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Factor Analysis/Smart Beta

FTSE Russell

Do factors carry information about the economic cycle?

Part 2: New thinking: Rebooting the Investment Clock for the new normal and QE regime

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AUTHOR

Marlies van Boven, PhD
Head of Investment Research, EMEA
+44 20 7866 1853
marlies.vanboven@lseg.com

Overview

Institutional investors often pose the question of how factors perform across economic cycles. The concept of a normalized cycle has come under pressure in the post-Global Financial Crisis (GFC) era that has seen sustained quantitative easing (QE), financial repression and lower trend growth. Consequently, this has necessitated a reappraisal of the traditional Investment Clock. In this paper, we focus on the new thinking, rebooting the Investment Clock to link factor behavior to secular regime shifts in the US market.

- The Investment Clock's analysis [1] is predicated on the notion of a discernible economic or business cycle whose existence is questionable post GFC due to quantitative easing.
- An evolution of the Investment Clock is to observe a pattern of secular regime shifts.
- We find that regimes have a significant impact on factor payoffs, driven by the level and volatility of economic indicators.
- Since the GFC, below trend growth and inflation have oscillated in an all-time narrow range and have proven to be a difficult environment for broad-based factor performance.
- If the past is any indication of the future a more favorable environment for diversified factor investing is trend economic growth and target inflation.

Contents

Introduction

The behavior of factors across the economic cycle has been well documented in the literature [2 to 5]. In Part one of this series, “The Investment Clock: linking factor behavior to the economic cycle” [1], we apply the Investment Clock framework to link factor behavior to the economic cycle. The traditional Investment Clock’s analysis is predicated on the notion of a discernible economic or business cycle. However, quantitative easing and 12 years of economic stagnation have led to the end of a clear business cycle.

The new thinking focuses on regimes and how factors respond to secular regime shifts. The volatility of the business cycle has been in a downward trend since the high inflation seventies, but the global financial crisis (GFC) and quantitative easing (QE) have pushed the economic indicators well below trend, oscillating in an all-time narrow range for a prolonged period.

We show that factors respond to identifiable regime shift between 1970 and 2020: the high inflation of the 1970s, the Great Moderation, Goldilocks, GFC followed by a prolonged period of QE, the period of “Normalization”, and the recent event Covid-19.

We delve deeper for an answer to the important question of how quantitative easing has impacted factor performance. We provide a framework, by identifying three economic volatility regime shifts since the 1970s that can provide guidance to factor allocation strategies. The main conclusion is that the current ultra-low interest rates, and a regime with the market delivering the highest risk-adjusted returns, have proven to be a challenging environment for factor strategies. If the past is any indication of the future, moving towards a more moderate regime with trend economic growth and target inflation could be a more favorable environment for diversified factor strategies.

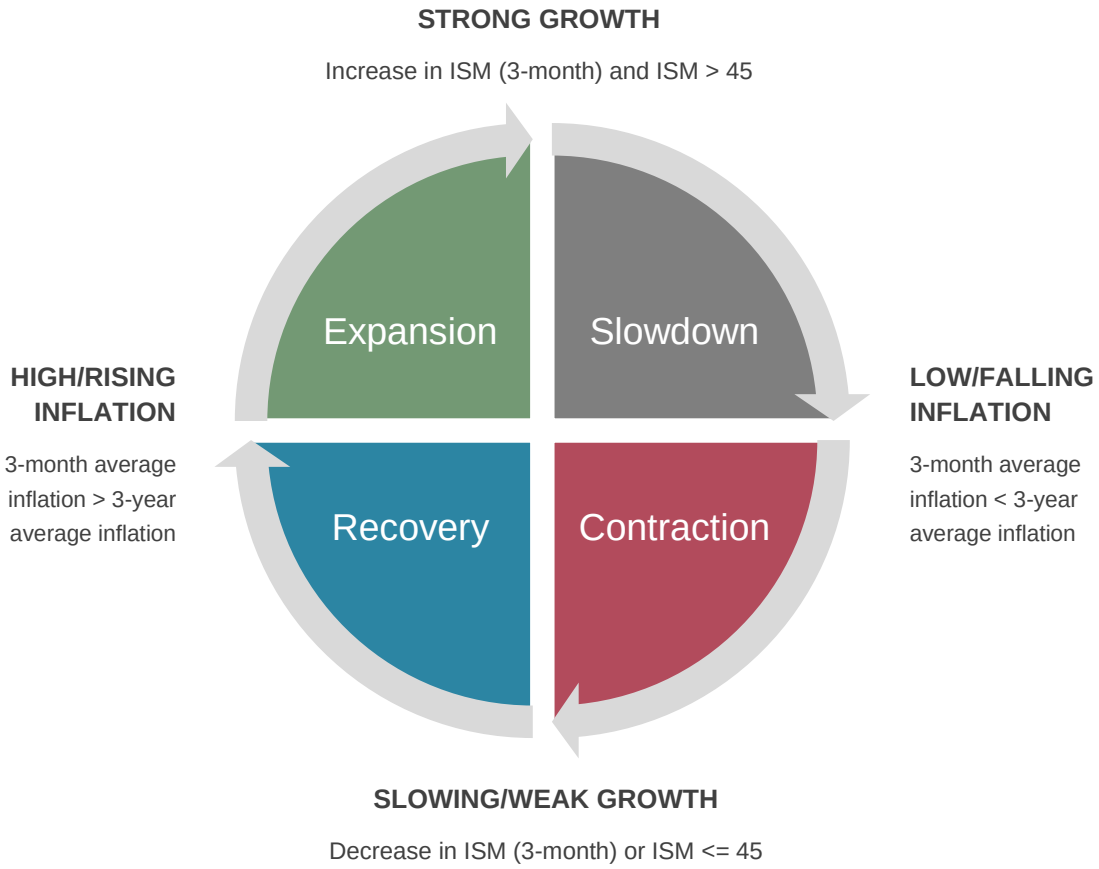
The paper is organized as follows: In Section 1, we link the profitability of factor strategies to secular regimes. In Section 2, we examine the impact of quantitative easing, comparing factor behavior across three economic volatility regimes. Section 3 summarizes the results and concludes.

1. New thinking: Rebooting the Investment Clock for the new normal and QE regime

The Investment Clock's analysis, discussed in Part 1 [1] and shown in Figure 1, is based on the assumption of a discernible economic or business cycle. The concept of a normalized cycle is questionable, especially post GFC, due to massive QE. An evolution of the Investment Clock is to observe a pattern of secular regime shifts.

In this section, we identify the regimes and try to understand if we observe persistent factor behavior across secular regimes. This will also help us understand why factors have not done well, relative to history, since the GFC. In the next section, we have a closer look at the impact of quantitative easing on factor performance and answer the important question of what is different since the GFC.

