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Performance of Actively Managed Exchange Traded Funds

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Performance of Actively Managed Exchange Traded Funds

by

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Dedicated to my grandparents.

ABSTRACT OF THE DISSERTATION

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Zachary Kaplan, Chair

Investors who want access to active asset management can choose to invest in actively managed exchange traded funds (AMETFs), actively managed non-transparent ETFs (ANETFs) or mutual funds. Three major differences of AMETFs, ANETFs and mutual funds are the venues funds are traded on, tax liabilities, and disclosure requirements. This paper exploits the 2019 SEC rulings on ETFs to study empirically which fund structure for active asset management delivers the best return performance and explores what are the driving forces behind the superior performance. I find that for equity funds, AMETFs is associated with 0.158% lower monthly returns than mutual fund, suggesting the cost of higher disclosure frequency exceeds tax benefits of AMETFs.

Keywords: AMETFs, semi-transparent ETFs, performance, disclosure frequency, tax benefits

Chapter 1: Introduction

Traditionally, investors who wanted to have investment professionals select stocks for them to invest in, and adjust these allocations with changing market conditions, were limited to investing in traditional actively managed mutual funds. With the Security and Exchange Commission (SEC) approving the first actively managed exchange traded fund (AMETF) in 2008, this has changed, and since then, AMETFs and mutual funds have been competing for the assets that investors allocate to active management. The total net asset under management (TNA) of AMETFs experienced tremendous growth in the past decade, from $45.2 billion in 2011 to $336 billion in 2021. In 2019, the SEC introduced a new kind of actively managed fund: non-transparent or semi-transparent ETF (ANETF) and approved the first ANETF in 2020. The total net asset (TNA) of ANETFs has experienced fast growth since their introduction, reaching TNA of $3 billion in 2021. This paper empirically studies which fund structure delivers the best return performance and sheds light on the relative costs and benefits of AMETFs, ANETFs, and actively managed mutual funds by exploring the driving forces behind the superior performance.

Three major differences of AMETFs, ANETFs, and mutual funds are the venues funds are traded on, tax liabilities, and disclosure requirements. First, concerning venues, AMETFs and ANETFs are traded on the secondary market like stocks, while mutual funds are traded through distribution channels such as investment professionals and financial advisors. Furthermore, investors can buy and sell ETF shares any time intraday on the secondary market. Mutual funds, in contrast, must be redeemed for the closing net asset value (NAV) of the mutual fund shares, and the investor must select to redeem his shares before the market closes, so he is uncertain as

to the price at which he will ultimately redeem his shares. As a result, ETFs offer intraday liquidity while actively managed mutual funds do not. However, due to the different redemption models mutual funds and ETFs use, fund returns cannot directly capture the liquidity benefit of AMETFs. The intraday share price of ETFs is determined by supply and demand in the secondary market and can deviate from net asset value. When this happens, authorized participants (APs) and arbitrage traders will engage in arbitrage trades to bring the ETF price in line with its net asset value eventually. Those trading activities can increase the volatility of AMETFs and ANETFs, providing another source of price risk, that mutual funds avoid by redeeming at the NAV.

Second, regarding tax liabilities, AMETFs are generally able to avoid paying capital gain taxes on sales of appreciated securities while mutual funds and ANETFs do not. The ability to avoid taxes arises because fund shares are exchanged for securities with authorized participants (APs), which are considered an in-kind transfer for tax purposes. Specifically, when the price of an AMETF on the open market falls below its net asset value (NAV), the fund executes trades with the AP exchanging shares of securities for shares of its own stock. Provided it trades its appreciated shares with the AP, rather than for cash in the market, the AMETF is able to divest appreciated shares with the APs, rather than for cash in the market. The ability to meet redemption demand by exchanging appreciated shares of the ETF for cash allows AMETFs to avoid taxes related to asset sales because the IRS treats these transfers as in-kind, so they do not trigger capital gain taxes. As a result, AMETFs are more tax efficient than mutual funds. Moussawi, Shen and Velthuis (2021) show that ETFs attract tax sensitive investors for their tax efficiency. The tax efficiency of AMETFs directly increases fund returns. It also reduces the cost of trading, which can indirectly increase fund returns, by allowing the fund to profit from trades

that are profitable before taxes but would not be after. The SEC does not allow ANETFs to utilize in-kind transfers because the ANETF structure is novel and under observation.

Third, the SEC requires AMETFs to disclose holdings more frequently than mutual funds and ANETFs. The SEC regulations require AMETFs to disclose their full portfolio holdings daily to the public. In contrast, mutual funds and ANETFs need only to disclose positions quarterly, and mutual funds can disclose with a sixty-day delay of the closing positions. As a result, AMETFs face the risk that investors will profit from their positioning, at the expense of their returns. AMETFs can be expected to suffer more from front-running cost. If front running is severe, it can negatively impact the performance of actively managed funds. Then funds that disclose more frequently would perform worse because they suffer from higher front-running cost. In that case, AMETFs would be expected perform worse than actively managed mutual funds and ANETFs. Research shows that increasing disclosure frequency can have negative impact on fund performance. For example, Agarwal et al. (2015) show that higher disclosure frequency reduced the return of more informed mutual funds. Parida and Teo (2016) found that successful mutual funds that disclose semi-annually perform better than their counterparts which disclose quarterly. Mutual funds and ANETFs, by concealing their investment positions, would seem to minimize front-running cost.

Theoretically, front-running, and more frequently rebalancing cost would be reasonably expected to eat into AMETFs performance and making it perform worse than mutual funds and ANETFs. While the tax benefit would increase AMETF returns. Access to secondary market would increase AMETF and ANETF volatility and add more risk to investors.

This paper utilizes the 2019 SEC ruling on custom basket use and introduction of semi-transparent ETFs to study the competing forces that drives AMETFs, ANETFs, and actively

managed mutual funds' performances. The 2019 SEC ETF ruling (Rule 6c-11) allows transparent ETFs under the rule to use custom baskets without the need to go through long procedure of obtaining exemptive relief. This grants transparent ETFs easy access to custom baskets.[1] The 2019 SEC ETF ruling became effective in December 2019. Investment companies rushed to reap the tax benefit brings by the easy access to custom baskets. First, I examine the return of AMETFs, ANETFs, and mutual funds, controlling for fund characteristics. The competing forces that drive the different return performance of ANETFs, AMETFs and mutual funds are tax efficiency and disclosure frequency. Empirical results shows that ANETF structure is associated with 0.285% higher returns than both AMETFs and mutual funds over the sample period from December 2019 to September 2021, although the coefficient is not significant. For equity funds, AMETF structure is associated with 0.158% lower monthly returns than mutual funds over the sample period from December 2019 to September 2021.[2] The result that AMETFs performs worse than active mutual funds suggest that the tax benefit of AMETF structure is lower than the cost of being front runned. This thus suggests the exemption from daily holdings disclosure gives actively managed mutual funds advantage over traditional AMETFs.

