Nikola Stakic[1]

Nikola Stefanovic

UNLOCKING THE POTENTIAL: EXPLORING THE IMPACT OF ETF INVESTMENTS ON THE GLOBAL FINTECH LANDSCAPE

Abstract: The COVID-19 pandemic has not only transformed our daily lives but has also acted as a catalyst for the rapid evolution of the FinTech industry. This sector has gained substantial recognition from global investors who are eager to allocate their surplus funds to this domain. This paper aims to examine the FinTech industry from a financial market perspective, specifically focusing on investments in thematic FinTech exchange-traded funds (ETFs). Our analysis centres on two prominent ETFs, namely FINX and ARKF, and compares their performance against the Standard & Poor's 500 stock market index. Notably, the results demonstrate the outperformance of this industry niche, even in the face of strong overall market performance during the pandemic years. Employing a factor regression approach, we implement the Carhart 4-factor model for both ETFs over the period from March 2019 to December 2021. The findings suggest resemblances between the FinTech industry and the overall market in terms of factor-investing styles and momentum-driven behaviour of market participants. However, significant disparities in performance metrics are observed between the respective ETFs.

Keywords: Fintech, Exchange-Traded Funds (ETFs), Investments, Financial Markets

1. Introduction

Over the past decade, FinTech has emerged as a widely used term in the business world, reflecting its transformative impact on the global economic and financial landscape. The unprecedented nature of the Covid-19 pandemic has further highlighted its revolutionary role in fostering a more inclusive, effective, and transparent approach to conducting business at both institutional and individual levels. Originating as a response to the global recession of 2008, where technology-driven innovations were ignited, FinTech has undergone significant evolution throughout the second decade of the 21st century. It has not only altered customer behaviour but also introduced a multitude of investment opportunities within the vast array of available financial and real instruments. By combining financial services with Information Technology (IT), FinTech disrupts the established financial system by revolutionizing existing areas and offering entirely alternative solutions. The Covid-19 pandemic has profoundly affected financial systems worldwide, particularly in terms of digital financial services provision and the

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Corresponding author: Nikola Stakic
Email: nstakic@singidunum.ac.rs

functioning of FinTech markets. The socio-economic shocks brought about by the global pandemic have disrupted certain FinTech sectors while creating opportunities for others, resulting in a state of flux for many. All relevant stakeholders have shown increased interest in the FinTech market, recognizing its role in shaping a new financial ecosystem that extends its impact to the broader socio-economic landscape. Notably, the Covid-19 pandemic has accelerated the adoption of FinTech by enabling the remote delivery of financial services. However, FinTech firms are not a monolithic sector, but rather comprise a range of firms, which deliver different financial services, based on different business models (CCAF et al., 2020).

One of the acknowledging aspects of FinTech relevance, and its' deepening penetration to various end-users, is understanding this industry (or sector) from the investment point of view as well. More specifically, it is necessary to understand Fintech companies as source of added value for not only new and existing customers, but for investors in financial markets as well, who are willing to outperform the notion of risk-adjusted return and generate positive alpha. Although the industry doesn't have clear boundaries and it's facing with versatile scope of businesses, to better understand stock market performance of FinTech industry, there is a necessity of grouping the participants and present them on the aggregate level. By pooling the FinTech companies into investment opportunity, investors can express their broader views and articulate their investment mandate more easily, as well as to compare specific industry segment via cross-sectional analysis.

The revolutionary nature of FinTech can be easily applied to industry of exchange-traded funds (ETFs) as well, making it one of the fastest-growing segments of the investment management business. The massively positive disruption of the ETF revolution, which began in the 1990s, is actually reaching its full pace in the previous few years, especially in the rapidly-growing base of retail investors. What is even more interesting to notice, ETF attractiveness across all markets' segments in the last decade would not have been even possible to imagine without accelerating incorporation of financial technology among individual investors, with specific emphasis on trading platforms and algorithm-based approach, to name a few.

The rise of ETF industry and its' foundation owes the credit to even more important field of indexing—the application of the efficient market theory and quantitative science to portfolio construction. These funds provide liquid access to virtually every asset class and allow both large and small investors to build institutional-calibre portfolios. The foundation for the growth of ETFs was the secular growth of indexing, which began 20 years before the first ETFs were launched in Canada (1990) and the United States (1993). Indexing is at the heart of a process that has moved the investment industry from art to science, and the growing popularity of index-based investment has forced all asset managers and advisers to improve their precision and value proposition (Hill et al., 2015). Following its' structure and mechanics, ETFs can be made for any type of asset class or investment strategy, on the different levels of broadness and coverage of its constituents, making it user-friendly and appealing type of investment vehicle. In addition, when you include their various benefits – such as liquidity, price discovery, transparency, and tax efficiency; it is not without reason to witness their reaffirming market' attractiveness and exponential growth by different metrics.

