

## APPLICATION OF SECTOR ROTATION IN ACTIVE PORTFOLIO MANAGEMENT FOR US AND EU STOCK MARKETS

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**Abstract:** The paper deals with active portfolio management through sector rotation. Focusing on European and American markets, it introduces the reader to the intricacies of sector rotation in active investing using a carefully selected investment strategy. We aim to propose and validate an investment approach that combines monetary policy changes with momentum. We construct our investment portfolios by constructing sector-specific exchange-traded funds (ETFs) for the European and U.S. markets. We analyze monthly data from March 2003 to March 2023 to evaluate performance. Our investigation covers several critical aspects, such as market efficiency, active vs. passive investing, a comparison between active and passive investment approaches and Bottom-Up vs. Top-Down approaches. We explore the merits of these contrasting strategies in active investing. To guide our investment decisions, we closely monitor interest rate changes. Specifically, we track adjustments made by the European Central Bank (ECB) for European markets and the Federal Reserve (FED) for U.S. markets. These serve as monetary easing and tightening indicators, respectively, reflecting expansionary and restrictive policies. Our sector ETFs are strategically selected based on these interest rate changes, either cyclically or defensively. Subsequently, we evaluate the performance of our portfolios using momentum strategies. Notably, our proposed strategy effectively reduces market risk in the E.U. and U.S. markets. Our portfolios surpass the benchmark STOXX600 across all metrics in the European markets. However, in the U.S. markets, the benchmark S&P500 exceeds the performance of all our portfolios.

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**Keywords:** Active portfolio, Business cycles, Sector rotation, ETF, Momentum.

### Introduction

The investment management industry went through significant changes during the last decade. Active management is under pressure, with investors switching from active to index funds. New "smart beta" products offer low-cost exposure to many active ideas. Exchange-traded funds are increasing. Will the active management survive? In this paper, we intend to analyze one of the most popular active approaches to investing – timing the economic cycle using sector rotation.

Sector rotation involves shifting investment allocations to different sectors of the economy based on anticipated market performance. This strategy is predicated on the cyclical nature of the economy and the stock market, where different sectors tend to outperform at different stages of the economic cycle. Investors implementing this strategy aim to capitalize on these trends by investing in sectors expected to perform well in the upcoming cycle and divesting from sectors expected to underperform. Investors can enhance returns and mitigate risks by actively adjusting their portfolios in response to changing market conditions. However, successful sector rotation requires a deep understanding of economic indicators and market trends. It is a dynamic strategy that demands active engagement and continuous market monitoring.

### Literature review

Sector rotation can be considered one of the most popular trading strategies used by active investment portfolio managers, as described by Erickson (2014). The investment manager implements a sector rotation strategy by shifting portfolio weights, that is, by periodically rotating into a sector or a group of sectors while rotating from other sectors. The impetus for sector rotation is recognizing that not all sectors perform well simultaneously. So, the main task of the investor is to take a step before the sector becomes the best or the worst. Authors Johnson and *et al.* (2015) believe that the key to successfully applying a sector rotation strategy is identifying an indicator that signals a portfolio shift before unusual sector performance. Specifically, their goal was to see if shifts and changes in the Fed's monetary policy serve as an indicator that can be used to identify pivot points ahead of price movements.

Chava *et al.* (2020) analyzed whether investors consider the industry level during the business cycle. Geoffrey & Ngene (2021) showed that macroeconomic conditions and uncertainty in financial markets

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affect the returns of investment portfolios. Grobys (2015) analyzed the effects of volatility spillover on U.S. markets and confirmed that the economic environment affects volatility in the financial market. Alexiou & Tyagi (2020) analyzed the U.S. and E.U. markets from 1999 to 2020. Their analysis explored sectoral rotation based on macroeconomic, momentum, and company fundamental factors.

Our research builds on this research. We set out to analyze the performance of various sector rotation strategies within the U.S. and European markets from 2003 to 2023. The article examines interest rate-based sector rotation based on macroeconomic and momentum strategies. The main goal of this article is to propose our investment strategy, which combines the above strategies for creating portfolios.

