MORNINGSTAR®

The Impact of Industry Tilts on Factor Performance

Industry tilts appear to pay off for momentum but are not integral to the success of value and low-volatility strategies.

Morningstar Manager Research
15 March 2017

Alex Bryan, CFA
Director of Passive Strategies Research, North America
+1 312-244-7042
alex.bryan@morningstar.com

Adam McCullough, CFA
Analyst, Passive Strategies Research
+1 312-244-7381
adam.mccullough@morningstar.com

Contents

Key Takeaways

- Value and low-volatility investment strategies demonstrate persistent industry tilts, which do not significantly enhance their performance. Investors can reduce active risk without significantly hindering performance by constraining these factors' industry tilts.

- Momentum strategies perform best when industry weightings are left unconstrained. This is because momentum's industry weightings are dynamic, allowing it to effectively capture short-term persistence in industry performance leadership.

Executive Summary

Factor investment strategies systematically target stocks with characteristics that have historically been associated with better risk-adjusted performance. But they often end up with industry weightings that differ from the market's. This study seeks to evaluate whether such industry tilts contribute to the success of value, momentum, and low-volatility factor strategies, or whether they are an uncompensated source of risk.

To do that, we compare the performance of three factors (value, momentum, and low volatility) applied to both individual stocks and entire industries. This analysis revealed that there has not been a meaningful performance benefit from tilting toward cheaper industries, and only a modest benefit from tilting toward the least-volatile industries. Stock selection appears to be vital to the success of both the value and low-volatility factors. However, we found that there has been a significant performance advantage from tilting toward industries with strong momentum.

These results suggest that an industry-constrained approach to investing in value and low-volatility portfolios can reduce active risk without significantly hindering performance. However, it is best to leave momentum strategies' industry weightings unconstrained. This is because momentum's industry weightings are dynamic, allowing it to effectively capture short-term persistence in industry performance leadership. In contrast, the value and low-volatility factors demonstrate persistent industry tilts, which contain less information and do not significantly enhance their performance.

Introduction

In the world of factor investing, industry tilts are often an afterthought. Factor-oriented strategies target securities with characteristics, such as low valuations, high profitability, strong momentum, and low volatility, which have historically generated attractive long-term risk-adjusted performance. But most factor-oriented strategies do not adjust for differences in these characteristics across industries, which can lead to unintended industry bets. If these industry tilts contribute to strategies' performance edge, then they may be desirable, otherwise they may just introduce a source of uncompensated active risk.

Even if industry tilts contribute to a factor strategy's outperformance, normalizing factor measures to reflect differences across industries may still make sense. Valuations and accounting practices are more similar within an industry than across industries. For example, technology stocks almost always trade at higher valuations than those in the utilities industry and are generally less asset intensive. In light of these persistent differences, industry-relative factor signals may offer more information about stocks' future expected returns than unadjusted signals. Substituting larger intra-industry bets for industry tilts may be prudent if intra-industry stock selection offers a more favorable trade-off between active return and active risk (higher information ratio) than industry selection.

A few asset managers offer factor strategies that implement industry-relative adjustments to their factor signals. These firms argue that such adjustments can improve performance, or reduce risk by mitigating unintended industry bets. For example, in early 2016, AQR adjusted its suite of multistyle funds, including AQR Large Cap Multi-Style QCELX, to place greater weight on each stock's factor characteristics relative to its industry peers. In September 2015, BlackRock switched the benchmarks underlying iShares Edge MSCI USA Quality Factor QUAL and iShares Edge MSCI USA Value Factor VLUE to indexes that apply this sort of industry-relative adjustment from unadjusted indexes. These funds anchor their industry weightings to those of the market-cap-weighted MSCI USA Index and target stocks with attractive quality and valuation characteristics, respectively, within each industry. This adjustment offers the intended factor exposure without industry tilts.

Interestingly, BlackRock does not industry-adjust its iShares Edge MSCI USA Momentum Factor MTUM strategy, arguing that the strategy's dynamic industry tilts offer return benefits. Goldman Sachs takes a similar view. Its suite of multifactor ETFs, including Goldman Sachs ActiveBeta U.S. Large Cap Equity ETF GSLC, only applies an industry-relative selection approach to the value factor.

