

Russell Research

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Measuring alpha potential in the market

Using the Russell–Parametric Cross-Sectional Volatility Indexes

Variety's the very spice of life, that gives it all its flavor.
–William Cowper

Introduction

The terms *variety*, *breadth*, *dispersion* and *cross-sectional volatility* are all used to describe the opportunity set available to investment managers. Since Grinold first introduced the fundamental law of active management, a consensus has emerged in academic and practitioner research that cross-sectional volatility is a valid measure of the alpha potential in a market.¹ Research supports the position that cross-sectional volatility can play an important role at many points in the investment process. In this paper we formally define a measure of cross-sectional volatility, demonstrate potential uses for a set of indexes that track this metric, and establish a strong positive relationship between cross-sectional volatility and active manager dispersion.

Cross-sectional volatility (CrossVol™) measures the return dispersion of a universe of securities. It measures whether stocks are moving together or are diverging and provides a guide to investors on the level of active risk and alpha potential in a market. As CrossVol increases, the opportunity to outperform – and underperform – the market increases as well. Both managers and investors must take current levels of CrossVol into account: managers, to make sure that the risk profile of their portfolio is appropriate for their objectives; and investors, to assess performance records and make informed investment decisions.

There is significant evidence to show that cross-sectional volatility numbers are vital to the active investment process. Potentially all investors, money managers and market observers will have interest in and uses for CrossVol at different stages in the investment process. We anticipate that this measure could become a key indicator that investors will follow on a daily as well as monthly basis in all markets and across all market dimensions. To help to

¹ See Appendix 1 for a discussion of academic and practitioner research publications on this issue.

make this possible, we have developed the Russell–Parametric Cross-Sectional Volatility Indexes. This index series uses the Russell Global Indexes and sub-indexes and a calculation methodology developed by Parametric Portfolio Associates.

This paper is organized as follows:

1. CrossVol Calculation
2. The Current Market Environment
3. Using Cross-Sectional Volatility Indexes
4. CrossVol and Active Management Returns
 - a) U.S. Large Cap Portfolios
 - b) U.S. Small Cap Portfolios
 - c) Global and International Portfolios
 - d) Quantifying the Relationship between CrossVol and Manager Portfolios
 - e) Alternative Explanatory Variables: Equal-Weighted CrossVol and the VIX
5. Conclusions

CrossVol calculation: vive la différence!

We measure and report the cross-sectional volatility of each market as follows:

$$\sigma_x = \sqrt{\sum_i w_i (r_i - R)^2}$$

where

w_i = the beginning of period, float-adjusted capitalization weight of stock i ,

r_i = the total return of stock i for the period and

R = the published return of the relevant Russell index for the period.

The Russell–Parametric Cross-Sectional Volatility Indexes are subdivided in the same fashion as the underlying Russell Global Indexes. They cover all the major regions, including global, U.S., developed ex-U.S., and emerging markets. Within each region, CrossVol is calculated for all cap, large cap, small cap, value and growth, as well as for economic sector indexes.

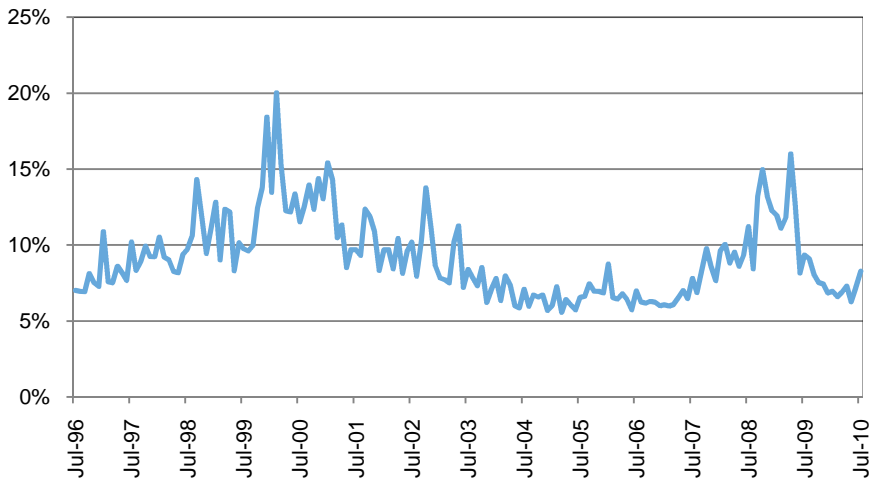
The current market environment

Figure 1 shows the calculated cross-sectional volatility using the monthly returns of stocks in the Russell Global index.² The values represent percent monthly return and can be interpreted as the “average return difference between stocks in a given month.”

Two periods stand out: The technology bubble in 1998–2000 and the global finance crisis in 2008–2009. During these periods, active bets had a greater impact on returns. During the low CrossVol period from 2003–2007, active bets had a lesser impact on returns.

² All CrossVol numbers used in this research and reported in this paper are based on a preliminary research data set created by Parametric and Russell for this purpose.

Figure 1 / Cross-sectional volatility of monthly returns for Russell Global Index stocks, 6/1996–6/2010



CrossVol can also provide interesting perspectives on various subsets of the market. In Figure 2, we calculate CrossVol for the technology sector and the financial sector. With this type of data we can start to draw inferences about the value of manager skill in different environments. Clearly, the ability to pick resilient technology stocks was a more valuable skill in the 1990s than it has been in recent years. During the recent economic crisis, technology stocks crashed and recovered as a group. Financials, however, experienced significant dispersion of returns (some financial stocks never recovered).

Figure 2 / Cross-sectional volatility of global technology stocks and global financial stocks, 6/1996–6/2010

