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U.S. Equity Strategy Weekly

Momentum: Style's Third Domain or a Replacement for Growth

Momentum gets a bad rap. It is often viewed as a reflection of consensus thinking, or beta chasing, and a strategy highly prone to sustained or crushing risk reversals. Our data tell a different story and one so favorable that we'd encourage investors to take a closer look at momentum's attributes.

- **Momentum is a leadership strategy.** It has outperformed on an absolute and risk-adjusted basis through time and over various market and economic cycles. Take the 1930s which was defined by extreme circumstances, yet momentum outperformed the composite by 280 bps, growth by 70 bps and value by 810 bps per annum.
- **Momentum is not a high beta strategy.** Beta on the high momentum index is 0.92 versus 0.94 for growth and 1.21 for value using data back to 1930. Looking within the decades doesn't alter the conclusion. Recall that momentum is a relative concept, whereby stocks with the best total return momentum in tough markets, for example, are those falling by the least.
- **Momentum offers a powerful complement to value for portfolio diversification purposes.** The excess returns for momentum are inversely related to those for value but positively related to those for growth. Meanwhile, momentum and value outperform core portfolios over time. Thus, a combination of the two styles is likely to provide a solid risk-adjusted portfolio.
- **So, what's the optimal style allocation?** Our highly stylized work says such a portfolio would be 63.7% weighted towards the Russell 1000 Value and 36.3% weighted towards AQR's High Momentum Benchmark, with no weighting given to the Russell 1000 Growth or Russell 1000 Composite benchmarks.

Bottom Line: The data presented in this paper suggest that value managers might want to consider including some exposure to momentum, core managers might want to favor momentum over growth, and growth managers might want to broaden their view of growth outside of the traditionally defined metrics.

Introduction

The report's key takeaways are as follows: *(1) Momentum is a leadership strategy both in absolute terms and on a risk-adjusted basis; (2) Momentum provides an excellent complement to value for portfolio diversification; (3) Momentum is positively correlated with, but dominates, the performance of a conventionally defined growth strategy; and, (4) The above conclusions are robust to various economic, earnings and market cycles.*

Most long-only money managers sit within a growth, value or core style box. Momentum investing is not afforded the luxury of its own official box, probably because it frequently receives a bad rap. The distance between it and Ben Graham's investment principles might be likened to a flight taken from Jakarta to Bogota. Many onlookers view momentum as the ultimate in consensus investing, or beta chasing, and as a strategy highly prone to sustained or crushing risk reversals. Yet, our data tell a different story and one we'd like to share with you in various ways through the remainder of this document.

The goal of this report is to document and characterize the momentum effect, or the correlation between a stock's forward return and its recent performance history, within a broader historic context[1]. There is no attempt to break new ground here, or to offer a complete description of momentum investing, since hundreds of examples of academic research on the subject can be readily found with a simple Google search[2]. This document is simply meant to summarize and share some of our recently completed work on the subject with a wider audience.

Momentum Investing Through the Decades

We have summarized the total return performance of three large-cap style benchmarks – High Momentum, Value and Growth – and the core portfolio (i.e., the S&P 500) from the 1930s by decade and point to point (Exhibit 1). The long-term data in this table might be best packaged as follows[3]:

- **Momentum has led over the very long term.** The data from 1930 show that a High Momentum portfolio has delivered a compound annual growth rate of 13.1% versus 11.6% for Value, 9.4% for the S&P 500 while Growth brings up the rear at 8.9%. The ordinal ranking across these various style benchmarks is preserved on a risk-adjusted basis, as measured by the Sharpe Ratio.
- **The race for leadership between High Momentum and Value has been much closer when it is examined on a decade-by-decade basis.** Exhibit 1 also shows the return history through eight individual decades since 1930, with four of those being led by High Momentum and the other four being led by Value. The 1930s, a decade defined by economic depression, might offer a great counter example for those who believe that momentum does poorly in bad market and economic environments. In fact, the High Momentum portfolio not only outperformed the S&P 500, but was the best performing of the three style strategies during that decade.

