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PERFORMANCE AND RISK OF THE US-LISTED ASIA PACIFIC EXCHANGE TRADED FUNDS

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Abstract: This study assesses the performance and risk of thirty-four US-listed Asia Pacific equity Exchange Traded Funds (ETFs) from 2016-2023. Both raw and risk-adjusted returns and ETFs' ability to achieve positive alphas have been examined. Performance and risk persistence have been investigated too. The empirical findings show that the average return of the examined ETFs is positive while the average risk is rather low. The results also indicate that the sample's ETFs do not achieve significantly positive alphas. Regarding persistence, the results reveal that the Asia Pacific ETFs can occasionally repeat their performance between two successive years, while risk is more persistent through time.

Jel Classification: G11

Keywords: ETFs, Performance, Risk, Asia Pacific Stock Markets, Diversification

1. INTRODUCTION

The equity markets of the Asia Pacific region have been of great interest to international investors. The main driving force of this interest has been the high growth rates of the local economies recorded over the last decades. Based on data by *World Economics*, the Gross Domestic Product (GDP) of the Asia Pacific region is more than twice that of the Americas, four times the GDP of the European economies and ten times the GDP of the African countries. Asia Pacific countries captured more than 70% of the global GDP growth over the decade 2014-2023, with China alone accounting for 32%. In addition, GDP

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per capita is growing much faster in Asia than in other regions. As a result, the Asian share of global GDP is over 54% and is likely to approach 60% by 2030, continuing to fuel global growth.[1]

A significant factor that boosts economic growth and the interest of international investors in the markets of the Asia Pacific region is the tremendous rise in the population of the countries in the region, especially in China and India. According to *World Economics*, the Asian population is higher than that of Africa, the Americas and Europe combined. The rise in population entails that more (and frequently cheaper) workforce is available for the local industries. Population growth also entails that more customers are available for locally produced merchandise and services.

From a purely financial perspective, in several cases, the stock markets of Asia Pacific are assumed to offer significant exploitable inefficiencies compared to those provided by the more mature equity markets around the world.[2] The chance of making money by taking advantage of market inefficiencies is a strong motivation for international investors.

An international investor located outside the Asia Pacific region who wishes to take a place in the local stock markets has a series of options to do so. The first option concerns the direct purchase of shares of companies listed on the local stock exchanges. However, as Asia Pacific is a region rather than a single country, one needs to consider each country's unique drivers, peculiarities and market dynamics, such as varying income levels, central bank policies, and political regimes, as well as, possible trading restrictions posed by each country concerning aspects such as hedging, shorting and price limits. The cost of investing in multiple companies for a decent level of portfolio diversification to be attained should be considered too.

Investing in the bonds issued by the local governments and enterprises can be another option. Purchasing shares of mutual funds and Exchange Traded Funds (ETFs) issued by local managing companies can be another venue to get access to the Asia Pacific stock markets. However, an investor from Europe or the United States can invest from their home by acquiring shares of US or European mutual funds and ETFs domiciled in the US or Europe but focused on the Asia Pacific region.

By following the latter option, an American or a European investor gets access to the shares of hundreds of different companies located throughout the Asia Pacific region, including exposure to specific countries, sectors and industries. Such an investor does so with great trading simplicity, low cost

and high tax efficiency. Along with the benefits of investing in Asia Pacific-focused mutual funds and ETF shares, an international investor should not ignore the risks associated with such investments. Possibly, the most significant of them concerns currency risk resulting from the continuous fluctuation of the exchange rates between the US dollar and euro with the local currencies in the region. The higher cost of investing in international mutual funds and ETFs compared to the cost of their domestic peers should not be neglected by international investors either.

The research issue addressed by the current paper concerns the performance potential that is offered to investors from the United States (or other developed stock markets) by ETFs that are locally listed (i.e., in the United States) but invest in companies from the Asia Pacific region. The risks of such investments, as well as, the factors that can affect the returns on the US-listed Asia Pacific ETFs are also a concern in this paper. Our study is justified by the combination of the increasing interest shown by investors in the US in international investment opportunities and the prospects for significant long-term growth of the economies in the Asia Pacific region. Such growth may be translated into notable stock returns, which are always in demand for investors with overseas focus.

The current paper focuses on the performance and risk of thirty-four Asia Pacific equity ETFs that are traded on the US stock market over the eight-year period from 2016 to 2023. Performance is computed both in raw and risk-adjusted return terms. The ability of these ETFs to achieve positive alphas against the overall Asia Pacific and the US markets is also evaluated. The influence of the Fama and French factors on performance is considered too. Finally, the persistence in ETFs' performance and risk is examined.

The empirical results indicate that the average raw and risk-adjusted return of the sample's ETFs has been positive over the period under study, while the average risk has been rather modest throughout the study period, except the COVID-19-year 2020 when the sample's average volatility was about 65% higher than that of the entire study period's average risk figure. On the ability of the Asia Pacific ETFs to offer positive alphas, our results show that these ETFs fail to do so. In fact, in several cases, when the performance is assessed against the US stock market benchmark, the examined ETFs produce significantly negative alphas. Finally, with regards to persistence, our results reveal that, to some degree, the performance of Asia Pacific ETFs can persist between two successive years, even though in some cases performance reverts between two

years. On the other hand, risk is more persistent throughout the period under study. At the short-run level, the concurrent return is found to be negatively affected by their one-day lagged returns but positively related to their two-day lagged returns. Regarding the short-term risk, the findings indicate that the significantly positive correlation of ETFs' concurrent intraday volatility with its lagged prices can go back up to one week (at least).

We deem that the practical implications of our results can be quite significant, thus rendering our study a quite significant contribution to the relevant literature. First, it constitutes a comprehensive but simple (from a methodological perspective) study on an interest niche of the US ETF market. The methodological simplicity of our study entails that investors with basic analytical skills can use our study as a basis for their research in the field. More importantly, the positive raw and risk-adjusted returns of the Asia Pacific-focused ETFs revealed by our study provide investors with some level of confidence that choosing to invest in the Asia Pacific region can be a profitable decision. In this respect, the occasional performance persistence revealed by our study might indicate market inefficiencies that could be exploited via suitable investing strategies. The reverting trends in ETFs' daily returns detected could also be very useful to investors, especially short-term traders. Finally, the persistence in risk revealed by our research pictures a quite stable environment for investors, especially those who abhor being exposed to turbulent stock markets.

The rest of the paper is structured as follows: A review of representative studies on the Asia Pacific ETFs is conducted in Section 2. The applied research methodology is analysed in Section 3. The sample of the study is described in this section too. The empirical findings of the study are provided in Section 4. Section 5 concludes this paper.

2. LITERATURE REVIEW

Several studies investigate the performance of US-listed ETFs that are focused on the Asia Pacific region. Rompotis (2010) examined the performance and risk of sixteen American iShares investing in the Asian stock markets and found that ETFs underperform their underlying indexes with an average tracking error of 0.47%. He also showed that the impact of the US Fama and Frech factors concerning size and value on the performance of these ETFs can be significant, even though the sign and the magnitude of the impact are fund-specific rather than being unanimous among ETFs.

Kuo and Mateus (2007) reported somehow opposite results by dealing with twenty US-based but internationally focused ETFs, twelve of which are placed in the stock markets of the Asia Pacific region. The main finding of the authors is that the international ETFs, including the Asian Pacific ones, can beat the broad US market stock index. They also reported some performance persistence at the annual level.

Zawadzki (2020) compared the performance of international ETFs listed in the US to the return of their benchmarks with a sample of 18 funds investing in developed and emerging markets, including six funds that focus on Asia Pacific. According to the empirical findings, the ETFs under study fail to fully replicate the return of their benchmarks, while, in some cases, tracking errors can be significantly negative.

The tracking error of 26 international ETFs traded on the US stock market is computed in the study of Shin and Soydemir (2010). Seven of these funds are channelled to Asia. The results reveal a substantial tracking error which persists over time. With respect to the Asia-focused ETFs, the authors report that the tracking efficiency of these funds is inferior to the corresponding efficiency of the US ETFs that invest in more developed stock markets around the world indicating that the efficiency of the underlying Asian stock markets is in question.

With respect to the efficiency of Asian markets, Jares and Lavin (2004) showed that the US-based iShares which invest in stocks from Japan and Hong Kong trade at a significant premium to their net asset values. The existence of this premium is attributed to the different trading hours between the US and Asia. The authors also reveal a positive relationship between return and lagged premium, as well as a negative relation between return and contemporaneous premium.

Other studies focus on the performance of ETFs that are traded on stock markets around the Asia Pacific region. In this respect, Gallagher and Segara (2006) examined the performance of ETFs that are traded on the Australian Securities Exchange. The authors focussed on whether these ETFs can track the underlying indexes efficiently finding that they actually do so. The tracking ability of ETFs from New Zealand was investigated by Chen et al. (2017). By discriminating between daily and monthly trading data, the authors found that the daily tracking error of ETFs is substantial. At the monthly level, tracking efficiency is enhanced, even though significant differences in returns between ETFs and benchmarks can still be observed.

Wong and Shum (2010) assessed the performance of fifteen global ETFs by considering the bear and bull markets during the period 1999-2007. The sample included four ETFs that are listed in the US, one from Canada, six Asia-based ETFs and four European ETFs. Based on the testing using the Sharpe ratio, the empirical results show that all the examined ETFs, including the Asian ones, always achieve higher returns during bullish markets compared to their returns during bearish markets.

Chu (2011) also reported substantial tracking inefficiencies for ETFs in Hong Kong, which are comparatively higher than those found for ETFs in the United States and Australia. With respect to the latter, Pan and Li (2016) reported that the tracking error of gold ETFs in China is comparatively inferior to the tracking error of the equity ETFs in Hong Kong, the US and Australia. Chinese ETFs were also the subject of a study by Wu et al. (2021), who compared the return of passively managed ETFs and index funds in China during the period from February 2005 to December 2018. The results show that ETFs outperform the index funds.

With respect to Japan, several studies focused on locally traded ETFs, but the performance of these funds has been (at best) under-researched. Several studies investigate the influence on the equity market in Japan by the trading activity of the Bank of Japan (BOJ) in the local ETF market. Hanaeda and Serita (2017) reported that the activity of the BOJ contributes to the decrease in underlying stocks' volatility. A persistently positive effect on the values of ETFs' underlying stocks triggered by the purchases of ETF shares by the BOJ was reported by Barbon and Gianinazzi (2019) and Harada and Okimoto (2021). On the contrary, Koyama (2022) found that the trading activity of the BOJ in the local ETF market does not affect the prices of the underlying stocks. Concerning the return of Japanese ETFs, Rompotis (2024) revealed that these ETFs are not able to produce any material alpha to the benefit of their investors.

Finally, several studies focus on ETFs from India. Tripathy and Sethi (2021) investigated how Indian ETFs replicate the returns of their benchmarks and analysed the factors that could affect their tracking ability. The results show that the exposure of the examined ETFs to the underlying indexes is lower than the required one. As a corollary, long-run price differences between ETFs and indexes exist. Sethi (2016) also reported significant deviations in performance between Indian ETFs and their benchmarks. Alamelu and Goyal (2023) assessed the ability of Indian ETFs to fully replicate the performance

of their benchmarks with a sample of 27 equity-oriented ETFs that are traded on the National Stock Exchange of India over the period 2015-2019. The analysis shows that most of the examined ETFs performed better than their benchmarks, with tracking errors being quite notable.

3. METHODOLOGY

3.1. Risk-Adjusted Returns

Two kinds of risk-adjusted return measures are applied in this section. The first measure is the Sharpe ratio, which is shown in the following formula (1):

$$SR_i = \frac{\bar{R} - \bar{R}_f}{\sigma_i} \tag{1}$$

where $\bar{R}_f$ indicates the daily return of an ETF, $\bar{R}_f$ refers to the average daily risk-free rate and σ_i is the standard deviation of the difference between the return of an ETF and the risk-free rate. The Sharpe ratio assesses how well an ETF compensates its investors for the risk they take. Higher figures of the Sharpe ratio indicate higher performance of an ETF.

The Modigliani-Modigliani (MM) ratio is the second risk-adjusted measure used in our analysis. This ratio is computed by multiplying the Sharpe ratio with the standard deviation in market return and adding the risk-free return thereafter to it. The MM ratio is depicted in the following formula (2):

$$MM_i = SR_i * \sigma_m + R_f \tag{2}$$

where SR_i is the Sharpe ratio of an ETF and σ_m is the standard deviation in market return. R_f refers to the risk-free rate. Similar to the Sharpe ratio, the higher the MM ratio, the better the performance of an ETF. The Sharpe and MM ratios are computed twice, with market and risk-free return data for the Asia Pacific region and the United States, respectively.

3.2. Six-Factor Performance Analysis

In this section, we have evaluated the performance of ETFs traded in the US but focused on stock markets from the Asia Pacific using the multi-factor model of Fama and French (2015), which combines the Fama and French five factors with the momentum factor of Carhart (1997). The applied model is as follows:

$$R_i - R_f = \alpha_i + \beta_{1,i}(R_m - R_f) + \beta_{2,i}SMB + \beta_{3,i}HML + \beta_{4,i}RMW + \beta_{5,i}CMA + \beta_{6,i}MOM + \varepsilon_i \quad (3)$$

where R_i denotes the daily return of ETFs, which has been calculated with trade prices that have been found on www.nasdaq.com, R_m concerns market return and R_f is defined as in the previous section. Alpha represents the return that can be achieved by an ETF above the market. Beta indicates the systematic risk of ETFs.

