Actively Managed ETFs: Are They Really Active?

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Abstract

Actively managed ETFs are new but fast-growing products in the financial markets. We examine whether they employ active management and deliver better risk-adjusted returns to the investors than their passive peers. Our sample consists of ETFs investing in the U.S. Equity, International Equity, and World Equity from 2008 to 2019. We find that actively managed ETFs neither significantly differ in their management style nor deliver better risk-adjusted returns to the investors than their passive counterparts. Based on net flows to these funds, active ETF investors do not seem to pay attention to the "skill" component of the fund returns, suggesting that flows to active ETFs may not be as "smart" as expected.

Keywords: ETFs; Actively managed ETFs; Tracking error; Risk-adjusted returns; Fund flows

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1. Introduction

Actively managed ETFs are a relatively new but fast-growing product in financial markets. They provide many similar benefits as traditional ETFs, such as intraday liquidity, low cost investing, and tax efficiency, and allow managers to employ active investment strategies and opportunities to outperform passive benchmarks.

The main concern regarding active ETFs has been the efficiency of their pricing. The arbitrage pricing mechanism that ensures ETFs shares trade close to their NAV relies mainly on the transparency of their holdings. To address this concern, SEC requires that all actively managed ETFs disclose the identities and weightings of their holdings daily. Studies of premiums and discounts associated with active ETFs find that their long-term mean premium is close to zero, with relatively low diffusion volatility (Hilliard 2014). This finding suggests that the arbitrage process remains efficient for these funds despite their decreased transparency. Due to the novelty of these funds, however, the study uses a limited number of actively managed ETFs over a short time period.

The newest development in actively managed ETFs is the debut of ANTs, actively managed non-transparent ETFs, approved by the SEC at the end of 2019. These types of actively managed ETFs have the same features as other ETFs, except they disclose their holdings to the public only quarterly, not on a daily basis. This feature ensures that they can meaningfully pursue an active investment strategy but comes with a more severe lack of transparency. To address this issue, the SEC limits the fund investments to only securities that trade simultaneously as the funds themselves. This requirement means that ANTs can trade only in U.S. stocks, the American Depositary Receipts and Global Depositary Receipts of foreign companies, U.S. Treasuries, U.S. listed ETFs, and in foreign stocks that trade during U.S. market hours. To insure that the in-kind creation/redemption process can function, ANTs' sponsors are required to provide additional information on the creation and redemption baskets and their intraday NAVs.

The assets under management of actively managed ETFs account only for a small part of total ETF assets (Figure 1). However, the number of actively managed ETFs and their assets under management has increased exponentially, especially in recent years (Figure 2). In fact, the amount of money invested in active ETFs had risen from $10 million in February 2008, when the first such funds were launched in the market, to $112

billion in May 2020. Figures 2a and 2b show the distribution of actively managed ETFs across Morningstar U.S. category groups. The largest number of funds operate in the taxable bond category (98 funds as of May 2020). Assets under management in this category represent 73 percent of assets of all actively managed ETFs domiciled in the U.S. as of January 2020. The dominance of active ETFs in the fixed income category can be attributed to corporate bonds being traded in a somewhat opaque over-the-counter market, providing greater opportunity for professional managers to outperform. Besides, Meziani (2015) and Beck, Chong, and Phillips (2017) point out that the daily holdings disclosure is less of a concern to bond funds than equity funds as investors may not achieve significant benefits by trading ahead of these funds. Actively managed ETFs investing in U.S. equity have also registered considerable growth (81 funds as of May 2020). Their assets managed have increased from $7 million in April 2008 to almost $5 billion in May 2020. Active ETFs focusing on international markets have shorter history and slower growth pace with 39 funds and total assets of $2.9 billion as of May 2020.

Despite the structural challenges that actively managed ETFs face, they represent an attractive alternative to passive funds for ETF investors. According to data compiled by Bloomberg, the number of newly launched actively managed ETFs (68 funds) in the first half of 2020 surpassed, for the first time in history, the number of recently launched traditional ETFs (63 funds)[1]. This analysis suggests that investors are starting to turn towards ETFs not only as a form of efficient diversification but also in their search for higher performance.

In this paper, we examine actively managed ETFs within the U.S. equity and International equity category and ask three questions. (1) Do active ETFs employ active investment strategies? (2) Do they offer better returns to investors than their passive peers? (3) Are the flows to these funds determined by the same factors as are the flows to passive funds?

We find that active ETFs do not have higher tracking errors than passive funds in the same category suggesting that active management does not represent a substantial investment strategy of these funds and that they tend to adhere to the underlying index similarly as do their passive peers.

Concerning the performance of these funds, the empirical evidence is not conclusive.

[1] See "Active ETF Launches Are Outstripping Passive for First Time", available at `https://www.bloomberg.com/news/articles/2020-07-16/active-etf-launches-are-outstripping-passive-for-first-time?srnd=etfs`

Some studies support the idea that actively managed ETFs indeed add value to investor's portfolios by enhancing risk-adjusted returns (Beck, Chong, and Phillips (2017); Meziani (2015); Schizas (2014); Garyn-Tal (2013)). Other studies instead attest to their failure to deliver positive alphas while exposing investors to higher volatility (Rompotis (2015)). Our results support the later studies. We find that active ETFs do not bring higher returns to their investors and even underperform in the U.S. equity group.

To answer our last question, we examine the flows to actively managed ETFs. Demand for active ETFs is on average not higher than for passive funds as their net flows are either lower or not statistically different from flows to passive funds. Following recent literature on fund flows (Barber, Huang, and Odean (2016); Song (2020)), we decompose returns into skill alpha and non-skill components. We document persistence in ETF flows and performance chasing behavior of their investors. This is consistent with the findings of Clifford, Fulkerson, and Jordan (2014), Broman and Shum (2018), and Dannhauser and Pontiff (2019). However, alpha and benchmark adjusted returns have a more substantial impact on net flows to passive funds. This finding is somewhat surprising because it is the active, not passive index-tracking funds that deviate from the index search for better returns. Our finding differs from the results of Yousefi, Najand, and Sun (2020), who conclude that flows to active ETFs appear to be smart money.

The remainder of the paper is structured as follows. Section 2 describes our data sample and methods used in the analyses in this paper. Section 3 analyzes whether active ETFs deviate more from the benchmark than passive funds. Next, section 4 compares the performance of active and passive funds. Section 5 investigates the determinants of flows, specifically the difference in flow performance relations in active and passive ETFs. Section 6 reexamines the active management of actively managed ETFs using different measure. Finally, section 7 concludes the paper.

2. Data

Our data in this study come from several sources. We use Morningstar to identify actively managed ETFs and fund categories. To be included in the sample, each ETF must be domiciled in the U.S. and have Morningstar U.S. Category classification as either U.S. Equity or International Equity. Active ETFs are identified by the Actively Managed

indicator in the Morningstar database. We exclude ETNs, leveraged ETFs using Leveraged Fund and Exchange Traded Notes indicators and name detection. Fund returns, characteristics and exchange activities data are from CRSP database. To be included in the sample, each fund must have at least 36 monthly observations and available data on all the variables used in the analyses. Following Clifford, Fulkerson, and Jordan (2014), Broman and Shum (2018), and the mutual funds literature, we remove all funds that are less than 6 months old to avoid issues with incubation bias and outliers in the number of shares outstanding during the early life of a fund. We classify the ETFs that invest only internationally but not domestically as International Equity (Japan, Europe, Diversified Emerging Markets, Foreign Large Core, Foreign Large Value, Foreign Large Growth, Foreign Small/Mid Value)[2]. We classify funds that invest both internationally and in the U.S. as World Equity (World Large Growth, World Large Core). According to Morningstar, these funds still keep 30-70% of their assets in domestic stocks.