In the previous two pandemic years, ETF industry has gained even more acknowledgement from the investment community, following the market turmoil and worldwide price corrections among benchmark indices. Contrary to many expectations of heightened volatility during market selloffs, ETF industry went even

further - it proved its resilience, especially during the first year of pandemic. As liquidity in underlying markets deteriorated during the selloff, especially in fixed-income universe, ETFs continued to trade efficiently, playing a leading role in price discovery for investors and banks as they gave transparency to the values at which investors were prepared to exchange risk. ETFs did not increase market volatility; instead, they were a source of stability as investors increasingly turned to ETFs to efficiently rebalance holdings, hedge portfolios, and manage risk (BlackRock, 2020).

This paper is organized as follows: second part gives a closer explanation about global ETF industry and mechanics of ETF instruments. Third part analyzes Fintech market through ETF investments and explains their stock market' performance through different return and risk metrics. Methodological approach in multi-factor regression analysis is demonstrated in fourth part, followed by respective results and concluding remarks.

2. ETF Mechanics and Market Overview

ETFs, as a form of pooled investment, have successfully managed to tackle shortcomings being derived from its financial "predecessors" – mutual open-end funds and closed-end funds. Conventional mutual funds must typically buy back their units for cash, with the disadvantage that investors

can only trade once a day at the net asset value (NAV) computed after the close. Moreover, the trustee needs to keep a fraction of the portfolio invested in cash to meet the possible redemption outflows, creating the explicit cash-drag which amplifies total costs of running the fund. On the other hand, by having the possibility to trade throughout the day with the stocks as an instrument, closed-end funds are fixing the former drawback. However, due to limited (fixed) number of shares being issued, ongoing redemption and creation processes are practically out of the option, which creates significant price divergence from NAV value, in form of discount or premium.

ETFs have a unique structure that requires a fund manager as well as an authorized participant who can deliver the assets to the manager. The role of the authorized participant is to be the market maker for the ETF and the intermediary between investors and the ETF fund manager when shares are created or redeemed. To create shares of the ETF, the authorized participant delivers a basket of the underlying stocks to the fund manager and, in exchange, receives shares of the ETF that can be sold to the public. When an authorized participant needs to redeem shares, the process is reversed so that the authorized participant delivers shares of the ETF in exchange for a basket of the underlying stocks that can then be sold in the market (Figure 1).
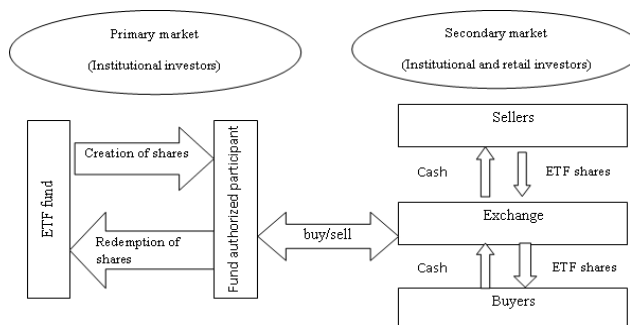

Figure 1. ETF Structure and Mechanics Source: (Deville, 2008)

The creation/redemption process is used when the authorized participant is either called upon to deliver new shares of the ETF to meet investor needs or when large redemptions are requested. The redemption process occurs when an authorized participant needs to reduce its exposure to the ETF holding and accepts shares of the underlying securities in exchange for shares of the ETF.

ETFs during the crisis were however more resilient than alternative investment options. ETFs in a crisis are affected when looking at the premiums/discounts to NAV seen as the markets scramble. Discounts refer to the scenario when the security (bonds) trade at a price that is below the intrinsic/face value of the security which occurs for several reasons, including increasing interest rates or turmoil. Conversely, premiums refer to the price of the security being sold at above the price of the security for similar reasons (Stakić et al., 2021).