### Data and methodology

In this paper, we examine the effectiveness of our proposed strategy, which is to merge two strategies: an interest rate-based sector rotation and a momentum-based sector rotation. We compare monthly ETF returns for the U.S. and European markets over 20 years (from March 2003 to March 2023). When choosing the period for the analysis, several factors came into play. The date of creation of the ETF was a crucial starting point, as it sets the earliest possible boundary for our analysis. It's also essential to ensure that the chosen period covers several phases of business and market cycles. The appropriate setting of the analyzed period aims to comprehensively understand the performance of the ETF during different economic conditions. Ultimately, the goal is to select a period that provides a holistic view of the ETF's behaviour, aiding in informed decision-making. Data were obtained from Yahoo Finance on a monthly frequency. As for the interest rate-based strategy, the changes were categorized into periods of rising and falling interest rates. For changes in interest rates, we used the United States Fed Funds Target Rate for the American market and the Euro Zone ECB Refinancing Rate for the European market in our monitored period. Changes in interest rates were categorized into periods of monetary easing or tightening. Based on monetary easing, we select cyclical sectors for the portfolio, and on the contrary, during monetary tightening, we focus on defensive sectors.

For the empirical investigation, we considered nine sector ETFs for the U.S. market and ten ETFs for the European market. Sectors for both markets were categorized and grouped into cyclical or defensive based on the GICS classification criteria.

The simple monthly returns of sector ETFs for the U.S. and European markets are analyzed and compared with the monthly returns of their benchmarks, namely the S&P 500 Total Return Index and the STOXX Europe 600 EUR Price Index. Simple monthly returns  $r_t$  was calculated based on the formula:

$$r_t = \frac{P_t - P_{t-1}}{P_{t-1}}, \quad (1)$$

$P_t$  is a close price in time  $t$ , and  $P_{t-1}$  is a close price in the previous time. Monthly returns are expressed as a percentage. Also, arithmetic averages of these simple monthly returns were used to compare performances between constructed portfolios and benchmarks. The cumulative changes of the simple monthly returns were used for the comparisons' graphical representation (line graphs). The risk is defined as the standard deviation of the monthly returns.

The investment portfolio was constructed by investing in an equally weighted portfolio comprising the three strongest momentum ETFs comprising only cyclical sector ETFs in periods of monetary easing and an equally weighted portfolio comprising the three strongest momentum ETFs comprising only defensive sectors in periods of monetary tightening. Additionally, we will treat transaction costs as zero due to the complexity of assigning transaction costs to each transaction, as they are based on several factors, such as tracking error, the ETF's bid-ask spread, and commissions.

As for the sector rotation strategy based on momentum, we used the returns from the previous month or months, which we will mark with the letter "J", and we will measure the performance of the portfolio during the following month or months, which we will denote by the letter "K". For each market (American and European) 16 portfolios were created with "J" and "K" by months, quarters, half-years, by the year and their subsequent combinations. Specifically, the variables "J" and "K" will take 1, 3, 6, and 12 months, respectively.

Our portfolios were created by taking only long positions and only in the three sectors with the highest momentum for each value of "J", either from a basket of cyclical or defensive sectors, depending on the type of monetary policy we are in at the time. The criteria for determining the order of the sectors are

based on the performance in the period of origin. We have used the arithmetic mean to calculate cumulative monthly returns because these are short-term investment horizons.

Sectors are evaluated based on the above criteria, and the top three sectors, either cyclical or defensive by type of monetary economy, are equally included in the winning portfolio.

After evaluation, the zero-cost sector portfolio designated "winning portfolio" is purchased for "K" months. Here, the total return of the winning portfolio is an equally weighted average of the cumulative return of the various stocks that make up the portfolio over the holding period. After "J" months, the portfolio is rebalanced using the same steps as above, the cumulated returns are calculated, and the process continues till the end of the observation period.

The performance of our proposed portfolios was evaluated based on monetary policies. As the performance criteria, we applied price return, risk (standard deviation of the returns) and Sharpe Ratio.

### Results and Discussion

We analyze the U.S. and European markets' monetary policies from March 2003 to March 2023. We mean "unwinding the economy" during expansionary monetary policy when we watch the interest rate fall. On the contrary, the "tightening of the economy" during the restrictive policy is when we observe the increase in the interest rate. Our findings are summarized in Table 1 for the U.S. and Table 2 for the E.U.