To assess whether an industry-relative approach to factor investing is prudent, this study investigates whether tilting toward industries with stronger value, low-volatility, and momentum characteristics provides better performance. It compares those industry-level factor strategies to comparable strategies applied to individual stocks. If the strategies work well at the stock level but not at the industry level, it would suggest that industry tilts may not be necessary to capture the associated performance advantage.

Research Design

We constructed value, momentum, and low-volatility factor strategies applied to both individual stocks and entire industries. Each factor strategy measures 50 years of monthly returns from December 1966 through November 2016, using data from the French Data Library. The stock-level factors ignore industry membership, so they can have industry tilts that may contribute to their performance. However, comparing the performance of the stock- and industry-level factor strategies helps illustrate the impact of those industry tilts.

The French Data Library sorts all U.S. stocks listed on the NYSE, AMEX, and Nasdaq exchanges into deciles at the end of June each year based on their book/price ratios from the prior year-end. We measured the stock-level value factor performance as the return difference between a market-cap-weighted portfolio of stocks in the cheapest five deciles and those in the most expensive five deciles.

We applied a similar approach to measure the industry-level value factor performance. Instead of ranking stocks, we ranked the 12 Standard Industry Classification industries (listed in Appendix 1) at the end of June each year based on their book/price ratios from the prior year-end. The industry-level value factor performance is calculated as the return difference between a market-cap-weighted portfolio of the cheapest six industries and most expensive six industries.

The stock- and industry-level momentum and low-volatility factors follow a similar approach. The momentum factor portfolios for both the stock and industry level were formed based on their prior 12-month returns, excluding the most recent one, and rebalanced monthly. This is consistent with the standard academic measure of momentum. The low-volatility factor portfolios were also refreshed monthly, based on each group's daily volatility during the preceding 60 trading days. While several low-volatility strategies, such as PowerShares S&P 500 Low Volatility ETF SPLV, use a longer measurement period, this is how the French Data Library sorts stocks into deciles by volatility, so we replicated it for the industry-level low-volatility factor portfolios. This short window can create higher turnover than a longer lookback period and may be a noisier predictor of future volatility.

Results

Value Factor

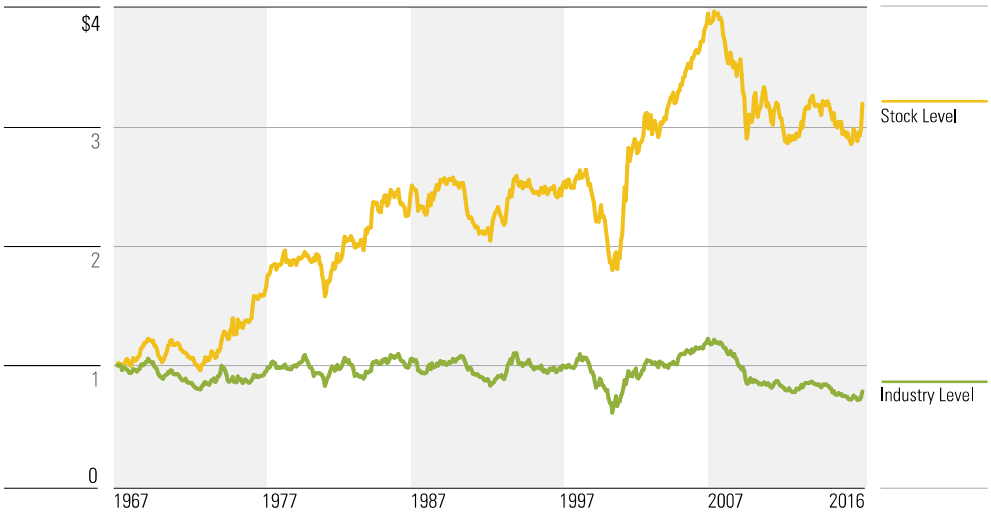
It is no secret that value stocks have historically outperformed growth stocks over the long run. Indeed, the stock-level value factor returned 2.36% annualized during the trailing 50 years through November 2016. But surprisingly, the industry-level value factor posted a small negative return (negative 0.32% annualized) during the 50-year sample period, which suggests that industry tilts do not significantly contribute to the performance of a broad market-cap-weighted book/price value strategy. Exhibit 1 shows the value factor performance during the 50-year sample period. Exhibit 2 graphs the growth of a dollar in each value factor approach during the same time period. Despite the gap between the two value factor returns, they were highly correlated. (The correlation coefficient was 0.78.)