Figure 1. The traditional Investment Clock: definition of the economic cycles



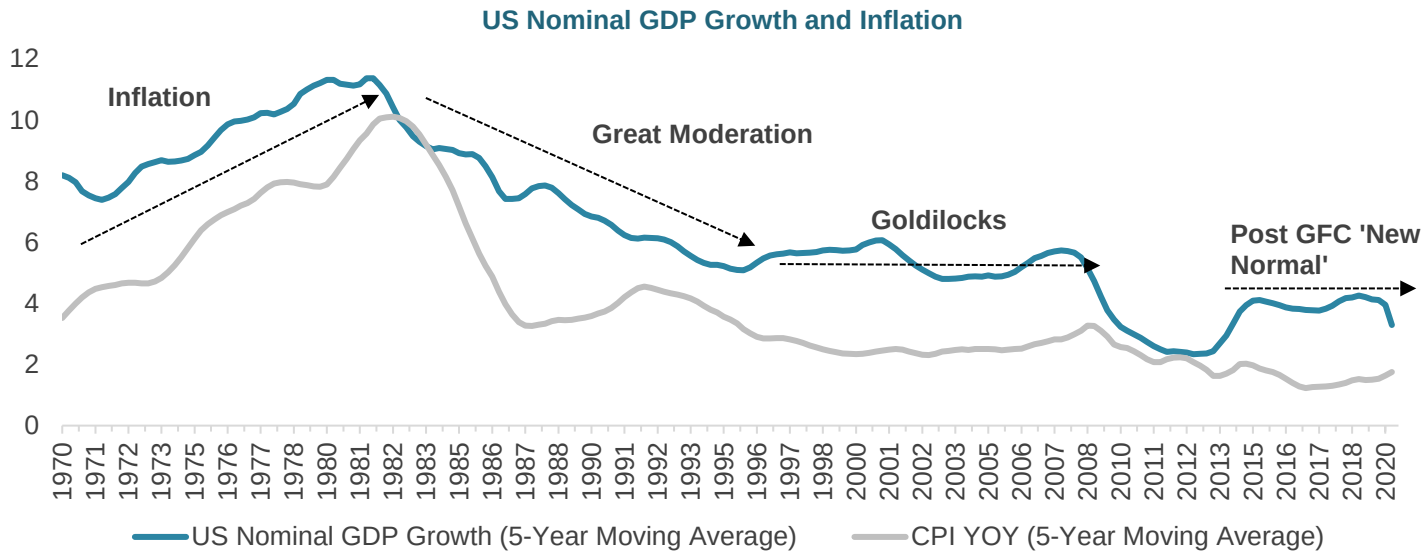
Note: The theoretical phases of the Investment Clock based on changes in Inflation (CPI) and Growth (ISM) expectations. Its underlying principle is that the economy follows periods of expansion, overheating, cooling off and contraction with inflation picking up and then falling away when growth slows.

The Investment Clock was born out of the 1950-1980 period, with its pronounced economic cycles. The notion of the economic cycle has changed radically since then. This is clear looking at the trend in US nominal GDP and inflation in Figure 2. The high inflation of the 1970s and the early 1980s recession were marked by large movements in GDP and inflation. The Great Moderation signified a period of moderate growth with controlled inflation, resulting in a significant drop in volatility of the cycle, further continued during Goldilocks. The GFC led to massive quantitative easing and ultra-low interest rates, with GDP and inflation remaining below trend and oscillating in a narrow range. How have factors responded to these regime shifts?

In the remainder of this section, we discuss the behavior of factors for each secular regime, including during large market shocks taking place within a particular regime. The summary results can be found in Table 1. We will discuss the results against the backdrop of the historical values of the Investment Clock's market cycles. Please refer to Part 1 [1] of this series for a more detailed discussion of the Investment Clock.

In the final section, we delve deeper into the longer-term volatility changes of the regimes and discuss the macro conditions that have been supportive of factor investing.

Figure 2: Secular regime shifts between 1970 and June 2020



Source: Refinitiv.

Table 1. Summary factor performance and economic indicators across regimes

Regimes	Dates	Market	Size	Value	Quality	Momentum	ISM	CPI	Real GDP	Nominal GDP
70's High Inflation	1974 to 1979	3.1%	11.7%	11.9%	-1.8%	7.8%	54	8.5	2.6%	10.7%
80's recession	1980 to 1982	4.3%	6.7%	3.2%	6.7%	17.2%	43	10.0	2.3%	8.4%
Great Moderation	1983 to 1995	8.4%	-1.8%	4.3%	6.3%	9.6%	53	3.6	3.4%	6.6%
Goldilocks	1996 to 2005	6.8%	3.7%	3.8%	6.5%	10.9%	55	2.5	3.3%	5.5%
TMT Bubble burst	03/2000 to 2002	-17.9%	4.9%	22.1%	26.9%	9.4%	48	2.6	1.8%	4.2%
GFC and QE	2008 to 2014	8.2%	3.0%	3.5%	4.4%	-3.1%	52	1.9	1.6%	2.8%
GFC	2008	-46.0%	-1.0%	-10.7%	33.3%	12.7%	46	3.8	-2.8%	1.8%
QE Risk Relief Rally	2009	30.0%	17.0%	37.6%	-13.7%	-65.4%	47	-0.3	2.5%	-1.8%
QE	2010 to 2014	14.7%	1.1%	-0.5%	2.2%	6.2%	54	2.0	2.3%	3.9%
Post GFC "New Normal"	2015 to 2019	8.5%	-1.6%	-8.4%	5.5%	5.7%	53	1.5	0.2%	3.4%
Covid-19	2020	-2.7%	1.9%	-37.9%	-3.5%	6.8%	48	1.3	-18%	-3.3%
Covid-19 Outbreak	Q1 2020	-30.7%	-13.5%	-34.7%	6.5%	19.4%	50	1.5	-5%	-3.4%
Covid-19 QE	Q2 2020	28.8%	14.8%	9.4%	-8.8%	-14.9%	46	0.7	-31%	-8.6%