Our final sample includes 53 active and 427 passive ETFs covering the period from April 2008 to December 2019. The U.S. Equity category consists of 33 active and 203 passive funds, the International Equity of 18 active and 206 passive funds, and the World equity of 2 active and 18 passive funds.

Previous literature has shown the fund prospectus benchmark often does not match the fund's actual style (Sensoy (2009); Cremers and Petajisto (2009)). Therefore, we do not use the self-declared benchmark when evaluating the fund's tracking error and performance. Instead, we rely on the Morningstar equity style box for U.S. equity funds to define a fund's benchmark each month. The Morningstar equity box is based on the fund's actual holdings. It classifies the fund style to nine categories: Large Blend, Large Growth, Large Value, Mid Blend, Mid Growth, Mid Value, Small Blend, Small Growth, and Small Value with the following corresponding benchmarks: Russell 1000, Russell 1000 Growth, Russell 1000 Value, Russell Mid Cap, Russell Mid Cap Growth, Russell Mid Cap Value, Russell 2000, Russell 2000 Growth, and Russell 2000 Value. For International and World funds, we use the FTSE/Russell benchmark assigned to each fund by Morningstar. This assignment is also based on the fund's holdings. Monthly fund's volatility of returns is calculated based on 24-month rolling standard deviation of benchmark adjusted returns and net returns. In our study, we rely on tracking error to

[2]Because the sample does not contain any active ETFs that invest in a single country (except Japan), we remove their passive counterparts as well (except Japan)

measure the level of fund active management. Following Drenovak, Urosevic, and Jelic (2014), we estimate three types of monthly tracking error using daily returns in a month. The first tracking error, TE1, is the mean of the absolute value of the difference between the return of an ETF and the benchmark index.

$$TE1 = \frac{\sum_{t=1}^{n} |r_{i,t} - r_{b,t}|}{n}$$

The second type, TE2, is the standard deviation of the difference between the fund return and the benchmark return,

$$TE2 = \sqrt{\sigma_i^2 + \sigma_b^2 + 2\sigma_i \sigma_b \rho_{i,b}}$$

and the last measure, TE3, is the standard deviation of the residuals from the OLS regression of the fund returns on the benchmark returns.

$$r_{i,t} = \alpha_i + \beta_i r_{b,t} + \epsilon_{i,t}$$

where $r_{i,t}$ is the return of fund i on day t, $r_{b,t}$ is the return of the relevant benchmark on day t, and $\epsilon_{i,t}$ is the residual. The standard deviation of the residuals from the above regression is our last measure of tracking error.

We measure the fund's performance as the benchmark adjusted returns using the Fama-French-Carhart (4 factors), Fama-French (3 factors), and CAPM models. Following Breloer, Scholz, and Wilkens (2014) we utilize the international version of these models for funds in International Equity and World Equity categories. The market factor for International funds is the excess return of the MSCI ACWI ex USA All Cap index. The size factor is the average return of the MSCI ACWI Ex USA Small Value index and the MSCI ACWI Ex USA Small Growth index minus the average return of the MSCI ACWI Ex USA Large Value and the MSCI ACWI Ex USA Large Growth index. The value factor is the difference between the average return of the MSCI ACWI Ex USA Small Value and the MSCI ACWI Ex USA Large Value index and the average return of the MSCI ACWI Ex USA Small Growth and the MSCI ACWI Ex USA Large Growth index. The momentum factor is proxied by the returns of the MSCI World ex US Momentum index. Similarly, we construct the factors for the World funds using the MSCI ACWI IMI, MSCI ACWI Small Value, MSCI ACWI Small Growth, MSCI ACWI Large Cap Value, MSCI ACWI Large Cap Growth, MSCI ACWI Large Cap Value, and MSCI ACWI Momentum indexes.

Following the recent literature (Barber, Huang, and Odean (2016); Song (2020); Dannhauser and Pontiff (2019)), we decompose the fund monthly excess returns into two components. Specifically, we estimate the factor sensitivities by 24-month rolling regression for a fund i in month t using model F_N with N factor as

$$r_{i,t} - r_{f,t} = \alpha_{i,t}^{F_N} + \sum_{n=1}^{N} \beta_{i,t}^{n} F_{n,t} + \epsilon_{i,t}.$$

We calculate the fund factor-related return (FRR) in month t using each fund's estimates of factor exposures as:

$$FRR_{i,t}^{F_N} = \sum_{n=1}^{N} \hat{\beta}_{i,n,t-1}^{F_N} F_{n,t}$$

and the factor-adjusted component (alpha) as

$$\hat{\alpha}_{i,t}^{F_N} = (r_{i,t} - r_{f,t}) - FRR_{i,t}^{F_N}.$$

We also calculate monthly net fund flows as:

$$Flow_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1} * (1 + r_{i,t})}{TNA_{i,t-1}}$$

and winsorize net fund flows at the 1st and 99th percentiles to mitigate the impact of outliers or data error issues. Clifford, Fulkerson, and Jordan (2014) and Broman and Shum (2018) document that exchange and trading characteristics can also affect the flows to ETFs. Therefore, we include the following variables in regressions when examining flows of ETFs: standard deviation of daily volume, average daily spread, standard deviation of daily spread, price-NAV ratio (as of the end of the month), and share turnover (average daily volume in a month divided by the beginning of month shares outstanding). We use lagged independent variables by one month, and control for calendar month and fund category fixed effects (using Morningstar Institutional Category). Standard errors are clustered at the fund level.

Summary statistics are shown in Table 1. Active ETFs are significantly smaller and younger than passive funds. They do not seem to outperform their passive peers on benchmark adjusted returns, although they charge significantly higher fees to their

investors. They have significantly higher tracking errors, and their portfolios comprise a lower number of holdings. The exchange and trading characteristics are significantly different only in the International Equity category. Specifically, active ETFs in this category have lower liquidity (higher spread), lower trading activities (lower share turnover), and trade at a larger premium than passive funds.

[Insert Table 1]

3. Are Active ETFs really active?

This section addresses our first question of whether active ETFs do really employ active investment strategies. We use tracking error as a proxy for active management. Tracking error measures how much the fund's returns deviate from returns of the benchmark. Passive funds aim to replicate the benchmark and, therefore, should have low tracking errors. On the other hand, actively managed funds aim to beat the underlying benchmark by strategic asset allocation or stock selection. Thus, if they indeed employ active management, we should observe higher tracking errors.

