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Title: **Quantitative equity management**

Despite the recent lag, quants provide diversification and alpha opportunities

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Synopsis: After outperforming in the early 2000's, quantitative investment strategies have lagged in recent years. This reversal of fortune is largely explained by quantitative managers' preference for certain factors.

Combining quantitative managers with fundamental managers will likely increase portfolio diversification. Also, low correlations provide support for including multiple quantitative managers in investment structures.

Basing hire-and-fire decisions on a quantitative or traditional label is likely to be counterproductive. Instead, investors should seek to retain managers who have the necessary skills for translating investment insight into actual returns.

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FEBRUARY 2011

Quantitative equity management

By: Mark Thurston, Head of Global Equity Research

Introduction

Quantitative investment techniques have been an increasingly hot topic over the past few years. In the early part of the past decade, quantitative strategies performed very well, but in recent years the returns realized by quantitative managers have materially lagged those of managers following traditional strategies. This paper reviews both the history and the prospects of quantitative equity products relative to those of traditional products.

Quantitative managers utilize systematic processes to identify mispriced securities and build efficient portfolios. Most successful quantitative managers attempt to uncover predictive signals from both readily available public data and proprietary information. The signals quantitative managers exploit can be linked to investors' behavioral biases as well as to informational asymmetries. Like most investing strategies, common quantitative investment strategies, and their resulting factor preferences, tend to be rewarded in some markets and to lag in others.

To understand why quantitative techniques became so popular and then faltered, it helps first to understand the markets and the common signals these techniques exploit. In the early to mid-2000s, smaller-cap value stocks outperformed in an environment that was particularly rewarding for quantitative managers, who typically prefer these stocks, and that also favored traditional managers, who were then focusing on the same stocks.

However, in the second half of 2007 and most of 2009, quantitative equity managers' performance significantly lagged that of traditional managers. This underperformance over the past few years has led many investors to question the future efficacy of quantitative management in general. Specifically, quantitative managers have been criticized for focusing too narrowly on a common set of preferred factors. A popular perception is that such focus has significantly reduced, or even eliminated, the alpha potential from these factors. A similar criticism highlights the belief that quantitative managers' factor preferences result in too much homogeneity within the group and thus a reduction in diversification opportunity.

Taking a step back, it is worth noting that active management success is most dependent on how much insight investment managers successfully apply, rather than simply on the decision to invest on the basis of qualitative or quantitative techniques. As more investment ideas become well known, uncovering and exploiting new opportunities can become difficult for any manager. The best managers, either quantitative or traditional, will continually invest in research in order to develop both innovative ways to analyze alpha signals and techniques for exploiting those signals.

Key questions regarding quantitative equity management

DO QUANTITATIVE MANAGERS INCREASE DIVERSIFICATION IN A PORTFOLIO?

If, as a group, quantitative managers bring materially different factor exposure to portfolios than traditional managers do, it should follow that their inclusion will improve multi-manager portfolio diversification. To address whether this is so, our paper reviews the pair-wise excess return correlations of quantitative and traditional managers across the U.S., global ex-U.S., Europe and Japan equity universes maintained by Russell. We find that quantitative managers are in fact different from traditional managers.

ARE QUANTITATIVE MANAGERS DIFFERENT ENOUGH FROM EACH OTHER TO PROVIDE DIVERSIFICATION OPPORTUNITIES?

One of the claims made following the 2007 underperformance of quantitative strategies is that by exploiting the same factors, these strategies lead to crowding. If that is true, then we can expect correlations between quantitative managers to be high. To address this issue, we review the correlations of quantitative managers across different geographies (see Exhibit 1, below). We find low correlations, providing support for including multiple quantitative managers in investment structures.

HOW HAVE QUANTITATIVE MANAGERS PERFORMED ACROSS DIFFERENT GEOGRAPHIES OVER THE PAST SEVERAL YEARS?

Most reviews of quantitative strategies focus on U.S. managers. Since Russell tracks quantitative products across multiple geographies, we extend the analysis to non-U.S. regions as well. We find that performance patterns have been similar across geographies, and that common factors have contributed to recent underperformance across geographies. We find also that quantitative manager performance has been fairly cyclical across various geographies.

