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Research Article

Quantitative Strategies to Outperform the S&P 500 by Investing in Euronext Stocks

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Abstract

This article looks to investigate whether it is possible to create a strategy on which the investor selects individual stocks that can outperform the average returns of the Standard and Poor's 500 (S&P 500) stock index. 311 non-financial companies listed on the Amsterdam, Brussels, Lisbon, and Paris stock exchanges were analyzed in the period between 2017 and 2022. For the analysis, we used the panel data methodology and the Generalized Method of Moments (GMM). The data imply that it is possible to achieve returns that surpass the S&P 500 by analyzing the growth, financial strength, and profitability of Euronext companies. It has been demonstrated that larger, less indebted, and more profitable companies tend to generate returns that are higher than those presented by the S&P 500. Both managers, who must prioritize sustainable growth and operational efficiency, and investors, who can apply the indicators presented in this study as stock selection criteria, can find important implications in these conclusions.

Keywords: Stock Returns, Euronext, S&P 500, Fundamental Analysis.

Introduction

The search for investment strategies that outperform market indices is a central topic in the financial sector (Lynch and Rothchild, 2000). The allure of seeking a "magic formula" that allows one to consistently outperform widely followed benchmarks such as the S&P 500 has motivated generations of investors (Dichtl, 2020; Li et al., 2022; Sheth et al., 2023; Pfister and Kendzia, 2023). However, the results have shown that this task is much more challenging than it might seem at first glance, considering that at least 60% of actively managed equity funds fail to outperform market indices over one year, and this percentage grows when analyzing a more extended period (McGuigan, 2006; Sheth et al., 2023; S&P Global, 2024). Likewise, Rompotis (2022) states that the managers of actively managed equity funds do not appear to have superior market timing skills.

The discussion about the effectiveness of active versus passive strategies gained even greater prominence with the famous challenge by Warren Buffett, who in 2007 bet a million dollars on how the S&P 500 would, over a decade, outperform a selection of actively managed investment funds (Frans et al., 2022). Buffett firmly believes in the superiority of passive strategies for the average investor, given the inherent difficulty of outperforming market indices after costs. The only hedge fund that took on the challenge was Protégé Partners LLC. A decade later, the S&P 500 had an average annual return of 7.1%, while the hedge fund had an

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average annual return of just 2.2% (Frans et al., 2022).

Buffett's victory in the challenge raised a pertinent question: If highly qualified managers with significant resources cannot outperform the S&P 500, what hope is left for individual investors or fund managers operating in specific markets, such as Euronext? Euronext, the largest stock exchange in continental Europe, includes companies from different industries and sectors, offering a wide range of stocks for selection. However, the diversity and complexity of this market also present significant challenges to building an active and effective investment strategy.

In this context, it is essential to analyze whether building an active investment strategy is possible based on selecting individual Euronext stocks capable of achieving greater returns than those obtained by the S&P 500. This investigation is of great importance because, as far as we know, no study has analyzed this topic in the Euronext markets. It also proves relevant as it can identify more effective forms of active management to help investors make more informed decisions that align with their expectations. In academic terms, this study is also important, considering that, if an active investment strategy is identified as capable of consistently outperforming the S&P 500, it may suggest the existence of inefficiencies in the capital market that have not yet been fully explored.

Bryan (2006), Fatouros et al. (2024), and Moura and Neves (2024) state that creating an active and successful stock strategy requires the rigorous application of fundamental analysis. Moura and Neves (2024) state that fundamental analysis includes an in-depth assessment of companies' economic fundamentals, which is crucial for assessing whether a stock is undervalued or overvalued.

This article is organized as follows: section 2 presents the literature review on strategies to obtain a return superior to the market. Section 3 presents the econometric methodology, data sources, sample definition, variables used, and descriptive statistics. Section 4 presents the empirical results and discussion. Finally, section 5 concludes the study.

