Acadian Asset Management
RESEARCH NEWS

A Quantitative Approach to Global Growth Portfolios

By
Acadian Asset Management LLC

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Summary

The past two decades have seen broad acceptance of quantitative approaches to active equity management, but these developments have largely been confined to core and value portfolios. Common wisdom has held that growth stocks are best analyzed using traditional fundamental processes. Acadian believes there is an under-recognized opportunity for the use of quantitative methods in the growth stock area. We have developed a new quantitative model, called the Adaptive Factor Model, specifically to identify attractive growth stocks. In January 2009, we launched the Acadian Global Growth strategy which is based on this new model.

Quantitative Approaches: An Overview

Over the past couple of decades, quantitative methods have moved from the periphery to the mainstream of investment management. Estimates suggest that by the middle of 2007, more than $2 trillion of assets were being managed with the use of quantitative methods (Fabozzi, Focardi and Jonas, 2008). Some of these assets are invested in passive strategies, whose goal is to track specific indices. However, a substantial proportion of these assets are invested in active strategies, which seek to use quantitative methods to capture alpha by picking outperformers and avoiding underperformers.

A wide range of quantitative models and strategies have been developed by academic researchers and practitioners. Most of these approaches draw heavily upon four decades of research into asset pricing, which have focused on ways in which market behavior deviates from what would be expected under assumptions of perfect efficiency. Researchers have found a number of anomalies which appear sufficiently persistent to be used for investment purposes, including patterns related to valuation, size, accruals, and momentum. Several of these anomalies were already being used by fundamental analysts as "rules of thumb" in their work.

Quantitative models and strategies are now being widely applied for portfolios invested in core and value styles. But it appears less common to see quantitative methods being used to build portfolios of growth stocks. The majority of growth portfolios still rely heavily on fundamental analysis, and from conversations that we have held with asset owners and consultants, it seems that most of the managers of such portfolios believe that company-specific insights are essential for picking attractive growth stocks.

While we believe there are some insights that can come from fundamental analysis, Acadian also sees an underutilized opportunity to deploy quantitative analysis in the growth space. In addition to the

"fundamental alpha" sought by traditional analysts, there is also the potential for some "quantitative alpha" in growth stocks that may be captured by an appropriately specified quantitative model.

Why Should a Quantitative Approach Work in Growth?

Quantitative models seek to identify predictable patterns in market behavior. There is a large body of economic theory showing that if markets were perfectly efficient, then asset prices would follow a random walk. In such a market, there would not be any persistent patterns in the market that could provide investable signals.

Most practitioners and many academics agree that the financial markets generally are quite close to efficiency. However, decades of research by academics and practitioners have found that there are some persistent patterns in market behavior, and that some of them may indeed be investable (Campbell, 2000; Kothari, 2001). The source of such investable patterns has been a topic of debate among researchers in various academic disciplines for decades, most recently drawing from the discipline of behavioral finance (Barberis and Thaler, 2003; Hirshleifer and Teoh, 2008).

Theoretical and empirical research in behavioral finance includes work on overreaction, risk aversion, herd-following, and extrapolating the recent past into the future. There is no reason to assume that these types of behavioral biases are limited to certain types of stocks. In fact, we believe that many of the cognitive errors identified by behavioral finance may be particularly acute among investors who concentrate on growth stocks.

