

Original Research Paper

ETFs in European Emerging Markets: Performance, Risk and Sustainability

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Abstract: Over the past few decades, Exchange-Traded Funds (ETFs) have become one of the most innovative financial instruments traded in financial markets. The aim is to offer an overview of the ETF market in Emerging Europe through a study on performance, risks and sustainability. The research examines the costs, the performance of the fund over calendar year periods (annual return), the volatility measurements (standard deviation and Sharpe ratio), the components of modern portfolio theory (R-squared, alpha and beta) and the sustainability measurements (Morningstar Portfolio Corporate Sustainability Score and the Portfolio Carbon Risk Score). It is developed through the collecting and re-elaborating of a data set of 46 ETFs in emerging Europe published on www.morningstar.co.uk using a screener tool. Data are collected on October 7th, 2023. The study uses an age-cohort analysis which is a method to analyze and evaluate changes in the behavior of a group with a common demographic feature in a given period of time. In particular, the analysis puts in evidence the value of some parameters of the cohort of funds in the period 2005-2022. Results of the study show that ETFs continue to have a positive performance, resisting the negative economic and social context and the investors' attention to sustainable ETFs, especially in recent years, has increased. The findings will serve as an important point of reference for investment choices for building a profitable portfolio for the investor. This study contributes to the current understanding of how ETFs are developing in emerging Europe and how investments must always be oriented towards ethical and sustainability principles.

Keywords: Exchange Trade Funds, Performance, Risk, Sustainability, Age Cohort Analysis

Introduction

Exchange Traded Funds (ETFs) are passively managed mutual investment funds traded on organized markets (Cullen, 2023). They recorded a relevant growth in the last years thanks to transparency, intra-day liquidity, diversification and easy access to international markets that characterize them (Antoniewicz and Heinrichs, 2014; Barnhart and Rosenstein, 2010; Marszk and Lechman, 2020).

The European ETF market is very resilient (Le Sourd and Safaee, 2021). In 2022, despite difficult financial market conditions, passive funds held up better than active funds, attracting annual positive net flows of €78.4 billion. However, collection in 2022 was lower than in 2021 in which 160 billion euros were recorded. Furthermore, assets under management fell to 1.32 trillion

euros in 2022 from 1.41 trillion in 2021 (www.morningstar.it).

In the last few years, the investors diversify into Emerging European markets to reduce their portfolio risk. Moderate correlations in the Emerging market investments and lack of long-term co-movements with equity returns in developed markets allows to reduce risk (Syriopoulos, 2006). Central and Eastern European are characterized by a more political and economic stability, reducing the risks associated with the instability of the Emerging economies (Hilliard and Le, 2022).

Furthermore, in recent years, the Environmental, Social and Governance (ESG) ETFs is strongly growing, recording in the European market values exceeding those in the United States both in terms of number of products and assets under management.

This study examines ETFs investing in Emerging Europe. The aim is to offer an overview about the European emerging market for ETFs, with a focus on performance, risk and sustainability. In particular, we examine the costs, the performance of the fund over calendar year periods (annual return), the volatility measurements (standard deviation and sharpe ratio), the components of modern portfolio theory (R-squared, Alpha and Beta) and the sustainability measurements (Morningstar Portfolio Corporate Sustainability Score and the Portfolio Carbon Risk Score).

The study is developed through the collection and re-elaboration of a data set of 46 ETFs in Emerging Europe published on www.morningstar.co.uk using screener tool. Data are collected on October 7th, 2023. The study uses an age cohort analysis to put in evidence the value of some parameters (annual return, risk, modern portfolio theory, sustainability) of the cohort of funds in the period 2005-2022.

This study contributes to the enrichment the literature on how ETFs are developing also in Emerging Europe and on how investments must always be oriented towards ethical and sustainability principles.

The study is organized as follows. Paragraph 2 provides literature on ETFs. The study considers the literature on ETFs in European Emerging market and the literature on sustainable ETFs. Paragraph 3 describes the data and the methodologies adopted. Paragraph 4 proposes the application of the methodology to the data collected. Conclusions summarize the main results and discuss how these can be used to draft policy recommendations.

