# Testing Earnings Revision Overlay on Fundamental Factors in International Indices

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**Abstract**

This study tries to replicate and compare the findings to an important paper by ***Utkarsh*** (Pricilla Luk, 2017)**.** Here we explore the effectiveness of overlaying earnings revision strategies on traditional fundamental value and quality factors across six international indices: Dow Jones 30, Nasdaq 100, S&P 500, FTSE 100, DAX 40 and OMX Stockholm 30 for the period 2018-2023. Earnings revision strategies have been regularly used by market participants for predicting stock price return or stock selection. The earnings revision-screened factor portfolios outperformed their respective comparable factor portfolios across most of the above-mentioned markets for the value and quality factors. Stock prices tended to move in the same direction as their earnings revisions. The paper also demonstrates how market participants generally had stronger reactions to the net percentage of upward and downward revisions in earnings estimates rather than the percentage change of the consensus estimates figures.

**Keywords:** *Earnings Revision, Fundamental Factors, Investment Strategies, Factor Investing, Quantitative Analysis, Risk Management, Portfolio Optimization, Asset Allocation.*

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# 1. Introduction

Earnings revision estimates, also known as earnings revisions or earnings forecast revisions, refer to changes made by financial analysts or institutions to their previously published earnings estimates for a company. These revisions can be either upward or downward adjustments to the earnings per share (EPS) or revenue forecasts for a specific period, such as a quarter or a year.

Earnings revision estimates are significant because they reflect changes in analysts' expectations regarding a company's future financial performance. Analysts may revise their estimates based on various factors, including new information about the company's operations, industry trends, economic conditions, or changes in management guidance.

Here are some key points to understand about earnings revision estimates:

1. **Upward Revisions**: When analysts revise their earnings estimates upward, it typically indicates that they expect the company to perform better than previously anticipated. This can be due to factors such as stronger-than-expected sales, improved margins, successful product launches, or favourable market conditions.

2. **Downward Revisions**: Conversely, downward revisions suggest that analysts are lowering their expectations for the company's financial performance. This could result from disappointing sales figures, declining margins, regulatory issues, macroeconomic challenges, or company-specific problems like management changes or product recalls.

3. **Market Reaction**: Earnings revision estimates can impact investor sentiment and stock prices. Positive revisions may lead to increased investor confidence and upward pressure on stock prices, while negative revisions can trigger selling pressure and stock price declines.

4. **Consensus Estimates**: Analysts' earnings revisions contribute to consensus estimates, which represent the average of all analyst forecasts for a company's financial metrics. Consensus estimates are widely followed by investors and are used as benchmarks to evaluate a company's actual performance against expectations.

5. **Importance for Investors**: For investors, monitoring earnings revision estimates can provide valuable insights into market sentiment and expectations for individual companies. Companies

with consistently positive revisions may be viewed more favourably by investors, while those with frequent downward revisions may raise concerns about their financial health and prospects.

The aim of this thesis is to investigate the effectiveness of earnings revision strategies used in portfolio construction. The thesis builds upon the information presented in the publication released by Utkarsh (Pricilla Luk, 2017) and it tries to replicate and compare the results to those of Utkarsh's papers. We have used five years of stock market data across six indices over four countries obtained from WRDS I/B/E/S database. We build a complex and effective code in R from ground up to analyse all the data and calculate all the results presented in this study. The idea is to create portfolios based on three value factors and three quality factors. Then we use our earnings revision parameters to further distil these portfolios and measure their performances (average monthly excess return and beta) compared to the original fundamental factor portfolios. The main motive of this study is to test if the results obtained in the original paper produce some noteworthy observations in the western markets or not. During the time of our research, we could not find any other publication that used the methodology mentioned in the original paper to analyse markets in the western countries. Hence, it was a great matter of interest for us to see if we can explore this space. In order to replicate, we built a whole chunk of R code from the ground up and we tried to maintain the accuracy of calculations using complex functions and logical statements in R.

# 2. Literature Review

In this section, we present an overview and background of the previous literature on earnings revisions and its impact on investment strategies. We also elaborate on the key concepts of portfolio construction and historical analysis of earnings revisions overlay on fundamental factors as described in different literature and explain the importance of earning revisions and analyst forecasts.

Financial analysts produce three important pieces of information: earnings forecasts, price targets, and recommendations (Li, 2022). Recent studies have shown that analysts forecast errors as well as quarterly and annual forecast revisions have significant pricing effects and the performance of stocks (William Beaver, 2008).

Well established studies have shown that stock prices typically move in the same direction as their earnings revisions, and the earnings revision strategies delivered excess returns in a majority of the studied markets (Mixon, 2001). Due to the high portfolio turnover of this strategy, using earnings revision as an overlay to fundamental factors may be more practical (Hong, 2003).

