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**THE DEMOCRATIZATION OF DIVERSIFICATION:
HOW EXCHANGE-TRADED FUNDS (ETFs) ARE TRANSFORMING
INVESTMENT STRATEGIES***Received 27 December 2024; accepted 30 December 2024; published 03 January 2025*

Abstract. *This article explores the transformative impact of Exchange-Traded Funds (ETFs) on modern investment strategies, emphasizing their role in democratizing diversification. ETFs are presented as versatile financial instruments that enable both professional and individual investors to access diversified portfolios at relatively low costs. The paper discusses the mechanics of ETF creation, trading, and redemption, along with their advantages, including transparency, liquidity, and cost efficiency. It also addresses potential drawbacks, such as liquidity challenges, tracking errors, and systemic market risks. The evolving role of ETFs in financial markets is contextualized with technological advancements like artificial intelligence and machine learning, which enhance portfolio management capabilities. Additionally, the article examines the implications of passive investing on market efficiency, stock liquidity, and active management, offering a balanced perspective on the future of ETFs in portfolio management.*

Keywords: *Exchange-Traded Funds (ETFs), investment strategies, portfolio management, market efficiency, index tracking, stock liquidity, risk management.*

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Introduction

The Democratization of Diversification: How Exchange-Traded Funds (ETFs) are Transforming Investment Strategies

Similar to individual equities, Exchange-Traded Funds or ETFs are funds consisting of securities that mimic an index, bond, commodity or a pool of assets (Clements, 2020a). Exchange traded funds or ETFs are financial investment instruments listed on the stock exchange. A number of investors that include professional and individual investors have developed an interest in Exchange Traded Funds (ETFs). ETFs are gadgets that enable the investor to invest in a vast number of securities at once; to invest in the average of those stocks (Miziołek et al., 2020a). ETFs are investment structures like mutual funds which have welcomed a significant boost in the last couple of years.

Methods***How an ETF is Set-Up***

Many of the concepts associated with ETFs are similar to those executed by open-end and close-end mutual funds; however, an ETF has its peculiarities. An Exchange-Traded Fund (ETF) can only be created through a number a procedures, entities, and processes. Out of the objective, the aim is to create a fund that has liquidity, which will mimic the target index or investment plan in addition to being attractive to investors (Schizas, 2014). It is not easy and involves coordination of

many organizations and must adhere to the laws. Apart from the sponsor, index provider, and Authorized Participants (AP), the custodian of the assets, the fund administrator, regulating authorities and an exchange platform can be considered significant (Pavolova et al., 2021).

First, ETF providers or sponsors do not make creations directly to investors or institutions. Instead, the ETF provider creates shareholders by distributing ETF shares to APs, which are typically market-makers or brokerages after an exchange of creation units (Cullen, 2023). An Equity ETF consists of component stocks and APs will purchase or obtain physicals of the component stocks largely in lots of 50,000 shares to create a single creation unit (Lehman, 2024). Actual Purchases then exchange this creation unit for the sponsor's ETF shares. APs are then the legal owners of the ETF shares which they can sell in the market.

The element of innovation is in the fact that ETFs provide clients with the opportunity to invest in certain strategies that were not available or were costly before, for instance, hedge funds (Marszk and Lechman, 2024). They also possess the right to challenge the modern asset management industry as a disruptive recurrence. This is because many traditional active managers and hedge funds get a large chunk of their active performance through bets on the factors whether it is value or growth style that can be purchased via index funds and ETFs at a minimal cost (Barroso and Detzel, 2021). The shared feature of ETFs is that most can be bought and sold during the trading day on an exchange.

Buying the Shares or Just an Index

Exchange-Traded Funds consist of purchase and ownership of the underlying shares. When new ETF shares are being created, APs purchase a package of such securities which the ETF proposes to track (Miziołek et al., 2020b). This basket replicates the make-up of the index or the strategy of the ETF as it is when investing in it. The overwhelming majority of ETFs implies the direct purchase and ownership of the securities that compose an index or correspond to the investment company's strategy (Braun, 2016). This is the case because the Exchange-Traded Fund (ETF) moving along the index or strategy gives transparency as well as liquidity to the investors. Like mutual funds and Unit Investment Trusts (UIT), ETFs also have redeemable shares which means that they are related to both the open-end investment companies (Bakhri et al., 2021). Still, unlike mutual funds and UITs, ETFs are traded on the national securities exchanges. In that regard, ETFs are a kind of closed-end funds.