SMB, i.e., Small Minus Big, is the size factor measured as the average return on nine small-cap portfolios minus the average return on nine large-cap portfolios. *HML*, i.e., High Minus Low, is the value factor computed as the average return on two value portfolios minus the average return on two growth portfolios. Robust Minus Weak (*RMW*), and Conservative Minus Aggressive (CMA), concern the operating profitability and investment factors. *MOM* is the momentum factor.[3] Two versions of model 3 are run; one with the Asia Pacific and one with the US explanatory variables.[4]

The size effect assumes that small-cap firms beat the large ones. The value effect captured by the *HML* factor implies that the average returns on stocks with a high value, that is, a high book-value to market-value equity ratio, must be higher than the returns on stocks of low value. Moreover, based on the findings of Fama and French (2015), negative estimations should be expected for the *RMW* factor. In addition, as noted by Fama and French (2015), past investment can be considered as a proxy for the expected future investment and, consequently, the *CMA* factor implies a negative relation between the expected investment and the expected internal rate of return.

Finally, the momentum in asset prices is treated as an anomaly which is difficult to explain by the traditional theory of efficient capital markets, according to which an increase in the price of an asset cannot be used to predict future price increases. Behavioural economists try to explain this anomaly by suggesting that the hypothesis about rational investors is not valid, as the latter tend to underreact to the release of new information, failing to reflect new information into the stock prices.

3.3. Performance and Risk Persistence

Performance and risk persistence are assessed in this section. Two levels of persistence are considered. The first one concerns annual performance and risk persistence and is assessed with model (4):

$$X_t = \lambda_0 + \lambda_1(X_{t-1}) + u \quad (4)$$

where X_t refers to the performance or risk of ETFs in year t. The model is applied with the one-lagged annual performance or risk of ETFs as the independent variable. A positive and statistically significant slope that approximates unity will indicate a high level of persistence in performance and risk. If significantly negative slopes are provided by the model (4), performance and risk will revert.

The second level of persistence examined regards the relationship of ETFs' return and risk on day t with their lagged values back to five days. The model used to test short-term persistence is as follows:

$$Y_w = \varphi_0 + \varphi_1(Y_{w-1}) + \varphi_2(Y_{w-2}) + \varphi_3(Y_{w-3}) + \varphi_4(Y_{w-4}) + \varphi_5(Y_{w-5}) + u \quad (5)$$

Y_w is the return or the intraday volatility of ETFs on day w.

3.4. The Sample

The sample of the study includes 34 passively managed ETFs that trade in the US but invest in stocks from the Asia Pacific region. Total assets managed by these ETFs amount to $43.9 billion, capturing 88% of total assets held by the 53 US-traded passive and active ETFs included in the *Asia Pacific Equities ETF Category* on ETF Database (www.etfdb.com). The period under study spans from January 1, 2016, to December 31, 2023.

No sophisticated sampling process was applied. The only selection criterion applied was that for an ETF to be considered in our analysis, it must have data over the whole period under study. 34 ETFs (or 64% of total funds) satisfied this requirement. We deem that our sample was quite representative of this sector of the ETF market in the US given that more than half of the corresponding ETFs were considered, which covered the biggest part of the sector based on their assets under management.

Table 1 provides the profiles of the examined ETFs, which include their ticker, name, inception date, age, assets as of December 31, 2023, expense ratio, average daily volume, trading frequency, and average intraday volatility. Trading frequency was computed as the fraction of the days with positive volume to total trade days over the period under study. Intraday volatility was calculated by dividing the difference between the daily highest trade price and the daily lowest trade price by the daily close trade price.[5]

The average ETF in the sample was sixteen years old, as some of the first ETFs (country iShares) that ever entered the US stock market were included in the sample. The youngest ETF in our sample was nine years old. The age of the sample indicates that the examined ETFs are well-established in the market.

The amount of assets held by the sample's average ETF was $1.2 billion, with extreme asset figures ranging from just $18 million to $7.8 billion (in the case of the First Trust Asia Pacific ex-Japan AlphaDEX Fund and the iShares MSCI India ETF, respectively). The average expense ratio was 0.59%, while expense ratios range from just 0.08% (in the case of the Vanguard FTSE Pacific ETF) to 0.89% (in the case of the iShares India 50 ETF). In addition, 14 ETFs had expense ratios that were higher than the sample's average. Overall, the analysis of expense ratios shows that investing in US ETFs that are oriented to Asia Pacific is not as cheap as investing in ETFs with local orientation.

The average daily trading volume amounted to 779 th. shares. It is worth noticing that the gap between the sample's extreme volumes was huge, with the most tradable fund being the iShares MSCI Hong Kong ETF. The average daily volume of this ETF was 4.4 million shares. The less tradable ETF in the sample was the First Trust India NIFTY 50 Equal Weight ETF, whose average daily volume amounted to 4.4 th. shares. Moreover, the average trading frequency approximated 99%. Overall, volumes and trading frequencies verify the increased interest in US ETF products investing in the Asia Pacific region. This increased interest is reflected in the relatively high average trading volumes for several ETFs in the sample and the lack of days with zero trading for the majority of the examined ETFs.

Finally, an average intraday volatility of 0.96 is reported in Table 1, with minimum and maximum intraday volatility measures in the sample ranging between 0.50 to 1.41. In our view, the intraday volatility estimates indicate a rather modest investing environment from a risk perspective. Thus, the Asia Pacific-focused ETFs could be suitable for investors disliking being exposed to very volatile markets.

Table 2 reports the average daily and total (annual) returns of ETFs on an annual basis. At the daily level, the average return over the entire period under study was slightly positive at 2 basis points (bps). At the annual level, 2018 and 2022 were rather bad years as the sample's average returns in these years were negative. This is also the case for the returns of most of the individual ETFs examined. The average terms of the rest years are positive, with the year 2017 presenting the highest sample average return, which equals 10 bps.

Similar trends are observed when total returns are taken into consideration. The sample's average annual return over the entire period under study was 23.6%. In addition, 24 ETFs achieved positive total returns. Similar to daily returns, annual returns were negative for the majority of the examined ETFs

in the years 2018 and 2022. The opposite was the case for most ETFs during the years 2016, 2017, 2019, 2021 and 2023.

Table 3 provides the risk estimates of the sample. The average risk measure over the entire period under examination is 1.36. The less risky year for the examined ETFs was 2017, with an average risk of 0.79, while the most turbulent year was 2020, with an average risk measure of 2.25. The high rise in the risk of ETFs in 2020 must relate to the negative effect of COVID-19 on the stock markets worldwide during that year.

Overall, based on the average returns in Table 2, the performance of the US ETFs channelled to the Asia Pacific region during the period 2016-2023 is quite satisfactory in raw terms. In addition, this satisfactory performance has been achieved without the investors in these ETFs needing to be exposed to severe risk, rendering the Asia Pacific ETFs a rather suitable investment choice.

4. EMPIRICAL RESULTS

4.1. Risk-Adjusted Returns

These risk-adjusted returns of Asia Pacific ETFs are discussed in this section. Sharpe and Modigliani-Modigliani ratios are provided in Tables 4.1 and 4.2, for the Asia Pacific data and the US market data, respectively. The risk-adjusted return ratios are presented on an annual basis during the period 2016-2023, as well as for the whole study period.

Given that the daily risk-free rate was quite close to zero for most of the study period, both in the Asia Pacific area and the US, the estimates of the Sharpe ratio behave similarly to raw returns in Table 2. Except for 2018 and 2022, the majority of the annual Sharpe ratios are positive, while, with just a few exceptions, the single Sharpe ratios of the examined ETFs over the entire study period are positive too. This trend in Sharpe ratios is observed regardless of the market data used.

Similar patterns are observed when the MM ratios are considered. The average MM ratio for the period 2016-2023 is 0.01, the same as the average Sharpe ratio. Moreover, the mean difference between the Sharpe and MM ratios during the entire period under study (in both versions of the market data used to compute the risk-adjusted returns) is only 1 bps.

Even though the majority of the individual Sharpe and MM ratios over the period 2016-2023 are positive, most of them are rather low, as the maximum of them amounts to 0.03 for both ratios. At the annual level, the maximum

Sharpe ratio is equal to 0.20 (found in 2017 for both versions of the ratio). The highest MM ratio is 0.14 (observed in 2020 in Table 4.2). Overall, it seems that the risk-adjusted performance of the examined US-listed Asia Pacific ETFs is not that great. As we will see in the next section, the alphas of the examined ETFs are not that spectacular either.

4.2. Six-Factor Performance Analysis

The results of model (3) are offered in Tables 5.1 and 5.2, for the Asia Pacific and the US explanatory variables, respectively. The exhibits report the alpha estimates along with the coefficients of the model's independent variables. T-tests on the significance of estimates are provided too, along with the R-squared values, which assess the explanatory ability of the applied model.

With just one exception, the alphas deriving from the Asia Pacific version of the model are not statistically significant indicating that the examined ETFs go hand in hand with the proxy for the stock markets in the Asia Pacific region (found on the website of Kenneth French). Put differently, the examined ETFs cannot produce any material above market return. When it comes to the US version of the model, eleven significantly negative alphas are obtained. All other estimates are insignificant. These results show that the performance of the Asia Pacific-focused US ETFs can be inferior to the return of the benchmark created by Kenneth French for the broad stock market in the US.

The average systematic risk estimate (beta) obtained through the Asia Pacific version of the model (3) equals 0.71. All individual beta estimates are significant at 1%. The maximum beta in the sample is lower than unity. Beta estimates being lower than unity may indicate that the examined ETFs are more conservative than the market benchmark. The average beta provided by the US version of the model is 0.73. All betas in the sample are statistically significant and only one of them is higher than unity.

The average SMB coefficient equals -0.01 and -0.04 in the Asia Pacific and the US versions of the model (3), respectively, indicating that the size factor can slightly affect the performance of the sample's ETFs negatively. This inference applies only to ten ETFs in the Asia Pacific model (3) and eleven cases in the US model. In the Asia Pacific model, ten SMB estimates are significantly positive. One significantly positive estimate for the size factor is obtained from the US model. Overall, the results on SMB estimates indicate that the size can affect the performance of ETFs, but this effect is rather fund-specific.

The average HML estimates are equal to -0.16 and 0.12 for the Asia Pacific and the US model (3), respectively. In the Asia Pacific model, the HML estimates are significantly negative in twenty cases and positive just in two cases. On the other hand, twenty-seven positive and significant HML estimates are produced by the US model, but no significantly negative estimate is obtained. These results are quite interesting and possibly picture significant differences in the structure of the underlying Asia Pacific and US stock markets regarding the value of the publicly traded companies.

The opposite differences are observed in the coefficients of the RMW factor. The average RMW estimate in Table 5.1 is equal to 0.03, while the corresponding average in Table 5.2 is equal to -0.09. Twelve and seven RMW estimates are significantly positive and negative, respectively, in the case of the Asia Pacific model. Fifteen coefficients are negative and significant in the US model, while the rest estimates are insignificant. Once again, these results may indicate constructive differences in the underlying stock markets concerning the robustness factor.

Going further, the effect of the conservativeness factor is rather immaterial as a limited number of significant CMA estimates are observed in Tables 5.1 and 5.2 with mixed signs (seven cases in the Asia Pacific model and nine cases in the US model). At best, these results indicate that the impact of conservativeness on performance can be significant only occasionally.

Finally, as far as momentum is concerned, the results in Table 5.1 show that the relevant Asia Pacific factor is significantly positive in twenty-four cases. The average momentum estimate is equal to 0.13. These results indicate that the momentum factor in the Asia Pacific stock markets contributes to the performance of the corresponding ETFs by thirteen bps on average. This inference does not apply to the US momentum factor. In this case, nine significantly negative MOM estimates are found in Table 5.2 and just two are significantly positive.

To summarise this section, the empirical results obtained by applying the two versions of the model (3) show that the examined ETFs cannot beat the market benchmarks in the Asia Pacific and the US. On the contrary, in several cases, ETFs underperform the proxy of Kenneth French for the US stock market. Furthermore, the systematic risk of ETFs is found to be lower than the markets' risk. Finally, the Fama and French (2015) factors and the momentum factor of Carhart (1997) can explain the performance of ETFs, even though the impact of each factor on performance varies, either among ETFs or between the two underlying stock markets considered.

4.3. Performance and Risk Persistence

The empirical results on performance and risk persistence are discussed in this section. Table 6 presents the results on performance. Five alternative measures of performance are used, namely, average daily returns, total annual returns, and annual alphas estimated both with Asia Pacific and US market data, Sharpe ratios and Modigliani-Modigliani ratios, also computed with Asia Pacific and US data.