Factor-based investment strategies are widely adopted by investors during portfolio construction, and products based on these strategies have seen significant growth in the passive investment sector. While many of these products track indices that focus on common equity factors like value, quality, dividend yield, size, volatility, and momentum, there's a growing interest in exploring alternative factors. This interest stems from a desire among investors to diversify their portfolios by incorporating additional sources of return drivers.

Among the alternative factors being studied, earnings revisions have gained particular attention. Market participants frequently use earnings revisions to predict stock price movements or select stocks. Research on earnings revision strategies is extensive, with much of it focusing on how the market responds to changes in analysts' earnings estimates or the frequency of upgrades and downgrades over short-term periods. However, the findings regarding the effectiveness of earnings revision strategies have been mixed, indicating the need for further investigation and refinement.

Factor-based investment strategies are a cornerstone of modern portfolio theory, aiming to systematically capture sources of returns beyond traditional market exposures (Michael B.Clement, 2011). These strategies rely on academic research that identifies specific factors, such as value, quality, momentum, and low volatility, which have historically been associated with outperformance over the long term.

The effectiveness of factor-based strategies lies in their ability to provide investors with diversified sources of return. By targeting factors that have demonstrated persistent risk premia over time, factor-based strategies offer the potential for enhanced risk-adjusted returns compared to traditional market-cap-weighted approaches.

Factor-based strategies also play a crucial role in portfolio diversification. By investing in factors with low correlations to each other and to the broader market, investors can reduce portfolio volatility and enhance risk-adjusted returns (Jay Heon Jung, 2015). This diversification benefit is particularly valuable during periods of market turbulence when traditional asset classes may exhibit high levels of correlation.

Moreover, factor-based strategies offer transparency and rules-based methodologies, providing investors with a clear understanding of the underlying investment process. This transparency enhances investor confidence and allows for more informed investment decisions.

However, it's essential to acknowledge that factor-based strategies are not without risks. Factors can experience periods of underperformance or fail to deliver expected returns, known as "factor crowding" or "factor decay." Additionally, factors may be subject to economic cycles, market sentiment shifts, or structural changes that can impact their effectiveness over time.

Despite these challenges, the importance of factor-based strategies remains significant for investors seeking to achieve their investment objectives while managing risk effectively. Continuous research and refinement of factor models are essential to adapt to changing market conditions and investor preferences, ensuring the ongoing relevance and effectiveness of factor-based investing in portfolio construction.

When it comes to earnings revision, there are several factors that affect the decision of an analyst to revisit and release earnings forecast (Narasimhan Jegadeesha, 2006). Analysts play a pivotal role in the financial markets by providing insights and forecasts on company performance, including earnings revisions. Several factors influence analysts in releasing their earnings revisions, shaping their forecasts and recommendations.

1. Company Performance: Analysts closely monitor a company's financial performance, including revenue growth, profitability, and operational efficiency. Positive or negative changes in these metrics can prompt analysts to revise their earnings forecasts accordingly.

2. Industry Trends: Industry-specific factors such as regulatory changes, technological advancements, and market trends can influence analysts' perceptions of a company's prospects. Analysts consider how these factors may impact the company's earnings potential and adjust their forecasts accordingly.

3. Macroeconomic Conditions: Analysts assess broader economic conditions, including GDP growth, inflation rates, and interest rates, as these factors can impact consumer spending, business investment, and overall corporate earnings. Changes in macroeconomic indicators may lead analysts to revise their earnings forecasts for individual companies.

4. Competitive Landscape: Analysts evaluate a company's competitive position within its industry and consider how competitive dynamics may affect future earnings. Changes in market share, pricing strategies, and competitive threats can prompt analysts to adjust their earnings estimates.

5. Management Guidance: Analysts often rely on guidance provided by company management during earnings calls or investor presentations. Management's outlook on future performance, revenue guidance, and strategic initiatives can influence analysts' earnings forecasts and revisions.

6. Market Sentiment: Analysts consider market sentiment and investor expectations when making earnings revisions. Positive or negative sentiment towards a particular stock or sector may influence analysts' forecasts, even in the absence of significant fundamental changes.

7. Information Availability: The availability and quality of information can impact analysts' ability to make accurate earnings forecasts. Analysts rely on company disclosures, financial reports, industry reports, and other sources of information to inform their earnings revisions.

8. Peer Comparisons: Analysts often compare a company's performance to its industry peers and benchmark indices. Relative performance metrics, such as valuation multiples and growth rates, may influence analysts' earnings revisions relative to peers.

Overall, analysts consider a wide range of factors when releasing earnings revisions, aiming to provide investors with accurate and insightful forecasts of company earnings. These factors reflect the dynamic and complex nature of the financial markets and underscore the importance of thorough analysis and research in the investment decision-making process.

