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Actively vs. Passively Managed Exchange Traded Funds

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Abstract

This paper employs standard methodology found in the literature on mutual funds' performance and addresses the debate of "active vs. passive" management using data from the U.S. ETF market. The results obtained show that the active ETFs underperform their passive peers while they are more volatile than them. Moreover, the active ETFs fail to deliver any significant alpha as demonstrated by both single-factor and multi-factor regression analysis of performance. The passive ETFs do not produce any above-market return but they are not supposed to anyway. Going further, the active ETFs receive inferior performance ratings to those of passive ETFs. Finally, the active ETF managers are found to be lacking in any material market timing skills.

Keywords:

Active ETFs, Passive ETFs, Performance, Selection Skills, Market Timing.

JEL classification:

G12, G15

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Gestión Activa frente a **Gestión pasiva de Fondos cotizados**

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Resumen

Este artículo utiliza la metodología estándar sobre rendimientos de fondos de inversión y aborda el debate gestión "activa" vs. gestión "pasiva" utilizando datos del mercado americano de fondos de inversión cotizados (ETF). Los resultados obtenidos muestran que los fondos gestionados activamente superan a sus homónimos gestionados pasivamente, si bien exhiben una mayor volatilidad. Además, los ETF activos no tienen un alfa significativo, como se demuestra tanto por análisis de regresión unifactorial del rendimiento como por el análisis multifactorial del mismo. Los ETF pasivos no producen ningún rendimiento por encima del mercado, pero en cualquier caso no se espera que lo hagan. Yendo más lejos, los ETF activos reciben inferiores puntuaciones, en cuanto a rendimiento, que los ETF pasivos. Por último, los gestores de ETF activos parecen carecer de capacidad en lo que al "market timing" (asignación dinámica de capital entre una amplia clase de inversiones) se refiere.

Palabras clave:

ETF activos, ETF pasivos, Rendimiento, Capacidad de selección, Asignación dinámica de inversiones.

1. Introduction

The debate of whether portfolio managers can beat the market and gain above average returns is very intense in the academic literature. In this respect, the records of the literature are voluminous and separated to these studies which find that the active management does add value for investors [e.g. Ippolito (1989)] and other studies which support exactly the opposite, that is the managers fail to produce any above-normal returns [e.g. Blake, Elton and Gruber (1993), Malkiel (1995) and Gruber (1996)]. The latter studies show that actually the actively managed portfolios underperform the market after adjusting returns for expenses incurred by the active management.

In this paper, we address the issue of active versus passive management using data from the sector of American Exchange Traded Funds (ETFs). Active and passive ETFs have significant structural differences. The very basic difference between them is that the passive ETFs are structured to track a specific market index while the active ETFs aim at beating the market. Active ETFs are usually assigned a benchmark index of reference but they are designed to track an investment manager's top picks, mirror any existing mutual fund or pursue a particular investment objective and target to offer investors above-average returns. Other differences between the passive and active ETFs concern the number of market makers required by each type of ETFs (at least two and one market maker for passive and active ETFs respectively), the minimum size of investment (not required by passive ETFs but required by active ETFs) and the relationship between the market maker and the ETF manager. More specifically, these investing participants are not related to each other for passive ETFs while the market maker and the manager of an active ETF belong to the same company.

It should be noted that contrary to what has happened in the case of traditional open-ended mutual funds, the records of financial literature on active ETFs is rather poor. This lack in the literature is mainly attributed to the significant time delay between the introduction of passive ETFs (the first passively managed was launched in the U.S. market at the beginning of 1993) and the active ones (the first four actively managed ETFs available on the U.S. market were created in the spring of 2008 but active ETFs were available on the XTRA market in Germany at the beginning of the new century).

Going further on explaining why the literature on active ETFs is not sound, a major factor is that the active ETFs have not faced yet the same spectacular growth and proliferation among investors as the passive ones. The main reason for this anemic development of active ETFs relate to the arbitrage opportunities offered by passive ETFs but not offered by the active ETFs. Arbitrage opportunities arise when a gap between the trading prices of ETFs and the value of underlying securities exists. The efficient arbitrage execution contributes to the sharp elimination of these gaps. Arbitrage is based on the in-kind creation/redemption process of passive ETFs and it is attainable because the holdings of the tracking market indexes are publicly known throughout the trading day. In contrast, the stocks held by the actively managed ETFs are usually not publishable information until the end of the trading day because these stocks are picked by active ETFs so that they can beat their benchmark of reference. Therefore, should the holdings of active ETFs be disclosed frequently enough so that arbitrage could take place, their capability of beating the market weakens. In such a case, investors would simply let the fund managers do all of the research waiting for the disclosure of their choices and they would then buy the selected securities avoiding to pay the management fees. Thus, the arbitrage and the in-kind creation/redemption are essentially non-events for active ETFs.

As far as the specific records of the literature on active ETFs are concerned, Rompotis (2011a) examines the performance of active ETFs versus the Standard and Poor's 500 Index finding that these funds fail to outperform the index. Moreover, Rompotis (2011b) reports that the active ETFs underperform their own benchmarks as well as their passively managed ETF peers, namely passive ETFs written on the same index. In the same spirit, Schizas (2011) shows that the active ETFs do not perform better than the passive ones while they are more volatile than them. Finally, in another context of research concerning the issue of "active vs. passive ETFs", Thirumalai (2004) and Rompotis (2010) find that the active ETFs have lower bid-ask spreads than the passive ones.