At year-end 2020, global ETF market reached level of $7.8 trillion in net assets, out of the $63.1 trillion that represents the total worldwide assets invested in regulated open-end funds (Regulated open-end funds include mutual funds, exchange-traded funds (ETFs), and institutional funds). Only in the United States, the ETF market—with 2,204 funds and $5.4 trillion in total net assets—represents by far the largest geographical segment in the world, accounting for 69 percent of market share, leaving far behind Europe with only 15% share. Within the US, the total net assets in ETFs accounted for 18 percent of assets managed by investment companies at the year-end 2020 (Investment Company Institute, 2021). Growth rates of ETFs' assets under management (AUM) are few times bigger than growth of any other collective type of investment vehicle. Increased adoption among investors is followed with the number of established ETFs worldwide, with the U.S. leading the role. Their number almost double in the previous six years, with the year of 2021. setting the new record of 445 entities, which will be very difficult to beat in the upcoming years.
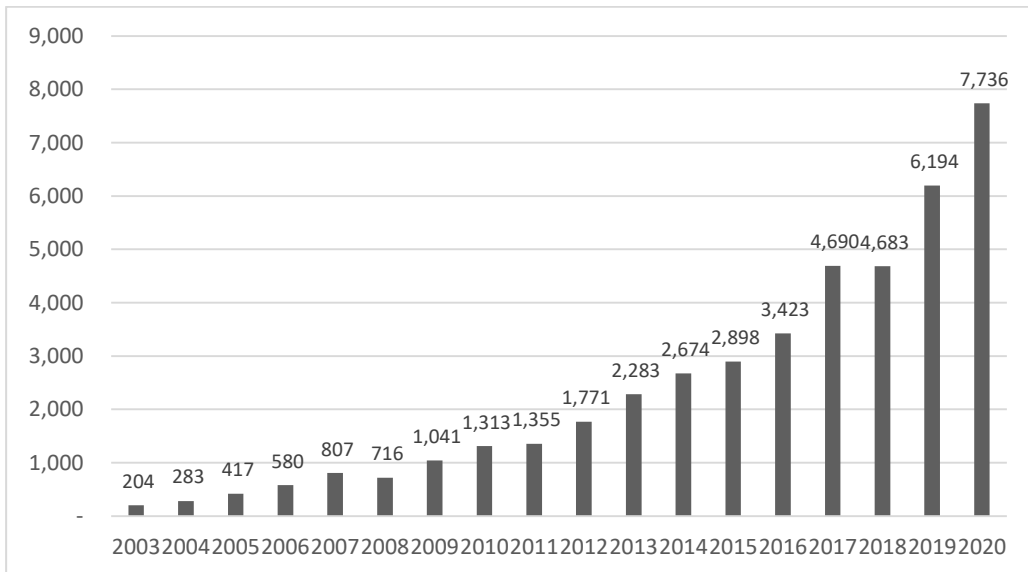
Source: Data compiled from Investment Company Institute (2021)
Figure 2. Global ETF industry by AUM (in $ billions)

Given its universal adoption in financial markets, the classification of ETF industry is based on numerous criteria, and it represents never-ending evolution of new mandates, strategies, asset asset-class exposure etc. However, the heart of the industry can be assigned to equity ETFs across all national and regional markets, even though the fixed-income ETFs have significant net issuance in the previous years, attributed to long standing ultra-loose macroeconomic environment. Within the equity investment universe, thematic and impact investing (Investment strategies that seek to generate positive, measurable social and environmental impact alongside a financial return.), where the FinTech segment belongs, has shown enormous growth potential and rising adoption among (predominantly) institutional investors. In addition, U.S. thematic ETFs have been most successful within its universe in the previous 5 years among all other types, outperforming the SPY (ETF that resembles S&P 500, proxy for U.S. stock market) in 48% of cases, according to Bloomberg. To put this into perspective, active ETFs and all-equity ETFs have outperformed SPY in 11% and 14% of cases, respectively.

When it comes to 2021 and the ETF industry, booming momentum has continued with the record-setting figures. More than $1 trillion in new cash has poured into the industry, with equity-focused ETFs leading the inflows. The net global inflows into ETFs (funds and products) had reached $1.14 trillion by the end of November 2021, compared with the record annual haul of $762.8 billion gathered over the whole of 2020. The inflows took global ETF assets under management to $9.92tn at the end of the month, meaning the figure is likely to surge beyond the $10tn mark for the first time in December (Flood, 2021).

