



LOGAN CAPITAL
MANAGEMENT, INC.



Demystifying Factors

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The cat and the cucumber

I am willing to bet you have seen the video: Cats are seemingly terrified when they are surprised by a cucumber that has been placed out of their line of sight while they were eating.

The key idea is 'surprised'; Surprises are scary, to both cats and to sophisticated institutional investors. Institutional investors and their Consultants and Advisors have developed voracious appetites for:

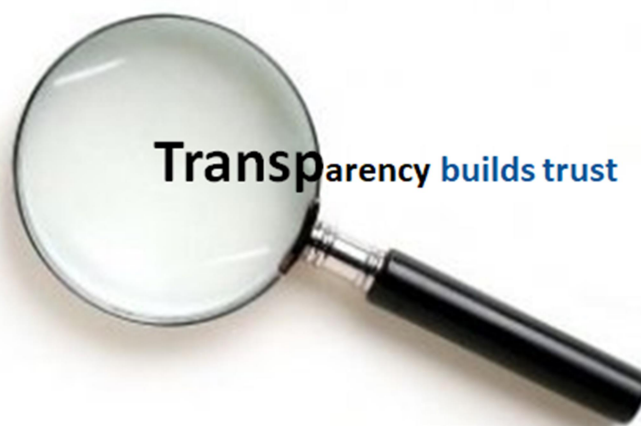
- Increased transparency tied to performance decomposition and
- Microscopic granularity in evaluating assumed portfolio risk exposures

In this paper, I have attempted take the 'mystery' out of factor based portfolio risk assessment and its corollary, factor based performance attribution. The key concept fueling interest in factors is **the never-ending pursuit of greater transparency.**

Transparency builds trust

When a Client knows what to expect from the investment process, they **trust their Investment Manager, Consultant or Advisor.**

Clients who trust their investment professionals are more likely to be patient during challenging investment environments and to remain engaged especially during deep or protracted downturns.



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Why are factors important?

Today, most Clients, Consultants and Advisors seek out managers who can effectively articulate their bets (e.g., small caps will do better than larger caps) and unintended biases (e.g., excluding energy stocks misses benefit from rising profitability caused by government policy changes) in the portfolios.

- **Factors have explanatory power**

The ability to decompose investment performance after the fact, for example at each quarter end, can help an Investment Manager explain the impact of individual attributes of the bets and/or inherent biases in the portfolio.



- **Factors have predictive power**

The ability to show the existing bets in the portfolio, or portfolio positioning, can help an Investment Manager explain changes (or lack thereof) in the portfolio over time. For example, a 'Top-Down Core' portfolio manager may be forecasting a downturn in the economy leading to a meaningful market correction. In this case, they may reposition the portfolio to be more defensive by buying more deep value stocks, lower volatility stocks or higher dividend payers because they believe those types of stocks will hold their values relatively better under adverse market conditions.



- **Increased transparency is the “Flavor of the Year”**

In a marketplace where Investment Managers are experiencing pressure to perform in all types of markets since the US bear market from October 2007 to March 2009, greater transparency is highly sought after by sophisticated investors, their Consultants and Advisors. The granularity provided by a factor based explanation of portfolio bets can help align the understanding of the Investment Manager and Clients, which can be critical to retaining business in the event a particular portfolio bet causes portfolio performance to suffer on either a relative or absolute basis.





What is a factor?

factor

fac·tor

'faktər/

noun: factor; plural noun: factors

1. a circumstance, fact, or influence that contributes to a result or outcome.