This paper comprises an expansion to the previous work of Rompotis in the field. In particular, the main differentiation from the work in Rompotis (2011a) is that the current study uses pairs of active and passive ETFs having the same benchmark whilst in the previous study the Active ETFs were evaluated versus the Standard and Poor's 500 Index. On the other hand, the current study differs from that of Rompotis (2011b) in the sense that it uses an extended sample of active and passive ETF pairs (eight versus three in the previous study) as well as more updated data. More specifically, the study period of the current paper spans from the inception of each active ETF up to 31 December 2011. The respective period under investigation in Rompotis (2001b) ended on 28 November 2008.

In this paper, various issues surrounding performance are investigated. The first step of our investigation concerns the risk-adjusted performance and the systematic risk of these investment products. In this respect, both single-factor and multi-factor regression analysis is performed. Going further, a rating of ETFs' performance follows. The ratings applied are the accumulated return of funds along with the well-known Sharpe and Treynor ratios. Finally, the market timing skills of active ETF managers are assessed. This issue is also examined for passive ETFs but their managers are not supposed to possess such skills anyway and any lack revealed will not be a surprise.

The results of our analysis show that the active ETFs underperform their passive peers. In addition, they are more risky investment vehicles than the passive ones, which is natural given their active nature. Furthermore, the active ETFs do not produce any significant positive risk-adjusted excess return as demonstrated by both single-factor and multi-factor regression performance analysis. The passive ETFs do not produce any above-market return as well, an element which is not surprising as they do not aim at beating their benchmarks but simply at replicating them. Going further, the return of active ETFs is basically awarded inferior ratings to those of passive ETFs, with the exception of average Treynor ratio, which is higher for active ETFs than the passive ones. Finally, the active ETF managers are found to be lacking in any material market timing skills.

The results of the current study are quite similar to those provided in the previous articles of Rompotis published in 2011. However, given the differentiations from the previous articles described above, the main contribution of the this article is that it further boosts the already known patterns in trading with actively managed ETFs via employing an extended sample of ETFs as well as using more updated price data. Moreover, another significant contribution of the article rests with the consistency in results among the three studies of Rompotis. Consistency means that examining different samples of active ETFs over different time periods consistently reveals that the active ETFs underperform the passive ETFs or the market index. This consistent failure of active ETFs in achieving what they are supposed to (to beat the market or the passive peers) should trouble their managers and possibly induce them to reconsider or adjust their strategies. In addition, the failure highlights the risks entailed by trading with active ETFs and therefore investors should probably reconsider their investment strategies too.

The remainder of this paper is structured as follows. Section 2 develops the methodology used in our empirical investigation of active versus passive ETFs. Section 3 describes the data used in this study and provides the descriptive statistics of the sample's returns. The empirical findings of our research are presented in Section 4 and the conclusions are discussed in Section 5.

2. Methodology

2.1 Risk-Adjusted Performance

To analyze the managerial skill to achieve superior returns by picking stocks that could outperform the index we first use the risk-adjusted return derived from the Jensen's model:

$$R_{p,i} - R_f = \alpha_{p,i} + \beta_{p,i}\,(R_m - R_f) + \varepsilon_{p,i} \qquad (1)$$

where, $R_{p,i}$ denotes the daily portfolio's return for the sample's active or passive ETF i. R_m represents the return of the market portfolio and R_f is the daily risk-free rate, expressed by the daily risk-free return found on French's website. As stated on the French's website, in the definition of the $R_m–R_f$ term, which stands for the excess return of the market, R_m is the value-weight return on all NYSE, AMEX, and NASDAQ stocks (from CRSP) and R_f the one-month Treasury bill rate (from Ibbotson Associates). It should be noted that the usage of the French's risk-free rate is common in the relevant mutual funds literature. The coefficient $\alpha_{p,i}$ (Jensen's alpha) is used to determine the excess return of the ETF i and measures the stock selection ability of the managers. If the market is efficient and the portfolio of ETF i is properly priced, the expected alpha should not be different than zero. Positive and significant alphas indicate that the manager adds value while negative and significant alphas indicate that the managers fail to well diversify the portfolio they manage or that they pick stocks that are overpriced. However, we should note that this analysis basically applies to the active ETFs because the flexibility for passive ETF managers to choose stocks or other securities that are different to these that compose the tracking index is very limited.

The coefficient β_i measures the part of the ETF's i statistical variance that cannot be mitigated by the diversification provided by the ETF portfolio, because it is correlated with the return of the other stocks included in portfolio. Beta stands for the systematic risk of ETF i and evaluates the degree of its sensitivity to the movements of the benchmark. ε_i represents the residuals of regression equation (1).

The second model we apply is the Fama and French three-factor model described in equation (2):

$$R_{p,i}–R_f=\alpha_{p,i} + \beta_{p,i}\,(R_m–R_f)+ s_{p,i}\,(SMB)+ h_{p,i}\,(HML)+ \varepsilon_{p,i} \qquad (2)$$

where: $R_{p,i}$, R_m , R_f and $\varepsilon_{p,i}$ are defined as above. SMB stands for "small (market capitalization) minus big" and HML for "high (book-to-price ratio) minus low"; they measure the historic excess returns of small caps over big caps and of value stocks over growth stocks. $s_{p,i}$ is the coefficient loading for the average excess return of portfolios with small equity class over portfolios of big equity class and $h_{p,i}$ is the coefficient loading for the average excess returns of portfolios with high book-to-market equity class over those with low book-to-market equity class. Intuitively, one would expect a portfolio of big stocks to have a negative $s_{p,i}$ coefficient, a portfolio of value stocks to have a positive $h_{p,i}$ coefficient, etc. Both the *SMB* and *HML* variables are found on the website of Kenneth French.

