Momentum: Replacing Growth Indexes as a Healthy Menu Option?

Quantitative price-momentum strategies can be sensibly employed by long-term investors, particularly when paired with value-oriented strategies

- Growth indexes, by systematically screening out the most attractively valued stocks, have underperformed their broad market counterparts more often than they have outperformed, and we believe that will continue to be true.
- Rather than pairing their value-oriented managers with managers that closely track growth indexes, many investors would be better served by using simple, quantitative momentum strategies alongside their value exposure.
- Momentum indexes generally have a more appealing and consistent overall record of outperformance than growth indexes. We believe that systematic momentum strategies should outperform broad indexes over time after transaction costs if they are constructed and implemented effectively to blunt the impact of those costs.

Over the past two decades, investors and their advisors have tended to view long-only equity managers across a value-growth style continuum, and portfolios that did not have significant exposure to both the value side of the style box and the growth side were often considered insufficiently diversified.[1] Reinforcing this belief, the late 1990s was a painful period for investors that avoided growth managers, which soared while value funds stagnated. And recently, the Russell 3000® Growth Index has outperformed its broad and value counterparts over the trailing one-, five-, and ten-year periods ended September 30, 2014.

[1] This practice is employed somewhat more commonly with US equity managers than with global managers or those focused on other regions.

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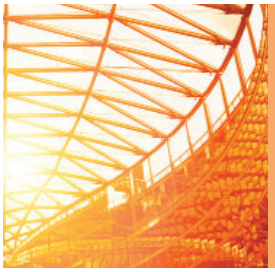


In part due to these experiences, many investors' portfolios employ fundamental managers benchmarked to an index of high-priced stocks, such as the Russell 1000® Growth Index or the Russell 2000® Growth Index (and, to a lesser extent, growth-tilted global or global ex US indexes such as the MSCI World Growth Index or the MSCI EAFE Growth Index).[2] Given their construction, we believe that indexes of perennially expensive growth stocks are engineered to underperform both broad markets and value-tilted indexes over the long term, raising the questions of whether growth index funds (and closet-indexing managers that hew closely to these flawed growth bogies) should continue to have a permanent place in the portfolio, and whether investors should seek to "balance" their value exposure with corresponding growth-index exposure. After all, doctors would not advise us to balance our daily exposure to vegetables with a corresponding exposure to pastries in some sort of nutritional style box.[3] And growth indexes are the pastries of the investment world: they taste delicious (after all, they tend to own the fast-growing, talked-about companies rather than the seeming has-beens), but we do not expect them to be particularly enriching over the long run.

Rather than pairing their value-oriented managers with managers that closely track growth indexes, many investors would be better served by using simple, quantitative momentum strategies alongside their value exposure. Momentum strategies systematically overweight stocks that have delivered strong recent price performance while underweighting laggards.[4] *Like* growth indexes, the excess returns of cross-sectional momentum have tended to be weakly or even negatively correlated with value excess returns. *Unlike* growth indexes, momentum's excess returns have tended to be attractive relative to the broad market. The combination of value and momentum can be a powerful one indeed. This shift from growth indexes to quantitative equity momentum indexes is sensible from a long-term strategic perspective, and with relative valuations for growth stocks near their long-term average and a small but adequate roster of momentum-tilted investment products available, the shift could also be implemented today by many investors.

[2] The Russell Growth indexes are not based purely on valuation—they also incorporate earnings growth. However, their components are still perennially expensive compared to the broad market. Since 1978, the Russell 1000® Growth Index has traded at a median 28% valuation premium to the full Russell 1000® Index, and it has never been at parity or cheaper than the broad index.

[3] While a substantial body of research has clearly established value exposure as a factor that is associated with a return premium, the growth style has no such premium.

[4] In the context of this paper, "momentum" refers to cross-sectional momentum: securities that have recently outperformed other securities are overweighted (while underperformers are underweighted, excluded, or sold short), with regular rebalancing to refresh the index's holdings and weightings. Another form of momentum investing—time-series momentum—analyzes the security or index's recent performance relative to that security or index's historical performance. This note does not evaluate time-series momentum in detail.

Expanding on the topics mentioned above, this research note:

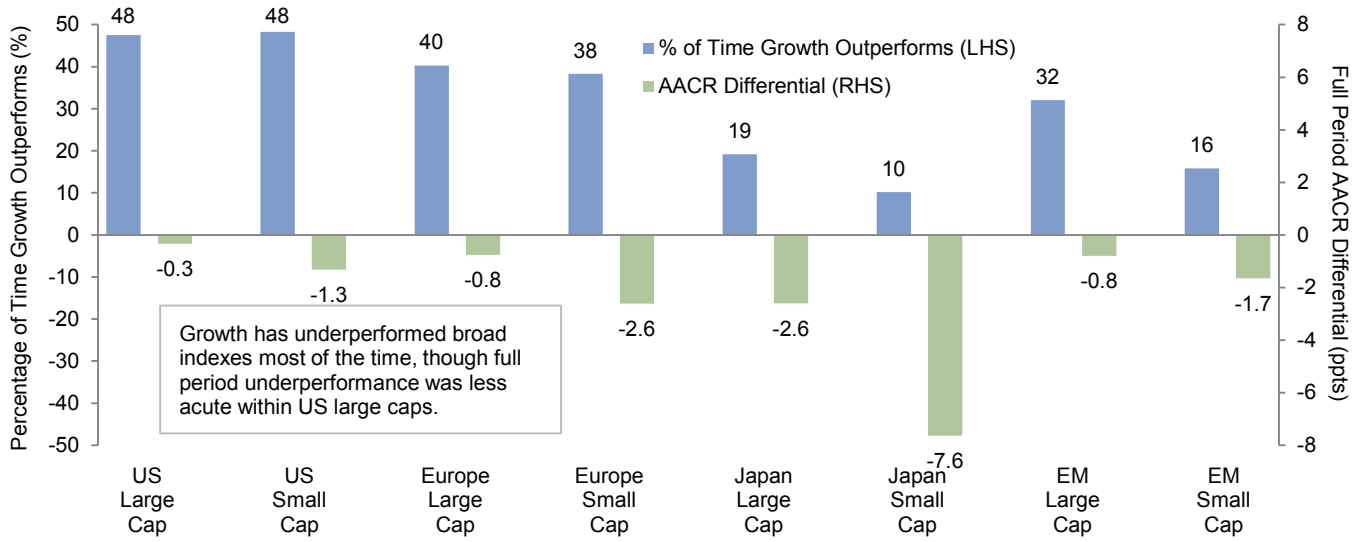
- Compares the historical performance of growth and momentum indexes;
- Discusses some causes for momentum's outperformance;
- Looks at whether momentum's outperformance survives transaction costs and can be sustained;
- Examines the compatibility of a value-momentum pairing;
- Touches on the role of growth-benchmarked active managers in light of the concerns about growth indexes;
- Determines whether today would be an acceptable time to make a strategic shift toward momentum and away from growth-index exposure; and
- Briefly discusses implementation.

Growth Indexes Are Perennial Laggards

Particularly since the 1990s, when Morningstar popularized the firm's Style Box and academics Kenneth French and Eugene Fama trained the finance world to think along value and capitalization axes, investors have often built portfolios that employ value managers or index funds, alongside managers or index funds that tilt toward fast-growing (yet more richly valued) stocks. We remain fans of the value investment approach, and certainly some growth-oriented active managers remain worthy of consideration, but we would shy away from growth index funds (and from active managers that investors believe can beat the growth index but not necessarily the broad market index).

Growth indexes, by systematically screening out the most attractively valued stocks, have underperformed their broad market counterparts more often than they have outperformed, and we believe that will continue to be true. The problem has been less acute within the US large-cap universe (Figure 1), where the excess returns of the MSCI US Growth Index of US large-cap stocks outperformed the broad market index in 48% of overlapping three-year periods (over the full period from 1975 through September 2014, the growth index has underperformed the broad market by a modest 0.3% annually). In Europe, growth has lagged by an annual average of 76 bps over the same time period, outperforming in just 40% of three-year periods. In Japan, growth has underperformed by a woeful 260 bps per year annualized since 1980, topping the broad index only 19% of the time. The historical periods during which growth has outperformed have tended to coincide with poor bank stock performance (because growth indexes tend to have lower allocations to financials than broad or value indexes).