This paper continues to examine the compare the return and characteristics of a subsample of newly introduced semi-transparent/active non-transparent ETFs (ANETFs) with their existing mutual fund counterparts to facilitate studying the competing forces that drives

[1] "Custom basket policies and procedures. An ETF relying on rule 6c-11 will be permitted to use baskets that do not reflect a pro-rata representation of the fund's portfolio or that differ from the initial basket used in transactions on the same business day ("custom baskets") if the ETF adopts written policies and procedures setting forth detailed parameters for the construction and acceptance of custom baskets that are in the best interests of the ETF and its shareholders. The rule also will require an ETF to comply with certain recordkeeping requirements." https://www.sec.gov/news/press-release/2019-190

[2] I also extended the sample period to December 2017, with sample period from December 2017 to September 2021, for equity funds, the AMETF structure is associated with 0.026% higher monthly return, but the coefficient is not significant. Also, the extended period panel data contains 672 AMETFs, about 350 of them are incepted after the SEC rulings became effective. This shows the tax benefit brought by 2019 SEC ruling attracts more investors to AMETF space.

performance of ANETFs and actively managed mutual funds. Fidelity, T. Rowe Price, and Putnam choose to embrace the 2019 SEC rules with creation of ANETFs that are replicas of their existing mutual funds. Those replica ANETFs are managed by the same management team and have goals identical to their mutual fund counterparts, allowing us to hold constant the assets held by the funds while examining variation in capital market outcomes. Seventeen out of the twenty-nine ANETFs are ETF version of existing mutual funds. Those seventeen replica ANETFs on average are about 0.68% the size of their mutual fund counterparts. Comparative statistics shows that replica ANETFs charges lower fees but mean monthly return of replica ANETFs s is almost identical to their mutual fund counterparts. The mean portfolio turnover is 70.83%, almost double that of their mutual fund counterparts. Since ANETFs rebalance their portfolio more frequently, the discrepancy of low fee but same return could be because replica ANETFs pay higher rebalancing costs.

After establishing that disclosure frequency could be the major economic force dragging down AMETF return. Next, I conduct empirical analysis on the risk of ANETFs comparing with AMETFs to assess the risk implications of different disclosure frequency. There are two aspects of the risk measures. First, the opaque disclosure requirements could attract more noise traders and introduce more volatility to ANETF price. Second, price of AMETFs and ANETFs can deviate from its net asset value. The price deviation from NAV can be costly as they bring additional risk for investors, because in addition to bearing the risk of fluctuations of the price of the holdings of the mutual fund they also bear the risk of deviations of the share price of the ETF from the NAV. I employ a regression controlling for fund characteristics to compare the volatility and price deviation of AMETFs and ANETFs. Empirical analysis shows that ANETF is less volatile, but experience higher fund turnover than AMETFs. Furthermore, the gap between

price and NAV of ANETFs is significantly smaller than that of traditional AMETFs. The low volatility, high turnover and smaller price deviation of ANETFs suggests that the opaque disclosure requirements of ANETFs attracts more trading activities, but the APs are efficient at keeping the price close to ETF share NAV, ANETFs are less risky to investors than full-transparent AMETFs.

My paper makes two key contributions. First, it contributes to the research literature on actively managed ETFs performance. AMETF is a relatively new financial innovation and only occupies about at most 3% of ETF space since inception. Therefore, there are limited studies on them, and even fewer studies compare AMETFs with actively managed mutual funds. The most relevant paper is Sherrill and Upton (2018), they compare performance fund flow of AMETFs and mutual funds and find evidence that AMETFs and actively managed mutual funds are substitutes. Other research works compare the performance and volatility of AMETFs with passive ETFs and finds AMETFs underperform and are more volatile than passive ETFs, following the same index (e.g., see Rompotis ,2011a&b; Schizas, 2014; Dolvin, 2014, Meziani 2015). However, prior research is limited to small AMETF samples and fails to compare AMETFs with other actively managed mutual funds, which is a better counter-factual from the standpoint of fund organization. This paper builds upon those findings by comparing the performance of AMETFs, ANETFs and actively managed mutual funds using a large sample of 672 AMETFs to reveal that actively managed mutual fund structure delivers significantly better performance. It is also the first one to empirically study the performance and volatility of newly introduced semi-transparent ETFs.

Second, this paper contributes to the literature on the effect of fund disclosure frequency and tax efficiency of ETF on fund performance. Prior research finds that more frequent portfolio

disclosure provides front-runners and copycats funds with more timely information (Wermers, 2001), and front-runners and copycats funds use this information to free ride actively managed mutual funds, thus disclosure requirements may hurt actively managed mutual funds' performance. (e.g., see Frank et al., 2004; Ge and Zheng, 2006). Agarwal et al. (2015) developed a model for different mandatory disclosure frequencies and find empirically that increasing disclosure frequency can hurt mutual fund performance. Prior studies shows that ETF structure is more tax efficient than mutual funds (e.g., see Poterba and Shoven, 2002; Bergstresser, D., & Pontiff, J. ,2013; Moussawi, Shen & Velthuis (2021)). Colon (2017) adds to the literature by showing in detail how in-kind redemptions of ETFs provides tax advantage over mutual funds. My paper builds upon those existing work by showing the overall effect of disclosure frequency and tax benefits on fund performance. Fund returns are affected positively by tax efficiency but negatively by more frequent disclosure requirements, leading to an overall slightly negative effect on AMETF returns than mutual funds.

This paper is organized as follows: Chapter 2 describes the data, samples, and summary statistics. Chapter 3 presents the empirical results and Chapter 4 concludes.