Tracking errors are related to other fund characteristics, such as fund size, age, expense ratio, fund returns volatility, and the number of assets in the fund's holdings (Vardharaj, Fabozzi, and Jones (2004); Rompotis (2015)). To closely examine tracking errors of active versus passive funds, we regress tracking errors on a dummy variable Active that takes the value of one for actively managed ETFs, zero otherwise and control for other fund's characteristics:

$$\begin{aligned} TE_{i,t} = \beta_0 &+ \beta_1 Active_{i,t} + \beta_2 Log(Age)_{i,t-1} + \beta_3 Log(TNA)_{i,t-1} \\ &+ \beta_4 Expense_{i,t-1} + \beta_5 Fund\ volatility_{i,t-1} + \beta_6 Holdings_{i,t-1} \\ &+ (Category\ Fixed\ Effects) + (Time\ Fixed\ Effects) + \epsilon_{i,t} \end{aligned}$$

where *TE* is tracking error, *Log(Age), Log(TNA), Expense, Volatility,* and *Holdings* are control variables depicting the size, age, volatility of fund returns, and the number of stocks in fund's holdings, respectively.

The results of the regression are presented in Table 3. For all three categories, the dummy variable *Active* is not statistically significant in all three different tracking error

measures. These results suggest that active ETFs do not deviate from their benchmarks and therefore do not employ active management. Older and larger ETFs investing in U.S. equity have better tracking performance. Furthermore, intuitively, the funds that have more stocks in their portfolio will achieve lower tracking error. In addition, fund expense and volatility positively affect ETFs' tracking error in International and World categories. Overall, our results are consistent with Schizas (2014), who finds that active ETFs are not more active than their respective passive funds. Our results also agree with the empirical evidence that many active mutual funds are "closet indexers" (Cremers and Petajisto (2009)).

[Insert Table 3]

4. Performance of Active and Passive ETFs

In the previous section, we find that despite charging higher expense ratios to investors, active ETFs are not active. Next, we investigate whether they bring significant benefits to their investors compared to passive funds. We regress different performance measures while controlling for other confounding variables of fund performance:

$$\begin{aligned} Performance_{i,t} = \beta_0 &+ \beta_1 Active_{i,t} + \beta_2 Log(Age)_{i,t-1} + \beta_3 Log(TNA)_{i,t-1} \\ &+ \beta_4 Expense_{i,t-1} + \beta_5 Flow_{i,t-1} + \beta_6 Performance_{i,t-1} + \beta_7 TE_{i,t-1} \\ &+ \beta_8 Turnover_{i,t-1} + (Category\ Fixed\ Effects) \\ &+ (Time\ Fixed\ Effects) + \epsilon_{i,t} \end{aligned}$$

where *Performance* is expressed as benchmark-adjusted returns and alphas from the Fama-French-Carhart (4 factors), Fama-French (3 factors) and CAPM models.

Regression results are reported in Table 4. We find that actively managed ETFs significantly underperform their passive peers in the U.S. Equity category. On a monthly basis, the risk-adjusted returns for the U.S. Equity active ETFs range from 0.15 to 0.23 percentage points lower than their passive peers' risk-adjusted returns. These numbers translate to the difference ranging from 1.8 to 2.76 percentage points annually. Funds that trade their portfolios more often and funds that deviate from underlying benchmark

earn significantly lower benchmark-adjusted returns. Our findings are consistent with the findings in the mutual fund literature that active mutual funds underperform passive funds. Therefore, investors would generally benefit by investing in passively-managed funds (Sharpe (1991) and French (2008)).

We do not find significantly different performance between active and passive ETFs for the International Equity and World Equity categories. Similarly, as for the U.S. Equity, funds that have higher turnover earn significantly lower risk-adjusted returns. In contrast to the U.S. Equity, the International Equity funds with higher tracking error earn significantly higher risk-adjusted returns. There is also weak evidence of short term performance persistence in International ETFs, as the coefficient of the first lag of alpha is positive and statistically significant when the performance is measured by the Fama French 3 factor alpha.

[Insert Table 4]

5. Determinants of flows

In this section, we examine the determinants of flows to ETFs and compare the impact of previous performance on flows between active and passive funds. We control for various previously documented determinants of fund flows, including fund characteristics, e.g., age, size, expense, and turnover and exchanged related variables (Clifford, Fulkerson, and Jordan (2014)). We also include three lags of flows since Dannhauser and Pontiff (2019) document the persistence of ETF flows for up to three months. We estimate the following regression:

We use the following regression where the dependent variable is monthly ETF net flows. We control for various previously documented determinants of fund flows, including fund characteristics e.g., age, size, expense, and turnover and exchanged related variables (Clifford, Fulkerson, and Jordan (2014)). We also include three lags of flows since Dannhauser and Pontiff (2020) document ETF flows persistence for up to three months.

$$
\begin{aligned}
Flow_{i,t} = \beta_0 + \beta_1 Active_{i,t} + \beta_1 Performance_{i,t-1} + \beta_2 Performance_{i,t-1}.Active_{i,t} \\
+ \sum_j \beta_j Fund\ Variables_{i,t-1} + \sum_k \beta_k Exchange\ Variables_{i,t-1} \\
+ (Category\ Fixed\ Effects) + (Time\ Fixed\ Effects) + \epsilon_{i,t}
\end{aligned}
$$

where *Flow* is the monthly ETF net flow, *Active* is a dummy variable indicating the actively managed fund, and *Performance* is measured as benchmark-adjusted returns and alphas from the Fama-French-Carhart (4 factors), Fama-French (3 factors), and CAPM models. Due to data availability of the control variables, the sample period of the flow analyses is from May 2014 to December 2019. Table 5 presents the results for the U.S. Equity (Panel A), International Equity (Panel B), and World Equity categories (Panel C).

We find that active ETFs have not been entirely successful in attracting investor flows. Monthly net flows into active funds are approximately 1.2 to 1.3 percentage points (equivalent to $0.6 to $0.7 million per month) lower than the flows to their passive peers in the U.S. equity category and not statistically different in the other two categories. These findings are in line with the fact that active ETFs still account only for a small proportion of ETF total net assets.

Consistent with the previous studies (Clifford, Fulkerson, and Jordan (2014); Dannhauser and Pontiff (2019)), we document the performance chasing behavior and flow persistence in the U.S. Equity and International Equity categories. The coefficients on lagged alphas and benchmark adjusted returns are positive and statistically significant in Panel A and Panel B of Table 5. Although these coefficients are not significant in the World Equity, it should be treated with caveats due to the small number of funds in this category. We expect, however, different responses to performance between investors of active and passive ETFs. The skill component of performance, i.e., alpha and benchmark adjusted returns, should be stronger determinants of flows to active ETFs since it depicts the manager's ability to select stocks. Consistently with this view, Yousefi, Najand, and Sun (2020) provide empirical evidence that flows to active ETFs appear to be smart. However, we find that the coefficient on the interaction term between *Alpha* and *Active* is negative and significant for the U.S. Equity and not significant for International and

World equity categories. This result suggests that investors in active ETFs do not seem to pay attention to the managers' skill-related returns. Turning to other variables, we find that investors pay attention to expense ratios and the fund's age. Funds with higher expense ratios and older funds have lower ETF flows.

[Insert Table 5]

6. Robustness

Another measure of the level of a fund active management is 1-R^2 (Amihud and Goyenko (2013)), where R^2 is obtained from the regression of the fund daily excess returns on multifactor models (CAPM, Fama French 3 factor and Fama French and Carhart 4 factor models). Amihud and Goyenko (2013) suggest that this measure can indicate the active management and predict mutual fund returns. In the context of active ETFs, Garyn-Tal (2013) also identifies that active ETFs with low R^2 have better performance. Using this new measure, we do not find any difference in the level of activeness between actively managed ETFs and passive peers, consistent with our findings using tracking errors.