[1] Please see Appendix I for a brief description of the benchmarks used throughout this report.
[2] One early example of a "modern" momentum study is by Narasimhan Jegadeesh in a report titled "Evidence of Predictable Behavior of Security Returns" (1990). Since the 1990s, however, Clifford Asness is the name most commonly associated with the best practical research on this topic. As a recent example, see "Value and Momentum Everywhere", Asness et. al. (2009).
[3] Appendix II offers a rich addition to the historic data for the High Momentum, Value, Growth and S&P 500 benchmarks that were used in this section of the report.

Exhibit 1: The Performance of Momentum, Value, Growth & the S&P 500 since the 1930s

Summary of Index Performance by Decade	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	1930-Present
CAGR									
French High Momentum	2.3%	12.9%	23.3%	14.1%	10.3%	18.6%	23.1%	0.6%	13.1%
French Value	-5.8%	17.2%	22.3%	10.7%	12.3%	20.4%	14.3%	4.0%	11.6%
French Growth	1.6%	7.4%	17.5%	8.0%	3.4%	15.8%	20.0%	-1.3%	8.9%
S&P 500	-0.5%	9.0%	19.3%	7.8%	5.9%	17.6%	18.2%	-0.9%	9.4%
Sharpe Ratio									
French High Momentum	0.21	0.73	1.49	0.71	0.29	0.53	1.13	-0.05	0.55
French Value	0.15	0.88	1.23	0.51	0.38	0.75	0.73	0.16	0.41
French Growth	0.19	0.53	1.27	0.35	-0.08	0.42	0.98	-0.17	0.36
S&P 500	0.15	0.59	1.38	0.35	0.04	0.54	0.96	-0.15	0.37

Source: RBC Capital Markets Research, Dr. Kenneth R. French

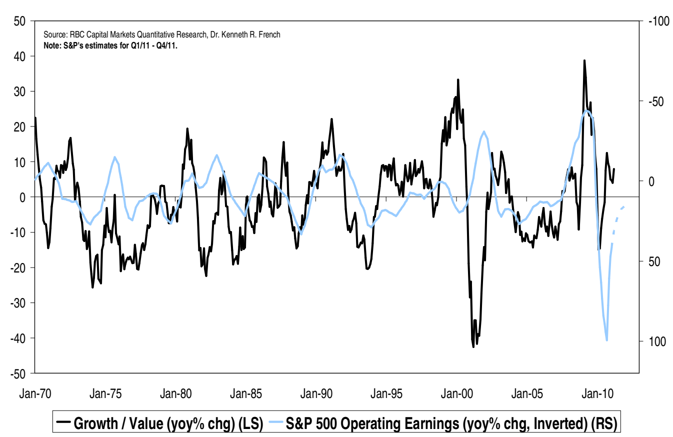
- **Growth doesn't appear all that "growthy".** This portfolio has pulled up the rear from point to point, through most decade-long time-spans, and on risk-adjusted terms.
- **Momentum is not a high beta strategy despite belief to the contrary.** To see this, you will have to refer to the data presented in Appendix II. However, we can tell you that the estimated beta since 1930 on High Momentum is 0.92 versus 0.94 for Growth and 1.21 for Value. Meanwhile, in any given decade, the highest beta afforded to the momentum portfolio was 1.11 during the 1980s. Why might this be so? Recall that momentum is a relative concept, whereby stocks with the best momentum in tough markets, for example, are those falling by the least.

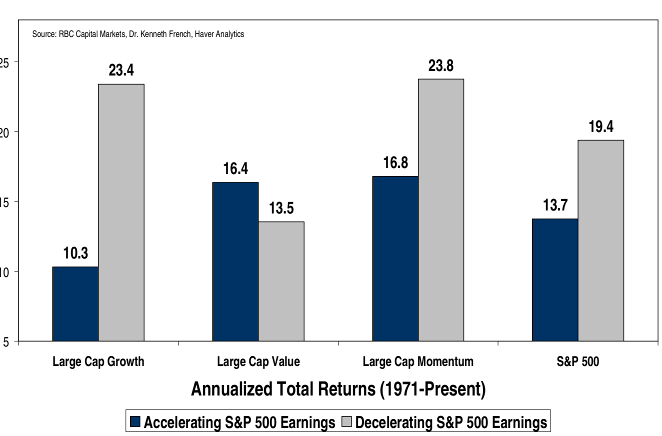
Momentum Investing over the Economic & Earnings Cycle

Most conventional macro literature on style investing argues that an investor might be able to augment returns by dynamically shifting the portfolio mix between growth and value through the business and earnings cycle. We not only look at the merit of the idea, but test whether the same conclusions can be supported after including the High Momentum portfolio into the decision tree.