Chapter 2.Data, Sample and Summary Statistics

2.1 Data

To conduct my analysis, I use a variety of datasets. Monthly return data on ETFs and mutual funds are obtained from CRSP. The list of actively managed ETFs comes from Morningstar and FactSet. Characteristics and intraday price data of ETFs are obtained from ETF Global. Mutual funds characteristics data comes from CRSP database, fund latest prospectus and annual report. For the mutual fund data, I first retained all entries with blank index_fund_flag column to exclude index funds. The mutual fund data are at portfolio level; to arrive at the fund level data, we follow DE Sherrill, Shirley and Stark (2017), Chen et al. (2013), and select LIPPER OBJECTIVE CODES to identify actively managed mutual funds, by dropping treasury, municipal debt and money market funds using funds' LIPPER OBJECTIVE CODES. Next, I dropped institutional shares using information in fund name, and then aggregated portfolio entries that hold by the same fund using fund name.

2.2 Sample

As explained in the introduction, the main differences of AMETFs, ANETFs and mutual funds are the venues funds are traded on, tax efficiency, and disclosure frequency. We want to assess the performance of AMETFs, newly introduced ANETFs, and mutual funds to help understand the cost and benefit of different fund structures to investors. Beginning in December of 2019, ETF managers can use custom baskets, which allows ETFs to delay or avoid capital tax gain using in-kind redemption for appreciated securities. So, we choose sample period starting

from December 2019, so that AMETFs are operating under the same tax rules for the duration of our sample. We choose to end our sample in September 2021, because prior to this date, ANETFs do not have access to custom baskets. After 2021, ANETFs can use custom baskets and thereby improve tax efficiency beginning in October 2021.[3]

To construct our sample, first, we obtain the list of actively managed ETFs from FactSet and Morningstar, together there are 854 AMETFs as of September 2021. After matching with the CRSP dataset, 725 out of the 854 AMETFs have monthly return data in CRSP in the sample period. ETF Global provides the characteristics data of AMETFs. After merging the two datasets, I arrive at a sample of 725 AMETFs. There are five major asset class categories of AMETFs, including equity, fixed income, alternatives, commodities, and currency. This paper focuses on ETF's two dominating asset classes: equity and fixed income. The final AMETF dataset consists of 672 AMETFs and 9,719 month-fund observations.

I obtained the non-transparent ETFs list of fifty-five ANETFs from FactSet and Bloomberg, and then cross-referenced with ETF website to identify a correct list of active non-transparent ETFs. This leads to a list of twenty-nine non-transparent ETFs as of September 2021. Seventeen out of the twenty-nine ANETFs are replicas of their mutual fund counterparts, meaning that they are launched as an ANETF version of an existing mutual fund, with the same management team and the same investment objectives as their mutual fund counterparts. The

[3] To be prudent, the SEC did not give all semi-transparent ETFs access to custom basket at first. In late September 2021, NYSE obtained exemptive relief for ANETFs to use custom basket. https://www.sec.gov/rules/sro/nysearca/2021/34-93120.pdf, https://www.yahoo.com/lifestyle/nyse-gets-custom-basket-etf-161500803.html

replica ANETFs allows a direct comparison between new ANETF structure and mutual fund structure.

The mutual fund sample includes actively managed mutual funds in equity and fixed income asset classes. I first dropped institutional class share funds using information in fund name, and then extract fund name from each class shares. I aggregated multiple fundno share classes that are under the same fund name and combined the total net asset. To compute fund returns, expense ratio and portfolio turnover ratio, I took the value-weighted average over all fundnos within the same fund by the total net asset of the fund.

2.3 Summary Statistics

Table 1 reports summary statistics of the AMETF and ANETF dataset by asset class. This paper will focus on two major asset classes in AMETFs: equity and fixed income. The AMETF sample consists of 504 equity AMETFs and 168 fixed income ETFs. Monthly return (Return) is net of fee and calculated using net asset value, which is consistent with how CRSP constructed mutual fund returns. Panel A reports summary statistics of AMETFs. The mean return of equity AMETFs is 1.22% with 5.74% standard deviation during sample period. I constructed turnover variable by dividing monthly trading volume (VOL) over shares outstanding of the fund (SHROUT):

$$Turnover_{i,t} = VOL_{i,t}/SHROUT_{i,t}$$

To explore the impact of different fund structures on fund returns, I construct two dummy variables of interest: AMETF indicator (AMETF_FL) and ANETF indicator (ANETF_FL).

Panel B reports summary statistics of ANETF data set. First, we compare ANETFs, which are all equity ETFs, with equity AMETFs in our sample. Panel B shows that ANETFs have higher mean return, mean lower expense ratio, and lower risk than traditional AMETFs. Panel B reports that the mean return of ANETFs in our sample period is 1.39% with standard deviation of 6.62%. The mean return of ANETFs is higher than the sample mean return of AMETFs. The mean net expense ratio of ANETF is 0.65%, higher than that of the sample mean at 0.74% in AMETF. The standard deviation of ANETF's expense ratio is 0.15%, much lower than that of AMETFs.

In addition, ANETFs show higher monthly turnover, which reflects the level of trading activities. The mean monthly turnover of ANETFs in the sample is 37.99%, about 60% higher than the mean turnover of AMETFs. Since older funds may be less volatile, and all ANETFs in the sample are no more than two years old, the higher monthly turnover could indicate that fund age is a major factor influencing trading activities. To control for this, I include fund inception year variable to control for fund age in regression design when accessing volatility in Chapter 3.

Table 1.Summary Statistics of Actively Managed ETFs and Semi-transparent/active non-transparent ETFs (ANETFs)

This table reports the summary statistics of AMETF and ANETF dataset. Panel A reports the summary statistics on all AMETFs in the dataset. Panel B reports summary statistics of ANETFs. Return is the monthly net of fee return of AMETFs and in percentage. Monthly total net asset (TNA) is in million dollars. Exp_ratio is the net expense fund charges to investors. Turnover is monthly trading volume divided by month-end share outstanding. Turnover is zero when funds are traded less than 100 shares that month. Turn_ratio is twelve-month end fund portfolio turnover.Data primarily comes from CRSP database. The portfolio turnover data of ETFs in CRSP is incomplete. I collected portfolio turnover data from fund latest prospectus and annual report. The asset class classification is based on the Lipper class code. EQ is short for equity and FI is short for fixed income. Return , turnover, portfolio turnover(turn_ratio) and expense ratio(exp_ratio) are in percentage.