For example, Mixon found earnings revisions in the U.S. caused stock prices to move in the same direction as their estimates. He also suggested combining earnings revisions with other stock selection factors due to the higher turnover of the earnings revision strategy. Hong and Lee found earnings revision strategies delivered significant excess returns in some international markets, and the effectiveness of the strategy was related to information dissemination mechanisms within the market.

Earnings revisions, or changes in analysts' earnings estimates, play a crucial role in portfolio construction and investment decision-making. Here are some key points regarding their effectiveness and importance:

1. Predictive Power: Earnings revisions are widely regarded as valuable indicators of future stock price movements. Positive revisions (upgrades) often signal improving fundamentals and potential future outperformance, while negative revisions (downgrades) may indicate deteriorating prospects and potential underperformance. Therefore, incorporating earnings revision information into investment models can help investors identify stocks with favorable future prospects and avoid those with deteriorating fundamentals.

2. Market Reaction: Market participants closely monitor earnings revisions because they tend to influence market sentiment and stock prices. Positive revisions can lead to upward price momentum as investors become more optimistic about a company's future earnings potential, while negative revisions can trigger downward price pressure as investors adjust their expectations downward. Therefore, earnings revision data can be used not only for stock selection but also for timing entry and exit points in the market.

3. Research Abundance: Empirical research on earnings revision strategies is abundant and has shown promising results. Many studies have found that portfolios constructed based on earnings revision signals can outperform the broader market or passive benchmarks over certain time periods. This research has contributed to the growing popularity of earnings revision strategies among both institutional and individual investors.

4. Risk Management: Incorporating earnings revision signals into portfolio construction can enhance risk management by providing additional insights into the fundamental strength or weakness of individual stocks. Stocks with positive earnings revisions may be less prone to downside risk, while those with negative revisions may be more vulnerable to adverse events. Therefore, earnings revision data can complement traditional risk management techniques and help investors build more resilient portfolios.

5. Informational Advantage: Earnings revision data can provide investors with an informational advantage over the broader market. By analysing earnings revision trends and patterns, investors can gain insights into changing market expectations and company fundamentals before they are fully reflected in stock prices. This information asymmetry can be leveraged to make more informed investment decisions and potentially generate alpha in the portfolio.

Overall, earnings revision data is a valuable tool for portfolio construction, offering predictive power, market insight, and risk management benefits. By incorporating earnings revision signals into investment models and decision-making processes, investors can enhance their ability to identify attractive investment opportunities and achieve their investment objectives.

However, another research discovered that between 2002 and 2003, earnings revision strategies did not yield excess returns in the U.S. market (Xu, 2008). This lack of success appeared to be driven by market participants' tendency to overreact, likely due to overly optimistic extrapolations from previous successes

of these strategies. Nonetheless, the studies have suggested that earnings estimate revisions continued to exhibit serial correlation, hinting at their potential as a source of alpha (Xu, 2008).

Meanwhile, another study conducted a study on the U.S. market, examining how the market responded to analyst revisions of earnings estimates, target prices, and stock recommendations (Feldman, 2012). They found that all three types of revisions were linked to notably positive excess returns. Their analysis revealed that the market's reaction was particularly pronounced for target price and stock recommendation revisions, despite these types of revisions being less frequent compared to earnings estimate revisions.

This study tried to investigate the effectiveness of earnings revision strategies across diverse western equity markets, encompassing US, UK, Germany and Sweden. The aim is to ascertain whether earnings revisions could serve as an alternative driver of returns in these markets.

The primary objective of this research is to assess the efficacy of earnings revision strategies within U.S. markets against fundamental factor portfolios. The approach involves applying two earnings revision screens, focusing on EPS change and EPS diffusion, respectively, to fundamental value and quality factor portfolios. Specifically, the study examines whether these earnings revision screens historically generated alpha returns or mitigated risk by filtering out stocks with subpar earnings revisions from the factor portfolios.

# 3. Data and Methodology

In this section, we examine the data and define some key measures.

## *3.1. Data Description*

In this research paper, we used the analysts' consensus earnings-per-share (EPS) estimates data and the companies' actual reported fundamental data from the WRDS (I/B/E/S) database. We studied the effectiveness of overlaying the two earnings revision screens—the three-month change in the EPS estimate (EPS change) and the three-month diffusion of the EPS estimate (EPS diffusion)—on the value and quality factors. The value factors included the book-to-price ratio, earnings-to-price ratio, and sales-to-price ratio. The quality factors included the net income growth, financial leverage ratio, and return-on-equity ratio. We studied the effect of overlaying the EPS change and EPS diffusion screens separately on each of the underlying value and quality factors.

Since the aim of this thesis is to replicate and compare the findings of this study with the two papers published by Utkarsh Agrawal (Pricilla Luk, 2017), the methodology of calculating variables and construction of portfolios are based on the same method used by him in his papers. From here on now, we will refer to his two papers as the "original papers". Almost all of our findings and results will be corelated with the results and the findings of his papers.