Figure 1. "Growth" Indexes Versus Broad Indexes: Frequency of Outperformance and Full Period AACR Differential
As of September 30, 2014 • US Dollar



Performance of Systematic Momentum Strategies Has Been Much Stronger

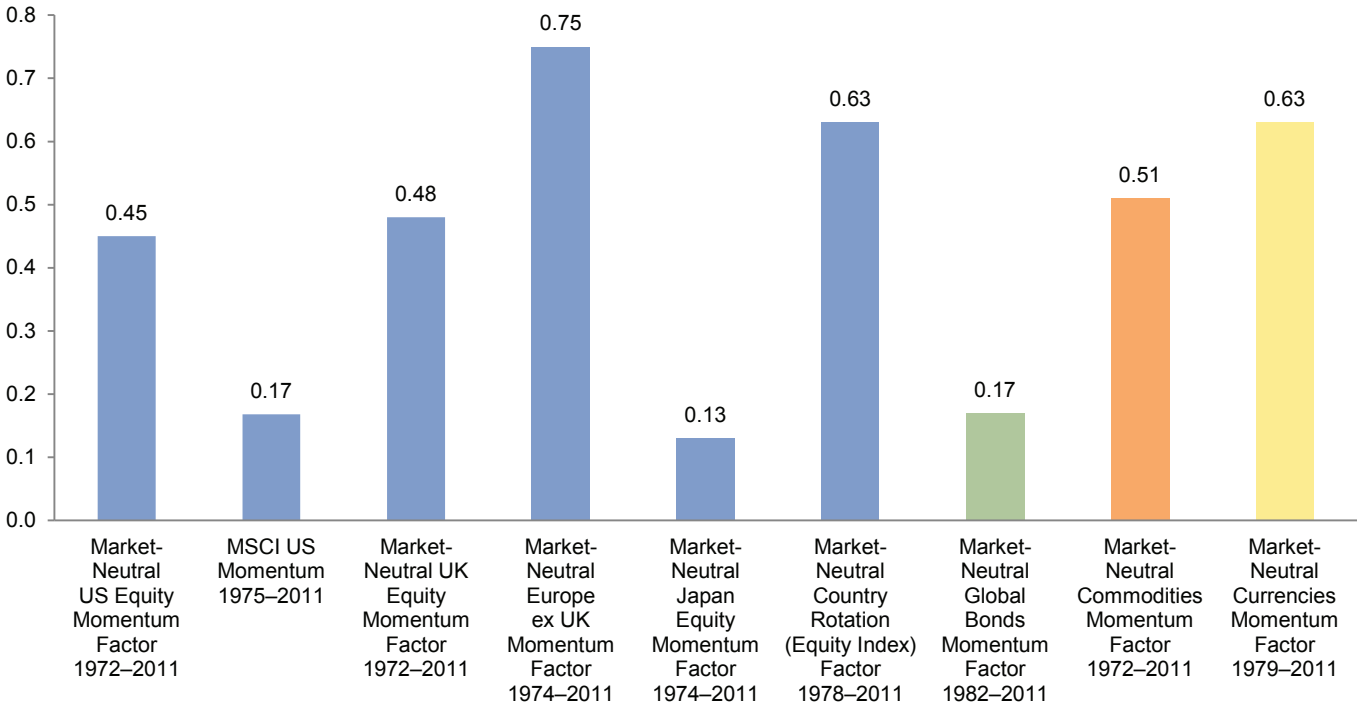
For two decades, academics have highlighted the positive and economically significant excess returns of systematically buying recent winners and selling recent losers.[5] Many quantitative money managers have incorporated a momentum strategy into their stock-selection models, and trend-following hedge funds and CTAs use a variety of momentum signals as well.[6] As highlighted in Figure 2, the momentum anomaly has generated attractive historical excess returns across a variety of asset classes (most recently within the US Treasury market[7]). Each bar illustrates the Sharpe ratio for an index version of the strategy based on its excess return versus the relevant broad market index. In addition to the strategies shown on the chart, some hedge funds have built attractive multi-decade net performance records using trend-following momentum strategies implemented across multiple asset classes.

[5] Early research includes Narasimhan Jegadeesh and Sheridan Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *The Journal of Finance* 48, no. 1 (March 1993): 65–91. Another example is the 1994 University of Chicago doctoral thesis of Cliff Asness, who went on to found quantitative money management firm AQR Capital. Fama and French have written about the momentum anomaly as well (see Eugene F. Fama and Kenneth R. French, "Dissecting Anomalies," *The Journal of Finance* 63, no. 4 [August 2008]: 1653–1678). Momentum is sometimes included alongside value, size, and the overall market when investors are evaluating the embedded factor exposures of a portfolio.

[6] For more on trend following, please see Gene Lohmeyer et al., "Befriend the Trend: An Overview of Managed Futures Investing," Cambridge Associates Research Report, 2014.

[7] *Liberty Street Economics*; "Can Investors Use Momentum to Beat the U.S. Treasury Market?," blog entry by J. Benson Durham, May 7, 2014.

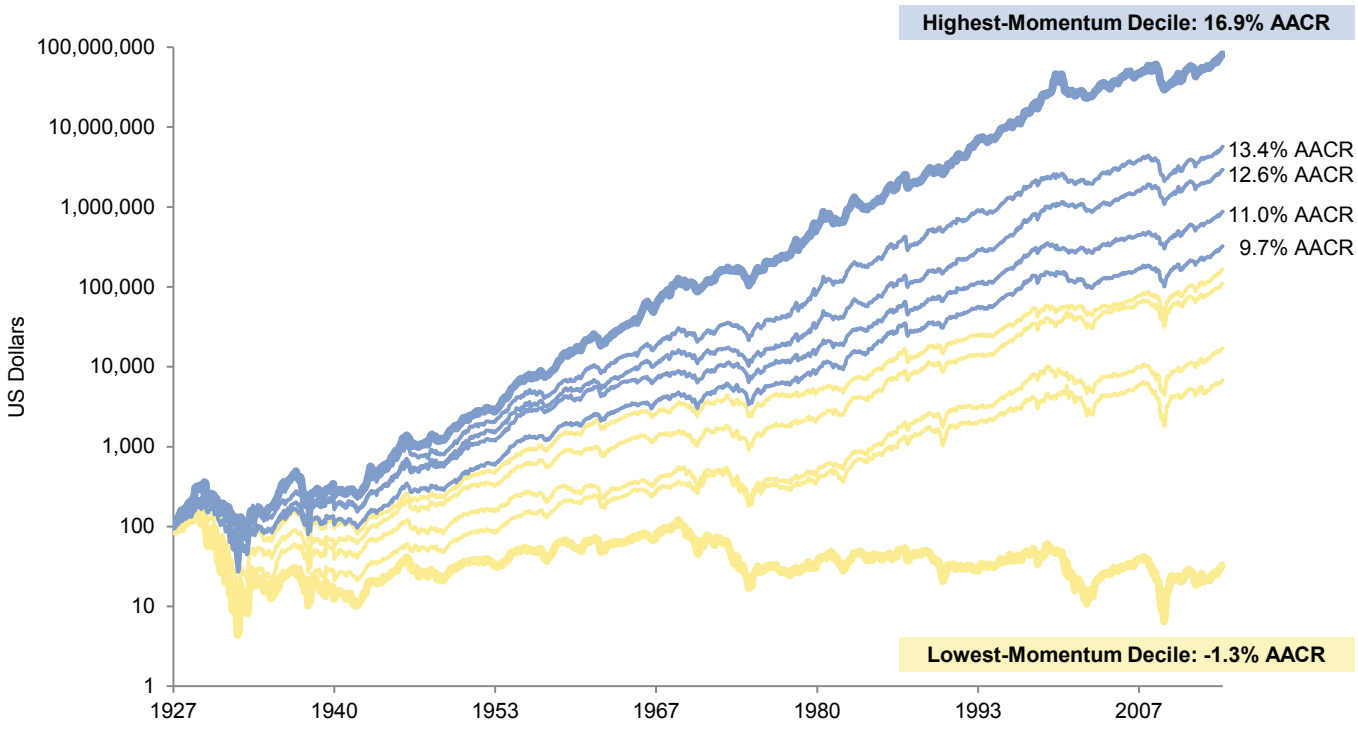
Figure 2. Performance of Momentum Across Asset Classes
Sharpe Ratio of the Excess Return of Various Momentum Strategies