Panel A: Summary Statistics of Actively Managed ETFs(AMETFs)

Variable	N	Mean	Std. Dev.	Median	Mode	Pctl. 25	Pctl. 75
			Asset_class: EQ				
Return	6815	1.22	5.74	1.2	0	-1.07	3.64
TNA	6815	193.45	1078.49	42.8	2.1	14.25	102.95
exp_ratio	6815	0.74	0.39	0.75	0.79	0.55	0.85
turnover	6815	24	28.41	13.01	0	6.52	28.78
turn_ratio	6815	1.27	3.94	0.31	0	0	0.86
AMETF_FL	6815	1	0	1	1	1	1
ANETF_FL	6815	0.04	0.2	0	0	0	1
			Asset_class: FI				
Return	2904	0.3	2.35	0.24	0.03	-0.09	0.97
TNA	2904	798.25	2092.25	125.75	10	35.98	406.43
exp_ratio	2904	0.5	0.36	0.4	0.35	0.29	0.61
turnover	2904	16.63	17.33	12.33	0	6.31	20.77
turn_ratio	2904	1.06	1.62	0.63	0	0.29	1.11
AMETF_FL	2904	1	0	1	1	1	1
ANETF_FL	2904	0	0	0	0	0	0

Panel B：Summary Statistics of Semi-transparent/active non-transparent ETFs(ANETFs)

Variable	N	Mean	Std. Dev.	Median	Mode	Pctl. 25	Pctl. 75
			Asset_class: EQ				
RET	283	1.82	5.03	2.2	0	-1.6	4.82
TNA	283	56.31	84.41	18.7	2.1	5.75	60.8
exp_ratio	283	0.65	0.15	0.59	0.79	0.5	0.59
turnover	283	37.99	39.8	21.4	0	9.33	53.4
turn_ratio	283	0.54	0.41	0.5	0	0.25	0.72
			Asset_class: FI				

Table 2 reports the summary statistics of the actively managed mutual fund data set. For equity asset class funds, the mean net expense charged by actively managed mutual funds are higher than AMETFs, with mean about 1.31% and standard deviation 8.43%. The mean return of actively managed mutual funds is also slightly higher than that of AMETFs in both categories. The turnover of mutual funds reflects only fund flows. In contrast, the creation and redemption of shares creates turnover for AMETFs and ANETFs but does not result in fund flows. As a result, turnover is not an apples-to-apples comparison between funds. To ensure consistency I exclude the turnover variable when perform comparative analysis between AMETFs, ANETFs and mutual funds.

Table 3 reports the results of two sample t-test on the mean value of variables between AMETFs and mutual funds. Test shows evidence that the mean monthly return depends on fund structure for equity funds, but not for fixed income funds. Test results also shows evidence that the means of all independent variables listed depend on fund structure, regardless of fund asset class. We will explore whether mutual funds are performs significantly better than AMETFs and discuss what drives the performance difference in the next Chapter.

Table 2: Summary Statistics of Actively Managed Mutual Funds

This tabel reports the summary statistics of actively managed mutual funds dataset. Monthly total net asset (TNA) is in million dollars. Exp_ratio is the net expense fund charges to investors. Turn_ratio is twelve-month end fund portfolio turnover.Data primarily comes from CRSP mutual fund database. Return, portfolio turnover(turn_ratio) and expense ratio(exp_ratio) are in percentage. The data comes from CRSP mutual fund database. Return is the monthly net of fee fund return. The asset class classification is based on the Lipper class code. EQ is short for equity and FI is short for fixed income. After aggregate fund portfolio data to fund level and drop institutional fund shares, I arrive at 5554 mutual funds and 108498 month-fund observations in the sample.

Summary Statistics of Actively Managed Mutual Funds

Variable	N	Mean	Std. Dev.	Median	Mode	Pctl. 25	Pctl. 75
			Asset_class: EQ				
Return	85348	1.39	6.62	1.72	0	-1.27	4.27
TNA	85348	1753.62	7754.18	158.8	0.2	26.1	809.2
exp_ratio	85348	1.31	8.43	1.03	0	0.71	1.31
turn_ratio	85348	0.76	1.8	0.43	0.28	0.24	0.77
			Asset_class: FI				
Return	23150	0.34	2.39	0.33	0	-0.12	1.17
TNA	23150	1578.38	5775.27	173.9	0.2	32	835.35
exp_ratio	23150	1.68	17.95	0.79	0	0.55	1.04
turn_ratio	23150	1.48	1.96	0.81	0.54	0.5	1.55

Table 3: Two sample t test of summary statistics

This table reports the two sample t-test results on the mean value of common variables between AMETFs and mutual funds in the sample dataset. Monthly total net asset (TNA) is in million dollars. Exp_ratio is the net expense fund charges to investors. Turn_ratio is twelve-month end fund portfolio turnover.The asset class classification is based on the lipper class code. EQ is short for equity and FI is short for fixed income.

Test of summary statistics

Variable	Mean		t Value	p-value	Df
	MF	**AMETF**			
					Asset class: EQ
RET	1.38	1.22	2.3	0	8085.7
TNA	1753.65	193.45	52.74	0.2	75908
exp_ratio	1.03	0.74	57.56	0	9009.6
turn_ratio	0.76	1.27	-10.69	0	7042.5
					Asset class: FI
RET	0.34	0.3	0.88	0.38	3694.4
TNA	1578.38	798.25	14.36	0	9963
exp_ratio	0,83	0.5	43.21	0	4607.3
turn_ratio	1.48	1.06	12.88	0	4054.3

Chapter 3.Emprical Results

3.1 Return of ANETF, AMETF and Mutual Funds

ANETFs and AMETFs both trade on the secondary market. The differences are disclosure frequency and the ability to use custom basket to defer tax liability. Under the 2019 SEC rulings, ANETF are only required to report their holdings quarterly, similar to traditional mutual funds. ANETFs usually reports a proxy basket at a higher frequency than quarterly on their website. However, ANETFs cannot use custom basket during the sample period, thus they cannot capture the tax benefit as traditional AMETFs do.

