

# Quality: A Distinct Equity Factor?

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Far from being an avant-garde technique, the practice of ranking stocks on the basis of a quality score is well-established, and has been engrained in the investment process of asset managers, especially those following a value strategy. Even as early as 1949, in his original publication of *The Intelligent Investor*, Benjamin Graham highlighted the importance of quality stocks by affirming:

*“The risk of paying too high a price for good quality stocks – while a real one – is not the chief hazard...the chief losses to investors come from the purchase of low quality stocks at times of favorable business conditions...”*

In the last two decades, this truism took on renewed significance with the spectacular failure of sizeable companies such as WorldCom, whose market capitalization bore a scant relationship with their fundamentals. There is also growing recognition that high-quality companies can be determined *a priori* and that their performance cannot be comprehensively explained by classical risk factors alone—namely size, momentum, volatility and value. This has therefore given credence to the idea that a fifth factor—quality—exists in its own right and, in combination with other risk premia, may act as a good diversifier in investment portfolios.

However, despite increased research efforts on this subject, there is still little consensus on what constitutes quality, and what sets it apart from the other well-known risk factors—notably size, momentum, volatility and value. While the definitions of even these familiar risk factors can vary, there is a general agreement on the basic traits of these factors. A case in point is the manner in which value stocks are identified using financial ratios—notably price-to-book, price-to-sales and price-to-earnings—that are widely adopted measures and, to a large extent, all aim to evaluate how cheap a given stock is with respect to its fundamental value.

The same cannot be said of quality, a topic which still fiercely divides practitioners and academics. At the most basic level, some industry experts restrict their definition of quality to a single metric and consider quality and profitability as kindred concepts. Others, however, opine that quality comes in different guises and should encompass compatible, though unconnected, features like cash flow generation ability, earnings growth and stability, and management efficiency, among other features.

In this research paper, we aim to shed some light on this topic and discuss the following aspects:

- The definition of quality and the rationale for the factors chosen to gauge quality in the S&P Quality Indices Framework;<sup>1</sup>
- The performance of quality and other risk premia under different macroeconomic environments;
- The evaluation of key metrics of quality strategies across different regions;
- An analysis of returns through examining factor and industry exposures; and
- A discussion of how quality can be combined with other factors.





<sup>1</sup> It should be noted that the S&P Quality Indices discussed herein are under development.

## What is Quality?

Attempts at defining quality have so far been unsatisfyingly nebulous, from the all-encompassing “characteristics that make a company valuable,” (Asness, Frazzini and Pedersen 2013) to the more exact, yet contentious “high and stable profitability and low debt” (Calvert, 2012). Definitions aside, there is even considerable disagreement in the number of metrics that should be used to identify high-quality stocks. One opinion simply equates it to some description of profitability. By contrast, other industry professionals favor an approach that accounts for the manifold aspects of high-quality companies. Additionally, more complex measures have been devised, such as Piotroski’s F-score, which employs nine fundamental criteria and involves ratios spanning from operating cash flow per share to leverage.

Irrespective of the approach selected, the aim of any quality measure should be to assist in estimating a company’s future profitability and the source of risk to which it is most subjected. Broadly speaking, “high-quality companies” share similar characteristics of seeking to generate higher revenue and cash, and enjoying more stable growth than the “average” company. Equally important, high-quality companies seek to adopt a conservative, yet effective, capital structure that allows them to grow. Finally, high-quality companies are run by managers who tend to exercise prudence in the administration of the companies’ affairs. Together, these propitious traits generally shield these companies from the vagaries of the economic cycle, making them slightly more immune to downturns.

Unquestionably, some of these characteristics are qualitative in nature and thus cannot be observed objectively. Often, there is much overlap among factors that can be gauged through company-specific analysis. In light of this, we consider a three-pronged approach to determine quality in a systematic manner, in which each of the attributes identified are accorded equal importance (see Exhibit 1).

Exhibit 1: Systematic Framework for Determining Quality Companies							
Category		+		+		=	
Rationale	<ul style="list-style-type: none"> <li>What is the competitive position of the company in respect of its peers?</li> <li>What unique offering does it have to give it an advantage?</li> <li>Is the company profitable enough?</li> </ul>	<ul style="list-style-type: none"> <li>How well do earnings reflect the strength of the company?</li> <li>Are there any clear signs of earnings management and accounting red flags?</li> <li>Are earnings persistent?</li> </ul>			<ul style="list-style-type: none"> <li>An efficient and prudent capital structure</li> <li>Capacity to sustain ongoing activities and growth</li> <li>Ability to remain solvent</li> </ul>		
Example Measures	<ul style="list-style-type: none"> <li>Return-on-equity</li> <li>Return-on-assets</li> <li>Gross profit/assets</li> </ul>	<ul style="list-style-type: none"> <li>Exceptional items</li> <li>Accruals ratio</li> <li>Change in CFO and net Income</li> </ul>			<ul style="list-style-type: none"> <li>Operating leverage</li> <li>Financial leverage</li> <li>Current ratio</li> </ul>		

Source: S&P Dow Jones Indices LLC. CFO: Cash flow from operations.

## Gauging Quality Using the S&P Quality Indices Framework

Having seen the general characteristics with which high-quality companies are generally endowed, we proceeded to examine the measures that have been chosen for the S&P Quality Indices Framework and explicate the rationale for selecting them. In developing this framework, we have elected to adopt a simple and parsimonious approach, as we believe this is sufficiently effective in obtaining exposure to the average high-quality company. Certainly other techniques are possible, in which more factors are included and/or where sector neutrality with the benchmark is maintained. In our view, while these approaches have merit, there are also important drawbacks; in particular, they tend to lack transparency and are heavily reliant on the efficacy of underlying models and other assumptions, which may rapidly fall into a state of disuse.

For this reason, we have opted to use three measures: return-on-equity (ROE), balance sheet accruals ratio (BSA) and financial leverage.

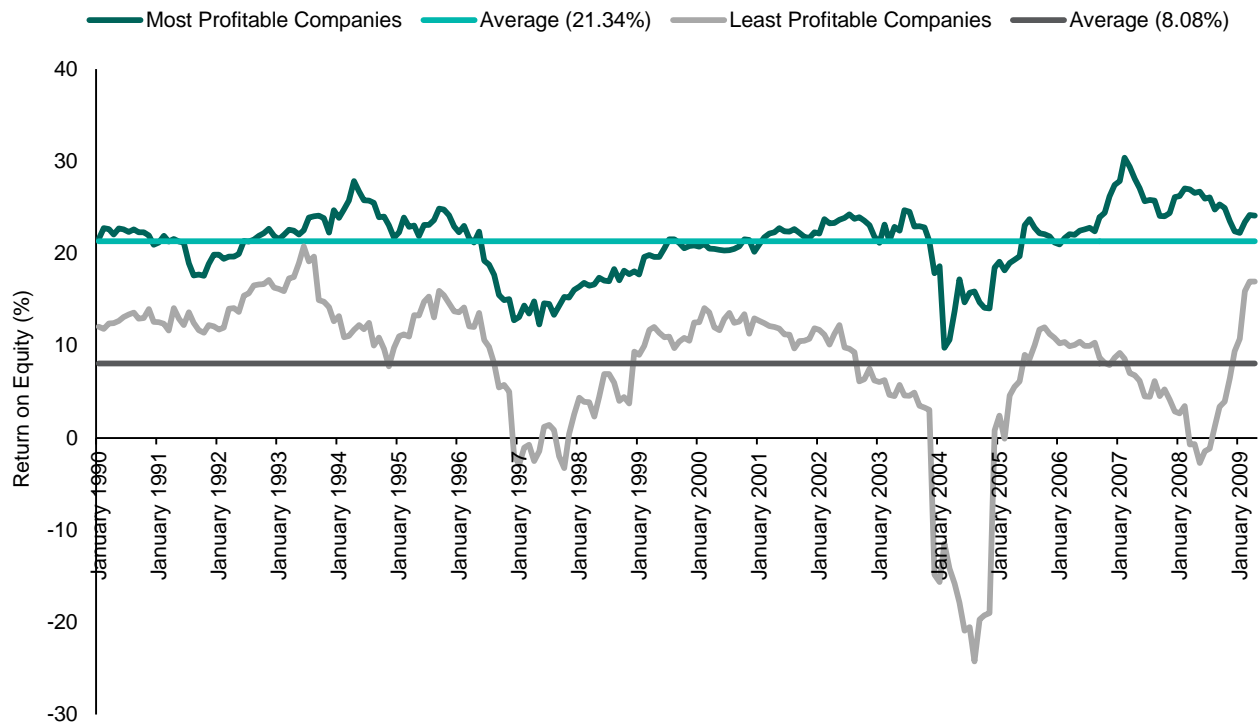
### Return-on-Equity (ROE)

ROE is one of the most commonly used measures for reviewing a company's profitability. A typical way of assessing ROE is through examining the 12-month income scaled by the company book value. Many industry professionals advocate this measure not only because it is simple to calculate and interpret, but also because it produces meaningful results. Others are more cautious about the informational value of ROE, given its widespread adoption in the investment community. Some have even cast doubt on whether ROE can really contribute toward distinguishing high-quality companies.