A hypothetical portfolio constructed with the highest-momentum US stocks (sorted by decile) would have outperformed the lowest-momentum decile of stocks by more than 17 ppts annually from 1927 to last year, according to Professor Ken French of the Tuck School of Business (Figure 3). This simulation exaggerates the potential benefit of systematic momentum because it does not incorporate the substantial drag from transaction costs,[8] and this style of chart tends to visually minimize the pain of drawdowns early during the history of the data. These momentum-decile portfolios are constructed by calculating the performance for each security over the most recent year, excluding the most recent month (this methodology is also employed by AQR in its momentum indexes; MSCI uses the z-score of the stock's six- and 12-month returns, also excluding the most recent month). Some indexes, including those from AQR and MSCI, incorporate market capitalization as an input (for example, by multiplying a stock's market cap by its momentum score to determine the final index weighting); this dilutes the momentum impact somewhat but increases capacity and lowers trading costs.

[8] We discuss the impact of transaction costs on momentum strategies later in the paper.

Figure 3. Cumulative Wealth of US Equity Portfolios Formed By Prior-Period Price Momentum
January 1, 1927 – December 31, 2013



Moreover, the momentum anomaly has persisted since its discovery and with some amount of "live" investment in the strategy[9]—a fact not true of many "anomalies" that are discovered only to be quickly arbitraged away. In the nearly two decades since AQR founder Cliff Asness wrote his doctoral thesis on the topic, momentum indexes have outperformed broad indexes handily (Figure 4).[10]

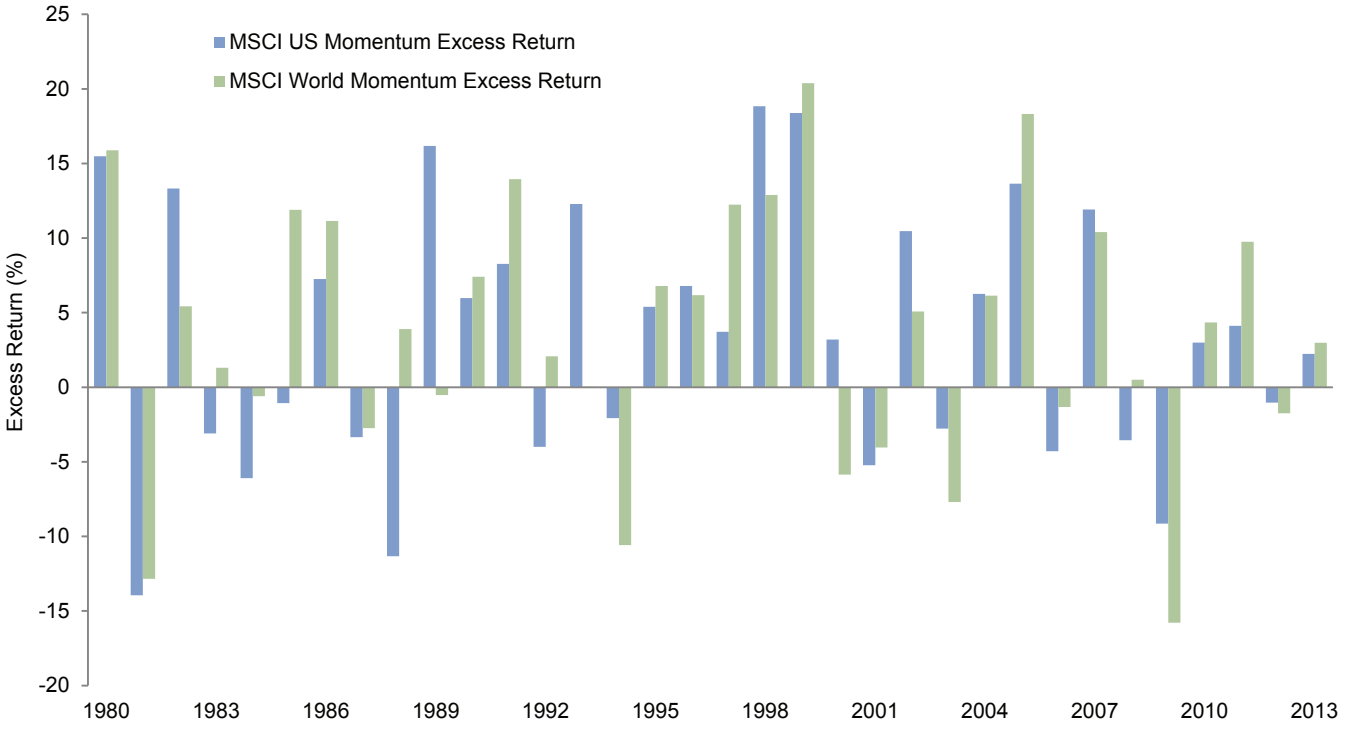
The historical results are generally attractive over long periods; however, momentum has had plenty of rough spots (which is true of every honest strategy), evident in Figure 5. While Figure 5 focuses on calendar-year periods, the MSCI US Momentum Index has experienced significant relative return drawdowns over longer timespans as well (sometimes when broad equities were also suffering). Since the index's inception in 1975, it has experienced seven drawdowns of at least 10 ppts relative to the broad MSCI US Index, including a 22 ppt hit in 1980–81 and a 23 ppt relative return drawdown spanning from mid-2008 to early 2010.

[9] It is very difficult to quantify the amount of this live investment, in part because price momentum is rarely used as a sole investment factor (it is often used by quantitative managers in conjunction with other factors).
[10] The MSCI indexes were launched quite recently, so their results are generally only backtests, even for the ten-year period shown.

Figure 4. Outperformance and Tracking Error of Selected AQR and MSCI Momentum Indexes
As of September 30, 2014

	Full Period Outperformance AACR (%)	Full Period Annualized Tracking Error (%)	Full Period Since	Trailing 10-Year Outperformance AACR (%)	Index Launch Date
AQR International Momentum	0.58	6.94	1/31/1990	0.86	1999
AQR Momentum [US]	1.60	7.78	1/31/1980	-0.62	1999
AQR Small Cap Momentum [US]	3.57	6.58	1/31/1980	0.02	1999
MSCI ACWI Momentum	3.06	8.04	12/31/2000	2.68	2013
MSCI World Momentum	2.57	8.61	1/31/1999	2.74	2013
MSCI World ex US Momentum	1.10	3.69	1/31/1999	0.41	2013
MSCI Japan Momentum	-0.60	9.83	7/31/1999	-0.58	2013
MSCI Europe Momentum	2.82	7.29	1/31/1999	3.97	2013
MSCI UK Momentum	2.04	3.10	7/31/1999	2.29	2013
MSCI US Momentum	2.20	7.39	1/31/1999	1.97	2013

Figure 5. Annual Excess Return of Selected Momentum Indexes Versus Broad Indexes
1980–2013 • US Dollar