The three-month EPS change was calculated as the current median EPS estimate minus the prior three-month median EPS estimate, divided by the absolute value of the prior three-month median EPS estimate (Pricilla Luk, 2017). The three-month EPS diffusion was calculated as the sum of the EPS diffusion over the past three months in which the EPS diffusion for each month was computed as the number of upward revisions minus the number of downward revisions of EPS estimates for that month, divided by the total number of EPS estimates. All EPS estimates are measured in the local currency of the company.

For our analysis, we formed equal-weighted top quintile (Q1), bottom quintile (Q5), top median (M1), and bottom median (M2) hypothetical portfolios for the EPS change and EPS diffusion separately in each examined market. The Q1 and M1 portfolios consisted of stocks with higher values of EPS change and EPS diffusion, respectively, and vice versa for the Q5 and M2 portfolios.

The earnings revision-screened factor portfolios for each factor were formed in two steps. First, we selected the top quartile of stocks by each fundamental factor from the base universe. Next, we dropped the bottom quintile of stocks by earnings revision from the stocks selected in the first step (Agrawal, 2018). To have a fair comparison, we also formed the comparable factor portfolios by selecting the top quintile stocks from the base universe by the same fundamental factors.

All the portfolios were equally weighted. The original papers go on in detail discussion on how they approached rebalancing of the portfolio for every fiscal year, we have intentionally ignored the rebalancing, given the scope of this study. We have discussed further in detail later on in the section: Limitations and Future Research, why trying to rebalance portfolios as mentioned in the original papers is not practical for the given scope of the research. The data obtained from the I/B/E/S database was manually and painstakingly arranged such that the indices covered in this study reflect the true set of stocks for the given time period. I/B/E/S monthly estimate data are measured on the close of the Thursday preceding the third Friday of each month, and they are updated at the latest by the close of the following Tuesday. This makes the rebalancing of portfolios an extremely convoluted and difficult process for a single student. In order to rebalance the portfolio, we need the reference data of the close of the Wednesday following the third Friday of the month in our hypothetical portfolio formation. Eventually, to have a conservative lagging period between the data reference dates and the portfolio rebalancing effective dates for a real-time index or portfolio management, rebalancing of the portfolios will be done after the close of the second Friday of the following month after the estimate data were released. This process made the arrangement of data of unnecessarily complex, and we chose to skip this process for the convenience of the study undertaken.

The point of the above-mentioned data collection, methodology and portfolio construction is to do the following:

1. Compare the Q1, Q5, M1 and M2 portfolios based on three-month EPS change and three-month EPS diffusion to the “base universe” portfolio, i.e. equally weighted hypothetical portfolio of all the stocks in a given index. This is to show the effectiveness of earnings revision as a factor in portfolio construction. This is also to compare with the results obtained in the original papers.
2. Construct earnings revisions screened portfolio for value and quality factors. We have three value factors (book to price ratio, earnings to price ratio and sales to price ratio). We have three quality factors (financial leverage ratio, ROE and net income growth). We have two Earnings revision

factors: three-month EPS change and three-month EPS diffusion. Hence, we form a total of six earnings revision screened fundamental factor portfolio and then we compare them with the normal fundamental factor portfolios. We calculate the average monthly excess returns and beta to measure the performance of these portfolios.

## *3.2 Sample Universe*

Our study included six indices from four countries: US, UK, Germany and Sweden. The indices covered are Dow Jones 30, Nasdaq 100 Tech, S&P 500, FTSE 100, DAX 40 and OMX Stockholm 30. As stated earlier, the goal of this study is study replicate the findings of the original papers and compare the results for the western markets. Companies domiciled in each market from their respective indices with at least three analyst estimates at the time creating the base universe for the respective market. A higher number of analyst estimates results in a higher number of revisions, which in turn lowers the estimate bias from a single analyst. Selecting the above-mentioned indices have following advantages:

1. These indices are well known indices around the world as they mostly constitute of large cap stocks. This reduces the effect of size bias when forming equally weighted hypothetical portfolios. Some of these indices with a good mix of diverse stocks also reduces the overall impact of sector bias on our portfolio.
2. Since these indices are one of the most reputed indices, it was not hard to have companies with at least three analyst estimates which helped in maintaining a sufficient number of stocks in the base universe throughout the back-test history.
3. We did not have to worry about variation in companies' fiscal year periods that could lead to inconsistency in the estimate horizon. Furthermore, we did not have to worry if a company announced its fiscal earnings and switched its fiscal years between the start and the end of the measurement period for the EPS change and EPS diffusion calculations, since we made required adjustments so that the estimates measured for the current and prior months belonged to the same fiscal year.