All twenty-nine ANETFs are included in the AMETF data set. An OLS regression with suitable control variables would allow us to access the performance of ANETFs comparing with AMETFs through analyzing their return and volatility. Both ANETFs and AMETFs utilize the ETF structure that allows them access to secondary market. A regression with ANETF indicator and control variables allows us to compare the performance of the two structures on average and these average differences will reflect the impact of disclosure frequency and access to custom basket on fund returns. I employ the following regression to compare return of non-transparent ETFs and actively managed ETFs. I select the same control variables as Sherrill and Upton (2018), to control for differences in performance that would be expected based on fund characteristics and style, rather than the ETF type.

$$Return_{i,t} = \alpha + \beta_1 ANETF\_FL_i + log(TNA)_{i,t} + Exp\_ratio_{i,t} + Turn\_ratio_{i,t} + Turnover_{i,t} + Fund\_style_i + \varepsilon_{i,t}$$

$Return_{i,t}$ is the monthly return for fund i in month t. $ANETF\_FL_i$ is an indicator variable that equals one for non-transparent ETF and equals zero otherwise and is our variable of interest. $TNA_{i,t}$ is the log of total net asset value for fund i in month t, and controls for differences in fund size that can impact returns. $Exp\_ratio_{i,t}$ is the net expense ratio of fund i in month *t*. $Turover_{i,t}$ is calculated by dividing monthly fund volume (CRSP variable VOL) by its shares outstanding (SHROUT). I added turnover as control variable when comparing only ANETFs and AMETFs because turnover controls for trading activities. $Fund\_style$ is the lipper class code obtained from CRSP and controls for the style of the fund.

In addition to the Sherrill and Upton (2018) set of control variables, I include a few supplemental variables. I use LIPPER CLASS CODE to control for fund style. Net expense ratio instead of management fee is used to be consistent with the next expense ratio for mutual funds. Mutual funds net expense ratio includes waivers and reimbursement and can more accurately reflect the net expense investors are charged.

Table 4 reports the results of regressing monthly return of ETFs on ANETFs indicator, and controls. I clustered standard errors on fund and month to ensure standard errors are robust to cross-sectional correlations in portfolio returns and serial correlation in performance. ANETF is associated with 0.285% higher returns than both AMETFs and mutual funds during the sample period of December 2019 to September 2021, but the coefficient is not significant. Column (8) reports our full regression analysis coefficients. The coefficient on inception year is insignificant, indicating that the age of the fund does not significantly affect the return performance. This indicates that for AMETFs and ANETFs, fund age does not significantly affect return performance.

Table 4: Return of AMETFs and ANETFs

This table reports the regression results of monthly return of funds on ANETF indicators with the AMETFs and ANETFs dataset, controlling for log total net asset, net expense ratio, ETF turnover, ETF inception year and fund portfolio turnover. ANETF_FL is indicator variable representing ETF type. ANETF_FL equals one if the fund is semi-transparent and zero otherwise. Return is the monthly net of fee return. Return is the monthly net of fee return of AMETFs and in percentage. Monthly total net asset (TNA) is in million dollars. Exp_ratio is the net expense fund charges to investors. Turnover is monthly trading volume divided by month-end share outstanding. Turnover is zero when funds are traded less than 100 shares that month. Turn_ratio is twelve-month end fund portfolio turnover. Data primarily comes from CRSP database. The portfolio turnover data of ETFs in CRSP is incomplete. I collected portfolio turnover data from fund latest prospectus and annual report. Return, turnover, turn_ratio and expense ratio(exp_ratio) are in percentage. I clustered robust standard errors by fund and month. Standard errors clustered by fund and month are reported in brackets. All variables are winsorized at 1% and 99% level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Return				
ANETF_FL	0.330	0.30	0.306	0.298	0.371	0.367	0.233	0.29
	(0.435)	(0.436)	(0.437)	(0.437)	(0.437)	(0.438)	(0.445)	(0.446)
log(TNA)	0.103***	0.097***	0.101***	0.097***	0.093***	0.093***	0.108***	0.106***
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.052)	(0.052)
exp_ratio		-0.307*		-0.299	-0.303*	-0.289	-0.293	-0.281
		(0.256)		(0.282)	(0.256)	(0.282)	(0.282)	(0.282)
turn_ratio			-0.011	-0.001		-0.003	-0.002	-0.003
			(0.019)	(0.021)		(0.021)	(0.021)	(0.021)
turnover					-0.006**	-0.006**		-0.006**
					(0.003)	(0.003)		(0.003)
inception							0.025	0.031
							(0.033)	(0.033)

My next set of analysis seeks to compare AMETFs and mutual funds, which have more structural differences and need a different model, because, for example, we cannot use turnover as a control. Mutual funds are also only required to disclose their holdings less frequently than AMETFs. The less frequent disclosure helps mutual funds to mitigate or even eliminate of cost associated with being front runned. AMETF is more tax efficient than mutual funds and brings significant tax benefits to investors. The cost associated with being front runned can negatively impact fund return while tax benefits can positively impact fund return. I employ regression to access the effect of different fund structure on fund returns. Mutual funds are not traded on secondary market intraday, thus the turnover would reflect fund flows while AMETF turnover also reflect trading activities in the secondary market. To ensure variables consistency, I exclude turnover and inception. The following regression setting is employed to access the return of AMETFs, ANETFs and actively managed mutual funds:

$$Return_{i,t} = \alpha + \beta_1 AMETF\_FL_i + \beta_2 ANETF\_FL_i + log(TNA)_{i,t} + Exp\_ratio_{i,t} + Turn\_ratio_{i,t} + Fund\_style_i + \varepsilon_{i,t}$$

$AMETF\_FL_i$ is an indicator variable that equals one if the fund is AMETF and equals zero otherwise. All other variables are consistent with regression settings in Table 4. Table 5 reports the regression results. Panel A column (5) shows the regression results for all equity funds in the sample. The results in Panel A indicates that AMETF performs significantly worse than mutual funds and semi-transparent ETFs in the sense of absolute returns. For equity funds, AMETFs is associated with 0.158% lower monthly returns than mutual funds.[4] This provides some evidence that that disclosure frequency is the strongest force dragging return of traditional AMETFs. This

[4] To ensure the robustness of the results, I also ran regression that includes both fund style and month-year fixed effects, with same sample period of December 2019 to September 2021. After including month-year fixed effect, for equity funds, the coefficient of AMETF indicator is -0.232, and still significant.

justifies investors' choice of actively managed mutual funds over AMETFs in the past years. The cost of being front runned by other fund managers when AMETFs disclose daily exceeds and more frequent rebalancing cost associated with intraday trading exceeds the tax benefit of access to custom basket in the short term. However, the liquidity benefit of ETFs cannot be directly observed through returns. Investors who invest in ETFs would be expected to value liquidity more than those invest in mutual funds or more tax sensitive. ANETFs presents the highest return on average in all three structures. This comes as some surprise as ANETFs do not enjoy tax benefit during our sample period and would be expected to perform worse than mutual funds. It could be the case that investment companies with better track records and management skills choose to launch ANETFs and those ANETFs are superior to other funds. Later I will further explore the ANETFs sample.

