White Paper
Asset Allocation

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Asset Performance and the Business Cycle
A European Case Study

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Introduction

Traditional theory suggests there are four stages of the business cycle: recovery, expansion, slowdown and contraction. In this paper, we provide a long-term analysis of European business cycles and their impact on sectors, smart beta factors and fixed income. We believe the lessons gleaned can help to inform asset allocation decisions.

Investment strategies to identify outperformers and laggards in different economic or market phases are well documented in financial literature and can encompass approaches that are as diverse as price momentum and fundamental bottom-up analysis.

One of the most widely used and instinctive styles is to conduct asset allocation through information garnered from the business cycle. On the surface, this approach makes sense since business cycles exhibit characteristics that are likely to impact investment assets differently. The idea that the market functions under recurring fluctuations depending on a number of variables was formalised by Burns and Mitchell (1946).[1]

Burns and Mitchell posit that business cycles are a type of fluctuation found in the aggregate economic activity of nations that organise their work mainly in business enterprises. Moreover, they believe that a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions and revivals, which merge into the expansion phase of the next cycle.

Undeniably, each business cycle has its own particularities and no two business cycles are ever identical, even though they may bear striking resemblance to one another as the rhythm of cyclical fluctuations in the economy has tended to follow similar patterns. Performance across asset classes similarly rotates in line with different phases of the business cycle. For this reason, asset allocation with appropriate consideration to the business cycle may be invaluable as part of a longer-term investment strategy.

The Typical Phases and Characteristics of a Business Cycle

The business cycle represents the periodic fluctuations in economic activity, most notably production, trade and general economic activity. The length of a business cycle is the period of time containing a single boom and contraction in sequence. Customarily, there are four distinct phases in a business cycle: recovery, expansion, slowdown and contraction.

- **Recovery** During the recovery phase, economic growth remains below trend but rebounds sharply from the trough. Ordinarily, credit conditions have loosened and easy monetary policy leads to strong growth in profit margins.

- **Expansion** Frequently the longest phase of the business cycle, the expansionary phase enjoys a more moderate rate of growth than the recovery phase. In this part of the cycle, economic activity gathers momentum as company profitability is healthy against the backdrop of an accommodative, yet increasingly neutral, monetary policy.

- **Slowdown** A classic slowdown phase coincides with peak economic activity, signifying that growth is decelerating even though it remains positive. In this phase, the economy may start to overheat as capacity becomes more constrained, which leads to inflationary pressures.

- **Contraction** In the contractionary phase, economic activity generally falls as corporate profits decline, and the availability of credit turns scarcer, and monetary policy is also anticipated to become more accommodative.

Case Study Methodology

Defining the Business Cycle

Even though the business cycle is well understood as a concept, there is surprisingly little consensus on how it should be defined. For the purpose of the analysis in this article, we use primarily the DZ Bank Euroland Leading Economic Indicator to judge the state of economic activity in Europe. Because less historical data is available in Europe, and to ensure that the analysis applies both in the eurozone as well as OECD Europe, we have conducted the same regime analysis using the OECD Eurozone Economic Indicator and OECD Europe Economic Indicator. The level of performance of a given market segment or strategy was judged on the basis of their overall performance across all the different leading indicators.

It should be noted that the analysis is carried out through the use of leading indicators because they are better predictors of economic conditions over the short run. Research[2] shows that the leading economic indicators can be useful to determine the near-term (i.e. six to nine months) direction of aggregate economic activity.

We prefer to use leading indicators as they are better thought of as a predictor of economic conditions rather than a current barometer. Indeed, using this approach may produce results that vary from those produced by other research on this topic, for example those that use coincident indicators. However, we believe the forward-looking nature of the results provide insights not gleaned from other approaches.

Economic Cycles are Defined Based on DZ Bank Euroland Leading Economic Indicators

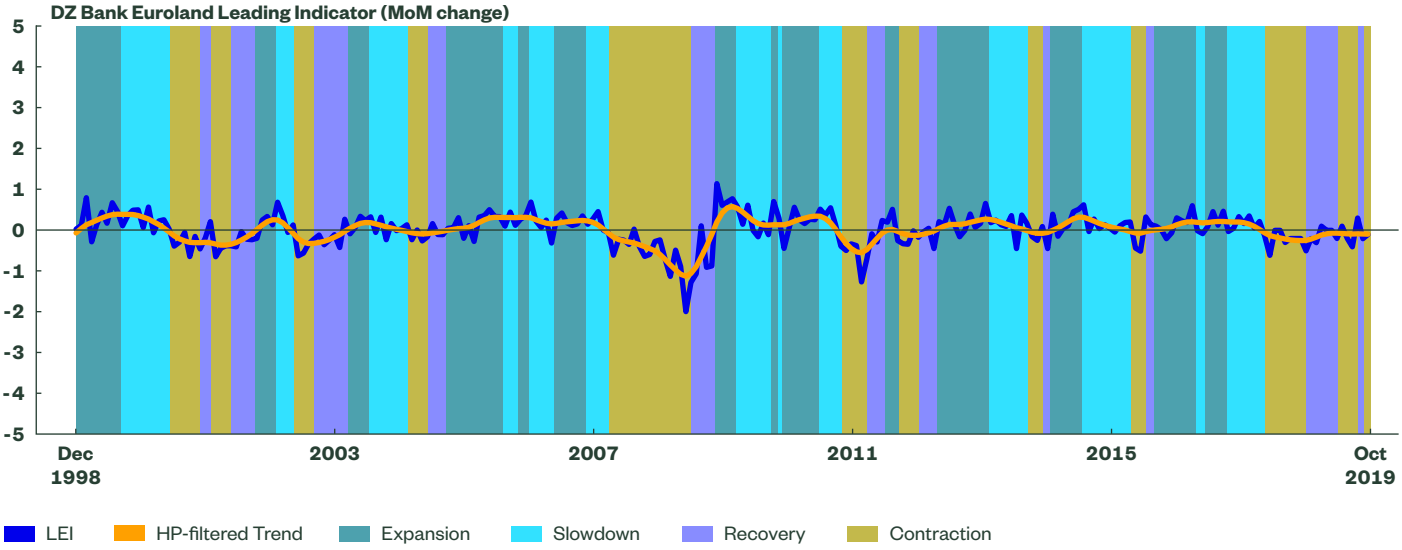
The DZ Bank Euroland Leading Economic Indicator (LEI), modelled on the Conference Board US Leading Economic Indicator, is a composite of nine economic indicators that are selected based on their ability to reflect movements in GDP growth rate. Using a signal processing technique known as an HP-filter (see Prescott and Hodrick [1997][3] for details), we extracted the cyclical trend from monthly change of the LEI. The cyclical component was then classified into four different regimes based on simple rules related to the slope of the trend line. The four stages are as follows:

- **Recovery** The LEI index contracts at a decelerated pace
- **Expansion** The LEI Index expands at an accelerated pace
- **Slowdown** The LEI index expands at a decelerated pace
- **Contraction** The LEI contracts at an accelerated pace

Figure 1 shows the economic regime based on our model.