Our study period was from January 01, 2018, to December 31, 2023, and the performances of all the portfolios were measured in the local currency of their respective markets. We took our sample time of five years since this provided enough data to perform our analysis and it also helped construct portfolios that were closest to their original counterparts since it required manual effort to add and remove individual stocks from the data obtained from the I/B/E/S database.

# 4. Results and Analysis

## *4.1. Risk and Return Effect of Earnings Revision Screened portfolios.*

In this section, we examine the efficacy of the earnings revision strategies, the three-month EPS change, and the three-month EPS diffusion in the six different indices through the analysis of their top and bottom quintiles and median portfolio historical returns. We evaluated the average monthly excess return and the beta of the quintile and median portfolios versus their respective base universes. A base universe is defined as an equally weighted hypothetical portfolio with at three analyst estimates. Eight separate portfolios were formed with four being based on EPS change and four being based on EPS diffusion strategy as discussed earlier.

| Index | EPS Change (%) | | | | EPS Diffusion (%) | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q5 | M1 | M2 | Q1 | Q5 | M1 | M2 |
| Dow Jones 30 | 2,07 | 1,48 | 0,67 | 0,57 | 2,32 | 1,39 | 0,64 | 0,60 |
| Nasdaq 100 Tech | 2,56 | 2,07 | 0,75 | 0,78 | 2,47 | 2,00 | 0,62 | 0,82 |
| S&P 500 | 3,24 | 2,63 | 0,93 | 0,96 | 3,38 | 2,59 | 0,85 | 1,07 |
| DAX 40 | 1,77 | 1,76 | 0,49 | 0,63 | 2,22 | 1,10 | 0,77 | 0,77 |
| FTSE 100 | 0,14 | 6,44 | 1,47 | 1,49 | 5,68 | 30,38 | 1,40 | 1,66 |
| OMX Stockholm 30 | 4,73 | 1,31 | 1,13 | 2,20 | 5,05 | 0,25 | 1,01 | 1,41 |

*Table 1.* Average Monthly Excess Return of the Earnings Revision Portfolios Versus Their Respective Universes.

As observed from the table above, historically the top quintile and median portfolios of both earnings' revision strategies outperformed their respective universes. However, it was surprising to see that even the bottom quintile and median portfolios performed better than their base universe counterparts which was not observed in the original paper. This shows that there is an overwhelming favourable reaction to positive earnings revision in well established western markets. When compared to their eastern contemporaries, the bottom quintile and bottom median portfolios underperformed in most of the markets. This indicates that stock prices tend to move in the same direction as their earnings revisions in these indices. The top quintile EPS change portfolios delivered significantly higher average monthly excess return over their respective universes in every index with the exception of FTSE 100. Another important observation is the performance of top quintile EPS diffusion portfolios. As observed in the original papers, EPS diffusion portfolios performed slightly better than the EPS change portfolios. This further confirms that market participants have stronger reactions to the net percentage of upward and

downward revisions in the EPS estimate rather than the percentage change of the consensus earnings estimate figures. This is an interesting pattern since it provides a sense of similarity between the western and eastern markets. FTSE 100 had the most unusual results with mere 0.4% average monthly excess return for Q1 EPS change portfolio over the base universe portfolio but a whopping 30% average monthly excess return for Q5 EPS diffusion portfolio over the base universe portfolio. This seems a little confusing since this would mean that the stocks with positive earnings forecast somehow did not generate higher alpha compared to the stocks which had relatively gloomier forecasts. Moreover, one observation could be that European markets reacted performed better for the top median portfolios compared to their US counterparts. One consistent observation was that the quintile portfolios performed better than the median portfolios across the markets, which is in consistence with the findings of the original paper. Another interesting observation is that the top quintile and median portfolios of both of the earnings revision strategies recorded significant excess return historically in Swedish index, thus indicating that market participants in this market reacted strongly to both the net percentage of upward and downward revisions in the EPS estimate and the percentage change of the consensus earnings estimate figures.

| Index | EPS Change | | | | EPS Diffusion | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q5 | M1 | M2 | Q1 | Q5 | M1 | M2 |
| Dow Jones 30 | 0,69 | 1,19 | 0,87 | 0,85 | 0,59 | 1,33 | 0,88 | 1,00 |
| Nasdaq 100 Tech | 1,11 | 1,17 | 0,93 | 0,93 | 0,91 | 0,90 | 0,90 | 0,94 |
| S&P 500 | 0,95 | 1,08 | 0,90 | 0,95 | 0,81 | 1,03 | 0,85 | 1,05 |
| DAX 40 | 0,91 | 1,10 | 0,88 | 0,95 | 0,79 | 1,10 | 0,80 | 1,02 |
| FTSE 100 | 0,17 | -1,68 | 1,69 | 0,22 | 3,40 | 1,22 | 1,53 | 0,24 |
| OMX Stockholm 30 | 0,94 | 1,19 | 0,80 | 1,01 | 0,86 | 0,84 | 0,83 | 0,61 |

*Table 2.* Beta of the Earnings Revision Portfolios Versus Their Respective Universes.