In the Fama-French three-factor model, the size effect implies that firms with small market capitalization exhibit returns that, on average, are significantly superior to those of large firms. Hypothetical explanations for the size effect have suggested that the small firms stocks are more illiquid and trading in them generates greater transaction costs; there is also less information available on small firms and therefore the cost of monitoring a portfolio of small stocks will generally be greater than that of a portfolio of large firms, and also, given that small shares trade less frequently, their betas might be less reliable. The book-to-market equity effect shows that average returns are greater for stocks having higher book value to market-value ratio than their competitors and vice versa. The high book value firms are underpriced by the market and, therefore, there are good buy and hold targets, as their price will rise later. This anomaly undermines the semi-strong form efficiency of the market. These two variables explain average return differences across portfolios that cannot be accounted for by beta.

2.2 Rating Performance

In this section, we rate the performance of ETFs. The first method we use is the accumulated return of each ETF over the examined period. The second rating method concerns the Sharpe ratio, which is estimated via the following equation (3):

$$S_{p,i} = \frac{\bar{R}_{p,i} - \bar{R}_f}{\sigma_{p,i}} \tag{3}$$

where, $\bar{R}_{p,i}$ denotes the average daily portfolio's return for the ETF i and $\bar{R}_f$ is the average daily risk-free rate. $\sigma_{p,i}$ is the standard deviation of ETF's i return used as a proxy for the ETF's risk. The Sharpe ratio is estimated by the division of ETF's i excess return to its risk and is used to determine how well the return of the ETF i compensates the investor for the per unit risk they take. The higher the Sharpe ratio is, the better is the performance of ETF.

Additionally to Sharpe ratio, we estimate the Treynor ratio which is expressed by the next formula (4):

$$T_{p,i} = \frac{\bar{R}_{p,i} - \bar{R}_f}{\beta_{p,i}} \tag{4}$$

where, $\bar{R}_{p,i}$ and $\bar{R}_f$ are defined as above and $\beta_{p,i}$ is the systematic risk of ETF i. Again, the higher the Treynor ratio is, the better is the performance of ETF.

2.3 Testing Market Timing Ability

In general, the market timing ability of fund managers implies the efficient increase or decrease in the portfolio's exposure on equities prior to market accessions or decreases, respectively. However, the manager's market timing ability is affected by the investing objective of the fund, which possibly obliges the manager to keep the same maximum or minimum portion of equities in their portfolio. In this case, the manager tries to time the market just by adjusting the equity synthesis of the portfolio, substituting the overpriced stocks by undervalued stocks. The successful market timing is also affected by the usage or not of leverage and derivative products.

To test the market timing ability of ETF managers we use the model developed by Treynor and Mazuy (1966) and described in Bollen and Busse (2001) and (2004). The model is expressed by the following equation (5):

$$R_{p,i}-R_f = \alpha_{p,i} + \beta_{p,i}\,(R_m-R_f) + \gamma_{p,i}\,(R_m-R_f)^2 + \varepsilon_{p,i} \qquad (5)$$

where, $R_{p,i}$, R_m and R_f are defined as above and $\gamma_{p,i}$ measures timing ability. If the manager increases (decreases) efficiently the portfolio's exposure to market index prior to market accessions (recessions), $\gamma_{p,i}$ will be positive resulted from a convex function of portfolio's return with respect to market return. We note that we apply model (5) to passive ETFs too but we do not expect the passive ETF managers to present any meaningful timing skills as they are not supposed to. They just need to follow the tracking index and adjust their portfolios whenever the synthesis of the benchmark changes without delays.

Bollen and Busse (2001) suggest that the daily tests on market timing are more powerful than monthly tests and that mutual funds exhibit more significant timing efficiency in daily tests than in monthly tests. In our paper, we evaluate the market timing skills of ETF managers using daily data expecting significant estimations for γ coefficients for active ETFs and insignificant γ estimates for passive ETFs.

3. Data and Descriptive Statistics

The sample of our study consists of nine pairs of active and passive ETFs that have the same benchmark. Table 1 describes the profiles of our sample's ETFs, which are the symbols of ETFs, their names, benchmark, type, the first trading day considered for each pair, the published expense ratio, and the average trading volume and frequency. As shown in the table, the ETFs used concern funds that are written on well-known market indexes of the U.S stock market along with those that are referred to the MSCI EAFE Index. In addition, some of the ETFs used are among the most tradable securities in the U.S. market (e.g. the SPDRS 500 and the PowerShares QQQ).

Table 1 reports an average expense ratio for active ETFs of 0.86%. The corresponding ratio for passive ETFs is significantly lower and equal to 0.16%. This difference is reasonable given the nature of these alternative investment vehicles; that is the active management adopted by the first ETF group is expected to incur more expenses for research and analysis than the passive ETFs.

Furthermore, Table 1 exhibits a chaotic difference in the trading activity between the active and passive ETFs. In particular, the average volume of active ETFs just exceeds the 2,500 shares per day. On the other hand, the average volume of passive ETFs well exceeds the 66 million shares per day. This phenomenon is attributed to various factors which first relate to the length of trading history of these ETF groups. In particular, the active ETFs are very young compared to the passive ETFs as their life span does not exceed four years. On the other hand, the first passive ETF ever launched (the SPDRS 500) is about 20 year-old. Moreover, the difference in costs is also a significant element that can explain the difference in investment interest between active and passive ETFs. Finally, maybe the most important factor is the fact that the active ETFs have failed so far to deliver material above-market returns (as it has been demonstrated in the existing literature and will be confirmed by the current study). The difference in trading activity between the two products is also verified by the records of trading frequency (days with non-zero volume divided by the total number trading days of the index of reference). The average frequency of active ETFs is approximately equal to 67%. The corresponding figure for passive ETFs is 98%.