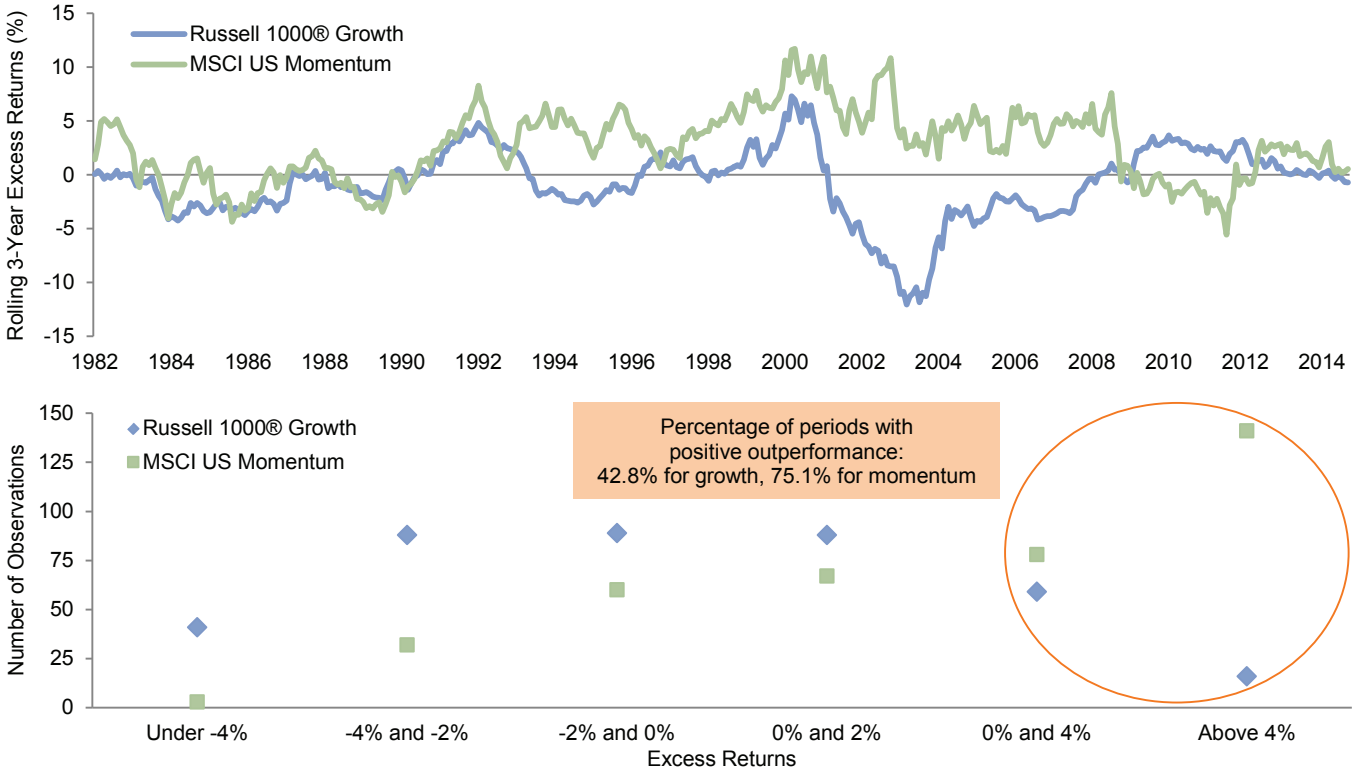


Momentum Has Trounced Growth in Most Three-Year Periods

Momentum indexes generally have a more appealing and consistent overall record of outperformance than growth indexes and this is true for rolling three-year periods (minimizing the impact of endpoint sensitivity). Momentum, like growth, is subject to plenty of performance droughts, but 75% of rolling three-year periods saw outperformance versus the broad index, compared to 43% of periods for the growth index (Figure 6).

However, many institutional investors are loath to explicitly seek out momentum exposure for at least two reasons: buy high/sell low is the opposite of how most of us have been trained to invest, and momentum has a reputation for being evanescent and ill-suited to long-term investors. Contrary to that reputation, we believe that quantitative price-momentum strategies can be sensibly employed by long-term investors, particularly when paired with value-oriented strategies (the excess returns of which have generally had low or negative correlations to momentum excess returns).

Figure 6. Rolling Three-Year Excess Returns
January 31, 1982 – September 30, 2014



What Is the Source of Momentum Outperformance?

Practitioners and academics have established a number of theories to explain why securities that have recently performed better tend to continue doing so. Some believe that momentum excess returns compensate investors for incremental risk, while others attribute the outperformance to behavioral effects.

The academics and practitioners who argue that equity momentum performance is compensation for risk typically claim that momentum companies tend to have higher fundamental or valuation risks than the broad market, which causes their cost of capital and thus their returns to be higher than those of the broad market.[11] One common (mis)perception among investors is that momentum strategies reliably perform terribly when broad markets do poorly; if true, investors may require higher returns as compensation for this risk. However, it is not clear that momentum *consistently* performs poorly during dismal market environments. The worst decile of quarterly returns for the MSCI US Index (during which the index returned roughly -8% or below) is associated with a median *out*performance of 0.8% for the MSCI Momentum Index, and the highest decile of returns for the MSCI US Index is associated with a very similar 0.7% median momentum outperformance (the correlation of broad-market returns and momentum outperformance is near zero). Earlier, we mentioned that the MSCI US Momentum Index had underperformed the broad index by 23 ppts starting in 2008—this drawdown spanned the very sharp market meltdown during late 2008 through early March 2009, but also continued during the market rebound during the balance of 2009. During the 2000–02 bear market, momentum initially underperformed but then sharply outperformed from mid-2001 to mid-2002. While it's not clear that momentum consistently carries significant additional risk during market crashes, risk-based explanations associated with higher corporate risk are well supported, alongside behavioral-based explanations.

The behavioral explanations for momentum's historical success sometimes focus on investors' tendency to exhibit a delayed reaction to new information, as well as the speed of information diffusion. The most informed investors learn of developments first; then, as that information becomes more widely known, other investors trade on it. Well-informed investors react to developments and news at companies more quickly and thus move their share prices, but less-informed investors may rely on the share price changes as a signal of news, thus extending the time period during which the news gets absorbed. An additional behavioral concept that may explain some of the momentum effect is

[11] For examples of risk-based explanations for momentum effects, see Jonathan Berk, Richard C. Green, and Vasant Naik, "Optimal Investment, Growth Options, and Security Returns," *The Journal of Finance* 54 (1999): 1553–1608; Timothy C. Johnson, "Rational Momentum Effects," *The Journal of Finance* 57 (2002): 585–608; and Jacob S. Sagi and Mark S. Seasholes, "Firm-Specific Attributes and the Cross-Section of Momentum," *Journal of Financial Economics* 84, no. 2 (May 2007): 389–434.

loss aversion (which can cause some investors to take profits prematurely and to delay the recognition of losses—this tendency can allow a more patient systematic strategy to benefit as winners and losers continue on their respective paths over the weeks and months to come). Momentum's outperformance may well be caused both by risks that need to be compensated *and* by behavioral foibles.

Is Momentum's Excess Return Sustainable?

One consideration is whether the historical paper profits of momentum persist after trading costs. Many momentum strategies have high turnover, pushing transaction costs to the forefront. In a 2013 working paper, three principals at AQR Capital discussed the historical transaction costs of momentum strategies, using actual trading data across 19 developed equity markets from 1998 to 2011.[12] They determined that the transaction costs of a high-turnover, unconstrained momentum strategy employed across 2,000 US stocks would have consumed nearly all of the strategy's gross excess return, with trading costs of 4.8% compared to a gross excess return of 5.0%. This is like steaming a pricey five-pound lobster, only to realize that all but an ounce or two was inedible shell! However, by simply incorporating minimal liquidity constraints into the strategy's trading rules, the researchers reduced the trading frictions by more than half, while only diminishing the momentum return premium by 34 bps, leaving a substantial net excess return after transaction costs of 2.5%, according to their simulation.[13] We believe that systematic momentum strategies should outperform broad indexes over time after transaction costs if they are constructed and implemented effectively to blunt the impact of those costs.