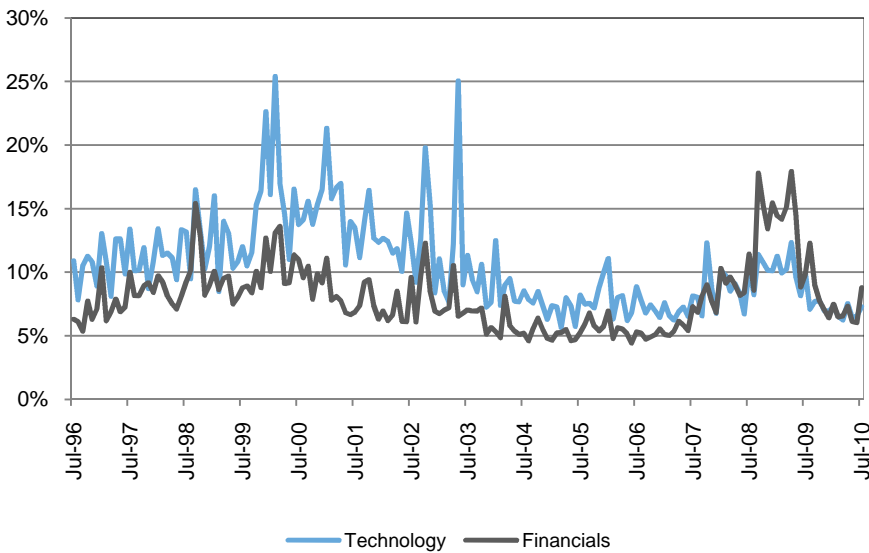
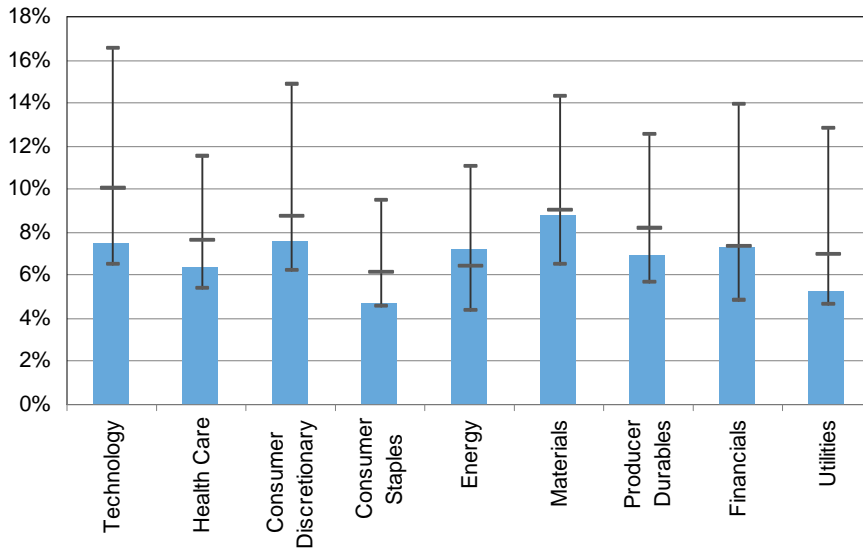


Figure 3 looks at a snapshot of CrossVol for the major sectors in the Russell Global Index. The blue bars represent CrossVol for April 2010; the lines represent the 5th, 50th and 95th percentiles for monthly CrossVol over the prior 10 years. Most of the sectors experienced low cross-sectional volatility during April 2010, compared to historical averages. This implies that stocks in most sectors are responding uniformly to economic factors, such as interest rates, and are less responsive to stock-specific news. Articles in the financial media describe investors as exhibiting “herd” behavior. This could be an explanation for the current low cross-sectional volatility. CrossVol indexes provide a way to quantify and isolate this type of market observation

One exception to the low CrossVol is the energy sector, which had higher than normal cross-sectional volatility, due to the Gulf oil spill and its effect on BP and other oil company stock prices. Financials and materials both have an April CrossVol close to average.

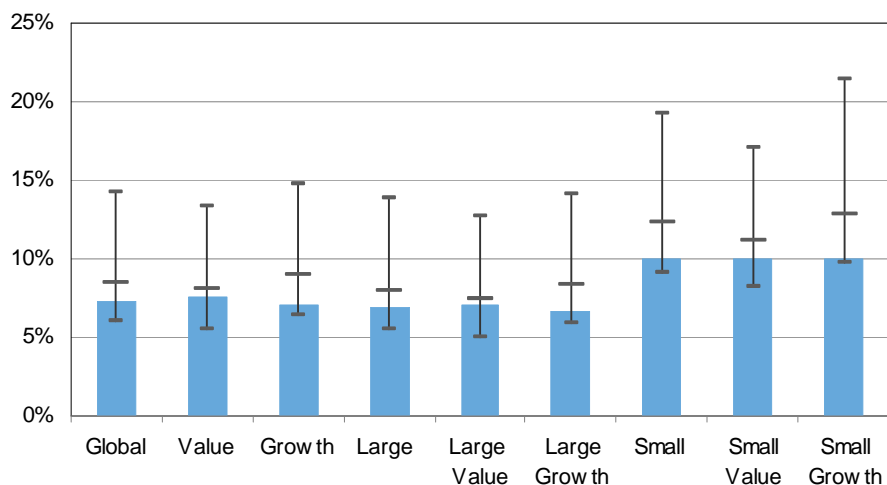
Figure 3 / Cross-sectional volatility for global sectors, April 2010; historical CrossVol ranges (5th, 50th and 95th percentiles) based on monthly CrossVol levels, 6/1996–6/2010³



³ See Appendix 2 for definitions of Russell Manager Universes, Russell Indexes and Russell Sectors.

Figure 4 shows a similar snapshot for the global style indexes. In general, small cap indexes have higher cross-sectional volatility and thus higher potential for active managers to outperform. This chart also shows that opportunities for active management seem lower than average in April, except for Large Value, which was close to average.

Figure 4 / Cross-sectional volatility for global style Indexes, April 2010; historical CrossVol ranges (5th, 50th and 95th percentiles) based on monthly CrossVol levels, 6/1996–6/2010



Using cross-sectional volatility indexes

The section above demonstrated the type of market analysis that can be done with cross-sectional volatility indexes. There are other uses as well, including:

- as an input to the asset allocation decision, specifically where to go active and where to stay passive (both strategically and tactically);
- as a tool for investors and consultants to evaluate manager performance; and
- as a way for an investment manager to scale active weighting decisions within a portfolio.

While it is beyond the scope of this paper to explore all potential uses, we can provide a specific example of how these indexes have already been used by an investment manager. Our example is a passive portfolio managed by Parametric.

The objective of Parametric’s portfolio was to closely track the Russell 3000® Index, while actively managing the taxation of capital gains. The strategy uses an optimizer to defer the realization of capital gains and to accelerate the realization of capital losses, subject to risk constraints. During periods of high cross-sectional volatility, the weighting differences between the tax-managed portfolio and the index may result in excess returns, positive or negative.