Figure 1

Regimes Based on DZ Euroland Leading Economic Indicator



Source: Bloomberg Finance L.P., State Street Global Advisors. Monthly data from January 1999 to October 2019.

Assessing Performance of Asset Classes over Business Cycles

To understand the performance of different strategies and asset classes over time, we studied both the level of outperformance as well as its consistency on the basis of the model above. This is achieved by calculating the four metrics that are used as our evaluation criteria to assess the performance of different indices.

Level of Excess Return and Consistency are Both Key Criteria in Assessing Performance

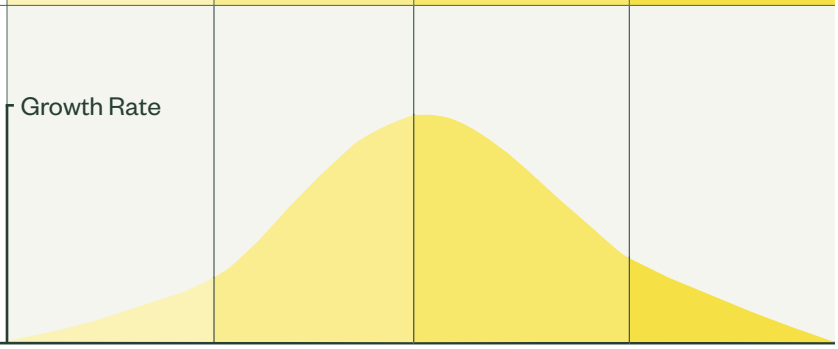
Category	Metric	Rationale
Level of Outperformance	Average excess return	This measure computes the difference in the monthly performance of an asset compared to the benchmark. It is **indifferent to when a return period begins** during a phase.
	Full-period average excess monthly performance	This measure calculates the average of the compounded performance of an asset class against the benchmark in a particular business cycle phase. It best captures the average performance **outcome on a "full-cycle" basis, because it accounts for compounding.**
Outperformance Consistency	Average hit rate	This ratio calculates the frequency of an asset outperforming the benchmark in a given economic phase.
	Full-period hit Rate	This ratio calculates the frequency of an asset outperforming the benchmark on a full-cycle basis.

Source: State Street Global Advisors, as of 31 December 2019.

The four metrics are the principal criteria taken into consideration in the determination of an asset's performance rank. As a general rule, this means assets that score consistently well across all four categories are ranked higher than assets that do well in only a few categories. This analysis was carried out for equity sector, equity smart beta and fixed income indices. Figure 2 shows the best-performing indices in each category in different business cycles, based on our evaluation criteria. In the forthcoming sections, we examine in detail the performance of sectors, smart beta and fixed income indices.

Figure 2
Best-Performing Assets in Different Business Cycles

	Recovery	Expansion	Slowdown	Contraction
Sectors	**Real Estate** Materials	**Consumer Discretionary** Industrials	**Industrials**	**Consumer Staples** Heathcare Utilities
Smart Beta	**Low Volatility**	**Size** Large Cap Value Small Cap Value	**Size**	**Low Volatility** Quality Dividend
Fixed Income	Investment Grade High Yield	**High Yield** Investment Grade	**High Yield** Investment Grade	Treasuries



Source: State Street Global Advisors, Bloomberg Finance L.P. The above diagram is for illustrative purposes only. Assets in bold represent those that scored well across *all* evaluation criteria, whereas assets in normal typeface represent those that scored well on the majority of the evaluation criteria. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown.

Case Study Results

Sectors

To understand how the performance of equity sectors changes over time, we have opted to study the European equity sectors across different business cycles since January 1999.

To start, we examine the **recovery period**, which is often one of the shortest, as well as the most volatile, phases in the cycle. During this period, growth remains negative although it starts to recover from its trough.

Real Estate Outperformed Strongly in Recovery and Consumer Staples in Contraction

With a market beta of approximately 0.9, **real estate** delivered the strongest level of performance across all evaluation criteria and delivered a consistently robust level of average excess return, when compared with the European market benchmark (see Figure 3).[4]

A possible reason for this result is that the strength of anticipated consumer and corporate spending drives the return of the sector but, instead of targeting sectors with higher market beta, the market is still proceeding with some degree of prudence, given the uncertainty associated with the economic growth in this phase. As a consequence, it elects sectors that offer a high, but not the highest, level of upside participation. This finding is broadly consistent with the US market, where real estate also outperformed during this phase.

Correspondingly, the materials sector also fared well in Europe. With more than 70% of the sector in the chemicals industry and a market beta of just over 1, the sector tended to be fairly sensitive to the economic cycle, as it was in the US. Paradoxically, other cyclical sectors, namely the consumer discretionary sector, faltered during this period, despite having a bull beta of 1.6, which means that the sector generally moves up by 1.6 times more than the benchmark in a rising market.

Indeed, one might expect that, when the economy starts to recuperate from its lows, the sectors that are most geared towards strong economic growth would be set to prosper most. However, this has not been the case as economic growth, while ameliorating, has not yet asserted itself fully.

The **expansionary** phase generally follows the recovery phase and is usually one of the lengthier periods in the cycle, representing 31% of the observations. As the economy shifts beyond its initial stage of revival and growth rates start to become more established, the leadership of highly cyclical assets begins to taper. More sectors now benefit from the economic boom, and this is demonstrated by the tightening of sector dispersion.[5] In this phase, the cyclical sectors, including **industrials** and **consumer discretionary**, stood out across all the evaluation criteria.

Considering solely the magnitude of excess returns, the consumer discretionary sector came out on top in this phase. With a market beta of 1.24, it is made up of highly cyclical industries, split between consumer durables (46%) and apparel and automobiles and components (37%). These industries are highly reactive to equity up-markets and would take advantage of the strong economic growth that is increasingly established. In this phase, consumption-orientated industries should thrive as consumers gain confidence in the stability of an economic recovery and are comfortable with increasing personal expenditure.

In a similar vein, industrials in Europe, just like its counterparts in the US, performed well in this stage of the cycle and attained healthy relative returns — with remarkable levels of consistency. More than 75% of this sector comprises the capital goods industry group, which invariably benefits from the demand surge in an environment of sustained economic growth.

Interestingly, the information technology sector in Europe did not attain consistent levels of excess return during the expansion phase, unlike its counterpart in the US.