The results in Table 6 show that the average daily returns of the examined ETFs revert from year 2016 to year 2017. The estimated slope is significantly negative at -0.91. All other return measures behave the same way between 2016 and 2017. All the corresponding slopes are negative and significant, ranging from -1.17 (in the case of both Sharpe ratios) to -0.62 (in the case of MM ratio calculated with US data). The performance also reverts between the years 2022-23. All the relevant slopes are negative, being significant in the case of Asia Pacific alphas, Sharpe and MM ratios. The maximum negative slope in the years 2022-23 is equal to 0.62 (in absolute terms).

On the other hand, the performance presents a sufficient level of persistence in the years 2019-20. All the respective slopes are statistically positive and significant, ranging from 0.19 to 0.51. The slopes of years 2018-19 are also positive, but only those of daily returns, annual returns and alphas are statistically significant. Positive slopes are obtained for the years 2020-21 but, with just one exception in the case of US alphas, these estimates are not significant in statistical terms. A significantly positive slope is also obtained for the US alphas in the years 2017-18.

The results on risk persistence are provided in Table 7. Three types of risk are considered, namely, standard deviation in daily returns, intraday volatility and systematic risk estimated by model (3) with Asia Pacific and US market data, respectively.

Regarding the standard deviation of returns, all the relevant slopes in Table 7 are positive and, with just one exception, statistically significant. The significant estimates range from 0.48 (in years 2019-20) to 1.01 (in years 2021-22). Intraday volatility also presents a high level of persistence. All the slopes are positive and significant. The lowest slope is equal to 0.27 (in years 2020-21) to 1.32 (in years 2017-18). The slopes obtained for betas are positive and significant too, with just three (out of fourteen) exceptions. Overall, the slopes obtained for the several risk estimates indicate a high level of persistence for risk at the annual level.

The outcomes of the model (5) on the short-term persistence of daily returns are provided in Table 8. As observed in this table, with just one exception, all the coefficients for day t-1 are negative and statistically significant. The mean estimate of the sample is equal to -0.11 indicating that, on average, the contemporaneous return of ETFs will be lower by its one-day lagged return by eleven bps.

On the other hand, twenty-five-day t-2 coefficients are significantly positive, while the rest estimates are not significant. The sample's average day t-2 coefficient is equal to 0.05. These estimates indicate that the impact on contemporaneous return by its two-day lagged value can be quite significant.

Concerning day t-3, only six significantly positive coefficients are observed in Table 8. Six significantly negative day t-4 estimates are found in Table 8. Based on these results, the impact on contemporaneous returns by the three and four-day lagged returns cannot be that significant. Interestingly enough, day t-5 lagged returns seem to contribute to the contemporaneous return of the examined ETFs in a positive fashion. Twenty-three-day t-5 coefficients are statistically significant, while the average day t-5 coefficient equals 0.05.

Overall, the results of model (5) on daily returns show that the contemporaneous return is significantly affected by its lagged values back to five days. The negative and positive relationship of the current return with the one-day and two-day lagged returns, respectively, could be exploitable via suitable trading strategies by short-term traders.

The results on the short-term persistence of intraday volatility are provided in Table 9. When it comes to the influence on contemporaneous intraday volatility by its one lagged value, the results reveal a significantly positive impact as all the day t-1 coefficients are positive and highly significant. The average coefficient of the sample equals 0.30, indicating that the intraday volatility of the average ETF on day t can be explained by its lagged value of 30 bps.

Similar results are obtained when the two-day lagged values of intraday volatility are taken into consideration. All the relevant coefficients are positive and significant at 1%. The corresponding sample's average is 0.19. With just one exception, all the coefficients of day t-3 intraday volatility are significantly positive, while the corresponding average estimate is equal to 0.11. With no exception, all the day t-4 estimates are significantly positive, with an average estimate of 0.13. Finally, regarding the day t-5 intraday volatility, twenty-five significantly positive estimates are found in Table 9. The relevant average estimate is 0.05.

To summarise these results, our analysis shows that the intraday volatility of the examined ETFs highly persists in the short run. This short-term persistence means that the intraday volatility of an ETF on day t can be affected by its lagged values back to five days (at least).

5. CONCLUSION

This study assesses the performance of the US-based ETFs which focus on the Asia Pacific area. Such ETFs are a convenient means of low cost for investors in the US to get access to the stock markets of Australia, New Zealand, Japan, China, India, and other countries in the region. 34 ETFs were examined covering about 90% of the total sector, according to their assets under management. The study covers the period 2016-2023.

Several issues concerning the performance and risk of these ETFs were investigated. In particular, the raw and risk-adjusted returns were computed, while alphas were estimated too with a six-factor regression model. Moreover, several types of risk were considered, including the standard deviation in the daily raw returns, intraday volatility, and the systematic risk (beta) estimated with the six-factor regression model. The annual and short-term persistence of performance and risk was also assessed. The impact on performance by Fama and French (2015) factors concerning size, value, robustness, conservativeness and momentum was evaluated too.

The empirical results show that the examined ETFs achieved sufficiently positive raw returns during the period under study, even though at the annual level, raw returns were not always positive throughout the study period. Similar observations were made when the risk-adjusted returns of ETFs were considered. On the other hand, the examined ETFs failed to achieve any above-market returns during the period under study. In fact, in some cases, ETFs seemed to underperform the broad stock market index in the US. On the question of performance persistence, our results reveal that performance can persist between two successive years. However, there are years during the study period when performance significantly reverts. In the short run, the results show that return is negatively affected by its one-lagged values and positively by its two-day lagged values.

With regards to risk, our analysis shows that the risk of the examined ETFs was rather modest during the period under investigation, except year 2020, when the health crisis triggered by COVID-19 resulted in a significant rise in the turbulence of stock markets worldwide. When it comes to persistence, our

analysis finds that risk highly persists, both at the annual level and in the short run.

Finally, as far as the impact on performance by the Fama and French (2015) factors is concerned, our analysis reveals that such factors can affect the performance of the examined ETFs. This finding applies both to the Asia Pacific and the US market factors, even though the impact of each variable is not necessarily monotonic when comparing the results obtained via using the Asia Pacific and US market data, respectively.

Overall, the current study indicates that investing in Asia Pacific through relevant ETFs that trade in the US can be a quite satisfactory choice, given the significant positive total raw returns achieved during the study period. Nevertheless, these ETFs cannot outperform the Asia Pacific and the US market benchmarks as they cannot provide any significantly positive alpha. These findings should be kept in mind by investors when making their investment choices.

In addition, investors should not neglect the limitations of our research. Specifically, there are currently 51 equity ETFs listed in the US that focus on the Asia Pacific region, while our study includes 34 funds. Consequently, our results could be representative of the sample alone, rather than for the entire population of the relevant ETFs. Moreover, no fixed-income ETFs are included in our analysis. Finally, our study mainly focuses on the performance and risk of the US-listed Asia Pacific ETFs. However, along with performance and risk, investors are concerned about the cost of their investments. This issue is only limitedly addressed by our paper.

The limitations of our paper indicate some of the venues for plausible further research in the field. Thus, a future study could focus both on equity and fixed-income ETFs from the Asia Pacific region and make comparisons that will accentuate similarities and differences between the two types of ETFs. A thorough research on the costs involved when investing in the Asia Pacific region through US-listed ETFs should be welcomed too. The potential for implementing profitable arbitrage strategies by choosing between US-listed and Asia Pacific-listed ETFs with common benchmarks should also be examined.

Notes

1. Source: www.worldeconomics.com (January 2024).
2. Refer to: https://www.eastspring.com/insights/thought-leadership/investing-in-asia-through-a-factor-lens.

3. The model is applied for each ETF with the method of Ordinary Least Squares and, when it is necessary, adjustments are made, to deal with autocorrelation and heteroskedasticity issues. The same applies to models (4) and (5) that follow.
4. Daily data on the factors considered in model (3) have been found on the website of Kenneth French on: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.
5. Tickers, names, inception dates, assets and expense ratios are available on www.etfdb.com. Volumes and trade prices have been found on www.nasdaq.com.

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Table 1: Profiles of ETFs

This table presents the profiles of ETFs, which include their ticker, name, inception date, age, assets, expense ratio, average daily volume, and trading frequency, as the fraction of the days with no zero volume to the total trade days over the study period January 1, 2016, to December 31, 2023, and average intraday volatility calculated as the fraction of the daily highest trade price minus the daily lowest trade price to the daily close trade price.

Ticker	*Name*	*Inception*	*Age*[1]	*Assets ($Ms)*[1]	*Expense Ratio*[1]	*Volume*[2]	*Trade Freq.*	*Intr. Vol.*[2]
VPL	Vanguard FTSE Pacific ETF	Mar 04, 2005	18.67	6,877	0.08%	560,761	100.00%	0.81
INDA	iShares MSCI India ETF	Feb 02, 2012	11.92	7,786	0.64%	3,602,173	100.00%	0.87
EEMV	iShares MSCI Emerging Markets Min Vol Factor ETF	Oct 18, 2011	12.21	4,315	0.25%	641,391	100.00%	0.75
EWY	iShares MSCI South Korea ETF	May 09, 2000	23.66	3,993	0.57%	3,431,162	100.00%	1.04
EWT	iShares MSCI Taiwan ETF	Jun 20, 2000	23.55	3,695	0.57%	4,145,570	100.00%	0.92
AAXJ	iShares MSCI All Country Asia ex-Japan ETF	Aug 13, 2008	15.39	2,384	0.69%	1,119,991	100.00%	0.99
EWA	iShares MSCI-Australia ETF	Mar 12, 1996	27.82	2,163	0.50%	2,861,483	100.00%	1.06
EPP	iShares MSCI Pacific ex Japan ETF	Oct 25, 2001	22.20	1,889	0.47%	511,331	100.00%	0.89
IPAC	iShares Core MSCI Pacific ETF	Jun 10, 2014	9.56	1,793	0.09%	93,827	100.00%	0.78
EPI	WisdomTree India Earnings Fund	Feb 22, 2008	15.87	1,962	0.84%	1,578,495	100.00%	0.87
AIA	iShares Asia 50 ETF	Nov 13, 2007	16.14	1,398	0.50%	103,499	100.00%	1.00
INDY	iShares India 50 ETF	Nov 18, 2009	14.13	760	0.89%	140,661	100.00%	0.88
EWH	iShares MSCI Hong Kong ETF	Mar 12, 1996	27.82	590	0.50%	4,414,830	100.00%	0.83
VNM	VanEck Vietnam ETF	Aug 14, 2009	14.39	523	0.66%	325,983	100.00%	1.31
SMIN	iShares MSCI India Small-Cap ETF	Feb 08, 2012	11.90	569	0.74%	60,111	100.00%	1.10
EWS	iShares MSCI Singapore ETF	Mar 12, 1996	27.82	481	0.50%	703,336	100.00%	0.86
EEMA	iShares MSCI Emerging Markets Asia ETF	Feb 08, 2012	11.90	417	0.49%	60,550	100.00%	1.05
EIDO	iShares MSCI Indonesia ETF	May 05, 2010	13.67	416	0.58%	804,526	100.00%	1.16
GMF	SPDR S&P Emerging Asia Pacific ETF	Mar 19, 2007	16.80	314	0.49%	24,200	100.00%	0.87
THD	iShares MSCI Thailand ETF	Mar 26, 2008	15.78	280	0.57%	163,773	100.00%	1.05
EWM	iShares MSCI Malaysia ETF	Mar 12, 1996	27.82	237	0.50%	555,190	100.00%	0.89

Ticker	*Name*	*Inception*	*Age*[1]	*Assets ($Ms)*[1]	*Expense Ratio*[1]	*Volume*[2]	*Trade Freq.*	*Intr. Vol.*[2]
PIN	Invesco India ETF	Mar 05, 2008	15.83	198	0.78%	180,013	100.00%	0.84
INCO	Columbia India Consumer ETF	Aug 10, 2011	12.40	144	0.75%	15,320	100.00%	0.87
ENZL	iShares MSCI New Zealand ETF	Sep 01, 2010	13.34	114	0.50%	40,994	100.00%	1.05
NFTY	First Trust India NIFTY 50 Equal Weight ETF	Feb 14, 2012	11.88	121	0.80%	4,432	72.32%	0.50
EPHE	iShares MSCI Philippines ETF	Sep 28, 2010	13.27	98	0.58%	190,922	100.00%	1.23
GLIN	VanEck India Growth Leaders ETF	Aug 25, 2010	13.35	95	0.77%	35,737	100.00%	1.13
BKF	iShares MSCI BIC ETF	Nov 12, 2007	16.15	69	0.70%	42,688	100.00%	1.02
ECNS	iShares MSCI China Small-Cap ETF	Sep 28, 2010	13.27	54	0.58%	11,893	98.66%	1.16
ASEA	Global X FTSE Southeast Asia ETF	Feb 17, 2011	12.88	42	0.65%	12,727	98.06%	0.94
DVYA	iShares Asia/Pacific Dividend ETF	Feb 23, 2012	11.86	43	0.49%	8,579	99.55%	0.63
PAK	Global X MSCI Pakistan ETF	Apr 22, 2015	8.70	34	0.80%	9,983	98.76%	1.41
IDX	VanEck Indonesia Index ETF	Jan 15, 2009	14.97	29	0.57%	35,077	100.00%	1.09
FPA	First Trust Asia Pacific ex-Japan AlphaDEX Fund	Apr 18, 2011	12.71	18	0.80%	6,267	93.69%	0.78
Average			16.17	1,291	0.59%	779,338	98.85%	0.96
Min			8.70	18	0.08%	4,432	72.32%	0.50
Max			27.82	7,786	0.89%	4,414,830	100.00%	1.41

[1] As of December 31, 2023; [2] Average over the period January 1, 2016, to December 31, 2023,

Table 2: Raw Returns of ETFs

This table presents the average raw daily and total (annual) returns of ETFs on an annual basis during the period January 1, 2016, to December 31, 2023.