Literature Review

ETFs are index funds that replicate the performance of the baskets of underlying securities and allow the investor to passively manage their capital. Their peculiarity is that they are listed like very normal shares that can be traded continuously throughout the stock market session (Agapova, 2011).

The ETF is a typical example of a passively managed financial instrument. In fact, with passive management the manager tends to replicate the performance of the reference market as faithfully as possible, minimizing his own free decisions.

ETFs were born in the early 1990s. The first real ETF was listed in Canada on 1990, 9 March, it was the Toronto 35 Index Participation Fund, a fund capable of precisely replicating the blue chip index listed on the Canadian market.

After three years the United States market launches its first ETF, the S&P 500 depository repeat, this fund replicates the standard and Poor's 500 index. It was very successful.

In 1996 Morgan Stanley subsidizes and promotes Barclays' first ETF which launched a fund that replicated

investments on a cross-national basis, Barclays' Global Investors. A long series of listings followed both in the United States and in Europe and in less than 20 years ETFs came to account for around 10% of the entire global investment fund market.

As regards the European ETF market, the first instruments were created in April 2000: The pioneer exchanges were those of Frankfurt and London, followed by Zurich, Stockholm and Euronext.

In Italy, the first ETFs traded date back to September 30, 2002; in addition to the classic ETFs indexed to Euro STOXX, down jones and S&P 500, they also included those linked to S&P/Mib, Nasdaq 100 and government bonds and euro area bonds (Tsalikis and Papadopoulos, 2019).

In the past decade, many studies were on ETFs, with a particular focus on their performance and tracking efficiency. Wong and Shum (2010) examine the performance of a sample of ETFs in 1999-2007 and observing Sharpe ratio they put in evidence that ETFs realized returns in the bullish market higher respect to the bearish market. In particular, some other studies put in evidence the nothing alike in performance between ETFs and index mutual funds and whether these financial instruments are substitutes. Aber *et al.* (2009) analyze a sample of US-based ETFs and put in evidence that these funds are inclined to trade at premium and not at a discount.

Furthermore, literature have taken into consideration ETF volatility, the effect ETF trading has on the underlying assets and tracking error determinants, too. For example, by comparing the volatility of daily returns with the volatility of overnight returns of 24 international iShares ETFs, (Tse and Martinez, 2007) highlight that there are substantial differences between iShares ETFs that invest in Asian and European markets and iShares ETFs that they invest the North American and South American markets.

In recent years, the literature on ETFs has also focused on the growth of the financial markets of emerging economies and the sustainable ETF segment.

With reference to the first aspect, it is important to note that Emerging Europe is preparing to overtake developed Europe. According to the Gaub (2019), countries in the eastern part of the region such as Romania, Poland and Hungary will be richer than other countries in the European union by 2025.

Eastern Europe seems to have found a similar pace to that of other global markets, but it still has a long way to go to recover what it lost during the pandemic and following the war in Ukraine.

Converse *et al.* (2023) analyze a sample mutual funds and ETFs, showing that returns in countries where ETFs hold a large share of the equity were significantly more sensitive to global financial. This finding indicates that

ETFs are a new channel for international capital flows and make Emerging markets more vulnerable to economic cycles. Filippou *et al.* (2022) suggest that the demand of U.S. investors for foreign country ETFs was not significantly correlated with the foreign market volatility measures, limiting the benefits from international diversification. They find that ETFs in Emerging Europe are not significantly affected by changes in developed countries' volatility indexes.

Regarding to the second aspect, it is important to consider that ETFs, like other financial products, can include sustainability aspects, replicating indices that select securities based on financial, environmental, social and governance analyses (Marszk and Lechman, 2023).

In recent years, the European market for sustainable ETFs has grown significantly. During 2022, ETFs incorporating ESG criteria recorded 51 billion euros of inflows, equal to 65% of total flows to ETFs and Exchange Traded Commodities (ETCs).

Furthermore, investments in sustainable ETFs went from 235.3 billion euros in 2021-248.8 billion euros in 2022, corresponding to 18.8% of assets invested in ETFs and ETCs in Europe (up from 16.7% of 2021), a percentage that rises to 20.5% if ETCs are excluded (www.morningstar.it).