[Insert Table 6]

7. Conclusion

Actively managed ETFs are relatively new type of ETFs. So far, they manage only a small proportion of assets in the ETF industry. Still, recently, the number of newly launched funds in this category exceeds the number of newly launched passive funds. In this paper, we examine three essential aspects of actively managed ETFs. Specifically, we compare the tracking errors, risk-adjusted returns, and net flows of actively managed ETFs to traditional passive ETFs.

We find that despite their name, actively managed ETFs do not seem to depart from their benchmarks significantly. Their tracking errors, *ceteris paribus*, are not significantly different from tracking errors of their passive peers in the U.S. and World Equity

categories and even significantly lower in the International Equity. Our results remain robust using another different measure of active management. Consequently, they do not deliver better performance to their investors. In fact, in the U.S. Equity category, the performance of actively managed ETFs is significantly lower than the performance of passive funds. An analysis of flow performance reveals that net flows to these funds are less sensitive to alpha than net flows of passive funds. The finding is surprising because it is the purpose of these funds to deliver returns above the benchmark, and therefore investors should pay attention to the "skill" of these managers.

In short, our analysis did not reveal any significant benefits of investing in actively managed ETFs. However, to this time, actively managed ETFs could not take full benefit of active management mainly because of the requirement for daily holding disclosure and generally low market volatility. Recent SEC approval of new non-transparent ETF models and the ongoing fee competition in the asset management industry, together with growing concerns of consequences of pure index-tracking and increased market volatility, maybe just the right spark for these funds to soar.

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Figure 1: Active and Passive ETFs total net assets ($ million)

This figure illustrates the total net assets of active and passive ETFs from 2008 to 5/2020.

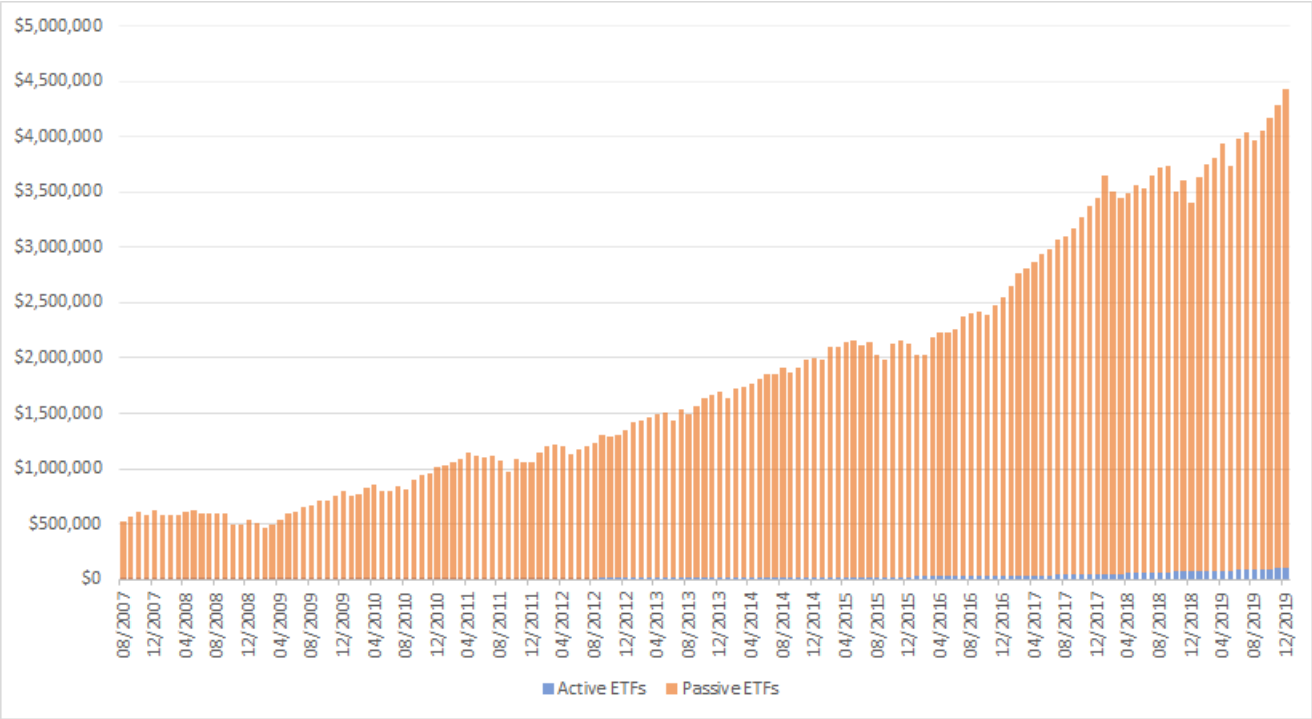
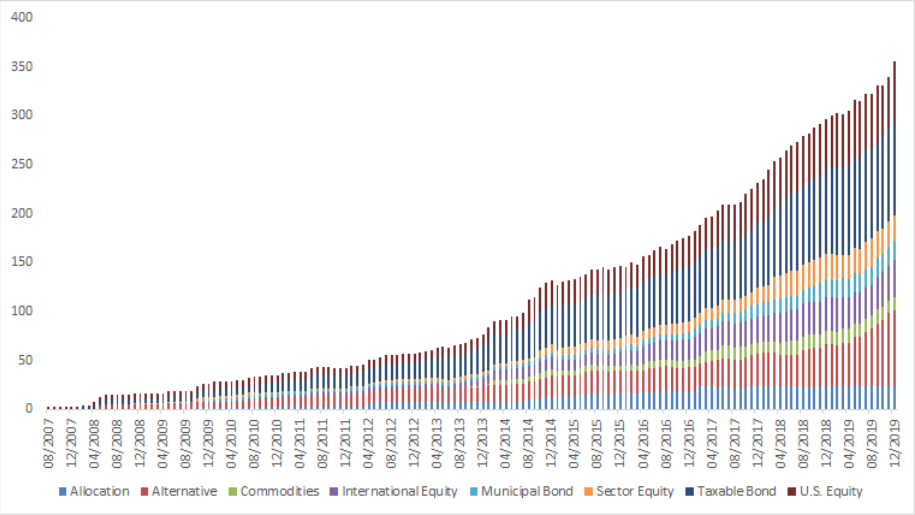


Figure 2: Number of US Active ETFs and total net assets ($ million) by Morningstar category

This figure illustrates the total net assets and number of active ETFs by Morningstar category from 2008 to 5/2020.