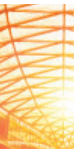
Momentum May Be Superior to Growth as a Value Foil

A large body of research[14] and historical returns indicate that quantitatively driven momentum strategies may deliver attractive risk-adjusted returns despite the poor esteem in which many investors hold momentum. For investors that currently hold growth index exposure, momentum may in fact be a better foil to value strategies. The excess returns of momentum indexes versus the broad market have tended historically to have low or negative correlations to the excess return of value indexes; this is true of growth as well, but with growth indexes the expected excess return is negative, whereas

[12] Please see Andrea Frazzini, Ronen Israel, and Tobias J. Moskowitz, "Trading Costs of Asset Pricing Anomalies," Fama-Miller Working Paper; Chicago Booth Research Paper No. 14-05 (December 5, 2012). AQR researchers are conflicted, because the firm employs momentum strategies in many of their investment products; at the same time, they are very knowledgeable on the topic, and their research continues to be well respected.

[13] The unconstrained strategy is blind to the reality of trading costs, happy to mandate impossibly costly trades to stick rigidly to the momentum strategy. The liquidity constraints caused the model to forgo the highest-expected-cost trades, so long as their avoidance didn't increase the strategy's tracking error to the unconstrained strategy beyond 1%. It also limited or eliminated any trade that would have exceeded 5% of a stock's average daily trading volume.

[14] Several examples of this research have already been cited.

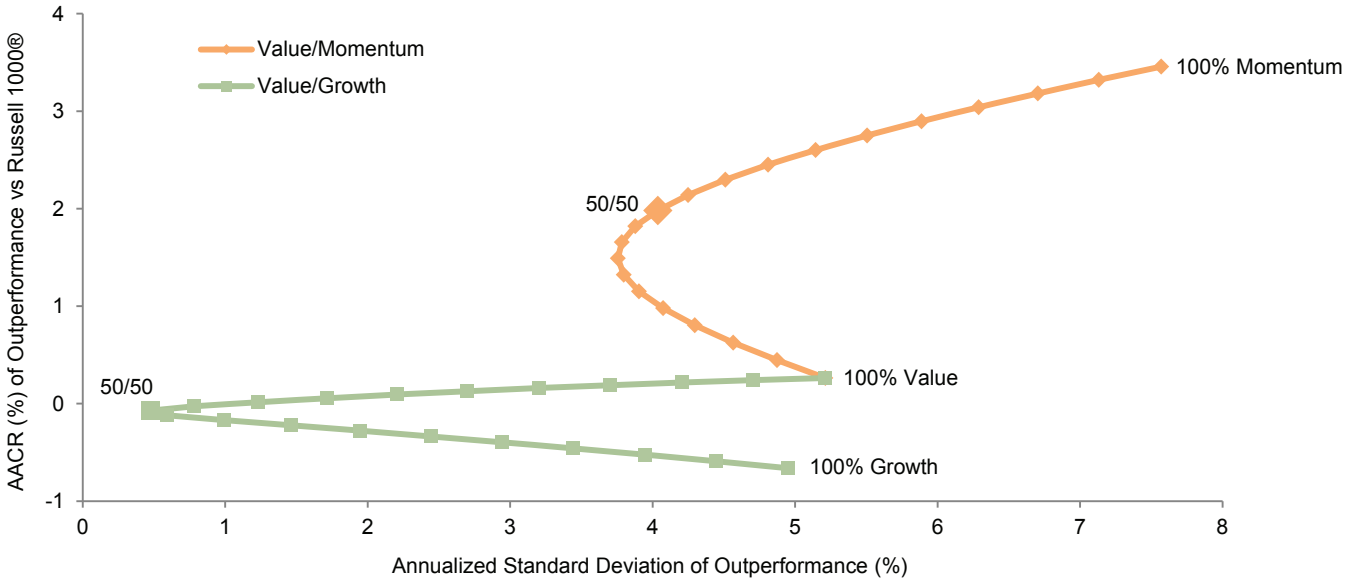



with momentum it is positive.[15] Combining two strategies that have strong *and* uncorrelated excess return can be powerful indeed. We illustrate this with an efficient frontier showing data from 1990 through today. During the historical period shown, the value-momentum combination would have offered modest outperformance with low tracking error (Figure 7). In part this is because many of the periods that have been savage for value strategies have offered strong momentum returns, and vice versa; thus, a 50/50 approach moderates the sharp edges of both strategies. During the 35 calendar years from 1979 through 2013, the Russell 1000® Value Index underperformed the broad Russell 1000® Index by more than 5 ppts fully one-fifth of the time. The same is true for the MSCI US Momentum Index. Yet a 50/50 blend of those two only suffered one calendar year of severe (worse than 500 bps) underperformance: during 2009, when both value and momentum had severe setbacks, costing the 50/50 blend a whopping 1,000 bps of underperformance.[16]

[15] Future excess returns from newly conceived momentum indexes are likely lower than backtests of those indexes would indicate because backtest biases are pervasive and backtests do not face any drag from transaction costs. That said, the initial research on momentum extends back decades, so substantial out-of-sample results are available.

[16] Systematic quality strategies also appear to offer reasonably good diversification to value strategies; however, quality has been less extensively researched than momentum, and the existence of a return premium for quality stocks is not yet well established. Definitions of quality and the relevant index selection metrics vary widely. We remain fans of quality-focused fundamental managers, but we are not yet ready to embrace the relatively new quality-centric indexes.

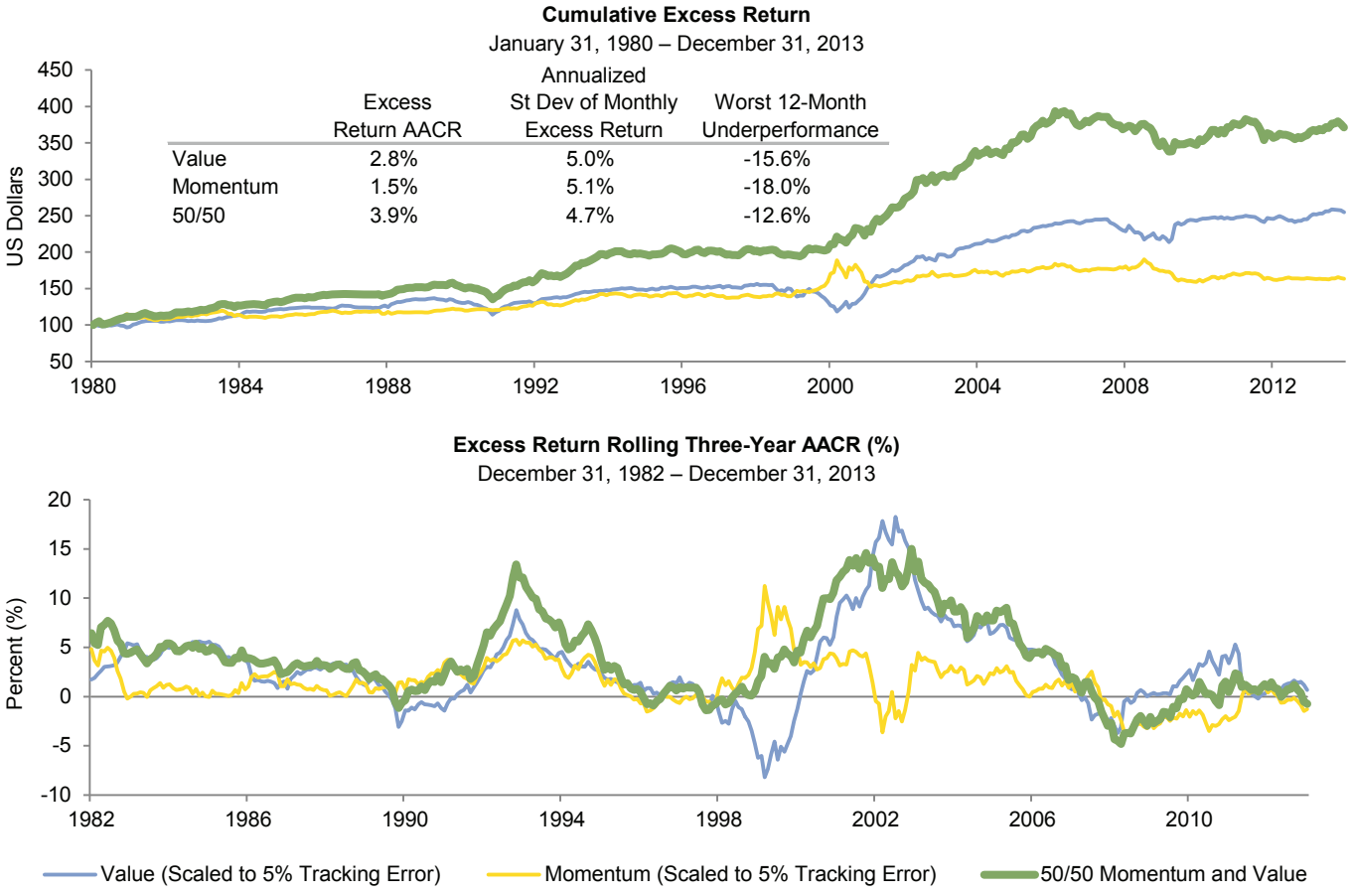
Figure 7. Efficient Frontier of US Equity Momentum, Growth, and Value Indexes
January 31, 1990 – September 30, 2014