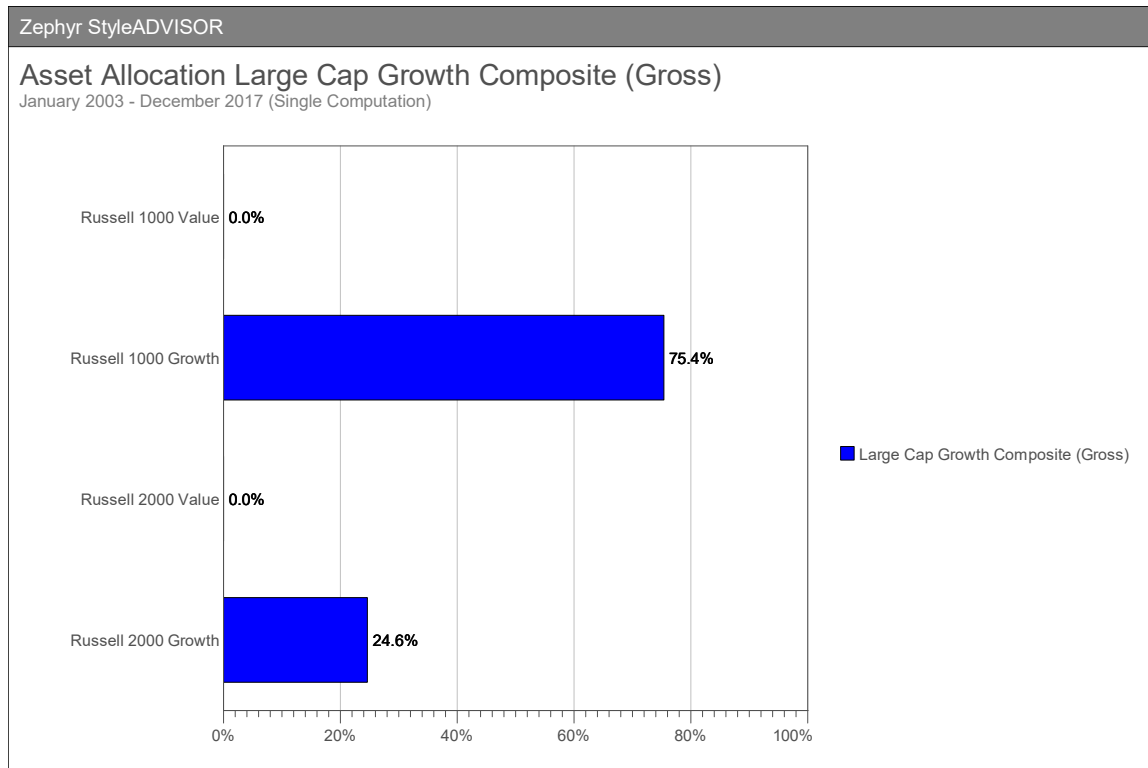
Source: Dictionary.com

Indexes can be factors. As I pointed out in my paper, **“Is Your Index Fooling You?”**:

There is no shortage of indices geared to a particular set of attributes and one can drill down with increasing granularity: high dividend payers, low volatility or Malaysian consumer services midcap value, for example.



Exhibit 1 shows a regression analysis of a Large Cap Growth (“LCG”) Composite using a widely used palette of factors that comprises the Russell 1000 Value (R1000V), Russell 1000 Growth (R1000G), Russell 2000 Value (R2000V) and Russell 2000 Growth (R2000G) indexes.