Exhibit 1 Value Factor Performance (12/1966 – 11/2016)

Value Factor Approach	Annualized Return (%)	Annualized Standard Deviation (%)
Stock-level	2.36	8.10
Industry-level	-0.32	8.45

Source: Authors' calculations on portfolios constructed using the French Data Library.

Exhibit 2 Value Factor Performance: Industry-Level vs. Stock-Level



Source: Authors' calculations on portfolios constructed using the French Data Library.

A regression analysis, which is presented in exhibit 3, reveals that the industry-level value factor's performance had significant positive exposure to the stock-level value factor and skewed toward larger stocks. After accounting for the industry-level factor's exposure to the market risk, size, momentum, and stock-level value factors, it still underperformed (generated significant negative alpha). This suggests that investors are not compensated for simply targeting the cheapest industries, which is consistent with the findings of a study by Randolph Cohen and Christopher Polk, two researchers at Northwestern University.[1]

1 Cohen, R.B., & Polk, C.K. 1998. "The Impact of Industry Factors in Asset-pricing Tests." Kellogg Graduate School of Management, Northwestern University, Working Paper.

Exhibit 3 Industry-Level Value Factor Regression (12/1966 – 11/2016)

	Coefficient	T-Stat
Alpha	**–0.14**	**–2.42**
Beta	0.01	0.82
SMB (Small Size)	**–0.20**	**–10.70**
Stock Value Factor	**0.78**	**31.84**
Momentum	–0.01	–1.13

Source: Authors' calculations on portfolios constructed using the French Data Library. Note: Bolded figures are significant at the 5% level.

Exhibit 4 shows how often (measured by the number of months) each industry appeared in the cheaper (long portfolio) and more expensive (short portfolio) halves of the industry rankings used to construct the industry-level value factor. Consistent with expectations, the money (financial), utilities, telecom, and energy industries appear in the cheaper half of the rankings most often. Conversely, the healthcare, business equipment (which includes tech companies), nondurable (consumer defensive), and chemicals industries appeared in the expensive half most often. Because the value factor is slower-moving, industries did not often switch between the long and short portfolios.

Exhibit 4 Industry-Level Value Factor Portfolio Composition (12/1966 – 11/2016)

Industry	Months in Long Portfolio (%)	Months in Short Portfolio (%)	Count of Portfolio Switches
Money (Financials)	100.0	0.0	0
Utilities	96.8	3.2	1
Telecom	86.0	14.0	6
Energy	86.0	14.0	6
Other	72.0	28.0	10
Consumer Durables	70.8	29.2	7
Manufacturing	69.2	30.8	5
Chemicals	8.0	92.0	4
Shops	4.0	96.0	4
Consumer NonDurables	3.2	96.8	3
Healthcare	2.0	98.0	2
Business Equipment	2.0	98.0	2

Source: Authors' calculations on portfolios constructed using the French Data Library.

Although most value-oriented factor strategies do not explicitly target cheaper industries, they tend to consistently have overweightings in them. Exhibit 5 illustrates the Russell 1000 Value Index's industry tilts relative to the Russell 1000 Index. These indirect industry bets increase risk but don't appear to contribute to performance, suggesting that an industry-relative approach to value may offer better risk-adjusted returns.

