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Economic Cycles and Equity Styles in Europe | October 2009

Summary

This Research Bulletin reviews the performance of style factors in the enhanced Barra Europe Equity Model (EUE3) in different macroeconomic regimes. These economic cycles affect both the cash flows of companies and the discount rates applied to their valuation. Fundamental equity investors typically account for economic conditions when underweighting or overweighting certain asset classes, sectors, and investment styles.

Rotation Strategies

A textbook rotation strategy involves switching from one industry group to another during the business cycle (Reilly and Brown, 2006). For example, cyclical industries, whose sales depend on general economic activity, are usually attractive during the early stages of an economic recovery. Later on, towards the peak of a business cycle when inflation becomes a concern, basic materials industries become more attractive. Style rotation strategies are less familiar than industry rotations, even though there has been academic interest in studying the performance of different investment styles through time. For example, Oertmann (1999) shows that value-growth spreads in 18 markets exhibit a time variation similar to that of the global economic risk premium, suggesting that economic conditions and market climate may play a role in this variation. Campbell and Vuolteenaho (2004) and Lettau and Wachter (2007) point out that growth stocks co-vary more with discount rates, while value stocks co-vary more with shocks to cash flows.

The factor structure of the EUE3 model allows us to examine the performance of nine different investment styles in European equity portfolios (apart from other influences such as industry and country effects) in different macroeconomic environments. The development of the model gives us an opportunity to examine style rotation in European markets in a comprehensive way.

Identification of Macroeconomic Regimes

This paper uses a relatively simple regime identification framework, relying on two key variables — GDP growth[1] and inflation — for defining different macroeconomic scenarios. These two variables are among the most important in assessing the overall state of the economy and are critical in the setting of fiscal and monetary policy.

To identify the regimes, we extracted trends in seasonally-adjusted economic growth and consumer price inflation by using the Hodrick-Prescott filter.[2] The output gap is defined as the difference between actual and trend real GDP. We define rising growth regimes as those where actual output is growing faster than potential output, and slowing growth regimes as those where actual output grows slower than potential output. High and low inflation periods are identified by looking at times when inflation is above or below its estimated Hodrick-Prescott trend. We adopted the following naming convention for the regimes:

[1] Alternatively, we also calculated regimes using industrial production as a measure of current real economic activity; it is available on a monthly (rather than quarterly) basis. We found no significant difference in results when using industrial production rather than GDP growth to identify rising/falling growth regimes.

[2] The Hodrick-Prescott (HP) filter determines the trend component series $\{\tilde{x}_t, t=1,...,T\}$ from the raw series x_t by minimizing

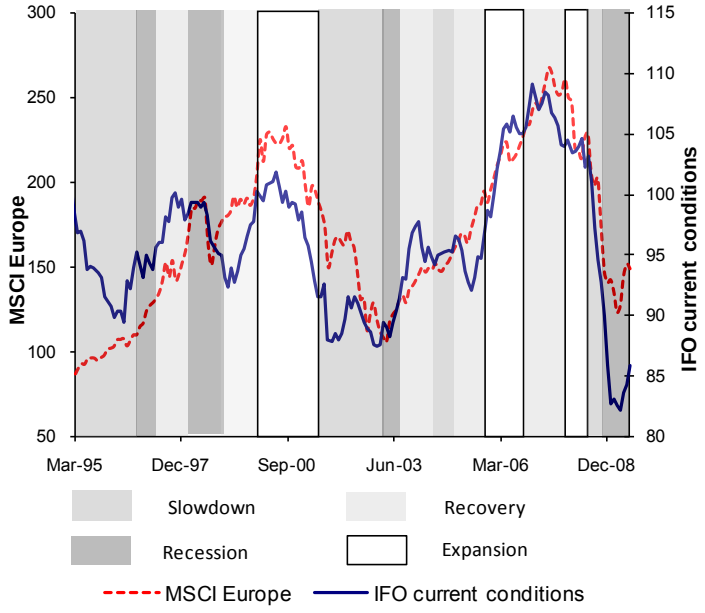
$$\sum_{t=1}^{T}(x_t-\tilde{x}_t)^2+\lambda\sum_{t=2}^{T-1}\left[(\tilde{x}_{t+1}-\tilde{x}_t)-(\tilde{x}_t-\tilde{x}_{t-1})\right]^2$$

where λ is a constant and T is the number of usable observations. The filter is a popular technique in business cycle analysis. Hodrick and Prescott (1997) suggest a value of $\lambda=1600$ for the analysis of quarterly data and their recommendation is widely followed in the literature applying the HP filter.