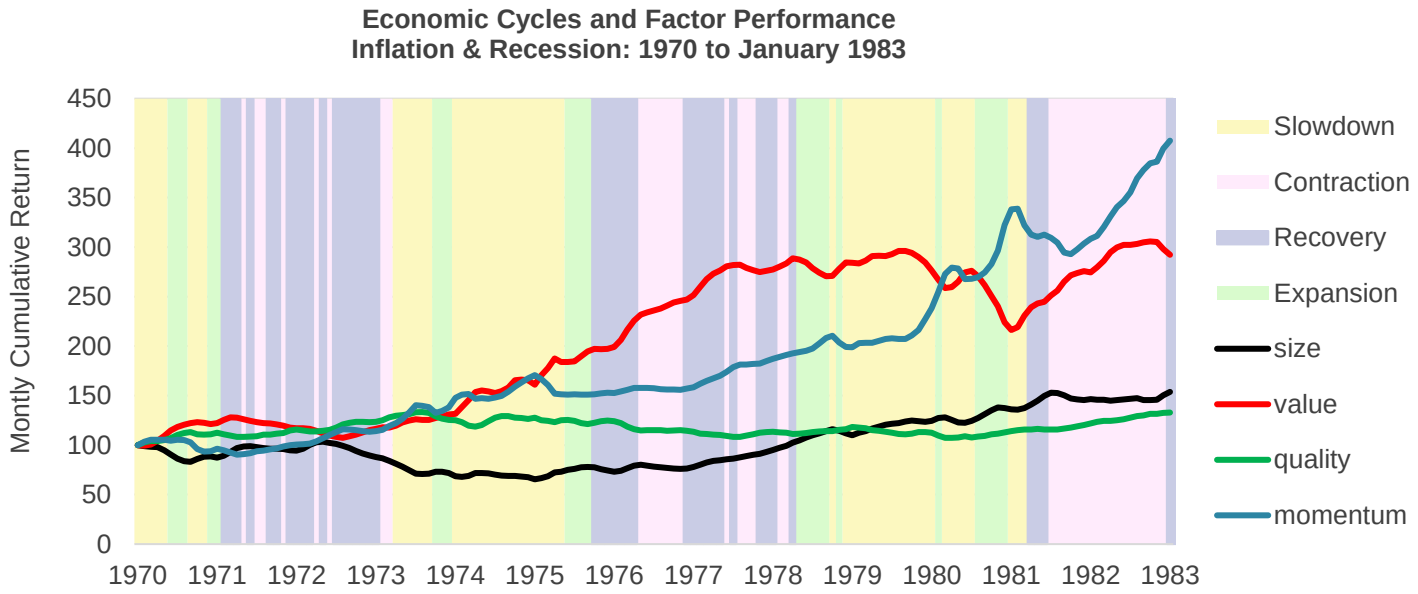
Note: Factors are annualized monthly factor returns. ISM, CPI and GDP are the average over the specified period. Source: AQR, Refinitiv

Regime 1: 1970s' high inflation and early 1980s' recession (1974 to 1982)

The 1970s were marked by double-digit inflation rates. At the root of the problem was the oil crisis and an accommodative monetary policy financing a massive budget deficit. This led to a period of stagflation – low growth with rapidly rising prices. Professor Jeremy Siegel called the period the greatest failure of American macroeconomic policy in the post-war period [6].

Inflation was quite volatile during that period. It first reached double digits in 1974, briefly calmed down around 1976, before reaching an all-time high of 14% in the early 1980s. Under the leadership of Paul Volcker, the central bank reversed its policies, raising interest rates to as high as 20% to get inflation under control, which was the onset of the 1980s recession. The graph below shows the historical economic cycles of the Investment Clock [1] and the cumulative factor returns. It suggests that the 1970s are market by periods of slowdown and recovery, reaching bottom in the 1980s recession period. A market recovery did not start until early 1983.

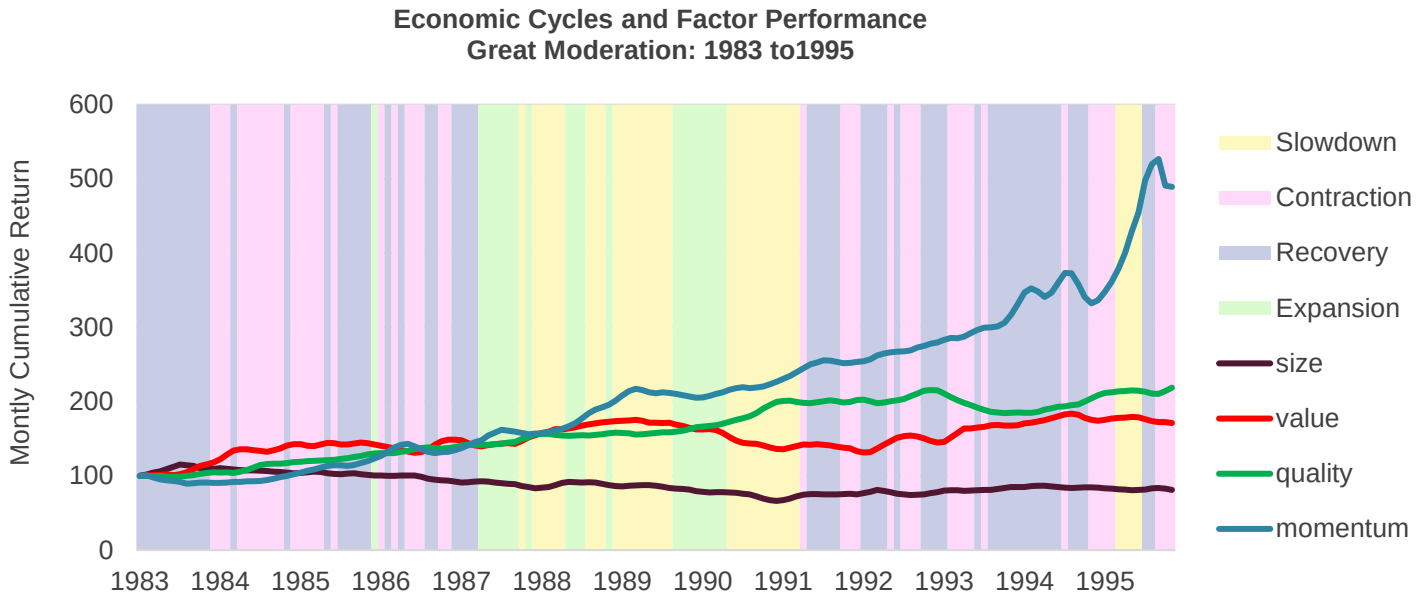
As the market initially fell in the early 1970s, Size had a bad run (-10%), whereas Value (8.1%) and Momentum (11%) were the winning factor strategies. The onset of the recession in 1981 hurt Value (-20%) and benefited the long/short Momentum factor (31%). In 1981, investors still traumatized by the erosion of money in the 1970s, started to buy cheap quality stocks (Value (25%), Quality (7%)). Factor performance during the recession was marked by high and lows, but a buy and hold strategy would have delivered a positive average annualized return across all factors.



Note: Economic cycles are the quarterly observations of the Investment Clock. Factors are the cumulative monthly returns. Source: FTSE Russell.