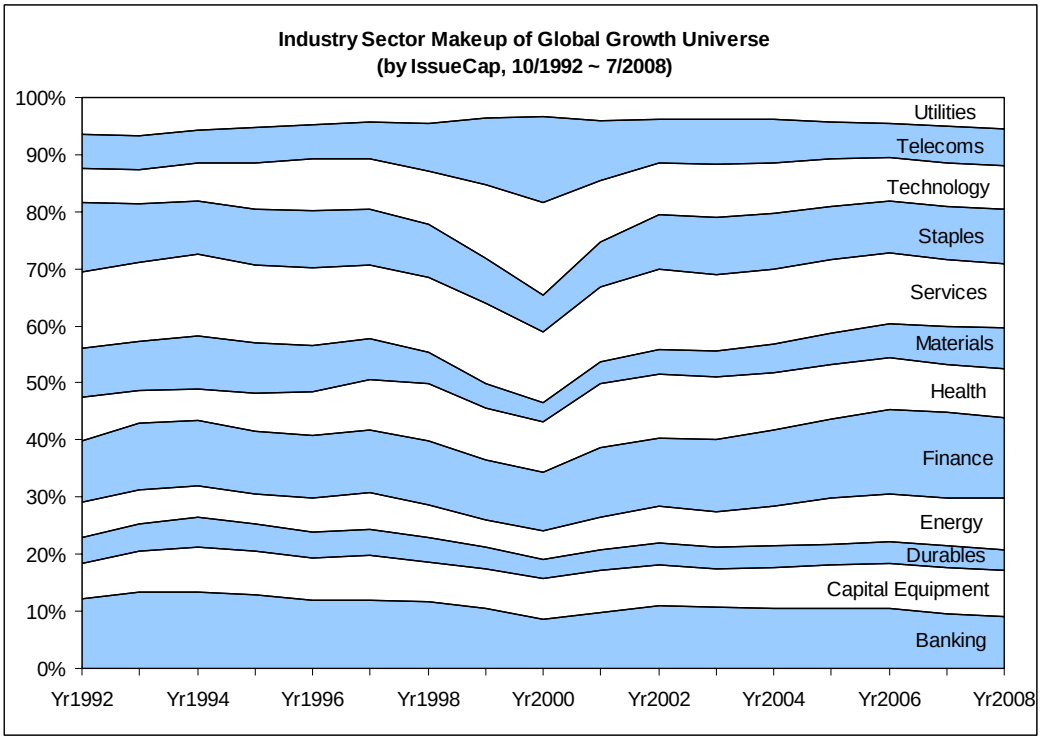
Traditional growth managers tend to focus heavily on company-specific risk, and make decisions on the basis of news flow, corporate events, and expectations about the market's response to new products and technologies. Investing in growth companies on the basis of fundamental analysis therefore requires individuals to react to news and make assumptions about an uncertain future, arguably creating an environment in which behavioral bias can flourish. We would argue that this in turn can provide the opportunity for a more objective and disciplined approach to take advantage of potential mispricings. In essence, the approach is somewhat similar to that identified by Michael Lewis (2003) in his exploration of how statistical analysis can take advantage of human bias in professional baseball.

The current uncrowded nature of the quantitative growth space offers another potential benefit to this type of approach. Since there are relatively few quantitative investors focusing on growth stocks, consequently there may be more opportunities for a disciplined process to identify, and these anomalies may be relatively persistent and underexploited.

Given this, it is interesting that there are so few quant managers currently at work in the growth space. We believe that this is largely a historical accident, whereby value managers were among the first to gravitate toward quantitative techniques. It is not obvious that the characteristics of value companies should lend themselves more readily to quantitative analysis. Our research suggests that that growth stocks can indeed be subjected to quantitative analysis, though they may well require techniques tailored to their specific characteristics.

In this context, it is important to note that the growth universe has evolved over time, and is no longer dominated by companies focusing on technology and biotechnology. As shown in Exhibit 1, the global growth universe currently includes significant market cap weightings in a broad range of sectors, including energy, materials, services and financials. There is thus ample scope in the growth universe for the use of a systematic investment discipline.