Over the course of 2008, portfolio managers actively sold positions in many financial services firms to realize a tax loss. This created benchmark-relative risk in the portfolio. As the year unfolded, stocks like AIG and Bank of America continued to underperform the broad market. Since these names were underweight in the portfolio for tax reasons, the portfolio outperformed the index by close to 1%. Usually outperformance is a cause for

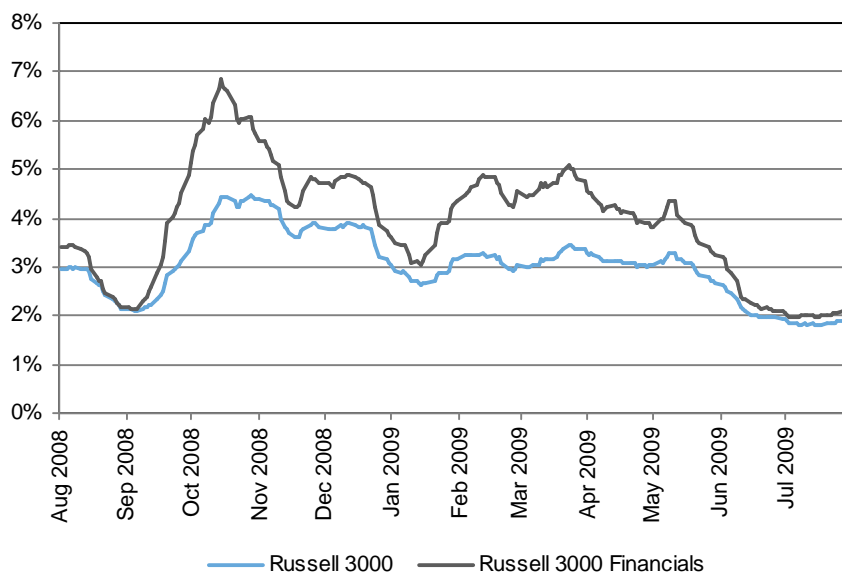
celebration, but for a passive manager attempting to track the market, it is cause for concern.

Market-level risks such as valuation and sector tilts were estimated and controlled by use of a risk model. Even though the portfolio was underweight *AIG* and *Bank of America*, it held close to a full weight in the financial sector. A question remained: given increasing market uncertainty, how should stock-specific risk be controlled? Accordingly, a constraint is placed at the stock level to control specific risk in the optimization process.

At Parametric, the portfolio managers follow cross-sectional volatility at both the index and the sector levels. If the *CrossVol* is higher at the overall index level, the portfolio managers manage the risk by tightening the bounds around the individual securities – for example, by not allowing an underweight to a given stock of more than 50 basis points versus the index. This prevents the portfolio from deviating significantly from the underlying benchmark. Similarly, if the *CrossVol* is higher for a particular sector, then the bounds around that sector will be tightened.

As shown in Figure 5, the daily *CrossVol* in the financial services sector was significantly higher than the index during the crisis in 2008 and 2009. To counteract this elevated level of active risk in the portfolio, bounds on stocks were tightened to 25 basis points. The amount of tightening was scaled to correspond with the percentage increase in cross-sectional volatility, which had doubled. The goal here was not to reduce active risk, but rather to hold it constant. Since the dispersion in stock returns was increasing, the tolerance for weighting differences from the Index had to be decreased. This tightening of stock bounds helped to mitigate the underperformance that occurred when stocks reversed dramatically in March and April of 2009.

Figure 5 / Daily Russell 3000 CrossVol, 8/2008–7/2009



The example above demonstrates how investment managers can use the index to scale the aggressiveness of their weighting differences versus an index. This example shows a passive manager taking active positions for tax reasons, but the same reasoning and process could be applied to an actively managed portfolio.

CrossVol and active manager returns

What factors drive active management performance? Richard Grinold introduced The Fundamental Law of Active Management in 1989 in his seminal paper published in the *Journal of Portfolio Management*. Grinold and Ronald Kahn further explored the concept in their magnum opus, *Active Portfolio Management*, published in 1995. The Fundamental Law states that the contribution from active management for a given portfolio is the product of 1) manager skill, or what they name “the information coefficient”; and 2) the breadth of the market or the opportunity set.

If CrossVol is indeed a valid measure of the active opportunity set and a useful measure of market breadth, we should see a strong relationship between the level of CrossVol in a given market and the dispersion of returns to active management. To test this, we calculate the dispersion of active manager returns in the U.S. and international/global markets and measure the relationship to CrossVol in each market based on the corresponding Russell Index. Specifically, we define manager dispersion as the difference in returns to the 5th and 95th percentile of each Russell manager universe for each month of the sample period. We calculate the monthly CrossVol of the Russell Index that forms the relevant benchmark for each manager universe. To mitigate the impact of survivorship bias in manager universe returns, our sample is confined to the period for which we have historically accurate monthly frozen universe membership data available. In Table 1, below, we identify the Russell indexes and manager universes used in this research, and the sample periods for each.

Table 1 / Russell manager universes, Russell indexes and sample periods used in this study⁴

Universe	Russell Index	Sample Period
U.S. Large Cap Market-Oriented Portfolios	Russell 1000 [®] Index	10/31/2003–12/31/09
U.S. Large Cap Growth Portfolios	Russell 1000 [®] Growth Index	10/31/2003–12/31/09
U.S. Large Cap Value Portfolios	Russell 1000 [®] Value Index	10/31/2003–12/31/09
U.S. Small Cap Market-Oriented Portfolios	Russell 2000 [®] Index	10/31/2003–12/31/09
U.S. Small Cap Growth Portfolios	Russell 2000 [®] Growth Index	10/31/2003–12/31/09
U.S. Small Cap Value Portfolios	Russell 2000 [®] Value Index	10/31/2003–12/31/09
All Country Large Cap Equity Portfolios	Russell Global Index	10/31/2004–12/31/09
All Country ex-U.S. Large Cap Equity Portfolios	Russell Developed ex-U.S. Large Cap Index	10/31/2004–12/31/09

⁴ See Appendix 2 for definitions of Russell Manager Universes, Russell Indexes and Russell Sectors.

U.S. large cap portfolios

In Figures 6, 7 and 8, below, we display the historical time series of manager dispersion for U.S. market-oriented, value and growth manager universes and the CrossVol of the Russell Index benchmark for each manager universe. We see a clear pattern of correspondence between manager dispersion and CrossVol in each chart.