Buying ETF Shares

The fundamental means of obtaining ETF shares are as follows: Initial creation and selling; selling by the APs based on creation and redemption demands and supply; and on the stock exchange by every investor (Henriques et al., 2022). Moreover, the component stocks are purchased and when necessary, changed to reflect more index change or to reinvest dividends. This continues to make ETFs capable of mimicking their intended indices and delivering on investors' needs. Whenever needed, new creation units for ETFs and, consequently, new shares of ETFs can be created. ETF shares may also be redeemed through another method of an in-kind transfer from an AP to the ETF provider (Methling and von Nitzsch, 2019). Redemption takes place when the AP wants to sell the basket of stocks on behalf of the ETF, which in turn trims the number of shares of the ETF. Due to the creation and redemption of ETFs the shares outstanding in ETFs can change from one trading day to the other (Pessina and Whaley, 2021).

Results

Impact from ETFs on The Stock Market and Indices

Indexation hypothesis state that the passive investment through ETF having reduced detrimental impact on the market quality of the basket securities (Liebi, 2020). However, there are fears that ETF trading results in similar volume and liquidity in the underlying securities, as well as increased reliance on it for trading-acquired return co-movement. On this basis, it can be claimed that a higher pairwise return connectivity undermines the process of price formation and active managers' capacity to deliver alpha (Sherrill et al., 2020). For example, index-oriented exchange

traded funds ETFs increase the intensity of stock return synchronisation. But a newer line of concern that has been advanced is that the products may also create other market-wide systemic issues due to the network externality they create through arbitrage possibilities (Clements, 2020b). A very related issue is that ETF trading displaces volume and liquidity in the actual stocks mostly through Retail investors.

Stock Market Movements When Everyone Buys ETF

In the end, ETFs work like an individual stock, which makes them to be bought and sold when markets are open unlike the mutual funds which can only be traded in at the end of the day at the net asset value (Cheng et al., 2019). Thus, ETFs can be purchased based on limit, market or stop loss order and can be sold based on short selling including on the margin and using such derivatives making them important tools of risk management (Sakarya and Ekinci, 2020). In addition, ETFs are substantially more varied as investment products than futures securities. There is no attempt at market prediction involved in passive strategies and the approaches are principally limited to the hope of attaining lower transaction costs and diversification to increase and stabilize returns with respect to the single stocks (Marszk and Lechman, 2020b).

However, stock prices will continue to fluctuate within individual stocks due to events that are specific to that company. These events include earnings' announcement, merger and acquisition, changes in the management, and new product releases. The overall shifting of the market trends depends on the changes that Gross Domestic Product (GDP) rate exhibits, the level of unemployment, inflation rates, and changes that the interest rates and Central Bank policies demonstrate (Yadav et al., 2024). These have an impact on the investors' perception as well as the general trend of the market. For the detailed market trends, which are socio-political and macro-economic factors, including news and currents carries an impact will prevail. This is just a perception that through majority of the retail investors a particular ETF is sold, whereas the institutional investors, hedge funds, and other active participants in the market will continue to trade on individual stocks based on their research and action plans (Marszk and Lechman, 2020a). Their actions will thus keep on affecting stock price.

If passive investing through ETFs is the only winning strategy, that might raise doubts about the efficiency of a market. Other market users, especially active ones, influence the formation of a stock's price because they develop and respond to new information. Inactivity can slow it down and this is perhaps what could happen when there is no active investment. In this case, the liquidity of stocks may decline if most of the trades are done in ETF securities. Certain stocks might turn less liquid; thus, volatility could be realized in cases of large trade transactions. A market risk might be a market with high levels of passive investment; large trades in ETFs impact all the stocks in the ETF. This could lead to more pronounced movements of the market as a whole (Kuang, 2024). For example, the market as a whole for oil. Thus, although ETFs help to simplify the investment process and achieve diversification, at the same time, the mechanics guarantee that stock prices will continue to change in response to fundamental factors, market conditions, and trading. Therefore, the stock market will still be characterized by other factors besides the ETFs buying and selling and the factors mentioned above.