Exhibit 5 Russell 1000 vs. Russell 1000 Value Index Industry Weightings

Industry	Russell 1000 (%)	Russell 1000 Value (%)	+/– Russell 1000 (%)
Consumer Staples	8.6	8.0	-0.6
Consumer Discretionary	12.7	4.7	-8.0
Energy	7.3	13.7	6.4
Financials	14.8	26.3	11.5
Healthcare	13.3	10.5	-2.8
Utilities	3.0	5.9	2.9
Industrials	10.7	10.2	-0.4
Telecom Services	2.4	3.6	1.2
Information Technology	20.4	9.6	-10.7
Real Estate	3.6	4.5	1.0
Materials	3.3	2.9	-0.4

Source: Morningstar Direct. Data as of 11/30/2016.

Momentum Factor

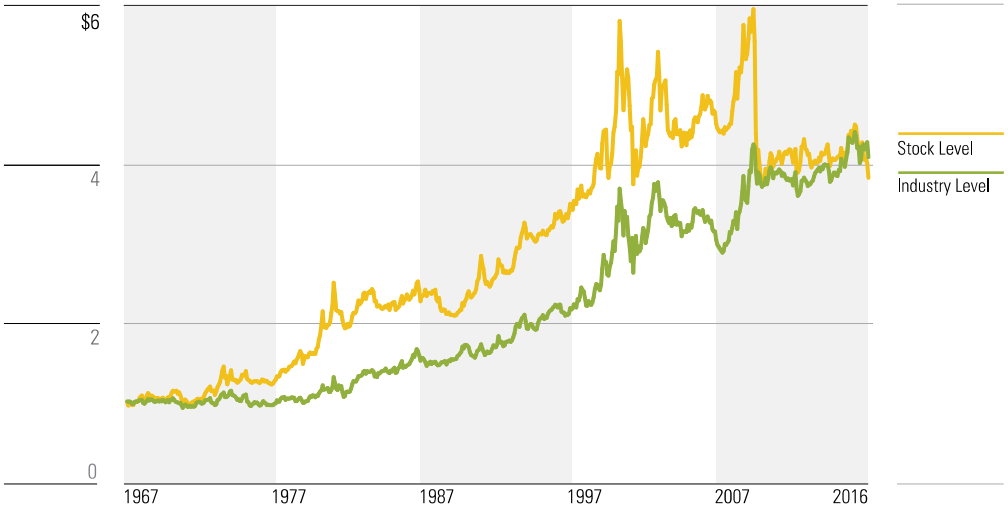
The industry-level momentum factor performed much better than its value counterpart. It actually generated a slightly higher return than the stock-level momentum factor with marginally lower volatility. However, the stock-level momentum factor strongly outperformed the industry-level momentum factor until February 2009. During the next seven months, the stock-level momentum factor significantly underperformed the industry-level factor, wiping out most of its lead. This is because performance leadership among many stocks reversed in this time, as the stocks that were hit the hardest during the financial crisis rebounded the most. This reversal had a smaller impact on the industry-level factor. The performance results for the full sample period and the growth of a dollar invested in both the industry- and stock-level momentum factors are shown in exhibits 6 and 7, respectively.

Exhibit 6 Momentum Factor Performance (12/1966 – 11/2016)

Momentum Factor Approach	Annualized Return (%)	Annualized Standard Deviation (%)
Stock-level	2.73	10.88
Industry-level	2.87	9.58

Source: Authors' calculations on portfolios constructed using the French Data Library.

Exhibit 7 Momentum Factor Performance: Industry-Level vs. Stock-Level



Source: Authors' calculations on portfolios constructed using the French Data Library. Data as of 11/30/2016.

Consistent with the value factor results, the industry- and stock-level momentum factors were highly correlated during the sample period. (The correlation coefficient was 0.79.) And as expected, the industry-level factor performance displayed significant positive exposure to the stock-level momentum factor, as the regression results in exhibit 8 show. The industry-level momentum factors did not produce significant excess returns after controlling for exposure to the market risk, size, value, and stock-level momentum factors.