According to Joyce and Mayer (2012), there are microeconomic reasons as to why companies with high ROE tend to perform well. They argue that these companies are often able to sustain competitive advantages, thereby creating an oligopoly within their sector. These advantages can take many forms, from superior branding to intellectual property value. As a result, companies that were profitable in the past are seen as likely to remain profitable in the future. To put this to the test, we sorted all the companies within the S&P 900 by their profitability one, three and five years ago to verify if this trend has persisted.

Exhibit 2 shows the historical five-year forward ROE. The results suggest that while highly profitable companies in the past are likely to remain highly profitable in the future, this does not appear to be the case for highly unprofitable companies, whose information coefficient t-statistic is statistically significant at the 1% level, as presented in Exhibit 3. Using a shorter time frame also appears to improve the explanatory power of ROE, which is consistent across other developed and emerging markets.

### Exhibit 2: The Persistence of ROE 5-Year Forwards



Source: S&P Dow Jones Indices LLC. Figures based on monthly USD returns of constituents within the S&P 900 between January 1990 and March 2009. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

**Exhibit 3: The Persistence of ROE Over Time**

Quintile	Average ROE (1-Year) (%)	Information Coefficient (1-Year)	Average ROE (3-Year) (%)	Information Coefficient (3-Year)	Average ROE (5-Year) (%)	Information Coefficient (5-Year)
Quintile 1	26.8	0.48*	22.8	0.29*	21.1	0.25*
Quintile 5	-0.82	0.11	4.30	-0.03	6.17	-0.02

\* Statistically significant at 1% level

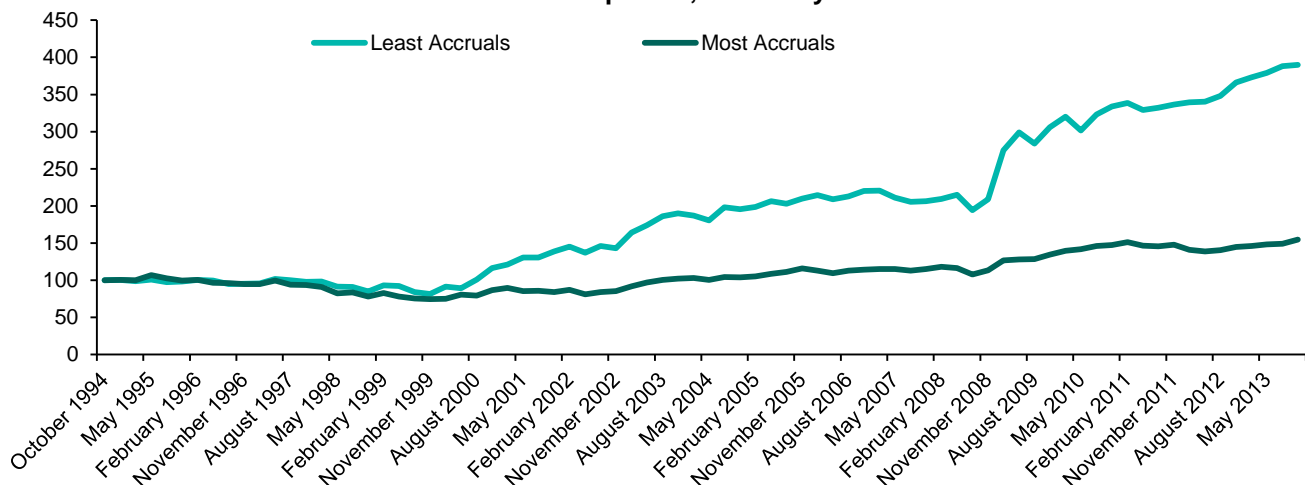
Source: S&P Dow Jones Indices LLC. Figures based on monthly USD return-on-equity of constituents within the S&P 900 between January 1990 and December 2008. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

**Balance Sheet Accruals Ratio (BSA)**

The usefulness of BSA has been the subject of much analysis. Interest in this topic stems mainly from the desire to probe whether information reported in financial statements is truly reflective of the underlying performance of companies. Academic research conducted by Sloan (1996) indicates that the more a company's accounts are made up of noncash items, the more error-prone their financial statements. This may be a result of accruals being transient and subject to considerable estimations and potential misrepresentations. For this reason, the accruals ratio can also be seen as an indirect way of stressing the primacy of cash earnings.

In addition to identifying the reliability of financial information, the BSA ratio has also been useful in estimating stock returns. Research carried out by Perotti and Wagenhofer (2011) and Kozlov and Petajisto (2013) went further by affirming that the BSA ratio is the strongest predictor of stock returns across different markets. Despite this, doubt on the applicability of this ratio remains, partly because some authors have excluded financial stocks in their analyses, arguing that the balance sheet structure of financial companies is inherently different from that of nonfinancials.

For this reason, we conducted simulations to test the validity of the BSA ratio as a signal by sorting companies into quintiles on the basis of their ratio. Here, we define BSA ratio as the ratio of the change in the net operating assets over the last 12 months and the average net operating assets over the same time period. From the results in Exhibit 4, we can see that the quintile of U.S. stocks with the lowest BSA growth beats the quintile with the highest growth by over 5% (annualized) between 1994 and 2013. Similar results are also found in emerging and other developed markets. More interestingly still, applying the same methodology to financial companies does not appear to have undermined the general finding of the spread between high- and low-accruals financial stocks being roughly in line with that of the rest of the universe. This finding is consistent with other research, such as Mahedy (2005), which concludes that the spread between high- and low-BSA stocks within the three financial industries (insurance, banking and investment banking/brokerage) was near average.

**Exhibit 4: Cumulative Excess Return of US Companies, Sorted by Accruals**

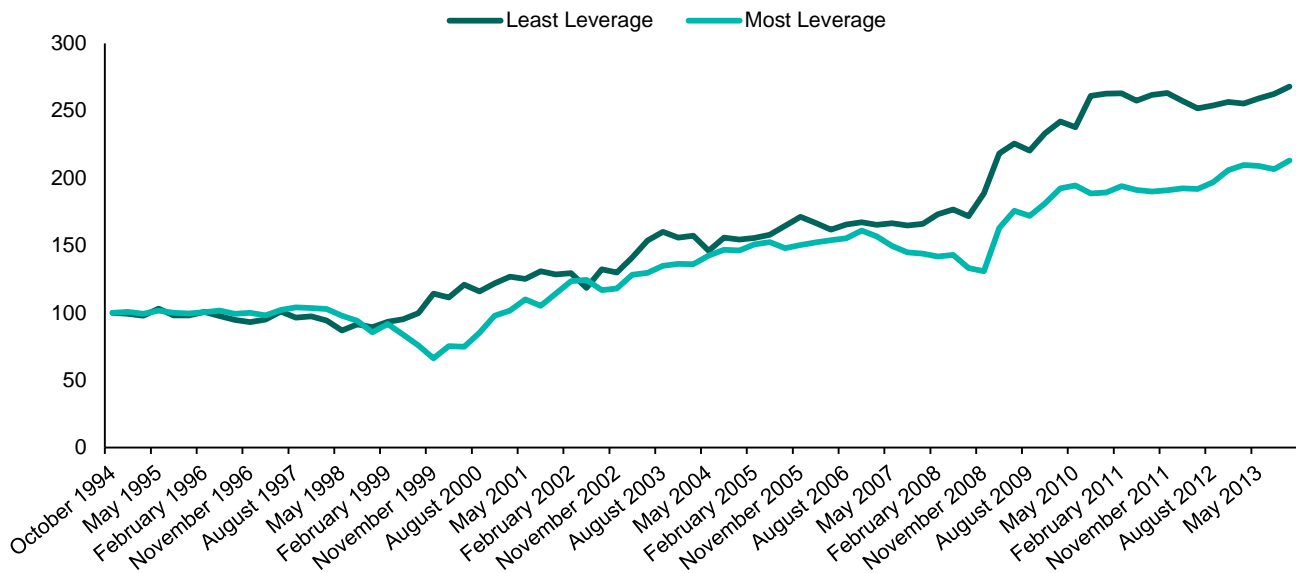
Source: S&P Dow Jones Indices LLC. Figures based on monthly USD returns of constituents within the S&P 900 between October 1994 and December 2013. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

## Financial Leverage

The third aspect of any quality measure includes considering risk reduction in times of uncertainty. In other words, high-quality companies are seen as those that can keep a steady course in times of crisis by the fact that their earnings would generally be less sensitive to the volatility of the business cycle. In addition, high-quality companies appear to be able to finance their ongoing business activities without overexposing themselves to debt financing. Therefore, studying the financial leverage of a company can potentially yield instructive clues about the financial health of that company and whether its financing arrangement is sustainable.