Regime 2: Great Moderation (1983 to 1995)

Volcker's change in monetary policy lay the foundation for the "The Great Moderation", starting from the mid-1980s and lasting until about 1995. The Great Moderation was characterized by a reduction in volatility of the business cycle, compared to the decades before. Over this period, GDP growth averaged 3.4%, and inflation was under control, averaging about 3.6%. In 1983, there was a period of recovery from the recession, followed by a few years hovering between contraction and recovery. The prosperity of the 1990s shows a largely expansionary period with some slowdowns during the mid to late-1990s. Between 1992 and 1995, Size recovered (2%), Value (7.8%) and Momentum did well (11%), while Quality lost steam (1.5%), as investors started feeling confident about the longevity of this new economic paradigm. Factors over the full period delivered handsome returns, (Value 4.3%, Quality 6.5%, Momentum 9.6%), apart from Size (-1.8%).

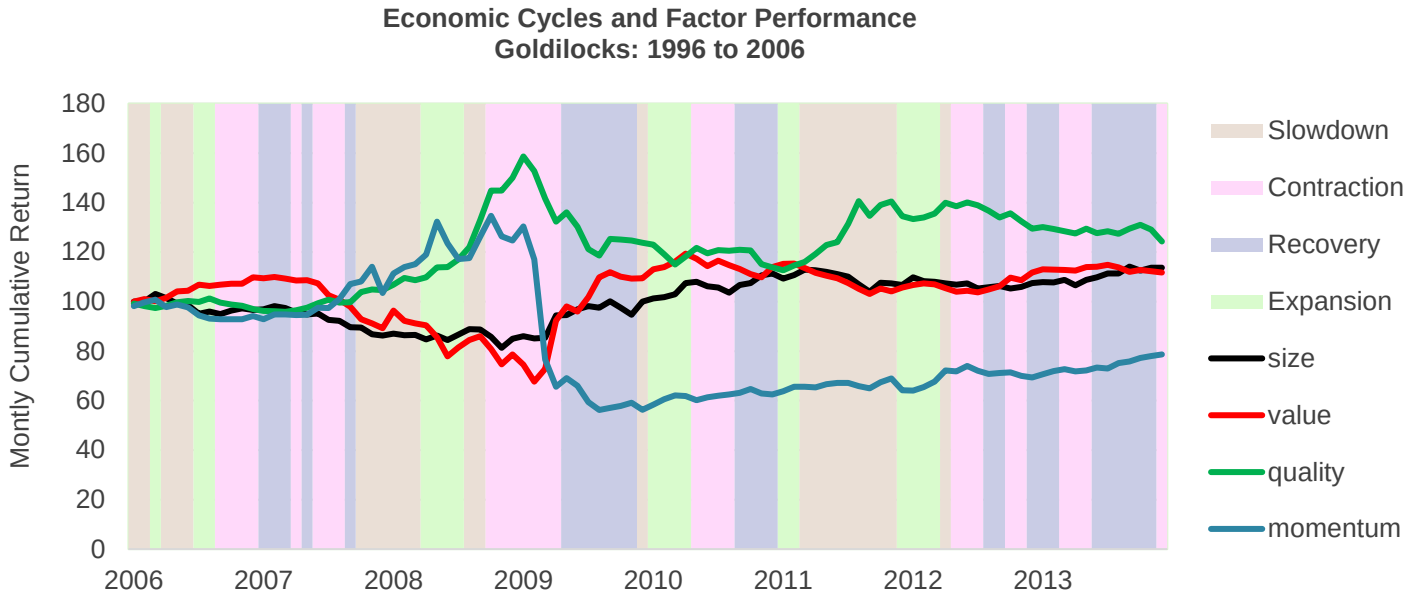


Note: Economic cycles are the quarterly observations of the Investment Clock. Factors are the cumulative monthly returns. Source: FTSE Russell.

The "Great Moderation" was the catalyst for the start of the secular bull market leading to "Goldilocks".

Regime 3: Goldilocks (1996 to 2005)

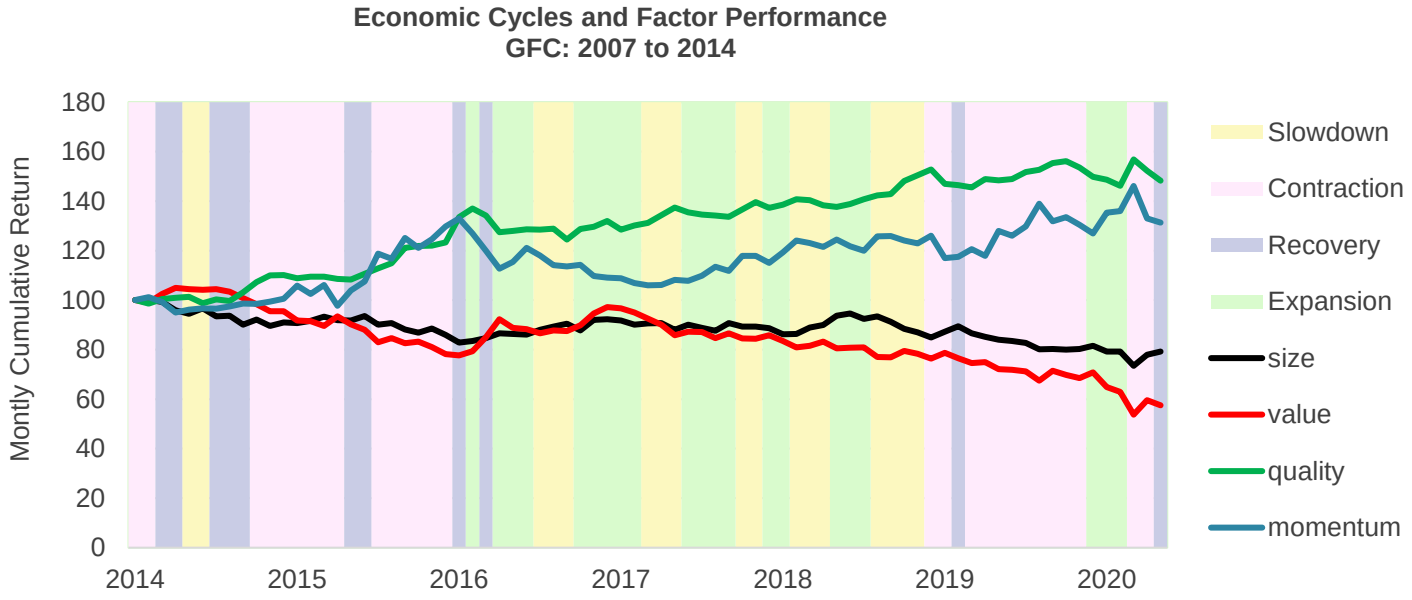
A Goldilocks economy is defined as an economy which is not too hot or too cold, but just right – a period of sustained moderate economic growth with controlled inflation. Alan Greenspan oversaw a period with real GDP growth of around 3.3% and inflation contained at about 2.5%. Gordon Brown, then the UK Chancellor, said the business cycle had been eliminated and we were in a period of NICE (non-inflationary consistent expansion). Alan Greenspan also injected the notion of the "Fed Put". His accommodative stance boosted investor's confidence in the 1990s, and the telecom, media, and technology sectors reached astronomical valuations, pushing value-investing out of favor. The Tech Bubble burst (March 2000) was followed by a slowdown and some contractionary months during the early 2000s. Investors bought the "left-behind" Value and Quality stocks, gaining respectively 22% and 27% annualized between March 2000 and December 2002. A broad recovery phase started in 2003, mixed with some periods of expansion and slowdown. Value and Quality stocks continued to perform well, supported by Momentum which lasted until 2006. Over the full period, factors were well rewarded (Size 3.7%, Value 3.8%, Quality 6.5%, Momentum 10.9%, all annualized).