WHAT PORTFOLIO CHARACTERISTICS DO QUANTITATIVE MANAGERS GENERALLY PREFER?

Factor biases explain both recent performance shortfalls and the success in earlier periods. In particular, value, capitalization and momentum are key drivers.

IS RECENT UNDERPERFORMANCE OF QUANTITATIVE MANAGERS A SECULAR OR CYCLICAL PHENOMENON?

Although simplistic quantitative strategies will likely face threats from increasing market efficiency, a look at the pattern of returns offers reasonable evidence to support the view that the past three years' shortfall was more of a cyclical phenomenon.

The analysis we have conducted to answer the questions above uses manager returns for the seven years 2003 through 2009. The returns are broken out by geography as well as by type of manager, either quantitative or traditional. Russell collects both performance and holdings data for managers in its universes. In addition, Russell analysts meet with these managers to identify and confirm the appropriateness of the quantitative or traditional categorization. Four geographical universes are represented: U.S., global ex-U.S., Europe and Japan. The universes are restricted to market-oriented investment styles, to remove biases that could be introduced by managers focusing on the tail growth or value styles.

Quants improve portfolio diversification

A key question investors face is whether quantitative portfolios provide beneficial diversification in a multi-manager lineup. To address this question, Exhibit 1 shows rolling three-year pair-wise excess return correlation between quantitative and traditional managers with a market-oriented focus.[1] Ranging from –0.08 to +0.12, these low correlations support the idea that quantitative managers have generated performance different from that of traditional managers.

Exhibit 1 / 3-year rolling correlation quantitative and traditional managers

	U.S.	Global ex-U.S.	Europe	Japan
06/30/2006	0.00	-0.02	-0.08	0.12
09/30/2006	-0.01	-0.01	-0.07	0.08
12/31/2006	-0.01	-0.01	-0.06	0.06
03/31/2007	-0.01	-0.01	-0.05	0.03
06/30/2007	0.00	0.02	-0.06	0.02
09/30/2007	0.01	0.02	-0.05	0.03
12/31/2007	0.03	0.04	-0.05	0.03
03/31/2008	0.02	0.03	-0.06	0.01
06/30/2008	0.05	0.05	-0.03	0.00
09/30/2008	0.04	0.03	-0.03	-0.02
12/31/2008	0.02	0.04	0.00	-0.02
03/31/2009	0.03	0.03	0.00	-0.02
06/30/2009	0.04	0.03	-0.01	-0.01
09/30/2009	0.05	0.04	0.01	0.00
12/31/2009	0.05	0.03	0.01	0.00
03/31/2010	0.05	0.04	0.01	0.01

Because quantitative managers behave differently than traditional managers do, there is a diversification benefit to be had from including quantitative managers in the opportunity set. In recent periods, quantitative managers have underperformed traditional managers. In prior periods, though, quantitative managers have outperformed. Over long time horizons, portfolios built with a combination of quantitative and traditional management styles should provide superior risk-adjusted returns when compared to portfolios limited to the traditional or the quantitative style alone.

Not all quant managers are the same

Some investors who perceive quantitative managers to be insufficiently distinct from each other expect their performance and factor exposures to be very similar. A number of studies show that the correlation between quantitative managers is similar to the correlation between fundamental managers. Most of these studies use publicly available manager universe data. We conducted our analysis by looking at the detailed Russell universes by geographies and have come to similar conclusions.

Exhibits 2 and 3 show, respectively, the three-year rolling pair-wise excess return correlation between quantitative managers and that between traditional managers, each computed in different geographies. Correlation is higher between quantitative managers than between traditional managers. However, in the U.S., and recently in Europe, quantitative managers demonstrate low correlation.

[1] See the appendix for details on the number of managers in each respective universe.