To analyze whether this theory translates into practice, we ranked all the companies in the S&P 900 by their financial leverage ratio. From the results in Exhibit 5, we can see that lowly-g geared companies beat highly-g geared ones by about 1% per annum (p.a.), but this outperformance is unremarkable vis-à-vis the reduction in return volatility (by about 3% p.a.), which may imply that lower indebtedness offers companies downside protection. Further analyses suggest that low gearing is not always associated with higher-profit companies. In fact, in calmer markets, companies with less gearing often tend to lag behind those with high gearing, but they usually prevail in financial downturns, as their “safer” characteristics come to the foreground.

### Exhibit 5: Cumulative Excess Return of U.S. Companies Sorted by Financial Leverage



Source: S&P Dow Jones Indices LLC. Figures based on monthly USD returns of constituents within the S&P 900 between October 1994 and December 2013. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

## The Persistence of Quality

Using the systematic framework detailed in Exhibit 1, high-quality stocks have outperformed low-quality ones on an absolute and a risk-adjusted basis over longer periods of time (see Exhibit 6). This may illustrate that investors have historically been compensated for holding high-quality stocks.

Nevertheless, the concept of being rewarded for owning high-quality stocks may seem to defy logic, as risk premia are usually offered for assuming some form of risk. For instance, the size risk premium can be regarded as compensation for illiquidity. On the other hand, investors in high-quality stocks appear to be getting a “free lunch”. Some researchers have advanced an explanation for this supposed conundrum. For instance, Hunstad (2013) posits that the reason why high-quality stocks do well is similar to why low-volatility stocks do well; namely, that in the search of lottery-type payoffs, the prices of low-quality/high-risk stocks are driven up beyond their fundamental value, whereas high-quality/low-risk stocks are neglected.

**Exhibit 6: Returns and Risk-Adjusted Returns of Different Universes, Sorted by Quality**

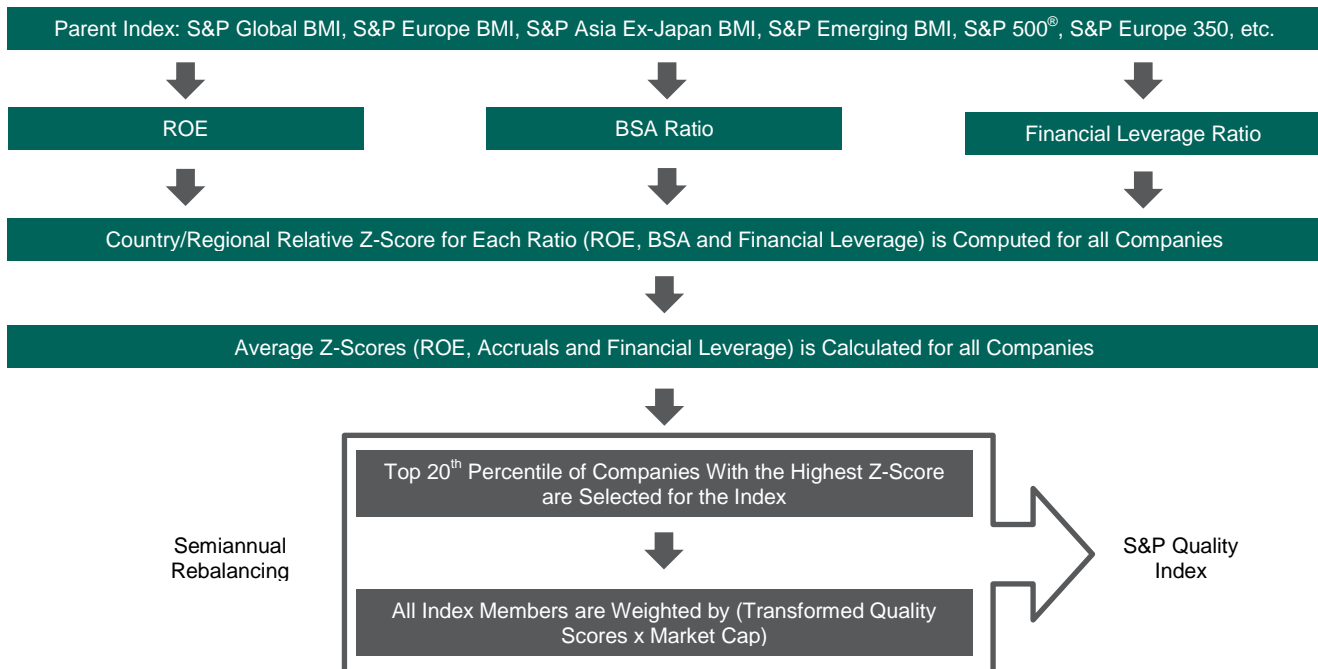
Universe	U.S.		Developed Ex-U.S. Market		Emerging Market	
	Return (%)	Return-per-Risk	Return (%)	Return-per-Risk	Return (%)	Return-per-Risk
High Quality	15.2	0.93	10.5	0.59	15.0	0.72
Quintile 2	14.0	0.83	9.4	0.55	14.1	0.65
Quintile 3	13.1	0.74	7.3	0.42	12.4	0.52
Quintile 4	12.7	0.68	5.7	0.32	9.4	0.37
Low Quality	10.3	0.47	3.3	0.14	2.0	0.08

Source: S&P Dow Jones Indices LLC. Figures based on monthly USD total returns between November 1994 and December 2013 based on the S&P 900 (indicated as U.S.), the S&P Developed Ex-U.S. LargeMidCap (Developed Ex-U.S. Market) and S&P Emerging LargeMidCap Indices (Emerging Markets). Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

**Index Portfolio Construction for the S&P Quality Indices Family**

The S&P Quality Indices are constructed on the basis of existing S&P Dow Jones Indices benchmarks for large- and mid-cap companies, and they cover both single countries and regions. For each of the companies within the eligible universe, three fundamental ratios—ROE, BSA and financial leverage—are computed. The ratios are then converted into (relative) z-scores and are averaged to provide an overall quality score. From this, the top quintile is chosen in the final index and the selected companies are weighted by their quality score multiplied by their corresponding float market capitalization, subject to caps on a country, sector and stock level (see Exhibit 7). The weighting scheme<sup>2</sup> is designed to strike a balance between tilting weights toward high-quality stocks while maintaining the link to the market capitalization of individual companies in order to ensure there is sufficient liquidity and capacity.

**Exhibit 7: Portfolio Construction for S&P Quality Indices**



Source: S&P Dow Jones Indices LLC.

<sup>2</sup> We tested a number of weighting schemes during the design process and concluded that simply reweighting all the universe constituents is less effective in getting exposure to the average high-quality company than selecting the top quintile of companies, by their respective quality scores.



## Performance Evaluation

### Performance of the S&P Quality Indices Against Their Benchmarks Across Regions

Quality indices for major regions and countries were reviewed from 2000 and 2013 and encompassed regions, including Global, Developed Market, Developed Market Ex-U.S., Developed Market Ex-Japan, Emerging Market, Europe, Pan Asia and Pan Asia Ex-Japan, as well as single countries including the U.S. and Japan. In all, the S&P Quality Indices beat their respective market-cap weighted benchmarks across the board between 2000 and 2013, calculated through the use of back-testing (see Exhibit 8). The S&P Global, Developed and Emerging Quality Indices achieved annualized returns of 7.5%, 7.5% and 10.5%, respectively, surpassing their benchmarks by 3.6%, 3.7% and 2.9%, respectively. On a risk-adjusted basis, the returns were equally strong, and their Sharpe ratios were approximately 0.5, also well above their benchmarks' ratios.

Among all the regions investigated, the Quality indices outperformed their benchmarks the most in the US (5.4%) and the least in Japan (0.6%). Broadly speaking, the S&P Quality Indices exhibited lower return volatility and lower maximum drawdowns than their respective benchmarks. In addition, it is noteworthy that the returns of the S&P Quality Indices did not come at the expense of significant tracking error, which was all between 4.5%-6.7%. Among all the regions examined, the U.S. had the highest information ratio.