Materials and Methods

The study of the ETFs market has been carried out by the collection and elaboration of a data set of funds published on www.morningstar.co.uk using screener tool. We use this screener tool to find ETFs that meet some search criteria. In particular, we have selected ETFs considering all ETF Provider, all Fund Size (Mil/Bn), all ETF structure and only Europe emerging as geographical region. Data are collected on October 7th, 2023. Specifically, the sample consists of 46 ETFs in geographical region of the Emerging Europe. In research, we focus on the European Emerging ETFs industry because the ETFs on Emerging countries are a simple way to invest in the economies of these countries that are growing rapidly over the last few decades, as e.g., Hungary or Poland. This agrees to know ETF adoption in countries where macroeconomic situations and financial systems are formed by common factors.

ETFs in Emerging Europe are 0.54% respect to total funds (Table 1).

The sample is described taking into consideration three characteristics of the ETFs.

The first characteristic of the sample regards the inception date, i.e., the date on which the fund began its operations. Specifically, it shows an increase of the ETFs in the past twenty years; they passed from 32 in 2005-2016-14 in decade 2017-2022. The second characteristic

of the sample concerns the sector. The sample shows a prevalence on the total of funds in the industrials sector (43.48%), followed by those energy (30.43%) and financial services (26.09%).

A further characteristic is the Ongoing charge. It is the total expenses that investors pay each year under normal market circumstances. Ongoing charges replace the Total Expense Ratio (TER) and represent an accurate cost of fund ownership. In fact, they include professional fees, management fees, audit fees and fund custody fees, while they do not include performance fees.

Table 1: ETF by largest geographical regions. The table shows the number and the percentage compared to the total of the sector equity of the ESG funds of a data set of funds published on Morningstar on October 7th, 2023

Category	Number	Percentage compared to the total
Africa/middle east	12	0.14
Asia developed	199	2.32
Asia emerging	956	11.16
Australasia	153	1.79
Europe developed	1,979	23.10
Europe emerging	46	0.54
Japan	486	5.67
Latin America	93	1.09
North America	4,383	51.17
United Kingdom	259	3.02
Total funds	8,566	100.00

The ongoing charge are a fundamental variable. In particular, Bogle (2005) shown that “in investing, you get what you don't pay for. Costs matter. So intelligent investors will use low-cost index funds to build a diversified portfolio of stocks and bonds and they will stay the course. And they won't be foolish enough to think that they can consistently outsmart the market”.

Table 2 presents the descriptive statistics regarding the ongoing charge.

Table 2: Descriptive statistics on ongoing charge of ETFs (%). In the table several statistical analyses on costs to pay, from year to year, under normal circumstances, on the 46 ETFs are shown

	Value
Average	0.51
Min	0.00
Max	0.74
Mode	0.50
1° quartile	0.46
2° quartile	0.50
3° quartile	0.65
Skew	-1.30

The average value is equal to 0.51%. Still, the skew value results significant: In fact, this value represents a distribution that cannot be divided with a vertical axis into two equal mirror images. If the indicator value is negative, this means that the skewness distribution is directed towards more negative values.

From the methodological point of view, an age cohort analysis is developed to highlights the value of specific parameters of the cohort of funds in 2005-2022. The analyzed factors are annual return, the volatility measurements, the modern portfolio theory and the sustainability.

The performance indicates how an investment has grown or fallen over a set period of time. Investors may compare the performance of funds with similar investments.

The volatility measurements are standard deviation and Sharpe ratio. In particular, standard deviation is in percentage, as returns, while Sharpe ratio is measured with standard deviation and excess return to determine reward for unit of risk. The Sharpe ratio is one of the indicators frequently used to measure the performance of ETFs (Tsolas, 2022). Furthermore, in Europe, these volatility measurements showed a higher correlation with efficiency for ETFs (Henriques *et al.*, 2023).