On the other hand, countercyclical sectors (such as health care) trailed the benchmark. With just under 80% of the sector comprised of pharmaceutical and biotech companies, the sector is largely unaffected by the vagaries of the economic cycle. However, the market beta of the sector in Europe is somewhat less defensive than that of the sector in the US. A possible explanation for this is that the health care systems in Europe are largely centralised and government-operated, which assume the role of price setters, i.e. they maintain a level of control over the prices for patented drugs.[6]

The **slowdown** phase usually follows the expansionary phase and accounts for 27% of the observations in this analysis. In this phase, economic growth remains positive even though it is slowing.

At first glance, it seems astonishing that the **industrials** sector, of which over 75% comprises the capital goods industry, could outperform in a decelerating growth environment since the sector is most often identified with a strong, stable growth phase. On closer inspection, European industrials, being more reliant on exports than their American counterparts, are more influenced by global, rather than domestic, growth as well as international trade with emerging and other foreign markets.

Looking at the European industrials[7] sector, 38% of the revenues were generated in the European Union, and of that 6.8% came from Germany. This contrasts starkly with the US industrials[8] index, where 56%[9] of the revenues originated from the US. A concrete example can be found in the largest member of the MSCI Europe Industrials Index: Siemens AG reported that exports accounted for 62% of its overall revenue in 2019.[10]

Contraction marks the final phase of the cycle. It made up 25% of the observations and is the phase that suffered the most acute negative returns overall. As economic growth falters, sectors that are linked with the economic cycle fall out of favour, giving way to countercyclical sectors.

Among all the sectors under consideration, **consumer staples** came out on top (see Figure 3). With a market beta of 0.76, nearly half of the sector is made up of companies in the food, beverage and tobacco industry. They tend to be cash rich and high dividend paying and thus can help attenuate any equity down markets. **Health care and utilities** were also frequent outperformers, as high dividend levels disbursed by the companies in the sector helped them hold up relatively well during recessions.

That said, European health care companies appear tangibly different from their US counterparts. Over the last decade, the equity market beta of European health care companies[11] was 0.90 whereas the beta of US healthcare companies was 0.80. A possible explanation of the difference in the market sensitivity of the sector in these regions may be that US companies have more pricing power than their European counterparts because of the decentralisation in the American health system. As a result, the average American consumer spent 2.3 times more on pharmaceutical products and 2.8 times more on total health care expenditure than the average European consumer.

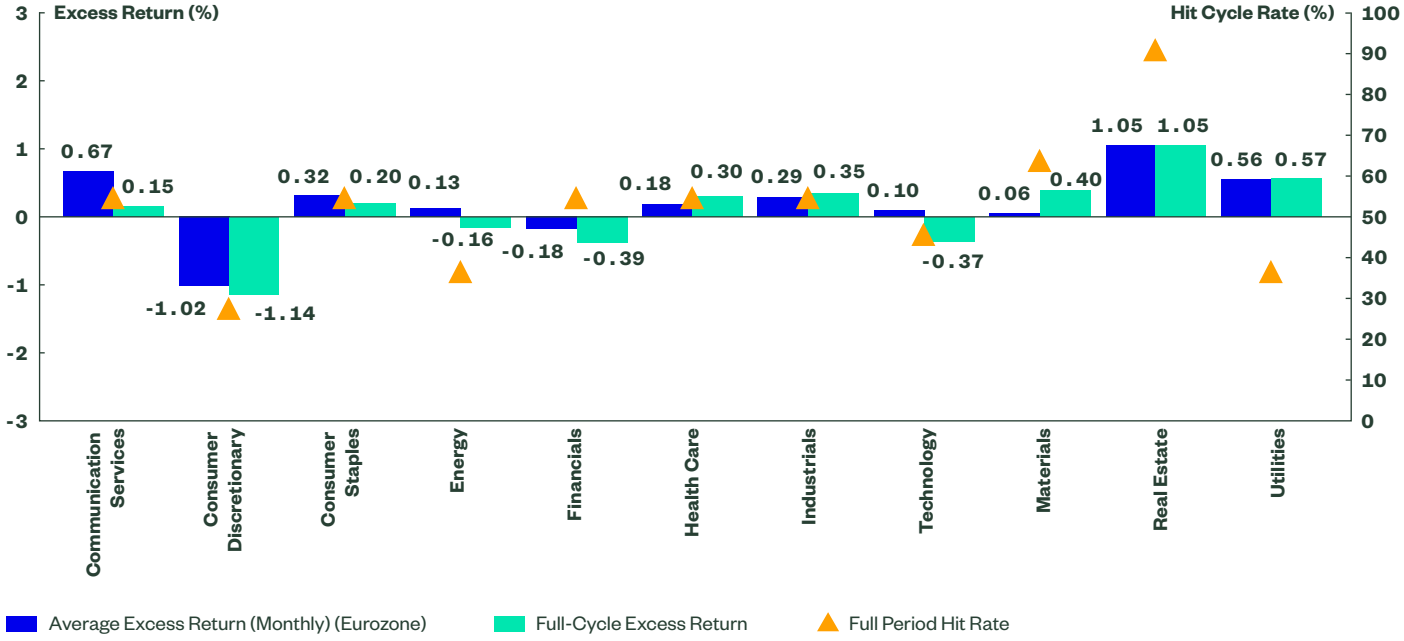
In regard to utilities, the sector in Europe, like in the US, did well during the contraction phase. However, there is a substantial difference between the two regions owing to divergent regulatory frameworks that govern the operation of electric utilities, in particular. This may partially explain why the 10-year market beta of the utilities sector in Europe is 0.90 versus 0.20 in the US.

In the US, electric utilities in each state are heavily regulated by the Public Utilities Commissions; the commissioners are normally elected by popular vote and they are therefore disinclined to raise electricity rates beyond the minimum profitability margin they are statutorily required to do. However, in Europe, there is a comparatively free market for power generation, even though more intervention has been seen in recent years as governments introduced regulation to encourage renewable power generation.