Figure 6 / U.S. large cap: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels

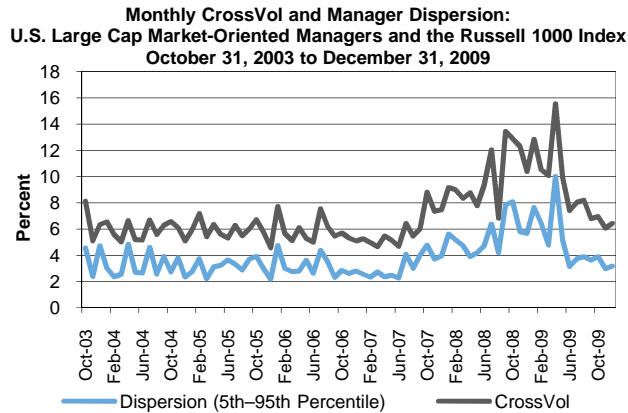


Figure 7 / U.S. large cap growth: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels

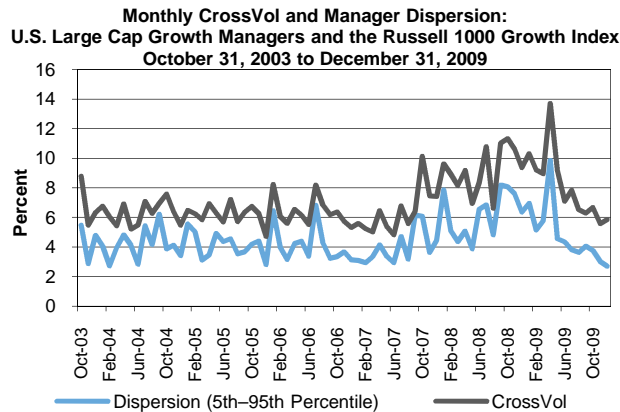
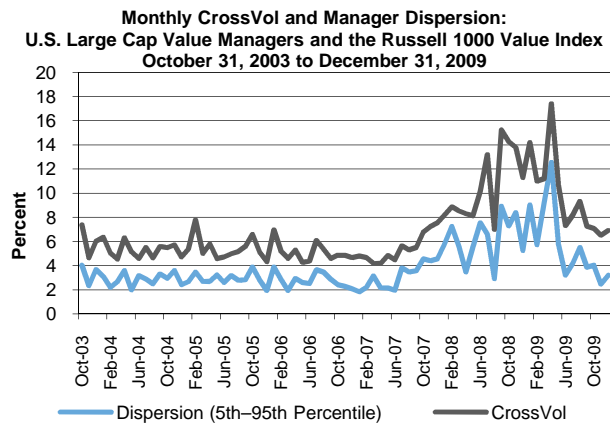


Figure 8 / U.S. large cap value: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels



U.S. small cap portfolios

In Figures 9, 10 and 11 we display the pattern of manager dispersion and CrossVol levels for U.S. small cap market-oriented, growth and value managers. We see here as well that the two series tend to move together.

Figure 9 / U.S. small cap: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels

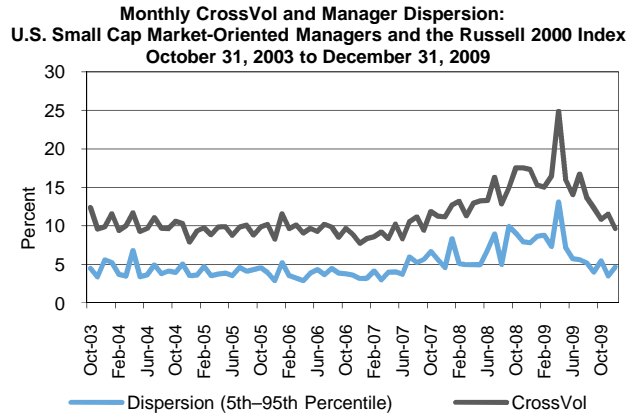


Figure 10 / U.S. small cap growth: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels

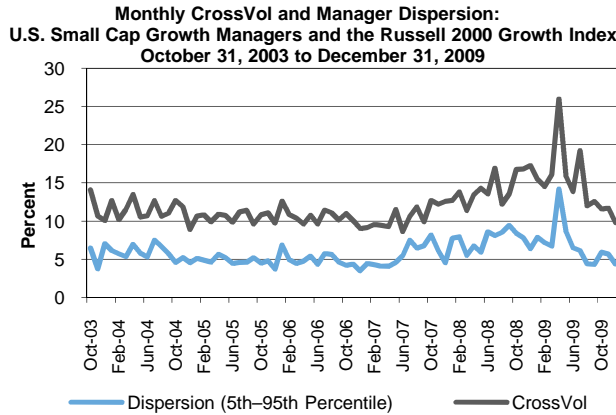
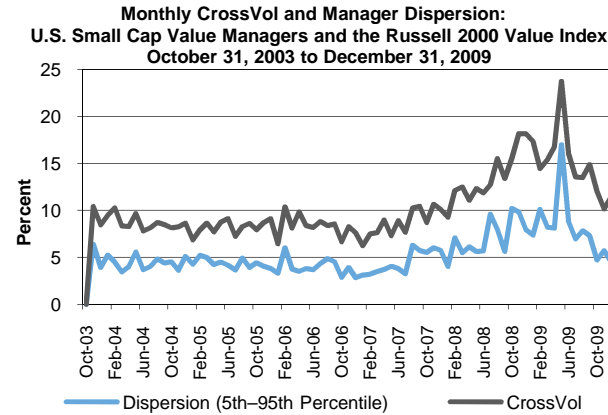


Figure 11 / U.S. small cap value: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels



International and global portfolios

CrossVol also measures the active opportunity set in markets and portfolios beyond the U.S. equity markets; the relationship holds for international and global equity portfolios, as shown in Figures 12 and 13.

Figure 12 / Global: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels

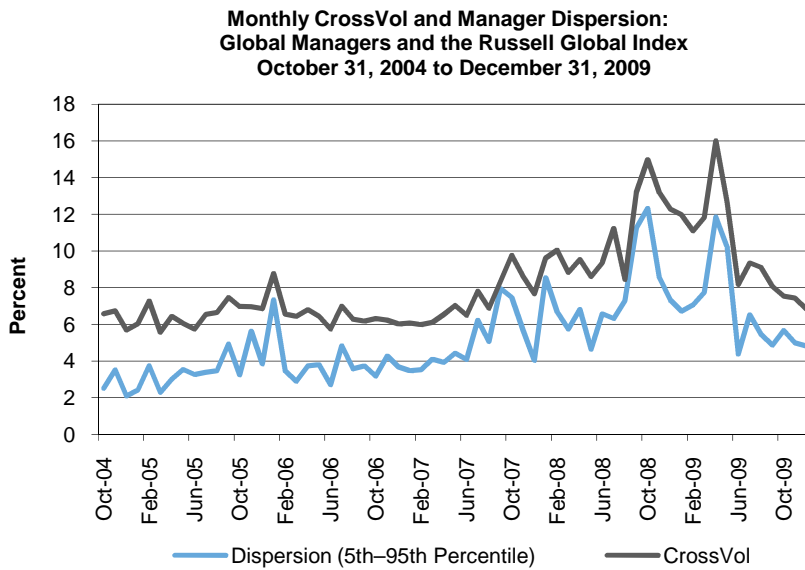
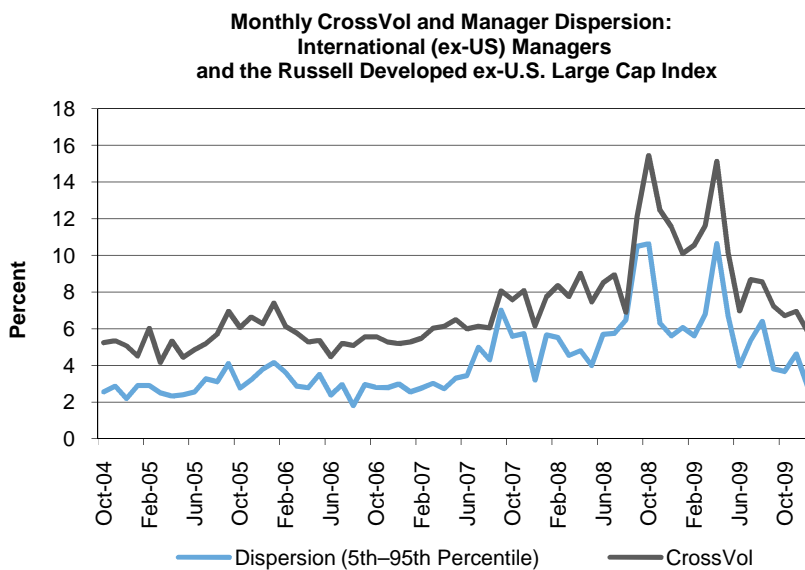