(a) Number of ETFs



(b) Total net assets ($ million)

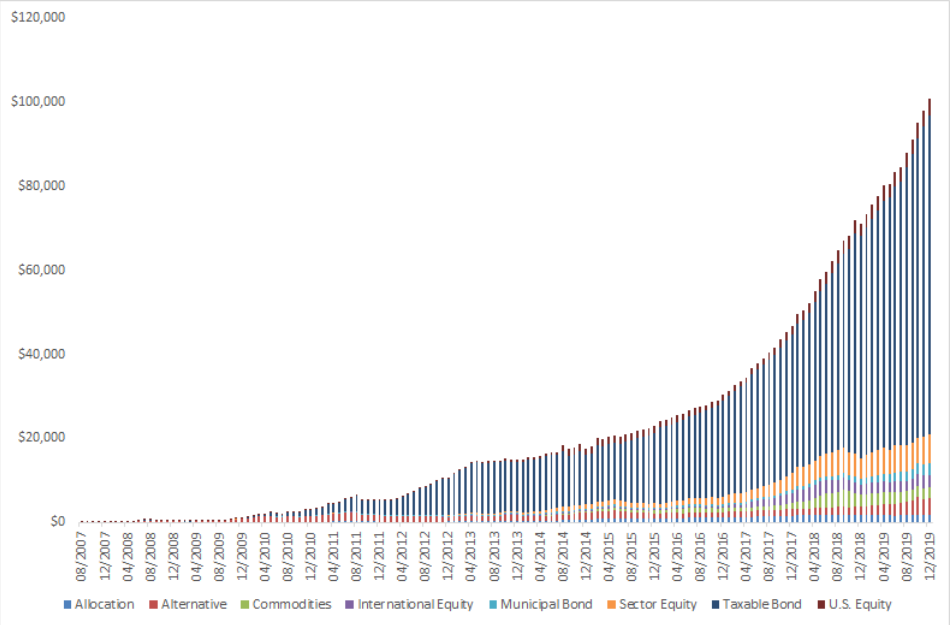


Table 1: Summary statistics

This table contains summary statistics for actively managed and passive ETFs within th U.S. equity, International Equity and World Equity categories. *TNA* the monthly total net assets in millions of dollars, *Benchmark adjusted returns* is the difference between fund net returns and style or benchmark returns in percentage; *Tracking error* are measured by three different methods and in percentage ; *Fund volatility* is 24-month rolling standard deviations of fund net returns in percentage; *Age* in months is the difference between the current month and the fund's inception month; *Expense ratio* is the stated annual expense ratio in percent; *Turnover ratio* is the stated annual turnover in decimals; *Holdings* is the number of stocks in the fund portfolio; *Flow* is a fund's dollar flow divided by the total net assets of the previous period; *Std. dev. Daily volume* is calculated using daily volume over the entire month; *Average daily spread* and *Std. dev. Daily spread* are calculated using each day's bid-ask spread for the entire month; *Price-NAV ratio* is the price to NAV ratio at the end of the month; *Share turnover* is calculated as the average of daily volume over the entire month divided the number of shares outstanding at the beginning of the month. Reported levels of statistical significance of the t-test between the means of group; *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	U.S. Equity			**International Equity**			**World Equity**		
	Active	Passive	Difference	Active	Passive	Difference	Active	Passive	Difference
TNA (million)	54.08	2995.42	-3078.51***	59.50	2600.22	-2540.72***	51.87	1394.06	-1342.19***
Benchmark adj. Return (%)	-0.24	-0.00	-0.24***	-0.05	-0.04	-0.01	0.05	-0.00	0.05
Tracking Error (TE1) (%)	0.24	0.17	0.07***	0.36	0.31	0.05***	0.27	0.16	0.11***
Tracking Error (TE2) (%)	0.31	0.21	0.09***	0.46	0.41	0.05***	0.35	0.21	0.14***
Tracking Error (TE3) (%)	0.25	0.18	0.07***	0.44	0.37	0.07***	0.33	0.18	0.15***
Fund volatility (%)	3.65	4.07	-0.42***	3.91	3.94	-0.03	3.34	3.19	0.15
Age (months)	43.62	83.53	-39.92***	37	68	-31***	31	67	-36***
Expense Ratio (%)	1.44	0.41	1.03***	0.86	0.56	0.30***	0.58	0.43	0.15***
Turnover Ratio	2.05	2.20	-0.15	0.69	0.38	0.31***	0.17	0.21	-0.04
Holdings	195	553	-358***	170	485	-314***	164	1156	-992***
Flow (%)	0.82	2.27	-1.45***	2.5	2.3	0.2	2.28	2.11	0.17
Std. dev. Daily volume	16933	2001123	-1984190*	13997	471701	-457704***	11907	173135	-161228***
Average daily spread	0.60	0.46	0.14	298.1	19.51	278.59***	0.34	0.47	-0.13
Std. dev. Daily spread	2.08	1.42	0.66	355.16	36.52	318.64***	1.93	0.70	1.23
Price-NAV ratio	1.00	1.00	0.00	1.00	1.00	0.00***	1.00	1.00	0.00
Share turnover	0.01	0.14	-0.12	0.01	0.01	-0.00**	0.01	0.01	0.00**

Table 2: Number of ETFs in sample

This table exhibits the yearly number of actively managed and passive ETFs in three categories: U.S. Equity, International Equity and World Equity that satisfy the data requirements and are included in the analysis. The period for U.S. equity category covers 2008-2019; The period for International Equity covers 2013-2019; The period for World Equity cover 2010-2019.

	U.S. Equity		**International Equity**		**World Equity**	
Year	Passive	Active	Passive	Active	Passive	Active
2008	73	2				
2009	73	3				
2010	80	5			5	1
2011	96	6			5	1
2012	103	7			8	1
2013	120	11	104	2	8	1
2014	134	14	129	6	10	1
2015	149	24	154	7	12	0
2016	180	26	192	14	15	1
2017	201	28	193	18	18	1
2018	199	28	189	18	18	1
2019	197	28	186	18	18	1

Table 3: Are Active ETFs really active?

The table presents the results of panel regressions Tracking errors on a dummy variable indicating whether a fund is an actively managed ETFs and the determinants of tracking error as control variables:

$$\begin{aligned} TE_{i,t} = {} & \beta_0 + \beta_1.Active_{i,t} + \beta_2.Log(Age)_{i,t-1} + \beta_3.Log(TNA)_{i,t-1} \\ & + \beta_4.Expense_{i,t-1} + \beta_5.Fund\ volatility_{i,t-1} + \beta_6.Holdings_{i,t-1} \\ & + (CategoryFixedEffects) + (TimeFixedEffects) + \epsilon_{i,t} \end{aligned}$$

where *Active* is a dummy variable with the value of 1 if the fund is an actively managed ETF; *Log(Age)* is the natural log of the fund's age in months; *Log(TNA)* is the natural log of the fund's total net assets; *Expense* is the fund's expense ratio; *Fund volatility* is the volatility of fund's net return; *Number of stocks* is the number of holdings in the fund's portfolio. The regression includes calendar month and category fixed effects. Standard errors are in parentheses and clustered at the fund level. *, **, *** denote significance at the 10%, 5%, and 1% levels.