	Average Returns									*Total Returns*								
Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
VPL	0.02	0.09	-0.07	0.06	0.07	0.00	-0.07	0.05	0.02	2.56	25.43	-16.83	14.76	14.39	-1.99	-17.51	11.93	27.10
INDA	0.00	0.12	-0.02	0.03	0.09	0.06	-0.03	0.07	0.04	-2.51	34.54	-7.57	5.43	14.42	13.97	-8.94	16.94	77.49
EEMV	0.01	0.09	-0.03	0.02	0.03	0.01	-0.06	0.02	0.01	0.51	24.23	-8.05	4.99	4.13	2.85	-15.55	4.79	14.24
EWY	0.04	0.14	-0.09	0.03	0.16	-0.03	-0.11	0.07	0.03	7.15	40.79	-21.45	5.66	38.37	-9.51	-27.47	16.02	31.93
EWT	0.06	0.09	-0.05	0.11	0.12	0.10	-0.19	0.06	0.04	15.00	23.29	-12.68	30.08	29.05	25.49	-39.71	14.62	80.23
AAXJ	0.02	0.13	-0.06	0.06	0.10	-0.03	-0.08	0.02	0.02	2.85	38.87	-16.71	15.69	21.92	-7.71	-21.66	2.75	24.64
EWA	0.04	0.06	-0.07	0.07	0.07	0.02	-0.03	0.04	0.02	6.70	14.53	-16.92	17.61	5.79	3.67	-10.47	9.49	28.38
EPP	0.02	0.08	-0.06	0.05	0.04	0.00	-0.03	0.01	0.01	3.07	20.80	-14.85	13.76	3.39	-0.23	-10.41	1.45	13.08
IPAC	0.01	0.08	-0.06	0.06	0.05	0.00	-0.06	0.05	0.02	2.28	22.17	-15.11	15.39	10.29	-0.87	-15.96	10.88	24.71
EPI	0.02	0.13	-0.04	0.01	0.09	0.09	-0.04	0.09	0.05	1.71	37.82	-10.92	0.36	17.36	24.89	-10.66	25.81	106.45
AIA	0.04	0.14	-0.06	0.08	0.13	-0.04	-0.10	0.02	0.03	9.39	42.82	-16.26	19.35	32.08	-12.17	-25.89	2.17	37.14
INDY	0.01	0.12	-0.01	0.04	0.07	0.05	-0.04	0.06	0.04	0.55	35.77	-4.85	9.34	9.89	11.48	-10.57	16.40	81.13
EWH	0.00	0.11	-0.04	0.04	0.02	-0.02	-0.03	-0.07	0.00	-1.72	30.49	-11.21	7.80	1.27	-5.88	-9.40	-17.33	-12.36
VNM	-0.04	0.13	-0.06	0.04	0.06	0.08	-0.22	0.05	0.00	-11.83	37.12	-17.51	8.41	9.38	21.44	-44.26	9.12	-12.64
SMIN	0.00	0.20	-0.11	-0.02	0.10	0.15	-0.05	0.12	0.05	-1.81	60.88	-26.63	-6.82	17.75	42.60	-14.23	34.83	109.71
EWS	0.00	0.11	-0.06	0.04	-0.03	0.00	-0.04	0.00	0.00	-3.06	30.11	-14.77	9.23	-11.02	-0.42	-12.06	-0.58	-9.05
EEMA	0.02	0.14	-0.07	0.06	0.10	-0.02	-0.09	0.02	0.02	3.89	40.85	-17.49	16.32	23.60	-6.23	-22.81	4.41	31.17
EIDO	0.07	0.07	-0.04	0.02	0.01	0.00	0.00	0.00	0.02	15.62	17.82	-12.70	3.38	-8.73	-1.92	-2.53	-0.31	6.95
GMF	0.02	0.13	-0.06	0.07	0.10	-0.01	-0.08	0.02	0.02	2.08	39.20	-16.08	17.80	23.15	-4.55	-20.98	5.26	37.32
THD	0.09	0.10	-0.04	0.03	-0.02	0.00	0.00	-0.06	0.01	22.94	28.31	-10.48	5.78	-12.02	-1.21	-1.25	-15.07	8.90
EWM	-0.03	0.07	-0.03	-0.01	0.02	-0.05	-0.03	-0.03	-0.01	-9.33	17.46	-9.71	-4.23	1.02	-13.09	-8.75	-6.96	-31.36
PIN	0.00	0.13	-0.03	-0.06	0.09	0.06	-0.08	0.08	0.02	-1.23	36.93	-8.45	-17.87	16.93	15.25	-20.41	20.24	31.15
INCO	0.01	0.17	-0.04	-0.01	0.08	0.05	-0.06	0.11	0.04	0.87	53.20	-10.91	-4.49	14.15	11.88	-15.84	29.53	83.06
ENZL	0.03	0.07	-0.01	0.09	0.10	-0.05	-0.07	0.01	0.02	6.00	19.48	-3.05	25.49	17.87	-13.50	-17.54	-0.11	29.39
NFTY	0.04	0.07	0.00	0.01	0.06	0.10	-0.03	0.09	0.04	7.89	17.00	-1.51	-0.38	9.07	24.82	-8.83	23.79	90.30

	Average Returns									*Total Returns*								
Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
EPHE	-0.01	0.08	-0.07	0.03	0.02	-0.01	-0.07	0.00	0.00	-3.91	19.74	-17.88	7.65	-4.72	-3.24	-17.23	-0.76	-22.97
GLIN	-0.01	0.21	-0.17	-0.09	0.03	0.11	-0.09	0.12	0.01	-5.78	66.35	-37.48	-22.62	-0.54	29.57	-22.76	34.81	1.76
BKF	0.04	0.14	-0.06	0.08	0.08	-0.05	-0.09	0.00	0.02	8.92	39.55	-15.69	20.79	15.24	-14.27	-23.29	-0.42	16.81
ECNS	-0.02	0.09	-0.09	0.02	0.09	0.01	-0.10	-0.11	-0.01	-7.97	23.29	-22.65	4.37	20.43	-2.48	-27.06	-26.62	-42.42
ASEA	0.03	0.12	-0.04	0.03	-0.02	0.01	0.02	0.01	0.02	5.43	32.94	-10.37	5.74	-10.21	0.41	2.82	0.95	24.32
DVYA	0.06	0.05	-0.08	0.04	-0.03	0.00	-0.03	0.03	0.00	14.55	11.43	-19.53	8.52	-13.53	-2.12	-9.02	6.14	-8.89
PAK	0.12	-0.13	-0.16	0.00	-0.01	-0.09	-0.16	0.06	-0.05	34.42	-29.26	-34.81	-2.85	-8.02	-20.65	-34.47	11.00	-68.03
IDX	0.07	0.07	-0.04	0.02	0.00	-0.01	-0.05	0.00	0.01	15.32	17.00	-12.40	3.95	-8.93	-3.64	-12.54	-1.67	-7.28
FPA	0.00	0.11	-0.10	0.02	0.07	0.00	-0.06	0.03	0.01	-0.99	31.39	-23.77	4.74	11.40	-1.96	-17.91	6.57	-0.77
Average	0.02	0.10	-0.06	0.03	0.06	0.01	-0.07	0.03	0.02	4.10	29.48	-15.21	7.15	8.96	2.96	-16.92	7.35	23.58
Min	-0.04	-0.13	-0.17	-0.09	-0.03	-0.09	-0.22	-0.11	-0.05	-11.83	-29.26	-37.48	-22.62	-13.53	-20.65	-44.26	-26.62	-68.03
Max	0.12	0.21	0.00	0.11	0.16	0.15	0.02	0.12	0.05	34.42	66.35	-1.51	30.08	38.37	42.60	2.82	34.83	109.71

Table 3: Risk of ETFs

This table presents the risk of ETFs on an annual basis over the period January 1, 2016, to December 31, 2023. Risk is computed as the standard deviation in raw returns.

Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
VPL	1.08	0.51	0.96	0.75	1.84	0.88	1.24	0.89	1.09
INDA	1.28	0.86	1.35	1.13	2.76	1.18	1.27	0.70	1.44
EEMV	1.03	0.57	0.92	0.66	1.57	0.70	0.95	0.64	0.93
EWY	1.39	1.00	1.47	1.18	2.56	1.39	1.72	1.42	1.58
EWT	1.36	0.79	1.25	0.92	1.87	1.30	1.78	1.30	1.37
AAXJ	1.20	0.70	1.30	0.97	1.96	1.17	1.59	1.05	1.29
EWA	1.40	0.80	1.07	0.83	2.99	1.07	1.58	1.19	1.52
EPP	1.21	0.67	0.96	0.81	2.36	0.91	1.38	1.06	1.27
IPAC	1.04	0.51	0.92	0.71	1.77	0.89	1.24	0.91	1.06
EPI	1.33	0.83	1.25	1.11	2.48	1.06	1.30	0.75	1.36
AIA	1.22	0.74	1.39	1.06	1.96	1.37	1.98	1.35	1.44
INDY	1.26	0.78	1.24	1.08	2.44	1.21	1.29	0.66	1.34
EWH	1.07	0.66	1.09	1.12	1.85	1.01	1.41	1.18	1.22
VNM	1.34	0.85	1.59	1.00	2.07	1.16	1.58	1.58	1.45
SMIN	1.41	1.08	1.50	1.24	2.62	1.19	1.39	0.85	1.50
EWS	1.23	0.63	1.05	0.87	1.94	1.00	1.33	1.05	1.19
EEMA	1.24	0.78	1.35	0.98	2.03	1.18	1.60	1.07	1.33
EIDO	1.56	0.84	1.64	1.19	3.04	1.33	1.20	0.95	1.61
GMF	1.20	0.68	1.24	0.93	1.89	1.17	1.53	0.95	1.25
THD	1.30	0.64	1.18	0.81	2.62	1.04	1.20	1.06	1.35
EWM	1.39	0.64	1.10	0.67	1.94	0.86	0.98	0.70	1.12
PIN	1.33	0.77	1.26	1.74	2.24	1.15	1.47	0.71	1.42
INCO	1.29	0.87	1.30	1.23	2.27	1.24	1.49	0.76	1.37
ENZL	1.13	0.73	1.02	0.83	2.50	1.04	1.46	1.16	1.34
NFTY	1.40	0.74	1.30	1.26	2.33	1.27	1.50	0.89	1.41
EPHE	1.42	0.93	1.25	1.05	2.79	1.15	1.29	0.98	1.47
GLIN	1.67	1.29	1.78	1.47	2.60	1.04	1.45	0.80	1.60
BKF	1.39	0.88	1.39	1.03	2.03	1.39	1.92	1.15	1.45
ECNS	1.51	0.93	1.46	0.97	1.81	1.88	2.21	1.54	1.59
ASEA	1.17	0.70	1.20	0.86	2.10	0.83	0.97	0.79	1.16
DVYA	1.17	0.61	0.87	0.75	2.28	0.84	1.21	0.94	1.19
PAK	1.04	1.35	1.44	1.57	2.02	1.15	1.46	1.80	1.51
IDX	1.54	0.84	1.59	1.19	2.88	1.21	1.18	0.99	1.55
FPA	1.11	0.77	1.11	0.98	2.12	1.06	1.85	1.38	1.37
Average	1.29	0.79	1.26	1.03	2.25	1.13	1.44	1.04	1.36
Min	1.03	0.51	0.87	0.66	1.57	0.70	0.95	0.64	0.93
Max	1.67	1.35	1.78	1.74	3.04	1.88	2.21	1.80	1.61

Table 4.1: Risk-Adjusted Return of ETFs (Asia-Pacific Market Variables)

This table presents two types of ETFs' risk-adjusted return, i.e., the Sharpe Ratio and the Modigliani-Modigliani (MM) Ratio, using market data from the Asia-Pacific Stock Markets on an annual basis over the period January 1, 2016, to December 31, 2023.