Note: Economic cycles are the quarterly observations of the Investment Clock. Factors are the cumulative monthly returns. Source: FTSE Russell.

Regime 4: Global Financial Crisis and quantitative easing (2007 to 2014)

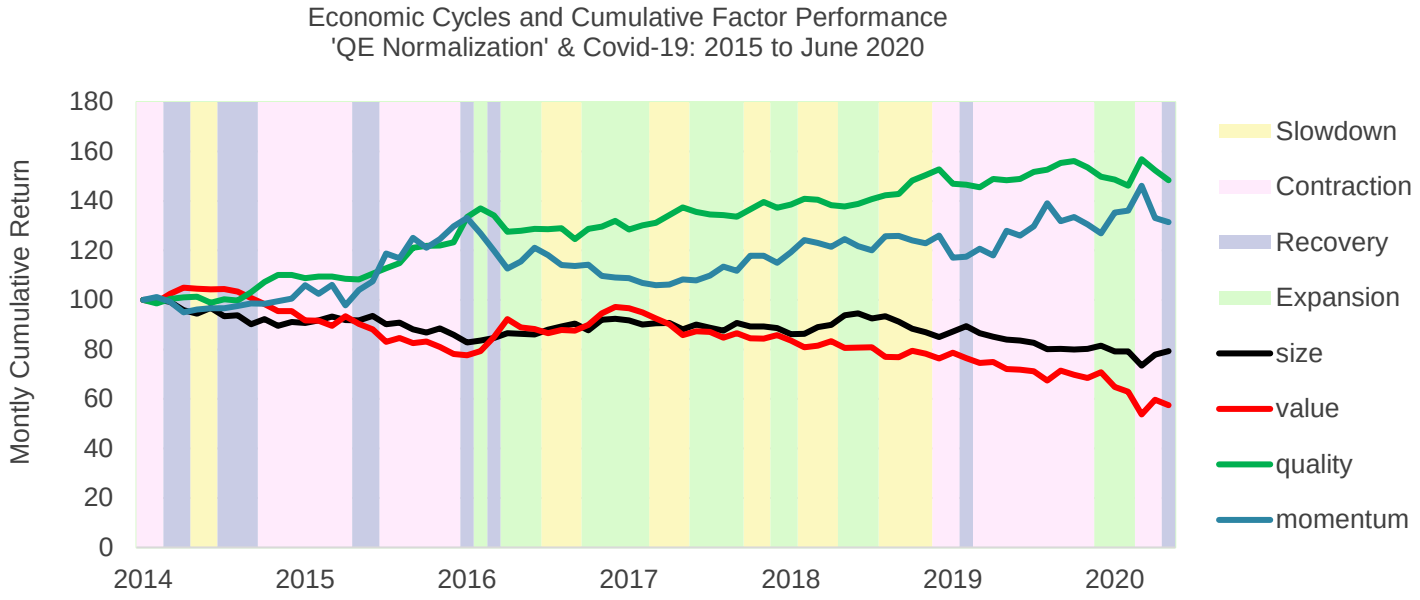
Ben Bernanke, chairman of the Fed from 2006 to 2014, started his tenure worried about inflation risk. He oversaw 17 consecutive rate hikes and a Fed funds rate as high as 5.25% in June 2006, resulting in an inverted yield curve. This was damaging to Value and Size strategies and investors sought the safety of Quality stocks. A period of slowdown begins at the end of 2007, gliding into a contraction in response to the GFC. In 2008, the market almost halved (-46%), as investors shunned cyclical Value stocks (-10.7%) and opted for the safe haven of Quality (33.3%), while Momentum (12.7%) held up. Real GDP fell to -4.1% and inflation hit a low of -0.2%. In response to the first quantitative easing program in 2009, there was a risk relief rally. Investors rotated out of Quality (-13.7%) into Small Cap (17%) Value (38%) strategies. Momentum, being short high beta after the crisis, was caught out (-65%). Further quantitative easing between 2010 and 2014, stimulated the market (+14.7%), while hurting factor performance relative to prior regimes (Size 1.1%, Value -0.5%, Quality 2.2%, Momentum 6.2%).



Note: Economic cycles are the quarterly observations of the Investment Clock. Factors are the cumulative monthly returns. Source: FTSE Russell.

Regime 5: Normalization: unwinding quantitative easing and Covid-19 (2015 to 2020)

Over the past decade, all-time low Fed rates and an expanding balance sheet have stimulated the economy to move between expansion and slowdown, but volatility spikes and market stress have also resulted in periods of contraction and recovery. The chairman of the Fed, Janet Yellen, and then Jerome Powell, set out the task of a gradual unwinding of the Federal Reserve's $4.5 trillion balance sheet that had swelled during the previous decade, as it engaged in QE in response to the GFC. Now that the economy had recovered, with real GDP at 2.49% and inflation at 1.55%, the Fed had planned to shrink it again. Investors became nervous about the unwinding process and continued their preference for high Momentum (5.5%) Quality (6.44%) stocks, shunning Value (-5.4%) and Size (-1.9%). This was also the period US technology stocks (FAANG) took off. An economic expansion started off 2020, but Covid-19 led to the largest contraction since the 1970s. In Q1 2020, the market dropped -30.6% and Value took the market by surprise, falling -37.9%, whereas Quality (6%) and Momentum (6.8%) held course. The Fed moved away from normalization and back to an extremely accommodative monetary policy, with the Fed's balance sheet almost doubling in the second quarter of 2020. This gave rise to a market recovery in June. In Q2 2020, the Market (28.8%), Size (15%) and Value (9%) did well, while Quality (-9%) and Momentum (-15%) lost some ground. Real GDP (-31%) is at an all-time low and inflation has fallen further below the 2% target, to 0.70%.