Period	Politics	Start (Date)	Start (Rate)	End (Rate)	The number of changes in the interest rate	Total Change
1	Release	Jan-00	6.50%	1.00%	13	-5.50%
2	Tightening	Jun-04	1.00%	5.25%	17	4.25%
3	Release	Sep-07	5.25%	0.13%	11	-5.13%
4	Tightening	Dec-15	0.13%	2.38%	7	2.25%
5	Release	Jul-19	2.38%	0.13%	5	-2.25%
6	Tightening	Mar-22	0.13%	4.88%	9	4.75%

Source: Authors

During the easing and tightening of monetary policy, the interest rate (United States Fed Funds Target Rate) reached an average of 3.35% from 2003 to 2023. The maximum value of the interest rate of 5.25% in this period was reached for the last time on August 16, 2007. The minimum value of 0.13% was recorded on January 26, 2022. Table 1 shows that the Fed's interest rate gradually increased to 5.25% as the U.S. economy recovered from the dot-com crash and terrorist attacks. Furthermore, we can observe the Fed's expansionary monetary policy and the interest rate's decrease by 5.13% in response to the global financial crisis and recession. Until the end of 2015, the interest rate remained nearly zero while the U.S. economy slowly recovered from recession. The Fed started raising interest rates after improving economic results and strengthening the labour market. In 2019, due to concerns about the slowdown in global growth, interest rates began to decrease, and in response to the COVID-19 pandemic, we see an aggressive easing policy. In 2022, the Fed signalled that it plans to gradually raise interest rates in response to rising inflationary pressures.

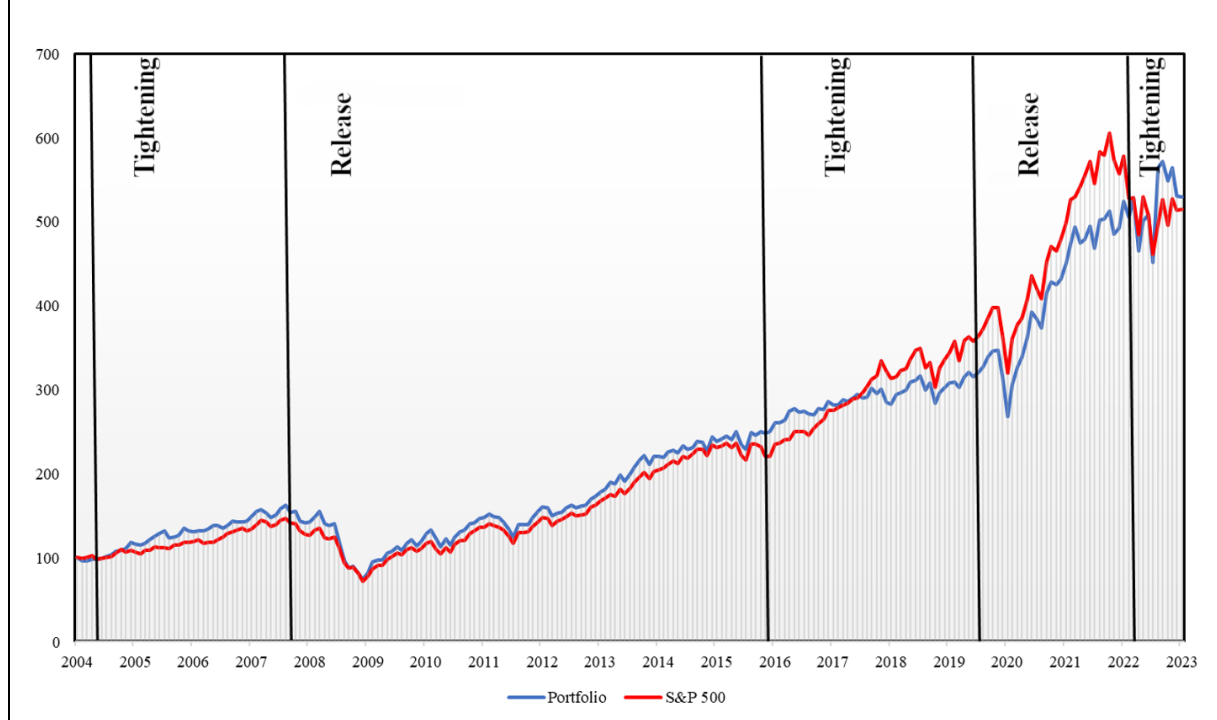
Period	Politics	Start (Date)	Start (Rate)	End (Rate)	The number of changes in the interest rate	Total Change
1	Release	Dec-01	3.75%	2.00%	4	-1.75%
2	Tightening	Nov-05	2.00%	4.20%	9	2.20%
3	Release	Sep-08	4.20%	1.00%	7	-3.20%
4	Tightening	Mar-11	1.00%	1.50%	2	0.50%
5	Release	Sep-11	1.50%	0.00%	6	-1.50%
6	Tightening	Apr-22	0.00%	3.50%	6	3.50%