Exhibit 2 / 3-year rolling correlation quantitative with quantitative managers

	U.S.	Global ex-U.S.	Europe	Japan
06/30/2006	0.15	0.47	0.39	0.41
09/30/2006	0.11	0.43	0.31	0.38
12/31/2006	0.10	0.47	0.28	0.39
03/31/2007	0.10	0.38	0.39	0.36
06/30/2007	0.10	0.36	0.30	0.39
09/30/2007	0.13	0.31	0.28	0.39
12/31/2007	0.14	0.29	0.40	0.44
03/31/2008	0.10	0.27	0.52	0.37
06/30/2008	0.10	0.36	0.41	0.37
09/30/2008	0.09	0.28	0.65	0.38
12/31/2008	0.15	0.31	0.56	0.27
03/31/2009	0.16	0.31	0.13	0.27
06/30/2009	0.13	0.33	0.05	0.26
09/30/2009	0.12	0.31	0.08	0.25
12/31/2009	0.12	0.32	0.02	0.25
03/31/2010	0.13	0.33	0.02	0.26

Exhibit 3 / 3-year rolling correlation traditional with traditional managers

	U.S.	Global ex-U.S.	Europe	Japan
06/30/2006	0.05	0.08	0.08	0.08
09/30/2006	0.04	0.10	0.05	0.09
12/31/2006	0.04	0.05	0.05	0.08
03/31/2007	0.03	0.03	0.01	0.12
06/30/2007	0.05	0.06	0.00	0.10
09/30/2007	0.07	0.06	0.05	0.11
12/31/2007	0.06	0.03	0.05	0.10
03/31/2008	0.05	0.02	0.07	0.12
06/30/2008	0.05	0.09	0.07	0.10
09/30/2008	0.03	0.09	0.02	0.14
12/31/2008	0.04	0.08	0.09	0.10
03/31/2009	0.07	0.09	0.08	0.09
06/30/2009	0.05	0.14	0.17	0.12
09/30/2009	0.06	0.16	0.18	0.12
12/31/2009	0.05	0.17	0.15	0.12
03/31/2010	0.07	0.16	0.18	0.10

Quant success is time period–dependent

While the average correlation between quantitative managers doesn't indicate crowding, there could be periods when crowding is more prevalent, such as in times of high market volatility or poor stock-level liquidity. Some argue that the impact of quant crowding was especially pronounced during 2007 and 2009. To address this concern, we analyze the historical returns and spread of returns between quantitative and traditional managers to see if quants exhibit any cyclicality in their return patterns relative to traditional.

Exhibit 4 presents the annualized historical returns of traditional and quantitative managers across the various geographies. Note the three-year periods 2007 through 2009 and 2004 through 2006. The primary causes of the performance differences are explained in the remainder of this paper. The spread represents the quantitative minus the traditional manager returns.

Exhibit 4 / Quantitative and traditional annual and annualized returns (%)

U.S.	2009	2008	2007	2006	2005	3-Year	5-Year
Quantitative	25.58	–36.86	5.03	16.08	7.37	–5.70	1.09
Traditional	31.27	–36.77	8.19	14.14	6.52	–3.53	1.65
Russell 1000®	28.43	–37.60	5.77	15.46	6.27	–5.36	0.79
Spread	–5.69	–0.09	–3.16	1.94	0.84	–2.16	–0.55
Global ex-U.S.							
Quantitative	32.97	–43.86	10.66	28.61	16.61	–6.74	3.90
Traditional	33.28	–42.81	14.82	27.06	15.58	–4.11	5.38
Russell Global ex-U.S. Large Cap Developed	36.45	–43.85	13.73	26.43	14.78	–5.27	4.33
Spread	**–0.30**	**–1.05**	**–4.16**	**1.55**	**1.02**	**–2.63**	**–1.48**
Europe	2009	2008	2007	2006	2005	3-Year	5-Year
Quantitative	34.59	–47.42	11.46	35.61	10.92	–8.19	2.04
Traditional	36.52	–45.00	15.04	32.66	9.55	–5.29	4.42
Russell Europe	38.39	–46.41	14.00	34.88	10.39	–5.44	4.71
Spread	–1.93	–2.42	–3.58	2.95	1.38	–2.90	–2.38
Japan							
Quantitative	7.41	–41.13	–10.65	5.88	46.46	–17.25	–2.79
Traditional	11.95	–42.57	–10.78	1.96	50.96	–17.10	–2.60
Russell Japan	7.98	–40.91	–10.74	3.16	46.38	–17.11	–2.97
Spread	**–4.54**	**1.44**	**0.13**	**3.92**	**–4.50**	**–0.15**	**–0.19**