Source: StyleADVISOR

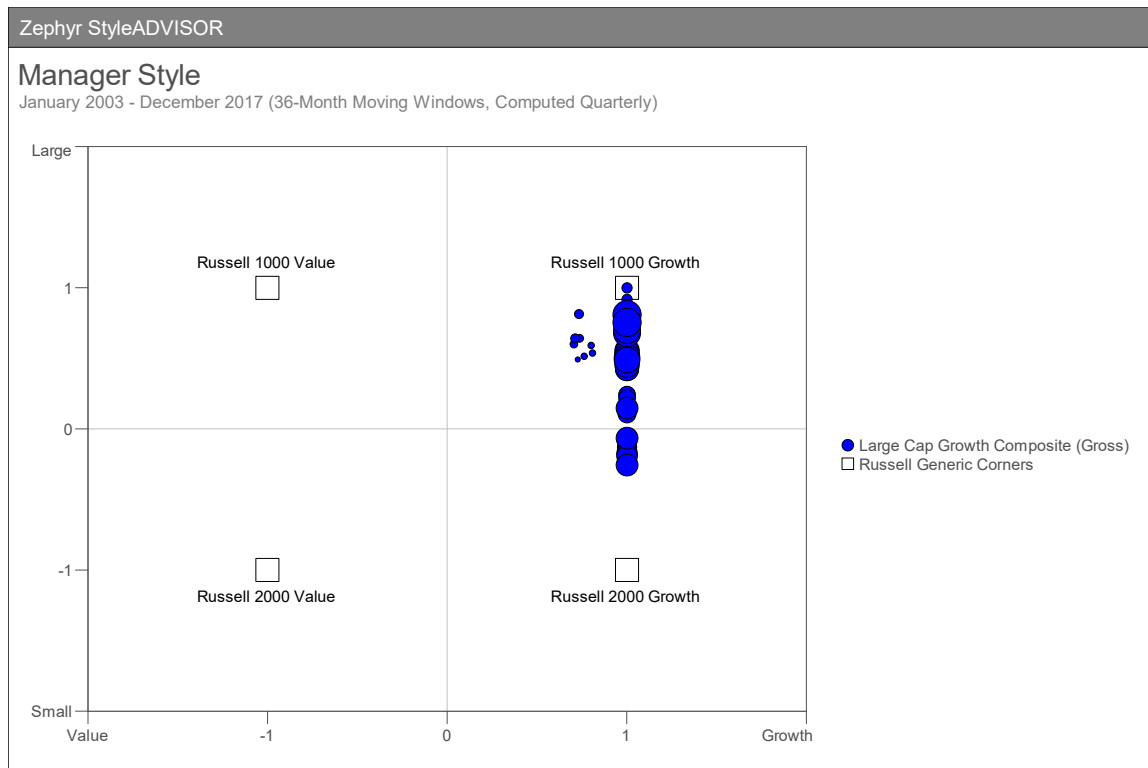
Exhibit 1

Zephyr StyleADVISOR calculates that the 15-year performance of this Large Cap Growth Composite (using a single computation for the time period) would best be replicated by applying a mix of 75% Russell 1000 Growth Index and 25% Russell 2000 Growth Index, with no contribution from the Value indexes.

Clear, concise and compelling.



Looking at a scatter plot of the same data plotting multiple rolling three-year time periods creates an interesting picture (Exhibit 2).



Source: StyleADVISOR

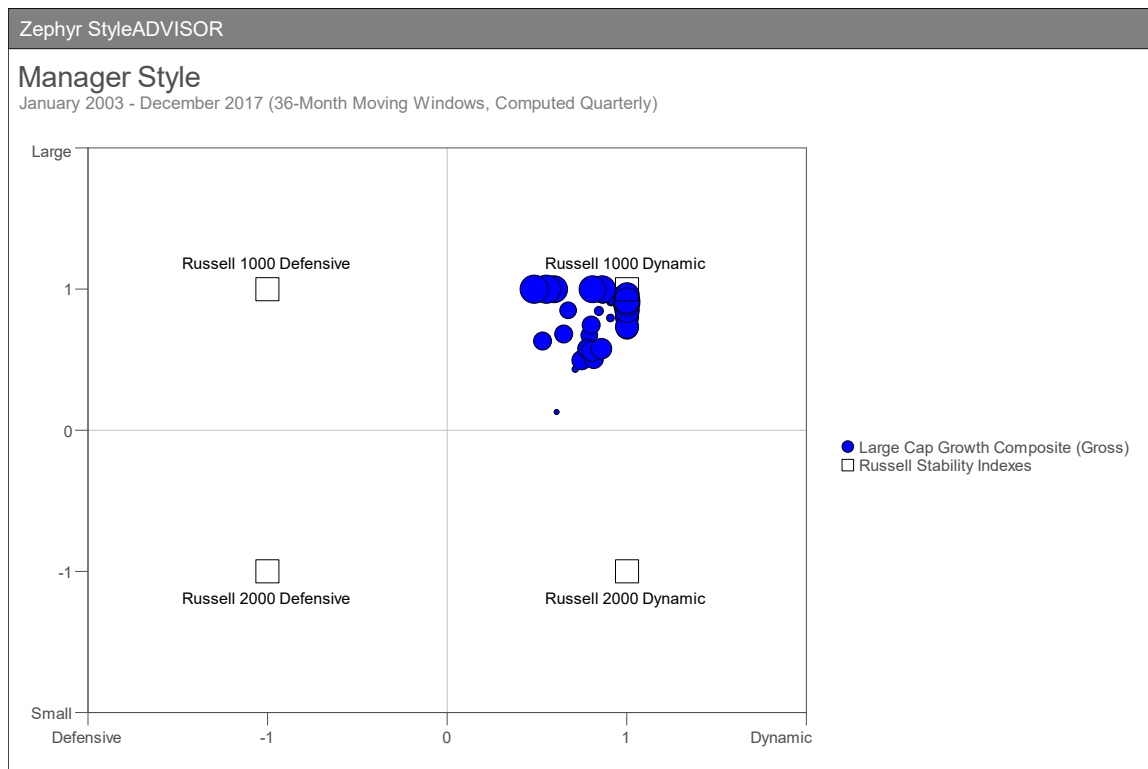
Exhibit 2

The plot points are “pegged” to the R1000G, which suggests that they would plot further to the right if allowed; that the composite is in fact even more “growthy” than the R1000G. This usually means that **a different set of factors might give more insight** into the characteristics of this strategy.



In the next graph (Exhibit 3), we plot the same composite using a more relevant set of index factors for this strategy; Indexes whose construction rules align more closely with the stock selection criteria used by the LCG composite's manager, namely the Russell Stability Indexes (Russell 10000 Defensive and Dynamic Indexes and Russell 2000 Defensive and Dynamic Indexes).