Source: Authors

During the loosening and tightening of the monetary policy in the E.U., the interest rate (Euro Zone ECB Refinancing Rate) reached an average of 1.13% from 2003 to 2023. The maximum value of the

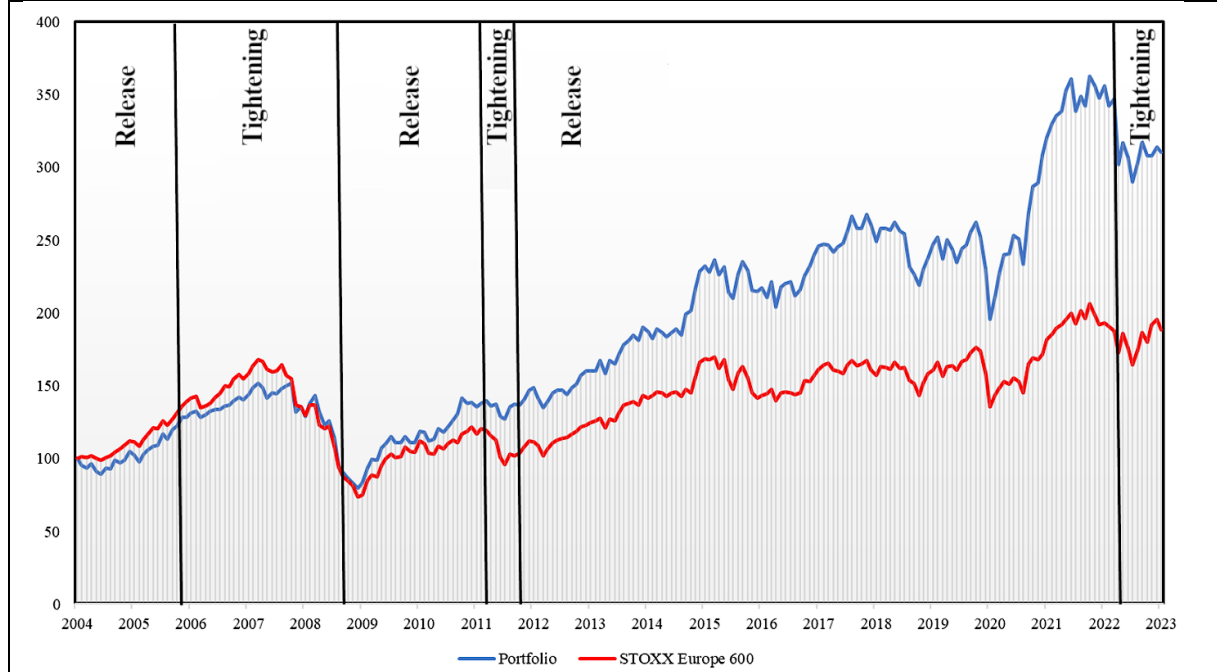
interest rate of 4.20% per divided time was recorded on December 1, 2009 (see Table 2). In this case, Europe's minimum value was 0.00% observable from September 2014 until July 21, 2022. In contrast to the monetary policy of the Fed, in this case, we can observe the dominance of monetary easing within the monitored period.