Note: Economic cycles are the quarterly observations of the Investment Clock. Factors are the cumulative monthly returns. Source FTSE Russell.

To conclude, the Investment Clock's limitation is the assumption of a normalized or constant cycle. We have seen that the notion of the cycle has changed radically over time. The new thinking focuses on regimes. Regimes have a significant impact on factor payoffs, driven by changes in the magnitude and volatility of economic indicators. In the final section, we focus on the impact of quantitative easing on the post-GFC factor performance against the context of previous regimes.

2. Key question: how has quantitative easing impacted factor performance?

Since 2009, markets have been stimulated by the Fed's massive quantitative easing program, which has led to a significant reduction in the volatility of the business cycle. In this section, we examine the period from 1970 to June 2020, and identify three major shifts in the volatility of the economic cycle (Table 2):

1. the High Volatility Regime of the 1970s inflation boom and 1980s recession bust;
2. the Moderate Volatility Regime of the Great Moderation and continued into Goldilocks;
3. the Low Volatility Regime of 12 years of stagnation since the GFC.

We will link factor performance to these economic volatility regimes and document distinctive behavior as a guide to future expectations. Then, we will discuss the levels and volatility of real GDP growth and inflation rates, to establish the framework. This will be followed with a discussion of the performance and risk characteristics of factors across the economic volatility regimes.

Table 2: Economic cycle volatility and long-term regimes

Dates	Economic Cycle Volatility	Regimes Covered
1970-1982	High	High Inflation & Recession
1983-2005	Moderate	Great Moderation and Goldilocks
2010-2020	Low	QE and New Normal

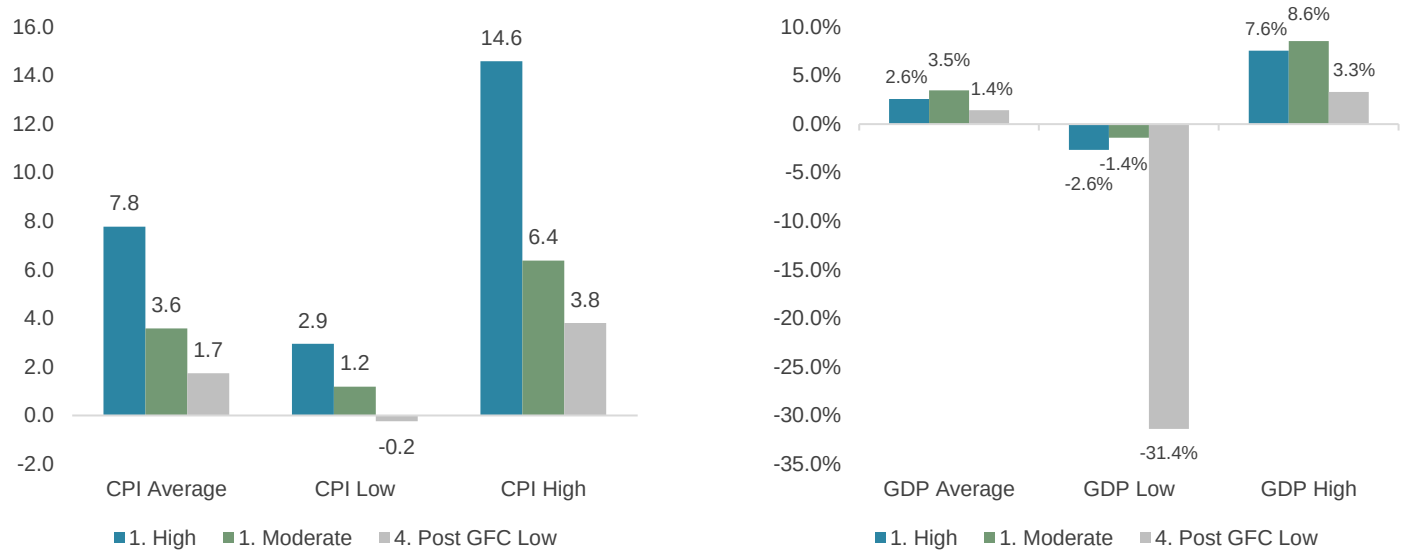
1. Economic Volatility Regimes and Economic Indicators

To establish the distinctive nature of the economic volatility regimes, we first examine the level and volatility of inflation and real GDP (Figure 3). Inflation reached an all-time high (14.6%) in the 1970s and an all time-low (-0.2%) post-GFC (till June 2020). The general trend across regimes is downward: inflation averaged 7.8% during the High Volatility Regime, 3.6% in the Moderate period and has fallen to 1.7% during the Low Volatility Regime, post-GFC period. Despite massive economic stimulus, inflation has remained below its 2% target since 2009.

During the High phase, GDP recovered to an average of 2.6%, but was quite volatile, ranging between -2.6% and 7.6%. The Moderate phase was marked by a healthy economic growth of around 3.5%. Real GDP growth hit an all-time low (-31.4%) in response to Covid-19, reducing real GDP growth post-GFC to a 1.4% low.

It is clear both the level and volatility of the economic indicators have substantially narrowed since the GFC. The impact of QE has led to a significant reduction in the volatility of the business cycle, with one big outlier due to Covid-19.

Figure 3. Economic growth and inflation across volatility regimes



Note: CPI is quarterly YOY change, GDP is quarterly YoY change in Real GDP. Source: Refinitiv.

2. Economic Volatility Regime: Factor Performance

We discussed earlier how QE has stimulated the market despite below trend economic growth and inflation expectations. Table 3 shows a steady upward trend in the annualized market return: 2.1% in the High to 11.5% in the Low regime. Even on a risk-adjusted basis, the market return post-GFC is superior. How has this impacted factor returns on an absolute and risk-adjusted basis? Size has not performed since the High period. Value's best performance was during the High (8.7%), followed by the Moderate phase (4.3%), but lost money post GFC (-4.6%). The results are confirmed on a risk-adjusted basis. Even though Quality and Momentum had a good run post-GFC, on a risk-adjusted basis, the Moderate Volatility Regime was superior. The equally weighted portfolio is a weighted average of the four factors. It is noticeable how the annualized return and risk-adjusted returns have diminished over time. In the Low phase, diversification across factors delivered a mere 1.2% per annum, leading to a low 0.13 on a risk-adjusted return basis. This is the only period where only two out of four factors delivered on a buy-and-hold basis.