	U.S. Equity			**International Equity**			**World Equity**		
	TE1	TE2	TE3	TE1	TE2	TE3	TE1	TE2	TE3
Active_t	0.0002	0.0003	0.0002	-0.0002	-0.0002	0.0001	0.0003	0.0005	0.0006
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0004)	(0.0004)	(0.0007)	(0.0009)	(0.0007)
Log(Age)_{t-1}	-0.0002**	-0.0003**	-0.0002*	-0.0002	-0.0002	-0.0001	-0.0000	-0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0005)	(0.0004)
Log(TNA)_{t-1}	-0.0001*	-0.0001*	-0.0001*	-0.0000	-0.0000	-0.0001	-0.0000	-0.0000	-0.0001
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0002)
Expense_{t-1}	0.0049	0.0057	0.0047	0.2056***	0.2548***	0.2055***	0.3295***	0.4124***	0.3400***
	(0.0119)	(0.0149)	(0.0123)	(0.0567)	(0.0719)	(0.0652)	(0.0699)	(0.0861)	(0.0655)
$\text{Fund volatility}_{t-1}$	0.0021	0.0039	0.0215**	0.0699***	0.0877***	0.0971***	0.0172	0.0230	0.0534
	(0.0126)	(0.0156)	(0.0103)	(0.0114)	(0.0141)	(0.0124)	(0.0625)	(0.0773)	(0.0596)
Holdings_{t-1}	-0.0006***	-0.0008***	-0.0006***	-0.0002	-0.0002	-0.0001	0.0001	0.0002	0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0001)	(0.0001)	(0.0001)
Constant	0.0031***	0.0039***	0.0024***	0.0004	0.0005	-0.0007	-0.0003	-0.0004	-0.0013
	(0.0006)	(0.0007)	(0.0005)	(0.0009)	(0.0011)	(0.0010)	(0.0022)	(0.0027)	(0.0019)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	15240	15240	15240	9659	9659	9659	893	893	893
Adj. R-squared	0.346	0.332	0.371	0.308	0.323	0.335	0.361	0.374	0.454

Table 4: OLS regressions of performance measures

The table presents the results of panel regressions of fund's performance measure on a dummy variable indicating whether a fund is an actively managed ETFs and the determinants of fund's performance as control variables:

$$\begin{aligned} Performance_{i,t} = \beta_0 + \beta_1 Active_{i,t} + \beta_2 Log(Age)_{i,t-1} + \beta_3 Log(TNA)_{i,t-1} + \beta_4 Expense_{i,t-1} \\ + \beta_5 Flow_{i,t-1} + \beta_6 Performance_{i,t-1} + \beta_7 TE_{i,t-1} + \beta_8 Turnover_{i,t-1} \\ + (CategoryFixedEffects) + (TimeFixedEffects) + \epsilon_{i,t} \end{aligned}$$

where *Active* is a dummy variable with the value of 1 if the fund is an actively managed ETF; *Log(Age)* is the natural log of the fund's age in months; *Log(TNA)* is the natural log of the fund's total net assets; *Expense* is the fund's expense ratio; *Flow* is the fund's net flow; *Performance* is the fund's performance measured by factor model alphas and benchmark adjusted returns. *TE* is the fund's tracking error. *Turnover* is the fund's turnover ratio. The regression includes calendar month and category fixed effects. Standard errors are in parentheses and clustered at the fund level. *, **, *** denote significance at the 10%, 5%, and 1% levels.

	Alpha(FFC)	Alpha(FF)	Alpha(CAPM)	Benchmark adj. ret
Panel A: U.S. Equity				
Active_t	-0.0019***	-0.0015***	-0.0022***	-0.0023***
	(0.0005)	(0.0005)	(0.0006)	(0.0006)
Log(Age)_{t-1}	-0.0004*	-0.0005**	-0.0008**	0.0001
	(0.0002)	(0.0002)	(0.0003)	(0.0001)
Log(TNA)_{t-1}	0.0001	0.0001**	0.0001*	-0.0002***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Expense_{t-1}	-0.0115	-0.0162	-0.0119	0.0095
	(0.0184)	(0.0177)	(0.0171)	(0.0131)
Flow_{t-1}	0.0019	0.0018	0.0004	0.0007
	(0.0013)	(0.0013)	(0.0020)	(0.0012)
Alpha_{t-1}	-0.0157	-0.0388***	-0.0764***	
	(0.0138)	(0.0149)	(0.0110)	
TE_{t-1}	0.1095	0.1185	-0.0042	-0.3092***
	(0.1181)	(0.1367)	(0.1451)	(0.1121)
Turnover_{t-1}	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Benchmark adj. ret_{t-1}				-0.0005
				(0.0160)
Constant	0.0009	0.0013	0.0018	0.0008
	(0.0010)	(0.0011)	(0.0013)	(0.0006)
Fixed Effects	Yes	Yes	Yes	Yes
Number of observations	15003	15003	15003	20429
Adj. R-squared	0.125	0.124	0.174	0.046
Panel B: International Equity				
Active_t	0.0002	-0.0002	-0.0008	-0.0000
	(0.0008)	(0.0008)	(0.0007)	(0.0005)
Log(Age)_{t-1}	0.0008**	0.0009***	0.0005	-0.0003
	(0.0003)	(0.0003)	(0.0003)	(0.0002)
Log(TNA)_{t-1}	0.0000	-0.0000	-0.0000	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Expense_{t-1}	0.0435	0.0097	0.1238	-0.0137
	(0.0956)	(0.0913)	(0.0990)	(0.0261)
Flow_{t-1}	-0.0004	-0.0013	0.0007	0.0006
	(0.0027)	(0.0031)	(0.0031)	(0.0016)
Alpha_{t-1}	0.0165	0.0262**	0.0060	
	(0.0127)	(0.0122)	(0.0116)	
TE_{t-1}	-0.0070	0.0404	-0.1403	-0.1184*
	(0.0958)	(0.0987)	(0.0944)	(0.0704)
Turnover_{t-1}	-0.0009*	-0.0007	-0.0011*	-0.0006
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Benchmark adj. ret_{t-1}				-0.0400***
				(0.0142)
Constant	-0.0038***	-0.0041***	-0.0021	0.0011
	(0.0013)	(0.0014)	(0.0014)	(0.0008)
Fixed Effects	Yes	Yes	Yes	Yes
Number of observations	9434	9434	9434	14586
Adj. R-squared	0.065	0.064	0.063	0.047

Table 4: OLS regressions of performance measures (continued)

	Alpha(FFC)	Alpha(FF)	Alpha(CAPM)	Benchmark adj. ret
Panel C: World Equity				
Active_t	-0.0014	-0.0013	-0.0012	-0.0013
	(0.0010)	(0.0010)	(0.0014)	(0.0021)
Log(Age)_{t-1}	-0.0006	-0.0009	-0.0014	0.0001
	(0.0008)	(0.0010)	(0.0009)	(0.0003)
Log(TNA)_{t-1}	-0.0001	-0.0000	0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Expense_{t-1}	-0.0526	-0.1322	-0.0877	-0.1463
	(0.1501)	(0.1737)	(0.2229)	(0.1303)
Flow_{t-1}	0.0022	0.0000	0.0007	0.0000
	(0.0030)	(0.0025)	(0.0033)	(0.0019)
Alpha_{t-1}	0.0260	0.0341	0.0239	
	(0.0568)	(0.0485)	(0.0412)	
TE_{t-1}	0.6918**	0.7656***	0.9424***	-0.2519
	(0.2466)	(0.2585)	(0.2590)	(0.2331)
Turnover_{t-1}	-0.0088***	-0.0075***	-0.0076**	-0.0028
	(0.0017)	(0.0016)	(0.0029)	(0.0024)
Benchmark adj. ret_{t-1}				0.0334
				(0.0335)
Constant	0.0033	0.0042	0.0055*	0.0020
	(0.0027)	(0.0030)	(0.0030)	(0.0013)
Fixed Effects	Yes	Yes	Yes	Yes
Number of observations	873	873	873	1333
Adj. R-squared	0.053	0.047	0.056	0.043

Table 5: Determinants of Flows

The table presents the results of panel regressions of fund's flows on a dummy variable indicating whether a fund is an actively managed ETFs and the determinants of fund's performance as control variables:

$$
\begin{aligned}
Flow_{i,t} = \beta_0 + \beta_1 Active_{i,t} + \beta_1 Performance_{i,t-1} + \beta_2 Performance_{i,t-1}.Active_{i,t} \\
+ \sum_j \beta_j FundVariables_{i,t-1} + \sum_k \beta_k ExchangeVariables_{i,t-1} \\
+ (CategoryFixedEffects) + (TimeFixedEffects) + \epsilon_{i,t}
\end{aligned}
$$

where *Active* is a dummy variable with the value of 1 if the fund is an actively managed ETF; *Performance* is the fund's performance measured by factor model alphas and benchmark adjusted returns. Fund variables include the fund's tracking errors, fund's flows in the previous three months, fund age and total net assets, expense and turnover ratios, and fund's return volatility. Exchange variables are standard deviation of daily volumes, average and standard deviation of daily bid-ask spreads, price-nav ratio and share turnover. The regression includes calendar month and category fixed effects. Standard errors are in parentheses and clustered at the fund level. *, **, *** denote significance at the 10%, 5%, and 1% levels.