Figure 1: Sector Rotation Performance - U.S. Markets 2003-2023



Source: Author (Paciga, 2023)

Figure 2: Sector Rotation Performance - E.U. Markets 2003-2023



Source: Author (Paciga, 2023)

In the E.U., we can observe the initiative of the ECB to solve the global financial crisis, and the interest rate decreased by 3.20% in 2008-2009. In 2011, the interest rate was raised twice to combat the rising inflationary pressures in the Eurozone. In response to the debt crisis, the interest rate in the Eurozone was reduced to historic lows. The ECB left the interest rate at 0% in response to the global pandemic.

From April 2022, we observe the ECB's restrictive monetary policy in response to inflationary influences and the global situation.

Figure 1 shows the portfolio's performance with 12 months of momentum and monthly rebalancing on the U.S. market. The portfolio represents the best combination based on the highest monthly return. The portfolio buckled the trend during the monetary policy tightening regime and continued outperforming the market during changes. An exciting trend is observed: yields usually start to fall after the announcement of monetary tightening, and after the announcement of monetary easing, yields increase. These trends can be attributed to the psychological behaviour of investors, who are likely to view monetary easing as a sign of economic growth and, conversely, monetary tightening as a sign of economic decline.

Table 3: Monthly return, Risk and Sharpe Ratio of the monitored ETFs and their benchmarks for the period (2003 – 2023)

Name and type of ETF	Average Monthly Return	Risk	Sharpe Ratio
<b>U.S. Defensive sectors</b>			
Energy Select Sector SPDR Fund	0.85%	7.67%	0.11
Consumer Staples Select Sector SPDR Fund	0.63%	3.36%	0.19
Health Care Select Sector SPDR Fund	0.73%	3.91%	0.19
Utilities Select Sector SPDR Fund	0.62%	4.10%	0.15
<b>US Cyclical Sectors</b>			
Materials Select Sector SPDR Fund	0.77%	5.82%	0.13
Industrial Select Sector SPDR Fund	0.82%	5.33%	0.15
Consumer Discretionary Select Sector SPDR Fund	0.91%	5.41%	0.17
Financial Select Sector SPDR Fund	0.46%	6.33%	0.07
Technology Select Sector SPDR Fund	1.10%	5.15%	0.21
<b>Benchmark</b>			
S&P 500	0.90%	4.27%	0.21
<b>EU Defensive sectors</b>			
iShares STOXX Europe 600 Oil & Gas UCITS ETF	0.30%	5.70%	0.05
iShares STOXX Europe 600 Food & Beverage UCITS ETF	0.68%	3.80%	0.18
iShares STOXX Europe 600 Health Care UCITS ETF	0.61%	3.56%	0.17
iShares STOXX Europe 600 Utilities UCITS ETF	0.40%	4.39%	0.09
<b>EU Cyclical Sectors</b>			
iShares STOXX Europe 600 Basic Resources UCITS ETF	0.77%	7.63%	0.10
iShares STOXX Europe 600 Industrial Goods & Services UCITS ETF	0.82%	5.24%	0.16
iShares STOXX Europe 600 Travel & Leisure UCITS ETF	0.52%	5.98%	0.09
iShares STOXX Europe 600 Banks UCITS ETF	0.02%	7.16%	0.00
iShares STOXX Europe 600 Technology UCITS ETF	0.73%	6.09%	0.12
iShares STOXX Europe 600 Telecommunications UCITS ETF	0.09%	4.28%	0.02
<b>Benchmark</b>			
STOXX Europe 600	0.47%	4.18%	0.11

Source: Author (Paciga, 2023)

Figure 2 shows the evolution of the portfolio for 12-month momentum and 12-month rebalancing, which represents the best combination based on monthly returns, together with the evolution of the European market benchmark. Figure 2 illustrates the strategy's performance and a graphical representation of monetary policy for the European market. The portfolio buckled the trend during the monetary policy tightening regime and continued outperforming the market during changes. It is interesting to observe that yields usually start to fall after the announcement of monetary tightening, and after the announcement of monetary easing, yields tend to increase. These trends can be attributed to the psychological behaviour of investors, who are likely to view monetary easing as a sign of economic growth and, conversely, monetary tightening as a sign of economic decline.