As a first step, we offer a quick visual test of the conventional wisdom (Exhibit 2, LHS). This chart makes it fairly clear that an investor being offered a choice between Growth and Value would shift into Growth as earnings momentum wanes, which is occurring right now. Meanwhile, the value strategy appears more rewarding once earnings momentum bottoms and turns up.

Exhibit 2: Growth, Value, Momentum & the Earnings Cycle





And, in fact, the annualized return data supports conventional thinking (Exhibit 2, RHS). It shows that Value has delivered 15.4% annualized returns while Growth has generated 10.3% annualized returns over periods of accelerating S&P 500 earnings. This contrasts with Growth's dominance during periods characterized by decelerating earnings, returning 23.4% versus 13.5% for Value.

However, the overall conclusions change rather dramatically once the High Momentum portfolio is introduced into the decision set. Exhibit 2 also shows that returns for High Momentum exceed those for Value in an accelerating earnings environment and slightly outperform those offered by Growth when earnings decelerate.

Bottom Line: Growth outperforms Value as S&P 500 earnings decelerate. Value outperforms Growth as S&P 500 earnings accelerate. Yet, the performance of High Momentum marginally dominates Growth in earnings decelerations and Value in earnings accelerations.

Optimizing on Style: 64% Value, 36% Momentum, 0% Growth!

Until now, we have borrowed from Professor Kenneth French's database in order to stress-test the robustness of our conclusions to various economic and market scenarios. The benefit of the Professor's data is the rich history, but most investors are unfamiliar with these style benchmarks and they are rebalanced monthly, which is not a realistic operating framework for many practitioners.

So, armed with the historic conclusions generated in the prior sections, we now turn our attention to widely accessible benchmarks in order to generate actionable ideas for portfolio construction. In this section, we look at the Russell 1000 benchmarks and compare those with AQR's Large-cap High Momentum benchmark. The latter index is constructed almost identically to Professor French's High Momentum portfolio, with the primary difference being that the AQR Index is rebalanced quarterly as opposed to monthly.

Exhibit 3 summarizes the performance for these widely accessible benchmarks based on the last 20 years of total return data. The conclusions we can draw from the data are largely identical to those we arrived at using the historical French data set, that being:

Exhibit 3: Performance of Russell 1000 AQR & Large-cap High Momentum Benchmarks

Performance Summary Since 1991	R1000 Composite	R1000 Value	R1000 Growth	AQR	50% AQR / 50% Core	50% AQR / 50% Value	50% AQR / 50% Growth
CAGR	9.8%	10.4%	8.7%	11.7%	10.8%	11.2%	10.3%
Alpha	0.0%	1.5%	-1.7%	1.8%	0.9%	1.7%	0.0%
Beta	1.00	0.90	1.10	1.04	1.02	0.97	1.07
Sharpe Ratio	0.45	0.50	0.36	0.51	0.50	0.54	0.44
Worst Month	-17%	-17%	-18%	-20%	-17%	-17%	-18%
Best 12 Months	55%	56%	54%	58%	54%	54%	55%
Worst 12 Months	-44%	-47%	-46%	-45%	-43%	-44%	-45%
% Negative 12m trailing periods	22%	23%	23%	21%	23%	24%	21%
Median Return in Down Months	-2.7%	-2.7%	-3.2%	-3.4%	-2.8%	-2.9%	-3.2%

Source: RBC Capital Markets Research, AQR Capital Management, Haver Analytics

- **The AQR Large-cap Momentum Index outperforms.** It has delivered an annualized pick-up of 130 basis points since 1991 over the second-best performing pure style index, which is the Russell 1000 Index. Risk-adjusted returns, as captured by the Sharpe Ratio, also rank ahead of all of the other pure style benchmarks.
- **Growth has been a substantial laggard.** Its compound annualized return sits below Value, Momentum and the core Russell 1000 benchmark; it has been a higher beta strategy; and, is a poor risk-adjusted member amongst its style peers.