Figure 13 / Ex-U.S. developed large cap: time series of dispersion of monthly manager returns (5th–95th percentile returns) and monthly CrossVol levels



Quantifying the relationship between CrossVol and manager dispersion

We have observed that CrossVol and manager dispersion move together over time, but how close is this relationship? In Table 2, below, we report correlations between manager dispersion and CrossVol for each of these manager universes and their matching market indexes.

Table 2 / Correlations between the dispersion of monthly manager returns for Russell universes (5th–95th percentile returns) and the monthly CrossVol levels for each matching Russell index (see Table 1) over the sample periods (10/2003–12/2009 for U.S.; 10/2004–12/2009 for global and non-U.S.)

Universes	CrossVol Index Base	Correlation between Manager Dispersion and CrossVol
U.S. Large Cap Market-Oriented	Russell 1000	0.94
U.S. Large Cap Value	Russell 1000 Value	0.93
U.S. Large Cap Growth	Russell 1000 Growth	0.87
U.S. Small Cap Market-Oriented	Russell 2000	0.87
U.S. Small Cap Value	Russell 2000 Value	0.90
U.S. Small Cap Growth	Russell 2000 Growth	0.76
Global	Russell Global	0.92
International (ex-U.S.)	Russell Developed ex-U.S. Large Cap	0.91

These high correlations attest to the relationship between CrossVol and manager dispersion, and they support the position that CrossVol is a valid measure of the active opportunity set. Regression analysis provides even more support. In Table 3, below, we display the regression R-square, the CrossVol coefficient and T-statistics for a series of regressions. Here, we set manager dispersion for each active universe as the dependent variable, and define the CrossVol of the matching index as the independent or explanatory variable. Our regression results validate the power of CrossVol in explaining manager dispersion; all coefficients were significant at the 99% level.

Table 3 / Results from regressions. Dependent variable: monthly manager universe dispersion (5th–95th percentile returns); independent variable: matching Russell Index monthly CrossVol levels (see Table 1). Sample periods (10/2003–12/2009 for U.S.; 10/2004–12/2009 for global and non-U.S.)

Universes	CrossVol Index Base	R ²	CrossVol Coefficient	TStat
U.S. Large Cap Market-Oriented	Russell 1000	0.88	0.61	23.26
U.S. Large Cap Value	Russell 1000 Value	0.87	0.65	21.70
U.S. Large Cap Growth	Russell 1000 Growth	0.75	0.73	14.75
U.S. Small Cap Market-Oriented	Russell 2000	0.76	0.56	15.36
U.S. Small Cap Value	Russell 2000 Value	0.81	0.61	17.65
U.S. Small Cap Growth	Russell 2000 Growth	0.58	0.47	10.08
Global	Russell Global	0.84	0.88	18.20
International (ex-U.S.)	Russell Developed ex-U.S. Large Cap	0.83	0.74	17.48

All T-stats are significant at the 99% confidence level.

Alternative explanatory variables: equal-weighted CrossVol and the VIX

The earliest published research on cross-sectional volatility – Ankrum and Ding (2001) and DeSilva, Sapra and Thorley (2001) – defined or preferred the market-weighted measure as we have defined it here as CrossVol. Subsequent research has often been based on an equal-weighted measure, presumably due to the lack of access to accurate constituent market weights and/or the computational simplicity of an equal-weighted measure. To capture the complete active opportunity set in each market and market segment or sector, all Russell–Parametric CrossVol measures are based on market (float-adjusted) constituent weights. We tested the explanatory power of the equal-weighted version of cross-sectional volatility in all our data sets, and found that all the equal-weighted versions had lower-regression R-squares, smaller coefficients and smaller T-stats. We report the equal-weighted regression results in Table 4, below. A comparison of all these results to the results displayed above, in Table 3, verifies that market value–weighted CrossVol is a more informative explanatory variable for manager dispersion, and by inference, a better measure of the active opportunity set in these markets.

Table 4 / Results from regressions. Dependent variable: monthly manager universe dispersion (5th–95th percentile returns); independent variable: matching Russell Index equal-weighted monthly CrossVol levels (see Table 1). (Sample periods 10/2003–12/2009 for U.S.; 10/2004–12/2009 for global and non-U.S.)

Universes	Index Base	Equal-weighted CrossVol	Equal-weighted CrossVol	Equal-weighted CrossVol
		R ²	Coefficient	TStat
U.S. Large Cap Market-Oriented	Russell 1000	0.75	0.33	14.67
U.S. Large Cap Value	Russell 1000 Value	0.79	0.40	16.47
U.S. Large Cap Growth	Russell 1000 Growth	0.54	0.35	9.20
U.S. Small Cap Market-Oriented	Russell 2000	0.68	0.35	12.46
U.S. Small Cap Value	Russell 2000 Value	0.75	0.38	14.71
U.S. Small Cap Growth	Russell 2000 Growth	0.51	0.30	8.69
Global	Russell Global	0.67	0.48	11.21
International (ex-U.S.)	Russell Developed ex-U.S. Large Cap	0.70	0.51	12.02

All T-stats are significant at the 99% confidence level.

In a recent white paper, Gorman, Sapra and Weigand (2010b) extol the importance of cross-sectional volatility while at the same time lamenting the difficulty in computing cross-sectional volatility on a regular basis. They suggest the VIX as a possible proxy for cross-sectional volatility and compare VIX levels to the equal-weighted cross-sectional volatility of the constituents of the S&P 500 Index. Our research indicates, however, that the VIX is a very poor proxy for CrossVol and that it performs poorly for style, small cap and non-U.S. markets. In Table 5 we report regression results by using the VIX end-of-month closing price levels as the explanatory variable for manager dispersion in sample markets. The R-squares are notably lower than those reported for CrossVol, and the coefficient values are smaller, although all regression results are significant at the 99% confidence level.