Exhibit 8 Industry-Level Momentum Factor Regression (12/1966 – 11/2016)

	Coefficient	T-Stat
Alpha	0.06	0.78
Beta	0.01	0.68
SMB (Small Size)	**0.06**	**2.62**
HML (Low Valuations)	0.02	0.69
Stock Momentum Factor	**0.70**	**30.35**

Source: Authors' calculations on portfolios constructed using the French Data Library. Note: Bolded figures are significant at the 5% level.

It's intuitive that the two momentum factor approaches delivered similar returns. Because stocks in the same industry share attributes such as accounting standards, business risks, and similar valuations, they tend to perform more like their industry than the broader market. Strong relative industry performance is driven by the individual stocks that constitute that industry, so these two momentum factor approaches should produce similar performance. Our findings are consistent with those of Tobias Moskowitz and Mark Grinblatt in their study, "Do Industries Explain Momentum?"[2]

2 Moskowitz, T., & Grinblatt, M. 1999. "Do Industries Explain Momentum?" *Journal of Finance*, Vol. 54, No. 4, P. 1249.

While it's true that cheap industries contain a disproportionate number of value stocks, momentum's industry tilts are more dynamic and seem to contain greater information about future expected returns. Differences in growth rates and capital structures will almost always cause the financial services and utilities industries to trade at lower valuations than the technology and healthcare industries. However, industry performance leadership is often a short-term phenomenon. The high-turnover momentum factor captures this effect, while the value factor is slow-moving. These results suggest that ignoring industry momentum reduces the efficacy of a momentum signal.

Exhibit 9 illustrates the frequent churning of industry performance leadership as measured by momentum. It shows the percentage of time (measured by the number of months) each industry landed in the top and bottom halves of the industry rankings. Most industries spent roughly equal time in each group and switched between the long and short portfolios 85 times, on average, during the 50-year sample period.

Exhibit 9 Industry-Level Momentum Factor Portfolio Composition (12/1966 – 11/2016)

Industry	Months in Long Portfolio (%)	Months in Short Portfolio (%)	Count of Portfolio Switches
Consumer NonDurables	62.0	38.0	95
Healthcare	58.0	42.0	67
Money (Financials)	56.2	43.8	92
Telecom	51.2	48.8	77
Energy	50.8	49.2	75
Manufacturing	49.5	50.5	82
Chemicals	49.0	51.0	87
Business Equipment	48.3	51.7	90
Shops	48.2	51.8	80
Utilities	47.8	52.2	92
Consumer Durables	39.7	60.3	84
Other	39.3	60.7	93

Source: Authors' calculations on portfolios constructed using the French Data Library. Data as of 11/30/2016

Low Volatility Factor

Neither the stock- nor the industry-level low-volatility factors in this study generated positive returns during the full sample period. However, absolute performance is not the best way to measure their efficacy. By definition, less volatile stocks and industries are not as risky as their more volatile counterparts, so it is better to assess the low-volatility factor's success by its risk-adjusted performance. Exhibit 10 shows the return, standard deviation, and Sharpe ratios for the low- and high-volatility portfolios used to create the stock- and industry-level factors.

The 50-year compounded return spread between the low- (long) and high- (short) volatility portfolios differ slightly from the factor returns. This is because the factors were calculated from the monthly spreads between the long and short portfolios, which allows them to compound at a slightly different rate than full period spread between the two portfolios. The two industry-level portfolio returns were comparable, but the low-volatility portfolio exhibited a lower standard deviation, resulting in better risk-

adjusted returns (as measured by its Sharpe ratio). However, the stock-level low-volatility portfolio had much stronger absolute performance relative to its more volatile counterpart. Not only did it enjoy a substantially lower standard deviation, but it also posted stronger returns.

Exhibit 10 Low Volatility Factor Performance (12/1966 – 11/2016)

Low Volatility Factor Approach	Annualized Return (%)	Annualized Standard Deviation (%)	Sharpe Ratio
Industry-level Factor	–0.75	8.58	—
Stock-level Factor	–0.54	13.36	—
Long industry-level portfolio	10.23	14.33	0.37
Short industry-level portfolio	10.11	17.44	0.30
Long stock-level portfolio	11.09	13.57	0.46
Short stock-level portfolio	8.90	22.59	0.18

Source: Authors' calculations on portfolios constructed using the French Data Library.