Panel B shows the performance regression results for fixed income funds. All twenty-nine ANETFs in our sample are equity funds, so for fixed income funds the results only have AMETFs and mutual funds. Consistent with *t* test results on Table 3 Panel B, the return of fixed income AMETFs and mutual funds are not significantly different. Fixed income funds own fixed-income securities including bonds and treasuries. Fixed income portfolios usually cannot be front runned but can still utilize custom basket to reap tax benefit. The distinction between fixed income AMETFs and mutual funds would be access to secondary market and tax benefit. Since only tax benefit directly increase returns. Results in Panel B suggests that the tax benefit of fixed income AMETFs does not significantly increase their return comparing with mutual funds.

Table 5: Return Regression Results of Mutual Funds, ANETF and AMETFs

This table reports the regression results of monthly return of funds on AMETFs and ANETF indicators, controlling for log total net asset, net expense ratio, and fund portfolio turnover. Panel A reports the regression results of equity funds and Panel B reports regression results of fixed income funds. AMETF_FL and ANETF_FL are indicator variables representing ETF type. AMETF_FL equals one if the fund is actively managed and zero otherwise. ANETF_FL equals one if the fund is semi-transparent. Return is the monthly net of fee return. Exp_ratio is the net expense fund charges to investors. Turn_ratio is twelve-month end fund portfolio turnover. I combined data downloaded from CRSP and ETF Global. Return, turn_ratio and expense ratio(exp_ratio) are in percentage. I clustered robust standard errors by fund and month. All variables are winsorized at 1% and 99% level. Standard errors clustered by fund and month are reported in brackets. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.

Panel A: Performance regression results for equity funds

	Asset_class: EQ			
	(1)	(2)	(3)	(4)
			Return	
AMETF_FL	-0.201***	-0.163*	-0.169*	-0.158***
	(0.089)	(0.089)	(0.093)	(0.094)
ANETF_FL	0.231	0.294	0.293	0.285
	(0.369)	(0.369)	(0.369)	(0.369)
log(TNA)		0.035***	0.035***	0.035***
		(0.008)	(0.009)	(0.009)
exp_ratio			-0.011	-0.002
			(0.052)	(0.053)
turn_ratio				-0.020
				(0.019)
Fund style control	Yes	Yes	Yes	Yes
Observations	91,036	91,036	91,036	91,036
Adjusted R-squared	0.008	0.008	0.008	0.008

Panel B:Performance regression results for fixed income funds

	Asset_class: FI			
	(1)	(2)	(3)	(4)
			Return	
AMETF_FL	-0.025	-0.039	-0.017	-0.02
	(0.046)	(0.045)	(0.047)	(0.047)
log(TNA)		0.006**	0.011**	0.012*
		-0.006	(0.007)	(0.007)
exp_ratio	0.049*		0.071**	0.075**
	-0.034		(0.036)	(0.036)
turn_ratio				-0.012
				-0.009
Fund style control	Yes	Yes	Yes	Yes
Observations	25,890	25,890	25,890	25,890
Adjusted R-squared	0.00003	-0.00001	0.0001	0.0001

3.2 Replica ANETFs

I continue to explore the effect of different fund structure-ETF or mutual funds- on actively managed fund performance by investigating the subsamples. Investment companies embrace the December 2019 rulings in three different ways. Fidelity, T. Rowe Price, and American Century choose to capture the benefit of non-transparent ETF structure by launching non-transparent ETFs (ANETFs) that are replicas of their existing mutual funds. By taking a closer look into the ANETF sample, we can see seventeen out of the twenty-nine ANETFs in the sample period are replica ETFs. Replica ETFs are managed by the same team as their mutual fund counterparts under same investment goals. Comparative analysis of replica ETFs and their mutual funds counterparts can provide more insight on what effect different structures have on fund performance and other fund characteristics. First, I identify the mutual funds that launched corresponding replica ANETF, then conducted comparative analysis using replica ETFs and their mutual fund counterpart's data.

Table 6 panel A presents summary statistics of the replica ANETFs and their mutual funds counterpart. Replica ETFs are much smaller than their mutual fund counterparts. The mean size of replica ANETFs is only 0.68% the mean size of mutual fund counterparts. The difference in mean monthly returns of replica ETFs and mutual funds is very small, at around 0.01%. ANETFs does not have access to custom basket and cannot enjoy the tax benefit of in-kind transfer, and they also disclose quarterly like mutual funds. The only difference would be access to secondary market, the result that replica ETFs have very similar returns to their counterpart mutual funds suggests that access to secondary market does not affect fund return performance.

There are 167 fund-month observations during the sample period. The mean and standard deviation of monthly returns are almost the same for replica ANETFs and their mutual fund's

counterparts. But replica ANETFs and their mutual fund's counterparts are quite different in total net asset, net expenses, and portfolio turnover. Replica ETFs are significantly smaller than their mutual funds counterparts. For example, Natixis U.S. Equity Opportunities Fund has 900 million dollars in TNA while the ETF version of the mutual fund (ticker: EQOP) only has around 9 million dollars in TNA. The mean total net asset for replica ETFs is $101.41 million, only 0.04% of their mutual fund counterparts' mean total net asset. Replica ETFs also charges lower net expenses and exhibit higher portfolio turnover. Table 6 panel B presents comparative statistics on replica ETFs and their mutual funds. ΔRET is the average monthly return difference between the two funds type and calculated using the following formula:

$$\Delta RET = \frac{(RET_{i,t}^{ETF} - RET_{i,t}^{MF})}{N}$$

$RET_{i,t}^{ETF}$ is the net return of replica ETF i in month t, and $RET_{i,t}^{MF}$ is the return of corresponding mutual fund in the same month. N is the total number of month-fund observations in the sample. Δexpense and ΔTNA are constructed in the same way. Eleven of the seventeen replica ETFs delivers slightly better mean monthly return than their mutual fund counterparts and four delivers slightly worse monthly returns. But the difference in monthly returns is very small, with the mean return difference (ΔRET) at only 0.01%.