While the efficient frontier shown in Figure 7 is based on indexes and thus does not account for transaction costs, Figure 8 incorporates estimated transaction costs. Figure 8 illustrates the outperformance (both cumulatively and on a rolling basis) of a value strategy, a momentum strategy, and a combination of the two. The momentum and value strategies individually have substantial tracking error, while their negative correlation with each other mutes the tracking error of the combined strategy. For this reason, in Figure 8 we have diluted both of the individual strategies so that their tracking error is in line with that of the combined index.[17]

[17] The returns for the individual value strategy represent 60% exposure to AQR's value factor (which is net of expected transaction costs) and 40% exposure to the broad index. The returns shown for the individual momentum strategy reflect 50% exposure to AQR's momentum factor (net of estimated transaction costs) and 50% exposure to the broad index. The broad index exposure that we use to dilute each strategy earns no outperformance versus itself, of course; it is also not adjusted for transaction costs, which would be modest.

Figure 8. Excess Return of AQR Value, Momentum, and Combination Strategies



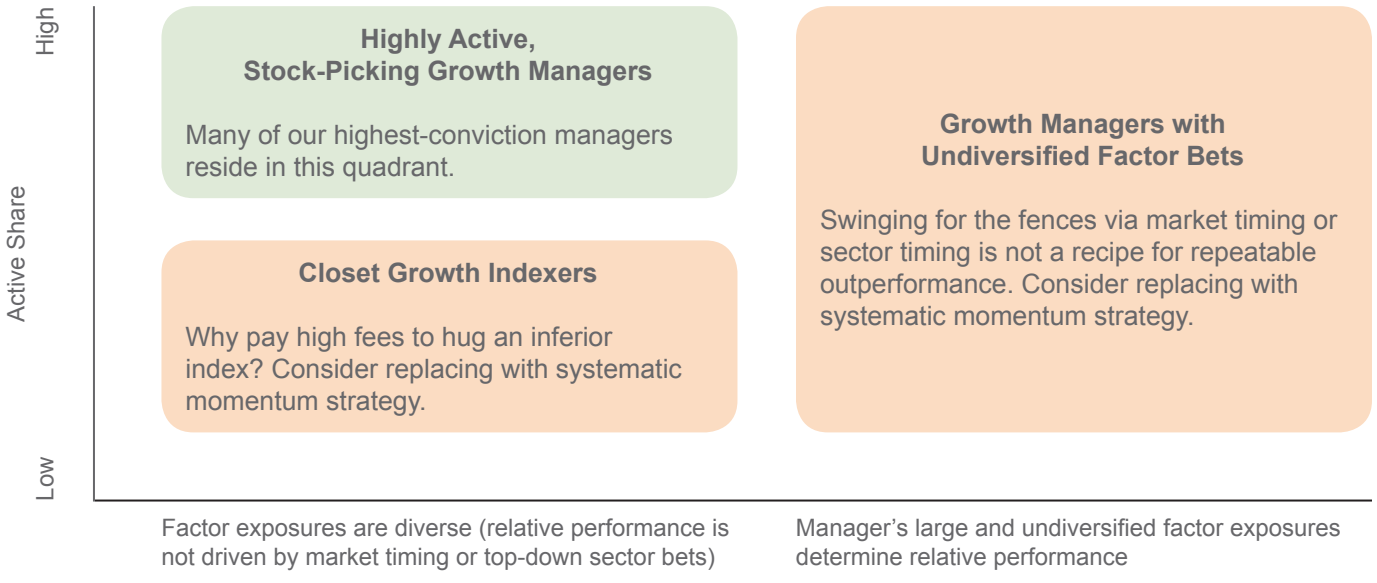
Should Active Growth Managers Still Have a Place in the Portfolio?

What about active growth-oriented managers that investors believe have strong relative performance potential versus their growth bogey? Should investors continue to incorporate them into the portfolio? To deserve a place in the portfolio, forward-looking performance expectations for growth-oriented managers must be strong relative to the *broad* equity market, not just versus the growth index. Returning to our dietary analogy, nutrition-focused eaters would not want be distracted by claims that a pastry was slightly *less unhealthy* than peer pastries; what matters is how the product stacks up against a broader universe of foods. If investors believe that a growth-oriented manager can meaningfully outperform the broad index net of fees, and not just the growth index, then including that manager in the portfolio can still make sense.

Active share is a helpful metric for evaluating active equity managers,[18] and this may be doubly true for growth-oriented managers given the undesirability of growth indexes that many of these managers use as a benchmark. Managers that are closet indexers, with modest overweights and underweights versus a growth-tilted index, are excellent candidates to replace with systematic momentum strategies (Figure 9). Even if these closet indexers beat the growth benchmark after fees, they may struggle to outperform the more challenging broad-market index. Managers

[18] Please see Kevin Ely, "Hallmarks of Successful Active Equity Managers," Cambridge Associates Research Report, 2014.

Figure 9. Landcape of Growth-Oriented Fundamental Managers



that employ market timing or sector timing, or that have significant sector bets, may also struggle in the long run; even if they are truly skilled, their painful performance swings can induce sizable asset flows and troubling organizational instability. These swing-for-the-fences funds would be good candidates for replacement by systematic equity momentum strategies. Investors evaluating growth-oriented active managers should look for highly active stock-pickers that don't exhibit undiversified factor exposure (represented by the green quadrant of Figure 9). While some of the growth managers that will struggle to outperform the broad index undoubtedly reside within that green quadrant, a large portion of the managers that *are* capable of outperforming the broad index reside there as well. This quadrant may represent the best fishing grounds for active growth managers that can outperform the broad market index; investors should be able to increase their odds by looking for managers that have a valuation discipline,[19] a tilt toward "quality" firms with high and consistent profitability, or both. Fundamental growth managers with a momentum bias may outperform as well, but investors should not lean heavily on that when selecting an active growth manager because accessing momentum exposure can be accomplished more consistently and perhaps with lower fees by using a systematic momentum approach.

[19] These would include managers that follow a growth at a reasonable price, or GARP, strategy.