Going further with the discussion of our sample's features, Table 2 provides the descriptive statistics of returns for the active and passive ETFs examined. The descriptive statistics reported are the average and median returns, the standard deviation of returns which stands for the risk relating to the investment in the particular funds, the extreme scores (min and max), along with the coefficients for skewness and kurtosis.

The average return of active ETFs is equal to 0.015%. The respective return of passive ETFs is 0.033%. The difference in average returns is significant at the 10% level. Therefore, we infer that the active ETFs underperform the passive ones. Median returns lead to the same inference. When it comes to risk, the results show that the active ETFs are more hazardous than the passive ones. This finding was to be expected but is not justified by the performance of active ETFs. In other words, the active ETF investors run higher risk than the passive ones without being compensated via higher returns. The greater volatility involved in investing in active ETFs is also confirmed by the range of extreme return records (21.82% for active ETFs and 15.16% for the passive ones). Finally, it does not seem to exist any skewness issue in the return's distributions of the sample's ETFs while returns are leptokurtic for both ETF groups with the return of active ETFs being more leptokurtic than those of passive ETFs.

Table 1. Profiles of ETFs

This table presents the profiles of active and passive ETFs, which are their trade symbol, names, benchmark of reference, type, expense ratio, average trading volume and the average trading frequency during the time period examined for each single pair of ETFs. The first trading day used for each pair of ETFs is also reported.

Symbol		Name		Benchmark	Type	1st Trading Day Considered	Expense Ratio %		Volume (Nº of shares)		Trading Frequency %	
Active	Passive	Active	Passive				Active	Passive	Active	Passive	Active	Passive
AADR	EFA	WCM/BNY Mellon Focused Growth ADR	MSCI EAFE Index Fund	MSCI EAFE Index	Equity	21/7/2010	1.25	0.34	3,899.46	21,095,087.65	85.25	100.00
GVT	IWB	Concentrated Large Cap Value Strategy Fund	Russell 1000 Index Fund	Russell 1000 Index	Equity	4/5/2009	0.79	0.15	1,835.35	1,694,690.35	48.51	100.00
PMA	IWL	Active Mega Cap Fund	Russell Top 200 Index Fund	Russell Top 200 Index	Equity	25/9/2009	0.75	0.15	1,520.37	16,486.73	72.68	83.71
PQY	QQQ	Active AlphaQ Fund	PowerShares QQQ Trust Series 1	NASDAQ-100 Index	Equity	30/4/2008	0.75	0.20	5,968.90	109,288,627.06	84.45	100.00
PQZ	IVV	Active Multi-Cap Fund	S&P 500 Index Fund	S&P 500 Index	Equity	30/4/2008	0.75	0.09	3,325.38	4,531,745.09	79.70	100.00
PQZ	SPY	Active Multi-Cap Fund	SPDR S&P 500	S&P 500 Index	Equity	30/4/2008	0.75	0.09	3,325.38	243,851,404.43	79.70	100.00
RPX	IVV	Growth Equity Strategy Fund	S&P 500 Index Fund	S&P 500 Index	Equity	2/10/2009	0.89	0.09	906.21	3,785,790.92	40.99	100.00
RPX	SPY	Growth Equity Strategy Fund	SPDR S&P 500	S&P 500 Index	Equity	2/10/2009	0.89	0.09	906.21	208,210,230.90	40.99	100.00
RWG	IWF	Large-Cap Growth Equity Strategy Fund	Russell 1000 Growth Index Fund	Russell 1000 Growth Index	Equity	2/10/2009	0.89	0.20	2,081.87	2,952,445.34	73.14	100.00
Average							**0.86**	**0.16**	**2,641.01**	**66,158,500.94**	**67.27**	**98.19**
Min							**0.75**	**0.09**	**906.21**	**16,486.73**	**40.99**	**83.71**
Max							**1.25**	**0.34**	**5,968.90**	**243,851,404.43**	**85.25**	**100.00**
t-test							4.506[A]		-2.114[C]		-3.424[A]	

[A] Significant at the 1% level. [C] Significant at the 10% level.

Table 2. Descriptive Statistics

This table presents the descriptive statistics of actively and passively managed ETFs for the period under examination for each single ETF. The descriptive statistics presented are the average daily return, the median return, the standard deviation of returns (risk), the extreme scores (minimum and maximum returns), and the Skewness and Kurtosis coefficients. T-test assesses whether the differences in descriptive statistics of active and passive ETFs are statistically significant. N is the number of available trading observations for each ETF pair.