Note that the replica ANETFs does not have access to custom basket and thus cannot enjoy tax benefit of ETF structure during our sample period of December 2019 to September 2021, and ANETFs are required to disclose portfolio holdings quarterly just like mutual funds do. The driving forces of any return difference can only be rebalancing cost associated with trading on the secondary market. The mean return difference (ΔRET) is only 0.01%, indicating that the

cost of rebalancing is very small and negligible. This facilitates the interpretation of our main result in section 3.1. The results in section 3.1 shows that AMETFs perform slightly worse than actively managed mutual funds, suggesting the cost of being front runned by other fund managers when AMETFs disclose daily, and the more frequent rebalancing costs associated with intraday trading exceeds the tax benefit of access to custom basket in the short term.

Ideally, an experiment in which fund managers would be randomly assigned to AMETF or actively managed mutual fund structure, would allow direct observation how the fund structure differences affect performance. In actuality, fund choose whether to be an AMETF or an actively managed mutual fund, so researchers have to study the effect of performance controlling for observable differences between the funds. The replica ANETFs provides a good opportunity for direct observation. Of course, one threat to the validity of the inferences drawn from this observational study is that there are uncontrolled for differences in ability that also affect the selection of managers into launching replica ANETF or not.

Table 6: Comparative Statistics of Replica ANETFs and Mutual Funds

This table reports comparative statistics of replica ANETFs and their corresponding mutual funds. Return is monthly net return of funds and in percentage. TNA is the total net asset of fund and in millions. Exp_ratio and turn_ratio are net expense and portfolio turnover of fund. ΔRET is the average of monthly return difference between replica ETF and corresponding mutual fund. I first subtract monthly return of mutual funds from monthly return of replica ETF, and then take the average. Δexpense and ΔTNA are constructed in similar fashion. ΔTNA ratio is the total net asset of replica ETF divided by that of corresponding mutual fund. Panel A reports the summary statistics of sample period. Panel B reports statistics of parallel comparison of replica ETFs and corresponding mutual funds. Higher is the number of funds with variables values larger than zero and lower is the number of funds with corresponding variable values lower than zero. There are 17 replica funds in our sample period.

Panel A: Summary statistics of replica ANETFs and corresponding mutual funds

Variable	N	Mean	Std. Dev.	Pctl. 25	Pctl. 75
		Replica ANETFs			
Return	167	2.20	4.86	-1.62	4.81
TNA	167	101.41	104.27	25.77	171.01
exp_ratio	167	0.56	0.11	0.50	0.59
turn_ratio	167	74.83	200.08	15.32	51.68
		Mutual Funds			
Return	167	2.21	4.70	-1.50	4.60
TNA	167	14992.67	38720.74	14702.00	263101.80
exp_ratio	167	0.70	0.20	0.60	0.80
turn_ratio	167	39.10	28.20	22.00	49.00

Panel B: Comparative statistics replica ANETFs and corresponding mutual funds

	Average	Higher	Lower
ΔRET	0.01	11	6
Δexpense	-0.18	3	14
ΔTNA	-14,891.26	0	17
TNA ratio	0.68	-	-

3.3 Volatility of AMETFs and ANETFs

This section access whether ANETFs are more volatile than AMETFs. One key difference of ETFs and mutual funds is that ETFs can be traded on the secondary market and thus are traded more frequently than mutual funds. ANETFs disclose less frequently than AMETFs, this allows us to assess the risk associated with less frequent disclosures by looking at the volatility of ANETFs and AMETFs. Part of what drives more trading on AMETFs are the daily disclosures invites front running and noise traders. Without the daily holding information, two scenarios can happen. When noise traders do not know the holdings of the ETFs, noise traders who believe they have more information could trade more, and cause ANETFs to be more volatile. Another scenario is that the semi-transparency of ANETFs would avoid being front-runned and the trading activities from front-running could be reduced. I can corroborate that by checking the volatility of ANETFs to see if the trading activities decreases. The results would also show whether semi-transparent ETF are riskier than traditional AMETFs. I employ similar regression settings to explore the volatility of ANETFs and AMETFs and construct volatility variable by computing the standard deviation of daily fund returns each month.

$$VOL_{i,t} = \alpha + \beta_1 ANETF_F L_i + log(TNA)_{i,t} + Exp\_ratio_{i,t} + Turn\_ratio_{i,t} + + Fund\_style_i + Inception_i + \varepsilon_{i,t}$$

$VOL_{i,t}$ is the monthly return volatility for fund i in month t. Inceptions is the fund inception year which effectively control for fund age. I include inception as an independent variable because fund with a long history tend to be larger and fluctuate less, and all ANETFs are launched in 2020 and 2021.Turn_ratio is the twelve-month end portfolio turnover, higher portfolio turnover indicates the fund employs more active strategy and the NAV of more active

fund could fluctuate wider. Larger funds tend to exhibit lower return volatilities. Funds that employ more active strategies usually charge higher expenses to investors to compensate for the more frequent trading costs. Table 7 reports the results. Column (7) - (9) shows regression results on multiple variables with inception year as control. Column (1) to (6) shows regression results with inception year. Column (8) shows the results with all control variables.

The volatility of ANETFs is slightly lower and significantly different from traditional AMETFs. The results indicates that ANETFs is slightly less risky than AMETFs.