**Exhibit 8: Historical Return Statistics of the S&P Quality Indices**

Region	12-Month Max. Drawdown		Risk-Adjusted Return		S&P Quality vs. Benchmark	
	S&P Quality (%)	S&P Benchmark (%)	S&P Quality	S&P Benchmark	Tracking Error (%)	Information Ratio
Global	-45.1	-50.6	0.50	0.24	4.2	0.84
Developed Market	-44.9	-49.9	0.51	0.23	4.5	0.83
Developed Market Ex-U.S.	-48.9	-53.0	0.44	0.22	4.5	0.77
Developed Market Ex-Japan	-44.5	-50.7	0.54	0.26	4.9	0.78
US	-40.3	-46.4	0.65	0.23	5.5	0.99
Europe	-46.5	-54.9	0.47	0.22	5.7	0.65
Japan	-46.7	-43.3	-0.02	-0.05	6.7	0.10
Emerging Market	-49.6	-56.5	0.48	0.33	6.4	0.45
Pan Asia	-50.2	-49.1	0.33	0.16	6.2	0.53
Pan Asia Ex-Japan	-51.6	-56.1	0.49	0.36	5.9	0.33

Region	Annualized Return		Annualized Volatility		S&P Quality vs. Benchmark	
	S&P Quality (%)	S&P Benchmark (%)	S&P Quality (%)	S&P Benchmark (%)	Beta	Excess Return (%)
Global	7.5	3.9	15.0	16.7	0.87	3.6
Developed Market	7.5	3.8	14.8	16.4	0.87	3.7
Developed Market Ex-U.S.	7.4	3.9	16.7	17.9	0.90	3.4
Developed Market Ex-Japan	8.1	4.3	15.0	16.9	0.85	3.8
US	9.0	3.6	13.9	15.6	0.83	5.4
Europe	8.1	4.4	17.2	19.7	0.84	3.7
Japan	-0.3	-1.0	18.6	17.6	0.99	0.6
Emerging Market	10.5	7.6	21.6	23.3	0.89	2.9
Pan Asia	6.1	2.8	18.3	18.1	0.95	3.3
Pan Asia Ex-Japan	9.8	7.8	19.9	21.9	0.88	2.0

Source: S&P Dow Jones Indices LLC. Figures based on monthly USD total returns between December 1999 and December 2013. Quality indices in different regions are represented by the S&P Quality Global, S&P Quality Developed, S&P Quality Developed Ex-U.S., S&P Quality Developed Ex-Japan, S&P Europe 350 Quality, S&P Quality Japan, S&P Quality Emerging Market, S&P Quality Pan Asia, S&P Quality Pan Asia Ex-Japan and S&P 500 Quality Indices. Benchmark indices in different regions are represented by the S&P Global BMI, S&P Developed BMI, S&P Developed Ex-U.S. BMI, S&P Developed Ex-Japan BMI, S&P Europe BMI, S&P Japan BMI, S&P Emerging BMI, S&P Pan Asia BMI, S&P Pan Asia Ex-Japan LargeMidCap BMI Indices and the S&P 500. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. Charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

Next, we examined how the returns of the S&P Quality Indices changed during periods of market strength and weakness, and to that end, we computed the monthly “winning” percentage and average excess return in up and down markets for the entire period. Overall, the S&P Quality Indices beat their benchmarks more than half of the time and delivered positive average excess returns across all regions. For example, the S&P Global, Developed and Emerging Quality Indices outperformed 57%, 61% and 58% of the time, respectively, with average monthly excess returns around 0.2%.

As the S&P Quality Indices were less volatile than the market, they tended to lag slightly in bull markets, but they provided a level of downside protection during bear markets. As shown in Exhibit 9, the S&P Quality Indices for global, developed and emerging markets had significantly higher winning percentages (above 70%) and average excess returns (above 0.8%) in down markets than in up markets. By contrast, they lagged more than 50% of the time in bull markets, registering an average monthly underperformance between 0.16% and 0.3%. In spite of this, the excess return generated by quality indices during down markets was much more pronounced than during up markets, explaining the outperformance of quality strategies over the long term.

#### Exhibit 9: Winning Percentages and Monthly Excess Returns of the S&P Quality Indices

Region	Winning Percentage			Average Monthly Excess Return		
	Up Months (%)	Down Months (%)	All Months (%)	Up Months (%)	Down Months (%)	All Months (%)
Global	43.2	75.3	57.1	-0.16	0.80	0.26
Developed Market	46.9	80.0	60.7	-0.19	0.92	0.27
Developed Market Ex-U.S.	40.8	72.9	54.2	-0.11	0.76	0.25
Developed Market Ex-Japan	49.0	73.5	58.9	-0.23	1.01	0.27
US	52.4	78.5	62.5	-0.09	1.19	0.40
Europe	38.9	76.7	55.4	-0.37	1.06	0.25
Japan	54.1	53.0	53.6	0.14	0.00	0.07
Emerging Market	47.9	70.8	57.7	-0.30	0.84	0.19
Pan Asia	58.1	61.3	59.5	0.09	0.49	0.27
Pan Asia Ex-Japan	41.5	68.9	53.6	-0.42	0.80	0.12

Source: S&P Dow Jones Indices LLC. Figures based on monthly USD total returns between December 1999 and December 2013. Quality indices in different regions are represented by the S&P Quality Global, S&P Quality Developed, S&P Quality Developed Ex-U.S., S&P Quality Developed Ex-Japan, S&P Europe 350 Quality, S&P Quality Japan, S&P Quality Emerging, S&P Quality Pan Asia, S&P Quality Pan Asia Ex-Japan and S&P 500 Quality Indices. Benchmark indices in different regions are represented by the S&P Global BMI, S&P Developed BMI, S&P Developed Ex-U.S. BMI, S&P Developed Ex-Japan BMI, S&P Europe BMI, S&P Japan BMI, S&P Emerging BMI, S&P Pan Asia BMI, S&P Pan Asia Ex-Japan BMI LargeMidCap Indices and the S&P 500. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

Average return statistics over long periods may conceal important details about the variations of returns over time. For this reason, we broke down the excess returns of the S&P Quality Indices of global, developed and emerging markets on an annual basis. As shown in Exhibit 10, the positive excess returns of the S&P Quality Indices were spread across different years, demonstrating that their long-term return was not dominated by any single market event or cycle. The annual return breakdown indicates that Quality strategies favor bear markets more than bull markets. During strong market rallies in 2003 and 2004, even though the S&P Quality Indices participated in the rally, their returns were lower than those of their benchmarks.



**Exhibit 10: Annual Excess Returns of the S&P Quality Global, Developed Market and Emerging Market Indices**

Year	Annualized Return: Global			Annualized Return: Developed Market			Annualized Return: Emerging Market		
	S&P Quality (%)	Benchmark (%)	Excess Return (%)	S&P Quality (%)	Benchmark (%)	Excess Return (%)	S&P Quality (%)	Benchmark (%)	Excess Return (%)
2000	-2.4	-10.3	7.9	-1.0	-9.4	8.5	-28.2	-31.5	3.4
2001	-12.7	-16.7	3.9	-13.9	-17.1	3.2	-2.5	-2.3	-0.3
2002	-11.6	-19.5	7.9	-12.4	-19.8	7.3	2.5	-11.6	14.1
2003	31.6	34.4	-2.8	31.4	33.5	-2.1	45.1	57.1	-12.0
2004	14.2	15.5	-1.3	14.5	15.1	-0.6	20.4	23.8	-3.4
2005	13.7	11.7	1.9	13.2	10.7	2.5	33.3	31.7	1.7
2006	22.3	21.3	1.0	21.8	20.2	1.7	30.6	37.7	-7.2
2007	22.1	12.7	9.4	20.2	10.3	9.8	34.2	41.3	-7.1
2008	-37.3	-41.7	4.4	-36.4	-40.6	4.1	-45.2	-52.0	6.7
2009	40.7	36.3	4.5	34.9	32.3	2.6	81.2	78.6	2.6
2010	14.9	13.4	1.5	13.6	12.7	0.9	29.2	18.8	10.4
2011	-0.3	-7.1	6.8	1.5	-5.3	6.8	-11.7	-19.4	7.6
2012	18.3	16.8	1.5	18.5	16.7	1.8	19.3	17.3	2.0
2013	19.9	23.2	-3.3	26.5	26.5	-0.1	2.1	-1.8	3.9
3-Year	12.3	10.2	2.1	15.0	11.8	3.2	2.4	-2.4	4.9
5-Year	18.0	15.6	2.4	18.4	15.8	2.6	20.3	14.5	5.7
2000-2013	7.5	3.9	3.6	7.5	3.8	3.7	10.5	7.6	2.9

Source: S&P Dow Jones Indices LLC. Figures based on monthly USD total returns between December 1999 and December 2013. Quality indices in different regions are represented by the S&P Quality Global, S&P Quality Developed and S&P Quality Emerging Indices. Benchmark indices in different regions are represented by the S&P Global BMI, the S&P Developed BMI and the S&P Emerging BMI LargeMidCap Indices. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

**Performance of the S&P Quality Indices Against Other Alternate Beta Strategies**

By comparing the S&P Quality Indices with other alternatively weighted index strategies, including low volatility, value, small cap and momentum, we aimed to develop a better understanding of the characteristics of the S&P Quality Indices.

Over the entire period, all of our alternatively weighted strategies surpassed the S&P 500, with the small-cap strategy index achieving the highest annualized return, followed by low volatility and quality (see Exhibit 11). Among all, only quality- and low-volatility strategies realized lower volatility and smaller drawdowns than the benchmark. In comparison with other alternate beta indices discussed, the S&P Quality Indices achieved the highest information ratio and a favorable risk-adjusted return.