Symbol		Average Return		Median Return		Risk		Minimum		Maximum		Skewness		Kurtosis		N
Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	
AADR	EFA	0.046	0.016	0.000	0.097	1.427	1.722	-7.869	-7.470	5.398	6.736	-0.518	-0.411	5.557	2.673	366
GVT	IWB	0.018	0.058	0.000	0.102	1.491	1.275	-10.467	-6.713	11.704	4.564	-0.242	-0.363	19.037	2.399	672
PMA	IWL	0.047	0.037	0.000	0.000	1.347	1.179	-6.095	-6.461	7.868	4.927	0.124	-0.429	5.542	3.716	571
PQY	QQQ	0.012	0.034	0.000	0.103	1.777	1.787	-10.412	-8.956	13.571	12.165	0.094	0.173	10.401	5.806	926
PQZ	IVV	-0.040	0.006	0.000	0.089	2.191	1.785	-12.375	-9.165	13.919	11.099	-0.648	-0.011	8.416	5.660	926
PQZ	SPY	-0.040	0.006	0.000	0.075	2.191	1.836	-12.375	-9.845	13.919	14.520	-0.648	0.272	8.416	8.791	926
RPX	IVV	0.037	0.044	0.000	0.101	1.851	1.270	-9.226	-6.477	17.598	5.150	2.155	-0.359	26.526	3.083	566
RPX	SPY	0.037	0.044	0.000	0.080	1.851	1.268	-9.226	-6.512	17.598	4.650	2.155	-0.361	26.526	2.800	566
RWG	IWF	0.019	0.051	0.000	0.113	1.453	1.246	-7.864	-6.298	8.888	4.744	-0.368	-0.355	7.480	2.892	566
Average		**0.015**	**0.033**	**0.000**	**0.084**	**1.731**	**1.485**	**-9.545**	**-7.544**	**12.274**	**7.617**	**0.234**	**-0.205**	**13.100**	**4.202**	**676**
Min		**-0.040**	**0.006**	**0.000**	**0.000**	**1.347**	**1.179**	**-12.375**	**-9.845**	**5.398**	**4.564**	**-0.648**	**-0.429**	**5.542**	**2.399**	**366**
Max		**0.047**	**0.058**	**0.000**	**0.113**	**2.191**	**1.836**	**-6.095**	**-6.298**	**17.598**	**14.520**	**2.155**	**0.272**	**26.526**	**8.791**	**926**
t-test		**-2.020[C]**		**-7.487[A]**		**2.630[A]**		**-4.453[A]**		**2.686[B]**		**1.052**		**2.779[A]**		

[A] Significant at the 1% level. [B] Significant at the 5% level. [C] Significant at the 10% level.

4. Empirical Results

4.1 Regression Results in Explaining Risk-Adjusted Performance

The regression results for the risk-adjusted performance assessed via the single-factor regression model (1) are presented in Table 3. Included in the table are the value of Jensen's alpha, which stands for the excess return which is delivered by ETFs, the beta coefficient of each ETF, the t-statistics on the statistical significance of estimates, the R-squares and the number of observations.

According to the results, both the active and passive ETFs do not deliver any significant excess return. The average alpha estimates for both groups are not statistically different than zero. This is also the case for the alphas obtained for each single ETF pair. Overall, the results indicate that the ETFs follow the market return failing to produce any significant abnormal returns. These findings are reasonable and expectable for passive ETFs, which do not aim at beating the market, but they cause trouble for active ETF managers who fail to justify the higher costs they charge investors by providing them with superior returns.

Interpreting results as an indicator of market's efficiency, we perceive that the U.S. ETF market is efficient enough offering managers low or no chances of gaining irregular returns. Considering the results as an indicator of the selection skills of the active ETF managers, the negative alpha estimates show that these managers either fail to properly diversify the portfolios they manage or fail to add value for investors by detecting and picking stocks that are undervalued. However, we should point out that the study covers a period that is characterized by the dramatic financial distress, market crisis and prices volatility. These features should make us be very sceptic when judging about the skills of the active ETF managers.

Considering systematic risk, the average beta of active ETFs is equal to 0.57 and the respective estimate for passive ETFs is equal to 0.94. The difference in betas is significant at the 1% level. Scanning through the individual betas, we do not see a case where the beta of active ETFs exceeds that of passive ETFs. Therefore, we may conclude that for the specific period under examination, the active ETFs are more conservative than the passive ones, an inference that is somehow strange given the active nature of these ETFs. The conservatism of active ETFs can possibly explain their failure to gain above-market returns. However, as noted above, the conservatism may relate to the volatility in financial markets and the economic distress in the United States and worldwide and to the effort of managers to tackle the negative effects of the financial crisis and protect their investors.

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Table 3. Single-Factor Model Regression Results

This table presents the results of the Single-Factor Pricing Model. The ETFs' daily excess return (return minus risk free rate) is regressed on the excess return of the benchmark. Alpha coefficient reflects the excess return that can be achieved by an ETF beyond the market return. Beta counts for the systematic risk of ETFs. T-tests on alphas and betas asses the statistical significance of these coefficients. T-test^ assesses the significance of the differences in regression's estimates between active and passive ETFs. R-square assesses the explanatory power of the regression. N is the number of available trading observations for each ETF pair.

Symbol		alpha		t-test (☒#0)		beta		t-test (☒#0)		R-square		N
Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	
AADR	EFA	0.033	-0.002	0.970	-0.096	0.686[A]	0.967[A]	10.092	15.863	0.433	0.592	366
GVT	IWB	0.001	0.010	0.031	0.745	0.267[A]	0.783[A]	3.217	7.557	0.068	0.802	672
PMA	IWL	0.015	0.001	0.562	0.064	0.712[A]	0.789[A]	11.442	20.743	0.430	0.687	571
PQY	QQQ	-0.014	0.000	-0.599	-0.069	0.720[A]	0.954[A]	15.512	67.980	0.567	0.986	926
PQZ	IVV	-0.046	-0.001	-1.273	-0.195	0.842[A]	0.967[A]	14.914	114.888	0.499	0.991	926
PQZ	SPY	-0.046	0.000	-1.273	0.001	0.842[A]	0.989[A]	14.914	60.240	0.499	0.979	926
RPX	IVV	0.026	0.000	0.342	0.012	0.238[A]	0.989[A]	3.955	185.363	0.027	0.994	566
RPX	SPY	0.026	0.000	0.342	0.019	0.238[A]	0.988[A]	3.955	322.009	0.027	0.995	566
RWG	IWF	-0.015	-0.006[C]	-0.405	-1.673	0.590[A]	0.991[A]	8.210	330.241	0.259	0.995	566
Average		**-0.002**	**0.000**	**-0.145**	**-0.133**	**0.571**	**0.935**	**9.579**	**124.987**	**0.312**	**0.891**	**676**
Min		**-0.046**	**-0.006**	**-1.273**	**-1.673**	**0.238**	**0.783**	**3.217**	**7.557**	**0.027**	**0.592**	**366**
Max		**0.033**	**0.010**	**0.970**	**0.745**	**0.842**	**0.991**	**15.512**	**330.241**	**0.567**	**0.995**	**926**
t-test		**-0.221**	**0.158**			**6.734[A]**	**32.78[A]**			**4.250[A]**	**16.997[A]**	
t-test^		**-0.244**				**-4.236[A]**				**-5.987[A]**		