Table 3 shows that the highest average monthly return for the monitored period on the American market was achieved by the technology sector at 1.10%, followed by the consumer materials sector at 0.91% per month. The technology sector also achieved the highest monthly Sharpe Ratio of 0.2. Interestingly, it was followed by sectors from the defensive basket, specifically the healthcare sector and consumer

staples, at 0.19 Sharpe Ratio. Interestingly, the highest monthly returns are not associated with the highest risk in this case. The energy sector reached the highest risk on the American market at 7.67%, followed by the financial sector.

On the European market, we can observe that the industry sector achieved the highest returns of 0.82% per month, followed by the materials sector, which achieved a return of 0.77%. On the other hand, the materials sector also has the highest risk of 7.63%. The healthcare sector achieved the second highest risk on the European market at 7.16%. Again, we see the trend that cyclical sectors achieved the highest returns. On the other hand, the best values of the monthly Sharpe Ratio were achieved by defensive sectors. Again, like the U.S. market, it was the Consumer Food & Beverage sector at 0.18 and the Healthcare sector at 0.17.

Table 4: Performance of portfolios depending on monetary policy in the U.S. market (2004 - 2023)

	Expansionary policy			Restrictive policy		
	Average Monthly Return (%)	Risk (%)	Shrape Ratio	Average Monthly Return (%)	Risk (%)	Shrape Ratio
USA J1K1	0.94%	5.75%	0.16	0.63%	3.49%	0.18
USA J1K3	0.87%	5.90%	0.15	0.61%	3.28%	0.19
USA J1K6	0.78%	6.03%	0.13	0.61%	3.27%	0.19
USA J1K12	0.86%	5.98%	0.14	0.79%	3.20%	0.25
USA J3K1	0.90%	5.73%	0.16	0.68%	3.26%	0.21
USA J3K3	0.96%	5.69%	0.17	0.68%	3.33%	0.20
USA J3K6	0.89%	5.65%	0.16	0.75%	3.36%	0.22
USA J3K12	0.89%	5.42%	0.16	0.80%	3.40%	0.23
USA J6K1	0.89%	5.70%	0.16	0.69%	3.35%	0.20
USA J6K3	0.92%	5.73%	0.16	0.70%	3.32%	0.21
USA J6K6	0.81%	5.59%	0.14	0.75%	3.26%	0.23
USA J6K12	0.83%	5.47%	0.15	0.67%	3.36%	0.20
USA J12K1	0.85%	5.62%	0.15	0.87%	4.09%	0.21
USA J12K3	0.83%	5.62%	0.15	0.71%	3.38%	0.21
USA J12K6	0.80%	5.56%	0.14	0.67%	3.41%	0.20
USA J12K12	0.83%	5.51%	0.15	0.72%	3.47%	0.21
S&P 500	0.87%	4.81%	0.18	0.74%	3.58%	0.21

Source: Author

When comparing the U.S. and European markets, we can observe that U.S. sector ETFs achieve higher average monthly returns. If we do not consider the communication services sector, then the average monthly yield of American sectors is 0.77% compared to 0.54% of European sectors. On the other hand, the average monthly risk of American sectors is 5.23% compared to the risk of 5.51% of European sectors. Table 3 also compares the monthly return, risk and Sharpe Ratio of selected benchmarks on the American market in the form of the S&P 500 and the E.U. market STOXX Europe 600 from March 2003 to March 2023. We can claim that the average monthly return on the American market, 0.90%, is relatively higher than that of the European index. On the other hand, the risk is lower in the European market at 4.18%.

Table 4 summarizes the performance of our portfolios depending on monetary easing and tightening over the period from March 2004 to March 2023 in the U.S. market. We can observe exciting results, especially considering the difference in results compared to the S&P 500 during expansionary and restrictive policies. We recorded an expansive policy for 130 months and a restrictive policy for 98 months during the monitored period. We found that neither portfolio reduced risk relative to the benchmark during expansionary policy. With a restrictive policy, we see diametrically different results. The portfolio achieved the lowest risk with combinations of one monthly momentum ( $J=1$ ) and twelve-monthly ( $K = 12$ ) rebalancing. During the restrictive policy, the portfolio surpassed the benchmark with an average monthly return of 0.79. It reached the highest value of the Sharpe monthly Ratio of 0.25 of all monitored portfolios.