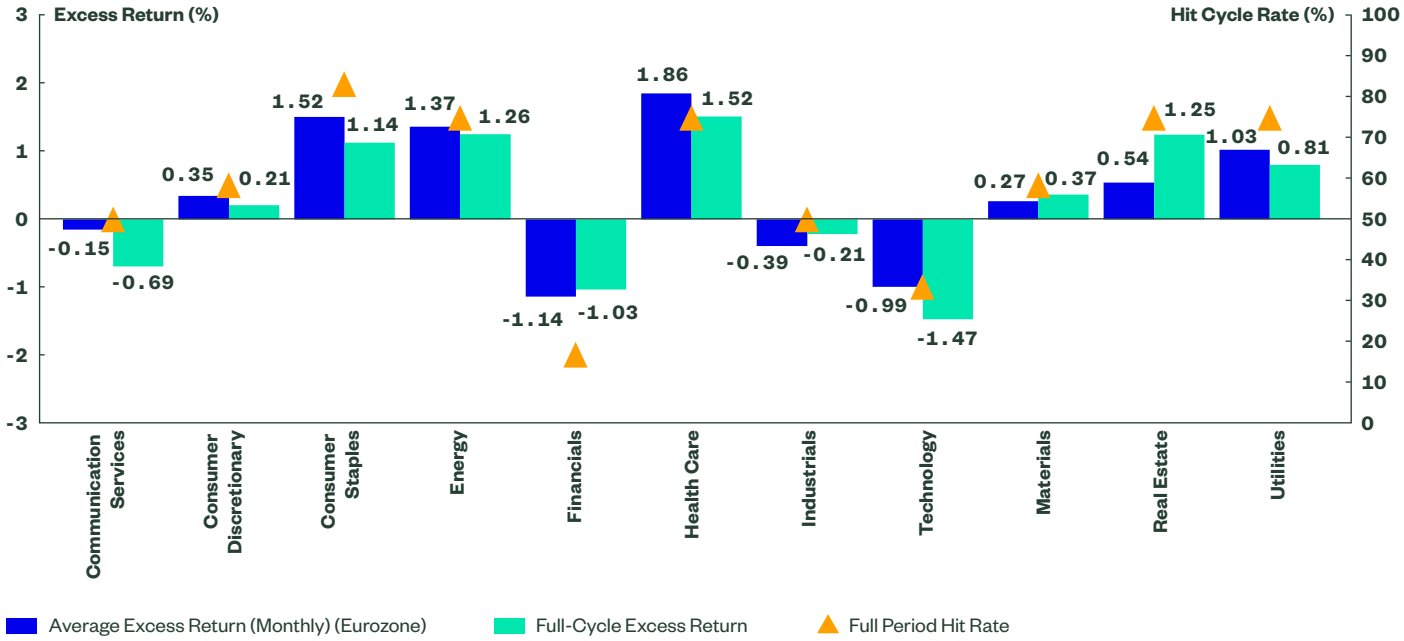
Figure 3

Sector Performance in the Recovery and Contractionary Phases

Sector Performance in Recovery Phase



Sector Performance in the Contractionary Phases



Source: Bloomberg Finance L.P., State Street Global Advisors. Monthly data between January 1999 and October 2019. Please refer to Appendix A1 for all the sources used in the analysis. Sector performance shown are as of the date indicated and are subject to change. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown. It is not known whether the sectors or securities shown will be profitable in the future.

Smart Beta

Our analysis of smart beta strategies spans business cycles from January 1999 compared to its corresponding benchmark.[12] In the **recovery phase**, as the economy begins its turnaround, value in Europe, which is usually expected to outperform at the beginning of the cycle, did not perform consistently well during this phase, especially when compared with the equivalent strategies in the US.

Size Did Well in Slowdown and Low volatility and Quality Dividend in Contraction

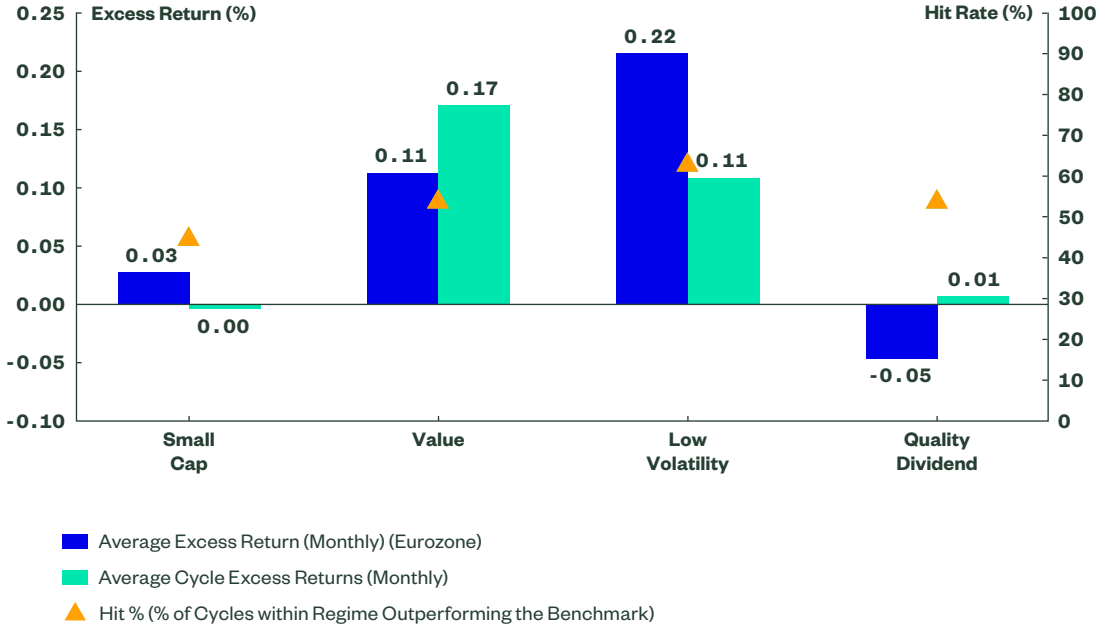
Low volatility attained a robust level of performance during this phase (see Figure 4). Of all the smart beta strategies under analysis, low volatility regularly achieved one of the highest level of average monthly excess return and a healthy period return even as the economy experienced a rebound. For instance, low volatility beat value at the tail end of the Global Financial Crisis as well as the US technology bubble. This contrasts markedly with the US, where value beat all the other smart beta strategies under consideration.

During the **expansionary** phase, **size** delivered a positive excess return on both an average and a full-cycle basis, and with a high hit rate. In this phase, **value**, regardless of the market capitalization, fared well. Some practitioners and academics believe that these factors beat the capitalization-weighted benchmark over the long run because there are risk premia associated with these factors. The risk premia is related to the compensation for high business cycle risk that value and small caps incur. Consequently, these factors can be anticipated to outperform in an environment where economic growth is established. On the contrary, defensive strategies — such as low volatility — trail the benchmark as safe stocks lose their appeal.