	Sharpe Ratio									*Modigliani-Modigliani Ratio*								
Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
VPL	0.01	0.18	-0.08	0.06	0.04	0.00	-0.06	0.02	0.01	0.01	0.08	-0.05	0.05	0.06	0.00	-0.06	0.04	0.01
INDA	0.00	0.14	-0.02	0.02	0.03	0.05	-0.03	0.04	0.02	0.00	0.07	-0.01	0.02	0.05	0.04	-0.03	0.05	0.03
EEMV	0.01	0.15	-0.04	0.02	0.02	0.02	-0.07	-0.01	0.00	0.01	0.07	-0.02	0.02	0.03	0.02	-0.07	0.01	0.01
EWY	0.03	0.14	-0.06	0.02	0.06	-0.02	-0.07	0.03	0.01	0.02	0.07	-0.04	0.02	0.10	-0.02	-0.07	0.04	0.02
EWT	0.05	0.11	-0.04	0.11	0.06	0.08	-0.11	0.07	0.03	0.04	0.05	-0.02	0.08	0.10	0.06	-0.11	0.07	0.03
AAXJ	0.02	0.19	-0.06	0.05	0.04	-0.02	-0.06	-0.01	0.01	0.01	0.09	-0.03	0.05	0.07	-0.02	-0.06	0.01	0.01
EWA	0.03	0.07	-0.07	0.07	0.02	0.02	-0.02	-0.01	0.01	0.02	0.03	-0.05	0.06	0.04	0.01	-0.02	0.01	0.01
EPP	0.02	0.12	-0.07	0.05	0.01	0.00	-0.03	-0.03	0.00	0.01	0.05	-0.04	0.05	0.02	0.00	-0.03	-0.01	0.01
IPAC	0.01	0.16	-0.08	0.07	0.03	0.00	-0.05	0.01	0.01	0.01	0.07	-0.05	0.06	0.05	0.00	-0.05	0.03	0.01
EPI	0.01	0.16	-0.04	0.00	0.03	0.09	-0.03	0.07	0.03	0.01	0.07	-0.02	0.01	0.05	0.07	-0.03	0.08	0.03
AIA	0.04	0.20	-0.05	0.06	0.06	-0.03	-0.05	0.00	0.01	0.03	0.09	-0.03	0.05	0.10	-0.02	-0.05	0.02	0.02
INDY	0.01	0.16	-0.02	0.03	0.02	0.04	-0.03	0.03	0.02	0.01	0.08	0.00	0.03	0.04	0.03	-0.03	0.05	0.03
EWH	0.00	0.16	-0.05	0.02	0.01	-0.02	-0.02	-0.10	-0.01	0.00	0.08	-0.03	0.03	0.02	-0.01	-0.02	-0.06	0.00
VNM	-0.03	0.15	-0.05	0.03	0.02	0.07	-0.14	0.02	0.00	-0.03	0.07	-0.03	0.03	0.04	0.06	-0.15	0.04	0.00
SMIN	0.00	0.18	-0.08	-0.02	0.04	0.12	-0.04	0.12	0.03	0.00	0.08	-0.05	-0.01	0.06	0.10	-0.04	0.12	0.03
EWS	0.00	0.17	-0.06	0.03	-0.02	0.00	-0.04	-0.03	0.00	0.00	0.08	-0.04	0.03	-0.02	0.00	-0.03	-0.01	0.00
EEMA	0.02	0.18	-0.06	0.06	0.05	-0.02	-0.06	0.00	0.01	0.02	0.08	-0.03	0.05	0.08	-0.01	-0.06	0.02	0.02
EIDO	0.04	0.08	-0.03	0.01	0.00	0.00	-0.01	-0.03	0.01	0.04	0.04	-0.01	0.02	0.00	0.00	0.00	0.00	0.01
GMF	0.01	0.20	-0.06	0.06	0.05	-0.01	-0.06	0.00	0.01	0.01	0.09	-0.03	0.05	0.08	-0.01	-0.06	0.02	0.02
THD	0.07	0.16	-0.04	0.02	-0.01	0.00	0.00	-0.10	0.00	0.06	0.07	-0.02	0.02	-0.01	0.00	0.00	-0.06	0.01
EWM	-0.02	0.10	-0.04	-0.04	0.01	-0.06	-0.04	-0.07	-0.02	-0.02	0.05	-0.02	-0.01	0.02	-0.05	-0.04	-0.04	-0.01
PIN	0.00	0.17	-0.03	-0.04	0.04	0.05	-0.06	0.06	0.01	0.00	0.08	-0.01	-0.02	0.06	0.04	-0.06	0.07	0.02
INCO	0.01	0.20	-0.04	-0.02	0.03	0.04	-0.04	0.12	0.02	0.01	0.09	-0.02	0.00	0.05	0.03	-0.04	0.12	0.03

	Sharpe Ratio									*Modigliani-Modigliani Ratio*								
Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
ENZL	0.03	0.10	-0.02	0.10	0.04	-0.05	-0.05	-0.03	0.01	0.02	0.05	0.00	0.08	0.06	-0.04	-0.05	0.00	0.02
NFTY	0.03	0.09	-0.01	0.00	0.03	0.08	-0.02	0.06	0.02	0.02	0.04	0.01	0.01	0.04	0.06	-0.02	0.07	0.03
EPHE	0.00	0.08	-0.06	0.02	0.01	-0.01	-0.06	-0.03	-0.01	0.00	0.04	-0.04	0.03	0.01	0.00	-0.06	-0.01	0.00
GLIN	-0.01	0.16	-0.10	-0.07	0.01	0.10	-0.07	0.11	0.00	0.00	0.08	-0.07	-0.03	0.02	0.08	-0.07	0.11	0.01
BKF	0.03	0.16	-0.05	0.07	0.03	-0.04	-0.05	-0.01	0.01	0.03	0.07	-0.03	0.05	0.05	-0.03	-0.05	0.01	0.01
ECNS	-0.01	0.09	-0.07	0.01	0.05	0.00	-0.05	-0.08	-0.01	-0.01	0.04	-0.04	0.02	0.08	0.00	-0.05	-0.05	0.00
ASEA	0.02	0.17	-0.04	0.02	-0.01	0.01	0.01	-0.04	0.01	0.02	0.08	-0.02	0.02	-0.02	0.00	0.02	-0.01	0.01
DVYA	0.05	0.07	-0.11	0.03	-0.01	-0.01	-0.03	-0.03	-0.01	0.04	0.03	-0.07	0.03	-0.02	0.00	-0.03	0.00	0.00
PAK	0.12	-0.10	-0.12	-0.01	-0.02	-0.07	-0.11	0.03	-0.03	0.10	-0.04	-0.08	0.01	-0.02	-0.06	-0.12	0.05	-0.02
IDX	0.04	0.08	-0.03	0.01	0.00	-0.01	-0.04	-0.02	0.00	0.04	0.04	-0.01	0.02	0.00	0.00	-0.04	0.00	0.01
FPA	0.00	0.14	-0.10	0.01	0.03	0.00	-0.04	-0.01	0.00	0.00	0.07	-0.07	0.02	0.05	0.00	-0.03	0.01	0.01
Average	0.02	0.13	-0.05	0.03	0.02	0.01	-0.05	0.00	0.01	0.02	0.06	-0.03	0.03	0.04	0.01	-0.05	0.02	0.01
Min	-0.03	-0.10	-0.12	-0.07	-0.02	-0.07	-0.14	-0.10	-0.03	-0.03	-0.04	-0.08	-0.03	-0.02	-0.06	-0.15	-0.06	-0.02
Max	0.12	0.20	-0.01	0.11	0.06	0.12	0.01	0.12	0.03	0.10	0.09	0.01	0.08	0.10	0.10	0.02	0.12	0.03

Table 4.2: Risk-Adjusted Return of ETFs (US Market Variables)

This table presents two types of ETFs' risk-adjusted return, i.e., the Sharpe Ratio and the Modigliani-Modigliani (MM) Ratio, using market data from the US Stock Markets on an annual basis over the period January 1, 2016, to December 31, 2023.

	Sharpe Ratio									*Modigliani-Modigliani Ratio*								
Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
VPL	0.01	0.17	-0.08	0.07	0.04	0.00	-0.06	0.02	0.01	0.01	0.08	-0.08	0.06	0.08	0.00	-0.09	0.04	0.02
INDA	0.00	0.14	-0.02	0.02	0.03	0.05	-0.03	0.04	0.02	0.00	0.07	-0.02	0.02	0.07	0.04	-0.04	0.05	0.03
EEMV	0.01	0.15	-0.04	0.02	0.02	0.02	-0.07	-0.01	0.00	0.01	0.07	-0.04	0.02	0.04	0.02	-0.11	0.01	0.01
EWY	0.03	0.14	-0.06	0.02	0.06	-0.02	-0.07	0.03	0.01	0.02	0.07	-0.06	0.02	0.14	-0.02	-0.10	0.04	0.02
EWT	0.05	0.11	-0.04	0.11	0.06	0.08	-0.11	0.07	0.03	0.04	0.05	-0.04	0.10	0.14	0.07	-0.17	0.08	0.04
AAXJ	0.01	0.18	-0.06	0.06	0.05	-0.02	-0.06	-0.01	0.01	0.01	0.09	-0.05	0.05	0.10	-0.02	-0.09	0.01	0.02
EWA	0.02	0.07	-0.07	0.07	0.02	0.02	-0.02	-0.01	0.01	0.02	0.03	-0.07	0.07	0.05	0.02	-0.03	0.01	0.02
EPP	0.02	0.11	-0.07	0.06	0.02	0.00	-0.03	-0.03	0.00	0.01	0.05	-0.07	0.06	0.03	0.00	-0.04	-0.01	0.01
IPAC	0.01	0.15	-0.07	0.07	0.03	0.00	-0.05	0.01	0.01	0.01	0.07	-0.07	0.07	0.07	0.00	-0.08	0.03	0.02
EPI	0.01	0.15	-0.04	0.00	0.04	0.09	-0.03	0.07	0.03	0.01	0.07	-0.03	0.01	0.08	0.08	-0.05	0.08	0.04
AIA	0.03	0.19	-0.05	0.06	0.07	-0.03	-0.05	0.00	0.01	0.03	0.09	-0.05	0.06	0.14	-0.03	-0.08	0.02	0.02
INDY	0.01	0.16	-0.02	0.03	0.03	0.04	-0.03	0.03	0.02	0.01	0.07	-0.01	0.03	0.06	0.04	-0.05	0.05	0.03
EWH	0.00	0.16	-0.04	0.02	0.01	-0.02	-0.02	-0.10	-0.01	0.00	0.08	-0.04	0.03	0.03	-0.02	-0.03	-0.07	0.00
VNM	-0.03	0.15	-0.04	0.03	0.02	0.07	-0.14	0.02	0.00	-0.03	0.07	-0.04	0.03	0.05	0.06	-0.22	0.04	0.00
SMIN	0.00	0.18	-0.08	-0.02	0.04	0.12	-0.04	0.12	0.03	0.00	0.08	-0.08	-0.01	0.08	0.11	-0.06	0.12	0.04
EWS	0.00	0.16	-0.06	0.03	-0.02	0.00	-0.04	-0.03	0.00	0.00	0.08	-0.06	0.04	-0.04	0.00	-0.05	-0.01	0.00
EEMA	0.02	0.17	-0.06	0.06	0.05	-0.02	-0.06	0.00	0.01	0.02	0.08	-0.05	0.06	0.11	-0.01	-0.09	0.02	0.02
EIDO	0.04	0.08	-0.03	0.01	0.00	0.00	-0.01	-0.03	0.01	0.04	0.04	-0.02	0.02	0.00	0.00	-0.01	-0.01	0.01
GMF	0.01	0.19	-0.06	0.07	0.05	-0.01	-0.06	0.00	0.01	0.01	0.09	-0.05	0.06	0.12	-0.01	-0.09	0.02	0.02
THD	0.07	0.15	-0.04	0.02	-0.01	0.00	0.00	-0.10	0.00	0.06	0.07	-0.03	0.03	-0.02	0.00	0.00	-0.07	0.01
EWM	-0.02	0.10	-0.04	-0.03	0.01	-0.06	-0.04	-0.07	-0.02	-0.02	0.05	-0.03	-0.02	0.03	-0.05	-0.06	-0.04	-0.01
PIN	0.00	0.16	-0.03	-0.04	0.04	0.05	-0.06	0.06	0.01	0.00	0.08	-0.02	-0.02	0.08	0.05	-0.09	0.07	0.02