The modern portfolio theory focuses on three indicators. The R-squared is a percentage value of fund movements that can be accounted through changes in its benchmark index. The R-squared of 100 indicates that all movements of the fund are perfectly correlated with its benchmark. On the contrary, a low R-squared indicates that small movements of the fund can be explained by movements in its benchmark index. Beta measures the volatility of a fund or a portfolio respect to the market. The R-squared can be employed to find the significance of a particular Beta. Generally, a higher R-squared will mean a more reliable Beta. If the R-squared is lower, then, Beta is less relevant than the performance of the funds. Alpha takes the volatility (price risk) of a fund and compares its risk-adjusted performance with a benchmark index. Alpha is also known as the residual return. The modern portfolio theory is a comprehensive analysis tool as it effectively uses market sentiment to predict low-risk, high-earning portfolios (Surtee and Alagidede, 2022). Furthermore, the modern portfolio theory can be useful to investors trying to construct efficient and diversified portfolios using ETFs.

Finally, the Morningstar Portfolio Corporate Sustainability Score and the Portfolio Carbon Risk Score are analyzed to show the sustainability level (Ben-David *et al.*, 2022). In particular, the Morningstar Portfolio Corporate Sustainability Score is an asset-weighted average of Sustainalytics' company level ESG risk rating. An ESG issue vary across companies and they should have a substantial impact on the economic value of a company

and therefore on the risk/return profile of an investment. The Portfolio Carbon Risk Score is the asset-weighted average of the carbon risk scores for a portfolio's covered, corporate holdings. The carbon risk score indicates the overall material risk a company faces from the transition to a low-carbon economy. To estimate the Portfolio Carbon Risk Score, Morningstar uses Sustainalytics' company carbon-risk ratings, which indicate the risk that companies face from the transition to a low-carbon economy. At least 67% of the portfolio assets should have a carbon-risk rating from Sustainalytics to calculate a score. The percentage of assets covered is rescaled to 100%. A lower score is better.

Results

Cohort analysis originated in demographic science. Currently, cohort analyzes are used in different scientific fields, including finance (Kock *et al.*, 2012).

Our study uses an age-cohort analysis that is a method to analyze and evaluate changes in the behavior of a group with a common demographic feature in a given period of time.

Before carrying out the study through age-cohort analysis, it is important to observe the performance recorded by the ETFs.

They register an average value of performance equal to -9.12% on October 7th, 2023 (Table 3).

Table 3 indicates how bad the 46 ETFs have performed on October 7th, 2023.

Table 3: Total returns of ETFs (%). Table indicate how the 46 ETFs performed on October 7th, 2023. The total return indicates the absolute return of the fund, over the past one, three, five and 10 years. It is expressed as a percentage

Category	Performance %				
	YTD	1 Yr	3 Yr	5 Yr	10 Yr
ETFs	-9.12	18.27	10.96	4.51	-1.49

Moreover, the current performance depends on irregular performance of the financial market and on the discontinuous performance characteristics of the fund manager, while it is not influenced by performance of the past. In fact, the performance is even higher and on average equal to 10.96% in a period of three years, while it is equal to 4.51% and in 10 years it is equal to -1.49% in the five years past performance.

Then, an age cohort analysis is applied to specific parameters that are annual return, risk, modern portfolio theory and sustainability. The cohort of ETFs refers to the period 2005-2022.

The 46 funds were clustered into three cohorts made up of five years. Each cohort was observed highlighted the trend of the parameters in the different periods. The age-cohort of the ETF is shown in Fig. 1.

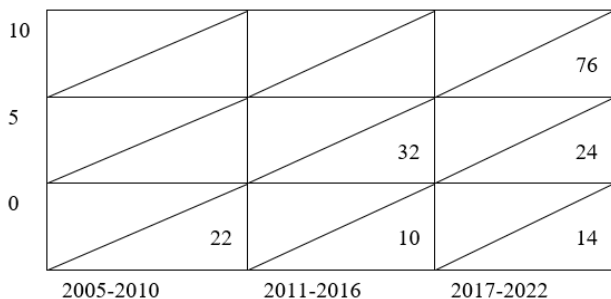


Fig. 1: Age-cohort of ETFs.
 Figure shows the three cohort of ETFs created on the date of birth

The first generation contains funds born between 2005 and 2010 that are equal to 22 in the first year’s life, to 32 after five years and to 76 after ten years. The second generation (2011-2016) regards 10 funds in the first year’s life, while it became more significant with 24 funds after five years. The third generation comprises 14 funds born between 2017 and 2022.