Table 5 / Results from regressions. dependent variable: monthly manager universe dispersion (5th–95th percentile returns); independent variable: VIX month-end closing price. Sample periods (10/2003–12/2009 for U.S.; 10/2004-12/2009 for global and non-U.S.

Universes	VIX R ²	VIX Coeff	VIX TStat
U.S. Large Cap Market-Oriented	0.57	0.11	9.81
U.S. Large Cap Value	0.62	0.15	10.88
U.S. Large Cap Growth	0.35	0.08	6.26
U.S. Small Cap Market-Oriented	0.61	0.14	10.58
U.S. Small Cap Value	0.56	0.16	9.54
U.S. Small Cap Growth	0.36	0.10	6.35
Global	0.59	0.16	9.29
International (ex-U.S.)	0.60	0.14	9.54

All T-stats are significant at the 99% confidence level.

We agree with Gorman, Sapra and Weigand, however, that cross-sectional volatility numbers are vital to the active investment process and that those numbers are difficult to compute. It is to meet this need that we have developed the Russell–Parametric Cross-Sectional Volatility Indexes.

Conclusions

In this paper, we introduce the Russell–Parametric Cross-Sectional Volatility Indexes and explore potential uses for those indexes. We establish a strong positive relationship between cross-sectional volatility and active manager dispersion. This is an important result for investment managers and those who evaluate them. We anticipate that CrossVol will be informative in all stages of the investment management process.

- CrossVol can inform the active versus passive decision in the asset allocation stage. Where CrossVol is high and where skill is present, active managers have the opportunity to add value. Where CrossVol is low, active management – skilled or not – will have little opportunity to produce returns that differ from the market.
- CrossVol contains important information for managers with tight risk controls. We have provided a detailed case study of the application of CrossVol to the management of a portfolio with strict risk controls relative to the benchmark – in this case, the Russell 3000 Index. For this portfolio, where active weighting decisions need to be moderated to hold the active risk budget constant, cross-sectional volatility is a key input. Similarly, ETFs that track a broad index with a subset of securities may also benefit from incorporating CrossVol into their process to manage tracking error due to idiosyncratic security returns.
- Conversely, for managers with broader constraints, or for absolute-return strategies, CrossVol can be an indicator of where the best potential for outperformance is located in the market, around the world and across the global arena; it is where the active action is.
- Finally, CrossVol can contribute important information to aid in the ex-post performance review process and the evaluation of value-added from active management strategies.

Appendix 1

What do academics and market practitioners say about cross-sectional volatility?

The years 2001 and 2002 saw the publication of two papers that demonstrated the connection between cross-sectional volatility and active manager returns dispersion, and that also identified the importance of market-value-weighting the measure. Ankrim and Ding (2001) define the weighted cross-sectional volatility (standard deviation) of market sector returns as the measure of the active management opportunity set. The authors used monthly sector returns, weighted by sector market values as of the prior month end. They find a strong relationship between cross-sectional volatility and active manager return dispersion as measured by return differences between the 5th and 95th percentiles of managers in Russell manager performance universes. They observe this relationship across a number of equity markets: U.S. Large Cap; U.S. Small Cap; Canada; Japan; and the United Kingdom. DeSilva, Sapra and Thorley (2001) find that the dispersion of mutual fund returns is linearly related to cross-sectional volatility, which they measure as the standard deviation of individual stock returns, based on the Center for Research in Security Prices (CRSP) database. The authors employ both market value and equal-weighted methods and note that market-value-weighted is the more relevant measure. They compare the pattern of cross-sectional volatility to the dispersion of returns to mutual funds in the Morningstar DB for U.S. Based on the close relationship they find, they argue that cross-sectional volatility is *essential to accurate performance evaluation* of active portfolios. They suggest a model for calculating *dispersion-adjusted alpha* based on cross-sectional volatility.

Since this initial work early in the millennium, many others have found a relationship between cross-sectional volatility and active manager performance dispersion in other markets and have proposed a variety of ways by which cross-sectional volatility could improve the investment process:

- Goodwin (2002) finds a notable relationship between cross-sectional volatility and manager dispersion in European markets.
- Jacob and Egger (2010) explore the potential uses of this relationship in emerging markets segmented by value and growth. They suggest that active managers can use cross-sectional volatility in the portfolio management process to manage risk exposures.
- Connor and Li (2009) make a strong case for the importance of cross-sectional volatility in explaining the dispersion of hedge fund returns, and *propose that cross-sectional volatility be added to the seven hedge fund risk factors* proposed by Fung and Hsieh (2004). These authors also suggest that cross-sectional volatility could be useful *for hedge funds to manage risk*.
- diBartolomeo, D. (2006) suggests that cross-sectional volatility (which he terms “variety”) *may help explain returns to some active strategies, such as momentum and value, and potentially may account for the value premium*.
- Yu and Sharaiha (2007) explore the use of cross-sectional volatility in the investment process, particularly *in alpha budgeting exercises*. The authors focus on U.S. and European equity markets, and make note of some differences in cross-sectional volatility behavior in the different regions.

A number of papers have explored the relationship between cross-sectional and time-series volatility, for example:

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- Hwang and Satchell (2004) test the use of cross-sectional volatility as an indicator/predictor of time-series volatility in U.S., U.K. and South Korean equity markets. They identify a strong contemporaneous relationship, but did not observe predictive power of one form of volatility vis-à-vis the other.
 - Gorman, Sapra and Weigand (2010a) develop a theoretical analysis of cross-sectional volatility and contend that cross-sectional volatility is more valuable than time-series volatility as a risk measure, particularly in the context of active management. They find that cross-sectional volatility is positively related to total, systemic and idiosyncratic time-series volatility, but is most informative for idiosyncratic. Thus, in their view, for benchmark-relative investing, all *managers should tend to pull in bets when cross-sectional volatility is high*, because of the impact on tracking error. They note that manager behavior may not follow that pattern in absolute-return strategies.

Finally we note that the global market crisis of the last few years has drawn attention once again to the role of cross-sectional volatility as a measure of the active opportunity set. Yasenchak (2009), for example, investigates the relationship between the cross-sectional volatility of the Russell 1000 Index and the dispersion of active management returns in the Russell U.S. large cap manager universe, highlighting the decline in cross-sectional volatility leading up to the crisis and the concurrent narrowing of the range of active manager returns.