Exhibit 4 / Quantitative and traditional annual and annualized returns (%)

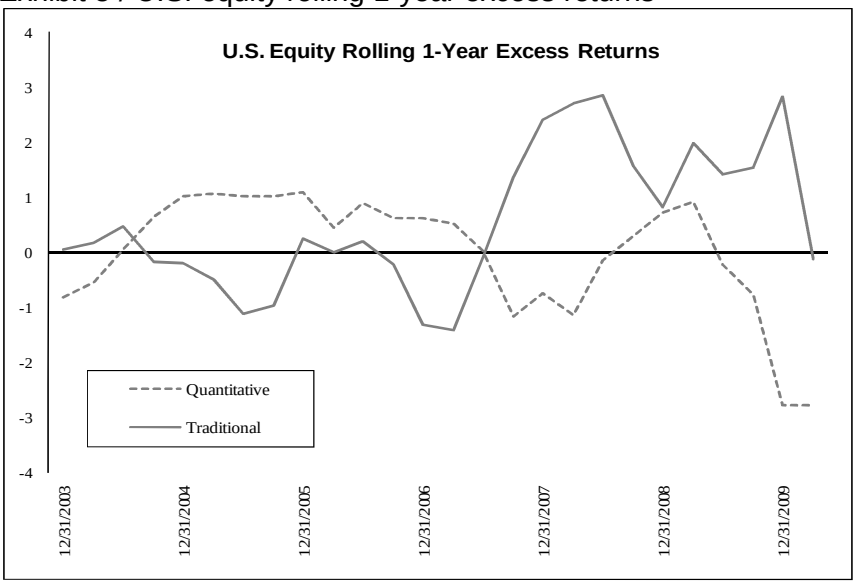
U.S.	2006	2005	2004	2003	3-Year	4-Year
Quantitative	16.08	7.37	12.41	29.08	11.95	15.95
Traditional	14.14	6.52	11.20	29.95	10.70	15.02
Russell 1000®	15.46	6.27	11.40	29.89	10.98	15.43
Spread	**1.94**	**0.84**	**1.21**	**–0.87**	**1.25**	**0.93**
Global ex-U.S.						
Quantitative	28.61	16.61	22.85	40.52	22.59	26.81
Traditional	27.06	15.58	19.57	34.80	20.36	24.01
Russell Global ex-U.S. Large Cap Developed	26.43	14.78	21.03	40.71	20.58	25.16
Spread	**1.55**	**1.02**	**3.28**	**5.72**	**2.24**	**2.79**
Europe	2006	2005	2004	2003	3-Year	4-Year
Quantitative	35.61	10.92	22.68	40.93	22.65	27.14
Traditional	32.66	9.55	19.50	37.44	19.67	23.64
Russell Europe	34.88	10.39	21.29	40.03	21.78	26.10
Spread	**2.95**	**1.38**	**3.18**	**3.49**	**2.98**	**3.50**
Japan						
Quantitative	5.88	46.46	16.17	27.20	21.54	22.96
Traditional	1.96	50.96	13.08	26.92	20.43	21.95
Russell Japan	3.16	46.38	11.95	25.05	19.12	16.15
Spread	**3.92**	**–4.50**	**3.09**	**0.28**	**1.10**	**1.01**

A few observations can be made from this data.

- 2007 and 2009 were challenging years for quantitative managers, particularly U.S. and Japanese quantitative managers. The three-year and five-year annualized numbers ending December 2009 demonstrate underperformance.
- 2004–2006 was a rewarding period for quantitative managers, who materially outperformed traditional managers over this period.
- Over the entire seven-year period, U.S. large cap quantitative manager performance has been particularly cyclical.

In conclusion: there has been a cyclical payoff for quantitative managers' strategies vs. those used by traditional managers. Exhibit 5 graphically illustrates this cyclicality for U.S. managers.

Exhibit 5 / U.S. equity rolling 1-year excess returns



As of 12/31/2009

Quant factor preferences explain performance

To aid in understanding the cyclicality of quantitative managers and the factor crowding that has been highlighted as a contributor to the 2007 and 2009 underperformance, Exhibit 6 compares quantitative and traditional global ex-U.S. managers' factor exposures. This data covers the nine years ending December 2009.