From the analysis of annual returns of each cohort, it is possible observe as all cohorts have a similar trend from 2016 to September 30, 2023, except 2022 (Fig. 2).

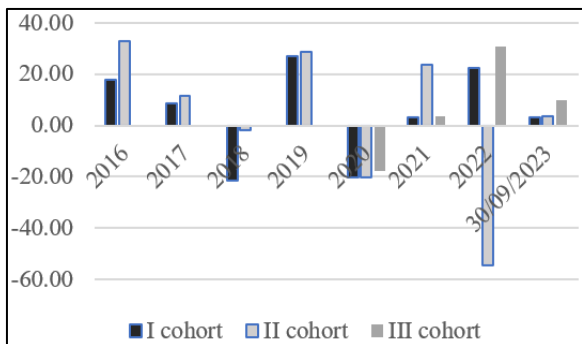


Fig. 2: Annual returns of cohorts of ETFs (%).
 Figure shows the average value of the absolute return of the cohorts of ETFs, in percentage

The three generations register positive annual returns in all the years excluding 2018 and 2020. Only the second generation has a negative annual returns also in 2022. The situation of the second generation can be attributed to the fact that in the cohort there are Russian securities, many of which suspended the calculation of the value of the shares, as well as subscriptions and redemptions, after the outbreak of the war in Ukraine. Specifically, higher values are registered in 2016 from the second generation (32.62%) and in 2019 from the first generation (26.92%). All generations in 2020 show negative values, respectively equal to -20.16 (I cohort), -20,07 (II cohort) and -17.88% (III cohort). To understand this trend in

2020, it is necessary to remember the serious economic consequences of Covid-19 and the measures to contain the pandemic (closures of production activities, travel restrictions, job losses, etc.) and the fiscal and monetary policies extraordinary to stimulate recovery.

In the third quarter of 2023, all generations demonstrate positive price returns, but with different values.

Observing the volatility measurements, all cohorts register a similar value of standard deviation. The first cohort shows the highest value of standard deviation equal to 41.66%, suggesting that most of the funds have a high volatility of returns. The first and third cohort show a positive value of the Sharpe ratio (respectively 0.38 and 0.60), while second cohort shows a negative value indicating a return below risk free (Fig. 3). From the numerical value of the Sharpe index of the second cohort, a return below risk free emerges, i.e., the performance of the asset is lower than the risk being assumed by investing in the same asset.

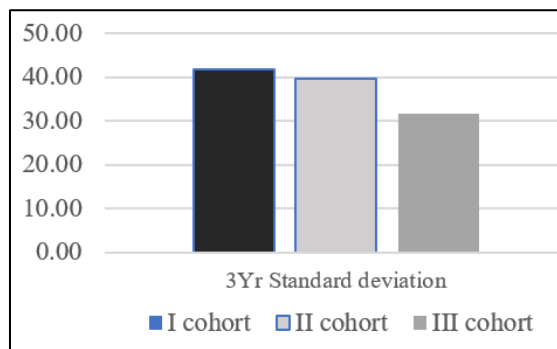
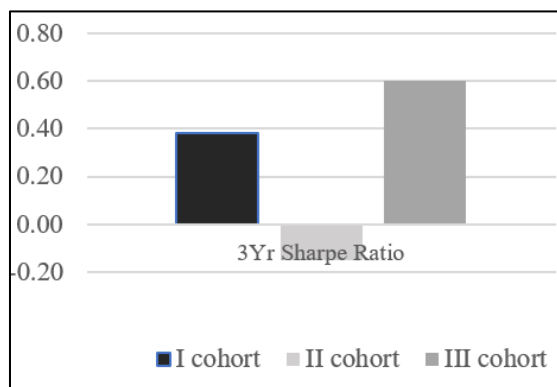


Fig. 3: Volatility measurements of cohorts of ETFs (%).
 Figures show the average value of the standard deviation and of the Sharpe ratio of each cohort of ETFs

The R-squared value of cohorts is high. This value shows a greater adaptation of the fund to the target market (Fig. 4).

Particularly, ETFs, born between 2011 and 2016, show the R-squared value equal to 99.97%. This suggests that more than 99% of the fund’s returns can be explained

by movements in the benchmark and this is true considering that ETFs passively replicate indices of various kinds.