Observations from our analysis, based on return beta, shows that the bottom quintile and median portfolios of both earnings' revision strategies tend to have more volatile returns than their respective universes for the almost all the indices over the entire back-tested period. This again is consistent with the findings of the original paper. As explained in previous studies, this was mainly due to the negative reactions of market participants toward stocks with downward estimate revisions. In every market, the bottom quintile, and median portfolios for both earnings revision strategies had return beta greater than one with respect to their universes, showing that market participants tended to react more strongly to estimate downgrades in these markets. The findings also show that the top quintile EPS change portfolios were less risky than their base universe counterparts. This could explain the strong average monthly excess return observed in previous table.

## *3.2 Risk and Return of Earnings Revision Screened Fundamental Factor portfolios.*

In this section, we examine the effectiveness of overlaying the earnings revision strategies on fundamental factor portfolios in various indices. We evaluated the average monthly excess returns and beta of the earnings revision-screened factor portfolios versus their respective comparable factor portfolios. As explained earlier, we formed three value factor portfolios based on book to price ratio, earnings to price ratio and sales to price ratio. Then these portfolios were screened using EPS change factors and EPS diffusion factors. Henc, we had a total of six portfolios to cover the performance of value factor and earnings revisions.

| Index | Book to price | | Earnings to Price | | Sales to Price | |
|---|---|---|---|---|---|---|
| | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED |
| Dow Jones 30 | 0,21% | 0,08% | 0,44% | 0,62% | 0,18% | 0,36% |
| Nasdaq 100 Tech | 0,12% | 0,20% | 0,14% | 0,21% | -0,04% | 0,06% |
| S&P 500 | 0,00% | 0,17% | 0,11% | 0,31% | -0,02% | 0,17% |
| DAX 40 | 0,04% | 0,26% | 0,68% | 0,80% | 0,28% | 0,43% |
| FTSE 100 | 0,23% | 0,36% | -0,17% | 0,18% | 0,13% | 0,56% |
| OMX Stockholm 30 | -0,79% | -0,57% | 0,08% | 0,42% | -0,10% | 0,51% |

*Table 3.* Monthly Average Excess Returns of Earnings Revision-Screened Value Portfolios Over Their Respective Comparable Value Portfolios.

As shown in the original paper, the earnings revision-screened factor portfolios outperformed their respective comparable factor portfolios across a majority of the markets for the value and quality factors. However, the findings in this study have been a little different. Though most of the indices maintain the trend of better performance of earnings revision-screened factor portfolios, the results for OMX Stockholm 30 were not in line with the results for other indices. This suggests that, historically, the earnings revision screen was not effective in generating return alpha over traditional fundamental factor portfolios in Swedish market. One value factor in particular, earnings to price ratio did significantly btter than other value factors when screened with earnings revision factors. In general, EPS diffusion showed a better performance than EPS change for almost all the markets. This is something again not in line with

the findings of the original paper where EPS change screen produced better alpha. However, for the quality factors, the EPS change screen was more effective. This again contradicts the findings of the original paper. This marks a significant difference between the behaviour of the western and eastern markets.

With the exception of Dow Jones 30, almost all the markets had statistically mixed excess returns for a majority of the earnings revision-screened factor portfolios, indicating ambiguous synergy of the earnings revision screen with fundamental factors in these markets. This again is not in alignment with the findings of the original paper where majority of the markets had statistically significant excess returns for a majority of the earnings revision-screened factor portfolios, indicating higher synergy of the earnings revision screen with fundamental factors in these markets. The excess returns were comparatively better for the earnings revision screened quality factor portfolios to those of earnings revision screened value factor portfolio. However, nothing more could be said except for the fact that financial leverage ratio was shown to be a better quality factor than ROE and net income growth.

| Index | Financial Leverage Ratio | | ROE | | Net Income Growth | |
|---|---|---|---|---|---|---|
| | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED |
| Dow Jones 30 | 0,18% | 0,18% | 0,12% | -0,06% | 0,14% | 0,31% |
| Nasdaq 100 Tech | 0,23% | 0,08% | 0,67% | 0,19% | 0,04% | -0,31% |
| S&P 500 | 0,23% | 0,08% | 0,21% | 0,06% | 0,23% | 0,17% |
| DAX 40 | 0,54% | 0,42% | 0,22% | 0,17% | 0,82% | 0,48% |
| FTSE 100 | 0,59% | 0,20% | 0,01% | -0,15% | -0,01% | -0,01% |
| OMX Stockholm 30 | 0,02% | -0,11% | 0,05% | -0,07% | 0,04% | -0,14% |

*Table 4.* Monthly Average Excess Returns of Earnings Revision-Screened Value Portfolios Over Their Respective Comparable *Quality* Portfolios.