Table 5 summarizes the performance of portfolios depending on monetary easing and tightening in the monitored period from March 2004 to March 2023 on the E.U. market. We found a difference in results compared to the STOXX 600 during expansionary and restrictive policies. We recorded an expansionary policy for 178 months and a restrictive policy for 50 months in the analyzed period. When compared with monetary policy in the American market, we see a clear predominance of monetary easing in the

American market. While not a single portfolio reduced the risk during the expansionary policy compared to the benchmark, we see diametrically opposite results like the U.S. market during the restrictive policy. Based on this, we can claim that the chosen investment strategy of sector rotation during monetary tightening in the European market increases the average monthly return and reduces the risk. The portfolio achieved the lowest risk with combinations of one monthly momentum ( $J = 1$ ) and three-monthly rebalancing ( $K = 3$ ).

Table 5: Performance of portfolios depending on monetary policy in the E.U. market (2004 - 2023)

	Expansionary policy			Restrictive policy		
	Average Monthly Return (%)	Risk (%)	Shrape Ratio	Average Monthly Return (%)	Risk (%)	Shrape Ratio
Europe J1K1	0.72%	4.88%	0.15	-0.29%	3.77%	-0.08
Europe J1K3	0.75%	4.79%	0.16	-0.20%	3.76%	-0.05
Europe J1K6	0.50%	4.84%	0.10	-0.08%	3.99%	-0.02
Europe J1K12	0.57%	4.93%	0.12	0.05%	4.19%	0.01
Europe J3K1	0.69%	4.93%	0.14	-0.02%	3.76%	-0.01
Europe J3K3	0.57%	4.86%	0.12	0.10%	3.97%	0.03
Europe J3K6	0.59%	4.82%	0.12	0.00%	4.02%	0.00
Europe J3K12	0.58%	4.98%	0.12	0.08%	4.04%	0.02
Europe J6K1	0.71%	4.44%	0.16	-0.01%	3.93%	0.00
Europe J6K3	0.49%	4.68%	0.10	0.14%	4.14%	0.03
Europe J6K6	0.57%	4.71%	0.12	0.06%	4.08%	0.02
Europe J6K12	0.57%	4.70%	0.12	-0.13%	4.30%	-0.03
Europe J12K1	0.64%	4.57%	0.14	0.08%	4.07%	0.02
Europe J12K3	0.75%	4.51%	0.17	0.08%	4.11%	0.02
Europe J12K6	0.64%	4.55%	0.14	0.09%	4.10%	0.02
Europe J12K12	0.76%	4.60%	0.17	0.03%	4.06%	0.01
STOXX Europe 600	0.57%	4.01%	0.14	-0.36%	4.72%	-0.08

Source: Author

## Conclusion

Comparing the general performance of the U.S. and E.U. markets, we see a significant difference between the average returns: 0,8% in the U.S., while only 0,11% in the E.U. Also, the average volatility is lower in the U.S. markets, resulting in a significant difference in the Sharpe Ratios favouring the U.S. market.

Shifts in macroeconomic factors, such as base rate levels, primarily and directly shaped the performance of the portfolios we built. The duration of monetary tightening or easing cycles was dictated by Central Bank decisions, leaving no room for subjective modification. Indeed, the length of these periods could have influenced the outcomes. However, we view this factor's actual impact on our study's final results as minimal.

Our strategies performed better in the E.U. markets compared to the U.S. markets. On the E.U. markets, the average performance for all three metrics was better for our sector rotation strategies than the benchmark. In the U.S. markets, the strategies performed worse in all the metrics.

Our analysis concludes that the European large-cap stock market offers opportunities for active sector rotation strategies to outperform the benchmarks for metrics like monthly return, risk, and Sharpe Ratios. These opportunities might be even more pronounced for mid and small-cap stocks.

We recommend viewing the analysis results in the context of the following limiting factors. We have considered a relatively short historical period, which reduces the explanatory power of the analysis. The sectors in our portfolios were equally weighted compared to the market capitalization weighting of the benchmarks. The size of the companies may have affected the results. We assume that it will be possible to follow up on our analysis, for example, by modifying the above limitation factors, such as choosing a more extended period of data collection, modifying the momentum and rebalancing periods, changing the structure of the portfolios, using a smaller or larger number of sectors, focusing on emerging markets and defining different macroeconomic or fundamental triggers for the rotation.

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