	Flow(FFC)	Flow(FF)	Flow(CAPM)	Flow (benchmark adj. ret)
Panel A: U.S. Equity				
Active_t	-0.0119***	-0.0120***	-0.0127***	-0.0119***
	(0.0032)	(0.0031)	(0.0034)	(0.0031)
Alpha_{t-1}	0.8241***	0.8302***	0.7108***	
	(0.0992)	(0.1047)	(0.0767)	
$\text{Alpha}_{t-1} * Active_t$	-0.4206*	-0.4664**	-0.3936**	
	(0.2232)	(0.2239)	(0.1972)	
FRR_{t-1}	0.6019***	0.5899***	0.7169***	
	(0.0869)	(0.0750)	(0.1498)	
$\text{FRR}_{t-1} * Active_t$	0.0103	0.0205	0.0449	
	(0.0790)	(0.0823)	(0.0867)	
Benchmark adj. ret_{t-1}				0.6662***
				(0.0889)
Benchmark adj.$\text{ret}_{t-1} * Active_t$				-0.3285**
				(0.1577)
TE_{t-1}	-1.1220*	-1.0972*	-1.0455*	-1.1049*
	(0.6107)	(0.6087)	(0.6145)	(0.6116)
Flow_{t-1}	0.0728**	0.0729**	0.0727**	0.0774***
	(0.0289)	(0.0288)	(0.0289)	(0.0287)
Flow_{t-2}	0.1042***	0.1040***	0.1046***	0.1034***
	(0.0178)	(0.0178)	(0.0177)	(0.0177)
Flow_{t-3}	0.1105***	0.1103***	0.1107***	0.1096***
	(0.0221)	(0.0220)	(0.0221)	(0.0219)
Log(Age)_{t-1}	-0.0064***	-0.0063***	-0.0063***	-0.0062***
	(0.0020)	(0.0019)	(0.0020)	(0.0019)
Log(TNA)_{t-1}	-0.0006	-0.0006	-0.0006	-0.0006
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Expense_{t-1}	-0.2602	-0.2593	-0.2633	-0.2588
	(0.3410)	(0.3420)	(0.3467)	(0.3326)
Turnover_{t-1}	0.0000***	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Fund volatility_{t-1}	-0.4121*	-0.3950*	-0.4376*	-0.4455*
	(0.2308)	(0.2344)	(0.2490)	(0.2334)
Std. daily volume_{t-1}	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ave. daily spread_{t-1}	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Std. daily spread_{t-1}	-0.0000*	-0.0000*	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Price-NAV_{t-1}	1.9297***	1.9289***	1.9514***	1.7872***
	(0.3899)	(0.3895)	(0.3863)	(0.3596)
Share turnover_{t-1}	0.7312***	0.7314***	0.7334***	0.7083***
	(0.2472)	(0.2474)	(0.2486)	(0.2405)
Constant	-1.8785***	-1.8784***	-1.9007***	-1.7307***
	(0.3896)	(0.3892)	(0.3861)	(0.3594)
Fixed effects	Yes	Yes	Yes	Yes
Number of observations	10289	10289	10289	10416
Adj R-squared	0.109	0.109	0.109	0.099

Table 5: Determinants of Flows (continued)

	Flow(FFC)	Flow(FF)	Flow(CAPM)	Flow (benchmark adj. ret)
Panel B: International Equity				
Active_t	-0.0057	-0.0054	-0.0055	-0.0045
	(0.0051)	(0.0051)	(0.0052)	(0.0053)
Alpha_{t-1}	0.5590***	0.5457***	0.5438***	
	(0.0804)	(0.0789)	(0.0796)	
$\text{Alpha}_{t-1} * Active_t$	0.1257	0.1952	0.1680	
	(0.2075)	(0.1971)	(0.2263)	
FRR_{t-1}	0.4292***	0.4788***	0.4432***	
	(0.0824)	(0.0912)	(0.1523)	
$\text{FRR}_{t-1} * Active_t$	0.1090	0.0863	0.0962	
	(0.0938)	(0.0953)	(0.0933)	
Benchmark adj. ret_{t-1}				0.5552***
				(0.1007)
Benchmark adj.$\text{ret}_{t-1} * Active_t$				0.2202
				(0.2575)
TE_{t-1}	-0.6225	-0.6211	-0.6162	-0.5041
	(0.6214)	(0.6207)	(0.6216)	(0.6759)
Flow_{t-1}	0.0982***	0.0981***	0.0979***	0.1040***
	(0.0325)	(0.0325)	(0.0325)	(0.0326)
Flow_{t-2}	0.0897***	0.0899***	0.0897***	0.0894***
	(0.0229)	(0.0230)	(0.0229)	(0.0235)
Flow_{t-3}	0.0683***	0.0683***	0.0681***	0.0645***
	(0.0226)	(0.0225)	(0.0226)	(0.0225)
Log(Age)_{t-1}	-0.0079***	-0.0079***	-0.0079***	-0.0076***
	(0.0024)	(0.0024)	(0.0024)	(0.0026)
Log(TNA)_{t-1}	-0.0026***	-0.0026***	-0.0026***	-0.0026***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Expense_{t-1}	-1.7685***	-1.7700***	-1.7748***	-1.6429***
	(0.5679)	(0.5667)	(0.5657)	(0.5787)
Turnover_{t-1}	0.0001	0.0001	0.0001	-0.0019
	(0.0031)	(0.0031)	(0.0031)	(0.0032)
Fund volatility_{t-1}	-0.1355	-0.1326	-0.1247	-0.0683
	(0.1998)	(0.1993)	(0.2014)	(0.2257)
Std. daily volume_{t-1}	0.0000***	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ave. daily spread_{t-1}	-0.0000**	-0.0000**	-0.0000**	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Std. daily spread_{t-1}	0.0000**	0.0000**	0.0000**	0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Price-NAV_{t-1}	2.0295***	2.0339***	2.0350***	1.9836***
	(0.3164)	(0.3179)	(0.3182)	(0.3177)
Share turnover_{t-1}	-0.0007	-0.0009	-0.0008	-0.0035
	(0.0081)	(0.0081)	(0.0080)	(0.0082)
Constant	-1.9600***	-1.9648***	-1.9661***	-1.9165***
	(0.3165)	(0.3181)	(0.3185)	(0.3180)
Fixed effects	Yes	Yes	Yes	Yes
Number of observations	8643	8643	8643	8814
Adj. R-squared	0.109	0.109	0.108	0.104