Starting from the previous decade, there has been a significant rise in interest within the academic community when it comes to ETF performance and analysis of its specific niches. In addition, academic papers are

focusing on testing the relevance of main features of ETF products and the economic outcomes of the industry itself. Liquidity of ETFs has been for a long time subject of the analysis across the market, and it was in most cases proved to be a valid benefit. Explicit and implicit costs of trading, like spreads and market impact, were significantly reduced, according to Boehmer and Boehmer (2003). Richie and Madura (2007) also found effect of increased liquidity in technology-driven QQQ ETF. Marshall at al. (2018) analyzed the liquidity of over 800 ETFs, with the results revealing a strong positive correlation between the liquidity of the ETF and the underlying securities. Moreover, the authors document causality between ETFs' and underlying securities' liquidity: ETFs' liquidity affects the liquidity of the underlying but is also affected by the latter. On the other hand, in times of financial distress, the liquidity provision of ETFs can deteriorate, resulting in increasing illiquidity of ETFs which transmits to the underlying securities. Ben-David et al. (2018) stressed out the short term ETF preference with high turnover, suitable for high-frequency trading arbitrage opportunities. They showed that stocks with higher ETF ownership display significantly higher volatility with increased negative autocorrelation in stock prices, which may represent significant systematic risk in distressed market times. Similarly, Da and Shive (2017) and Agarwal et al. (2018) found that ETF ownership is associated with higher co-movement of the underlying securities. Based on the Bhattacharya and O'Hara (2017), heightened price volatility and institutional fragility are manifested through informational linkage among ETF constituents as well.

3. FinTech and ETF Performance

Fintech refers to the use of technology to deliver simpler, faster and better financial services. The emergence of cutting-edge technologies like AI, cloud computing, big

data, the Internet of Things (IoT) and machine learning is driving the fintech space. The growing popularity of smartphones, rising demand for industrial automation and the increased utilization of wireless communication are boosting the transition to digital platforms.

In the first decade of 21st century, there was over $1.5 trillion of fintech investment and merger and acquisitions (M&A) activity (FT Partners Research, 2021). By 2025, widespread adoption and greater use of digital financial services could increase the gross domestic products (GDP) of all emerging economies by 6%, or $3.7 trillion, creating 95 million new jobs (Manyika et al., 2016). Growing opportunities in the global financial technology the market should materialize in CAGR of 23.4% between 2021 and 2026. According to the report, the fintech space is expected to reach a market value of around $324 billion by 2026 (Market Data Forecast, 2021).

In order to understand the performance of FinTech industry in the financial markets, currently there are dozens of relevant ETFs in the marketplace. However, only 2 ETFs satisfy benchmark status, given their diverse holdings across different segments of FinTech U.S.ge; unlike the rest who are more focused on specific activities (mobile payments for instance). Those ETFs are Global X FinTech ETF (ticker symbol FINX) and ARK Fintech Innovation ETF (ticker symbol ARKF). Based on the prospectus, FINX fund seeks to invest in companies on the leading edge of the emerging financial technology sector, which encompasses a range of innovations, helping to transform established industries like insurance, investing, fundraising, and third-party lending through unique mobile and digital solutions. On the other hand, ARKF is an actively managed ETF that seeks long-term growth of capital. It seeks to achieve this investment objective by investing under normal circumstances primarily (at least 80% of its assets) in domestic and foreign equity securities of companies that are engaged in the Fund's investment theme of financial technology ("Fintech") innovation. Some general profile characteristics related to both ETFs are provided in Table 1.

Table 1. General profile for FINX and ARKF funds

NAME	Global X FinTech ETF (FINX)	ARK Fintech Innovation ETF (ARKF)
Asset Class	Sector Equity	Sector Equity
Category	Technology	Technology
Fund Benchmark	Indxx Global Fintech Thematic NR USD	S&P 500 TR USD
Price/Earnings (Ttm)	32.28	41.10
Price/Book (Ttm)	5.27	5.98
Assets	1.29 B	2.84 B
Equity Holdings	54	38
Bond Holdings	0	0
Total Holdings	58	39
Expense Ratio	0.68%	0.75%
Inception Date	09-12-2016	02-01-2019

Source: ETF Database: The Original & Comprehensive Guide to ETFs, n.d.