Table 7. Volatility of AMETFs and ANETFs

This table reports the regression results of monthly volatility of funds on ANETF indicators, controlling for log total net asset, net expense ratio, inception year and fund portfolio turnover. ANETFs are all in equity asset class, so regression is ran using only equity AMETFs. Volatility is the monthly standard deviation of daily returns. Inception is the inception year of the fund. TNA is the total net asset of fund and in millions. ANETF_FL is indicator variable representing ETF type. ANETF_FL equals one if the fund is semi-transparent and zero otherwise. Exp_ratio is the net expense fund charges to investors. Turn_ratio is twelve-month end fund portfolio turnover. I combined data downloaded from CRSP and ETF Global. The portfolio turnover data in CRSP is incomplete. I collected more portfolio turnover data from fund latest prospectus and annual report. Turn_ratio and expense ratio(exp_ratio) are in percentage. Standard errors clustered by fund and month are reported in brackets.All variables are winsorized at 1% and 99% level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Volatility				
ANETF_FL	-0.172***	-0.269***	-0.178***	-0.179***	-0.267***	-0.275***	-0.07	-0.077	-0.162**
	(0.064)	(0.062)	(0.064)	(0.064)	(0.062)	(0.063)	(0.065)	(0.065)	(0.064)
log(TNA)	-0.001			-0.002	0.003	0.001	-0.017**	-0.018**	-0.017
	(0.008)			(0.008)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
turn_ratio		0.005***			0.005***	0.005***			0.005***
		(0.000)			(0.000)	(0.000)			(0.000)
exp_ratio			(0.087)	-0.088		-0.106		-0.097***	(0.117)
			(0.048)	(0.048)		(0.047)		(0.048)	(0.046)
inception							-0.039***	-0.039***	-0.045***
							(0.005)	(0.005)	(0.005)
Fund style control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,043	6,043	6,043	6,043	6,043	6,043	6,043	6,043	6,043
Adjusted R-squared	0.226	0.26	0.227	0.227	0.259	0.26	0.233	0.233	0.269

3.4 Price Deviation of ANETFs

Unlike mutual funds, the price of ETFs can deviate from its net asset value (Price deviation). When price deviation happens, market participants and APs of ETFs would engage in arbitrage trades to make a profit. Active management brings challenge to arbitrage as fund managers changes their portfolio more often than funds that passively following an index. Price of AMETFs can potentially deviate a lot from its NAV intraday, especially during periods of high market turbulence. Market participants tend to overreact in adverse market conditions and oversell. The price deviation from NAV potentially brings additional risk for investors, as it is another source of volatility. The price of traditional full transparent AMETFs usually only deviates from NAV for a short term. The arbitrage activities of APs and market participants, who can readily calculate the NAV based on last night's disclosed positions, can trade to bring it back to NAV.

ANETFs are semi-transparent, which would create barriers for market participants other than APs to engage in arbitrage trades as they do not have full information about daily fund holdings. ANETFs disclose portfolio holdings only quarterly. The opaque structure gives less information to market participants, making it harder to engage in arbitrage trading. This could lead more severe price deviation in ANETF shares from its net asset value. I employ regression to explore whether price deviation is worse for ANETFs by regressing the monthly mean absolute difference between NAV and ETF closing price on ANETF indicator, controlling for fund characteristics variables and price of ETF share.

Table 8 shows the summary statistics and regression results. Column (8) shows the main regression results. On average, the gap between price and NAV of ANETFs in our sample is

$0.024 significantly lower than that of traditional AMETFs, indicating that the gap between price and NAV of ANETFs is significantly smaller than that of traditional AMETFs. The quarterly disclosure of ANETF portfolio holdings makes it harder for market participants other than authorized participants to access the net asset value of ANETFs. Trading price might deviate from NAV more. Regardless of disclosure frequency, authorized participants (APs) of ETFs would engage in arbitrage trading to bring ETF price to be consistent with its net asset value. Under the close monitoring of SEC, the fund sponsors of ANETFs have more incentives to make APs engage in more frequent arbitrage trading to bring the price of ANETFs back in line with NAV. The size of ANETFs launched are small comparing with mutual funds with the same management goals.[5] It can be more challenging for APs to keep the price deviation of ANETFs lower when large size ANETFs are launched.

Overall, the empirical results that ANETFs exhibits significantly slightly lower volatility and lower price deviation from NAV than traditional AMETFs indicates that ANETFs are less risky than AMETFs.

[5] Section 3.3 analyzes subsample of ANETFs. Seventeen out of the twenty-nine ANETFs in the sample are replications of existing mutual fund counterparts. The mean size of those replica ANETFs are only 0.68% as large as the size of their mutual fund counterparts.

Table 8: Price Deviation Regression Results of ANETFs and AMETFs

This table reports the regression results of price deviation on ANETF indicators, controlling for log total net asset, turnover, inception year, one month lagged price and fund portfolio turnover. ANETFs are all in equity asset class, so regression is ran using only equity AMETFs. Gap is the absolute difference between price and NAV, calculated as monthly average of the absolute value of (closing price-NAV). Inception is the inception year of the fund. TNA is the total net asset of fund and in millions. ANETF_FL equals one if the fund is semi-transparent and zero otherwise. Exp_ratio is the net expense fund charges to investors. Turnover is the monthly trading volumn of the fund divided by its shares outstanding. Turnover and expense ratio(exp_ratio) are in percentage. Standard errors clustered by fund and month are reported in brackets.All variables are winsorized at 1% and 99% level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Gap			
ANETF_FL	-0.030***	-0.027***	-0.028***	-0.022***	-0.030***	-0.024***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
log(TNA)			-0.001	-0.002	-0.0005	-0.002
			(0.000)	(0.000)	(0.000)	(0.000)
turnover	0.0002***				0.0002***	0.0002***
	(0.000)				(0.000)	(0.000)
exp_ratio			(0.087)	-0.088		-0.106
			(0.048)	(0.048)		(0.047)
lag (PRC)	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)
Fund style control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,190	6,190	6,190	6,190	6,190	6,190
Adjusted R-squared	0.061	0.052	0.052	0.071	0.061	0.083

Chapter 4. Conclusion

Actively managed ETF(AMETF), actively managed non-transparent ETF(ANETF) and mutual fund are three fund structures for active asset management. Since AMETF and mutual fund are the two dominating fund structure and AMETF is becoming an important investment vehicle for active asset management, it is worth exploring what economic forces drive the performance difference of the two major active asset management vehicles. Theoretically, front-running, and more frequently rebalancing cost would be reasonably expected to eat into AMETFs performance and making it perform worse than mutual funds. While the tax benefit would increase AMETF returns.

This paper exploits the 2019 SEC ruling on custom basket use and introduction of semi-transparent ETFs to study the competing forces that drives AMETF and actively managed mutual funds' performance. I find that AMETFs performs slightly worse than actively managed mutual funds during our sample period, indicating fund returns are affected positively by tax benefit but negatively affected by more frequent disclosure requirements, leading to an overall slightly negative effect on AMETF returns than mutual funds. Semi-transparent ETFs shows lower volatility and lower price deviation than traditional AMETFs. The close monitoring of SEC is efficient on keeping the price deviation of semi-transparent ETFs from underlying value low. With access to custom basket, semi-transparent/active non-transparent ETF is less risky and could become a superior choice to mutual funds.

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