	Sharpe Ratio									*Modigliani-Modigliani Ratio*								
Ticker	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2016-23*
INCO	0.01	0.20	-0.03	-0.02	0.03	0.04	-0.04	0.12	0.02	0.01	0.09	-0.03	0.00	0.08	0.04	-0.06	0.13	0.03
ENZL	0.03	0.10	-0.01	0.10	0.04	-0.05	-0.05	-0.03	0.01	0.02	0.05	-0.01	0.09	0.09	-0.04	-0.07	-0.01	0.02
NFTY	0.03	0.08	0.00	0.00	0.03	0.08	-0.02	0.06	0.02	0.02	0.04	0.00	0.01	0.06	0.07	-0.03	0.07	0.03
EPHE	0.00	0.08	-0.06	0.03	0.01	-0.01	-0.06	-0.03	-0.01	0.00	0.04	-0.06	0.03	0.02	-0.01	-0.08	-0.01	0.00
GLIN	-0.01	0.16	-0.10	-0.07	0.01	0.10	-0.07	0.11	0.00	0.00	0.08	-0.10	-0.05	0.03	0.09	-0.10	0.12	0.01
BKF	0.03	0.15	-0.05	0.07	0.03	-0.04	-0.05	-0.01	0.01	0.03	0.07	-0.04	0.07	0.07	-0.03	-0.07	0.01	0.02
ECNS	-0.01	0.09	-0.07	0.01	0.05	0.00	-0.05	-0.08	-0.01	-0.01	0.04	-0.07	0.02	0.11	0.00	-0.07	-0.05	-0.01
ASEA	0.02	0.16	-0.04	0.02	-0.01	0.01	0.01	-0.04	0.01	0.02	0.08	-0.03	0.03	-0.03	0.01	0.02	-0.01	0.02
DVYA	0.05	0.07	-0.10	0.04	-0.01	-0.01	-0.03	-0.03	-0.01	0.04	0.03	-0.11	0.04	-0.03	-0.01	-0.04	0.00	0.00
PAK	0.12	-0.10	-0.12	0.00	-0.01	-0.07	-0.11	0.03	-0.03	0.10	-0.04	-0.12	0.00	-0.03	-0.07	-0.17	0.05	-0.03
IDX	0.04	0.08	-0.03	0.01	0.00	-0.01	-0.04	-0.02	0.00	0.04	0.04	-0.03	0.02	0.00	-0.01	-0.06	0.00	0.01
FPA	0.00	0.14	-0.10	0.01	0.03	0.00	-0.04	-0.01	0.00	0.00	0.07	-0.10	0.02	0.07	0.00	-0.05	0.01	0.01
Average	0.02	0.13	-0.05	0.03	0.02	0.01	-0.05	0.00	0.01	0.02	0.06	-0.05	0.03	0.05	0.01	-0.07	0.02	0.01
Min	-0.03	-0.10	-0.12	-0.07	-0.02	-0.07	-0.14	-0.10	-0.03	-0.03	-0.04	-0.12	-0.05	-0.04	-0.07	-0.22	-0.07	-0.03
Max	0.12	0.20	0.00	0.11	0.07	0.12	0.01	0.12	0.03	0.10	0.09	0.00	0.10	0.14	0.11	0.02	0.13	0.04

Table 5.1: Six-Factor Performance Regression Results (Asian-Pacific Market Variables)

This table presents the results of a six-factor performance regression model via which the daily excess return of each ETF is regressed on the excess return of the market index suggested by Fama and French for the Asia-Pacific Stock Market, and the Fama & French (2015) SMB (small minus big) factor, HML (high minus low book-to-price ratio) factor, the RMW (robust minus weak) factor, the CMA (conservative minus aggressive) factor, and the Carhart (1997) MOM (momentum) factor. All explanatory variables concern the Asian Stock Market. The study period spans from January 1, 2016, to December 31, 2023.

Ticker	*alpha*	*T-test*	*beta*	*T-test*	*SMB*	*T-test*	*HML*	*T-test*	*RMW*	*T-test*	*CMA*	*T-test*	*MOM*	*T-test*	R^2
VPL	0.00	0.02	0.65[a]	22.21	-0.10[c]	-1.79	-0.19[a]	-3.79	0.10[c]	1.90	0.04	0.60	0.09[b]	2.56	0.41
INDA	0.02	0.58	0.61[a]	13.62	-0.09	-1.09	-0.14[c]	-1.82	0.07	0.93	-0.02	-0.24	0.26[a]	5.14	0.22
EEMV	0.00	-0.11	0.59[a]	22.77	0.03	0.63	-0.13[a]	-3.00	0.01	0.12	0.08	1.48	0.10[a]	3.52	0.37
EWY	0.01	0.33	0.97[a]	22.18	-0.05	-0.60	-0.15[c]	-1.90	-0.01	-0.08	-0.07	-0.76	0.08	1.54	0.37
EWT	0.03	1.11	0.72[a]	18.21	0.00	0.05	-0.08	-1.18	0.04	0.59	-0.15[c]	-1.84	0.06	1.31	0.29
AAXJ	0.01	0.56	0.78[a]	22.15	-0.18[b]	-2.75	-0.30[a]	-4.98	-0.30[a]	-4.82	0.00	-0.05	0.10[b]	2.62	0.40
EWA	-0.02	-0.75	0.80[a]	21.61	-0.39[a]	-5.70	-0.44[a]	-6.77	0.65[a]	9.79	0.32[a]	4.18	0.19[a]	4.60	0.51
EPP	-0.02	-0.84	0.79[a]	26.38	-0.36[a]	-6.49	-0.26[a]	-5.01	0.27[a]	5.04	0.19[a]	3.03	0.13[a]	3.68	0.54
IPAC	0.00	-0.04	0.60[a]	20.66	-0.11[b]	-2.11	-0.20[a]	-3.95	0.11[b]	2.05	0.04	0.75	0.08[b]	2.55	0.38
EPI	0.02	0.84	0.64[a]	15.18	0.07	0.93	-0.02	-0.28	0.12[c]	1.65	-0.01	-0.08	0.22[a]	4.51	0.21
AIA	0.02	0.91	0.80[a]	20.31	-0.34[a]	-4.72	-0.42[a]	-6.07	-0.42[a]	-6.02	-0.01	-0.06	0.06	1.33	0.39
INDY	0.02	0.81	0.62[a]	14.77	0.04	0.56	-0.07	-0.99	0.02	0.23	-0.09	-1.08	0.16[a]	3.40	0.21
EWH	-0.01	-0.65	0.79[a]	25.84	-0.50[a]	-8.84	-0.04	-0.72	-0.42[a]	-7.62	0.09	1.37	0.04	1.07	0.47
VNM	0.00	-0.02	0.65[a]	14.07	0.27[a]	3.22	-0.17[b]	-2.05	-0.08	-0.99	0.14	1.51	0.08	1.48	0.15
SMIN	0.03	1.00	0.57[a]	11.73	0.14[c]	1.69	-0.12	-1.48	0.12	1.34	0.03	0.26	0.21[a]	3.81	0.15
EWS	-0.01	-0.62	0.83[a]	25.67	-0.03	-0.49	0.01	0.17	-0.04	-0.64	0.04	0.63	-0.02	-0.51	0.40
EEMA	0.02	0.64	0.76[a]	20.97	-0.18[b]	-2.64	-0.33[a]	-5.17	-0.27[a]	-4.15	-0.03	-0.34	0.13[a]	3.02	0.38
EIDO	-0.01	-0.25	0.82[a]	16.72	0.14	1.50	-0.05	-0.56	0.27[a]	3.05	0.13	1.25	0.17[a]	2.98	0.23
GMF	0.02	0.83	0.72[a]	20.54	-0.10	-1.50	-0.32[a]	-5.35	-0.30[a]	-4.77	0.01	0.08	0.14[a]	3.46	0.36
THD	-0.01	-0.22	0.77[a]	19.34	0.07	0.95	-0.13[c]	-1.83	0.11	1.47	0.19[b]	2.25	0.12[b]	2.60	0.29
EWM	-0.03	-1.30	0.63[a]	18.65	0.16[b]	2.61	-0.01	-0.22	0.17[b]	2.81	0.16[b]	2.26	0.05	1.42	0.25

Ticker	*alpha*	*T-test*	*beta*	*T-test*	*SMB*	*T-test*	*HML*	*T-test*	*RMW*	*T-test*	*CMA*	*T-test*	*MOM*	*T-test*	R^2
PIN	0.01	0.35	0.59[a]	13.06	0.08	0.97	-0.17[b]	-2.20	0.01	0.06	-0.02	-0.19	0.16[a]	3.14	0.18
INCO	0.03	0.97	0.50[a]	11.49	0.03	0.42	-0.22[a]	-2.93	0.05	0.62	0.02	0.17	0.15[a]	2.91	0.16
ENZL	0.00	0.02	0.60[a]	16.00	0.14[b]	1.99	-0.42[a]	-6.37	0.40[a]	5.92	0.06	0.77	0.23[a]	5.31	0.35
NFTY	0.03	0.93	0.63[a]	14.06	0.19[b]	2.30	-0.05	-0.62	0.00	0.01	-0.09	-0.95	0.19[a]	3.77	0.18
EPHE	-0.02	-0.73	0.57[a]	12.27	-0.17[b]	-2.00	-0.25[a]	-3.13	0.11	1.27	0.19[b]	2.03	0.15[b]	2.84	0.19
GLIN	-0.01	-0.18	0.62[a]	12.08	0.17[c]	1.78	-0.17[c]	-1.91	0.14	1.56	0.03	0.25	0.26[a]	4.48	0.16
BKF	0.02	0.58	0.78[a]	18.87	-0.18[b]	-2.32	-0.42[a]	-5.82	-0.37[a]	-5.04	0.06	0.66	0.12[a]	2.59	0.33
ECNS	0.00	-0.07	0.86[a]	18.06	0.25[b]	2.86	-0.45[a]	-5.49	-0.63[a]	-7.37	0.06	0.61	0.16[a]	3.01	0.27
ASEA	0.00	-0.08	0.77[a]	22.90	0.16[b]	2.63	0.11[c]	1.88	0.18[a]	2.93	0.11	1.54	0.00	-0.11	0.31
DVYA	-0.03	-1.39	0.82[a]	26.46	-0.04	-0.72	-0.03	-0.56	0.37[a]	6.75	0.29[a]	4.57	0.02	0.46	0.45
PAK	-0.05[c]	-1.69	0.45[a]	8.89	0.32[a]	3.38	0.08	0.91	0.09	1.03	0.06	0.56	0.00	-0.02	0.05
IDX	-0.01	-0.40	0.86[a]	18.51	0.24[b]	2.82	-0.02	-0.21	0.25[a]	2.97	0.12	1.26	0.14[a]	2.61	0.25
FPA	-0.02	-0.95	0.94[a]	25.35	0.07	1.10	0.16[b]	2.55	0.18[b]	2.75	-0.06	-0.81	0.27[a]	6.43	0.40
Aver	0.00	0.01	0.71	18.58	-0.01	-0.34	-0.16	-2.38	0.03	0.45	0.06	0.76	0.13	2.75	0.30
Min	-0.05	-1.61	0.45	8.89	-0.50	-8.84	-0.45	-6.77	-0.63	-7.62	-0.15	-1.84	-0.02	-0.51	0.05
Max	0.03	1.11	0.97	26.46	0.32	3.38	0.16	2.55	0.65	9.79	0.32	4.57	0.27	6.43	0.54

[a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level; [c] indicates statistical significance at 10% level.

Table 5.2: Six-Factor Performance Regression Results (US Market Variables)

This table presents the results of a six-factor performance regression model via which the daily excess return of each ETF is regressed on the excess return of the market index suggested by Fama and French for the US Stock Market, and the Fama & French (2015) SMB (small minus big) factor, HML (high minus low book-to-price ratio) factor, the RMW (robust minus weak) factor, the CMA (conservative minus aggressive) factor, and the Carhart (1997) MOM (momentum) factor. All explanatory variables concern the US Stock Market. The study period spans from January 1, 2016, to December 31, 2023.

Ticker	*Alpha*	*T-test*	*beta*	*T-test*	*SMB*	*T-test*	*HML*	*T-tes*	*RMW*	*T-test*	*CMA*	*T-test*	*MOM*	*T-test*	R^2
VPL	-0.03[c]	-1.90	0.75[a]	63.15	0.01	0.32	0.11[a]	5.34	-0.01	-0.36	0.00	0.09	-0.02[c]	-1.65	0.71
INDA	-0.01	-0.22	0.80[a]	37.21	-0.09[b]	-2.17	0.27[a]	6.96	-0.07	-1.28	-0.12[c]	-1.68	0.06[b]	2.71	0.46
EEMV	-0.02[c]	-1.65	0.59[a]	47.67	-0.03	-1.13	0.06[b]	2.66	-0.06[b]	-2.24	0.04	0.89	0.01	0.76	0.57
EWY	-0.03	-1.05	0.94[a]	41.84	-0.04	-0.84	0.08[b]	1.98	-0.02	-0.29	0.01	0.10	-0.03	-1.08	0.51
EWT	0.00	0.01	0.76[a]	38.72	0.01	0.37	0.02	0.54	-0.03	-0.71	-0.07	-1.02	0.03	1.18	0.48
AAXJ	-0.02	-1.12	0.78[a]	45.46	0.00	-0.08	0.01	0.32	-0.17[a]	-4.24	-0.04	-0.68	0.00	-0.19	0.57
EWA	-0.03[c]	-1.86	1.05[a]	62.30	-0.03	-0.80	0.24[a]	7.98	-0.05	-1.20	0.17[a]	3.05	0.00	-0.21	0.70
EPP	-0.04[b]	-2.28	0.88[a]	62.60	-0.04	-1.52	0.17[a]	6.71	-0.06[c]	-1.80	0.13[b]	2.86	-0.03[b]	-2.11	0.70
IPAC	-0.02[c]	-1.85	0.72[a]	59.86	0.00	0.05	0.11[a]	5.31	-0.02	-0.59	0.01	0.35	-0.02[c]	-1.60	0.69
EPI	0.00	0.15	0.74[a]	35.28	-0.05	-1.16	0.22[a]	5.95	-0.05	-1.09	-0.08	-1.11	0.03	1.44	0.43
AIA	-0.01	-0.63	0.80[a]	38.51	0.03	0.69	-0.03	-0.79	-0.19[a]	-3.97	-0.06	-0.87	-0.04[c]	-1.62	0.50
INDY	0.00	-0.05	0.72[a]	34.72	-0.05	-1.26	0.25[a]	6.73	-0.08[c]	-1.72	-0.13[c]	-1.94	0.04[c]	1.71	0.43
EWH	-0.04[c]	-1.64	0.62[a]	31.92	-0.04	-1.04	0.08[b]	2.41	-0.07	-1.65	0.11[c]	1.70	-0.05[b]	-2.26	0.38
VNM	-0.03	-1.14	0.66[a]	26.90	-0.09[c]	-1.99	0.08[c]	1.81	-0.13[b]	-2.32	0.13[c]	1.62	0.00	0.08	0.29
SMIN	0.01	0.26	0.75[a]	30.62	-0.08[c]	-1.84	0.17[a]	3.96	-0.09[c]	-1.66	0.04	0.47	0.01	0.24	0.36
EWS	-0.04[c]	-1.94	0.68[a]	40.88	-0.03	-1.06	0.11[a]	3.73	-0.11[b]	-2.74	-0.02	-0.32	-0.07[a]	-4.04	0.52
EEMA	-0.02	-0.92	0.79[a]	44.02	0.00	0.00	0.03	0.81	-0.18[a]	-4.31	-0.07	-1.20	0.01	0.37	0.55
EIDO	-0.03	-1.18	0.87[a]	34.62	-0.11[b]	-2.38	0.19[a]	4.38	0.01	0.22	0.14[c]	1.72	-0.03	-1.03	0.41
GMF	-0.01	-0.77	0.75[a]	44.29	0.03	0.80	0.01	0.43	-0.18[a]	-4.49	-0.07	-1.29	0.02	1.03	0.56
THD	-0.03	-1.12	0.69[a]	32.18	0.00	0.09	0.12[a]	3.01	-0.04	-0.78	0.09	1.33	-0.02	-1.00	0.38
EWM	-0.04[b]	-2.22	0.57[a]	31.10	-0.10[b]	-2.88	0.11[a]	3.36	-0.05	-1.09	0.07	1.21	0.01	0.46	0.35