When it comes to beta measurements, the results were in alignment with those of the original paper. We also found that the earnings revision overlay on the fundamental factors lowered the risk of the value and quality factors significantly across a all of the indices. We also found that the beta of the EPS change-screened factor portfolios was less than that of their respective EPS diffusion-screened factor portfolios. Therefore historically, the risk reduction from the EPS change screen was more than the EPS diffusion screen for the value and quality factors. This goes along with the findings of the original paper. The risk reduction observed was pretty uniform in all indices and for both value and quality factor portflios.

| Index | Book to price | | Earnings to Price | | Sales to Price | |
|---|---|---|---|---|---|---|
| | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED |
| Dow Jones 30 | 0,86 | 0,81 | 0,78 | 0,75 | 0,76 | 0,69 |
| Nasdaq 100 Tech | 0,98 | 1,03 | 0,99 | 1,03 | 0,86 | 0,94 |
| S&P 500 | 0,88 | 0,89 | 0,87 | 0,89 | 0,89 | 0,91 |
| DAX 40 | 0,91 | 0,96 | 0,95 | 0,95 | 0,91 | 0,94 |
| FTSE 100 | 0,99 | 0,96 | 0,95 | 0,94 | 0,93 | 0,98 |
| OMX Stockholm 30 | 0,71 | 0,72 | 0,92 | 0,98 | 0,84 | 0,95 |

*Table 5.* Beta of Earnings Revision-Screened Value Portfolios Vis-à-Vis Their Respective Comparable Value Portfolios.

| Index | Net Income Growth | | Financial Leverage Ratio | | ROE | |
|---|---|---|---|---|---|---|
| | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED | EPS CHANGE SCREENED | EPS DIFFUSION SCREENED |
| Dow Jones 30 | 0,88 | 0,86 | 0,78 | 0,75 | 0,92 | 0,88 |
| Nasdaq 100 Tech | 1,03 | 0,93 | 1,03 | 0,91 | 0,98 | 0,45 |
| S&P 500 | 0,93 | 0,92 | 0,87 | 0,87 | 0,95 | 0,91 |
| DAX 40 | 0,96 | 0,98 | 0,79 | 0,83 | 0,90 | 0,93 |
| FTSE 100 | 0,95 | 0,94 | 0,90 | 0,92 | 0,92 | 0,96 |
| OMX Stockholm 30 | 0,81 | 0,76 | 0,94 | 0,86 | 1,02 | 0,90 |

*Table 6.* Beta of Earnings Revision-Screened Value Portfolios Vis-à-Vis Their Respective Comparable *Quality* Portfolios.

# 5. Limitations and Future Research

The hypothetical portfolio construction method used for this study, where all the stocks in the portfolio were equally weighted, raises concerns over the practical implications of the earnings revision strategy. Though the indices usually consist of large cap stocks, the equal weighing method may result in a relatively lower excess return and higher beta of these hypothetical portfolios since it underestimates the impact of larger names and better performing stocks. Weighing portfolios based on market cap may result in less significant excess returns. A different weighing method to strengthen the earnings revision signals will be essential to improve the alpha of the earnings revision strategies.

The publications based on which this thesis is built upon have also explored in detail the effect of earnings revision strategies on the turnover of these hypothetical portfolios, which was not possible for me to accommodate in this study. A company's fiscal year periods vary over the years and analysis done current fiscal year estimate (FY1) leads to inconsistency in the period used for testing (Baule, 2017). Ideally, we should have used time-weighted average EPS change and EPS diffusion in our study to ensure alignment of estimate periods across companies examined in our analysis. This would mean that we first calculate the three-month EPS change and the three-month EPS diffusion for the current fiscal year (FY1) and the next fiscal year (FY2), respectively. Then, we compute the time-weighted average EPS change and EPS diffusion with the FY1 and FY2 weights in proportion to how much the next 12-month intervals overlapped with the FY1 and FY2 periods. In addition, when a company announced its fiscal earnings and switched its fiscal years between the start and the end of the measurement period for the EPS change and EPS diffusion calculations. Hence, further adjustments were needed to be made so that the estimates measured for the current and prior months belonged to the same fiscal year. This seemed to be way too complicated and time consuming given the scope this study and therefore, we decided to not rebalance the portfolio for every fiscal year. A more detailed study is required to further understand the extend of impact rebalancing of portfolios can have on the earnings revision strategies.

Usually, a significant size and sector biases are observed in some factor strategies, such as value and low volatility, and could be dominant drivers for factor performance (John B. Guerard Jr., 2015). Hence, further studies have been done on the sector and size bias of markets and how large, mid, and small cap stocks can alter the potential of this strategy for a given market. The indices we covered in this study cover a variety of sectors with the exception of Nasdaq 100-tech.