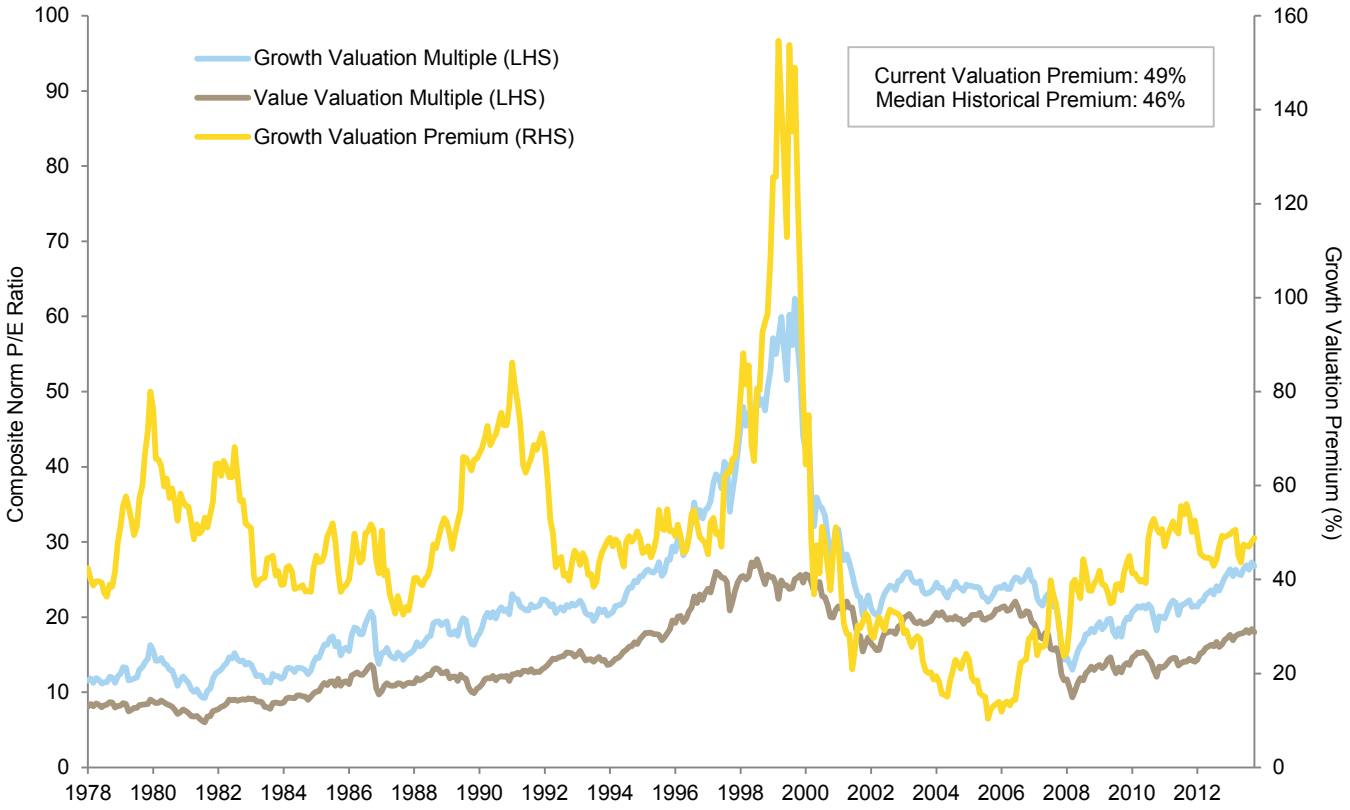
Is This a Good Time to Begin a Strategic Shift Away from Growth and Toward Momentum?

For investors convinced that quantitative momentum strategies hold more underlying promise than growth-indexed strategies, an important consideration is whether this is a good time to make a switch. Even if the decision is the right one from an equilibrium approach, perhaps there are periods when growth is particularly well positioned to outperform momentum going forward, and investors would understandably be reluctant to move away from a long-favored strategy if this appears to be one of those periods. Relative valuations may provide a key datapoint in this exercise. Currently, the Russell 1000® Growth Index trades at a 49% valuation premium to the Russell 1000® Value Index, which is nearly equal to the 46% median premium since 1978 (Figure 10).[20]

Current relative valuations are no bar to implementing the strategy shift today. That said, even during those periods when growth trades at a much slimmer valuation premium to

[20] The growth index always trades at a premium to value because of the construction of the two indexes (which sorts on valuation to determine the constituents of the two indexes). The shifting size of this premium is what we are measuring (it has varied from as slim as 10% as financials and other value shares performed strongly in 2006 and as large as 155% at the peak of the dot-com bubble). The value and growth indexes share about 30% of the stocks in the broad index (firms that are neither pure value nor pure growth are proportionally weighted to both index styles); for this reason, the valuation premium of the shares that are not held in both indexes is consistently somewhat higher than the premium for the full indexes.

Figure 10. Valuation Multiples and Premiums
December 31, 1978 – September 30, 2014

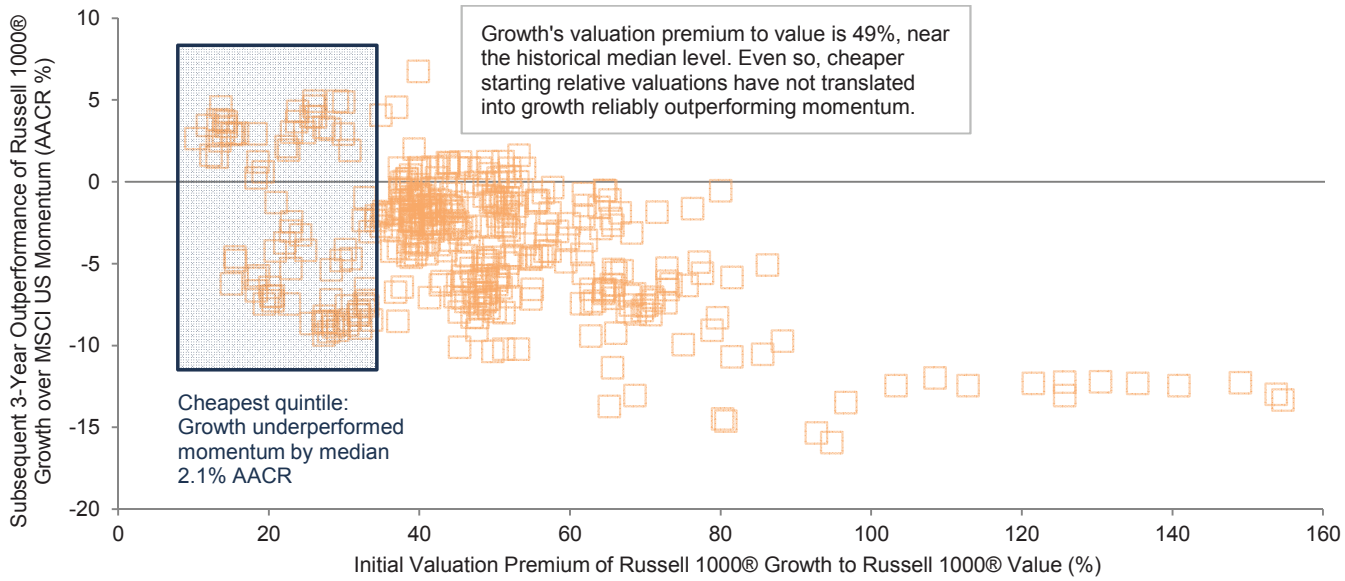


value, growth is hardly a slam dunk relative to momentum. When comparing starting valuation premiums to subsequent growth-versus-momentum returns, isolating the cheapest quintile of relative valuations for growth stocks[21] *still* translated into a median annualized underperformance of 2.1% over the next three years, with growth underperforming momentum 55% of the time despite the slim initial valuation premium for growth stocks (Figure 11). When investors pay rock-bottom premiums for growth (not the case today), growth is more likely to out-earn the broad index going forward; however, even when growth stock valuations are substantially slimmer than average, momentum typically *still* trumps growth.

In short, shifting toward quantitative equity momentum strategies as a counterpart to value equity exposure has merit, and while this is a strategic rather than tactical shift, current valuations do not present a roadblock.

[21] In this cheapest relative-valuation quintile, the Russell 1000® Growth Index started the period trading at a premium to the Russell 1000® Value Index, ranging from just 10% to roughly 33%, based on composite normalized price-earnings ratios.

Figure 11. Growth Outperformance Versus Momentum
December 31, 1978 – September 30, 2014



How Can Investors Implement Systematic Momentum?