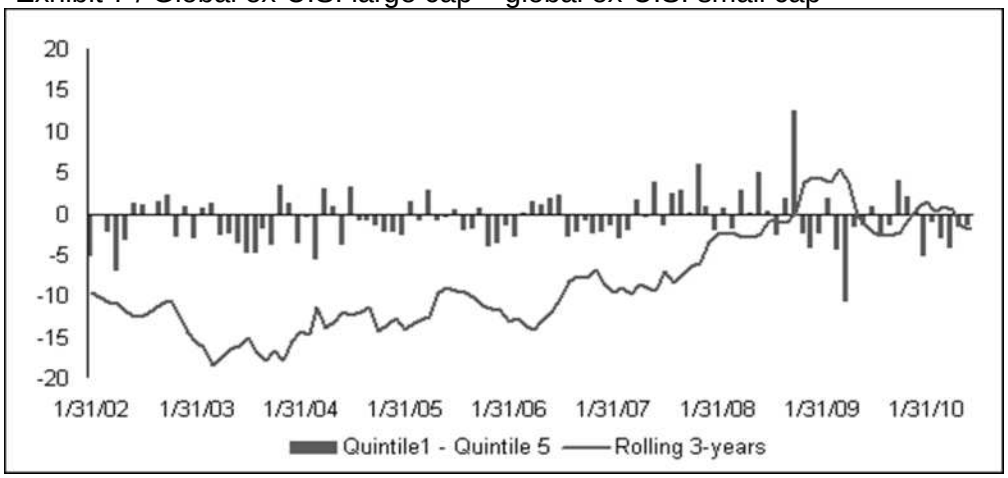
Exhibit 6 / Market-oriented global ex-U.S. managers (2002–2009)

	Quantitative	Traditional	Difference
Sector Deviation	7.71	11.18	–3.48
Number of Holdings	360	120	240
Large Cap %	30.91	32.93	–2.02
Mid/Small Cap %	15.93	11.54	4.40
Small Cap %	8.89	5.29	3.61
Japan %	21.03	18.10	2.94
United Kingdom %	21.26	20.38	0.87
Emerging Markets %	3.61	7.62	–4.01
IBES Long-Term Growth	9.09	9.61	–0.52
Country Deviation	9.56	14.54	–4.98
Financial Services %	23.50	23.14	0.36
Technology %	4.83	5.44	–0.61
Consumer Discretionary %	9.14	10.03	–0.88
Energy %	2.56	2.85	–0.28
Utilities %	10.69	9.45	1.24
BM Relative Price/BV	–0.08	0.06	–0.14
BM Relative Price/CF	–0.13	0.05	–0.17
BM Relative Price/Sales	0.05	0.09	–0.04
ROE Momentum	1.10	1.08	0.02
Debt to Capital	46.02	45.06	0.96
Rising Estimates	43.27	39.79	3.47
1-Year Trailing Returns	8.24	3.07	5.17

While there has been some rotation, these biases have been fairly persistent over the years. Three factors seem to explain a large part of the difference in performance between quantitative and traditional managers over the last nine years. Quantitative managers invest more heavily in the smallest cap tier of stocks than do market-oriented traditional managers; they also tend to prefer value stocks, and to have a higher exposure to price momentum. We review each of these factor preferences below.

Exhibit 7 shows the quarterly and rolling three-year spread of the first quintile of large cap stocks minus the fifth quintile of smaller stocks.