The third generation shows the lower R-squared value (93.15%). A higher R-squared value specifies a more useful Beta. ETFs of the first generation register the R-squared value equal to 99.39% and a Beta just over 1. As it is known, if the beta exceeds one the stock it is considered “aggressive” as it amplifies market movements.

Smart Beta ETFs are recently being developed which aim to dominate the market or replicate it while taking on less risk. In fact, smart Beta ETFs track an index and offer the simplicity, transparency and low costs that are the typical advantages of passive investment vehicles that have the sole purpose of matching the market. However, smart beta ETFs are not attracting the same interest in Europe as in the United States.

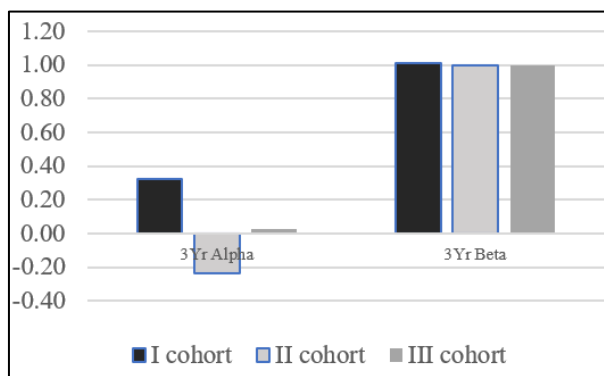
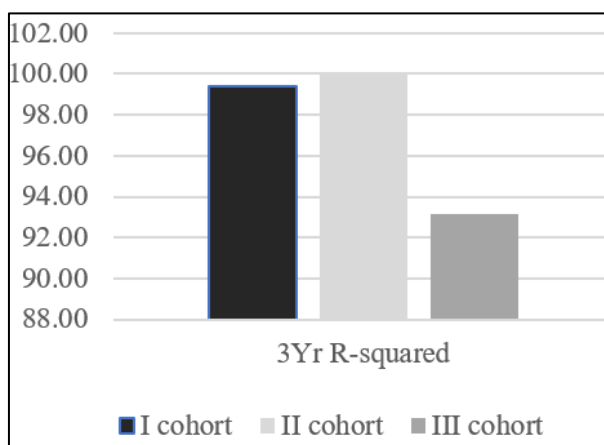


Fig. 4: Modern portfolio theory of cohorts of ETFs (%). Figures show the average value of R-squared, Alpha and Beta of cohorts of ETFs

Finally, in term of sustainability, it is important to highlight that there are differences in stock selection methodologies. In particular, the most common strategies are:

- The exclusion of stocks and companies that offer products and services in sectors considered controversial (such as weapons, tobacco, pornography and fossil fuels)
- The best-in-class approach, which selects the best securities by sector and geographical area from the point of view of ESG parameters
- The approach based on climate benchmarks (such as the EU Paris-aligned benchmark and the EU climate transition benchmark), designed to allow investors to align their portfolio with certain objectives for reducing climate-changing emissions

Sustainable ETFs can have different characteristics from the point of view of ESG criteria and risk/return profiles. In summary, each approach finds its own balance between two aspects: On the one hand, the adherence of the performances to the capitalization indices and the reduction of the so-called tracking error (i.e., the deviation between the performance of an ETF and that of its benchmark) and, on the other hand, the adoption of more or less stringent ESG criteria, also in response to the new regulations on sustainable finance (as regards the European context, see for example the Sustainable Finance Disclosures Regulation-SFDR).

On sustainability, the Morningstar Portfolio Corporate Sustainability Score was observed. Most scores range from 0-50, assigned to five risk categories:

- 0-9.99 negligible risk
- 10-19.99 low risk
- 20-29.99 medium risk
- 30-39.99 high risk
- 40 several risk

The I cohort presents a medium risk and has the following Corporate ESG Pillars: Environmental 6.52%, social 8.20% and governance 7.38%. The II cohort is characterized by approximately 60% of high risk while the remaining 40% is characterized by medium risk. In terms of Corporate ESG Pillars, the cohort is divided as follows: Environmental 10.07%, social 12.95% and governance 9.67%. The III cohort does not present the Morningstar Portfolio Corporate Sustainability Score. Finally, Portfolio Carbon Risk Score is analyzed. The average value of the cohorts is indicated in Table 4. The values of all cohorts express a low risk.