Discussion

The Potential Drawbacks of using ETFs in Portfolio Management

However, there are also possible disadvantages while using Exchange-Traded Funds, more specifically with regard to the factors of liquidity and tracking errors. Furthermore, it is a mathematical fact that the broader and more general an index is, lesser will be the bid-ask spread of an ETF, and the reverse is also true: the more specialized, the higher the bid-ask spread of an ETF (Aspris et al., 2020). These ETFs are characterized by low turnover hence the issue of exiting a position will not guarantee the preferred price. Furthermore, as said earlier, ETFs mimic the returns of the index with which it is aligned but at times managers may not do it well. This tracking error can be a cost for the investors, who may experience the performance of the portfolio differ from the

desirable profile (Malhotra, 2023). Yet, in these circumstances, profit is made possible due to arbitrage and the market equilibrium price should be attained.

It must be noted that apart from long-term risk reduction, passive strategies do not allow for risk mitigation other periods, including bear markets, and are fundamentally opposed to the principles of investing (Marszk and Lechman, 2023). In fact, passive strategies have some drawbacks applicable on long-term investment where index funds or ETFs, being mostly market cap weighted franchises passive stocks and companies which increase the weight of the best performers and decrease that of the worst ones, which is absolutely in conflict with the concept of letting value to grow where one is supposed to buy low and sell high (Valadkhani and Moradi-Motlagh, 2023). The other one is the absence of macro and fundamental analysis, which leaves investors with purchasing a group of stocks ignoring its valuation and the risk pertaining to economy. Moreover, it is important to state that passive management might be profitable only in relation with existence of active management, which, of course, after having done accurate valuation, exerts pressure on the securities prices and brings them to fair value (Grund, 2020). Hence, if everyone goes passive it means there will not be balance in the stock market and that is why the inefficient active managers will outcompete their counterparts. On the other hand, the main critique of the active management is that it's worse than the benchmark on average, after accounting for fees. As for the passive strategies, their implication is low on the expense side, yet, they do not capitalize on market returns that which can be more than the benchmark.

The Future Potential of ETFs in Portfolio Management

The idea of sector ETFs exists because industry influences, that are to a larger degree related to the business cycle, have grown in significance whereas country effects have declined over time owing to greater integration of financial markets and globalization of businesses. In recent years, the emergence of the financial technology and deep learning attracted massive attention by various spectral of industry. The World Economic Forum also defined fintech as disruptive innovation (Parpieva et al., 2021). The changes catalysed by financial technologies have given birth to related advancements. The difference will be apparent as the market unfolds. Traditionalists are yet to fully grasp the various forms that it will take as the market develops. Artificial intelligence and deep learning came to transform virtually every business in the course of but a few years. In the field of stock market prediction, deep learning model known as recurrent neural network with time series forecasting and attention mechanism has endowed artificial neural networks with the computation capability of time and trend (Fiordelisi et al., 2023). Therefore, success in these areas brings more possibilities to forecast the future and make sound decisions.

Machine learning can be defined as a subfield of computer science involving the use of various statistical methods to enable a computer system to acquire knowledge on a specific matter with the use of data but without coding (Gurrib, 2022). It also permits robo-advisors with deep learning techniques to implement and to assist investors with the decision pertinent to the portfolio optimization model's forecast result (Cullen, 2021). Thus, public markets have developed to enable individuals to feel comfortable to invest in public equity and fixed income. Such development is required in private markets by implementing machine learning infrastructure (Malinda and Chen, 2022). Sociopolitical and technological advancements including enhancement of information and analytical tools enabled the individual investors to invest in large quantities in the public markets (Aithal et al., 2023).