Table 3. Factor absolute and risk-adjusted returns: High, Moderate, Low Volatility regimes

Factors	Average Annualized Return			Risk-Adjusted Return		
	HIGH	MODERATE	LOW	HIGH	MODERATE	LOW
Market	2.1%	8.6%	11.5%	0.1	0.6	0.8
Size	3.9%	-1.6%	-0.3%	0.3	-0.2	0.0
Value	8.7%	4.3%	-4.6%	0.7	0.5	-0.4
Quality	2.1%	6.0%	4.0%	0.3	1.1	0.5
Momentum	11.0%	9.4%	5.9%	0.8	1.0	0.5
EW 4 Factors	6.4%	4.6%	1.2%	0.55	0.60	0.13

Note: Annualized monthly factor returns across volatility regimes. Risk-adjusted returns equal annualized returns divided by annualized standard deviation. The EW 4-factor portfolio, equally weights Size, Value, Quality and Momentum. Source: AQR.

The AQR factor strategies are long/short and their market sensitivity will be much lower than for long only strategies. However, we may gain some insights about their directional performance, combining the standard beta with how well the strategies perform in up and down markets (Table 4). Up (Down) Capture ratios show the ratio of portfolio returns to market returns when the market performance is positive (negative). The capture difference is the up minus the down capture ratio, measuring the asymmetry of the returns.

- Quality's consistent negative beta confirms its defensive properties in downward markets, even more pronounced since the GFC. Quality's correlation with the market is at an all-time low (-58%).
- Momentum's market neutral beta turned negative post 2008 and its correlation with the Market is at an all-time low (-35%). We can confirm that Momentum and Quality's correlation is also at an all-time high (30%).
- Value has a negative beta and high downside capture in the High and Moderate Regimes, indicating it performed well during falling markets. Value's beta turned positive post-GFC, with a positive down capture, which means on average losing money in down markets. This, combined with a low up capture, is one explanation for Value's poor performance since the GFC.
- The four-factor EW portfolio is market neutral across regimes, with a beta close to zero. As the market performance has become more dominant, the EW portfolio has not been able to keep up.

We conclude our analysis with the evolution of several risk characteristics across regimes and factors. The maximum drawdown (MDD) is the maximum loss from peak to trough before a new peak is attained and an important additional measure of factor riskiness. First, we notice that the market's MDD has become smaller going from the high to low volatility regime (-52.5%, -30.5%, -21.7%). Post-GFC, Quality's MDD is the lowest (-12.8%) whereas Value's (-50.2%) is at an all-time high. The MDD of the EW index remains fairly constant.

The final check is if factors follow a normal distribution or are impacted by some large outliers. Skewness is a measure of returns symmetry. Kurtosis is a measure whether the returns are heavy-tailed relative to a normal distribution (skewness = 3). Value is the only factor strategy with high excess kurtosis, which tells us it has heavy tails and more outliers relative to a normal distribution. These outliers can be positive or negative depending on the sign of the skewness. During the High phase when value performed well, the skew was positive. During the Moderate phase, Value's performance fell within a normal distribution and post-GFC, the skew is slightly negative, indicating some negative outliers.

Table 4. Risk Statistics: High, Moderate Low Volatility regimes

Volatility Regime	Factors	Up Capture	Down Capture	Capture Difference	Market Beta	Market Correlation	Maximum Drawdown	Skewness	Kurtosis
HIGH	Market	100%	100%	0%	1.00	-	-52.5%	0.04	0.72
	Size	37.3%	23.1%	28.2%	0.27	41%	-39.9%	0.36	1.49
	Value	-2.9%	-42.5%	-20.4%	-0.18	-26%	-32.1%	0.88	4.69
	Quality	-13.3%	-23.9%	-17.1%	-0.16	-40%	-23.3%	-0.23	0.10
	Momentum	20.3%	-27.3%	-2.5%	-0.05	-6%	-20.8%	-0.56	2.15
	EW 4 Factors	10.4%	-17.6%	-3.0%	-0.03	-17%	-29.0%	0.11	2.11
MODERATE	Market	100%	100%	0%	1.00	-	-30.5%	-1.14	6.53
	Size	-0.2%	10.6%	-5.2%	0.08	14%	-44.0%	0.39	2.13
	Value	-7.6%	-42.9%	25.3%	-0.27	-42%	-28.4%	0.75	1.40
	Quality	4.3%	-35.9%	15.8%	-0.13	-33%	-16.5%	0.14	0.55
	Momentum	31.4%	-16.2%	-7.6%	0.09	14%	-14.2%	-0.60	1.31
	EW 4 Factors	7.0%	-21.1%	7.1%	-0.06	-37%	-25.8%	0.17	1.35
LOW	Market	100%	100%	0%	1.00	-	-21.7%	-0.48	1.71
	Size	15.2%	30.3%	22.8%	0.25	50%	-26.7%	-0.07	0.48
	Value	5.4%	43.6%	24.5%	0.31	43%	-50.2%	-0.14	4.86
	Quality	-10.2%	-47.4%	-28.8%	-0.32	-58%	-12.8%	0.51	1.32
	Momentum	-3.2%	-48.9%	-26.0%	-0.27	-35%	-20.4%	0.00	0.78
	EW 4 Factors	1.8%	-5.6%	-1.9%	-0.01	-4%	-27.5%	0.08	1.86