- *Recession*: growth and inflation are both below trend
- *Recovery*: growth is above trend, inflation is below trend
- *Expansion*: growth and inflation are both above trend
- *Slowdown*: growth is below trend, inflation is above trend.

Figure 1 illustrates the distribution of different regimes through time and how the MSCI Europe Index and the IFO Current Conditions Index performed during those regimes.

Figure 1: Regimes, equity returns and expectations through time.

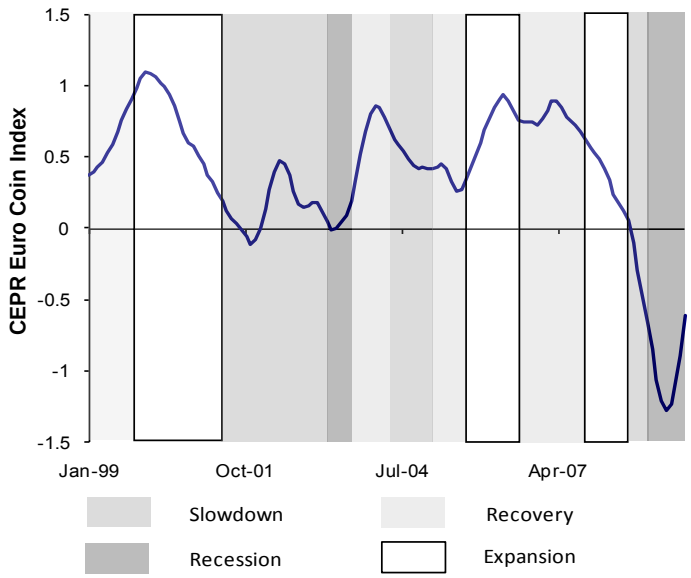


The definitions of regimes used in this paper do not correspond exactly to widely reported definitions of business cycles, such as those provided for Europe by the Centre for Economic Policy Research (CEPR) and the US by the National Bureau of Economic Research (NBER).[3] This methodology typically identifies few regimes within a period of several decades, with expansions often lasting a number of years and recessions lasting several quarters. However, the macroeconomic environment is unlikely to remain unchanged within such a broad regime, as indicated by the fact that committees setting interest rates around the world typically meet monthly to consider developments. Our method of identifying regimes does not focus only on output, but considers deviations in both economic growth and consumer prices from their trends, resulting in regimes changing more frequently than the expansions and recessions reported by the CEPR. This is consistent with the findings of other researchers who have taken similar approaches; for example, Van Vliet and Blitz (2009) report the average duration of each phase in

[3] For example, the CEPR defines a recession as a significant decline in economic activity, spread across the economy of the Euro area, usually visible in two or more consecutive quarters of negative growth in GDP, employment, and other measures of aggregate economic activity for the Euro area as a whole; and reflecting similar developments in most countries. A recession begins just after the economy reaches a peak of activity and ends when the economy reaches its trough; please refer to http://www.cepr.org/data/dating/methodology.asp

the economic cycle of around nine (9) months. Figure 2 shows a graph of the regimes we identify against a high frequency (growth focused) cyclical indicator produced by the CEPR. We see that peaks in the indicator typically correspond to above trend growth regimes (Recovery and Expansion), while troughs correspond to below trend growth regimes (Slowdown and Recession).

Figure 2: Regimes and CEPR cyclical indicator (€-coin)[4]



Characteristics of Macroeconomic Regimes

Table 1 presents a summary of regime characteristics. The most frequent regime for the eurozone economy was Slowdown, followed by Recovery. These were also the regimes with the highest average durations of approximately 12 and 11 months, respectively.

Table 1: Summary characteristics of different regimes.

	Number of regimes	Frequency	Average duration (months)	Annualised market return	Annualised market volatility	Market return/risk ratio
Recovery	5	29.8%	11.1	22.7%	13.5%	1.68
Expansion	3	21.6%	7.9	3.0%	17.4%	0.17
Slowdown	4	32.2%	11.8	-13.3%	21.4%	-0.62
Recession	4	16.4%	6.0	20.7%	23.7%	0.87

Note: Frequency is defined as number of months in regime divided by the total number of months in the sample.

In contrast, Recessions typically lasted around six (6) months and Expansions around eight (8) months. We also found that, on average, the annualized return of the EUE3 Market factor—a proxy for a return on a very broad European equity portfolio—was positive for all regimes except Slowdown. Recoveries had the highest average annualized Market return at 22.7%, but the

[4] http://eurocoin.cepr.org/

second highest annualized return was observed in Recessions. The regimes are characterized by clear differences in volatility, with Recoveries on average the least volatile (annualized volatility of 13.5%), while Slowdowns are the most volatile (annualized volatility of 20.7%). On a risk-adjusted basis, Recovery was a clear leader with a return-to-risk ratio of 1.68.