Conclusion

ETFs and index products have been growing for over two decades with tremendous popularity. EFTs are managed investment funds that have been in operation since the early 1990s as an efficient and competent portfolio investment to the expensive mutual funds. They evolved from the unbelievably unpronounceable commodities to goliaths of the industry. More and more institutional investors together with retail investors apply passive instruments as increasingly significant components of their portfolios (Elegeti, 2021). It also should be noted that the structuring of these funds in the beginning was similar to the structuring of mutual funds. More

specifically, the index that the ETF tracked was obtained through the direct acquisition of the actual equities or the securities in the index (Madden, 2023). Since the structured products a lot of investors were in search for another investment vehicle for investment other than this structured products that they have invested on and they have invested on the ETFs being sold in the market today as simple and easily manageable investment products where they act similar to stock where the management and tracking can be easily done in the stock exchange (Smodis and Smore, 2020). However, investors' attempt to experience a higher return by assuming exposure towards less liquid emerging market equities and other assets through ETFs that provides assured market availability has, on the other hand, compel more innovation in product packaging from the financial intermediaries. Another part of the product innovation could also be related to dealers' desire to find other sources of funding in order to meet the Liquidity Coverage Ratio (LCR) standard under Basel III. For instance, some product structures are used where run-off rates on liabilities could be lowered while at the same time keeping maturities of liabilities short. Hence, ETFs are no longer just looked upon as the simple and low cost to tax-efficient mirco-ETF like plain vanilla products of the mutual fund industry but have tended to become much more complex and a wide-ranging kind of investment vehicle and replication strategies (Reich and Sass, 2021).

As stated by Korenak, B. et al. (2023), the bear market starting at the beginning of 2022 a limit made a universal unfavourable impact on the observed ETFs since they are all long-only ones. This timing also meant a change of the relative performance between value and growth styles and the dominance of the more defensive forms of investing as it is seen when market conditions change. Also, in the same line of reasoning, Korenak, B. et al. (2023) observed that the fail to establish size premium over the observed span supports investors' reliance on large-cap stocks as a stable asset. Moreover, the size effect had a wholly negative effect and the size drift happened among the ETFs that have a stated large-size investment strategy. Over this observed period, the value style shown a remarkable bounce back which was evident by the hikes in the book to price ratios, operating profits and by equally conservative polices on the investments yields better results than by the previous lengthier period.

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References

- Aithal, P.K.; Geetha, M.; Dinesh, U.; Savitha, B. and Menon, P. (2023). Real-time portfolio management system utilizing machine learning techniques. *IEEE Access*, vol. 11, pp. 32595-32608. <http://dx.doi.org/10.1109/ACCESS.2023.3263260>
- Aspris, A.; Foley, S.; O'Neill, P. (2020). Benchmarks in the spotlight: The impact on exchange traded markets. *Journal of Futures Markets*, 40(11), pp.1691-1710. <https://doi.org/10.1002/fut.22120>
- Bakhri, S.; Rana, M.; Pradini, A.Y. (2021). The Role of Exchange Traded Fund to Drive the Growth of the Mutual Fund Industry in the Capital Market According to A Review of Islamic Law. *At-Tijarah*, 3(1), pp. 42-59. <http://dx.doi.org/10.52490/at-tijarah.v3i1.1264>
- Barroso, P.; Detzel, A. (2021). Do limits to arbitrage explain the benefits of volatility-managed portfolios? *Journal of Financial Economics*, 140(3), pp. 744-767. <https://doi.org/10.1016/j.jfineco.2021.02.009>
- Braun, B. (2016). From performativity to political economy: index investing, ETFs and asset manager capitalism. *New political economy*, 21(3), pp. 257-273. <https://doi.org/10.1080/13563467.2016.1094045>
- Cheng, S.; Massa, M.; Zhang, H. (2019). The unexpected activeness of passive investors: a worldwide analysis of ETFs. *The Review of Asset Pricing Studies*, 9(2), pp. 296-355. <https://doi.org/10.1093/rapstu/ry011>
- Clements, R. (2020a). Exchange-traded confusion: How industry practices undermine product comparisons in exchange traded funds. *Va. L. & Bus. Rev.*, 15, p.125. <https://dx.doi.org/10.2139/ssrn.3680219>
- Clements, R. (2020b). New Funds, Familiar Fears: Do Exchange Traded Funds Make Markets Less Stable? Part I, Liquidity Illusions. *Hous. Bus. & Tax LJ*, 20, p. 14. <https://hbtlj.org/wp-content/uploads/2021/10/Clements.pdf>
- Cullen, J. (2023). Exchange-traded funds, capital market efficiency and systemic risk. In *Research Handbook on Global Capital Markets Law* (pp. 318-333). Edward Elgar Publishing. ISBN: 978 1 80037 929 9