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Appendix 2

Descriptions of Russell Manager Universes and Russell Indexes used in this Study

1. Russell Manager Universes:

US large cap market oriented equity portfolios

These managers do not evidence a consistent preference for large cap companies emphasized in value or growth. However, two distinct types of organizations fall into this category: Those that construct portfolios with growth and valuation characteristics similar to the broad market over a market cycle; and those willing to make meaningful bets in growth or value emphasis across time, but with no consistent preference.

- Market-Oriented managers typically are willing to consider companies representative of the broad market when seeking investment opportunities.
- Portfolios may either be well diversified or take meaningful sector/factor bets relative to the market toward both growth and value over time.
- Average growth and valuation characteristics over time are near those of broad market indexes.

US large cap value equity portfolios (PRICE)

Managers in this group are large cap "value investors." While differences exist in how managers in this style define "value," an issue's current market price is a critical variable. For example, some organizations focus on companies having low absolute or relative P/E ratios, while others stress issues with above-market dividend yields. Additional measures that are frequently used are price/book value and price/sales ratios. A stock whose price has declined because of adverse investor sentiment may also attract some of these managers. Historical growth and profitability characteristics frequently are well below market averages, and overall characteristics are in sharp contrast to those of Growth managers.

- The focus is on buying securities at low valuations on an absolute basis or relative to the market and/or historical levels.
- Portfolios typically exhibit below-average price/book value ratios, below-average P/E ratios, and/or high dividend yields.
- Risk characteristics in terms of volatility and beta vary but frequently are below market averages.

US large cap growth equity portfolios

Managers in this style try to identify large cap companies with above-average earnings growth prospects. In general, two basic categories of securities are owned: Companies with consistent above-average historical and prospective profitability and growth; and those expected to generate above-average near-term earnings momentum based upon company, industry, or economic factors. In this category, securities may not have exhibited above-average historical growth but are expected to do so over the near future.

- These managers are willing to pay above-market multiples for the superior growth rate/profitability they anticipate. Other typical characteristics of this style include selection of higher quality companies; emphasis on consumer service, health care, and technology stocks; and light weightings in deep cyclicals and defensive stocks.
- The focus is on earnings growth and/or profitability, either above average or accelerating. In addition, dividend yield is frequently well below market averages,

valuation statistics are typically above market averages, the volatility of returns is above that of the market, and beta is frequently above 1.00.

US small cap market oriented equity portfolios

These managers select from a broad cross-section of small companies, and exhibit growth and valuation characteristics similar to small stock indexes such as the Russell 2000 Index or Russell 2500 Index.

US small cap value equity portfolios

These managers select small, under-researched companies that are considered undervalued relative to earnings, assets, or revenues. Portfolios typically emphasize financial services, regulated industries, and industrial cyclicals, and exhibit below-average valuation and growth characteristics.

US small cap growth equity portfolios

These managers emphasize less seasoned companies with above-average, long-term growth prospects. Portfolios typically display heavy concentrations in technology, health care, consumer, and service sectors and above-market valuation characteristics.

Global large cap equity portfolios

This universe includes manager portfolios that have the broadest equity mandates and employ a wide variety of investment styles. These managers have full discretion to invest in any country, be it developed or emerging. Typically, however, these managers hold larger stocks and hold the heaviest weights in developed countries. On average, portfolios hold around 75% of the assets in medium to large securities and around 40% is allocated to the US.

Global x-US large cap equity portfolios

This universe includes manager portfolios limited to investment outside the United States. Any U.S. investment must be limited to U.S. dollar short – term investments. On average the portfolios within this universe hold approximately 75% of their assets in medium to large stocks from both developed and some emerging market countries.

2. Russell Indexes:

Russell 1000[®] Index

The Russell 1000 Index measures the performance of the large-cap segment of the U.S. equity universe. It is a subset of the Russell 3000[®] Index and includes approximately 1000 of the largest securities based on a combination of their market cap and current index membership. The Russell 1000 represents approximately 92% of the U.S. market. The Russell 1000 Index is constructed to provide a comprehensive and unbiased barometer for the large-cap segment and is completely reconstituted annually to ensure new and growing equities are reflected.

Russell 1000[®] Growth Index

The Russell 1000 Growth Index measures the performance of the large-cap growth segment of the U.S. equity universe. It includes those Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values.

The Russell 1000 Growth Index is constructed to provide a comprehensive and unbiased barometer for the large-cap growth segment. The Index is completely reconstituted annually to ensure new and growing equities are included and that the represented companies continue to reflect growth characteristics.

Russell 1000® Value Index

The Russell 1000 Value Index measures the performance of the large-cap value segment of the U.S. equity universe. It includes those Russell 1000 companies with lower price-to-book ratios and lower expected growth values.

The Russell 1000 Value Index is constructed to provide a comprehensive and unbiased barometer for the large-cap value segment. The Index is completely reconstituted annually to ensure new and growing equities are included and that the represented companies continue to reflect value characteristics.

Russell 2000® Index

The Russell 2000 Index measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 Index is a subset of the Russell 3000® Index representing approximately 10% of the total market capitalization of that index. It includes approximately 2000 of the smallest securities based on a combination of their market cap and current index membership.

The Russell 2000 is constructed to provide a comprehensive and unbiased small-cap barometer and is completely reconstituted annually to ensure larger stocks do not distort the performance and characteristics of the true small-cap opportunity set.

Russell 2000® Growth Index

The Russell 2000 Growth Index measures the performance of the small-cap growth segment of the U.S. equity universe. It includes those Russell 2000 companies with higher price-to-value ratios and higher forecasted growth values.

The Russell 2000 Growth Index is constructed to provide a comprehensive and unbiased barometer for the small-cap growth segment. The Index is completely reconstituted annually to ensure larger stocks do not distort the performance and characteristics of the true small-cap opportunity set and that the represented companies continue to reflect growth characteristics.

Russell 2000® Value Index

The Russell 2000 Value Index measures the performance of small-cap value segment of the U.S. equity universe. It includes those Russell 2000 companies with lower price-to-book ratios and lower forecasted growth values.

The Russell 2000 Value Index is constructed to provide a comprehensive and unbiased barometer for the small-cap value segment. The Index is completely reconstituted annually to ensure larger stocks do not distort the performance and characteristics of the true small-cap opportunity set and that the represented companies continue to reflect value characteristics.

Russell Midcap® Index

The Russell Midcap Index measures the performance of the mid-cap segment of the U.S. equity universe. The Russell Midcap Index is a subset of the Russell 1000® Index. It includes approximately 800 of the smallest securities based on a combination of their market cap and current index membership. The Russell Midcap Index represents approximately 31% of the total market capitalization of the Russell 1000 companies.