Exhibit 1: Industry Makeup of the Global Growth Test Universe



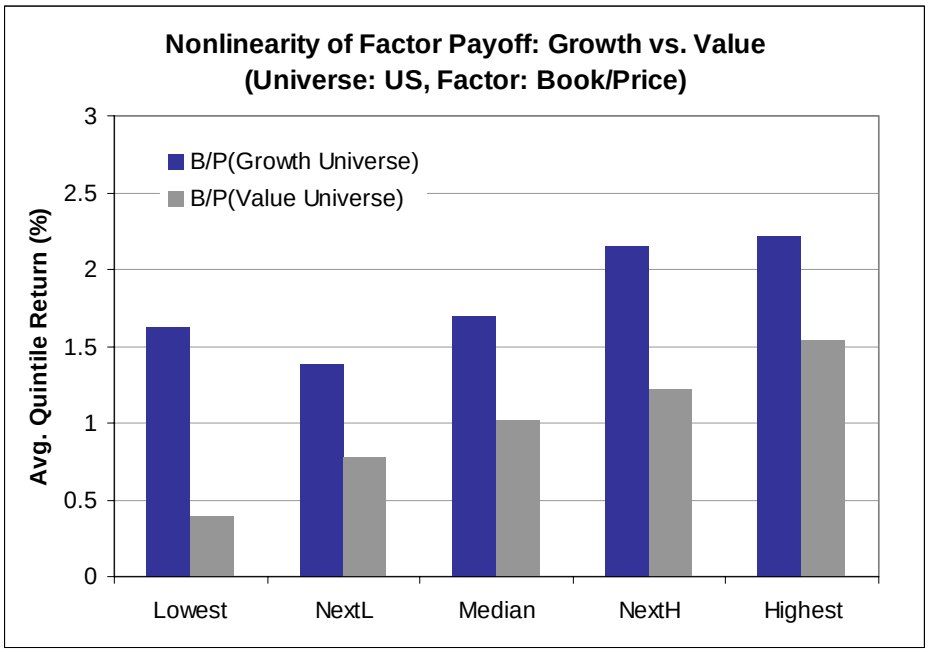
Source: Acadian, S&P/Citigroup, data as of July 31, 2008. For illustrative purposes only.

Acadian's Approach to the Growth Model

In order to build an effective quantitative model, we needed to choose a suitable universe of global growth stocks for analysis and testing purposes. For this purpose, we have constructed our own synthetic universe, comprising the firms that are in the S&P/Citigroup World Growth index (with "growth score" exceeding 50%) and also in the Acadian data universe. Over the past eleven years, this universe has ranged between 2,500 and 5,000 names. Notably, this universe had a high proportion of technology, telecom, and service companies in the late 1990s, but it has always had broad sector membership, including companies in all the major sectors including energy, financials and materials (Exhibit 1).

Based on our research and our review of related academic work, it appeared that building a quantitative model for a universe of growth stocks might be more challenging than building a similar model for a core or value portfolio (Dechow and Sloan, 1997; Ali, Hwang and Trombley, 2003; Mohanram, 2003). We began our analysis by taking some simple factors such as Price/Book and analyzing their historic returns using a fractile-based approach. Specifically, we divided our global growth universe into five quintiles of equal numbers of stocks. The use of fractile-level analysis helps to identify potential non-linearities in factor returns (Fama and French, 2007). For instance, over the period from January 1995 to December 2007, the average monthly returns by quintile to Book/Price for a universe of value stocks were monotonic, but this was not true for a universe of growth stocks, as shown below.