Using indexes that are more relevant factors for this strategy gives more clarity to the manager's style over time.



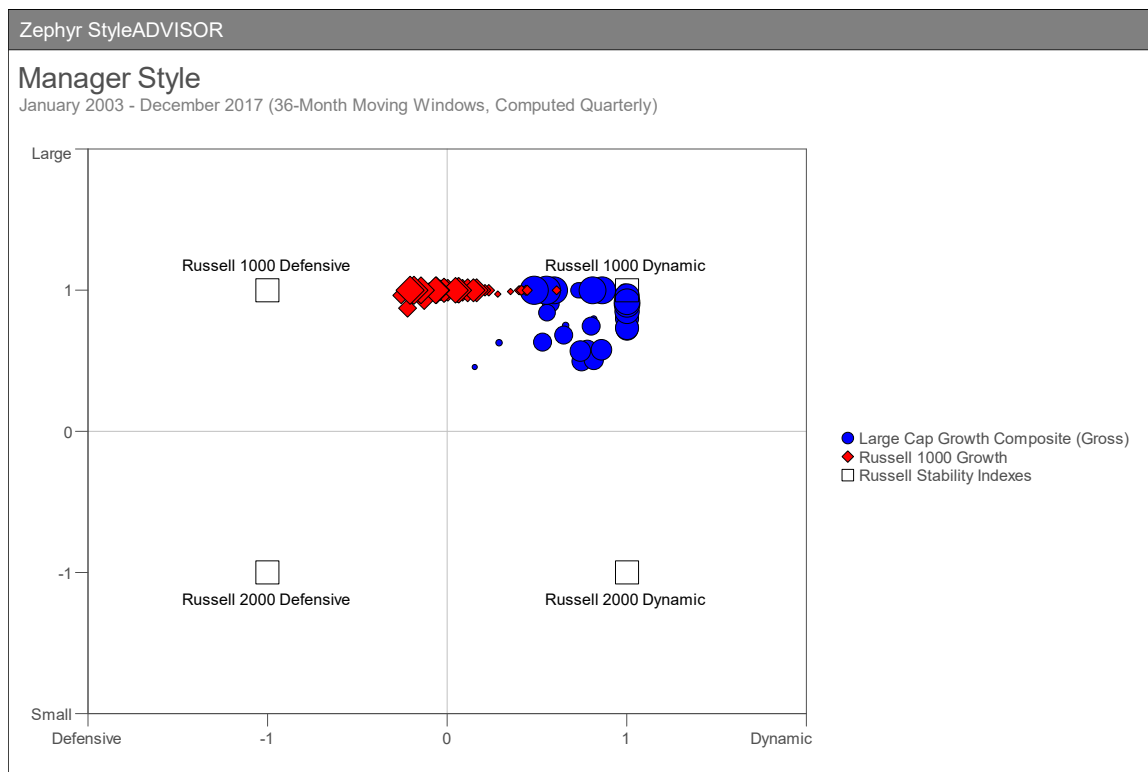
Source: StyleADVISOR

Exhibit 3



We gain even more information about the manager's style when we also plot the strategy's benchmark, the R1000G, using this palette of factors.

Exhibit 4 clearly shows that the R1000G, despite being a 'growth' index, has become more defensive during the last 15 years, while the manager has largely adhered to the same style.



Source: StyleADVISOR

Exhibit 4

So, **it is good practice to match the palette closely to the strategy.**



What makes a good factor palette?

Nobody describes this concept more succinctly or more elegantly than McKinsey. A good factor set will have the “MECE” property.

“MECE”:

The individual components will be **Mutually Exclusive**

And grouped together, the result will be **Cumulatively Exhaustive**.

Factor Palettes

Examples of factors* are listed below:

- Country
 - Currency
 - Sector
 - Industry
 - Stock Selection
 - Style
- **Style** (*Subfactors*)
 - Size
 - Growth
 - Value
 - Quality
 - Profitability
 - Dividend yield
 - Earnings variability
 - Debt to capital
 - Return on equity
 - Return on assets
 - Volatility
 - Momentum
 - Trade Activity
 - Leverage

**Defined and used by: Bloomberg, FactSet, Wilshire, Axioma, Style Research and others; Definitions are proprietary.*



My favorite factor is “**Alphabetic**”. A short summary in the paper’s abstract describes the phenomenon:

Alphabetic Bias, Investor Recognition, and Trading Behavior

[Heiko Jacobs](#) [Alexander Hillert](#)

Review of Finance, Volume 20, Issue 2, 1 March 2016, Pages 693-723,

<https://doi.org/10.1093/rof/rfv060>

Published: 14 December 2015

Abstract

Extensive research has revealed that alphabetical name ordering tends to provide an advantage to those positioned in the beginning of an alphabetical listing. This article is the first to explore the implications of this alphabetic bias in financial markets. We find that US stocks that appear near the top of an alphabetical listing have about 5-15% higher trading activity and liquidity than stocks that appear toward the bottom. The magnitude of these results is negatively related to firm visibility and investor sophistication. International evidence and fund flows further indicate that ordering effects can affect trading activity and liquidity.