Both ETFs are all-equity funds, with identical geographical asset allocation: more than 2/3 is domestic - U.S. exposure (68%) and rest of the 32% is being allocated outside United States. However, all other metrics and exposures differ, which consequently leads to different performance as well. For instance, one of the key differences comes for companies' size orientation, where ARKF has almost 70% holding of large-cap stocks, 25% of mid-cap, and remaining 5% of small-cap stocks. Although still concentrated in big-cap stock, size orientation is more balanced in the case of FINX: 57%, 30% and 13%, for big, mid and small companies, respectively. Based on the official Global Industry Classification Standard (GICS) classification, which encompasses 11 market sectors (Granulation is fourfold: 11 sectors, 24 industry groups, 69 industries and 158 sub-industries), ARKF is more diversified, on the other hand. Technology sector is, of course, the dominant one (50% weight), but with the presence of other "non-core FinTech" sectors, like consumer cyclical, real estate and healthcare. FINX fund has practically exposure to only 2 sectors, with heavy concentration in technology (80%), and rest in the financial services (with the negligible 1% in healthcare). High concentration within the same sector has led to higher risk metrics, despite more constituents within the holding base.

3.1. Return and Risk Performance

Performance of FinTech ETFs can be measured in relation to various reference benchmarks. Since in. both our cases ETFs are predominantly U.S. based, it is proper to use S&P 500 index as suitable benchmark (ETF that tracks index has ticker SPY). Moreover, S&P 500 is becoming continuously more concentrated proxy in the last six years, with the technology sector leading the market size and weight. From 500 constituents, top 10 companies are having 30% market weight, the highest share

since the mid '70s (Bloomberg, 2021), which is even more confirming case to use S&P 500 as proper benchmark. If we want to factor international exposure of each ETF, we can include the ETF with the benchmark that tracks global equity markets outside of the U.S., including stocks listed in more than a dozen emerging and developed markets - MSCI ACWI ex U.S. ETF, with the ticker ACWX.

Due to the different time of origination between FINX and ARKF, the dataset being used started from March 2019 until December 2021. Even, hypothetically, if there were more observations, that fact would not have been of such material value since most of the performance action has actually been ignited from March 2020 and the official declare of Covid-19 pandemic. From that moment onward, especially during last year, the slight divergence has come into effect, following the less bullish sentiment and change in monetary policy narrative. For example, SPY return in 2021 was very high – more than 23%, while both ETFs have negative return: -2.29% for FINX and – 6.56% for ARKF (All the returns are in nominal terms, which is important consideration given very high global inflationary environment in 2021.). For the whole observed timeframe, there is almost no difference between market performance and FINX fund – both are having close to 60% cumulative return. Compared to each, ARKF has superior performance of almost 120%, mainly attributed to one-year bullish trend between March 2020 and March 2021 (Figure 3). Similarly, CAGR is the same for FINX and SPY (21%), while for ARKF it is close to 34%. Unlike the U.S. financial market, which has witnessed highest valuation to date, other national markets were less attractive and quite modest in their recovery, although with 9% CAGR of ACWX fund, which would be considered as solid performance in pre-covid period.
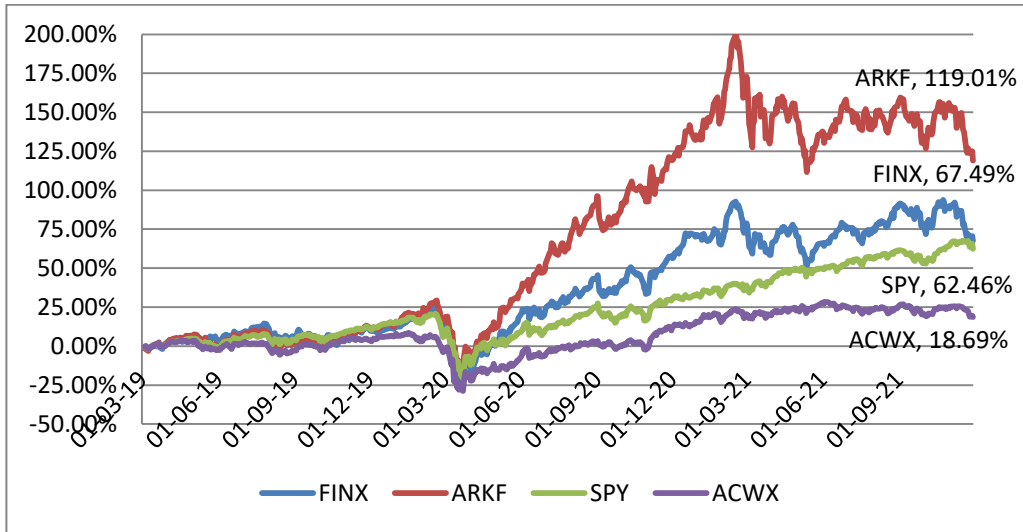
Source: Data compiled from Yahoo Finance quotes

Figure 3. Performance of FinTech and market benchmarks (March 2019- December 2021)

When it comes to risk performance and different associated metrics on risk-adjusted basis, ARKF has better results versus FINX, in majority of cases. Sharpe, Sortino and Treynor ratio are all superior with ARKF compared to FINX results (Table 2). Components of active return and active risk, measured through Information ration and Tracking error are also showing better performance. Not only that FINX has not been able to generate positive alpha, but it has achieved negative result compared to SPY.