Exhibit 7 / Global ex-U.S. large cap – global ex-U.S. small cap

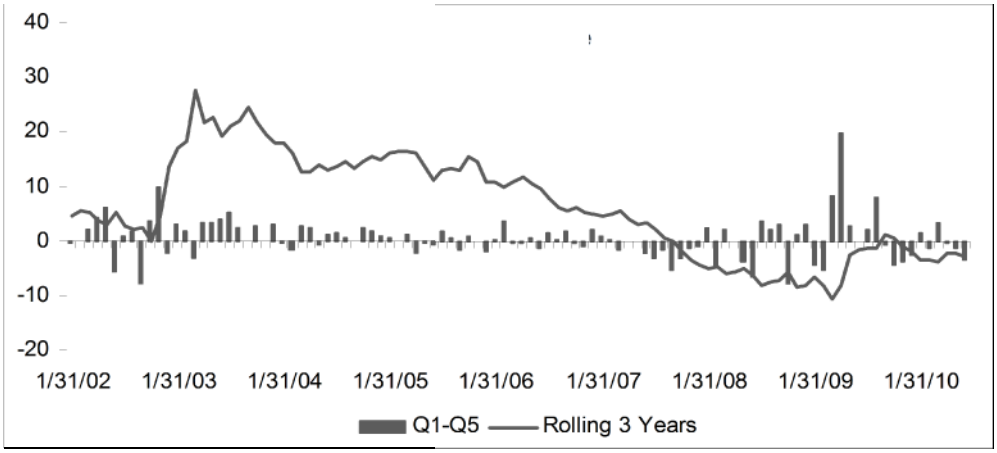


As of 1/31/2010

As demonstrated in Exhibit 7, larger capitalization stocks underperformed small capitalization stocks over this window of time. Until the past couple years, quantitative managers benefited from these factor returns.

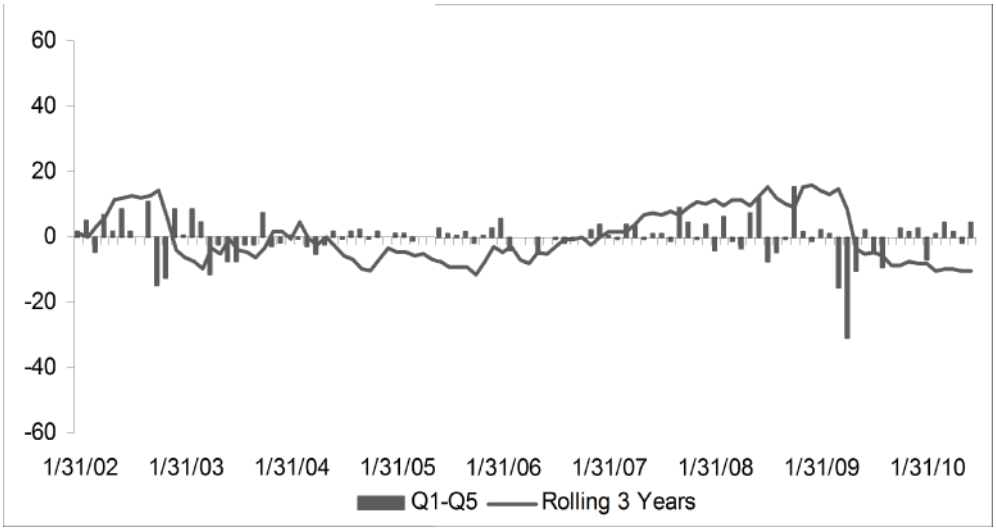
Quant managers also prefer value stocks. Value stocks, as represented by stocks with high book value to price, did particularly well in earlier periods and significantly lagged over the past few years. Exhibit 8 illustrates that, similarly to capitalization, this factor has been a key driver of both the outperformance and the recent underperformance of quantitative strategies.

Exhibit 8 / Global ex-U.S. book-to-price spread



The third factor favored by quant managers is price momentum. As Exhibit 9 shows, trailing stock returns, or momentum, contributed to underperformance of quantitative managers, particularly in 2009. Defensive stocks did very well in the difficult market of 2008, which created significant price momentum for these stocks. However, the market rotated to more cyclical and risky stocks in 2009, and this hurt quantitative managers.

Exhibit 9 / Global ex-U.S. momentum (1-year trailing returns)

