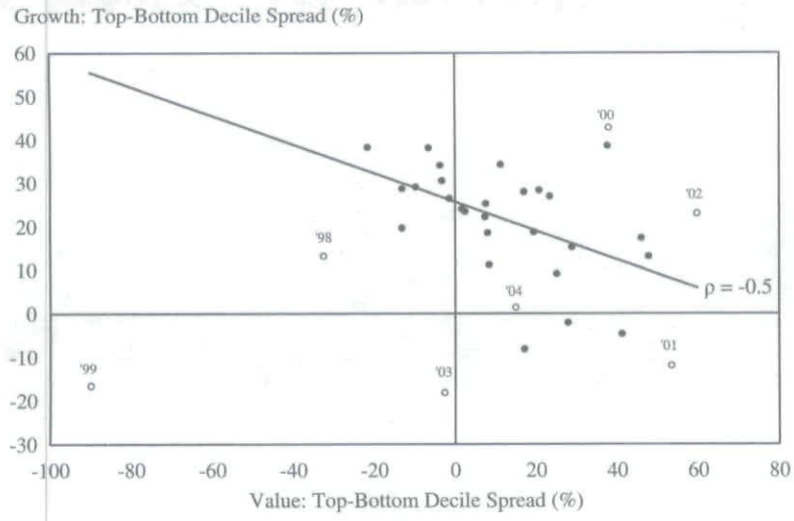


EXHIBIT 6
Negative Correlation of Style Spreads—Yearly



excursion. Value failed spectacularly in 1998 and 1999 on the way up, and bounced back in the following years. The corrupting influence of the dot-com rise caused many to question the use of value at all, so even beyond the dot-com stocks, value became suspect. Quarterly or monthly, optimized or generic, all show the same picture.

According to 2003, 2004, and not shown 2005 returns, it appears that things have returned to normal. The dot-com era suggests that style covariance may not be stationary.

EXPLOITING THE NEGATIVE CORRELATION OF PURE VALUE AND GROWTH

As suggested by our theory, value and growth effectiveness are generally negatively correlated. Dividing funds between two negatively correlated strategies should produce improved portfolio results with lower volatility than either pure strategy by itself. Exhibit 5 illustrates the return and standard deviation of return obtained for the styles separately and by combining two pure style long strategies by mixing funds between them at five different percentage mixes.

Most would agree that the 50/50 mix dominates either pure style. We use a long-only, sector-neutral, strategy of monthly rebalancing, buying from the top decile (150 out of 1,500 stocks), and holding until stocks fall below the fifth decile, paying transaction costs. We assume a current position size of $3 million for a $450 million total portfolio of 150 stocks.

Variable transaction costs are applied to monthly stock turnover, and to rebalancing to equally weighted positions each month. Yearly turnover is 70% for value and 130% for growth. One-way transaction costs range from 40 to 400 basis points, with an average round-trip cost of about 140 basis points.[4]

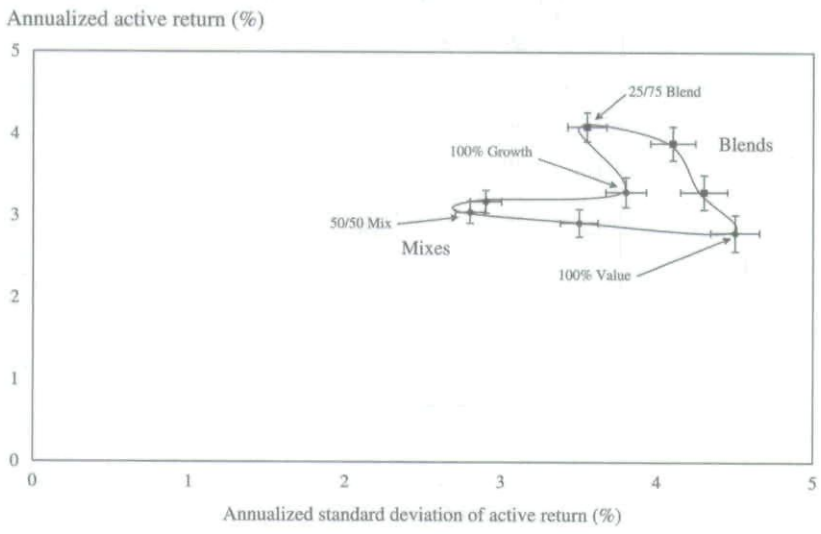
EXPLOITING JOINT OUTLIERS OF VALUE AND GROWTH

Exhibit 7 shows besides mixing the results of blending the two style rankings. We use the same rebalancing strategy and transaction costs, but blend value and growth together. Blending involves a reranking of scores based on preblending the factor decile scores. Most would agree that the 25/75 value/growth blend dominates either pure style.