Table 2. Risk metrics for Fintech and benchmark ETFs

Metric	FINX	ARKF	SPY	ACWX
Arithmetic Mean (annualized)	25,48%	39,29%	23,48%	16,78%
Geometric Mean (annualized)	21,11%	33,76%	21,65%	14,87%
Standard Deviation (annualized)	27,19%	29,35%	17,65%	18,45%
Max. Drawdown	-24,16%	-19,22%	-19,43%	-14,97%
Beta (*)	1,28	1,25	1,00	0,84
Alpha (annualized)	-4,36%	6,94%	0,00%	-8,60%
R Squared	69,28%	56,81%	100,00%	84,30%
Sharpe Ratio	0,81	1,12	1,16	0,84
Sortino Ratio	1,36	1,98	1,92	1,25
Treynor Ratio (%)	17,25	26,18	20,48	18,47
Active Return	-0,53%	12,12%		-15,65%
Tracking Error	15,87%	19,80%		8,01%
Information Ratio	-0,03	0,61		-1,95
Historical Value-at-Risk (5%)	-8,48%	-10,20%	-6,99%	-4.19%
Conditional Value-at-Risk (5%)	-15,48%	-15,16%	-10,19%	-14.97%
Upside Capture Ratio (%)	121,01	137,67	100,00	65,92
Downside Capture Ratio (%)	137,26	106,44	100,00	101,88

Source: https://www.portfoliovisualizer.com/

Another confirmation of U.S. market' superior performance is the fact that from risk perspective ACWX fund has underperformed its peers in almost all metrics. In both ARKF and SPY, there is a crucial lead from large-cap companies, who have shown superior performance, especially during the year of 2020, although ARKF was less correlated with overall market than the FINX fund (Table 3). Despite their differences in overall performance, thematic nature of FinTech industry can be shown in the funds' high cross-correlation result of 0.91.

Table 3. Correlation matrix for ETFs

Ticker	FINX	ARKF	SPY	ACWX
FINX	1,00	0,91	0,79	0,76
ARKF	0,91	1,00	0,69	0,70
SPY	0,79	0,69	1,00	0,90
ACWX	0,76	0,70	0,90	1,00

4. Factor Analysis and Results

For better performance evaluation of FinTech ETFs during the aforementioned period, it is necessary to go one step further and analyse the specific factors attributed to selected pool of stocks. A factor is a variable or characteristic with which individual asset returns are correlated. It can be broadly defined as any variable that is believed to be valuable in ranking stocks for investment and in predicting future returns or risks. Moreover, the nature of trading and its strategies are having different characteristics which are dependant of numerous variables. Exogenous shocks and systemic risks that occurred in the Covid-19 pandemic have shown behavioural nature of investment decision-making process and, consequently, heavier reliance of shorter-term types of factor investing strategies. A wide range of security characteristics have been used to define "factors." Some factors (most commonly, size, value, momentum, and quality) have been shown to be positively associated with a long-term return premium and are often referred to as rewarded factors. In fact, hundreds of factors have been identified and used in portfolio construction, but a large number have not been empirically proven to offer a persistent return premium (some call these unrewarded factors).

In order to incorporate short-term nature of trading and stock price consequences, we will use well known Carhart 4-factor model (Carhart, 1997) which is an extension of foundational 3-factor model by Fama and French (1993). For the additional factor – cross-sectional momentum, Carhart proved its distinction from initial ones, with the better explanatory power of mutual funds' performance (Korenak and Stakić, 2022). The 4-factor Carhart model can be expressed in the following way:

$$R_a = \beta_{mkt} \times MKT + \beta_{smb} \times SMB + \beta_{hml} \times HML + \beta_{mom} \times MOM + \alpha, \quad (1)$$

where the beta (β) represents exposure to respective factors: MKT – market premium, SMB- Size premium (small minus big companies, in terms of market cap), HML - Value premium (High Minus Low book-to-price ratio), MOM - Momentum premium (Up Minus Down); and Alpha (α) being the excess return over the benchmark (Table 4).