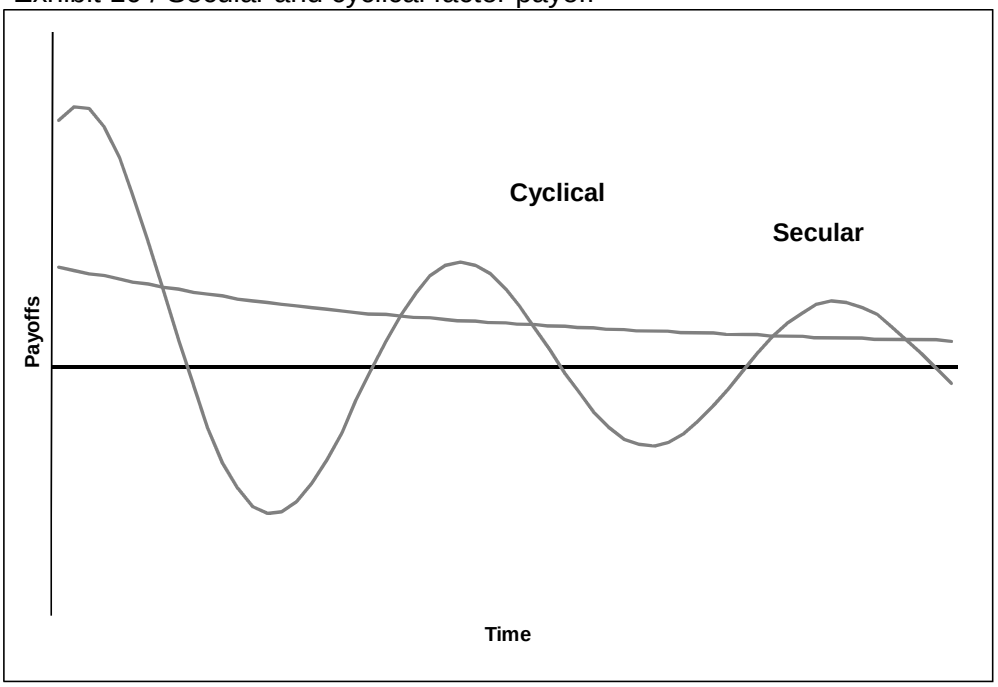


Cyclical rather than secular factors drove recent outperformance

As shown in the previous section, and consistent with investment intuition, factor returns are highly cyclical. Any investor can potentially profit from successfully timing exposure to cyclical opportunities and persistently tilting toward secular opportunities. If great numbers of investors gravitate, or rotate, more quickly to factors that have historically proven effective, it becomes increasingly difficult for the individual investor to capture excess return from these factors. However, it is hard to persuasively argue that this reduction in opportunity will impact quantitative managers more than it will traditional managers. Both types of managers look for fundamentally attractive characteristics not fully reflected in stock prices. In recent years, managers – often, quantitative managers – have repeatedly been let go due to investors' dissatisfaction with portfolio performance. Yet much of performance is cyclical, and there is significant potential for market rebound

The conceptual chart below illustrates both the cyclical nature of factor payoffs and the potential reduction in both these and more secular payoffs. Markets are likely to continue to become more efficient, and success will remain dependent on investor decision making that is predicated on a thorough understanding of the causes of managers' relative performance and the presence and sustainability of their competitive advantages.

Exhibit 10 / Secular and cyclical factor payoff



For illustrative purposes only

The perils of performance chasing

Investors, being human, are susceptible to behavioral biases, and the extrapolation and underreaction biases that drive a meaningful portion of stock mispricing drive counterproductive decision making at all levels of the investing process. In late 1999 and early 2000, a number of value-oriented strategies literally shut down in the wake of unprecedented underperformance. Many investors attributed poor portfolio performance to value managers at precisely the time the managers were poised to produce the most

significant outperformance in market history. Recently, a number of factors have contributed to the meaningful performance shortfall of quantitative strategies. While some will likely present ongoing challenges to both quantitative and traditional managers, many of these factors may simply be out of favor and thus likely to rebound.

Since 2007, the performance shortfall of quantitative strategies has contributed to reductions in quantitative managers' market share and assets under management. Also, the liquidity squeeze of 2007 served as a wake-up call, and many quantitative managers are incorporating unique factors and techniques that should provide competitive advantages going forward. There are fewer dollars chasing historically popular quantitative factors, and new quantitative strategies are being employed. These changes should increase the probability of quantitative managers' success.

Insight is paramount

Stepping back for a moment, we want to point out that basing hire-and-fire decisions primarily on a quantitative or traditional label is likely to be counterproductive. Instead, investors should seek to retain managers who have the necessary skills for translating investment insight into actual returns. Over time, the most knowledgeable and engaged managers will likely generate the largest excess returns.