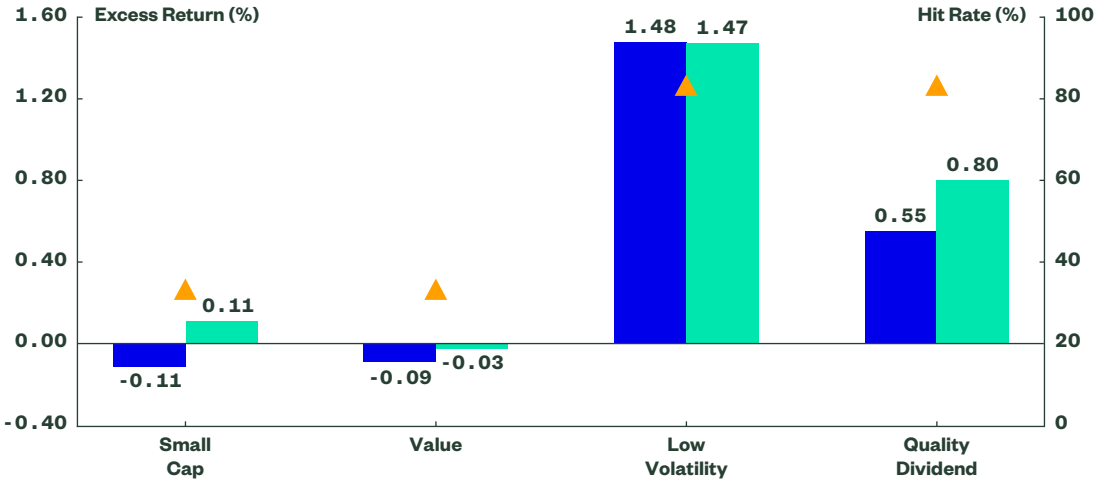
Whereas defensive strategies prevailed during the **slowdown** period in the US, that was not the case in Europe, as **size** achieved the highest level of excess return over the cycle and with a high hit rate.

Finally, in the **contraction** phase, the economy shifts toward a decline of growth and bearish sentiment asserts itself. Defensive strategies, namely **low volatility** and **quality dividends**, led the pack, both in terms of intensity and consistency of outperformance. On the other hand, the cyclical strategies struggled.

Figure 4
Smart Beta Performance in the Recovery and contractionary Phases
Smart Beta Performance in the Recovery Phase



Smart Beta Performance in the Contractionary Phase



Source: Bloomberg Finance L.P., State Street Global Advisors. Monthly data between January 1999 and October 2019. Please refer to Appendix B1 for all the sources used in the analysis.

Smart beta performance shown are as of the date indicated and are subject to change. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown. It is not known whether the sectors or securities shown will be profitable in the future.

Fixed Income

Finally, we examine the performance of bond strategies vis a vis their benchmark[13] across business cycles from December 1998. In the fixed income space, credit-sensitive instruments, including both **investment-grade and high yield corporate bonds, led the pack during the recovery phase,** a period when the recovery starts to revive (see Figure 5). In regards to high-yielding bonds, they typically do well in this phase because bond emissions should usually recover from their lows after the recessionary phase and there are usually fewer incidences of company defaults.

As a consequence, these bonds tend to be more sensitive to the economic outlook and corporate earnings than interest rate. Besides, they often have low duration because they are typically issued either with short maturities or are callable after a short period of time. Their characteristics are more closely akin to equities in many respects, though with diminished volatility. This is because they generate much of their return from income and they will be reimbursed earlier than equities, in the event of issuer debt default, for instance.

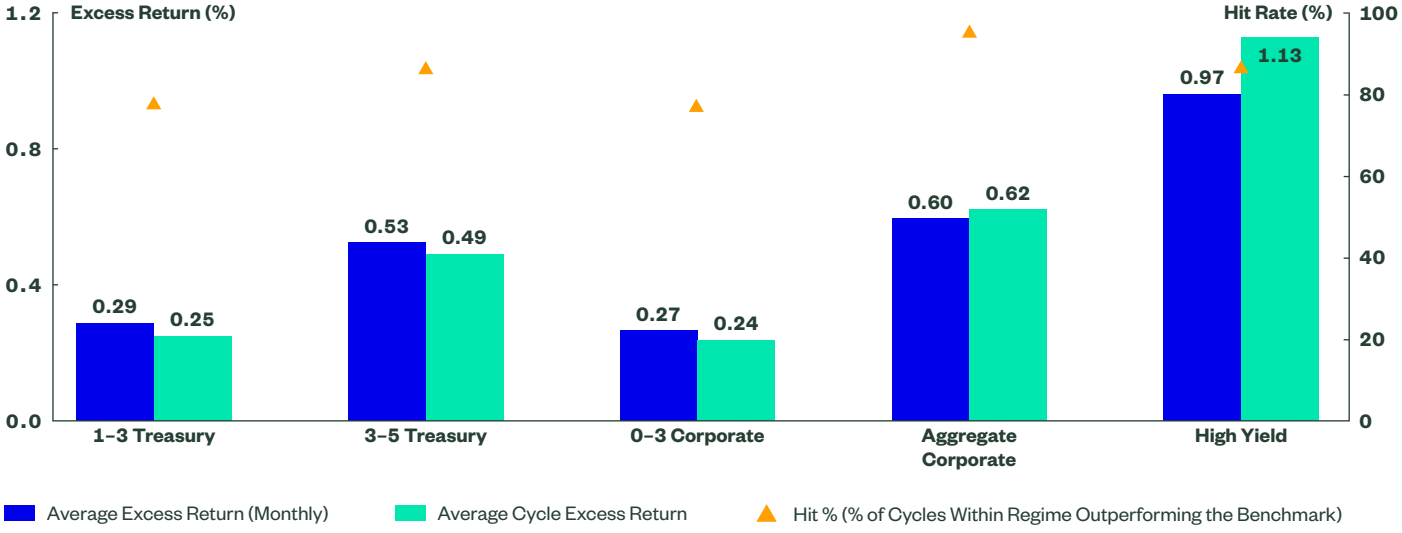
Our analysis shows that the performance of credit instruments, such as **investment grade corporate bonds,** continued to trump other types of fixed income instruments for the same reason, because they are also exposed to credit risk, albeit to a lesser degree.

Both types of **credit-sensitive bonds** and, in particular, **high yield bonds,** continued to eclipse other types of fixed income instruments in **expansionary and slowdown periods.** As the cycle matured, high yield bonds were hit hard, even though they still delivered a positive performance. Less economically sensitive bonds, notably government bonds, continued to perform badly. This contrasts starkly with the **contractionary phase,** when both high yield and investment grade bonds faltered and **government bonds** were the category of bonds that achieved the best return.