But I digress.

Factor palettes must be relevant to the portfolio or strategy that is being analyzed. A MECE factor palette enables estimated yet detailed decomposition of portfolio bets and ultimately, portfolio performance. For example, an international or global portfolio should use a palette that includes at a minimum Country, Currency, Sector/Industry, Stock Selection and Style. If desired, one can drill down further into the ‘Style’ factor (as shown in the ‘Examples of Factors’ table, above). However, leaving out ‘Country’ in the palette will eliminate an important source of beta in the analysis, and will assign the ‘Country’ effect to another category.

Factors are types of beta

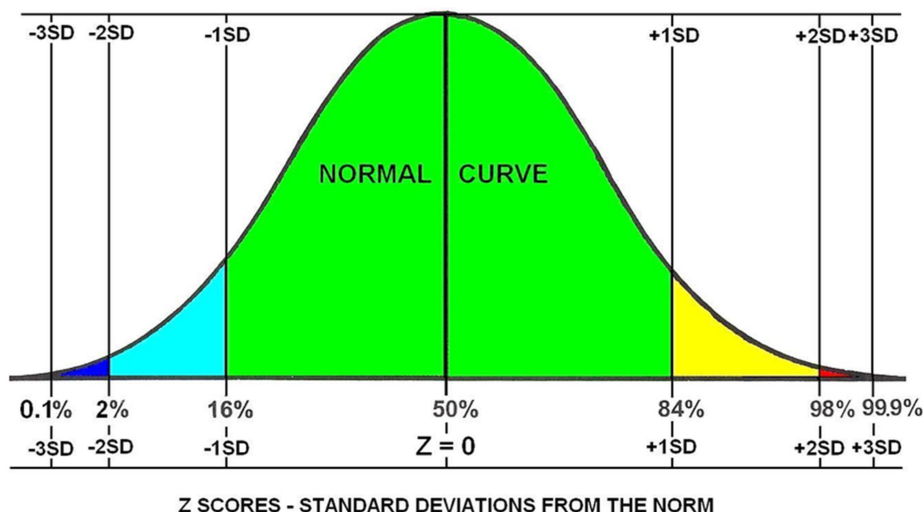
Ideally, a factor will describe performance that is ‘inescapable’ simply because that is the basket a portfolio is choosing from, such as the Japanese stock market, US Small Caps, or Real Estate Investment Trusts. For example, in a portfolio invested in the Japanese stock market: as goes the Japanese market as a whole (up or down), so goes the portfolio invested there. In other words, the portfolio will be affected by the beta of the Japanese stock market.

The concept of **alpha** will essentially be the cumulative effect of other **beta-type factor bets**—biases— that explain a portfolio’s performance deviation from the performance that would have been achieved by being broadly invested in the market. For example, owning French small caps or French high dividend payers would be bets against the broad French market: a size bet and a dividend bet. This type of analysis is especially critical in explaining performance when a segment of a stock market delivers performance that is markedly different from most of the constituents of that market.

Factor exposures are defined using a “Z-score”

The use of a Z-score allows comparisons across factors measured in different units, for example, a P/E Ratio, which is a ratio, versus market capitalization that is measured in currency. Factor Z-scores are the number of standard deviations away from the mean exposure within an investment pool (for example, a particular market) that a given portfolio exhibits. See Exhibit 5 for a Z-score refresher: the Normal Distribution, or Bell Curve.

Normal Distribution (Bell Curve)