Literature Review

An ETF is a financial instrument replicating a stock index's performance. Currently, there is a wide variety of asset classes, strategies, and regions that ETFs can expose investors to (Lettau and Madhavan, 2018). As with Euronext stocks, ETFs are traded on stock exchanges and are liquid assets. Aggarwal and Schofield (2014) state that the liquidity of ETFs is one of the main reasons for their growth and increasing popularity worldwide. Other factors that contribute to the popularity of ETFs as investment instruments are transparency, tax benefits, and the fact that they provide an easy and low-cost option for investors and institutions to diversify their portfolios, saving them the trouble of choosing individual stocks (Sheth et al., 2023; Pfister and Kendzia, 2023).

The S&P 500 was launched in 1993 and quickly became one of the world's most popular and traded ETFs (Omar et al., 2021). It is an index that is made up of a diversified portfolio of the 500 largest publicly traded companies in the United States of America (USA) and is frequently used as an indicator of the general performance of the North American and global stock market (Dichtl, 2020; Figà-Talamanca and Patacca, 2022).

According to Investing (2024) data, the S&P 500 obtained an average annual return of 8.61% between 2002 and 2023, while the Euronext 100 obtained an average annual return of 4.98% for the same period. These historical results have contributed to the great importance that the S&P 500 acquired among investors, being increasingly used as a reference to compare the performance of their investment portfolios (Dichtl, 2020; Pavlova and Sikorskaya, 2023). Many investors consider that investing in the S&P 500 is a good investment strategy because it is a way of participating in the USA stock market with a high level of diversification and because, on average, this index manages to provide a higher return than active management strategies (Ikenberry et al., 1998; Frino and Gallagher, 2001; Akey et al., 2021).

The 2013 Nobel Prize in Economics winner Eugene Fama presented the EMH in Fama (1970). Since then, it has been one of the most investigated hypotheses in the financial market. The EMH assumes that asset prices accurately reflect all relevant information and that markets are efficient. This assumption of market efficiency consequently means that investors cannot consistently "beat the market", as any new relevant information is quickly incorporated into asset prices (Malkiel, 1989; Timmermann and Granger, 2004).

However, the EMH has often been criticized by academics for its limitations. The first limitation is that it assumes perfect rationality from the investors. There are an increasing number of studies that show that investors often make

decisions based on emotions, cognitive biases, and irrational patterns of behavior, which calls the EMH into question (Dichtl, 2020; Costa, 2022a; Figà-Talamanca and Patacca, 2022; Khare and Kapoor, 2024). Additionally, the EMH states that prices reflect "all available information", but the nature of the relevant information is ambiguous and complex and, therefore, it is not clear how this different information is incorporated by the market and at what speed (Chen, 2024; Zarattini et al., 2024). Yosepha et al. (2024) state that this complexity creates uncertainty about the degree of efficiency markets achieve. Furthermore, Adrian et al. (2017) state that during periods of crisis or in less liquid markets, it can be difficult for investors to carry out transactions at the "correct" price, which again challenges the notion of market efficiency. Finally, it is important to emphasize that a set of studies points out strategies capable of providing higher returns than the market. Therefore, the existence of these successful strategies demands a reassessment of the EMH, recognizing that, although markets are vastly efficient, there are opportunities that investors can identify and thus obtain market-beating returns consistently (Bryan, 2006; Dichtl, 2020; Li et al., 2022; Sheth et al., 2023; Pfister and Kendzia, 2023).

A potential path for trying to outperform a passive strategy of buying and holding the S&P 500 is to apply investment strategies based on the fundamental analysis of companies (Dichtl, 2020; Moura and Neves, 2024; Fatouros et al., 2024). In this sense, Anwaar (2016), Farooq et al. (2021), and Yosepha et al. (2024) indicate that the ROA is a crucial indicator for determining the return on stocks, as it allows for the evaluation of a company's effectiveness level in terms of generating profits based on its total assets.