As expected from portfolio theory, mixing returns from pure style portfolios produces a reduced standard deviation with an averaging of returns. In blending the two styles into a single portfolio, it appears that standard deviation is slightly reduced, while return increases. This finding confirms our theory that mispriced outliers should

EXHIBIT 7

Realistic Long Portfolios Mixing and Blending Styles



be found all along the upper right edge of the observed value/growth distributions.

In mixing, some first-decile value stocks are also tenth-decile growth stocks. Blending may work better than mixing because blending avoids the bittersweet first-tenth, tenth-first, combinations inherent in mixing.

SIGNIFICANCE OF RESULTS

Exhibit 7 displays the annualized return and standard deviation of return of long strategies based on mixes and blends of pure generic value and growth. A smoothed curve connects the strategies. Around each displayed combination are error bars reflecting the sample standard deviations of the annualized mean and annualized standard deviation. Not often displayed, these estimated parameter error ranges provide a visual way to assess significance of results. We produce them from monthly return data using conventional sampling statistics. Mentally connecting the corners and smoothing suggests channels enclosing the ±1 sigma, or the two-thirds chance range, of where the return and standard deviation curves might really be.[5]

Michaud [1998] has suggested a statistical cloud idea, but with resampling as the basis for determining the distribution rather than classical sampling error statistics. This gives us a visual demonstration of the dangers of drawing conclusions without enough data. Although the plots are fairly tight, they are not the sharp curves usually displayed, but rather indications of curved probability clouds. With 34 years of monthly data, the curved cloud or smoke ring is distinct. If only 10 years is used, the one-sigma bands would just close up the center. If only three years, they would overlap.

Exhibit 8 displays the cumulative wealth of the best mix (50/50) and blend (25/75) strategies, the equal-weighted 1,500-stock universe from which they are drawn, and the S&P 500 index. Note how similar the absolute return fluctuation is for all universes and strategies.

Simple mixing and blending of styles produces meaningful and consistent gains over an equal-weighted universe and over the capitalization-weighted S&P 500. The average return gain from the S&P 500 index to the equal-weighted 1,500-stock universe is 170 basis points. The optimal 50/50 mix strategy adds another 310 basis points. The best blend adds another 100 basis points. The statistical significance of the difference between the 25/75 best blend and the 50/50 best mix, measured directly, is in excess of 4 sigma.

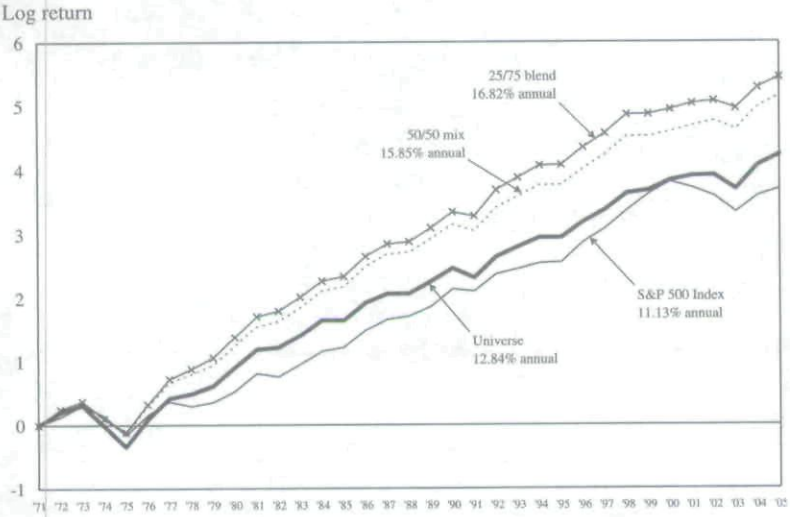
A fair-sized portfolio, easily $500 million, could be managed using an equal-weighted, 150-stock, sector-neutral, low-turnover strategy as we simulate. The return gains are substantial; the volatilities are similar; and the process is transparent. The typical large-cap benchmarked active mutual fund, however, lags the S&P 500 index by 200 basis points after costs. The difference between the absolute returns of the average mutual fund and a zero-fee blend strategy is almost 800 basis points.