Source: Researchgate.net

Exhibit 5

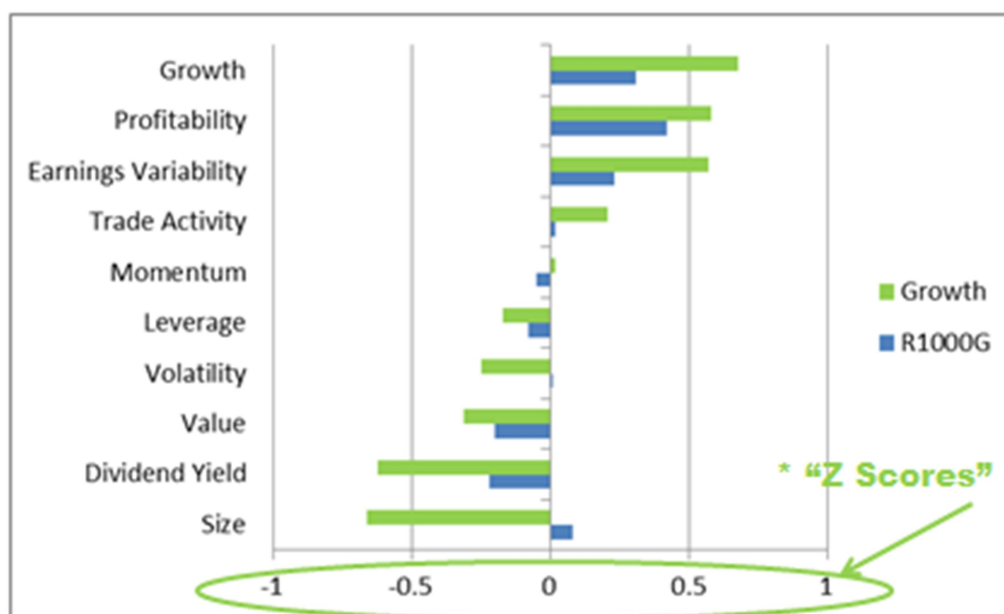
So, if your investment universe is ‘all publicly traded US stocks’ but you have a bias toward smaller caps, your Z-score for the ‘Size’ factor should be negative. Further, a US microcap investor would be expected to have a ‘Size’ factor Z-score of at least negative 2, (possibly negative 3), indicating that the weighted average market cap of the portfolio is much smaller than that of the broad US market.

If analysis of a microcap portfolio showed a higher ‘Size’ Z-score, say negative 0.5 or negative 1, one could reasonably conclude that the portfolio manager was not running a portfolio geared to microcaps...regardless of the strategy’s description.

However, factor bets are end point sensitive, so it is entirely possible that the microcap investor invested in Apple, Google or Microsoft many years ago when they qualified as microcaps, and investment guidelines permitted running winners. So it pays to be aware of the limitations of analyzing factor bets before jumping to conclusions. (That said, a “microcap portfolio” that today owns such names would not likely be described as a microcap portfolio.)

The use of Z-scores makes it easy to show the **Style bets** of this representative US mid- to large cap (“Growth”) portfolio (using the Bloomberg Style factor palette) compared to its benchmark, the Russell 1000 Growth Index, shown below in Exhibit 6.

Bloomberg style factor exposures* *Growth and R1000G 2016*



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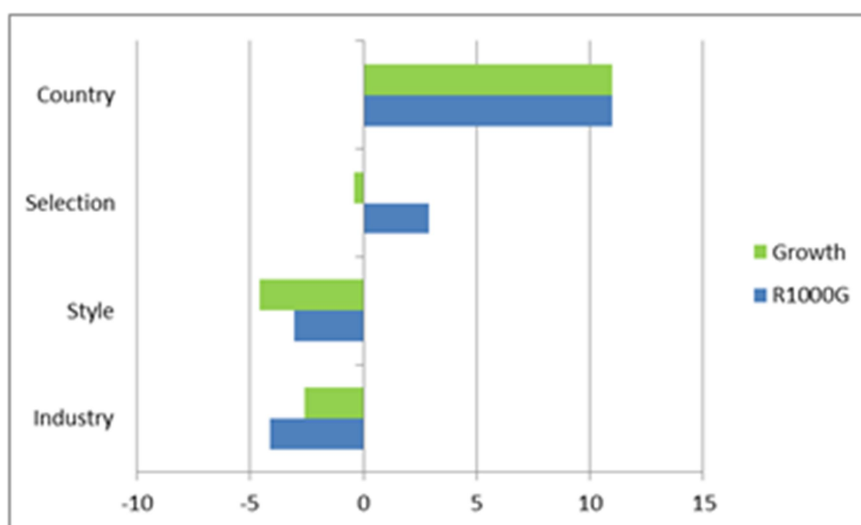
Data source: Bloomberg

Exhibit 6

Notable features of the portfolio are: it is “growthier”, exhibits greater average profitability and higher variability of earnings, owns less and/or lower dividend yielders, and has a smaller weighted average market cap than the Russell 1000 Growth Index. The fact that the Z-scores are generally about 0.5 or less away from the Z-scores of the index suggests that on balance the benchmark is appropriate for this representative portfolio.