Bin (2020) analyzed whether the ROA of North American companies can provide a higher return than the one provided by the S&P 500. To this end, the author gathered data from companies in the same index between 2006 and 2020. The results confirm the study by Marvin (2015) and demonstrate that an increase in the ROA can provide a higher return than the S&P 500. The authors state that these results are because the ROA can properly assess companies' financial health, even during periods of economic recession.

Given the above, we formulate our first research hypothesis.

Hypothesis 1: Euronext companies with increased ROA present higher returns than those of the S&P 500.

Xiong et al. (2021), in their study of stocks listed on the Chinese stock exchange, demonstrated that larger and more profitable companies tend to present higher returns than the market. The results align with those presented by Ribeiro and Quesado (2017) for Portugal and Farooq et al. (2021) for Australia, Brazil, Canada, Germany, India, Indonesia, the UK, and the USA. Therefore, we propose the following hypothesis:

Hypothesis 2: Larger European companies present higher stock returns than those of the S&P 500.

Ribeiro and Quesado (2017), Poretti and Heo (2022), and Yosepha et al. (2024) consider companies' debt to be relevant for the stocks to be able to present higher returns than those recorded by the market. Costa et al. (2024a) indicate that a reduction in debt causes companies to pay less interest and reduces the risk of insolvency. Likewise, less indebted companies have greater flexibility when handling market opportunities and economic recessions. Therefore, we formulate our third research hypothesis:

Hypothesis 3: Companies with lower leverage in the Euronext market present higher returns than those of the S&P 500.

In their study, Rahayu and Wardana (2021) aimed to determine whether a set of financial indicators of companies listed in the Jakarta Islamic Index could provide a higher return than the market in which they operate. To do this, they gathered data from all the companies that were part of the index between 2009 and 2018 and used the panel data methodology. The results suggest that the current ratio and the payout index indicators cannot provide profitability above the market. Ribeiro and Quesado (2017) presented similar results in their study of the Portuguese capital market. Although we did not find a statistically significant relationship in the literature, we propose the following research hypotheses:

Hypothesis 4: Companies with higher current ratios in the Euronext market present higher returns than those of the S&P 500.

Hypothesis 5: Companies with higher payout ratios in the Euronext market present higher returns than those of the S&P 500.

Data, Variables, Methodology

Sample

The information was collected from 311 non-financial companies listed on the stock exchanges in Amsterdam (41), Brussels (48), Lisbon (22), and Paris (200) between the years 2017 and 2022. As in the study by Costa et al. (2024b), all the data were obtained from The Wall Street Journal website.

Variables

Dependent variable

Based on several studies, such as the ones by Brown and Warner (1980), Martani and Khairurizka (2009), Kolb and Tykvova (2016), Dimitrova (2017), Rathnayake et al. (2019), Poretti and Heo (2022), Holiviana et al. (2023), and Kiesel et al. (2023), we use the abnormal returns, which can be calculated as follows:

$$R_{it} = \ln(P_t) - \ln(P_{(t-1)}) \quad (1)$$

$$Mr_t = \ln(Pm_t) - \ln(Pm_{(t-1)}) \quad (2)$$

Where P is the stock price; Pm is the value of the S&P 500; R_{it} is the annual stock return; Mr_t is the annual return of the S&P 500.

The abnormal return (AR_{it}) is the real excess return over the return of the S&P 500 and will represent the dependent variable in the estimated models.

$$AR_{it} = R_{it} - Mr_t \quad (3)$$

Independent variables

Table 1 shows the independent variables and their calculation to test the research hypotheses.