[A] Significant at the 1% level. [C] Significant at the 10% level.

Table 4. Multi-Factor Model Regression Results

This table presents the results of the Fama-French Three-Factor Pricing Model. The ETFs' daily excess return is regressed on the excess return of their benchmark, the Fama-French SMB variable, which stands for the "small (market capitalization) minus big" stocks index, and the Fama-French HML variable, which stands for the "high (book-to-price ratio) minus low" value stocks index. T-tests on coefficients assess their statistical significance. T-test^ assesses the significance of the differences in regression's estimates between active and passive ETFs. R-square assesses the explanatory power of the regression. N is the number of available trading observations for each ETF pair.

Symbol		alpha		t-test (☒#0)		beta		t-test (☒#0)		small-big		t-test (smb#0)		how-low		t-test (hml#0)		R-square		N
Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	
ADR	EFA	0.033	0.003	0.97	0.12	0.662^A	0.829^A	9.008	19.02	0.150	0.847^A	0.88	8.90	0.095	0.645^A	0.48	4.49	0.438	0.702	366
GVT	IWB	0.007	0.011	0.15	0.81	0.159^C	0.673^A	1.627	4.96	0.126	0.316^B	0.83	2.24	0.472^A	0.301^B	3.71	2.30	0.096	0.833	672
PMA	IWL	0.009	-0.005	0.36	-0.18	0.751^A	0.833^A	9.283	29.36	-0.006	-0.008	-0.05	-0.16	-0.194^B	-0.220^A	-2.01	-3.62	0.434	0.694	571
PQY	QQQ	-0.011	-0.001	-0.46	-0.38	0.717^A	0.954^A	11.000	63.82	-0.107	0.045	-0.87	1.16	0.047	-0.014	0.40	-1.33	0.570	0.986	926
PQZ	IVV	-0.043	-0.002	-1.20	-0.46	0.889^A	0.968^A	15.372	97.64	-0.142	0.036^C	-1.25	1.72	-0.168^C	-0.008	-1.79	-0.60	0.504	0.991	926
PQZ	SPY	-0.043	0.000	-1.20	0.02	0.889^A	1.010^A	15.372	42.99	-0.142	-0.021	-1.25	-0.75	-0.168^C	-0.078^C	-1.79	-1.72	0.504	0.980	926
RPX	IVV	0.026	0.000	0.44	-0.02	0.238^A	0.991^A	19.462	151.37	0.019	-0.002	0.07	-0.23	-0.025	-0.004	-0.16	-0.48	0.027	0.994	566
RPX	SPY	0.026	0.000	0.44	0.06	0.238^A	0.988^A	19.462	246.40	0.019	-0.006	0.07	-0.76	-0.025	0.006	-0.16	0.64	0.027	0.995	566
RWG	IWF	-0.013	-0.006	-0.35	-2.73	0.594^A	0.990^A	7.182	300.07	-0.065	0.001	-0.60	0.16	0.086	0.006	0.66	0.60	0.261	0.995	566
Average		**-0.001**	**0.000**	**-0.09**	**-0.31**	**0.571**	**0.915**	**11.974**	**106.18**	**-0.017**	**0.134**	**-0.24**	**1.36**	**0.013**	**0.070**	**-0.07**	**0.03**	**0.318**	**0.908**	**676**
Min		**-0.043**	**-0.006**	**-1.20**	**-2.73**	**0.159**	**0.673**	**1.627**	**4.96**	**-0.142**	**-0.021**	**-1.25**	**-0.76**	**-0.194**	**-0.220**	**-2.01**	**-3.62**	**0.027**	**0.694**	**366**
Max		**0.033**	**0.011**	**0.97**	**0.81**	**0.889**	**1.010**	**19.462**	**300.07**	**0.150**	**0.847**	**0.88**	**8.90**	**0.472**	**0.645**	**3.71**	**4.49**	**0.570**	**0.995**	**926**
t-test		**-0.105**	**0.000**			**5.978^A**	**24.22^A**			**-0.458**	**1.403**			**0.195**	**0.831**			**4.36^A**	**21.0^A**	
t-test^		**-0.108**				**-3.787^A**				**-2.041^C**				**-0.821**				**-6.481^A**		

^{A} Significant at the 1% level. ^{B} Significant at the 5% level. ^{C} Significant at the 10% level.

The results of the Fama and French three-factor model on the risk-adjusted return of active and passive ETFs are presented in Table 4. With respect to excess return and systematic risk, the results in Table 4 are in line with those obtained from the single-factor model. Again, there is no significant alphas for both active and passive ETFs and the average beta of active ETFs is significantly lower than the average beta of the passive peers. Going further, it does not seem to exist any material relationship between the performance of active and passive ETFs and the Fama and French factors relating to size and value factors. The average estimates for both the active and passive ETFs are not statistically different than zero. With respect to the individual estimates, there are just three significant and positive estimates of the size factor for passive ETFs, one significantly positive and three significantly negative estimates of the value factor for the active ETFs as well as similar estimates of the value factor for passive ETFs. Overall, we cannot confirm any systematic effect on the performance of active and passive ETFs exerted by the size and value of stocks.