However Style-based subfactors are only a part of performance attribution. Exhibit 7 shows factor based performance attribution for the representative Growth portfolio that has been calculated with each broad factor showing *contribution to return*. In general, contribution to return is calculated using average portfolio weight times factor performance over a given time period, although each vendor has a proprietary calculation method.

Style factors are only a part of attribution Contribution to return 2016 in %



Source: Bloomberg

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Data source: Bloomberg

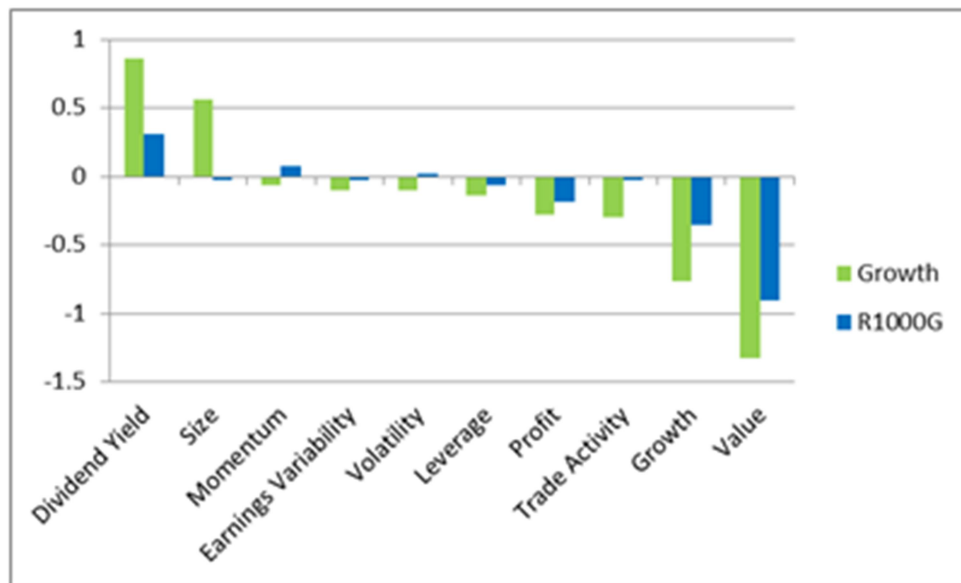
Exhibit 7

Note: This US-based portfolio has been analyzed using a global factor palette even though it is a US domestic strategy, therefore the ‘Country’ factor provides no additional information when compared to the Index.



Exhibit 8 shows the overall ‘Style’ factor decomposed into its constituents according to Bloomberg’s factor attribution.