Exhibit 2: SIMULATED Returns to Book/Price for Global Growth Companies

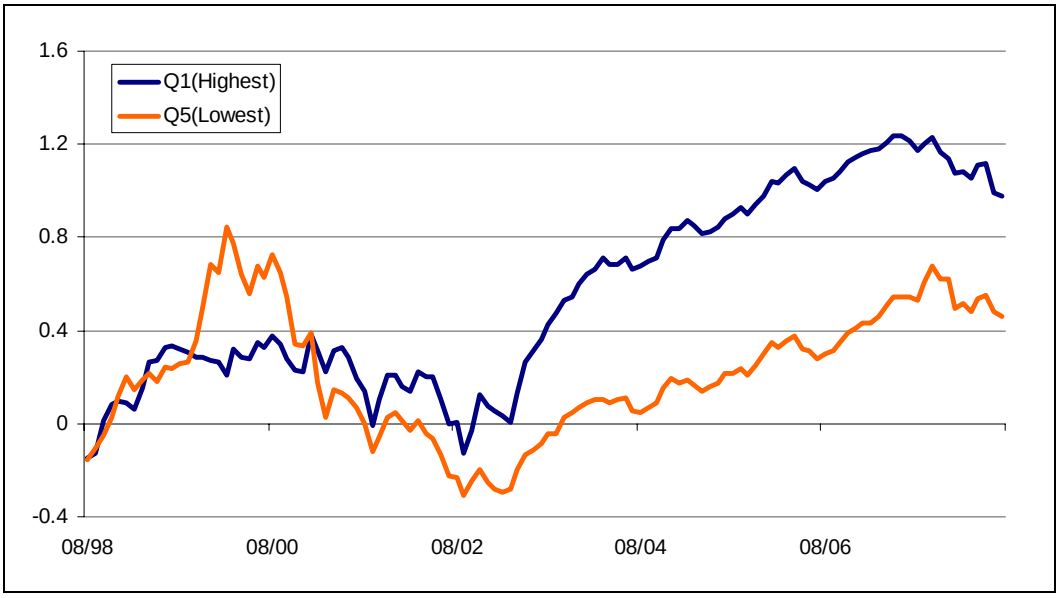


Source: Acadian, provided for illustrative purposes only, based on arithmetically compounded monthly returns from January 1995 to December 2007. Note that the term "return" indicates the statistical measure of a theoretical or simulated portfolio performance based on a strategy. It is not intended to represent investment returns generated by an actual portfolio. The returns of the simulated portfolio represent a theoretical Global Growth Portfolio. They do not represent actual trading or an actual account, but were achieved by means of retroactive application of a model designed with the benefit of hindsight. Results may not reflect the impact that material economic and market factors might have had on the adviser's decision-making if managing actual client assets.

In addition to being non-monotonic, the factor returns to growth stocks appear to behave rather erratically. During some sub-periods of our research period, the quintile-level returns to Book/Price differed considerably from the long-run pattern. Indeed, our analysis indicated that the factors which were most effective in a growth universe often underperformed during some multi-year periods.

For example, there have been eras when sentiment-based factors such as price momentum would have been very useful for identifying future outperformers among growth stocks, but there have also been episodes when such factors would not have provided useful signals — during such periods, investing on the basis of sentiment factors would probably have generated negative performance. Similarly, investing on the basis of valuation factors such as Book/Price would have been quite effective in the past ten years, except during the Technology-Media-Telecommunications bubble of the late 1990s and its immediate aftermath, as shown in Exhibit 3 below.

Exhibit 3: SIMULATED Returns to Book/Price for Global Growth Companies



Source: Acadian, provided for illustrative purposes only, returns are compounded arithmetically. Data as of (8/1998~8/2008). Note that the term "return" indicates the statistical measure of a theoretical or simulated portfolio performance based on a strategy; it is not intended to represent investment returns generated by an actual portfolio. The returns of the simulated portfolio represent a theoretical Global Growth Portfolio. They do not represent actual trading or an actual account, but were achieved by means of retroactive application of a model designed with the benefit of hindsight. Results may not reflect the impact that material economic and market factors might have had on the adviser's decision-making if managing actual client assets.

How Does the New Model Work?

Like most quantitative models, the new Adaptive Factor Model relies heavily on observed historical relationships. It takes information about various measurable characteristics of companies on a particular date, and then observes the subsequent stock price performance of those companies. Some of the characteristics tested for the model were conventional ones such as Price/Earnings or Earnings Quality, while others were developed by Acadian's in-house research team. The model's chosen factors mainly fall into four categories: Sentiment, Growth, Quality, and Valuation.

Exhibit 4: Examples of Factors In the Four Main Categories Used By the Adaptive Factor Model