**Exhibit 11: Return and Risk Metrics for U.S. Alternate Beta Strategies**

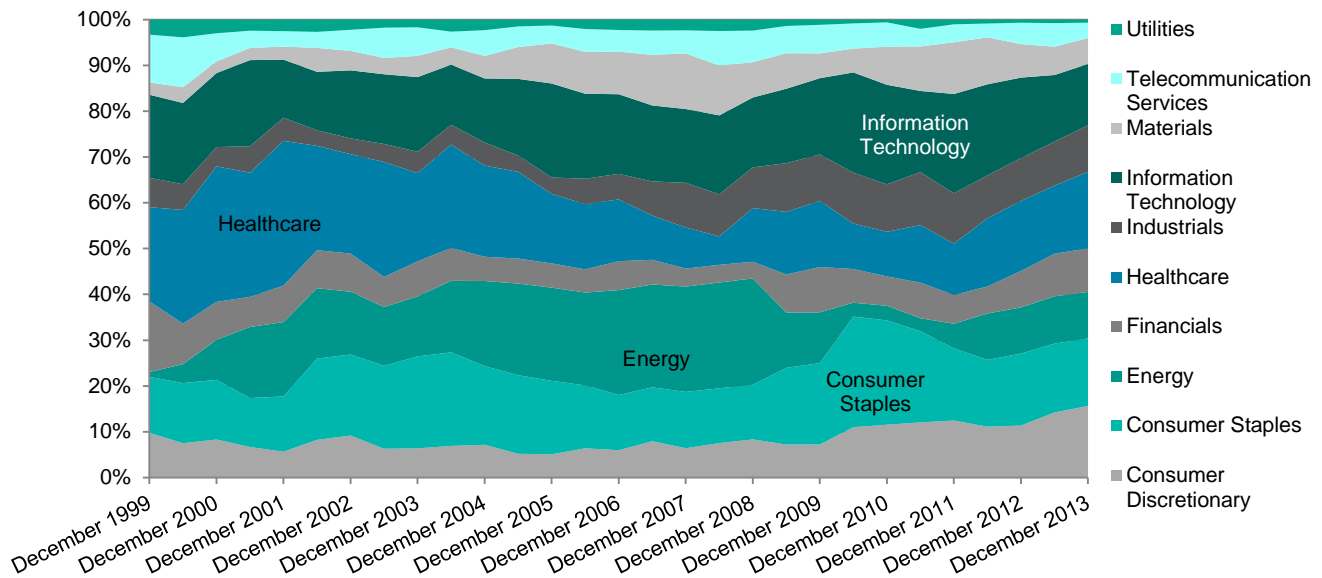
Alternate Beta Strategy	Annualized Return (%)	Annualized Volatility (%)	Risk-Adj. Return	12-Month Max. Drawdown (%)	Relative to the S&P 500			
					Market Beta	Excess Return (%)	Tracking Error (%)	Information Ratio
S&P 500	3.6	15.6	0.23	-46.4	NA	NA	NA	NA
Quality	9.0	13.9	0.65	-40.3	0.83	5.4	5.5	0.99
Low Volatility	9.5	11.4	0.83	-29.0	0.54	5.9	10.5	0.56
Value	8.2	17.1	0.48	-50.0	1.02	4.7	5.9	0.79
Small Cap	10.2	19.6	0.52	-47.3	1.05	6.6	10.8	0.61
Momentum	6.3	16.3	0.39	-50.5	0.90	2.7	8.4	0.33

Source: S&P Dow Jones Indices LLC, FTSE. Figures based on monthly USD total returns between December 1999 and December 2013. NA: Not available. The Quality, Low Volatility, Value, Small-Cap and Momentum strategies are represented by the S&P 500 Quality Index, the S&P 500 Low Volatility Index, the FTSE RAFI US 1000 Index, the S&P SmallCap 600 and a hypothetical momentum basket on the S&P 500. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

**Sector Exposures**

Because quality measures in different sectors are expected to vary depending on the market cycle, we would expect to see the sector composition change over time and this is reflected in Exhibit 12. Using the S&P Quality Global LargeMidCap Index as an example, one might expect a tilt toward healthcare, consumer staples, energy and information technology at different points in time, but it has tended to be less exposed to utilities and telecommunication services. This is in stark contrast with the typical low-volatility strategies, which usually have significant exposure to the financials and utilities sectors over the same period.

**Exhibit 12: Historical Sector Composition of the S&P Quality Global Index**



Source: S&P Dow Jones Indices LLC. Figures based on period between December 1999 and December 2013. Charts and graphs are provided for illustrative purposes.

At the end of 2013, the S&P Quality Global and the S&P Quality Developed LargeMidCap Indices had the highest concentration in the healthcare, consumer discretionary and consumer staples sectors, whereas the S&P Emerging Quality Index had the highest exposure to the telecommunications, information technology and consumer staples sectors (see Exhibit 13). Compared with the market-cap weighted benchmarks, the S&P Quality Indices underweighted the financials sector across the global, developed and emerging markets.

**Exhibit 13: Sector Composition of the S&P Quality Global, Developed Market and Emerging Market Indices**

S&P Quality Global Index				S&P Quality Developed Market Index				S&P Quality Emerging Market Index			
Sector	Quality (%)	Benchmark (%)	Diff. (%)	Sector	Quality (%)	Benchmark (%)	Diff. (%)	Sector	Quality (%)	Benchmark (%)	Diff. (%)
Healthcare	16.7	10.3	6.4	Cons. Disc.	17.8	12.5	5.3	Telecom	18.9	8.7	10.2
Cons. Disc.	15.6	12.0	3.6	Healthcare	17.3	11.2	6.1	I.T.	17.0	13.2	3.8
Cons. Staples	14.7	9.8	4.9	Cons. Staples	16.3	9.9	6.5	Cons. Staples	16.9	9.4	7.5
I.T.	13.4	12.5	0.9	I.T.	12.0	12.5	-0.5	Financials	11.6	28.7	-17.1
Energy	10.2	9.6	0.5	Industrials	11.3	11.4	-0.1	Energy	11.5	12.6	-1.1
Industrials	10.1	10.8	-0.7	Financials	9.9	20.8	-10.9	Cons. Disc.	8.7	7.3	1.5
Financials	9.5	21.6	-12.0	Energy	8.8	9.3	-0.5	Materials	6.9	9.6	-2.8
Materials	5.7	6.0	-0.3	Materials	4.7	5.6	-0.9	Utilities	4.0	3.1	0.9
Telecom	3.3	4.2	-0.8	Telecom	1.9	3.7	-1.8	Industrials	2.4	5.4	-3.0
Utilities	0.7	3.1	-2.4	Utilities	0.1	3.1	-3.0	Healthcare	2.0	2.0	0.0

Source: S&P Dow Jones Indices LLC. Figures covered period between December 1999 and December 2013. Charts and graphs are provided for illustrative purposes.

Next, we examined whether the S&P Quality Indices derived most of their excess returns from sector biases. To achieve this, we constructed a hypothetical sector-adjusted global benchmark that mimics the sector weights of the S&P Quality Global LargeMidCap Index.<sup>3</sup> We then compared the return of this hypothetical benchmark against the S&P Quality Global LargeMidCap and Global LargeMidCap Indices. Figures in Exhibit 14 show that although sector biases made an important contribution to outperformance, they did not appear to be the sole driver of excess returns. Over the entire period, the S&P Quality Global LargeMidCap Index beat the sector-adjusted benchmark by 2% p.a. Another noteworthy observation from the same exhibit is that outperformance driven by sector-bias does not appear to yield consistent results over time.

**Exhibit 14: Annual Excess Return Contribution of the S&P Quality Global Index**

Year	S&P Quality Global (a) (%)	Sector-Adj. Benchmark (b)(%)	Benchmark (c) (%)	Excess Return, Net of Sector Bias (a-b)(%)	Excess Return from Sector Bias (b-c) (%)	Total Excess Return (a-c)(%)
2000	-2.4	-4.4	-10.3	2.0	5.9	7.9
2001	-12.7	-16.3	-16.7	3.5	0.4	3.9
2002	-11.6	-17.4	-19.5	5.8	2.1	7.9
2003	31.6	30.1	34.4	1.5	-4.2	-2.8
2004	14.2	13.5	15.5	0.7	-2.0	-1.3
2005	13.7	13.2	11.7	0.4	1.5	1.9
2006	22.3	19.7	21.3	2.5	-1.5	1.0
2007	22.1	19.9	12.7	2.2	7.2	9.4
2008	-37.3	-38.7	-41.7	1.3	3.1	4.4
2009	40.7	37.9	36.3	2.9	1.6	4.5
2010	14.9	13.6	13.4	1.3	0.2	1.5
2011	-0.3	-3.6	-7.1	3.4	3.5	6.8
2012	18.3	16.3	16.8	2.0	-0.5	1.5
2013	19.9	24.4	23.2	-4.5	1.2	-3.3
3-Year	12.3	11.7	10.2	0.5	1.6	2.1
5-Year	18.0	16.9	15.6	1.1	1.3	2.4
2000-2013	7.5	5.5	3.9	2.0	1.6	3.6

Source: S&P Dow Jones Indices LLC. Figures based on monthly USD total returns between December 1999 and December 2013. The S&P Quality Index regions are represented by the S&P Quality Global LargeMidCap Indices. Benchmark index is represented by the S&P Global BMI LargeMidCap. The sector-adjusted benchmark return is the aggregated return of 10 S&P Global BMI LargeMidCap sector indices based on GICS sectors, weighted by their respective S&P Quality Global Index sector weights. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

<sup>3</sup> The sector-adjusted benchmark return is the aggregated return of 10 S&P Global LargeMidCap sector indices based on GICS sectors, weighted by their respective S&P Quality Global Index sector weighting.