Style Factor Contributions to Return in % *Growth and R1000G 2016*



Source: Bloomberg

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Data source: Bloomberg

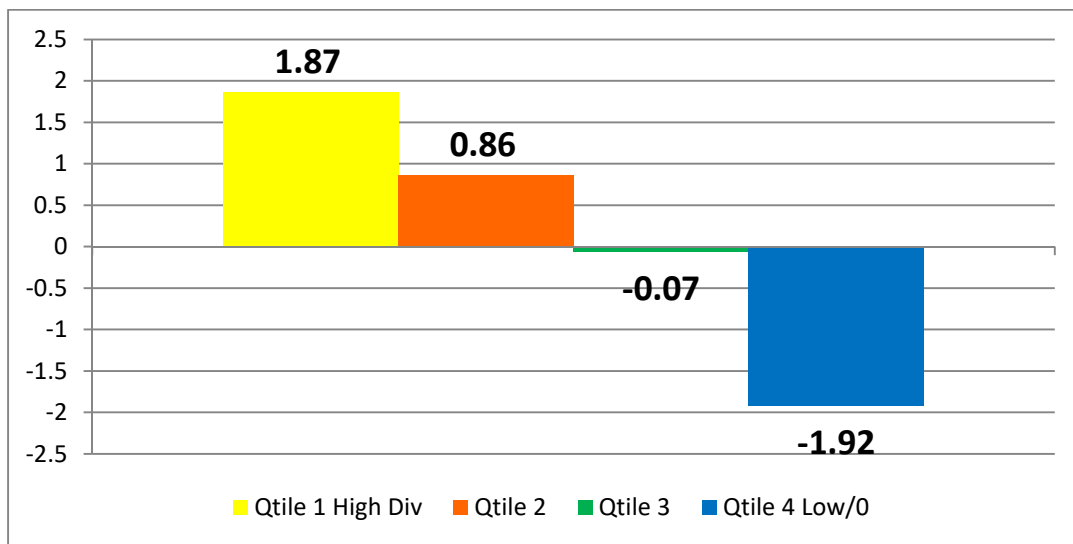
Exhibit 8



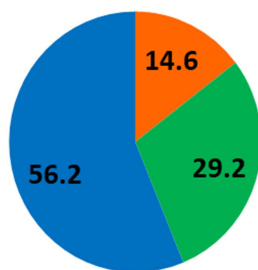
Putting factor analysis to work

A picture can be worth a thousand words. The attribution data generated by the various vendors can be good, but sometimes creating customized graphics that blend data from multiple sources can be better. The following exhibit, Exhibit 9, shows a graphic explanation of performance of a representative large cap growth portfolio in Q1 2016, a quarter where dividend stocks were responsible for performance of the Russell 1000 Growth Index. In this case, the portfolio performance lagged the Index's return significantly. A clear explanation is shown below.

Russell 1000 Growth Q1 2016 Performance by Dividend Yield

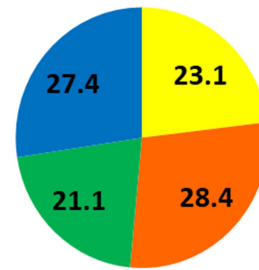


LCG MV by Dividend Yield



■ Qtile 1 High Div ■ Qtile 2 ■ Qtile 3 ■ Qtile 4/5 Low or No Div

R1000G MV by Dividend Yield



■ Qtile 1 High Div ■ Qtile 2 ■ Qtile 3 ■ Qtile 4/5 Low or No Div

Data source: Bloomberg

Exhibit 9



The pie charts in Exhibit 9, above, show that while the R1000G had 23% of its market cap represented by the best performing stocks - the top quintile dividend yielders, and more than half invested in the top two tiers that both produced positive returns, the representative LCG portfolio had no investments in top dividend yielding stocks and just 14% in the quintile 2 dividend yielders.

A word about factor based ETFs

There is no dearth of information about factor based investing using exchange traded funds (ETFs), which is usually promoted by those firms who have sponsored the ETFs.

A complete discussion is beyond the scope of this paper, however my view is that factor based ETFs can be valuable tools that could enable a plan sponsor to tweak overall plan-level exposure (for example, exposure to momentum) using the ETFs as an overlay rather than by rearranging allocations to managers.

Transparency is an advantage

There is no question that greater transparency in reporting to Clients, potential Clients, Consultants and Advisors creates an advantage for Investment Managers. The ability to embrace and explain performance using factor attribution has already become a requirement for active managers who invest on behalf of sophisticated investors.

The greatest advantage accrues when the data, the graphics and the explanation harmonize with a manager's investment philosophy and strategy.

And **transparency can be an advantage internally** as well. Managers who invest the time to integrate factor based reporting internally will have additional clarity into a portfolio's strengths and weaknesses, especially by stress testing to better forecast how a portfolio may react during economic or market challenges.



In summary

I hope this paper has taken the “mystery” out of analyzing portfolio bets, biases and performance using factor analysis.

The takeaways:

- Factors exposures are beta sources; they cannot be diversified away
- Factors can be a valuable tool to help understand and manage the portfolio’s bets and biases
- Transparency builds trust with Clients and their Consultants and Advisors.



With the market(s) at all-time highs and prognostications of both euphoria and doom on the horizon, this may be the time to embrace the deep dive into portfolio risks using factor analysis.

My view: **Ignore factors at your peril.**



Disclosures

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All information, including that used to compile graphs and performance and risk metrics, is obtained from sources believed to be reliable, but Logan does not guarantee its reliability.



Definitions

Large Cap Growth Composite: The Large Cap Growth Composite managed by Logan Capital Management used in Exhibits 1-4.

Russell 1000 Growth: An index composed of large-and mid-capitalization U.S. equities that exhibit growth characteristics.

Russell 1000 Value: An index composed of large- and mid-capitalization U.S. equities that exhibit value characteristics.

Russell 2000 Growth: An index composed of small capitalization U.S. equities that exhibit growth characteristics.

Russell 2000 Value: An index composed of small capitalization U.S. equities that exhibit value characteristics.

Russell Defensive Indexes: Measures the performance of companies that have relatively stable business conditions which are less sensitive to economic cycles, credit cycles and market volatility based on their stability indicators.

Russell Dynamic Indexes: Measures the performance of companies that have relatively less stable business conditions and are more sensitive to market cycles.

Representative Growth Portfolio: Representative portfolio managed by Logan Capital Management using the Growth investment strategy used as the basis for delivery of the Growth model.

Representative Large Cap Growth Portfolio: Representative portfolio managed by Logan Capital Management using the Large Cap Growth investment strategy used as the basis for delivery of the Large Cap Growth model.