Another interesting aspect of the research will be the time constraint. The studies so far have covered at most a decade's worth of data, which may not be enough to fully understand the earnings revision strategy.

The effect of market trend generally exists in single-factor strategies that exhibit different performance characteristics under various market conditions (Tony Chieh-Tse Hou, 2016). To investigate how earnings revision strategies behave during different market trends, one must study the performance of top and bottom quintile EPS change and EPS diffusion portfolios when the market was in upward, downward, and neutral price trends. Future studies can also explore the reaction of market participants in such upward, neutral or downward trend of a market since a positive earnings revision may not be good enough news in a downward trending market and vice versa. It has been observed that the market participants tended to penalize stocks with poor earnings revisions more when the market was in a downward trend and similarly the market participants in these markets tended to disregard earnings downgrades when the market was bullish (Ran Ron Barniva, 2020).

All of the factors mentioned above including sector and size bias, effect of market trend, time constraints and rebalancing of portfolio for every fiscal year for different companies in an index pose a big challenge to how we evaluate the effectiveness of the earnings revision strategy. Going forward, the future research should deal with these topics and help better understand how the earnings revision factor works with other value and quality factors. The scope is immense, and a lot of work still needs to be done in this field.

# 6. Conclusion

In this research paper, we overlaid two earnings revision strategies (EPS change and EPS diffusion) on the value factors (book-to-price ratio, earnings-to-price ratio, and sales-to-price ratio) and the quality factors (accrual ratio, financial leverage ratio, and return-on-equity ratio) to evaluate if earnings revision strategies were effective in generating return alpha over the fundamental factor portfolios.

Earnings revision strategies have been regularly used by market participants for predicting stock price return or stock selection. In this thesis, we examined earnings revision strategies across six global but mainly western indices: Dow Jones 30, Nasdaq 100 Tech, S&P 500, FTSE 100, DAX 40 and OMX Stockholm 30, thus covering countries like US, UK, Germany and Sweden. Our study was based on signals from companies' three-month change in EPS estimates and three-month diffusion of EPS estimates between January 01, 2018, and December 31, 2023.

The results suggested that stock prices tended to move in the same direction as their earnings revisions in the majority of the covered indices. The earnings revision strategies delivered the most pronounced and significant excess return in US indices specifically Dow Jones 30 but they are more mixed and ambiguous for European markets, especially FTSE 100 and OMX Stockholm 30. Market participants generally had stronger reactions to the net percentage of upward and downward revisions in the earnings estimates rather than the percentage change of the consensus earnings estimate figures. Companies with poor earnings revisions tended to have more volatile returns, as market participants reacted negatively to companies with downward revisions in estimates.

The results suggested overlaying earnings revision screens on fundamental value and quality factors generated positive return alpha across the majority of the indices studied. Among the various indices, the earnings revision-screened factor portfolios generated statistically significant positive excess return compared with their respective factor portfolios for Dow Jones 30 and S&P 500 for a majority of the fundamental factors. The earnings revision overlay on the fundamental factors lowered the risk of the value and quality factors significantly.

The main objective of this study was not only to find the exciting potential of overlaying earnings revision screen on value and quality factor portfolios but also to compare the findings with those of the

research paper that this thesis is based on. As discussed earlier, the findings were extremely informative to say the least. When it comes to testing the efficacy of the earnings revision as a factor in portfolio formation, it was in alignment with the findings of the original paper. The results in this study were also in alignment with those of the original paper when it comes to beta calculation of earnings revision screened value and quality factor portfolios. This showed certain similarities in the reaction and behavior of the western and eastern markets. However, the average monthly excess return data was mostly mixed for the western indices and gave some different signals than those found in the original paper. In the original paper, the EPS change screened factor portfolios generated significantly more alpha than the EPS diffusion screened factor portfolios. In this study, it was in fact the EPS diffusion screened factor portfolios that outperformed the EPS change screened factor portfolios.

The US indices were consistent with the findings of the original paper i.e. the earnings revision screened factor portfolios showed higher alpha and lower beta compared to the normal factor portfolios. However, the European indices, especially the UK and Swedish indices showed mixed to abnormal patterns. FTSE 100 showed an abnormally high Q5 EPS diffusion excess return and OMX Stockholm 30 showed exceptionally negative excess return for earnings revision screened book to price factor portfolio. These observations need further detailed examination.

Overall, the results were in alignment with the findings of the original paper. Earnings revision shows significant promise when considering portfolio construction. Using this factor in combination with all the other factors covered in this study could result in good results for the market participants and portfolio managers. The results of this research suggest that the signals from earnings revisions are important even for fundamental factor strategies as we show that the earnings revision-screened factor portfolios reduce the risk and enhance the return of the comparable factor portfolios, historically, across a majority of the indices.

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