- **The AQR Index is not high beta.** Its beta is lower than that for the Russell 1000 Growth Index and is only marginally higher than the overall market index which is, by definition, equal to 1.0.

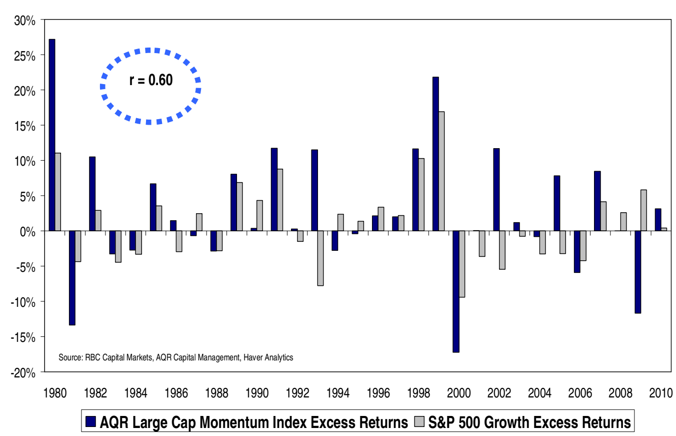
The columns to the right of the vertical separator in Exhibit 3 provide the performance analytics for three naively blended style portfolios. The first is the 50/50 blend between the Russell 1000 and the AQR Index. The second and third portfolios are analogous in design but use the Russell 1000 Value and Russell 1000 Growth indices, respectively, in place of the Russell 1000 Composite.

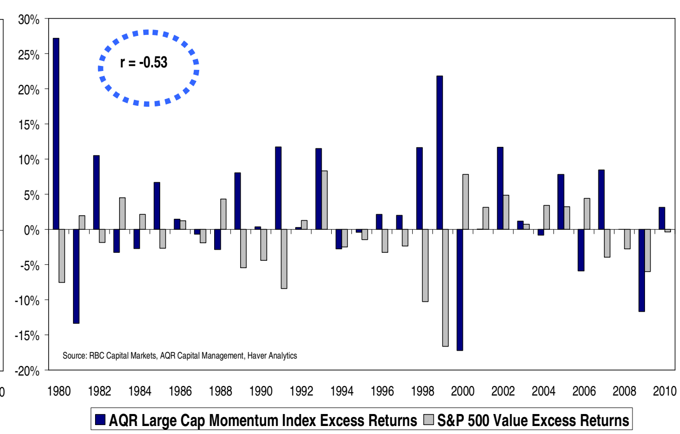
- **Core, growth and value managers are likely to enhance returns by adding some exposure to momentum.** On almost any important performance metric, the AQR/Core 50/50 portfolio blend beats the Russell 1000, the AQR/Value 50/50 blend beats the Russell 1000 Value, and the AQR/Growth 50/50 blend beats the Russell 1000 Growth Index.

- **An optimal portfolio is likely to be constructed using some combination of value and momentum, with growth probably receiving a very small weight.** The portfolio combination of value and momentum generates higher risk-adjusted returns than any of the other portfolios we have looked at.

Why does momentum make for such a good partnership with value? Statistically speaking, we think the answer is neatly captured in the two charts of Exhibit 4. The left hand side chart shows that the excess returns for momentum are positively related to the excess returns for growth. In other words, in a market favoring growth, we are also likely to see momentum outperform. At the same time, we find that the excess returns for momentum are inversely related to the excess returns for value. Said differently, we are more likely to see momentum underperform in a market favoring value. Meanwhile, most of the analytics in this report show that the performance metrics for momentum dominate those for growth, while value comes in at a close second behind momentum.