4.2 Results in Rating Performance

In this section we present the rating of ETFs and indexes performance according to the total return for the period, the Sharpe ratio and the Treynor ratio. The results are presented in Table 5. The ratings confirm the underperformance of the active ETFs relative to the passive ETFs concluded by discussing the raw returns. Specifically, the average accumulated return of active ETFs is negative and equal to –2.36%. The average corresponding return of the passive counterparts is equal to 14.57% being statistically different than that of active ETFs at the 5% level. In regards of single returns, there are only two out of nine cases where the accumulated return of active ETFs exceeds that of passive ETFs (WCM/BNY Mellon Focused Growth ADR versus the MSCI EAFE Index Fund and Active Mega Cap Fund versus the Russell Top 200 Index Fund).

Moreover, the average Sharpe ratio of active and passive ETFs is equal to 0.011 and 0.024, respectively. The difference in average Sharpe ratios between the two ETF teams is significant at the 10% level. Again, the abovementioned active ETFs have better Sharpe ratios than their passive peers.

Finally, with respect to the Treynor ratios, the relevant average calculation of active ETFs is 0.050 and the average estimate of passive ETFs is lower and equal to 0.035. In addition, there are four single Treynor ratios of active ETFs that are higher than those of passive ETFs and five that are inferior to them. However, there is no statistical significance in the difference in Treynor ratios.

Table 5. **Performance Rating**

This table presents the ratings of ETFs' performance. The rating methods applied are the accumulated return over the examined period for each ETF pair, the Sharpe ratio and the Treynor Ratio. T-test assesses whether the ratings are statistically different than zero. T-test^ assesses whether the difference in performance rating between ETF and market index is statistically significant.

Symbol		Accumulated Return		Sharpe Ratio		Treynor Ratio	
Active	Passive	Active	Passive	Active	Passive	Active	Passive
AADR	EFA	13.806	0.405	0.032	0.009	0.066	0.016
GVT	IWB	4.535	39.325	0.012	0.045	0.065	0.073
PMA	IWL	24.222	18.650	0.035	0.031	0.066	0.046
PQY	QQQ	-3.087	18.259	0.006	0.018	0.015	0.034
PQZ	IVV	-45.045	-9.126	-0.019	0.002	-0.049	0.004
PQZ	SPY	-45.045	-9.229	-0.019	0.003	-0.049	0.005
RPX	IVV	12.179	22.470	0.020	0.034	0.154	0.044
RPX	SPY	12.179	22.451	0.020	0.034	0.154	0.044
RWG	IWF	5.040	27.911	0.013	0.041	0.032	0.051
Average		**-2.357**	**14.568**	**0.011**	**0.024**	**0.050**	**0.035**
Min		**-45.045**	**-9.229**	**-0.019**	**0.002**	**-0.049**	**0.004**
Max		**24.222**	**39.325**	**0.035**	**0.045**	**0.154**	**0.073**
t-test		**-0.279**	**2.592[B]**	**1.719**	**4.397[A]**	**2.052[C]**	**4.609[A]**
t-test^		**-2.814[B]**		**-2.272[C]**		**0.727**	

[A] Significant at the 1% level. [B] Significant at the 5% level. [C] Significant at the 10% level.

4.3 Regression Results in Testing Market Timing

This section discusses the estimations of the Treynor and Mazuy 1966 model (5) which evaluates the market timing skills of ETF managers. The regression results are presented in Table 6. Presented in the table are the values of alpha, beta and gamma coefficients, the values of the relevant t-statistics, the R-squares and the number of daily trading observations available for each pair of active and passive ETFs. The gamma coefficient assesses the market timing skills of the managers. Positive and significant gamma estimates indicate that the managers efficiently time the market. Negative or insignificant gamma estimations imply that the ETF managers are lacking in sufficient market timing skills. However, we stress that the model basically applies to active ETFs since passively managed ETFs are not supposed to time the market.

According to the results, the active ETF managers do not possess any significant market timing skills. The average gamma obtained is negative and significant at the 10% level. In addition, there are four single gammas that are negative and significant at the 5% or better. On the other hand, the average gamma of passive ETFs is practically indifferent to zero.

Focusing on the active ETFs, the results of the applied model demonstrate that their managers failed to predict the depth of the unexpected financial crisis and adjust accordingly their investing decisions and the structure of their portfolios. Overall, our results are consistent with the previous findings of Treynor and Mazuy (1966), Henriksson and Merton (1981), Chang and Lewellen (1984), Henriksson (1984), Graham and Harvey (1996) on the time abilities of active mutual fund managers. All of these studies report limited on non-existent market timing ability for mutual fund managers. The common feature of these studies is that the returns are considered on a monthly or an annually basis while, in our study, returns are considered daily. Therefore, our findings are more comparable to the results of Bollen and Busse (2001 and 2004). These authors apply daily tests on the market timing efficiency of mutual funds revealing that the managers possess material market timing skills. However, this inference does not apply to active ETF managers, at least according to our results.