Nearly all managers attempt to utilize both proprietary and publicly available data and techniques to uncover mispriced securities. As we noted earlier, when new data and techniques prove effective and then become widely available, they will produce less excess return. This reduction in return potential will affect quantitative as well as traditional managers.

Conclusion

The last few years have not been kind to quantitative strategies. In 2007, the impending credit crisis brought on a liquidity squeeze that had a disproportionately negative impact on quantitative managers. Riskier stocks that were shunned in 2008 produced exceptional returns in 2009, but quantitative managers were underweighting companies with more cyclical earnings and higher levels of debt, and thus were not positioned to take part in this upward trend. Traditional managers who invested in such companies did particularly well in 2009. Thus, over the past three to five years, traditional managers have had a distinct performance advantage over quantitative managers.

Despite this recent performance history, though, there are a number of valid reasons for including quantitative managers when constructing multimanager portfolios:

- **Quantitative managers perform differently than traditional managers.** Including insightful quantitative managers will likely improve the risk/return characteristics of the overall portfolio.
- **Quantitative managers are sufficiently different from each other.** Although their strategies tend to focus on similar factor exposures, quantitative managers who have historically experienced, and are likely to experience, very different performance are relatively easy to identify. Combining these managers in a well-diversified portfolio can further reduce portfolio risk in a meaningful way.
- **Quantitative managers' factor preferences have resulted in periods of significant outperformance and significant underperformance.** A great deal of recent quantitative manager underperformance can be attributed to cyclical factors. These same factors have driven, and will likely again drive, periods of strong outperformance. Investors should avoid counterproductive extrapolation of recent performance.

As the cornerstones of quantitative strategies – information technology and data – continue to evolve, quantitative managers will continue to refine and apply their techniques to stock selection, portfolio construction and trading. We believe investors are well advised to seek out insightful quantitative managers who can take advantage of these opportunities. Avoiding quantitative managers may restrict the opportunity set and limit diversification opportunities.

Appendix: Number of observations

The table below lists the number of accounts by geography and type over the most recent three-year period. Russell analysts categorize managers on the basis of their detailed understanding of the investment process. ("MO" = market-oriented. Growth- and value-oriented quantitative managers were excluded from the analysis.)

		06/30/2008	09/30/2008	12/31/2008	03/31/2009	06/30/2009	09/30/2009	12/31/2009	03/31/2010
U.S. MO	Fundamental	183	178	168	173	168	179	175	179
	Quantitative	81	83	79	80	79	79	79	77
Global ex-U.S. MO	Fundamental	59	57	60	61	61	63	61	64
	Quantitative	30	28	28	29	31	30	34	34
Europe MO	Fundamental	70	73	69	72	69	71	71	71
	Quantitative	15	16	18	18	17	19	18	18
Japan MO	Fundamental	150	146	143	137	132	127	123	117
	Quantitative	20	20	20	20	20	20	20	20
		06/30/2006	09/30/2006	12/31/2006	03/31/2007	06/30/2007	09/30/2007	12/31/2007	03/31/2008
US MO	Fundamental	160	166	173	175	193	187	187	188
	Quantitative	67	75	78	78	77	81	79	83
Global ex-U.S. MO	Fundamental	45	47	50	48	53	49	57	56
	Quantitative	18	18	19	20	24	24	24	27
Europe MO	Fundamental	48	51	53	52	54	56	62	65
	Quantitative	9	9	9	11	11	12	15	15
Japan MO	Fundamental	155	155	153	152	153	149	153	154
	Quantitative	19	19	19	20	20	21	21	21

RELATED READING

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Fama, E. F., and K. R. French. 1992. “The Cross-Section of Expected Stock Returns.” *Journal of Finance* 47 (June): 427–465.

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INDEX DEFINITIONS

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 Global ex-US Large Cap Index** measures the performance of the largest securities in the Russell Global ex-U.S. Index, based on market capitalization. The index includes approximately 2,000 securities and covers 52% of the investable global market.

The **Russell Japan Index** measures the performance of the largest investable securities in Japan, based on market capitalization. The index covers 8.04% of the investable global equity market. The Russell Japan 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.

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