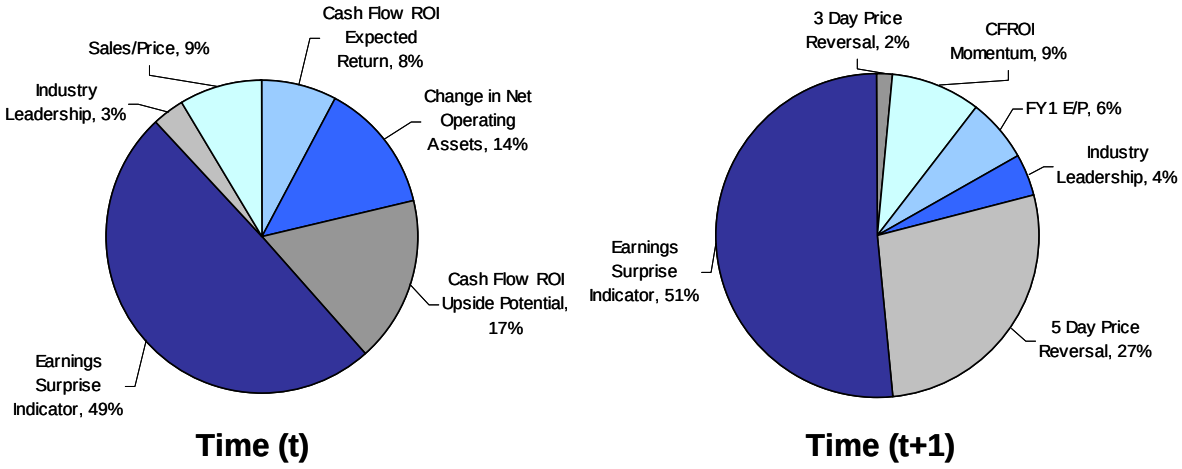
	Example 1	**Example 2**	**Example 3**
Sentiment	Investor Attention	Price Patterns	Insider Buying & Selling
Growth	Earnings Revisions	Earnings Surprises	CFROI Momentum
Quality	Quality of Earnings	Quality of Cash Flow	Operating Strength
Valuation	Price/Earnings	Price/Book	FY2 Price/Earnings

Source: Acadian, provided for illustrative purposes only

Each factor was assessed independently, using a quintile-based approach in order to ensure that any non-linearities in the relationships would be recognized. The new model uses a disciplined approach to select

factors and to determine their relative weights. The method chosen was derived partly from standard methods used in asset allocation work (as discussed in Qian, Hua, and Sorenson 2007, Chapter 7). However, for the reasons discussed above, our model does not make the simplifying assumption that factor returns and their covariances have a linear relationship which is consistent over time. Instead, the Adaptive Factor Model explicitly seeks to measure and adapt to changes in factor effectiveness and in the relationships between factor returns over time.

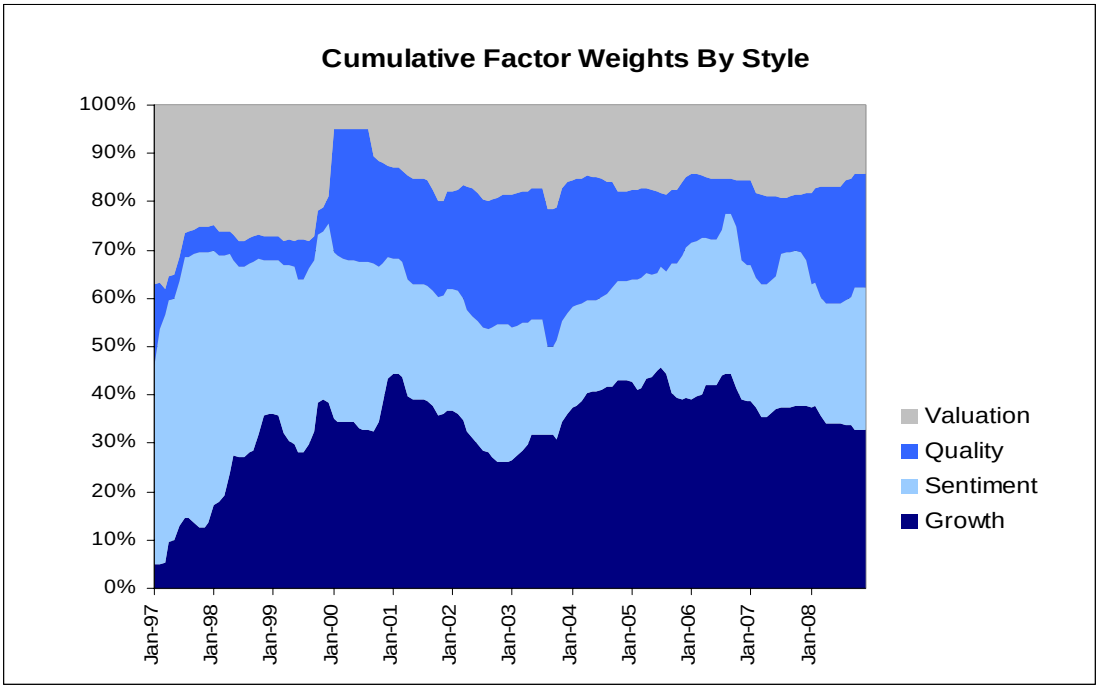
Exhibit 5: Examples of Possible Factor-Weight Combinations at Different Times