These results suggest that while a low-volatility factor can be successfully implemented at both the individual stock and industry level, it has historically been more effective at the stock level. This is likely because there is greater variability in volatility across stocks than industries. While stock-level low-volatility strategies still tend to skew toward defensive industries, this dispersion allows them to realize a greater reduction in volatility than the industry-level strategy.

Consistent with the value and momentum factor results, the industry- and stock-level low-volatility factors were highly correlated during the sample period. (The correlation coefficient was 0.66.) However, the industry-level low-volatility factor underperformed (generated a negative alpha) after controlling for its exposure to the market risk, size, value, and stock-level low-volatility factors, as the regression results in exhibit 11 show. This further indicates that the low-volatility factor has been more effective at the stock level.

Exhibit 11 Industry-Level Low Volatility Factor Regression (12/1966 – 11/2016)

	Coefficient	T-Stat
Alpha	**–0.18**	**–2.52**
Beta	**0.06**	**3.04**
SMB (Small Size)	**0.27**	**9.22**
HML (Low Valuations)	**0.11**	**4.20**
Stock Low Vol Factor	**0.58**	**18.81**

Source: Authors' calculations on portfolios constructed using the French Data Library. Note : Bolded figures are significant at the 5% level.

Not surprisingly, the industry-level low-volatility factor consistently favored the consumer nondurable (consumer defensive) and utilities industries, and generally avoided the business equipment (which includes technology stocks) and consumer durable (consumer cyclical) industries. However, its industry tilts were not as consistent as the value factor's. In some cases, it shifted out of industries as their risk increased, helping to improve risk-adjusted performance. For example, the utilities industry, which spent nearly 90% of its time in the low-volatility (long) portfolio, moved to the high-volatility (short) portfolio at

the end of July 2013. That industry's returns ranked in the bottom third of all industries in each of the next six months before it switched back to the low-volatility (long) portfolio.

Exhibit 12 illustrates the percentage of time each industry landed in the low- and high-volatility portfolios.

Exhibit 12 Industry-Level Low Volatility Factor Portfolio Composition (12/1966 – 11/2016)

Industry	Months in Long Portfolio (%)	Months in Short Portfolio (%)	Count of Portfolio Switches
Consumer NonDurables	90.2	9.8	39
Utilities	88.8	11.2	29
Chemicals	63.2	36.8	79
Money (Financials)	57.3	42.7	61
Manufacturing	57.3	42.7	75
Telecom	56.7	43.3	89
Other	55.3	44.7	83
Shops	52.0	48.0	100
Healthcare	37.7	62.3	65
Energy	24.7	75.3	89
Consumer Durables	9.7	90.3	46
Business Equipment	7.2	92.8	19

Source: Authors' calculations on portfolios constructed using the French Data Library.

Conclusion

This study demonstrated that there is not a long-term performance benefit that results from tilting toward cheaper industries and only a modest benefit from tilting toward less volatile industries. In both cases, stock selection appears to drive the factor performance benefits. But there was a considerable performance advantage from tilting toward industries with strong momentum. Recent performance tends to persist in the short term at both the industry and stock levels. Momentum's industry tilts change frequently, allowing it to effectively capture short-term persistence in industry performance leadership. In contrast, the value and low-volatility factors have persistent industry tilts, which do not significantly enhance their performance.

The results of this study suggest that it is sensible to make industry adjustments for factor strategies with persistent industry tilts, like value and low volatility, because they don't contribute significantly to these strategies' long-term success. However, it is best to leave industry tilts unconstrained for momentum strategies, because they can capture short-term industry performance persistence. These findings support the industry adjustments that some firms include in their factor strategies. Even without a performance benefit, industry constraints allow investors to mitigate unintended bets. This comes at the cost of lower factor style purity, higher turnover, and greater complexity. In many cases, it's worth the trade-off.