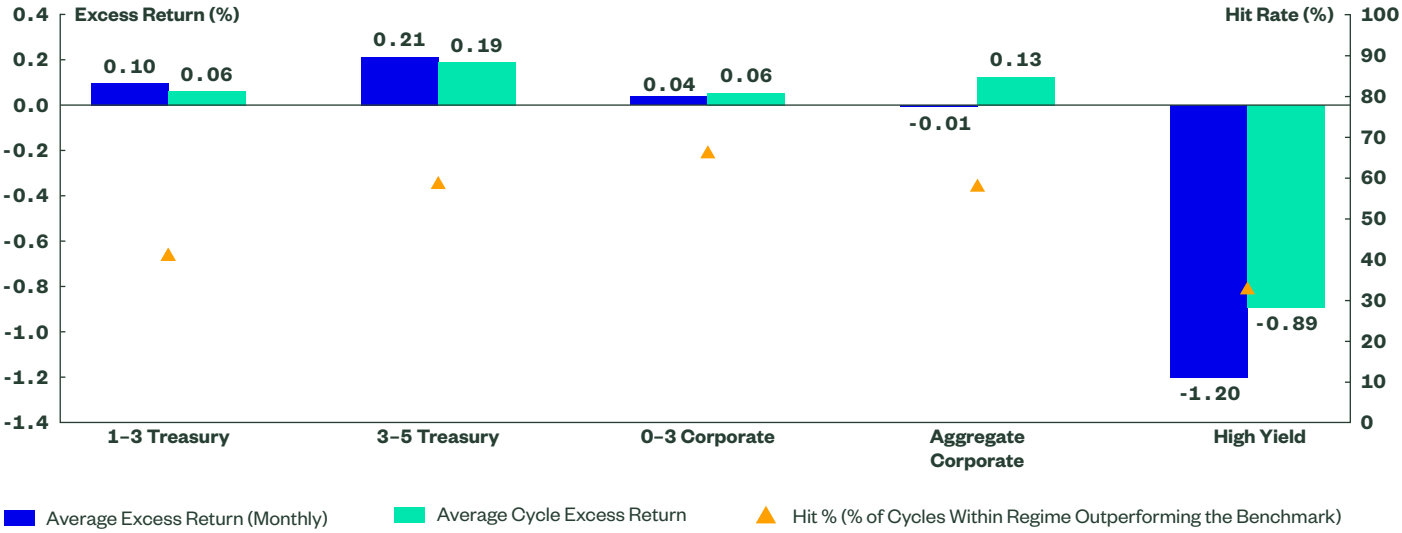
Figure 5

Fixed Income Performance in the Recovery and Contractionary Phases

Fixed Income Performance in the Recovery Phase



Fixed Income Performance in the Contractionary Phase



Source: Bloomberg Finance L.P., State Street Global Advisors. Monthly data between January 1999 and October 2019. Please refer to Appendix C for all the sources used in the analysis.

Fixed income performance shown are as of the date indicated and are subject to change. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown. It is not known whether the sectors or securities shown will be profitable in the future.

Conclusion

The analysis above serves to provide a general guide on how assets behave in different parts of the business cycle. Of course, each business cycle is unique and additional analysis, on the basis of fundamentals, may provide more insights on what assets are likely to outperform in the near term. Additionally, secular industry trends, as well as technological advances, are less influenced by economic cycles and may provide growth opportunities over multiple cycles.

Appendix A1: Eurozone Sectors

Exhibit 1a

Average Monthly Excess Return of Sectors in Different Cycles

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utility (%)
Recovery	0.67	-1.02	0.32	0.13	-0.18	0.18	0.29	0.10	0.06	1.05	0.56
Expansion	-0.91	0.73	-0.64	-0.63	-0.06	-0.98	0.64	0.05	0.53	0.07	-1.15
Slowdown	-0.37	-0.42	-0.60	-0.22	-0.18	-0.52	0.46	0.27	-0.22	-0.49	0.00
Contraction	-0.15	0.35	1.52	1.37	-1.14	1.86	-0.39	-0.99	0.27	0.54	1.03

Green cells represent positive values

Yellow cells represent negative values

Exhibit 1b

Average Full Period Excess Return of Sectors in Different Cycles (Monthly)

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utilities (%)
Recovery	0.15	-1.14	0.20	-0.16	-0.39	0.30	0.35	-0.37	0.40	1.05	0.57
Expansion	-1.77	0.94	-0.98	-1.17	0.21	-1.49	0.76	0.37	0.84	0.07	-1.38
Slowdown	-1.06	0.00	-0.18	-0.32	-0.44	-0.84	0.77	-0.78	0.29	-0.43	0.11
Contraction	-0.69	0.21	1.14	1.26	-1.03	1.52	-0.21	-1.47	0.37	1.25	0.81

Green cells represent positive values

Yellow cells represent negative values

Exhibit 1c

Average Monthly Hit Rate of Sectors in Different Cycles

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utilities (%)
Recovery	54.76	35.71	50.00	54.76	52.38	45.24	57.14	47.62	54.76	64.29	54.76
Expansion	40.26	61.04	41.56	40.26	46.75	35.06	64.94	49.35	57.14	48.05	33.77
Slowdown	42.65	38.24	38.24	50.00	50.00	48.53	63.24	55.88	54.41	44.12	54.41
Contraction	50.79	52.38	61.90	58.73	31.75	58.73	44.44	44.44	53.97	57.14	57.14

White cells represent values less than or equal to 50%

Red cells represent values greater than 50% but less than 60%

Blue cells represent values greater than or equal to 60%

Exhibit 1d

Average Full Period Hit Rate of Sectors in Different Cycles

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utilities (%)
Recovery	54.55	27.27	54.55	36.36	54.55	54.55	54.55	45.45	63.64	90.91	36.36
Expansion	21.43	64.29	14.29	28.57	57.14	21.43	71.43	57.14	64.29	42.86	14.29
Slowdown	30.77	30.77	46.15	38.46	46.15	30.77	92.31	46.15	53.85	38.46	46.15
Contraction	50.00	58.33	83.33	75.00	16.67	75.00	50.00	33.33	58.33	75.00	75.00

Source: Bloomberg Finance L.P., State Street Global Advisors. Monthly data between January 1999 and October 2019. Communication Services is represented by the MSCI EMU Communication Services Gross Return USD Index, Consumer Discretionary is represented by the MSCI EMU Consumer Discretionary Gross Return USD Index, Consumer Staples is represented by the MSCI EMU Consumer Staples Gross Return USD Index, Energy is represented by the MSCI EMU Energy Gross Return USD Index, Financials is represented by the MSCI EMU Financials Gross Return USD Index, Healthcare is represented by the MSCI EMU Health Care Gross Return USD Index, Industrials is represented by the MSCI EMU Industrials Gross Return USD Index, Technology is represented by the MSCI EMU Information Technology Gross Return USD Index, Materials is represented by the MSCI EMU Materials Gross Return USD Index, Real Estate is represented by the MSCI EMU Real Estate Gross Return USD Index, and Utility is represented by the MSCI EMU Utilities Gross Return USD Index. The US dollar indices were converted into EUR at Bloomberg spot USDEUR rates. The benchmark used was the S&P Euro BMI Index (Euros).

White cells represent values less than or equal to 50%

Red cells represent values greater than 50% but less than 60%

Blue cells represent values greater than or equal to 60%

Past performance is not a reliable indicator of future performance.
Sector returns shown are as of the date indicated and are subject to change. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown. It is not known whether the sectors or securities shown will be profitable in the future.