Note, provided for illustrative purposes only.

The various parameters of the model are updated on a monthly basis, in order to ensure that the information about factor effectiveness will always reflect information in a timely manner, as illustrated in a stylized example in Exhibit 5. We have carried out a range of tests on the robustness of the results, and have concluded that the changes in factor weights are not driven by data noise, but instead genuinely do reflect changes in factor efficacies over time. On a back-tested basis, the model would have assigned more weight to Sentiment factors in the late 1990s, but more recently would have given more emphasis to Growth factors. Many quantitative models tend to put heavy emphasis on Valuation factors, but the Adaptive Factor Model rarely gives these more than a small weighting for a portfolio of growth stocks.

Exhibit 6: Adaptive Factor Model Weightings of Factor Categories for Global Growth Companies



Source: Acadian, data as of July 2008. Note, provided for illustrative purposes only

How Acadian Manages the Quantitative Global Growth Strategy

On the basis of our research and some performance simulation work (whose results are available to qualified investors upon request), we have found that the Adaptive Factor Model would have performed reasonably well over a ten-year time span in a simulated portfolio setting.

The current version of this model is being used solely to identify companies with the potential to outperform; in other words to find candidates for a conventional long-only portfolio. As indicated above, our preliminary research suggests that the same model could also be used to identify companies with the potential to underperform, for the purpose of building a long-short leveraged or market-neutral portfolio. However, this work is still under development.

As discussed above, we also seek to consider explicitly the potential impact of transaction costs. Our strategy relies heavily on growth and sentiment factors, where quintile membership tends to have less persistence than for valuation and quality. Consequently, the unconstrained use of alpha forecasts would likely generate significant turnover, which can erode realized alpha. Within the portfolio construction process, we can control the annual turnover of the portfolio to a desired level, and for simulation purposes we kept it between 120% and 150%. Our research and the results from the simulation suggest that this level of turnover, which is quite typical for a growth portfolio, can offer a good tradeoff between alpha and transaction costs.

All of the results discussed in this white paper are based on the stocks in the global growth universe whose construction was discussed above. However, the Adaptive Factor Model is quite flexible and can be applied to sub-groups of stocks. For instance, if a client wishes to construct a portfolio of global growth ex-U.S. stocks, the model could readily be adapted to such a requirement. Depending on client

preferences, it would also be feasible to include specific constraints such as including or excluding particular sectors or industry groups, or even including or excluding particular stocks.

Global Growth Strategy Launch

We believe that the Adaptive Factor Model represents a promising development for global investment strategies focused on growth equities. The Acadian Global Growth Strategy was formally launched at the end of 2008, using the strategy and methodology model described above. The strategy seeks to capture attractive investment opportunities across a broad range of growth stocks globally. The strategy is managed subject to optimization with the goal of keeping its risk attributes within relatively tight constraints.

The process of forming and updating the strategy is based on Acadian's long-established core process. We will continue to monitor information flows related to our holdings on a regular basis, to ensure that the strategy is managed in a timely manner. Acadian will also continue to research new factors, and to incorporate them into the Adaptive Growth Model if they are demonstrably useful.

NOTE

Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual performance results subsequently achieved by any particular trading program.

One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or to adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

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