The Russell Midcap Index is constructed to provide a comprehensive and unbiased barometer for the mid-cap segment. The Index is completely reconstituted annually to ensure larger stocks do not distort the performance and characteristics of the true mid-cap opportunity set.

Russell Midcap® Growth Index

The Russell Midcap Growth Index measures the performance of the mid-cap growth segment of the U.S. equity universe. It includes those Russell Midcap Index companies with higher price-to-book ratios and higher forecasted growth values.

The Russell Midcap Growth Index is constructed to provide a comprehensive and unbiased barometer of the mid-cap growth market. The Index is completely reconstituted annually to ensure larger stocks do not distort the performance and characteristics of the true mid-cap growth market.

Russell Midcap[®] Value Index

The Russell Midcap Value Index measures the performance of the mid-cap value segment of the U.S. equity universe. It includes those Russell Midcap Index companies with lower price-to-book ratios and lower forecasted growth values.

The Russell Midcap Value Index is constructed to provide a comprehensive and unbiased barometer of the mid-cap value market. The Index is completely reconstituted annually to ensure larger stocks do not distort the performance and characteristics of the true mid-cap value market.

The Russell Global Index

The Russell Global index measures the performance of the global equity market based on all investable equity securities. The index includes approximately 10,000 securities in 65 countries and covers 98% of the investable global market. All securities in the Russell Global index are classified according to size, region, country, and sector, as a result the index can be segmented into thousands of distinct benchmarks. The Russell Global index is constructed to provide a comprehensive and unbiased barometer for the global segment and is completely reconstituted annually to accurately reflect the changes in the market over time.

The Russell Global Value Index

The Russell Global Value Index measures the value segment of the of the global equity universe. It includes companies with lower price-to-book ratios and lower forecasted growth values. The index is constructed to provide a comprehensive and unbiased barometer of the global value market. It is reconstituted annually to accurately reflect changes in the market and to ensure the index continues to reflect value characteristics.

The Russell Global Growth Index measures the growth segment of the investable universe. It includes those companies with higher price-to-book ratios and higher forecasted growth values. The index is constructed to provide a comprehensive and unbiased barometer of the global growth market. It is reconstituted annually to accurately reflect changes in the market and to ensure the index continues to reflect growth characteristics.

The Russell Developed ex-U.S. Large Cap Index

The Russell Developed ex-U.S. Large Cap index offers investors access to the large-cap segment of the developed equity universe, excluding securities classified in the U.S., representing approximately 40% of the global equity market. The Russell Developed ex-U.S. Large Cap index is constructed to provide a comprehensive and unbiased barometer for this market segment and is completely reconstituted annually to accurately reflect the changes in the market over time. The Russell Developed ex-U.S. Large Cap index includes the largest securities in the Russell Developed ex-U.S. Index.

The Russell Global Small Cap Index

The Russell Global Small Cap index offers investors access to the small-cap segment of the global equity universe representing approximately 11% of the global equity market. The Russell Global Small Cap index is constructed to provide a comprehensive and unbiased

barometer for the small-cap segment and is completely reconstituted annually to accurately reflect the changes in the market over time. The Russell Global Small Cap index includes the smallest securities in the Russell Global Index.

The Russell Global Small Cap Value Index

The Russell Global Small Cap Value Index measures the small-cap value segment of the global equity universe. It includes companies with lower price-to-book ratios and lower forecasted growth values. The index is constructed to provide a comprehensive and unbiased barometer of the global small-cap value market. It is reconstituted annually to accurately reflect changes in the market and to ensure the index continues to reflect value characteristics. The Russell Global Small Cap Value Index includes the smallest securities in the Russell Global Value Index.

The Russell Global Small Cap Growth Index

The Russell Global Small Cap Growth Index measures the small-cap growth segment of the global equity universe. It includes those companies with higher price-to-book ratios and higher forecasted growth values. The index is constructed to provide a comprehensive and unbiased barometer of the global small-cap growth market. It is reconstituted annually to accurately reflect changes in the market and to ensure the index continues to reflect growth characteristics. The Russell Global Small Cap Growth Index includes the smallest securities in the Russell Global Growth Index.

3. Sector definitions

Technology

Contains companies that serve the information technology, telecommunications technology and electronics industries. Companies developing and marketing internet software and/or providing internet services – including online databases and interactive services, web address registration services, database construction and Web design services – are found here. Also includes companies involved in entertainment software, including video games, and companies that produce machinery for making high-end electronics. E-commerce companies are not included in the technology sector.

Health Care

Consists of companies that manufacture health care equipment and supplies or provide health care-related services such as lab services, in-home medical care and health care facilities. Also included are companies involved in research, development and production of pharmaceuticals and biotechnology.

Consumer Discretionary

Contains companies that manufacture products and provide discretionary services directly to the consumer. Household durable goods, apparel, home electronic devices, leisure equipment and automotive are included. The services segment includes hotels, restaurants and other leisure facilities, media production services, consumer retailing and services, wholesalers, and importers/exporters. E-commerce companies are also included in the consumer discretionary sector.

Consumer Staples

Consists of companies that provide products directly to the consumer that are typically considered non-discretionary items on the basis of consumer purchasing habits. It includes manufacturers and distributors of food, beverages and tobacco as well as producers of non-durable household goods. It also includes food- and drug-retailing companies as well as

agriculture, fishing, ranching and milling companies. Consumer Staples is said to be a less dynamic Sector and to remain static, while the rest tend to be more cyclical in nature.

Energy

Contains of energy-related businesses, such as oil companies involved in the exploration, production, servicing, drilling and refining processes, and companies primarily involved in the production and mining of coal and other fuels used in the generation of consumable energy. Gas extraction, distribution and pipeline companies classify into this Sector. The alternative energy Sub-Sector includes companies engaged in any aspect of the solar power, wind power, hydro power and biofuel industries.

Materials and Processing

Consists of companies that extract or process raw materials, and companies that manufacture chemicals, construction materials, glass, paper, plastic, forest products and related packaging products. Metals and minerals miners, metal alloy producers, and metal fabricators are included.

Producer Durables

Contains companies whose businesses are dominated by any of the following activities: Manufacturing and distribution of capital goods, including aerospace, industrial machinery and electrical equipment. Also included are companies that supply transportation services, such as shipping, trucking, railroads and railroad equipment. Other areas include office equipment and services to businesses. Commercial services are also included in this group as an input to the manufacturing and distribution of capital goods.

Financial Services

Consists of companies involved in banking, mortgage finance, consumer finance, specialized finance, investment banking and brokerage, asset management and custody, corporate lending, insurance, financial investments and real estate, including REITS.

Utilities

Contains companies in industries heavily affected by government regulation, such as electric, gas and water utilities. Also includes companies providing telephone services, as well as companies that operate as independent producers or distributors of power.

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