Appendix A2: European Sectors

Exhibit 2a

Average Monthly Excess Return of Sectors in Different Cycles

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utility (%)
Recovery	0.91	-0.73	0.10	-0.01	-0.28	0.08	-0.05	0.18	0.43	-0.29	0.35
Expansion	-0.67	0.69	-0.48	-0.61	0.16	-0.85	0.74	0.21	0.77	0.14	-1.01
Slowdown	-0.32	-0.25	-0.43	0.04	-0.21	-0.61	0.32	0.42	0.00	0.20	0.03
Contraction	-0.63	-0.08	1.73	1.30	-1.15	1.94	-0.60	-1.78	0.25	0.41	1.03

Green cells represent positive values

Yellow cells represent negative values

Exhibit 2b

Average Full Period Excess Return of Sectors in Different Cycles (Monthly)

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utilities (%)
Recovery	0.52	-0.84	0.09	-0.40	-0.39	-0.01	0.05	-0.36	0.54	0.22	0.44
Expansion	-1.36	0.92	-0.72	-1.05	0.45	-1.45	0.95	0.41	1.22	0.26	-1.28
Slowdown	-1.12	0.01	-0.24	-0.04	-0.31	-0.87	0.67	-0.58	0.27	0.06	0.04
Contraction	-0.97	-0.05	1.35	1.17	-1.02	1.56	-0.45	-2.31	0.27	0.94	0.91

Green cells represent positive values

Yellow cells represent negative values

Exhibit 2c

Average Monthly Hit Rate of Sectors in Different Cycles

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utilities (%)
Recovery	57.14	38.10	52.38	54.76	52.38	52.38	52.38	57.14	50.00	50.00	59.52
Expansion	44.16	64.94	42.86	45.45	51.95	38.96	67.53	46.75	50.65	45.45	41.56
Slowdown	50.00	44.12	45.59	51.47	47.06	39.71	61.76	54.41	48.53	45.59	55.88
Contraction	46.03	50.79	69.84	60.32	30.16	68.25	41.27	41.27	53.97	60.32	58.73

White cells represent values less than or equal to 50%

Red cells represent values greater than 50% but less than 60%

Blue cells represent values greater than or equal to 60%

Exhibit 2d

Average Full Period Hit Rate of Sectors in Different Cycles

	Communication Services (%)	Consumer Discretionary (%)	Consumer Staples (%)	Energy (%)	Financials (%)	Health Care (%)	Industrials (%)	Technology (%)	Materials (%)	Real Estate (%)	Utilities (%)
Recovery	72.73	18.18	54.55	36.36	63.64	54.55	63.64	45.45	63.64	72.73	45.45
Expansion	21.43	71.43	21.43	35.71	50.00	28.57	100.00	71.43	78.57	46.15	21.43
Slowdown	30.77	38.46	46.15	46.15	46.15	38.46	76.92	61.54	53.85	58.33	53.85
Contraction	50.00	41.67	91.67	75.00	16.67	91.67	41.67	33.33	54.55	75.00	83.33

Source: Bloomberg Bloomberg Finance L.P., State Street Global Advisors. Monthly data between January 1999 and October 2019. Communication Services is represented by the MSCI Europe Communication Services Gross Return EUR Index, Consumer Discretionary is represented by the MSCI Europe Consumer Discretionary Gross Return EUR Index, Consumer Staples is represented by the MSCI Europe Consumer Staples Gross Return EUR Index, Energy is represented by the MSCI Europe Energy Gross Return USD Index, Financials is represented by the MSCI Europe Financials Gross Return EUR Index, Healthcare is represented by the MSCI Europe Health Care Gross Return EUR Index, Industrials is represented by the MSCI Europe Industrials Gross Return EUR Index, Technology is represented by the MSCI Europe Information Technology Gross Return EUR Index, Materials is represented by the MSCI Europe Materials Gross Return USD Index, Real Estate is represented by the MSCI Europe Real Estate Gross Return USD Index, and Utility is represented by the MSCI Europe Utilities Gross Return EUR Index. All US Dollar indices were converted into EUR using the Bloomberg spot USDEUR rates. The benchmark used was the S&P Europe BMI Index (Euros).

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Past performance is not a reliable indicator of future performance.
Sector returns shown are as of the date indicated and are subject to change. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown. It is not known whether the sectors or securities shown will be profitable in the future.

Appendix B1: Eurozone Smart Beta

Exhibit 3a

Average Monthly Excess Return of Smart Beta in Different Cycles

	Small Cap (%)	Value (%)	Low Volatility (%)	Quality Dividend (%)
Recovery	0.03	0.11	0.22	-0.05
Expansion	0.52	0.46	-0.19	0.15
Slowdown	0.35	0.41	0.47	-0.24
Contraction	-0.11	-0.09	1.48	0.55

Green cells represent positive values

Yellow cells represent negative values

Exhibit 3b

Average Full Period Excess Return of Smart Beta in Different Cycles (Monthly)

	Small Cap (%)	Value (%)	Low Volatility (%)	Quality Dividend (%)
Recovery	0.00	0.17	0.11	0.01
Expansion	0.72	0.53	-0.47	0.06
Slowdown	0.60	0.37	0.32	0.00
Contraction	0.11	-0.03	1.47	0.80

Green cells represent positive values

Yellow cells represent negative values

Exhibit 3c

Average Monthly Hit Rate of Smart Beta in Different Cycles

	Small Cap (%)	Value (%)	Low Volatility (%)	Quality Dividend (%)
Recovery	35.71	45.24	54.76	47.62
Expansion	67.53	62.34	44.16	51.95
Slowdown	60.29	58.82	45.59	42.65
Contraction	47.62	46.03	68.25	57.14

White cells represent values less than or equal to 50%

Red cells represent values greater than 50% but less than 60%

Blue cells represent values greater than or equal to 60%

Exhibit 3d

Average Full Period Hit Rate of Smart Beta in Different Cycles

	Small Cap (%)	Value (%)	Low Volatility (%)	Quality Dividend (%)
Recovery	45.45	54.55	63.64	54.55
Expansion	92.86	78.57	50.00	64.29
Slowdown	76.92	76.92	61.54	46.15
Contraction	33.33	33.33	83.33	83.33

Source: Bloomberg, State Street Global Advisors. Monthly data between January 1999 to October 2019, with the exception of Quality Dividend, Small Cap and Low Volatility. Monthly Data between January 1999 to June 2006 for "Quality Dividend". Small cap is represented by the MSCI EMU Small Cap Gross Return USD Index converted into EUR using Bloomberg spot USDEUR rates, Value is represented by the MSCI EMU Enhanced Value EUR Index, Low Volatility is represented by a back-test that consists of selecting the least volatile 100 stocks rebalanced on a quarterly basis until March 2001 and thereafter by the Euro STOXX Low Risk 100 Index in EUR and Quality dividend is represented by the MSCI EMU High Dividend Yield Index prior to June 2006 and S&P Euro High Yield Dividend Aristocrats index since 2006. The benchmark used was the S&P Euro BMI Index (Euros).
Past performance is not a reliable indicator of future performance.