Table 1: Presentation of the independent variables

Code	Description	Calculation form	Expected sign	Authors who used
Size	Size	Ln (Total Assets)	+	Ribeiro and Quesado (2017), Farooq et al. (2021), Xiong et al. (2021)
Liq	Liquidity	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	+	Ribeiro and Quesado (2017), Rahayu and Wardana (2021)
Lev	Leverage	$\frac{\text{Total Liabilities}}{\text{Total Assets}}$	-	Poretti and Heo (2022), Yosepha et al. (2024)
ROA	Return on Assets	$\frac{\text{Ebit}}{\text{Total Assets}}$	+	Bin (2020), Marvin (2015)
Pay_Rat	Payout ratio	$\frac{\text{Dividends}}{\text{Net Income}}$	+	Rahayu and Wardana (2021), Ribeiro and Quesado (2017)

Methodology

The general equation estimated is given by equation (4).

$$AR_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 Liq_{it} + \beta_3 Lev_{it} + \beta_4 ROA_{it} + \beta_5 Pay\_Rat_{it} + \varepsilon_{i,t} \quad (4)$$

We used the panel data methodology while estimating the coefficient parameters of equation (4) and called it model 1, similar to other authors, such as Rahayu and Wardana (2021), Abbas (2022), and Fernandes and Costa (2023). Additionally, we used the GMM methodology to

compute equation (4) coefficients to strengthen the results. We called it model 2, where GMM is used to mitigate possible endogeneity problems, which occur when independent variables correlate with the regression models' error terms (Ang et al., 2020). The GMM addresses this problem through instruments correlated with the independent variables but not with the error terms, ensuring more accurate and robust estimates (Guedes et al., 2024; Jungo et al., 2024).

Descriptive statistics

Table 2 presents the descriptive statistics of the variables analyzed in the study.

Table 2: Descriptive statistics of the variables

Variables	Mean	Median	S. D.	Min	Max
AR_{it}	-0.13	-0.11	0.51	-8.14	3.80
Size	7.05	7.06	2.42	0.45	12.60
Liq	3.21	1.38	27.00	0.27	916.00
Lev	0.98	0.60	11.50	0.00	359.00
ROA	0.40	0.03	7.39	-1.79	230.00
Pay_Rat	0.40	0.20	2.94	-82.00	54.50

The average value of the dependent variable is -0.13, which means that, on average, Euronext stocks performed worse than the market.

Empirical Results

Table 3 shows the results obtained in the regressions.

Table 3: Model 1 and 2 results

Model	1	2
AR_{it} (-1)	-	0.08
Size	0.03***	0.32**
Liq	0.00	0.00
Lev	-0.19**	-0.14*
ROA	0.00*	0.01*
Pay_Rat	-0.00	-0.00
Const	-0.26**	-
Number of observations	1,814	1,212
R^2 (Overall)	0.08	-
F-test	1.91 (0.00)	-
Hausman (p-value)	12.26 (0.03)	-
Wooldridge (p-value)	4.14 (0.04)	-
Sargan	-	64.45 (0.22)
Wald	-	13.34 (0.00)
Hansen over-identification	-	12.55 (0.18)

*Notes: The F, Hausman, and Wooldridge tests allowed us to conclude that the fixed effects model with standard errors is the most suitable type of regression for Model 1. The Sargan, Wald, and Hansen tests allow us to conclude that Model 2 is valid. T statistics: *** significance level of 1%, ** significance level of 5%, * significance level of 10%.*

Models 1 and 2 suggest that company size and profitability have a positive and statistically significant effect on the abnormal return of Euronext stocks. These data suggest that larger and more profitable companies tend to generate higher returns than those provided by the S&P 500. These results align with those presented by Ribeiro and Quesado (2017) and suggest that company size can provide lasting competitive advantages, such as economies of scale. Besides, these results confirm Bin's (2020) conclusions, which indicate that an increase in ROA signals that companies have good management and are improving their operational efficiency. These factors attract investors and increase stock returns.

Moreover, companies' indebtedness has a negative and statistically significant effect on the abnormal return of Euronext stocks. According to Yosepha et al. (2024), this result can be explained by the financial risk associated with the increased level of debt. Highly indebted companies tend to have higher interest payment costs and a greater risk of insolvency, which can discourage investors and result in lower returns (Yosepha et al., 2024).