For investors convinced of the merits of this approach, the remaining question is how to implement momentum opposite their value-centric equity managers. First, consider whether the portfolio already has significant momentum exposure. This is uncommon but not impossible, and might come from quant managers, or from hedge funds that employ momentum-driven trading (such as managed futures strategies), which will often employ equity momentum strategies, though they may include other strategies as well (and other asset classes, in the case of hedge funds).[22]

[22] For more on managed futures, please see Gene Lohmeyer et al., "Befriend the Trend: An Overview of Managed Futures Investing," Cambridge Associates Research Report, 2014.

For those investors without existing exposure, momentum-centric equity products are another option. However, because momentum is still a bit of a dirty word to many investors, few funds deliver systematic equity momentum in a clean, isolated, and transparent form. A limited number of mutual and exchange-traded fund options do exist for US-domiciled investors. These include three mutual funds from AQR designed to systematically tilt toward momentum in non-US developed markets, US large caps, and US small caps (tax-optimized versions of the funds are also available). Total expenses of roughly 50 bps to 60 bps are well above those of index funds and approach those of many fundamental equity managers. Exchange-traded funds from BlackRock iShares (ticker MTUM) and SSgA SPDRs (ticker MMTM) offer US

equity momentum tilts at 15 bp and 35 bp expense ratios, respectively.[23] For investors in any domicile, separately managed accounts benchmarked to a momentum index are an option, with investment minimums varying widely by provider. For investors subject to US capital gains tax, the higher turnover of momentum strategies may present a problem. While we are not aware of substantive research on the topic, an initial examination prepared for us by a firm that specializes in after-tax equity portfolio management indicated that a turnover-constrained momentum index could be reasonably implemented using a tax-managed approach, where the manager uses a modest tracking error budget to delay taxable gains and accelerate taxable losses.[24]

Conclusion

Despite the durable popularity of style box investing, it is becoming clear that growth indexes should not have a reserved seat in the portfolio, and neither should managers that can manage only to beat these indexes of overpriced stocks. Investors that currently aim to balance their value-oriented managers with growth index exposure should instead examine momentum strategies, which systematically overweight recently outperforming stocks. Momentum has typically offered low or negative correlations to value, as well as strong historical outperformance on its own. While many new momentum indexes and products do not have a substantial live track record, momentum as a systematic strategy has continued to perform well, long after researchers identified the anomaly in the 1990s and managers began to incorporate it into quantitatively managed products. We believe momentum's outperformance is likely due to a combination of behavioral traits and risk factors (however, we do not believe that momentum has a particularly high "crash risk"). Some momentum strategies have high turnover, and investors should (a) consider that transaction costs might render once-impressive backtest results less so, and (b) be wary of high-turnover strategies unless they are implemented quite carefully, with a strong awareness of managing these costs. Finally, investors looking to add momentum exposure can do so via quantitative managers or managed futures hedge fund strategies (although these will often add non-momentum bets in the case of the former, or incorporate momentum across non-equity asset classes in the case of the latter), or via a small number of mutual funds and exchange-traded funds. ■

[23] After nearly two years since inception, the SPDR product has less than $13 million in assets, and its high cost is a competitive disadvantage, so we would not be surprised to see it liquidate; caveat emptor.

[24] We are not aware of "live" accounts using this approach for momentum indexes, but the firm (Parametric Portfolio Associates) used historical index holdings provided by Russell indexes to determine that an investor in the top tax bracket implementing the Russell High Efficiency Momentum Index without tax management would have seen the annualized return diminish by nearly 3 ppts due to tax drag over the most recent five years, while employing tax-mitigation strategies within a tight tracking error budget would have resulted in after-tax returns that were very similar to pre-tax returns, before fees.

Contributors

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Exhibit Notes

"Growth" Indexes Versus Broad Indexes: Frequency of Outperformance and Full Period AACR Differential
Sources: Frank Russell Company, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data are monthly through September 30, 2014. Outperformance based on longest common period for both the growth index and the broad index: US large cap, January 31, 1975; US small cap, July 31, 1978; Europe large cap, January 31, 1975; Europe small cap, February 28, 2001; Japan large cap, February 29, 1980; Japan small cap, February 28, 2001; EM large cap, January 31, 1997; and EM small cap, June 30, 1994.

Performance of Momentum Across Asset Classes
Sources: Clifford S. Asness, Tobias J. Moskowitz, and Lasse Hejfe Pedersen, "Value and Momentum Everywhere," *The Journal of Finance* 68, no. 3 (June 2013): 929–985, MSCI Inc., and Standard & Poor's. MSCI data provided "as is" without any express or implied warranties.
Notes: Market-neutral factor portfolios are constructed by weighting each asset by its momentum score (the return over the past 12 months minus the most recent month); factor portfolios are long high-momentum assets and short low-momentum assets and are market neutral on a dollar basis. Excess return is the return of each momentum strategy over a relevant standard index. "Market-Neutral Country Rotation (Equity Index) Factor" represents the backtested returns of a strategy that rotates long and short exposure to various regional equity market indexes based on each index's recent relative performance. "Market-Neutral Currencies Momentum Factor" is a similar long/short currency strategy. In addition to Sharpe ratios of these factor portfolios, Asness, Moskowitz, and Pedersen also provide Sharpe ratios for the performance difference between the highest-momentum one-third of assets and the lowest-momentum one-third of assets, with each tercile being capitalization weighted. Implementing the cap-weighted strategy would likely incur lower transaction costs than the factor strategy; thus, the gross results of the cap-weighted strategies are likely more conservative than those of the factor results shown in this chart. The cap-weighted strategy has the following Sharpe ratios: US equity, 0.33; UK equity, 0.38; Europe ex UK equity, 0.55; Japan equity, 0.09; country rotation (equity index), 0.73; global bonds, 0.06; commodities, 0.53; and currencies, 0.34.

Cumulative Wealth of US Equity Portfolios Formed By Prior-Period Price Momentum
Source: Kenneth R. French Momentum Portfolios.
Notes: The momentum-decile portfolios in this analysis are constructed by calculating the performance for each security in the universe over the most recent year, excluding the most recent month. After sorting, the deciles are equal weighted.

Outperformance and Tracking Error of Selected AQR and MSCI Momentum Indexes
Sources: AQR International Limited, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Returns are based on US$ returns. Outperformance is the return of each momentum strategy over a relevant standard index.

Annual Excess Return of Selected Momentum Indexes Versus Broad Indexes
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Rolling Three-Year Excess Returns
Sources: Frank Russell Company, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data are monthly. Excess returns calculated against the Russell 1000® Index and MSCI US Index.

Efficient Frontier of US Equity Momentum, Growth, and Value Indexes
Sources: Frank Russell Company, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Note: All calculations are based on monthly excess returns, assuming reinvestment of income and dividends.

Exhibit Notes (continued)

Excess Return of AQR Value, Momentum, and Combination Strategies
Sources: Ronen Israel and Dan Villalon, "Building a Better Core Equity Portfolio: A New Paradigm for Core Equity Investing," AQR Capital Management LLC (May 2013); Frank Russell Company; and Thomson Reuters Datastream.
Notes: The value strategy and the momentum strategy reflect the excess returns of 60% exposure to AQR Value and 40% to the broad Russell 1000® Index, and of 50% exposure to AQR Momentum and 50% to the Russell 1000® Index, respectively. This is to limit the tracking error of the strategy to approximately that of the 50/50 value/momentum strategy.

Landscape of Growth-Oriented Fundamental Managers
Source: Cambridge Associates LLC.

Valuation Multiples and Premiums
Sources: Frank Russell Company and Thomson Reuters Datastream.
Note: The composite normalized price-earnings ratio is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings (the level of earnings based on a linear regression of real earnings growth), and return on equity (ROE)–adjusted earnings (adjusts current earnings for the ratio of current ROE to long-term average ROE).

Growth Outperformance Versus Momentum
Sources: Frank Russell Company and MSCI Inc. MSCI data provided "as is" without any express or implied warranties.