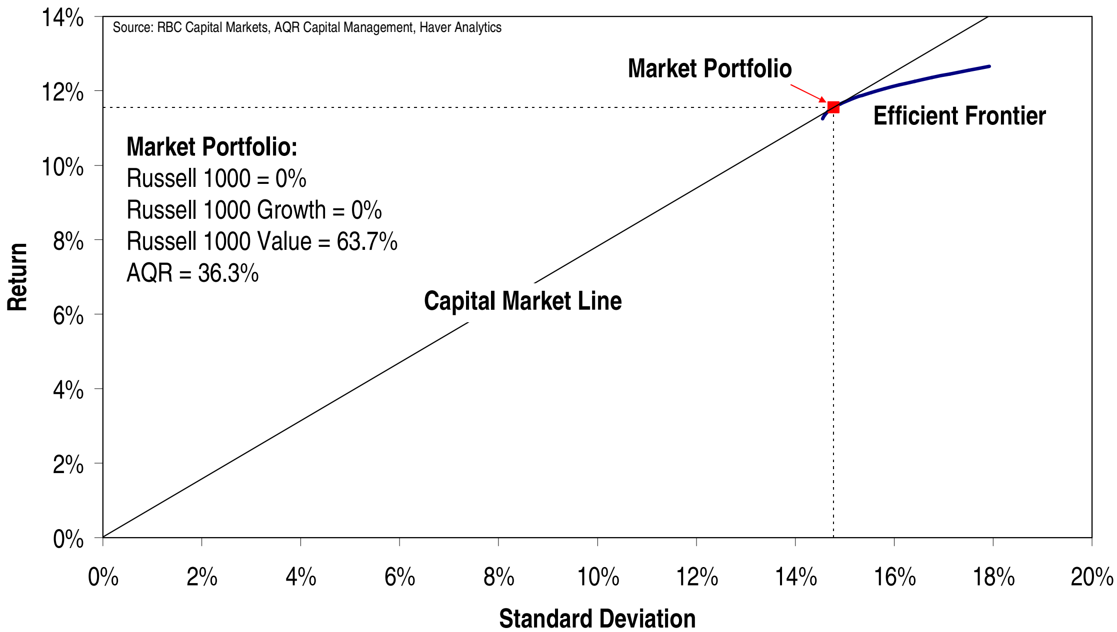
Exhibit 4: Excess Returns for Growth & Momentum, Value & Momentum





We constructed an efficient frontier based on the performance characteristics for the Russell 1000 Composite, its two style peers, and the AQR Momentum Index (Exhibit 5). This frontier offers an optimal return based on various combinations of the benchmarks for each level of risk. The particular combination we highlight is the "market portfolio", defined at the point where the Capital Market Line, a function of the current 3-month T-bill rate, lays tangent to the efficient frontier. This particular portfolio is 63.7% weighted towards Russell 1000 Value and 36.3% weighted towards the AQR, with no weightings given to the Growth or Core Benchmarks.

Exhibit 5: Results from a Style Optimization Exercise



Bottom Line: An optimized style portfolio generates no weighting to Growth, with Value and Momentum accounting for the entirety of the allocation.

Appendix I: Summary of Key Style Benchmarks used in this Report

- **AQR Large-cap Momentum Index.** This is a publicly accessible capitalization-weighted index rebalanced every three months with history back to 1980.[4] The key criteria for index construction and inclusion are as follows: (1) The largest 1000 U.S. companies are ranked by total return momentum defined as the total return of the stock over the prior 12 months, excluding the last month[5]; (2) Stocks in the benchmark include only the large-caps that rank in the top-third based on high momentum.

- **French Large-cap Style Indexes.** The Growth, Value and High Momentum indexes are based on total returns, are capitalization weighted and can be found within Professor Kenneth French's publicly accessible global equity database. Rebalancing periods for these indexes are monthly. All of the index construction and inclusion details can be seen on the website.[6]

- **Russell 1000 Indexes.** The Growth, Value and the Composite Index are cap-weighted total return indexes representative of the large-cap subset of the U.S. equity universe.[7]

[4] The following link provides the monthly return data and more details on AQR index construction: http://www.aqrindex.com/AQR_Momentum_Indices/Data_Downloads/Content/default.fs

[5] Excluding returns for the most recent month is a common practice in momentum-based research. Numerous reasons are cited in the literature including the fact that stock prices are prone to short-term reversals (i.e., negative first-order serial correlation), but display strong evidence of trend persistence at longer lags up to, and including, a one-year time interval (i.e., significantly positive higher-order serial correlation).