The results also align with the studies by Ribeiro and Quesado (2017) and Rahayu et al. (2021) and reveal that liquidity and dividend policy are not variables capable of determining the abnormal profitability of Euronext stocks.

Considering this, we validate Hypothesis 1, Hypothesis 2, and Hypothesis 3 and reject Hypothesis 4 and Hypothesis 5.

We used the following independent binary variable in Models 3 and 4 to strengthen the results (see Table 4). Models 3 and 4 are estimated using the same methodologies applied previously to estimate equation (4) coefficients, but the independent variables of (4) are substituted by the newly created variable Set (equation (5)).

$$\text{Set}_i = \begin{bmatrix} \text{Set}_i(1) \text{ if } \begin{bmatrix} \text{Size}_{it} - \text{Size}_{it-1} > 0 \\ \text{Lev}_{it-1} - \text{Lev}_{it} > 0 \\ \text{ROA}_{it} - \text{ROA}_{it-1} > 0 \end{bmatrix} \\ \text{Set}_i\ (0) \text{ if any of the conditions are not met} \end{bmatrix} \quad (5)$$

Table 4: Model 3 and 4 results

Model	3	4
AR_{it} (-1)	-	0.08
Set	0.25***	0.19***
Const	-0.20***	-
Number of observations	1,531	1,218
R^2 (Overall)	0.08	-
F-test	2.49 (0.00)	-
Hausman (p-value)	0.04 (0.84)	-
Wooldridge (p-value)	2.93 (0.08)	-
Sargan	-	64.42 (0.26)
Wald	-	29.75 (0.00)
Hansen over-identification	-	14.63 (0.15)

*Notes: The F, Hausman, and Wooldridge tests allowed us to conclude that the random effects model is the most suitable type of regression for Model 3. The Sargan, Wald, and Hansen tests will enable us to conclude that Model 4 is valid. T statistics: *** significance level of 1%.*

Robustness tests confirm that when companies improve their fundamental metrics (size, debt, ROA), their stocks obtain above-market returns. These results are essential for all investors in

Euronext stocks and show that it is possible to obtain higher returns than those presented by the S&P 500, as long as there is healthy growth in the companies, with a focus on efficiency and prudent debt management.

Conclusion

This study sought to determine whether it is possible to build an active investment strategy based on the selection of individual Euronext stocks that can obtain more significant returns than those offered by the S&P 500. To this end, data were analyzed from non-financial companies present on the stock exchanges of Amsterdam, Brussels, Lisbon, and Paris between 2017 and 2022.

Empirical results demonstrate that companies that increase their size perform better than the S&P 500. On the other hand, this study suggests that companies with less debt tend to be more highly valued by the market, possibly because investors see them as less risky and more sustainable in the long term. Finally, ROA had a positive and statistically significant impact in determining higher returns than those provided by the S&P 500, suggesting that companies that increase their efficiency tend to generate higher returns for their shareholders than those offered by the market average. Therefore, this work indicates that investors can obtain higher returns than those provided by the S&P 500 if they rigorously analyze Euronext companies' growth, financial strength, and profitability.

These results have important implications for managers and investors. For managers, the conclusion highlights the importance of focusing on strategies that seek growth and promote companies' financial sustainability and operational efficiency. From the point of view of investors, this work can be of great help, as they can use the indicators presented in this study as essential criteria in their selection of companies with the potential to generate returns above the market average.

This work has some limitations, as it needs to consider the valuable contribution that technical analysis can make in determining abnormal stock returns (Zarattini et al., 2024). For future studies, we suggest creating a hybrid model that captures fundamental and technical variables. Furthermore, another promising line of research would be to investigate the impact of auditing practices, particularly delays in releasing financial reports, as discussed by Phillips and Sutandi (2022).

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