Table 4: Portfolio Carbon Risk Score of ETFs (%). Table indicates the average of the Portfolio Carbon Risk Score of the 46 ETFs performed on October 7th, 2023

Cohorts	Value
I	25.34
II	22.56
III	18.66

Discussion

This study was designed to contribute to the enrichment of the literature on ETFs across the European Emerging financial markets with particular regard to aspects relating to level of performance, risks and sustainability.

Our study used an age-cohort analysis that allowed to analyze and evaluate the behavior in terms of performance, risk and sustainability of a group of ETFs investing in Emerging Europe with a common demographic feature in a given period of time.

From a quantitative point of view, the average value of Ongoing charge of the 46 ETFs is 0.51%. This value allows to comprehend how a lot of investments has been absorbed by costs.

The performance of ETFs is negative (-9.12%). Observing a period of one year, the performance is even higher (18.27%); while in the three years past the performance is equal to 10.96% and in five years it is equal to 4.51%.

Cohort analysis grouped the sample into three cohorts with five years' extent in the period of 2005-2022 and it highlighted annual return, risk, modern portfolio theory and sustainability.

With regards performance, the generations have positive annual returns from 2016 to September 30, 2023, except in 2018 and in 2020. The second generation has negative annual returns also in 2022 due to the presence of Russian ETFs.

The volatility measurements of cohorts of ETFs show similar values of standard deviation and Sharpe ratio, except second cohort which registered a negative value of Sharpe ratio.

In term of portfolio theory, the values of the cohorts have respected the passive management of the portfolio management strategy. The latter allows to ETFs can repeat market indices or sectors, offering with a supple and cost-effective investment opportunities. In fact, including low costs, intraday trading, tax efficiency and access to various asset classes represent all important advantages offered by ETFs.

Finally, with regards sustainability, the cohorts had medium and high Morningstar Portfolio Corporate Sustainability Score and a low Portfolio Carbon Risk Score.

It is important to underline that these results could be read considering two particular situations. On the one hand, the outbreak of the pandemic emergency had an impact which, for a certain period, distanced investors from Emerging Europe considered riskier. On the other hand, the outbreak of the war in Ukraine meant that some Russian securities suspended the calculation of the value of the shares, as well as subscriptions and redemptions.

This study allows to reflect on the evolution of ETF markets in Emerging Europe according to other scientific studies. Thanks to the application of a specific methodology and to the attention even toward the sustainability on these financial instruments. Our study intends to contribute to the scientific debate on the relevance of ETF in developing a better financial market more and more careful toward non only returns and risks but also sustainability principles.

Conclusion

ETFs have grown significantly over the past decades and have become a financial instrument in which retail and professional investors have shown investment interest. The study leads to several conclusions.

First, ETFs continue to have a positive performance, resisting to the negative economic and social context. Thanks to low costs, simplicity of buying and selling and to active ETF strategies particularly suited to helping investors build the 'strategic core' of their portfolios, ETFs have been able to achieve these results. This so, it is interesting to think about future development of ETFs increasingly oriented to a responsible management of traditional resources. Considering these observations, a sustainable future, based on an economic growth and a real improvement of the social conditions, can be guaranteed.

Secondarily, as interest in sustainable ETFs has increased, the offering of these products has also grown. In this way, the investor can choose the solution that best suits his needs and sustainability preferences. In particular, investors can select a large number of ETFs, incorporating sustainable strategies into their investment decisions. In fact, some ETFs invest in companies that encourage environmental and social issues.

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Author's Contributions

The study is the fruit of the joint work of all the authors who participated in the data collection, coordinated the data analysis and contributed to the writing of the manuscript.

However, Rosa Adamo mainly contributed to sections "Introduction" and "Discussion"; Domenica Federico to sections "Literature Review" and "Materials and Methods"; Antonella Notte to sections "Results" and "Conclusion".

Ethics

This article is original and contains unpublished material. The corresponding author confirms that all of the other authors have read and approved the manuscript and no ethical issues involved.

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