Table 6. Market Timing Regression Results

This table presents the results of the Treynor and Mazuy (1966) Model, which evaluates the timing ability of ETF managers. The ETFs' daily excess return is regressed on the excess return of the benchmark and the square return of the benchmark. The timing ability implies that the managers of ETFs efficiently respond to the movements of the stock market and revise the portfolios they manage. However, this is not case for passive ETFs and the relevant coefficients are expected to be insignificant. The timing ability is evaluated via the regression's gamma estimate. T-tests on coefficients assess their statistical significance. T-test^ assesses the significance of the differences in regression's estimates between active and passive ETFs. R-square assesses the explanatory power of the regression. N is the number of available trading observations for each ETF pair.

Symbol		Alpha		t-test (⊠#0)		beta		t-test (⊠#0)		gamma		t-test (⊠#0)		R-square		N
Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	Active	Passive	
AADR	EFA	0.073	-0.028	1.335	-0.602	0.677^{A}	0.973^{A}	10.319	16.797	-0.022	0.014	-0.740	0.635	0.436	0.593	366
GVT	IWB	-0.082	-0.002	-0.650	-0.293	0.208^{A}	0.967^{A}	2.415	176.785	0.026	0.002	0.405	0.759	0.035	0.989	672
PMA	IWL	0.077^{B}	0.048	2.397	1.318	0.799^{A}	0.841^{A}	12.478	32.970	-0.033^{A}	-0.027^{A}	-2.973	-2.991	0.541	0.756	571
PQY	QQQ	0.072^{C}	-0.003	1.658	-0.550	0.687^{A}	0.992^{A}	10.317	304.136	-0.046^{B}	0.001	-2.071	1.152	0.582	0.996	926
PQZ	IVV	0.198^{B}	-0.001	2.398	-0.275	0.524^{A}	0.989^{A}	7.860	135.922	-0.132^{A}	0.000	-3.297	0.354	0.321	0.994	926
PQZ	SPY	0.198^{B}	-0.002	2.398	-0.331	0.524^{A}	0.986^{A}	7.860	256.431	-0.132^{A}	0.001	-3.297	0.602	0.321	0.995	926
RPX	IVV	-0.003	-0.001	-0.024	-0.275	0.284A	0.989^{A}	3.350	135.922	0.016	0.000	0.510	0.354	0.030	0.994	566
RPX	SPY	-0.003	-0.002	-0.024	-0.331	0.284A	0.986^{A}	3.350	256.431	0.016	0.001	0.510	0.602	0.030	0.995	566
RWG	IWF	0.036	-0.010^{B}	0.443	-2.276	0.623A	0.991^{A}	6.877	336.559	-0.033	0.002^{C}	-0.981	1.824	0.260	0.997	566
Average		**0.063**	**0.000**	**1.103**	**-0.401**	**0.512**	**0.968**	**7.203**		**-0.038**	**-0.001**	**-1.326**	**0.366**	**0.284**	**0.923**	676
Min		**-0.082**	**-0.028**	**-0.650**	**-2.276**	**0.208**	**0.841**	**2.415**	**16.797**	**-0.132**	**-0.027**	**-3.297**	**-2.991**	**0.030**	**0.593**	366
Max		**0.198**	**0.048**	**2.398**	**1.318**	**0.799**	**0.992**	**12.478**		**0.026**	**0.014**	**0.510**	**1.824**	**0.582**	**0.997**	926
t-test						7.355^{A}					-0.185				18.87^{A}	
t-test^		2.034^{C}				-5.829^{A}				-1.864^{C}				-6.118^{A}		

^{A} Significant at the 1% level. ^{B} Significant at the 5% level. ^{C} Significant at the 10% level.

5. Conclusions

The ability of mutual fund managers to beat the market by applying efficient selection and market timing strategies has been thoroughly examined by the literature. The findings on this issue are ambiguous, which means that there are studies that report material outperformance of actively managed mutual funds with respect to the market returns but there are also studies that demonstrate that the active mutual funds basically underperform the market indexes and the passively managed index funds. In this paper, we expand the research on the "active vs. passive" management debate by providing new evidence from U.S. listed actively and passively managed ETFs.

The results of our study are summarized as follows: with respect to raw return, the active ETFs present lower returns than the passive ETFs. At the same time, the active ETFs are found to be more risky than the passive counterparts. Considering risk-adjusted performance, we find no evidence of active ETF managers achieving material excess returns with respect to the average market returns and risk-adjusted performance of the passively managed ETFs, which, in any case are not supposed to deliver any excess return. The underperformance of active ETFs is also depicted to the lower ratings (total return and Sharpe ratios) they receive relative to the passive ETFs. In addition, we find no systematic relationship between the performance of active and passive ETFs and factors relating to size and value of stocks listed in the U.S. market. The findings about risk-adjusted performance may suggest that the U.S. ETF market is efficient enough providing managers with no significant opportunities of gaining abnormal returns. On the other hand, the results can be interpreted as an indicator for the managers' lacking in selection skills. This indicator implies that the active ETF managers fail to detect and select the stocks that are undervalued. However, we should bear in mind that the unprecedented crisis in stock markets worldwide impoverishes the investing choices on the managers.

Considering the market timing abilities of ETF managers, the results indicate that managers are not able to time the market efficiently. In regression analysis, we find that market timing coefficients (γ estimates) are negative. While passive ETF managers simply follow the market without trying to time it, the active ETFs need to time the market efficient so as to help the portfolios they manage to outperform the market return. Therefore, our findings indicate that the active ETFs fail to do what they are supposed to. Moreover, the lack of market timing skills may contribute to the failure of active ETFs to achieve significant abnormal returns. Overall, our empirical results about the performance of the active and passive ETFs are in line with the previous findings of the literature on the performance of active mutual funds. The lack of significant risk-adjusted performance for active ETFs due to inadequate selection and market timing skills support the existing literature on mutual fund performance and managerial behavior with a new set of data having different operating characteristics.

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