- Cullen, J. (2021). Exchange-traded funds (ETFs) and FinTech: Market efficiency and systemic risk. In *Routledge Handbook of Financial Technology and Law* (pp. 227-244). Routledge. E-ISBN 9780429325670
- Elegeti, V. (2021). Rebalancing of exchange traded funds in stock market using option trading strategies. *Ekonomia i Prawo. Economics and Law*, 20(3), pp. 513-527. <https://doi.org/10.12775/EiP.2021.031>
- Fiordelisi, F.; Galloppo, G.; Lattanzio, G.; Paimanova, V. (2023). Looking at socially responsible investment strategies through the lenses of the global ETF industry. *Journal of International Money and Finance*, vol. 137(C). <https://doi.org/10.1016/j.jimonfin.2023.102917>
- Gurrib, I. (2022). Machine learning and portfolio management: a review. *Annals of Mathematics and Computer Science*, 5, pp. 31-43. <https://annalsmcs.org/index.php/amcs/article/view/60/35>
- Grund, S. (2020). Exchange-Traded Funds (ETFs) and Systemic Risk. <https://dx.doi.org/10.2139/ssrn.3583028>
- Henriques, C.O.; Neves, M.E.; Castelão, L.; Nguyen, D.K. (2022). Assessing the performance of exchange traded funds in the energy sector: A hybrid DEA multi objective linear programming approach. *Annals of operations research*, 313(1), pp. 341-366. <https://doi.org/10.1007/s10479-021-04323-6>
- Korenak, B.; Stakić, N.; Vesić, T. (2023). Understanding the dynamics of investment factors and exchange-traded funds performance in the US market 2018-2022. *International Review*, (3-4), pp. 125-135. <https://doi.org/10.5937/intrev2304123K>
- Kuang, W. (2024). The heterogeneity of the diversification effect of sustainable development goals related exchange-traded funds. *Journal of Sustainable Finance & Investment*, 14(2), pp. 366-387. <https://doi.org/10.1080/20430795.2021.1992336>
- Lehman, R.H. (2019). *The Elusive Trade: How Exchange-Traded Funds Conquered Wall Street*. BrownBooks. ORM. ISBN: 978-1612543079
- Lechman, E., & Marszk, A. (2023). Sustainable Investing. *Socio-Economic Impacts of Exchange-Traded Funds*. 1-256. <https://doi.org/10.1016/b978-0-12-823871-4.00005-2>
- Liebi, L.J. (2020). The effect of ETFs on financial markets: a literature review. *Financial Markets and Portfolio Management*, 34(2), pp. 165-178. <https://doi.org/10.1007/s11408-020-00349-1>
- Madden, D. (2023). Exchange-Traded Funds, Liquidity, and Centralized Risk Books: Moving Liquidity beyond the Portfolio. *Journal of Beta Investment Strategies*, 14(1). <https://doi.org/10.3905/jbis.2023.1.028>
- Malinda, M.; Chen, J.H. (2022). The forecasting of consumer exchange-traded funds (ETFs) via grey relational analysis (GRA) and artificial neural network (ANN). *Empirical Economics*, 62(2), pp. 779-823. <https://doi.org/10.1007/s00181-021-02039-x>
- Malhotra, D.K. (2023). Market Timing, Selectivity, and Performance of Technology Exchange-Traded Funds and Mutual Funds. *Journal of Beta Investment Strategies*, 14(1). <https://doi.org/10.3905/jbis.2023.1.026>
- Marszk, A. and Lechman, E. (2020b). Exchange-Traded Funds on European Markets: Has Critical Mass been Reached? Implications for Financial Systems. *Entropy*