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Blue cells represent values greater than or equal to 60%

Appendix B2: European Smart Beta

Exhibit 4a

Average Monthly Excess Return of Smart Beta in Different Cycles

	Small Cap (%)	Small cap Value (%)	Value (%)	Low Volatility (%)	High Dividend (%)
Recovery	-0.01	0.17	0.25	0.20	0.16
Expansion	0.81	1.00	0.35	-0.05	-0.10
Slowdown	0.53	0.47	0.04	0.67	-0.19
Contraction	-0.40	-0.64	0.00	1.45	0.48

Green cells represent positive values

Yellow cells represent negative values

Exhibit 4b

Average Full Period Excess Return of Smart Beta in Different Cycles (Monthly)

	Small Cap (%)	Small cap Value (%)	Value (%)	Low Volatility (%)	High Dividend (%)
Recovery	0.10	0.24	0.21	0.14	0.24
Expansion	1.10	1.46	0.36	-0.41	-0.38
Slowdown	0.76	0.81	0.08	0.45	-0.15
Contraction	-0.15	-0.35	0.10	1.37	0.68

Green cells represent positive values

Yellow cells represent negative values

Exhibit 4c

Average Monthly Hit Rate of Smart Beta in Different Cycles

	Small Cap (%)	Small cap Value (%)	Value (%)	Low Volatility (%)	High Dividend (%)
Recovery	45.24	52.38	52.38	59.52	57.14
Expansion	71.43	68.83	58.44	49.35	44.16
Slowdown	66.18	58.82	58.82	54.41	48.53
Contraction	41.27	33.33	47.62	71.43	63.49

White cells represent values less than or equal to 50%

Red cells represent values greater than 50% but less than 60%

Blue cells represent values greater than or equal to 60%

Exhibit 4d

Average Full Period Hit Rate of Smart Beta in Different Cycles

	Small Cap (%)	Small cap Value (%)	Value (%)	Low Volatility (%)	High Dividend (%)
Recovery	45.45	72.73	72.73	63.64	63.64
Expansion	92.86	71.43	57.14	57.14	35.71
Slowdown	76.92	76.92	69.23	53.85	38.46
Contraction	41.67	33.33	33.33	91.67	83.33

Source: Bloomberg, State Street Global Advisors. Monthly data between January 1999 to October 2019, with the exception of Small caps and Low Volatility. Small cap was represented by the S&P Europe Small Cap Index from January 1999 to December 2000 and thereafter the MSCI Europe Small Cap Index. Low Volatility is represented by a back-test that consists of selecting the least volatile 100 stocks rebalanced on a quarterly basis until March 2001 and thereafter by the STOXX Europe 100 Risk Weighted 100 Index and Quality dividend was represented by the MSCI Europe High Dividend Yield Gross Return EUR Index. The benchmark used was the S&P Europe BMI Index (Euros).
Past performance is not a reliable indicator of future performance.

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Appendix C: Fixed Income

Exhibit 5a

Average Monthly Excess Return of Fixed Income in Different Cycles

	1–3 Treasury (%)	3–5 Treasury (%)	0–3 Corporate (%)	Aggregate Corporate (%)	High Yield (%)
Recovery	0.29	0.53	0.27	0.60	0.97
Expansion	0.01	0.03	0.12	0.26	0.90
Slowdown	-0.02	0.01	0.05	0.11	0.60
Contraction	0.10	0.21	0.04	-0.01	-1.20

Green cells represent positive values

Yellow cells represent negative values

Exhibit 5b

Average Full Period Excess Return of Fixed Income in Different Cycles (Monthly)

	1–3 Treasury (%)	3–5 Treasury (%)	0–3 Corporate (%)	Aggregate Corporate (%)	High Yield (%)
Recovery	0.25	0.49	0.24	0.62	1.13
Expansion	0.05	0.07	0.20	0.38	1.27
Slowdown	-0.08	-0.10	0.05	0.10	0.63
Contraction	0.06	0.19	0.06	0.13	-0.89

Green cells represent positive values

Yellow cells represent negative values

Exhibit 5C

Average Monthly Hit Rate of Fixed Income in Different Cycles

	1–3 Treasury (%)	3–5 Treasury (%)	0–3 Corporate (%)	Aggregate Corporate (%)	High Yield (%)
Recovery	78.57	80.95	76.19	78.57	66.67
Expansion	54.55	53.25	61.04	57.14	71.05
Slowdown	45.59	51.47	52.94	50.00	76.47
Contraction	52.38	57.14	49.21	50.79	36.51

White cells represent values less than or equal to 50%

Red cells represent values greater than 50% but less than 60%

Blue cells represent values greater than or equal to 60%

Exhibit 5d

Average Full Period Hit Rate of Fixed Income in Different Cycles

	1–3 Treasury (%)	3–5 Treasury (%)	0–3 Corporate (%)	Aggregate Corporate (%)	High Yield (%)
Recovery	81.82	90.91	81.82	100.00	90.91
Expansion	50.00	64.29	57.14	64.29	92.86
Slowdown	46.15	30.77	61.54	53.85	76.92
Contraction	41.67	58.33	66.67	58.33	33.33

Source: Bloomberg Finance L.P., State Street Global Advisors. Monthly data between January 1999 and October 2019. 1–3 Treasury was represented by Bloomberg Barclays Euro-Aggregate Treasury 1–3 Year TR Index Value Unhedged EUR, 3–5 Treasury was represented by Bloomberg Barclays Euro-Aggregate Treasury 3–5 Year TR Index Value Unhedged, 0–3 Corporate was represented by ICE BAML 1–3 Year Euro Corporate Index prior to December 2006 and thereafter, it was represented by the Bloomberg Barclays EUR Corporate 0–3 Year Total Return Index Value Unhedged EUR. Aggregate Corporate was represented by Bloomberg Barclays Euro Aggregate Corporate Total Return Index Value Unhedged EU, High Yield was represented by the by Bloomberg Barclays Pan European High Yield Index between February 1999 to August 2004 and thereafter by the Bloomberg Barclays Liquidity Screened Euro High Yield Index TR. The fixed income benchmark used was Fama French 1M Treasury.
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About SPDR ETF Portfolio Solutions

The SPDR ETF Portfolio Solutions team provides in-depth portfolio analytics to assist clients with their asset allocation, portfolio construction, and risk management.

Endnotes

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