For the observed time series (March 2019 – December 2021), there are 33 observations of monthly returns for both FinTech ETFs and SPY, in order to be comparable, although the FINX ETF has longer track record than ARKF. Factor values were used as inputs, based on the dataset provided by Professor Kenneth R. French, which serves as one of the globally recognized source for factor analysis.

Table 4. Factor Regression outputs

Name	Ticker	Factors	MKT	SMB	HML	MOM	Annual Alpha	R^2	F-stat
Global X FinTech ETF	FINX	coefficient	1,33	0,46	-0,33	0,13	-8,72%	80,8%	29,5
		t-stat	20,280	2,099	-2,450	0,695	-1,652		
		p-value	0,000	0,045	0,021	0,492	0,110		
ARK Fintech Innovation ETF	ARKF	coefficient	1,35	1,15	-0,40	0,37	0,10%	81,5%	30,8
		t-stat	9,848	4,195	-3,512	2,117	0,015		
		p-value	0,000	0,000	0,002	0,043	0,988		
SPDR S&P 500 ETF Trust	SPY	coefficient	0,96	-0,20	0,04	-0,01	0,95%	99,7%	2561,7
		t-stat	127,034	-9,807	3,068	-0,944	1,688		
		p-value	0,000	0,000	0,005	0,353	0,103		

Source: Authors' calculation

Based on the results (with the 95% confidence interval) we can observe significance of all factors in case of ARKF, whereas the FINX shows that momentum factor is not significant; demonstrating different portfolio structure that is more momentum-based in ARKF than in FINX. Furthermore, we can observe in both ETFs negative HML factor results, implying similar exposure to growth-oriented sectors. In terms of companies' size exposure, we can observe in higher values in SMB factor at ARKF versus FINX, demonstrating heavier loading in small-cap and mid-cap investment universe. This is one of the key reasons of ARKF's superior performance, due to more pronounced bouncing effect of smaller companies, who are more aligned with the phases of economic cycles. This can be verified through relationship between upside and downside capture ratios (in Table 2), where ARKF is the only one having ratio between this two higher than one. Both ETFs are having strong exposure to market factor, and given that overall market was in bullish phase (especially after the first peak of Covid-19), this factor have contributed the most in the performance attribution analysis.

5. Conclusion

FinTech industry has come at the forefront of changes in the business sector. Its revolutionary aspect dictates the new methods of running various financial, investment and operational actions. In addition, constant evolvement of new products and mechanisms creates universal adoption, among different types of users: governments, business sector, and households. Due to specific nature of ongoing Covid-19 pandemic and its consequences on global economy, there has been even more need for FinTech development, in order to tackle the crisis with more efficiency and readiness, and having at the same time possibility to run the business on profitable manner.

Attractiveness of FinTech industry can be assessed, among other ways, from investment perspective, by evaluating the industry via the financial markets i.e., stock exchanges. To properly recognize the industry and analyse its performance, it is necessary to aggregate the companies into pooled type of investment vehicles which can give broader exposure to the specific market niche. That having in mind, thematic – FinTech ETFs have served as the good proxy for performance measurement, and to compare the niche with the overall market. Moreover, ETF industry is one of the fastest-growing investment segments that has gained strong popularity, especially among retail investors. Various benefits of ETF investing have enabled the FinTech industry

to be acknowledged from the investment community, who have strong beliefs in its continuing development. When it comes to specific results, despite the very strong performance of U.S. market in the previous two years, FinTech has either outperformed the overall market, or it was at par, depending on which ETF we are considering as a benchmark.

The future need for FinTech products and services would be definitely dependant on multiple factors. However, pandemic has ignited the never-returning wave of accelerating technological development that should create new value not only for the end-users, but also for investors in financial markets, who are willing to receive risk-adjusted return.