Ticker	*Alpha*	*T-test*	*beta*	*T-test*	*SMB*	*T-test*	*HML*	*T-tes*	*RMW*	*T-test*	*CMA*	*T-test*	*MOM*	*T-test*	R^2
PIN	-0.01	-0.56	0.69[a]	30.27	-0.07[c]	-1.69	0.22[a]	5.50	-0.10[c]	-1.78	-0.19[b]	-2.59	0.03	1.19	0.37
INCO	0.00	0.12	0.67[a]	29.91	-0.04	-0.97	0.14[a]	3.51	-0.07	-1.28	-0.05	-0.66	0.02	0.66	0.35
ENZL	-0.02	-1.01	0.77[a]	38.72	-0.06[c]	-1.70	0.08[b]	2.14	-0.07[c]	-1.61	0.26[a]	3.96	0.00	-0.17	0.46
NFTY	0.01	0.40	0.52[a]	20.71	-0.05	-1.13	0.18[a]	4.03	-0.13[b]	-2.11	-0.04	-0.43	0.00	0.12	0.21
EPHE	-0.04[c]	-1.65	0.73[a]	30.35	-0.08[c]	-1.85	0.18[a]	4.14	-0.02	-0.27	0.06	0.78	0.03	1.10	0.35
GLIN	-0.03	-1.00	0.77[a]	29.15	-0.04	-0.77	0.17[a]	3.70	-0.09	-1.38	-0.02	-0.29	0.03	0.91	0.34
BKF	-0.02	-0.84	0.81[a]	38.67	0.03	0.77	0.04	1.00	-0.32[a]	-6.56	-0.01	-0.14	0.01	0.37	0.50
ECNS	-0.04	-1.36	0.63[a]	23.33	0.12[b]	2.30	-0.03	-0.72	-0.37[a]	-5.77	-0.02	-0.25	-0.01	-0.21	0.29
ASEA	-0.02	-0.98	0.63[a]	35.23	-0.10[b]	-2.85	0.15[a]	4.59	-0.05	-1.15	0.08	1.32	-0.03[c]	-1.78	0.42
DVYA	-0.04[b]	-2.63	0.77[a]	51.90	-0.03	-1.06	0.24[a]	8.98	-0.02	-0.51	0.08	1.66	-0.02	-1.34	0.62
PAK	-0.07[b]	-2.11	0.38[a]	13.03	-0.09[c]	-1.69	0.09[c]	1.69	-0.02	-0.31	0.05	0.58	-0.01	-0.16	0.09
IDX	-0.04	-1.38	0.83[a]	34.19	-0.14[a]	-3.00	0.17[a]	3.97	-0.02	-0.32	0.11	1.43	-0.05[c]	-1.80	0.41
FPA	-0.03	-1.45	0.73[a]	34.58	-0.05	-1.29	0.13[a]	3.42	-0.06	-1.26	0.02	0.30	-0.05[c]	-1.95	0.42
Aver	-0.02	-1.10	0.73	38.06	-0.04	-0.96	0.12	3.52	-0.09	-1.84	0.02	0.32	0.00	-0.29	0.45
Min	-0.07	-2.63	0.38	13.03	-0.14	-3.00	-0.03	-0.79	-0.37	-6.56	-0.19	-2.59	-0.07	-4.04	0.09
Max	0.01	0.40	1.05	63.15	0.12	2.30	0.27	8.98	0.01	0.22	0.26	3.96	0.06	2.71	0.71

[a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level; [c] indicates statistical significance at 10% level.

Table 6: Performance Persistence of ETFs

This table presents the results of a cross-sectional regression model which evaluates the persistence in performance of ETFs. Performance is expressed in several ways, i.e., average daily returns, total annual returns, alphas, Sharpe Ratio and the Modigliani-Modigliani (MM) Ratio. The study period spans from January 1, 2016, to December 31, 2023.

	Average Daily Returns													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.12[a]	12.52	-0.06[a]	-4.73	0.05[a]	4.00	0.05[a]	4.70	0.00	0.18	-0.07[a]	-7.34	0.02	1.22
Slope	-0.91[a]	-3.75	0.05	0.43	0.34[c]	1.86	0.30[c]	1.67	0.21	1.09	-0.04	-0.27	-0.19	-1.08
R^2	0.31		0.01		0.10		0.16		0.04		0.00		0.04	
	Total Annual Returns													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	33.55[a]	12.91	-14.58[a]	-5.22	13.34[a]	3.26	6.29[a]	2.34	1.90	0.63	-16.86[a]	-9.33	4.35	0.94
Slope	-0.99[a]	-3.83	-0.02	-0.26	0.41[c]	1.69	0.37[c]	1.80	0.12	0.63	-0.02	-0.15	-0.18	-0.75
R^2	0.31		0.00		0.08		0.09		0.01		0.00		0.02	
	Alphas (Asia-Pacific Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.06[a]	6.79	-0.02	-1.51	0.01	1.46	0.00	-0.03	0.01	1.02	-0.02[b]	-2.10	0.02[a]	3.13
Slope	-0.69[c]	-1.68	0.14	0.97	0.40[a]	2.94	0.24[c]	1.69	0.10	0.51	0.14	0.87	-0.37[b]	-2.42
R^2	0.19		0.03		0.21		0.04		0.01		0.02		0.16	
	Alphas (US Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.00	0.23	-0.06[a]	-7.47	-0.02[b]	-2.69	-0.01	-0.59	-0.03[b]	-2.50	-0.03[a]	-3.30	-0.02[b]	-2.01
Slope	-0.75[b]	-2.01	0.23[c]	1.86	0.43[a]	3.14	0.19[c]	1.69	0.35[b]	2.08	-0.10	-0.59	-0.11	-0.57
R^2	0.35		0.10		0.24		0.01		0.11		0.01		0.01	

	Sharpe Ratio (Asia-Pacific Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.16[a]	16.11	-0.07[a]	-6.08	0.03[c]	1.97	0.02[a]	4.23	0.01	0.44	-0.05[a]	-8.72	-0.02	-1.43
Slope	-1.17[a]	-3.99	0.13	1.56	0.09	0.36	0.19[c]	1.97	0.30	0.84	-0.03	-0.30	-0.62[c]	-1.98
R^2	0.33		0.07		0.00		0.11		0.02		0.00		0.11	
	Sharpe Ratio (US Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.15[a]	15.85	-0.07[a]	-6.05	0.03[b]	2.12	0.02[a]	4.18	0.01	0.43	-0.05[a]	-8.81	0.00	0.17
Slope	-1.17[a]	-4.00	0.13	1.56	0.10	0.38	0.19[c]	1.96	0.30	0.84	-0.03	-0.30	-0.42[c]	-1.62
R^2	0.33		0.07		0.00		0.11		0.02		0.00		0.18	
	Modigliani-Modigliani Ratio (Asia-Pacific Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.07[a]	16.11	-0.04[a]	-5.05	0.03[a]	3.50	0.03	3.23	0.00	0.39	-0.05[a]	-7.87	0.00	0.14
Slope	-0.65[a]	-3.99	0.20	1.56	0.08	0.36	0.45[c]	1.97	0.15	0.84	-0.05	-0.30	-0.46[c]	-1.98
R^2	0.33		0.07		0.00		0.11		0.02		0.00		0.11	
	Modigliani-Modigliani Ratio (US Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.07[a]	16.44	-0.07[a]	-5.31	0.03[a]	3.05	0.04[a]	3.43	0.00	0.41	-0.07[a]	-8.15	0.02	1.49
Slope	-0.62[a]	-4.00	0.30	1.56	0.07	0.38	0.51[c]	1.96	0.12	0.84	-0.06	-0.30	-0.41	-1.69
R^2	0.33		0.07		0.00		0.11		0.02		0.00		0.21	

[a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level; [c] indicates statistical significance at 10% level.

Table 7: Risk Persistence of ETFs

This table presents the results of a cross-sectional regression model which evaluates the persistence in risk of ETFs. Risk is expressed in several ways, i.e., standard deviation in daily returns, intraday volatility and systematic risk. The study period spans from January 1, 2016, to December 31, 2023.

	Risk													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.07	0.32	0.53[a]	4.68	0.10	0.52	1.76[a]	6.41	0.95[a]c	4.21	0.30[c]	1.75	0.09	0.44
Slope	0.56[a]	3.10	0.92[a]	6.57	0.74[a]	5.06	0.48[c]	1.86	0.08	0.77	1.01[a]	6.79	0.66[a]	4.98
R^2	0.23		0.57		0.44		0.10		0.02		0.59		0.44	
	Intraday Volatility													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.15	1.55	0.24[a]	3.67	-0.51	-0.46	0.73[a]	6.27	0.50[a]	4.09	0.55[a]	3.13	0.24	0.87
Slope	0.49[a]	5.17	1.32[a]	13.11	0.77[a]	7.58	0.81[a]	5.67	0.27[a]	3.04	0.66[a]	3.29	0.55[b]	2.29
R^2	0.46		0.84		0.64		0.50		0.22		0.25		0.14	
	Systematic Risk (Asia-Pacific Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.12	0.74	0.46[a]	3.16	0.29[a]	3.34	0.87[a]	6.56	0.93[a]	5.67	-0.20[c]	-1.90	0.31[a]	5.43
Slope	0.63[a]	3.58	0.58[b]	2.87	0.62[a]	6.55	-0.04	-0.25	-0.36	-1.50	1.01[a]	6.21	0.79[a]	7.30
R^2	0.29		0.21		0.57		0.00		0.10		0.55		0.62	
	Systematic Risk (US Market Variables)													
	2017-16		*2018-17*		*2019-18*		*2020-19*		*2021-20*		*2022-21*		*2023-22*	
	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test	Coef´s	T-test
Const	0.18	1.30	0.25[b]	2.72	0.20[a]	3.32	0.66[a]	5.55	0.04	0.33	0.16[b]	2.89	0.08	0.72
Slope	0.59[a]	4.54	0.60[a]	5.33	0.63[a]	7.53	0.20	1.12	0.75[a]	4.80	0.64[a]	7.87	0.96[a]	5.19
R^2	0.39		0.47		0.64		0.04		0.42		0.66		0.46	

[a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level; [c] indicates statistical significance at 10% level.

Table 8: Short-Term Persistence of Daily Returns

This table presents the results of autoregressive model in which the return of each ETF on day is regressed on its lagged returns on day t-1, t-2, t-3, t-4 and t-5. The study period spans from January 1, 2016, to December 31, 2023.