## Macroeconomic Analysis

To analyze under which type of environment quality strategies were likely to outperform, we examined the return profile of the S&P 500 Quality Index, the S&P 500 Low Volatility Index and the S&P 500 in different economic and market regimes and divided our data set into different periods of economic growth— inflation, interest rate and investor sentiment regimes as shown in Exhibit 15 and measured the indices' returns accordingly.

### Exhibit 15: Indicators and Definitions of Different Macroeconomic Regimes

Factor	Indicator	Condition	Regime
Economic Growth	Real GDP growth	Current growth above 5-year average	Above-trend growth
		Current growth below 5-year average	Below-trend growth
Inflation	CPI YOY growth	Current growth above 5-year average	Above-trend growth
		Current growth below 5-year average	Below-trend growth
Investor Sentiment	VIX	VIX above top quintile value of overall studied period	Bullish
		VIX below bottom quintile value of overall studied period	Bearish
		Rest of the time	Neutral
Interest Rate	Federal fund rate	Period from first rate cut until the next rate hike	Easing
		Period from first rate hike until the next rate cut	Tightening

Source: S&P Dow Jones Indices LLC, OECD, Federal Reserves.

Our analysis indicates that quality stocks appear to be sensitive to economic growth and they have a tendency to deliver more significant excess returns when the economy slows, implying that earnings of high-quality stocks may be less vulnerable to a slowdown (see Exhibit 16). However, during periods of above-trend growth, the attractiveness of quality stocks diminishes, although they still deliver positive average excess returns. This is in marked contrast with the low-volatility index that significantly trails the S&P 500 under this scenario.

### Exhibit 16: Performance of Select Indices in Different Economic Growth Regimes

Real GDP Growth	S&P 500	Quality	Low Volatility
Average Return (Annualized)			
Above Trend (%)	18.0	19.7	13.5
Below Trend (%)	-0.8	6.6	8.4
Volatility (Annualized)			
Above Trend (%)	14.2	13.2	11.0
Below Trend (%)	20.5	18.3	14.6
Average Excess Return (Annualized)			
Above Trend (%)	NA	1.7	-4.5
Below Trend (%)	NA	7.3	9.2
Winning Percentage (vs. the S&P 500)			
Above Trend (%)	NA	46.8	34.0
Below Trend (%)	NA	75.9	65.5

Source: S&P Dow Jones Indices LLC, OECD. Figures based on monthly USD total returns between December 1994 and December 2013. NA: Not available. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

Additionally, the S&P 500 Quality Index appears to beat the market moderately in bullish or neutral markets, but the degree of outperformance is magnified during bearish markets (see Exhibit 17). This distinguishes it somewhat from the low-volatility index, which only seems to outperform the market when market sentiment is negative. Similarly of note is that the S&P 500 Quality Index had a historically high winning percentage (70%) when market sentiment was bearish, but it stayed above 57% even when market sentiment was either neutral or bullish.

Unlike observations from analyses of economic growth and investor sentiment, results for the inflation and interest rate are inconclusive.

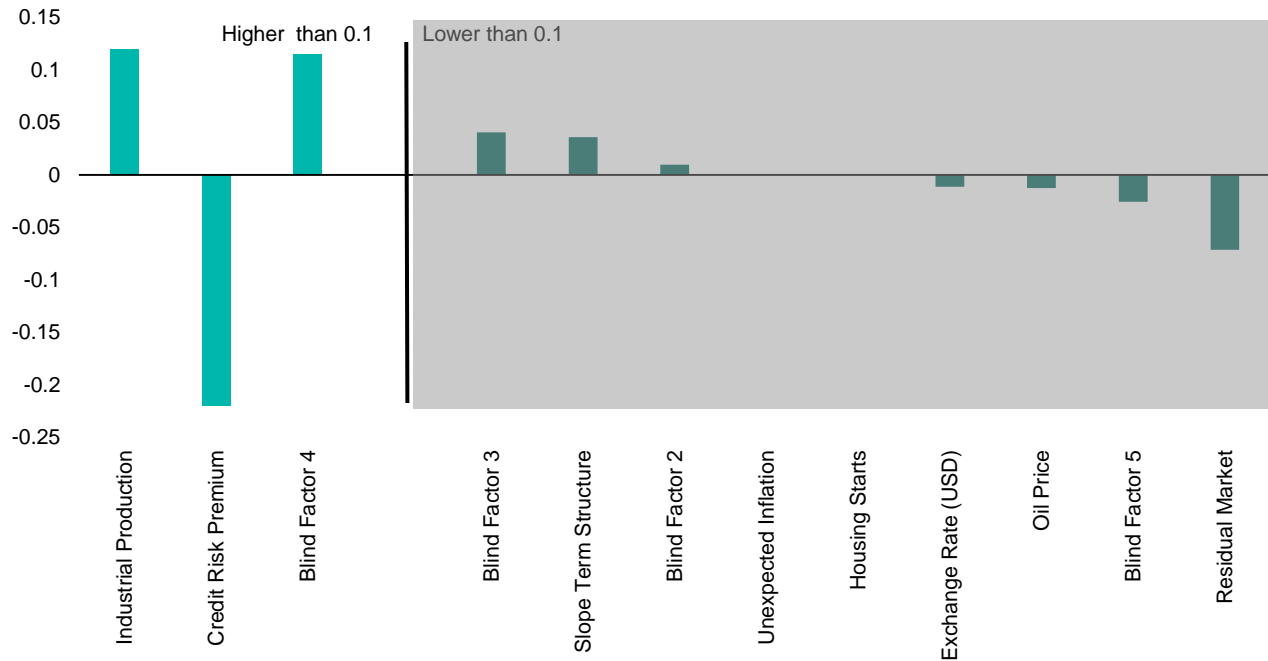
#### Exhibit 17: Performance of the S&P 500, the S&P 500 Quality and the S&P 500 Low Volatility Indices in Different Investor Sentiment Regimes

Market Sentiment	S&P 500	Quality	Low Volatility
<b>Average Return (Annualized)</b>			
Bullish (%)	25.7	28.8	23.6
Neutral (%)	16.1	17.9	12.9
Bearish (%)	-21.4	-10.3	-5.3
<b>Volatility (Annualized)</b>			
Bullish (%)	6.0	6.9	5.4
Neutral (%)	12.8	12.1	11.2
Bearish (%)	23.6	21.1	15.2
<b>Average Excess Return (Annualized)</b>			
Bullish (%)	NA	3.1	-2.1
Neutral (%)	NA	1.7	-3.2
Bearish (%)	NA	11.1	16.1
<b>Winning Percentage (vs. the S&amp;P 500)</b>			
Bullish (%)	NA	57.8	37.8
Neutral (%)	NA	59.1	46.0
Bearish (%)	NA	69.6	69.6

Source: S&P Dow Jones Indices LLC. Figures based on monthly USD total returns between December 1994 and December 2013. NA: Not available. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

Lastly, to investigate the macroeconomic factors to which the Quality strategy is exposed, a slightly different approach is taken using Northfield APT macroeconomic equity risk model. Exhibit 18 shows the active exposure of the S&P 500 Quality Index with respect to its benchmark. This reconfirms that the Quality strategy has active exposure to industrial production, implying that it has more exposure to higher-growth companies. Secondly, the strategy is exposed to the narrowing of the credit risk premium, which again is usually associated with early stages of economic expansion.

Compared to the S&P 500, the strategy does not have any significant tilt to oil prices, unexpected inflation, the slope of the yield curve, housing starts or the USD exchange rate.

**Exhibit 18: Active Macroeconomic Exposure of the S&P 500 Quality Index**

Source: S&P Indices LLC and Northfield APT Model. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

## Performance Attribution Analysis

### Systematic Exposures

As seen above, the S&P 500 Quality Index has outperformed its benchmark across different universes and over different testing periods. The aim of this section is to delve deeper into the source of the return by proposing to decompose the S&P 500 Quality Index with the aid of Northfield fundamental equity risk model.

Broadly speaking, relative return against a benchmark can emanate either from systematic tilts or stock-specific risks. Focusing on systematic tilts alone, both active exposures<sup>4</sup> and factor returns can drive the active return of a particular strategy, and active exposures can derive from both biases to specific sectors and overweightings to specific risk factors. In other words, to appreciate exactly where the outperformance comes from, it is important to understand the active exposures to the specific risk premia and sectors, as well as the returns attributable to such risk premia and sectors.

Although active exposures and factor returns both contribute to outperformance, active exposures tend to be more stable over time because they are inextricably linked to the way the strategy is designed. By contrast, returns due to risk premia and sectors can be very volatile and historical figures may be less meaningful in the future.