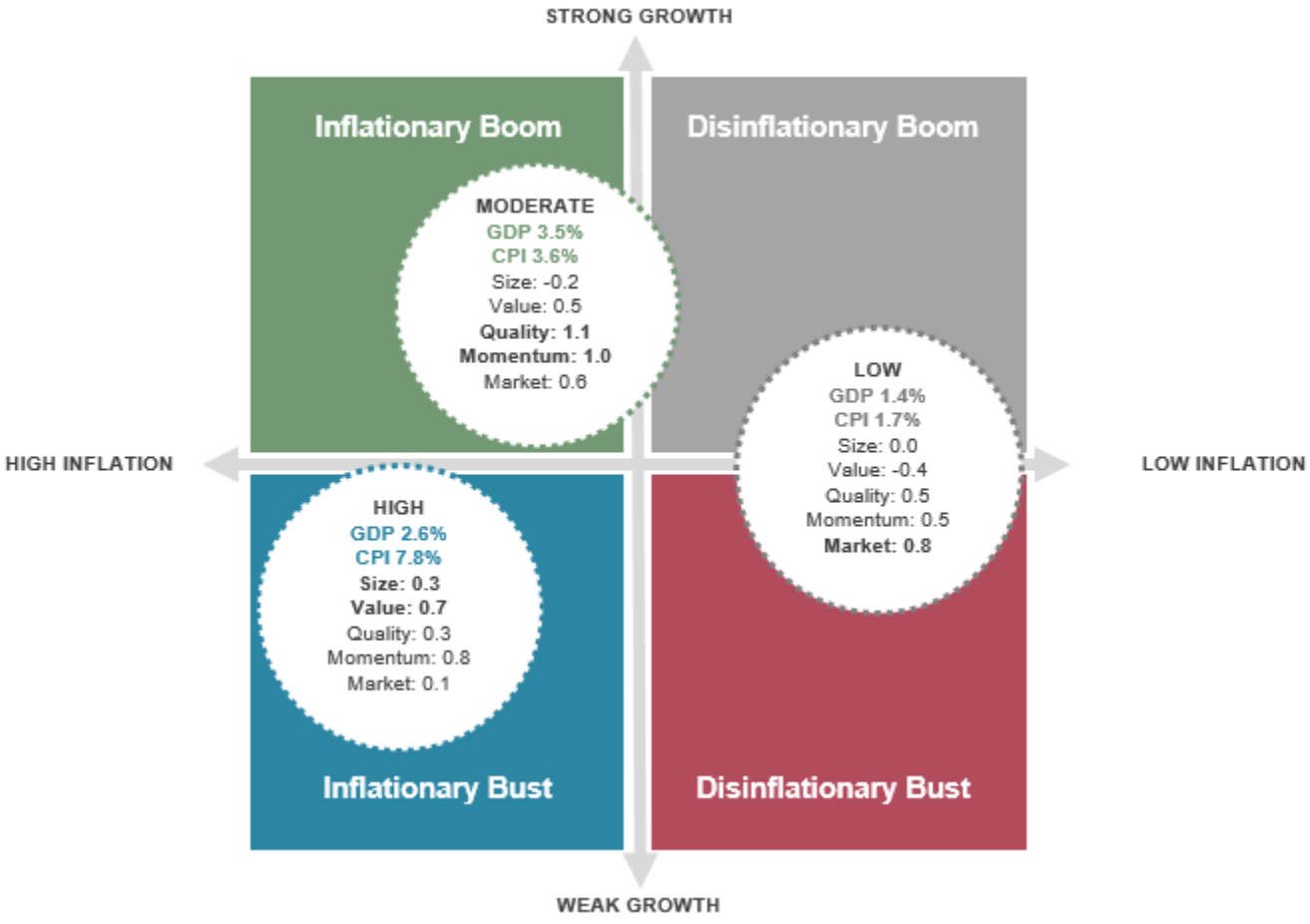
Source: AQR.

3. Conclusion: the post GFC period and QE has distorted both the cycle and factor performance - Regimes matter.

We have seen how QE has led to a substantial reduction in the volatility of the business or economic cycle. Despite massive stimulus, economic growth has remained below trend and the 2% inflation target has not been reached. Low interest rates and a market delivering the highest risk-adjusted return relative to previous regimes, has proved a challenging environment for factor strategies. The ultra-low rates, seen in the past 10 years, have also stimulated risk-taking. For factors, this meant investment in growth stocks, driving Quality and Momentum and hurting Value, and, to some extent, Size. With two out of four factors not delivering, diversification across strategies (usually the best way to get more stable performance), has led to low risk-adjusted returns.

We use a similar framework of the Investment Clock to visualize the economic volatility regimes (Figure 4). For each, we show the realized average real GDP and inflation rates, as well as the risk-adjusted factor returns. The risk-adjusted returns (in bold) show the regime where factors perform at their best. If the past is any indication of the future, moving towards a moderate regime, with (above) trend economic growth and contained inflation, may help to deliver a more broad-based factor performance. COVID-19 has pushed the economy further down the low inflation/weak growth quadrant, with the largest drop in GDP on record and a return to a period of QE to stimulate the economy.

Figure 4. New thinking: Volatility regimes and risk-adjusted factor performance



Note: Annualized risk-adjusted factor returns and average real GDP and CPI across volatility regimes. High: 1970 to 1982 (high inflation 1970s and early 1980s recession. Moderate: 1983 to 1985 (Great Moderation and Goldilocks), Low: 2010 to June 2020 (GFC, QE, Normalization QE and Covid-19).

Source: AQR, Refinitiv.

3. Summary and conclusions

In Part one of this series, "The Investment Clock: linking factor behavior to the economic cycle," [1] we used the Investment Clock framework to understand how factors respond to its economic cycles. The findings are intuitive, but post-GFC, we observe more return volatility and lower average factor payoffs.

The Investment Clock is based on the assumption of a normalized economic pattern. Its existence is questionable, especially post-GFC, due to the massive quantitative easing implemented to prop up the global economy. An evolution of the Investment Clock is to observe a pattern of secular regime shifts. Secular regimes are found to have a significant impact on factor payoffs, driven by changes in the magnitude and volatility of economic indicators. Historically factors have done well during regimes with trend economic growth and target but contained inflation like the Great Moderation and Goldilocks.

To get a better understanding of the impact of quantitative easing on factor performance, we define economic volatility regimes, based on the level and volatility of inflation and real GDP. We identify three major shifts in economic volatility between 1957 and 2020:

1. High volatility of the hyper-inflation seventies and early 80s recession;
2. Moderate volatility of the great moderation and goldilocks;
3. Low volatility since the GFC.

Average inflation has fallen going from the High to the Low economic volatility regime, whereas average real GDP growth was the highest during the period of moderate economic volatility.

We find that QE and the ultra-low interest rates have stimulated risk taking favoring high duration growth stocks. This has led to a surge in Quality and Momentum, leaving Value and Size behind, resulting in poor performance of a diversified (equal weighted) four-factor portfolio. If the past is any indication of the future, a more moderate regime, with trend economic growth and target inflation, is a positive economic climate for broad based and diversified factor investing.

References

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Appendix

Table 1: Data definitions

Factor Definitions AQR Long/Short Factors

Factors	AQR Name	Data input
Market	Market	Value-weighted return on all available stocks minus one-month treasury bills
Size	SMB	Total Market Value Equity (ME)
Value	HML Devil	Book Equity/ME
Quality	Quality minus Junk	Measures of Profitability: Growth, Safety and Payout
Momentum	Momentum	12-month prior return, skipping the most recent month

Data Source: www.aqr.com, monthly data files

Macro-economic Data

Macro Data	Definition	Data Frequency
GDP	Year-on-Year quarterly US GDP rate	Annual
Inflation	Year on Year CPI, quarterly and monthly	Annual and Monthly
ISM	ISM, monthly	Monthly

Source: Refinitiv.

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EMEA
+44 (0) 20 7866 1810

North America
+1 877 503 6437

Asia-Pacific
Hong Kong +852 2164 3333
Tokyo +81 3 4563 6346
Sydney +61 (0) 2 8823 3521