Table 5: Determinants of Flows (continued)

	Flow(FFC)	Flow(FF)	Flow(CAPM)	Flow (benchmark adj. ret)
Panel C: World Equity				
Active_t	-0.0203	-0.0197	-0.0166	-0.0272
	(0.0175)	(0.0173)	(0.0176)	(0.0208)
Alpha_{t-1}	-0.1068	-0.0666	0.1309	
	(0.2802)	(0.2647)	(0.3021)	
$\text{Alpha}_{t-1} * Active_t$	-0.7762	-0.6250	-0.0740	
	(0.4491)	(0.4595)	(0.4277)	
FRR_{t-1}	0.2236	0.1321	-0.5311	
	(0.2677)	(0.3091)	(0.7945)	
$\text{FRR}_{t-1} * Active_t$	0.2614*	0.2141	0.1543	
	(0.1467)	(0.1457)	(0.1450)	
Benchmark adj. ret_{t-1}				0.0450
				(0.2380)
Benchmark $\text{adj.ret}_{t-1} * Active_t$				0.4144
				(0.7055)
TE_{t-1}	-0.0315	0.0141	-0.2330	0.1428
	(2.3443)	(2.3418)	(2.2856)	(2.4291)
Flow_{t-1}	-0.1407**	-0.1409**	-0.1417**	-0.1331**
	(0.0590)	(0.0590)	(0.0590)	(0.0580)
Flow_{t-2}	0.0570	0.0563	0.0573	0.0457
	(0.0474)	(0.0471)	(0.0470)	(0.0497)
Flow_{t-3}	0.0173	0.0172	0.0173	0.0137
	(0.0296)	(0.0295)	(0.0296)	(0.0290)
Log(Age)_{t-1}	-0.0083	-0.0084	-0.0082	-0.0056
	(0.0053)	(0.0053)	(0.0051)	(0.0061)
Log(TNA)_{t-1}	0.0010	0.0011	0.0011	-0.0024
	(0.0029)	(0.0029)	(0.0029)	(0.0035)
Expense_{t-1}	-3.1087	-3.1829	-3.2578	-5.7218*
	(2.5022)	(2.5170)	(2.5133)	(2.8268)
Turnover_{t-1}	0.0165	0.0173	0.0186	0.0253
	(0.0201)	(0.0206)	(0.0199)	(0.0214)
Fund volatility_{t-1}	-0.5503	-0.5131	-0.3070	-1.1007
	(0.5340)	(0.5508)	(0.6111)	(0.7031)
Std. daily volume_{t-1}	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Ave. daily spread_{t-1}	-0.0136	-0.0134	-0.0138	-0.0156
	(0.0204)	(0.0204)	(0.0204)	(0.0177)
Std. daily spread_{t-1}	0.0034	0.0034	0.0035	0.0046
	(0.0046)	(0.0045)	(0.0045)	(0.0038)
Price-NAV_{t-1}	4.0636**	4.0765**	4.1446**	3.3510**
	(1.6359)	(1.6387)	(1.6433)	(1.5861)
Share turnover_{t-1}	-0.1012	-0.1006	-0.1086	-0.1103
	(0.2940)	(0.2942)	(0.2986)	(0.2784)
Constant	-3.9986**	-4.0118**	-4.0827**	-3.2508*
	(1.6237)	(1.6266)	(1.6311)	(1.5919)
Fixed effects	Yes	Yes	Yes	Yes
Number of observations	764	764	764	777
Adj. R-squared	0.062	0.061	0.062	0.053

Table 6: Robustness: Are Active ETFs really active?

The table presents the results of panel regressions Activeness (i.e.,$1 - R^2$) on a dummy variable indicating whether a fund is an actively managed ETFs and the determinants of activeness as control variables:

$$\begin{aligned} Activeness_{i,t} = \beta_0 + \beta_1.Active_{i,t} + \beta_2.Log(Age)_{i,t-1} + \beta_3.Log(TNA)_{i,t-1} \\ + \beta_4.Expense_{i,t-1} + \beta_5.Fund\,volatility_{i,t-1} + \beta_6.Holdings_{i,t-1} \\ + (CategoryFixedEffects) + (TimeFixedEffects) + \epsilon_{i,t} \end{aligned}$$

where *Active* is a dummy variable with the value of 1 if the fund is an actively managed ETF; *Log(Age)* is the natural log of the fund's age in months; *Log(TNA)* is the natural log of the fund's total net assets; *Expense* is the fund's expense ratio; *Fund volatility* is the volatility of fund's net return; *Number of stocks* is the number of holdings in the fund's portfolio. The regression includes calendar month and category fixed effects. Standard errors are in parentheses and clustered at the fund level. *, **, *** denote significance at the 10%, 5%, and 1% levels.

	U.S. Equity			**International Equity**			**World Equity**		
	Activeness(FFC)	Activeness(FF)	Activeness(CAPM)	Activeness(FFC)	Activeness(FF)	Activeness(CAPM)	Activeness(FFC)	Activeness(FF)	Activeness(CAPM)
$Active_t$	0.0162	0.0122	0.0193	0.0151	0.0353	0.0382	0.0068	0.0181	0.0057
	-0.0112	-0.0131	-0.0184	-0.0323	-0.0327	-0.037	-0.0463	-0.061	-0.0779
$Log(Age)_{t-1}$	-0.0180***	-0.0233***	-0.0193*	0.0019	0.005	0.0087	-0.0272	-0.032	-0.0194
	-0.006	-0.0077	-0.01	-0.016	-0.0162	-0.0202	-0.0304	-0.0375	-0.0434
$Log(TNA)_{t-1}$	0.0014	0.0023	0.0012	-0.005	-0.0051	-0.0049	0.0054	0.0074	0.006
	-0.0019	-0.0023	-0.003	-0.0041	-0.0042	-0.0052	-0.0158	-0.0204	-0.0246
$Expense_{t-1}$	0.349	0.4843	0.3723	15.6834***	15.3044***	16.8098***	32.7597***	40.1509***	49.7689***
	-0.5885	-0.6959	-0.8753	-3.9922	-3.8651	-4.5084	-5.1904	-7.3667	-9.4487
Fund $volatility_{t-1}$	-2.3440***	-2.8637***	-1.9271**	1.2449	0.6115	0.4444	-1.3113	-3.124	-4.3379
	-0.5996	-0.7353	-0.8711	-0.8002	-0.8466	-0.9966	-3.733	-6.2402	-7.7343
Number of $stocks_{t-1}$	-0.0304***	-0.0371***	-0.0468***	-0.0102	-0.011	-0.0142	0.0058	0.0068	0.0071
	-0.0052	-0.0063	-0.008	-0.0168	-0.0177	-0.0209	-0.0094	-0.0121	-0.0145
Constant	0.2406***	0.2964***	0.3177***	0.1562**	0.2283***	0.2933***	0.0795	0.1352	0.1199
	-0.0375	-0.0458	-0.0546	-0.0619	-0.0626	-0.0765	-0.1548	-0.2308	-0.2827
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	15240	15240	15240	9659	9659	9659	893	893	893
Adj. R-squared	0.338	0.345	0.471	0.363	0.455	0.468	0.352	0.31	0.328