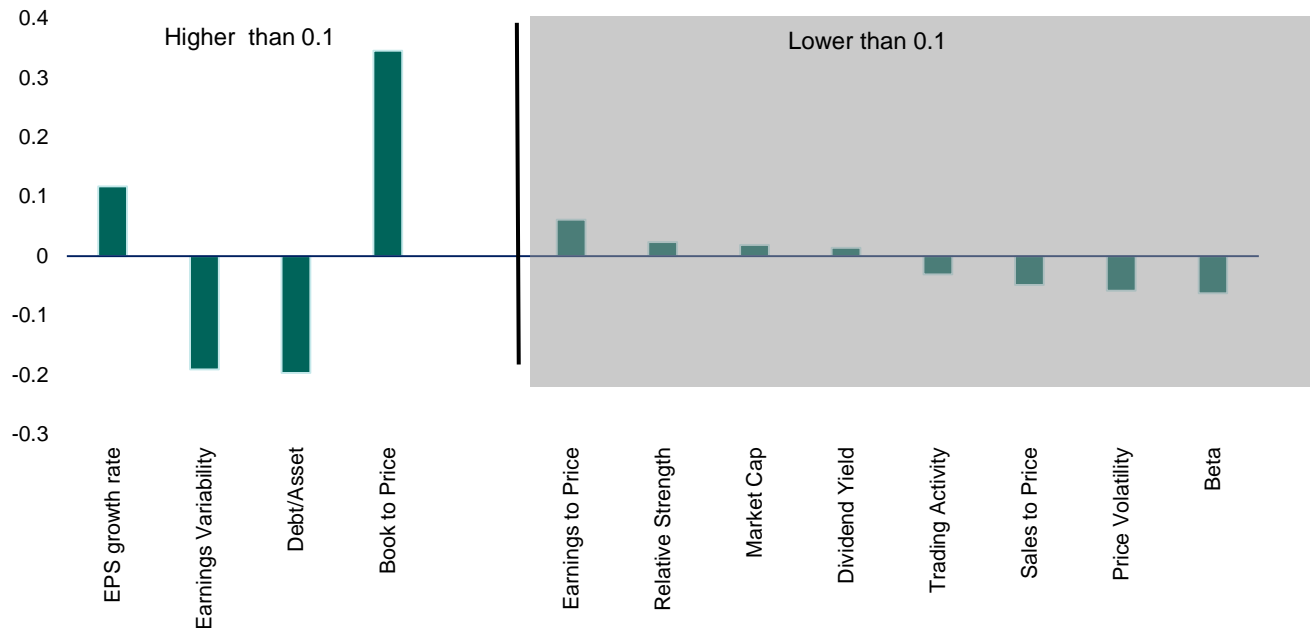
As seen in Exhibit 19 and Exhibit 20, the S&P 500 Quality Index has a bias to the book-to-price value measure compared to its benchmark, but there does not appear to be a consistent bias to other value measures over time. What seems more consistent is that the S&P 500 Quality Index appears to have lower earnings volatility, higher growth and lower gearing—characteristics that are often linked to high-quality companies. That being said, because the earnings-growth factor has not delivered much return over the period in our sample, a high exposure to it has historically had less impact on returns. In addition, although the S&P 500 Quality Index has only had marginally higher exposure to less-volatile stocks and smaller-capitalization stocks, this has enhanced return because the small-capitalization and price-volatility factors have shown higher returns over the period.

<sup>4</sup> Active exposures are exposures of the strategy in relation to its benchmark.



From a sector perspective, active exposures toward drug companies and beverage manufacturers have contributed 5% p.a. and a tilt against major banks has further added another 1% p.a. to the returns, while a slight underexposure to soft goods retail decreased returns by 1% p.a.

### Exhibit 19: Active Factor Exposure of the S&P 500 Quality Index



Source: Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

### Exhibit 20: Average Strategy Biases and Annualized Factor Return and Impact Over Time

	Beta	Earnings-to-Price	Book-to-Price	Dividend Yield	Trading Activity	Relative Strength	Market Cap	Earnings Variability	EPS Growth	Sales-to-Price	Debt-to-Equity	Price Volatility
Average Strategy Biases	-*	-*	-*	-*	-*	-*	-*	Low volatility tilt	High growth tilt	-*	Low debt tilt	-*
Active Exposure	-0.05	0.05	0.36	-0.00	-0.01	0.05	-0.00	-0.22	0.14	-0.05	-0.20	-0.03
Average Factor Return (%)	8.76	1.80	1.68	2.28	0.12	4.92	0.72	1.80	0.01	1.44	0.96	4.32
Average Factor Impact (%)	-0.56	0.19	0.26	0.03	-0.01	-0.01	0.50	0.42	0.03	-0.07	0.20	0.34

\* means insignificant or inconsistent active exposure

Source: S&P Dow Jones Indices LLC and Northfield U.S. Fundamental Model. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

## Stress Testing

As suggested previously, high-quality companies appear to hold up well in downturns and financial crises. To evaluate this, a series of stress tests were performed, based on historical events and hypothetical scenarios.

The methodology used to conduct the stress tests starts by computing the covariance<sup>5</sup> between the stressed variable and the returns of each of the factors in the Northfield U.S. fundamental equity risk model. With these covariances, the correlation is estimated between the stressed variable and each of the factors concerned. Periods over the entire testing interval are then sorted according to how similar they are to the scenario being tested. The more similar they are, the higher the weight they are given.

The results in Exhibit 21 indicate that based on past events—such as the Lehman crisis—the S&P 500 Quality Index may provide some downside protection if similar events were to happen in the future. In addition, it could be expected to slightly outperform the benchmark if there were a sudden increase in the VIX or if the 10-year bond yield rose by 1%. On the contrary, the strategy could be expected to trail the benchmark in a scenario where oil prices spiked.

### Exhibit 21: Results for Six Stress Tests

Return Type	Historical Extreme Events			Hypothetical Events (Factor Shocks)		
	LTCM Turmoil (August 1998)	9/11 Attack (September 2001)	Lehman Crisis (October 2008)	Oil Price Rises by 30%	VIX Rises by 50%	10-year T-Bond Yield Rises by 1%
Return (%)	-10.02	-6.86	-16.25	2.28	-6.37	3.85
Benchmark Return (%)	-11.38	-7.95	-19.18	2.74	-7.01	3.23
Active Return (%)	1.36	1.09	2.93	-0.46	0.64	0.62

Source: S&P Dow Jones Indices LLC and Northfield U.S. Fundamental Equity Model. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. LTCM = Long Term Capital Management. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

## Quality With Other Risk Premia

As quality companies have tended to have lower beta and return volatility, quality has had higher correlation with low-volatility than with any of the other alternate beta indices included in Exhibit 22. On the other hand, quality has had low correlation with the value strategy and mildly negative correlation with the small-cap strategy. Quality was uncorrelated with the small-cap and momentum strategies.

### Exhibit 22: Correlation of Excess Return (vs. the S&P 500) Between Quality and Other Alternate Beta Strategies

Quality	Low Volatility	Value	Small Cap	Momentum
1.00	0.49	0.16	-0.11	0.01

Source: S&P Dow Jones Indices LLC, FTSE. Figures based on monthly USD total returns between December 1994 and December 2013. The quality, low-volatility, value, small-cap and momentum strategies are represented by the S&P 500 Quality Index, the S&P 500 Low Volatility Index, the FTSE RAFI US 1000 Index, the S&P SmallCap 600 Index and a hypothetical momentum basket based on the S&P 500. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results.

## Quality and Low Volatility

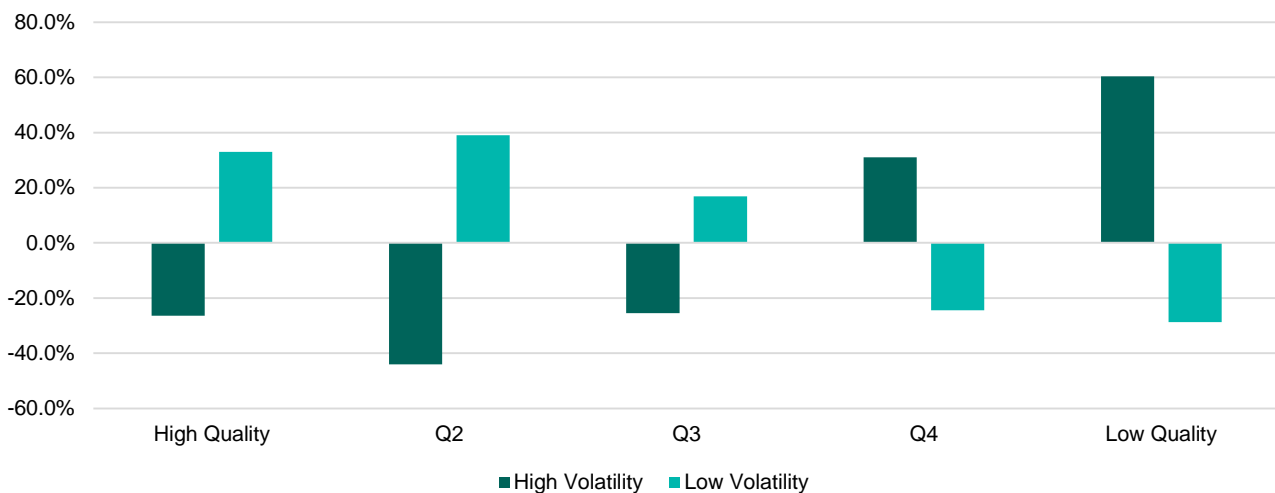
In explaining the “low-volatility anomaly,” researchers usually make indirect references to companies displaying desirable characteristics such as “anti-bubble” (Blitz and van Vliet, 2007). Intuitively, quality and volatility appear to be similar concepts. On the whole, high-quality companies should be less volatile than low-quality companies because they are profitable and more stable entities, which should help them ride the peaks and troughs of business cycles.