Thorp [2006] presents comparable practitioner screen results for combining value and growth, analogous to blending. The average of 16 combined growth and value strategies in his Table 1 returns 22.4%, beating pure value or pure growth as we report above.[6]

Applying the style-blended, equal-weighted strategy in a cap-weighted S&P 500-benchmarked environment hurts absolute returns, first, because a significant fraction of the portfolio is locked into likely zero-alpha large-cap stock exposure to reduce tracking error; and second, because the S&P 500 exposure lags the equal-weighted by almost 200 basis points. To a large extent, successfully exploiting factor models means using equal-weighted portfolios.

EXHIBIT 8

Cumulative Returns of Best Generic Blend and Mix Strategies



CONCLUSION

We suggest a value versus change-in-value theory spanning most useful factors, including a role for price momentum as a proxy for unmeasurable change in value. Combining 10 widely used factors into two simple equal-weighted generic style models, we confirm their natural clustering to define value and growth investment styles.

We expose the fallacy that value beats growth. We demonstrate style effectiveness at various holding periods and style effectiveness time dynamics, all suggested by theory. We confirm the theoretical possibility that observed value and growth style outliers have excess return potential. Unlike Thorp [2006], we apply realistic transaction costs in moderate-turnover sector-neutral long strategies.

We demonstrate two practical strategies, comparing their performance to equal- and cap-weighted indexes. We conclude that both the simple strategies of exploiting the inherent negative correlation of value and growth and of seeking jointly attractive stocks offer significant returns over an equal-weighted universe, which in turn offers a significant improvement over the cap-weighted S&P 500. These results suggest that it may be wise to abandon cap-weighted portfolios focused on cap-weighted benchmarks for mixed or blended equal-weighted value/growth strategies.

ENDNOTES

[1]There is an important difference between many of Thorp's [2006] results and the models used here. The Thorp models are mostly screens in the sense that stocks are identified satisfying a series of cutoff criteria resulting in a variable number of buys (yearly average from 5 to 56). We use composite reranked factor scores and measure extreme deciles: always 150 names in a universe of 1,500 stocks.

[2]The Russell Value and Growth indexes currently use book value and expected long-term growth, mixing the two by stock.

[3]We used fairly strict criteria requiring that anything that works well in the first 15 years of the database also work in the second. Nothing satisfies these criteria. Lots of approaches fit well in 10-year periods, but fail in others. We are looking for something more solid.

[4]Presenting empirical results without transaction costs raises questions about their practical significance. In producing the long strategy, we use a variable-transaction cost model based on Keim and Madhavan [1998], although their model based on 1991 through 1993 data does not transfer easily to other decades. We use a simplified form of their model that transfers and accounts for order size. Using a different approach, Hanna and Ready [2005] estimate transaction costs based on the bid-ask spread. Hanna and Ready use these costs to attack the practicality of the Haugen and Baker 50-factor model. Comparing their costs in 1993 with Keim and Madhavan's, they find them similar. Neither of these studies offers a way to adjust transaction cost for order size.

[5]We define monthly average excess returns and standard deviation as r and σ. Then annualized excess return and standard deviation are 12r and $\sqrt{12}\sigma$. Define monthly standard deviation of r and σ as $\sigma_r = \sigma / \sqrt{(\text{months})}$ and $\sigma_\sigma = \sigma / \sqrt{(\text{months} \times 2)}$. The annualized standard deviation of r and σ are $\sigma_r\sqrt{12}$ and $\sigma_\sigma\sqrt{12}$.

[6]Thorp [2006] uses exclusionary screens to generate smaller portfolios (13 to 102 stocks) with an average monthly turnover of about 30%. Applying our transaction cost algorithm reduces return to 17.4%. As Thorp's reported results tend to favor low-cap higher transaction cost stocks, the returns are likely lower. Smaller portfolios will also force volatility higher.

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