- Marszk, A. and Lechman, E. (2024). What drives sustainable investing? Adoption determinants of sustainable investing exchange-traded funds in Europe. *Structural change and economic dynamics*, 69, pp.63-82. <https://doi.org/10.1016/j.strueco.2023.11.018>
- Methling, F.; von Nitzsch, R. (2019). Thematic portfolio optimization: challenging the core satellite approach. *Financial markets and portfolio management*, 33(2), pp.133-154. <http://dx.doi.org/10.1007/s11408-019-00329-0>
- Miziołek, T., Feder-Sempach, E., Zaremba, A. (2020a). The Basics of Exchange-Traded Funds. In: *International Equity Exchange-Traded Funds*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-53864-4_3
- Miziołek, T., Feder-Sempach, E., Zaremba, A. (2020b). The Operation and Microstructure of Exchange-Traded Funds. In: *International Equity Exchange-Traded Funds*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-53864-4_4
- Pavolová, P., Bakalár, T., Kyšľa, K., Klimek, M., Hajduová, Z. and Zawada, M. (2021). The analysis of investment into industries based on portfolio managers. *Acta Montanistica Slovaca. Volume 26 (1)*, 161-170. <https://doi.org/10.46544/AMS.v26i1.14>
- Parpieva, F.S.; Yuzvovich, L.I.; Frais, V.E.; Mednikova, Y.K.; Murzataev, E.K. (2021). November. Financial Technologies as Drivers of Sustainable Development of Exchange-Traded and Venture Capital Funds. In *Second Conference on Sustainable Development: Industrial Future of Territories (IFT 2021)* (pp. 66-70). Atlantis Press. <https://doi.org/10.2991/aebmr.k.211118.013>
- Pessina, C.J.; Whaley, R.E). Levered and inverse exchange-traded products: Blessing or curse? *Financial Analysts Journal*, 77(1), pp. 10-29. <http://dx.doi.org/10.2139/ssrn.3572981>
- Reich, A.L.; Sass, C. (2021). Responsible Investing in Exchange-Traded Funds: An empirical analysis of information obstacles faced by retail investors. <https://www.diva-portal.org/smash/get/diva2:1562264/FULLTEXT01.pdf>
- Sakarya, B.; Ekinçi, A. (2020). Exchange-traded funds and FX volatility: Evidence from Turkey. *Central Bank Review*, 20(4), pp. 205-211. <https://doi.org/10.1016/j.cbrev.2020.06.002>
- Schizas, P. (2014). Active ETFs and their performance vis-à-vis passive ETFs, mutual funds, and hedge funds. *The Journal of Wealth Management*, 17(3), p. 84. <http://dx.doi.org/10.2139/ssrn.1872125>
- Sherrill, D.E.; Shirley, S.E.; Stark, J.R. (2020). ETF use among actively managed mutual fund portfolios. *Journal of Financial Markets*, vol. 51(C). <https://doi.org/10.1016/j.finmar.2019.100529>
- Smadis, S.; Smore, S. (2019). Exchange traded fund risk management and resiliency. *Journal of Risk Management in Financial Institutions*, 13(1), pp. 59-69. <http://dx.doi.org/10.69554/TDRB5524>

- Valadkhani, A.; Moradi-Motlagh, A. (2023). An empirical analysis of exchange-traded funds in the US. *Economic Analysis and Policy*, 78, pp. 995-1009. <https://doi.org/10.1016/j.eap.2023.05.002>
- Yadav, M.P.; Bhatia, S.; Singh, N.; Islam, M.T. (2024). Financial and energy exchange traded funds futures: an evidence of spillover and portfolio hedging. *Annals of Operations Research*, 333(1), pp. 501-516. <http://dx.doi.org/10.1007/s10479-022-04538-1>



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