[6] The following link can be used to access Professor Kenneth French's historically rich data library: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. His high momentum benchmark is constructed almost identically to AQR's, with the primary difference being the use of a one-month rebalance period.

[7] Further information about the Russell benchmarks is available on their website: http://www.russell.com/indexes/data/fact_sheets/us/russell_1000_index.asp.

Appendix II: Summary Benchmark Performance Analytics

French High Momentum Portfolio Performance by Decade	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	1930-Present
CAGR	2.3%	12.9%	23.3%	14.1%	10.3%	18.6%	23.1%	0.6%	13.1%
Alpha	2.2%	3.6%	3.0%	5.4%	4.3%	-0.5%	3.0%	1.6%	4.3%
Beta	0.80	1.03	1.03	1.08	1.02	1.11	1.08	0.81	0.92
Sharpe Ratio	0.21	0.73	1.49	0.71	0.29	0.53	1.13	-0.05	0.55
Worst Month	-26%	-22%	-7%	-9%	-17%	-23%	-15%	-15%	-26%
Best 12 Months	123%	80%	59%	49%	48%	95%	55%	45%	123%
Worst 12 Months	-57%	-25%	-6%	-15%	-34%	-22%	-8%	-42%	-57%
% Negative 12m trailing periods	50%	33%	6%	13%	28%	25%	8%	38%	25%
Median Return in Down Months	-5.5%	-3.1%	-2.3%	-2.5%	-2.8%	-2.7%	-3.0%	-3.1%	-3.0%

Source: RBC Capital Markets Research, Dr. Kenneth R. French

French Value Portfolio Performance by Decade	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	1930-Present
CAGR	-5.8%	17.2%	22.3%	10.7%	12.3%	20.4%	14.3%	4.0%	11.6%
Alpha	-0.2%	6.7%	0.6%	2.5%	6.2%	5.3%	-0.3%	5.5%	1.0%
Beta	1.45	1.13	1.13	1.06	1.00	0.82	0.82	1.04	1.21
Sharpe Ratio	0.15	0.88	1.23	0.51	0.38	0.75	0.73	0.16	0.41
Worst Month	-35%	-25%	-8%	-7%	-12%	-19%	-11%	-23%	-35%
Best 12 Months	358%	105%	84%	49%	84%	64%	46%	45%	358%
Worst 12 Months	-78%	-22%	-22%	-19%	-30%	-8%	-18%	-55%	-78%
% Negative 12m trailing periods	59%	28%	16%	23%	23%	10%	11%	38%	26%
Median Return in Down Months	-10.4%	-2.6%	-2.9%	-3.2%	-2.8%	-1.4%	-2.7%	-2.3%	-2.9%

Source: RBC Capital Markets Research, Dr. Kenneth R. French

French Growth Portfolio Performance by Decade	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	1930-Present
CAGR	1.6%	7.4%	17.5%	8.0%	3.4%	15.8%	20.0%	-1.3%	8.9%
Alpha	1.4%	-0.6%	-0.3%	0.0%	-2.6%	-2.7%	0.3%	-0.4%	0.2%
Beta	0.85	0.90	0.93	1.05	1.08	1.09	1.08	0.97	0.94
Sharpe Ratio	0.19	0.53	1.27	0.35	-0.08	0.42	0.98	-0.17	0.36
Worst Month	-28%	-22%	-6%	-9%	-14%	-23%	-14%	-15%	-28%
Best 12 Months	125%	60%	49%	39%	50%	62%	52%	35%	125%
Worst 12 Months	-61%	-21%	-7%	-18%	-45%	-18%	-7%	-38%	-61%
% Negative 12m trailing periods	46%	34%	9%	23%	42%	23%	5%	42%	27%
Median Return in Down Months	-5.1%	-2.5%	-2.3%	-2.1%	-2.6%	-2.5%	-2.5%	-3.0%	-2.7%