<sup>5</sup> Covariance is a measure of how much two variables change together and is similar to correlation. A positive covariance means the two variables move in the same direction while a negative covariance means they move in opposite directions. Like correlation, covariance of two variables does not imply causality.

That being said, there are important differences between quality and low volatility. Whereas a low volatility portfolio would have lower portfolio volatility as a core attribute, a quality stock portfolio tends to have other features because quality is a multi-faceted phenomenon, of which low volatility may be one. To demonstrate this, we conducted a correlation analysis between each of the five quality quintiles with the highest- and lowest-volatility quintiles. The results in Exhibits 23 show that there has been a very strong correlation (~65%) between high-volatility and low-quality stocks, while the correlation between low-volatility and high-quality stocks has been substantially less (~33%). This finding is consistent across other developed and emerging markets, and reinforces the idea that low-quality stocks are usually volatile but high-quality stocks may not necessarily be the least-volatile stocks.

As shown at the beginning of this section, the correlation between low volatility and quality is positive and, on the surface, this may suggest some connection between the two. However, looking at the average correlation can be misleading. As observed in Exhibit 24, it appears that the active exposures of the S&P 500 Low Volatility Index and the S&P 500 Quality Index are significantly different. The first observation is that the S&P 500 Quality Index generally has lower active exposure than the S&P 500 Low Volatility Index, which may likely be associated with its weighting scheme being linked back to the benchmark. The second observation is that the S&P 500 Quality Index's active exposure comes from value, lower debt and lower earnings volatility whereas the S&P 500 Low Volatility Index's active exposure derives mainly from a smaller-capitalization bias, lower price volatility, a higher dividend yield and significantly lower beta.

### Exhibit 23: Correlation of Quality and Volatility of the S&P 500 Universe



Source: S&P Dow Jones Indices, LLC. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

Exhibit 24: Statistics of Quality and Volatility of the S&P 500 Universe			
Active Exposures		Quality	Low Volatility
Price Volatility		-0.05	-0.48
Dividend Yield		0.02	0.54
Earnings to Price		0.08	0.24
Market Cap		-0.09	-0.85
Sales to Price		-0.03	0.11
Book to Price		0.36	0.25
EPS Growth Rate		0.16	-0.25
Trading Activity		-0.01	-0.22
Debt to Equity		-0.22	0.22
Earnings Volatility		-0.22	0.13
Relative Strength		0.04	-0.09
Beta		-0.08	-0.35

Source: S&P Dow Jones Indices, LLC and Northfield U.S. Fundamental model. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

## Combining Quality with Other Risk Factors

### Combining Quality With Low Volatility

In this subsection, we investigated whether there is any benefit in combining quality and low-volatility strategies by conducting two simulations based on different weighting schemes. First, we simply gave equal weight to both the low-volatility<sup>6</sup> strategy and the Quality strategy (Strategy 1). Second, we applied the Quality strategy after having eliminated the 30% of the stocks with the highest beta (Strategy 2). These findings are presented in Exhibit 25.

Both strategies beat the simple quality index and have lower volatility, but for different reasons. Strategy 1 has a significant exposure to smaller-capitalization stocks and a tilt toward companies with more stable earnings, and these two factors explain most of the return is due to risk factors. On the other hand, Strategy 2 does not have a significant size exposure, as it only eliminates the stocks with the highest beta and most of its returns derive from lower-volatility and higher-dividend stocks.

Exhibit 25: Combination of Quality and Low-Beta Strategies			
Metric	Quality	Strategy 1: 50% Low Beta and 50% Quality	Strategy 2: Quality After Removing 30% Highest Beta Stocks
Annualized Return (%)	9.42	9.63	9.42
Annualized Risk (%)	14.11	12.24	12.99
Return-per-Unit Risk	0.67	0.79	0.73
Top Four Active Exposures (w.r.t. Quality)	Market Cap		-0.41
	Book/Price		0.24
	Earnings Volatility		0.15
	Dividend Yield		0.14
	Price Volatility		-0.14
	Trading Activity		-0.13
	Beta		-0.08
	Dividend Yield		0.09

Source: S&P Dow Jones Indices, LLC and Northfield U.S. Fundamental model. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

<sup>6</sup> For this part of the analysis, we chose to focus on systematic risk (beta).

## Combining Quality With Value

We then turned to quality and value strategies and conducted a similar analysis to the one previously presented. Both strategies overtook the Quality index, but for different reasons. First, we allocated equal weight to both the value and the Quality strategy (Strategy 1) and second, we applied the Quality strategy on a value universe (Strategy 2). The findings are presented in Exhibit 26.

Both strategies outperformed the value index and had lower volatility, but Strategy 2 significantly outperformed both the pure-value index and the equal-weight index (Strategy 1). With respect to the pure-value index, Strategy 2 demonstrated a stronger value bias, lower earnings volatility and lower debt and, combined, these contributed most to the outperformance. This is consistent with findings from other researchers, such as Mead et al (2013), who confirm that “value was a higher driver of return than quality... and quality is a way to add value over time, especially when you marry it with valuation.”

Exhibit 26: Combination of Quality and Value Strategies					
Metric	Value	Strategy 1: 50% Value /50% Quality Equal Weight		Strategy 2: Quality on a Value Universe	
Annualized Return (%)	5.58	6.94		11.98	
Annualized Risk (%)	16.63	14.93		15.13	
Return per Unit Risk	0.31	0.46		0.79	
Active Exposure (w.r.t. Value)		Book/Price	-0.37	Debt/Equity	-0.46
		Earnings Volatility	-0.26	Book/Price	-0.37
		Debt/Equity	-0.22	Market Cap	-0.21
		EPS Growth	0.18	Earnings Volatility	-0.21

Source: S&P Dow Jones Indices, LLC and Northfield U.S. Fundamental model. Figures based on monthly USD total returns between December 1994 and December 2013 on the S&P 500 Quality Index and on the S&P 500 Value Index. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosures at the end of this document for more information on some of the inherent limitations associated with back-tested performance.

From the analysis in this section, we have shown that it may be beneficial to combine quality and other risk factors, such as low volatility and value.

## Conclusion and Summary of Findings

In conclusion, the major findings in this research paper for the periods indicated are as follows.

- We believe that quality is a multi-faceted concept as demonstrated by the three-pronged approach to identify high-quality companies that consider profitability generation, earnings sustainability and financial robustness.
- In the S&P Quality Indices Framework, we used ROE to measure profitability, the BSA ratio to measure earnings sustainability and the financial leverage ratio to measure the financial robustness of a given company.
- The absolute and risk-adjusted returns of the S&P Quality Indices appeared to have surpassed their benchmarks with lower volatility and maximum drawdowns. The outperformance appeared most significant in the U.S.
- The performance of quality strategies tend to be more impressive in bear markets while only lagging mildly in bull markets, indicating that such strategies may offer some downside protection in market crises.
- Macroeconomic analysis shows that quality stocks may be sensitive to economic growth and had tended to beat the market when the economy slows. However, they did deliver high average excess returns when growth is above-trend, which may explain why they have a positive exposure to the industrial production factor in the macroeconomic risk model.

- Quality strategies did not appear to have a significant exposure to inflation, oil price fluctuation or changes in the slope of the yield curve.
- The highest active exposure of the S&P 500 Quality Index, with respect to its benchmark, derives from a tilt toward high earnings growth, lower earnings variability, lower-leverage and value stocks.
- Stress tests indicated that the S&P 500 Quality Index generally performed better than its benchmark in both past and hypothetical crises and upheavals.
- Looking at correlation measures alone, low volatility and quality appear to be similar concepts, but their returns come from different sources. Returns from quality strategies come from less earnings variability, earnings growth, lower debt and value stocks. Meanwhile, returns from low-volatility strategies come from lower-volatility and smaller-capitalization stocks with a high dividend yield.
- Results showed that although quality strategies performed well on their own, they appeared to work well with other alternative risk premium strategies.

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The S&P 500 Quality Index, the S&P Quality Global LargeMidCap index and the S&P Quality Emerging LargeMidCap index are currently under development. All information presented herein is backtested. Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect on the launch date. Complete index methodology details are available at [www.spdji.com](http://www.spdji.com).

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