IShares Edge MSCI USA Value Factor VLUE and iShares Edge MSCI USA Quality Factor QUAL offer a low-cost industry relative approach to value and quality, respectively. Similarly, Fidelity Low Volatility Factor ETF FDLO (0.29% expense ratio) targets stocks with low volatility relative to their sector peers and matches the sector weightings of its selection universe. However, this fund was just launched in September 2016 and has a limited asset base, which can make it expensive to trade. IShares Edge MSCI Minimum Volatility USA USMV has a longer record and greater trading volume. It limits its sector tilts to within 5 percentage points of the broad MSCI USA Index's, which emphasizes intra-sector stock selection. IShares Edge MSCI USA Momentum Factor MTUM does not apply industry constraints, which should allow it to capture industry-level momentum. The four iShares funds charge a low 0.15% expense ratio.

Exhibit 13 Fund Summary

Industry	Ticker	Morningstar Category	Inception Date	Net Exp Ratio (%)	Avg Mkt Cap ($Bil)	# of Holdings	Total Assets ($Mil)	Morningstar Analyst Rating
AQR Large Cap Multi-Style I	QCELX	Large Blend	3/26/13	0.45	46.6	264	1,641	Bronze
Goldman Sachs ActiveBeta US LgCp Eq	GSLC	Large Blend	9/17/15	0.09	52.7	452	1,543	Bronze
iShares Edge MSCI USA Quality Factor	QUAL	Large Growth	7/16/13	0.15	74.6	127	3,610	Silver
iShares Edge MSCI USA Value Factor	VLUE	Large Value	4/16/13	0.15	59.2	152	2,552	Bronze
iShares Edge MSCI USA Momentum Factor	MTUM	Large Growth	4/16/13	0.15	65.0	125	2,110	Silver
iShares Edge MSCI Min Vol USA	USMV	Large Blend	10/18/11	0.15	43.9	185	12,365	Silver
PowerShares S&P 500 Low Volatility	SPLV	Large Value	5/5/11	0.25	40.4	101	6,432	Bronze
Fidelity Low Volatility Factor ETF	FDLO	Large Blend	9/12/16	0.29	58.1	123	13	—

Source: Morningstar Direct. Data as of 1/31/2017.

Appendix

Exhibit 14 Standard Industry Classification (SIC) Industry Descriptions

SIC Industry	Industry Description
Consumer Nondurables	Food, Tobacco, Textiles, Apparel, Leather, Toys
Consumer Durables	Cars, TVs, Furniture, Household Appliances
Manufacturing	Machinery, Trucks, Planes, Ofc Furn, Paper, Com Printing
Energy	Oil, Gas, and Coal Extraction and Products
Chemicals	Chemicals and Allied Products
Business Equipment	Computers, Software, Electronic Equipment
Telecom	Telephone and Television Transmission
Utilities	Utilities
Shops	Wholesale, Retail, and Some Services (Laundries, Repair Shops)
10 Healthcare	Healthcare, Medical Equipment, Drugs
Money	Finance
Other	Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment

Source: French Data Library.

References

Cohen, R.B., & Polk, C.K. 1998. "The Impact of Industry Factors in Asset-pricing Tests." Kellogg Graduate School of Management, Northwestern University, Working Paper.

Moskowitz, Tobias and Mark Grinblatt. 1999. "Do Industries Explain Momentum?" *Journal of Finance*, Vol. 54, No. 4, P. 1249.

About Morningstar Manager Research

Morningstar Manager Research provides independent, fundamental analysis on managed investment strategies. Analyst views are expressed in the form of Analyst Ratings, which are derived through research of five key pillars—Process, Performance, Parent, People, and Price. A global research team issues detailed analyst reports on strategies that span vehicle, asset class, and geography.

About Morningstar Manager Research Services

Morningstar Manager Research Services combines the firm's fund research reports, ratings, software, tools, and proprietary data with access to Morningstar's manager research analysts. It complements internal due-diligence functions for institutions such as banks, wealth managers, insurers, sovereign wealth funds, pensions, endowments, and foundations.

For More Information

Michael Breen
Director, Operations and Training, Global Manager Research
+1 312 696-6553

MORNINGSTAR®

22 West Washington Street
Chicago, IL 60602 USA