References:

Agarwal, V., Hanouna, P. E., Moussawi, R., & Stahel, C. W. (2018). Do etfs increase the commonality in liquidity of underlying stocks? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3001524

Ben-David, I., Franzoni, F., & Moussawi, R. (2018). Do etfs increase volatility? : Do etfs increase volatility? *The Journal of Finance*, *73*(6), 2471–2535. https://doi.org/10.1111/jofi.12727

Bhattacharya, A., & O'Hara, M. (2017). Can etfs increase market fragility? Effect of information linkages in etf markets. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2740699

BlackRock. (2020, July). *Lessons from COVID-19: ETFs as a Source of Stability*. https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-lessons-from-covid-19-etfs-as-a-source-of-stability-july-2020.pdf

Boehmer, B., & Boehmer, E. (2003). Trading your neighbor's ETFs: Competition or fragmentation? *Journal of Banking & Finance*, *27*(9), 1667–1703. https://doi.org/10.1016/S0378-4266(03)00095-5

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, *52*(1), 57–82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

CCAF, World Bank, & World Economic Forum. (2020). *The Global Covid-19 FinTech Market Rapid Assessment Study*. https://www3.weforum.org/docs/WEF_The_Global_Covid19_FinTech_Market_Rapid_Assessment_Study_2020.pdf

Da, Z., & Shive, S. (2018). Exchange traded funds and asset return correlations. *European Financial Management*, *24*(1), 136–168. https://doi.org/10.1111/eufm.12137

Deville, L. (2008). Exchange traded funds: History, trading, and research. In C. Zopounidis, M. Doumpos, & P. M. Pardalos (Eds.), *Handbook of Financial Engineering* (Vol. 18, pp. 67–98). Springer US. https://doi.org/10.1007/978-0-387-76682-9_4

ETF Database: The Original & Comprehensive Guide to ETFs. (n.d.). ETF Database. Retrieved December 27, 2021, from https://etfdb.com/

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3–56. https://doi.org/10.1016/0304-405X(93)90023-5

Flood, C. (2021, December 24). *ETF assets close to $10tn after second year of record growth*. Financial Times. Retrieved December 28, 2021, from https://www.ft.com/content/b9b8c57e-25a5-4dc7-aa02-945337b588cb

FT Partners Research. (2021, July). *Q2 2021 Quarterly Fintech Insights*. https://ftpartners.docsend.com/view/igaby8kcxzv3bqu7

Hill, J. M., Nadig, D., Hougan, M., & Fuhr, D. (2015). *A Comprehensive Guide to Exchange-Traded Funds (ETFs)*. CFA Institute Research Foundation.

Investment Company Institute. (2021). *Investment Company Fact Book: A Review of Trends and Activities in the Investment Company Industry*. https://www.ici.org/system/files/2021-05/2021_factbook.pdf

Kenneth R. French (n.d.). *Tuck School of Business*. Retrieved December 28, 2021, from http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Korenak, B., & Stakić, N. (2022). Investment performance attribution of the U.S. small-size value mutual funds using Fama-French five-factor model. *International Review*, *1–2*, 17–23. https://doi.org/10.5937/intrev2202021K

Manyika, J., Lund, S., Singer, M., White, O., & Berry, C. (2016, September). *How digital finance could boost growth in emerging economies*. McKinsey Global Institute. https://www.mckinsey.com/featured-insights/employment-and-growth/how-digital-finance-could-boost-growth-in-emerging-economies

Market Data Forecast. (2021, April). *Global Fintech Market Research Report*. https://www.marketdataforecast.com/market-reports/fintech-market

Marshall, B. R., Nguyen, N. H., & Visaltanachoti, N. (2018). Do liquidity proxies measure liquidity accurately in ETFs? *Journal of International Financial Markets, Institutions and Money*, *55*, 94–111. https://doi.org/10.1016/j.intfin.2018.02.011

Portfolio visualizer. (n.d.). Retrieved September 13, 2023, from https://www.portfoliovisualizer.com/

Richie, N., & Madura, J. (2007). Impact of the QQQ on liquidity and risk of the underlying stocks. *The Quarterly Review of Economics and Finance*, *47*(3), 411–421. https://doi.org/10.1016/j.qref.2006.04.002

Stakić, N., Singh, D., & Kuzevski Lunnemann, L. (2021). Exchange-traded funds and their performance during the covid crisis. *Proceedings of the 8th International Scientific Conference - FINIZ 2021*, 8–14. https://doi.org/10.15308/finiz-2021-8-14

Yahoo finance—Stock market live, quotes, business & finance news. (n.d.). Retrieved September 13, 2023, from https://finance.yahoo.com/

Nikola Stakic
Singidunum University, Faculty of Business,
Belgrade,
Serbia
nstakic@singidunum.ac.rs
ORCID 0000-0003-3732-5813

Nikola Stefanovic
Singidunum University, Faculty of Business,
Belgrade,
Serbia
nstefanovic@singidunum.ac.rs
ORCID 0000-0003-4554-7547