Source: RBC Capital Markets Research, Dr. Kenneth R. French

S&P 500 Performance by Decade	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	1930-Present
CAGR	-0.5%	9.0%	19.3%	7.8%	5.9%	17.6%	18.2%	-0.9%	9.4%
Sharpe Ratio	0.15	0.59	1.38	0.35	0.04	0.54	0.96	-0.15	0.37
Worst Month	-30%	-24%	-6%	-8%	-12%	-22%	-14%	-17%	-30%
Best 12 Months	160%	69%	56%	38%	54%	62%	49%	36%	160%
Worst 12 Months	-68%	-19%	-7%	-15%	-36%	-15%	-10%	-45%	-68%
% Negative 12m trailing periods	51%	33%	9%	25%	33%	18%	4%	45%	27%
Median Return in Down Months	-6.6%	-3.2%	-2.4%	-2.2%	-2.0%	-2.1%	-2.4%	-2.7%	-2.8%

Source: RBC Capital Markets Research, Dr. Kenneth R. French

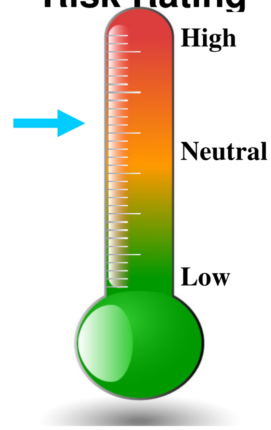
RBC CM US Equity Market Views

Market Outlook (Next 6 - 9 months)

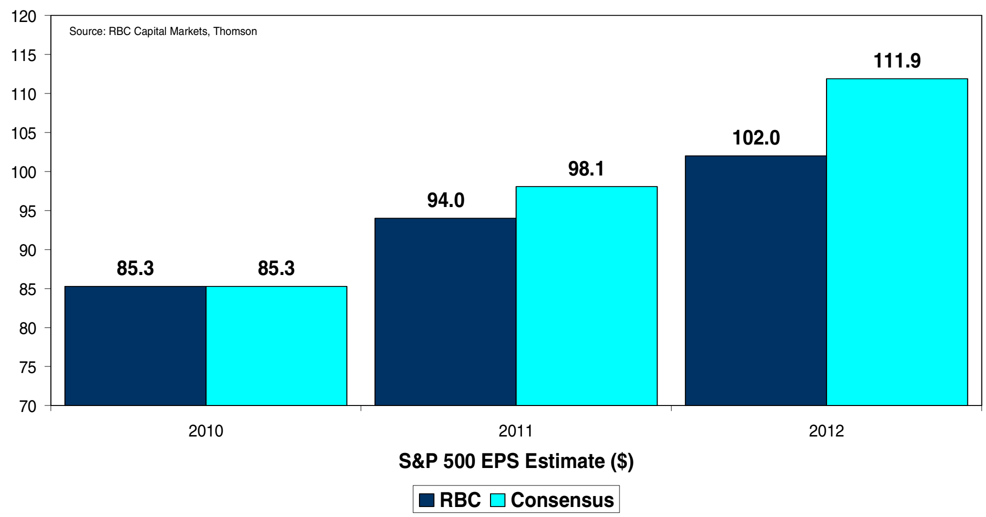
Overweight	X
Market Weight +	
Market Weight	
Market Weight -	
Underweight	

▲/▼ Directional Bias. Source: RBC Capital Markets

Risk Rating



S&P 500 Earnings Outlook



S&P 500 Sector Recommendations Summary

U.S. Equity Sectors	Current Recommendation	Recent Change (Mar 23, 2011)
Industrials	Overweight	*Upgraded from Market Weight*
Energy	Overweight	None
Information Technology	Overweight	None
Health Care	Market Weight	*Downgraded from Overweight*
Materials	Market Weight	None
Financials	Market Weight	None
Consumer Staples	Underweight	None
Telecom Services	Underweight	None
Utilities	Underweight	None
Consumer Discretionary	Underweight	None

Source: RBC Capital Markets

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Conflicts Disclosures

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Distribution of Ratings
RBC Capital Markets, Equity Research

			Investment Banking Serv./Past 12 Mos.	
Rating	Count	Percent	Count	Percent
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HOLD[SP]	587	43.3	128	21.81
SELL[U]	55	4.1	12	21.82

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