A Detailed Comparison of Performance

Table 2 presents a summary of performance by the type of regime.[5] The lefthand side illustrates the annualized excess returns, while the righthand side looks at the Sharpe ratios in different regimes. On average, Momentum had the highest Sharpe ratio across regimes, followed by Earnings Yield and Dividend Yield, while Growth and Leverage had the lowest Sharpe ratio. Momentum was also the factor that had the highest frequency of positive returns across all regimes, with a positive return in all periods except the two most recent Slowdowns. The highest Sharpe ratio across all factors and regimes was also observed for Momentum in Slowdown, while Growth posted the lowest observed Sharpe Ratio in this regime. Growth also had the lowest frequency of positive returns, with negative returns observed in all Expansion and Slowdown periods and positive returns in three out of five Recoveries and three out of four Recessions.

Table 2: Detailed results by regime type.

	Excess Returns (%)				Sharpe Ratios			
	Recovery	Expansion	Slowdown	Recession	Recovery	Expansion	Slowdown	Recession
MOMENTUM	6.17	5.70	9.22	-1.14	3.09	1.67	3.22	-0.37
VALUE	2.73	0.35	-1.19	1.46	2.05	0.21	-0.70	0.69
LIQUIDITY	1.92	1.54	-0.44	2.30	1.15	0.60	-0.16	0.72
SIZE	1.31	2.04	2.77	1.01	0.46	0.56	0.62	0.22
DIVYIELD	0.24	0.54	3.31	2.75	0.21	0.35	2.29	1.54
EARNYIELD	0.79	4.93	2.21	4.42	0.57	2.50	1.29	2.28
VOLATILITY	0.73	-6.44	-6.27	6.92	0.20	-0.81	-0.91	0.92
LEVERAGE	-0.04	-1.32	-0.83	-0.20	-0.04	-1.13	-0.75	-0.14
GROWTH	0.01	-2.67	-2.91	0.05	0.01	-1.73	-1.84	0.03

Let us now consider how the performance of factors differs across regimes. Although Momentum typically had some of the highest risk adjusted returns, Size was the most consistent performer, with risk-adjusted returns similar across all regimes, except Recession. Value performed best in Recoveries and was a below average performer in higher inflation regimes. Liquidity was the only factor to have a positive return in all Recessions and has typically performed above average in terms of risk-adjusted returns in all regimes, except Slowdowns. During our sample period, Dividend Yield performed best when actual growth was below potential growth—that is, during Slowdowns and Recessions. These regimes are characterized by high volatility and Slowdown is also the only regime with a negative Market return, making Dividend Yield a good defensive factor during our sample period. Earnings Yield, on the other hand, performed best at the turning points of the cycle, during Expansions and Recessions, although it also had above average performance during Slowdowns. Volatility performed best in low-inflation regimes, although it was a below average performer in all regimes, except Recessions. In all periods when inflation was above trend, the Volatility factor had a negative return. While Growth was typically one of the worst performing style factors, it had the same pattern as Volatility across regimes, performing only somewhat better in periods with low inflation. Leverage was also a below average performer across the board, but performed somewhat better in low-inflation regimes.

[5] More detailed results are available on request.

Limitations of Our Analysis and Conclusions

The main limitation of our analysis is that EUE3 factor returns are only available from the mid-1990s, making our sample relatively short. This period, containing 16 regimes, encompasses two broad economic and market cycles. The relatively short sample period and the limited number of regimes available may raise the risk that our results are period specific and may not be fully applicable to cycles outside our sample.

Keeping this limitation in mind, we find that the performance of style factors has varied with economic conditions during the period under investigation. The Momentum factor had the best overall performance, with the best risk-adjusted return across periods, and a positive return in the majority of all instances for all identified regimes. Considering annualized risk-adjusted returns in different regimes, it was among the top style factors across all regimes, except Recession. We find that some of the other consistent performers through the different regimes were the Earnings Yield, Liquidity and Size factors. Dividend Yield performed especially well during Slowdowns and Recessions, while Momentum and Value outperformed significantly in Recoveries. Volatility, Leverage, and Growth were the worst performing style factors in general, and all performed relatively worse in high-inflation regimes. While past research has shown that linkages between equities and macroeconomic variables are sensitive to the sample period, and rarely 100% persistent over time, this paper presents new evidence of possible value in certain quantitative macro overlays for fundamental investors in European equity markets.

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