Ticker	*Const*	*T-test*	*Ret(-1)*	*T-test*	*Ret(-2)*	*T-test*	*Ret(-3)*	*T-test*	*Ret(-4)*	*T-test*	*Ret(-5)*	*T-test*	R^2
VPL	0.02	0.88	-0.11[a]	-4.77	0.07[a]	3.24	0.02	0.72	-0.03	-1.27	0.06[b]	2.81	0.12
INDA	0.05	1.50	-0.20[a]	-9.06	0.06[b]	2.66	0.01	0.51	-0.03	-1.49	0.05[b]	2.44	0.15
EEMV	0.01	0.73	-0.13[a]	-5.80	0.07[a]	3.16	0.02	1.10	-0.04[c]	-1.79	0.04[c]	1.77	0.13
EWY	0.03	0.87	-0.10[a]	-4.36	0.06[b]	2.60	0.02	0.74	-0.05[b]	-2.22	0.04[c]	1.60	0.12
EWT	0.04	1.46	-0.08[a]	-3.63	0.05[b]	2.40	0.02	0.70	-0.04c	-1.93	0.03	1.38	0.11
AAXJ	0.02	0.87	-0.11[a]	-4.88	0.04[c]	1.96	0.00	0.04	-0.02	-0.83	0.03	1.14	0.12
EWA	0.03	0.96	-0.21[a]	-9.26	0.07[a]	2.97	0.04[c]	1.79	-0.02	-0.86	0.08[a]	3.66	0.16
EPP	0.02	0.72	-0.16[a]	-7.28	0.07[a]	3.31	0.04[c]	1.65	-0.03	-1.44	0.07[a]	2.99	0.14
IPAC	0.02	0.86	-0.11[a]	-4.99	0.06[b]	2.89	0.03	1.23	-0.02	-0.94	0.04	1.86	0.12
EPI	0.05	1.60	-0.14[a]	-6.09	0.07[a]	3.03	0.02	0.79	0.00	0.11	0.05[b]	2.36	0.13
AIA	0.03	0.99	-0.08[a]	-3.77	0.03	1.20	-0.01	-0.30	0.00	-0.13	0.01	0.58	0.11
INDY	0.04	1.46	-0.12[a]	-5.15	0.03	1.53	0.02	0.69	0.00	-0.18	0.03	1.43	0.12
EWH	0.00	0.17	-0.06[b]	-2.71	0.06[b]	2.69	0.01	0.56	-0.03	-1.26	0.03	1.31	0.11
VNM	0.01	0.20	-0.05[b]	-2.14	0.04[c]	1.73	0.02	0.81	0.01	0.59	0.04[c]	1.60	0.11
SMIN	0.05	1.42	-0.10[a]	-4.56	0.06[b]	2.80	0.03	1.49	0.02	0.87	0.05[b]	2.19	0.12
EWS	0.01	0.22	-0.03	-1.31	0.06[b]	2.83	0.03	1.28	-0.04[c]	-1.86	0.06[b]	2.57	0.11
EEMA	0.03	0.96	-0.12[a]	-5.37	0.04	1.58	0.00	-0.03	-0.01	-0.35	0.02	1.03	0.12
EIDO	0.02	0.49	-0.07[a]	-3.07	0.04[c]	1.98	0.01	0.45	-0.05[b]	-2.04	0.10[a]	4.64	0.12
GMF	0.03	1.05	-0.12[a]	-5.23	0.05[b]	2.28	-0.01	-0.35	0.00	-0.09	0.03	1.57	0.12
THD	0.02	0.53	-0.15[a]	-6.56	0.08[a]	3.36	0.06[b]	2.49	0.02	0.69	0.08[a]	3.71	0.14
EWM	-0.01	-0.36	-0.12[a]	-5.23	0.06[b]	2.63	0.01	0.41	0.00	0.17	0.07[a]	3.25	0.12
PIN	0.03	0.88	-0.10[a]	-4.62	0.02	0.92	0.01	0.58	0.00	-0.10	0.04[c]	1.62	0.11
INCO	0.04	1.44	-0.09[a]	-3.87	0.06[b]	2.74	-0.01	-0.60	-0.04[c]	-1.70	0.05[b]	2.24	0.12
ENZL	0.03	0.88	-0.16[a]	-7.14	0.06[b]	2.82	0.01	0.43	0.01	0.40	0.07[a]	3.10	0.14

Ticker	*Const*	*T-test*	*Ret(-1)*	*T-test*	*Ret(-2)*	*T-test*	*Ret(-3)*	*T-test*	*Ret(-4)*	*T-test*	*Ret(-5)*	*T-test*	R^2
NFTY	0.05	1.47	-0.10[a]	-4.65	-0.03	-1.23	-0.01	-0.36	0.02	0.84	0.07[a]	3.09	0.12
EPHE	0.00	0.06	-0.12[a]	-5.35	0.13[a]	5.94	0.01	0.49	-0.01	-0.42	0.05[b]	2.37	0.14
GLIN	0.01	0.38	-0.06[b]	-2.54	0.08[a]	3.78	0.02	0.90	0.02	0.98	0.04[c]	1.73	0.11
BKF	0.02	0.76	-0.10[a]	-4.64	0.03	1.40	-0.02	-0.85	0.00	-0.06	0.02	0.75	0.11
ECNS	-0.01	-0.33	-0.06[b]	-2.51	0.03	1.28	-0.03	-1.15	0.01	0.63	0.00	0.00	0.11
ASEA	0.02	0.76	-0.11[a]	-4.84	0.07[a]	2.97	0.04[c]	1.74	-0.02	-0.70	0.08[a]	3.72	0.13
DVYA	0.01	0.26	-0.12[a]	-5.52	0.10[a]	4.47	0.05[b]	2.34	-0.02	-0.84	0.10[a]	4.68	0.14
PAK	-0.04	-1.18	-0.04[c]	-1.77	0.02	0.86	0.05[b]	2.24	0.02	0.95	0.05[b]	2.41	0.11
IDX	0.01	0.28	-0.05[b]	-2.31	0.02	1.08	0.03	1.25	-0.03	-1.21	0.11[a]	4.99	0.12
FPA	0.01	0.41	-0.12[a]	-5.50	0.07[a]	3.10	0.01	0.29	0.03	1.41	0.02	0.68	0.12
Average	0.02	0.70	-0.11	-4.72	0.05	2.44	0.02	0.71	-0.01	-0.47	0.05	2.27	0.12
Min	-0.04	-1.18	-0.21	-9.26	-0.03	-1.23	-0.03	-1.15	-0.05	-2.22	0.00	0.00	0.11
Max	0.05	1.60	-0.03	-1.31	0.13	5.94	0.06	2.49	0.03	1.41	0.11	4.99	0.16

[a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level; [c] indicates statistical significance at 10% level.

Table 9: Short-Term Persistence of Intraday Volatility

This table presents the results of autoregressive model in which the intraday volatility of each ETF on day is regressed on its lagged intraday volatilities on day t-1, t-2, t-3, t-4 and t-5. The study period spans from January 1, 2016, to December 31, 2023.

Ticker	*Const*	*T-test*	*Ret(-1)*	*T-test*	*Ret(-2)*	*T-test*	*Ret(-3)*	*T-test*	*Ret(-4)*	*T-test*	*Ret(-5)*	*T-test*	R^2
VPL	0.14[a]	7.67	0.38[a]	16.98	0.13[a]	5.56	0.16[a]	6.79	0.12[a]	5.04	0.04[c]	1.60	0.49
INDA	0.13[a]	7.13	0.35[a]	15.84	0.32[a]	13.73	-0.01	-0.59	0.10[a]	4.20	0.08[a]	3.80	0.53
EEMV	0.17[a]	9.12	0.36[a]	15.96	0.17[a]	7.22	0.12[a]	4.96	0.13[a]	5.70	0.00	-0.04	0.41
EWY	0.24[a]	8.96	0.29[a]	13.18	0.18[a]	7.89	0.10[a]	4.10	0.15[a]	6.48	0.05[b]	2.14	0.36
EWT	0.23[a]	9.55	0.33[a]	14.95	0.14[a]	5.89	0.12[a]	4.97	0.15[a]	6.22	0.02	0.82	0.35
AAXJ	0.22[a]	9.26	0.35[a]	15.59	0.17[a]	7.40	0.10[a]	4.33	0.13[a]	5.65	0.01	0.64	0.40
EWA	0.15[a]	6.76	0.36[a]	16.16	0.16[a]	6.96	0.12[a]	5.30	0.15[a]	6.26	0.06[b]	2.77	0.54
EPP	0.14[a]	7.23	0.36[a]	16.21	0.16[a]	6.82	0.12[a]	5.18	0.16[a]	6.81	0.04[c]	1.73	0.51
IPAC	0.13[a]	7.52	0.36[a]	16.24	0.16[a]	6.96	0.14[a]	6.14	0.14[a]	5.89	0.02	1.06	0.50
EPI	0.14[a]	7.32	0.31[a]	13.94	0.24[a]	10.11	0.14[a]	5.84	0.10[a]	4.43	0.05[b]	2.21	0.50
AIA	0.23[a]	8.85	0.31[a]	14.00	0.17[a]	7.48	0.09[a]	3.69	0.16[a]	6.75	0.04[c]	1.75	0.37
INDY	0.13[a]	6.82	0.32[a]	14.13	0.19[a]	8.34	0.12[a]	5.08	0.16[a]	7.01	0.06[b]	2.59	0.50
EWH	0.22[a]	9.86	0.31[a]	13.74	0.15[a]	6.65	0.11[a]	4.71	0.15[a]	6.48	0.01	0.56	0.33
VNM	0.26[a]	8.37	0.31[a]	13.88	0.23[a]	9.80	0.10[a]	4.20	0.09[a]	4.04	0.07[a]	3.04	0.42
SMIN	0.22[a]	7.89	0.22[a]	10.02	0.27[a]	12.06	0.11[a]	4.84	0.09[a]	4.06	0.10[a]	4.43	0.40
EWS	0.18[a]	8.46	0.32[a]	14.17	0.16[a]	6.77	0.13[a]	5.65	0.14[a]	6.00	0.05[b]	2.19	0.40
EEMA	0.28[a]	9.71	0.25[a]	11.12	0.24[a]	10.43	0.11[a]	4.83	0.11[a]	5.00	0.02	1.06	0.33
EIDO	0.23[a]	8.53	0.38[a]	17.10	0.16[a]	6.95	0.08[a]	3.36	0.14[a]	6.06	0.03	1.25	0.44
GMF	0.20[a]	9.06	0.33[a]	14.67	0.18[a]	7.86	0.09[a]	3.82	0.16[a]	6.84	0.01	0.32	0.38
THD	0.17[a]	7.30	0.41[a]	18.26	0.16[a]	6.85	0.06[b]	2.56	0.17[a]	6.96	0.04[c]	1.86	0.52
EWM	0.20[a]	8.68	0.38[a]	16.98	0.16[a]	6.82	0.06[b]	2.49	0.11[a]	4.69	0.07[b]	2.93	0.40
PIN	0.14[a]	7.27	0.25[a]	11.26	0.28[a]	12.39	0.10[a]	4.25	0.15[a]	6.63	0.04[c]	1.99	0.47
INCO	0.15[a]	6.80	0.24[a]	10.65	0.23[a]	10.31	0.13[a]	5.62	0.12[a]	5.28	0.11[a]	4.96	0.45
ENZL	0.23[a]	8.34	0.29[a]	13.23	0.19[a]	8.34	0.11[a]	4.73	0.08[a]	3.38	0.11[a]	4.85	0.38

Ticker	*Const*	*T-test*	*Ret(-1)*	*T-test*	*Ret(-2)*	*T-test*	*Ret(-3)*	*T-test*	*Ret(-4)*	*T-test*	*Ret(-5)*	*T-test*	R^2
NFTY	0.13[a]	7.00	0.22[a]	9.79	0.13[a]	5.94	0.14[a]	6.34	0.13[a]	5.84	0.12[a]	5.53	0.29
EPHE	0.27[a]	9.37	0.37[a]	16.56	0.26[a]	10.89	0.07[a]	3.02	0.08[a]	3.35	0.00	-0.09	0.45
GLIN	0.20[a]	7.32	0.24[a]	10.94	0.25[a]	10.88	0.13[a]	5.48	0.16[a]	7.03	0.05[b]	2.20	0.45
BKF	0.25[a]	9.16	0.29[a]	12.97	0.19[a]	8.45	0.10[a]	4.34	0.11[a]	4.74	0.06[b]	2.64	0.35
ECNS	0.49[a]	11.66	0.22[a]	9.74	0.13[a]	5.62	0.05[b]	2.01	0.07[b]	2.92	0.12[a]	5.27	0.14
ASEA	0.24[a]	8.72	0.27[a]	11.94	0.17[a]	7.60	0.14[a]	6.27	0.08[a]	3.56	0.08[a]	3.59	0.32
DVYA	0.15[a]	7.50	0.17[a]	7.79	0.12[a]	5.32	0.27[a]	12.53	0.12[a]	5.17	0.09[a]	3.93	0.33
PAK	0.30[a]	7.64	0.25[a]	11.16	0.13[a]	5.89	0.15[a]	6.80	0.14[a]	6.16	0.11[a]	4.93	0.36
IDX	0.21[a]	7.83	0.33[a]	14.73	0.15[a]	6.55	0.13[a]	5.49	0.14[a]	5.87	0.06[b]	2.65	0.43
FPA	0.35[a]	12.00	0.16[a]	7.38	0.12[a]	5.37	0.12[a]	5.19	0.11[a]	4.82	0.03[c]	1.61	0.12
Average	0.21	8.37	0.30	13.57	0.19	8.00	0.11	4.83	0.13	5.45	0.05	2.43	0.40
Min	0.13	6.76	0.16	7.38	0.12	5.32	-0.01	-0.59	0.07	2.92	0.00	-0.09	0.12
Max	0.49	12.00	0.41	18.26	0.32	13.73	0.27	12.53	0.17	7.03	0.12	5.53	0.54

[a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level; [c] indicates statistical significance at 10% level.