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The performance of Mutual Funds vs. ETFs on the FTSE MIB over the period 2005-2015

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Abstract

Processing through econometric regression methodologies data related to the Italian market over the 2005-2015 period and elaborating two representative balanced (through specific criteria) portfolios, this paper finds that actively managed funds (Mutual Funds) outperform passively managed funds (ETFs) in terms of gross returns, whereas just the opposite is obtained when net of fees returns are considered. While perhaps supporting the "near market efficiency" hypothesis, this result would imply persistence on the Italian financial market of active management fees exceeding the correspondent net return premium for actively managed funds. Controlling for risk confirms this counter-intuitive conclusion, showing that only a portion of the fee-to-premium gap of Mutual Funds against ETFs is compensated by a lower volatility from the perspective of an averse-to-risk investor.

Introduction

The great and long economic growth of the 90's brought a remarkable increase of securities values, conveying to savers a misleading message of easy and persistently good and, sometimes, outstanding returns. The dramatic reversal of the financial and macroeconomic scenarios in the last eight years has made everybody aware that creating value requires a clear understanding of financial markets and their functioning mechanisms.

In the last decades, investment possibilities have increased dramatically while choosing how to allocate one's savings has become more difficult. An unexperienced investor can choose between two main types of financial intermediaries to channel his/her investments: 1) *actively managed* funds; or 2) *passively managed* funds. For the purpose of this paper, I will focus the analysis on Mutual Funds (actively managed) and Exchange-Traded Funds (passively managed) in equity markets, in that they are two key investment instruments in an open-ended landscape of opportunities.

The paper will investigate on whether, in the Italian market and in the considered period (2005-2015), actively managed funds (Mutual Funds) outperform passively managed funds (ETFs), in terms of gross returns and net of fees returns.

The main idea behind active management is that skilled managers, having access to superior information and to a wide range of resources (power of diversification), can turn their talent into higher returns for the unbeknownst investor, finding profitable opportunities in the financial markets which must of course be assumed as not perfect (arbitrage strategies are possible). This should actually be the primary driver for investing in mutual funds. Passive management, on the contrary, does not entail any substantial form of management: the expected returns depend entirely on the market performance. Furthermore, management policy is characterized by a *benchmark* (strategic asset allocation) that is the asset class target composition of the fund[1], a reference which is not necessarily respected at any specific point in time. On the contrary, depending on the market contingency, the fund will usually shape its *tactical asset allocation* to maximize returns. This way, it may do better or worse than the benchmark and the results achieved will be a measure of its performance over time. In my empirical analysis, the benchmark for assessing mutual funds' results is the ETFs' performance.

When comparing the two forms of financial investment, the most common conclusion drawn from academic debates is that, in reality and practice, ETFs do not outperform mutual funds but there is a clear cost advantage of the *passively managed* funds over the *actively managed* ones.

[1] For example, a fund benchmark could be: 85% of stocks and 15% of Government's securities.

However, there are mixed opinions on the matter, which are presented in *Chapter I*. Investigating, with reference to the Italian financial market, whether this assertion holds or not and at what conditions it does or not is within the scope of the analysis that follows.

A number of specifications are required to make such comparison relevant and useful, since gross returns of investments –which are not those expected but those calculated ex-post– may not be sufficient to evaluate performances of different financial instruments. Variability of fund values across the holding period is associated with risk and may well be taken, at least by individual investors, as an essential component of performance together with actual average net money returns. For the purpose of this empirical analysis, I will consider a *risk-averse investor*, who seeks to minimize the variance of the returns (risk).

The first step is to build two mean-variance portfolios, one made of Mutual Funds and the other of ETFs. This is done by means of the *Markovitz Portfolio theory* and for each year, from 2005 to 2015, both in terms of gross and net returns. The portfolios will become a powerful tool to conduct the following analysis for two fundamental purposes: 1) it will be possible to compare, in a realistic way, the performances in terms of total/net returns and standard deviations of Mutual Funds and ETFs over the 10-year period and 2) finding the optimal weights assigned to each fund in the portfolio will enable me to further the analysis back in terms of optimal monthly performances. Based on the optimal monthly returns, I will run two regressions. The first will establish the degree of correlation of the returns of the two portfolios, in terms first of gross returns and then of net returns. The second regression follows the same logic, but this time I consider the Sharpe Ratios as variables. This is the regression to which I will pay the most attention, in that Sharpe Ratios provide a measure adjusted for risk for the excess returns of the portfolios with respect to a benchmark and therefore, they are the main tool I will use to establish whether ETFs outperform Mutual Funds in terms of net returns. I will further the analysis of the Sharpe Ratios in three ways: 1) analysis of the residuals, 2) plotting and interpretation of Probability Density Functions of the portfolio data distributions and 3) conduct of the Shapiro-Wilk test. The analysis of the residuals aims at investigating whether the linear model used fits well the data and at seeing if there is correlation between the error term and the independent variable. By means of the Probability Density Functions I will take a look at the probabilities of Mutual Funds and ETFs to generate above-the-mean returns. Lastly, the Shapiro-Wilk test will provide evidence on whether the data that represent the sample are normally distributed. This test is complemented with a Quantile-Quantile plot. This empirical methodology will be illustrated in detail in Chapter II.

In Chapter II, I will also proceed with the selection of Mutual Funds and ETFs from the sample considered and create balanced representative portfolios of the two categories of funds, while

Chapter III presents and discusses the whole econometric analysis conducted on these portfolios and the results obtained. A summary of the research and some conclusions close the paper.

Chapter I – Some theory, definitions and relevant literature

An important classification of funds is that made according to whether their management is *active* or *passive*. Passively managed funds are based on the assumption that markets are efficient (in a Pareto's perspective) and that therefore, at least in the long-run[2], their performances should be the top ones. Consequently, the best asset allocation for this category of funds is the one which reflects the whole market composition. To keep maintaining such composition is the main mission of passive fund managers.

Exchange Traded Funds (ETFs) are specific passively managed funds which replicate the benchmark index of the stock market they refer to. "ETFs offer investors a way to pool their money in a fund that makes investments in stocks, bonds, or other assets and, in return, to receive an interest in that investment pool" (SEC, 2012). ETFs shares are negotiated in stock exchange markets as regular stocks and charge very low entry commissions, in comparison with actively managed funds, which require both entry and management fees.

As opposed to ETFs, actively management of funds relies on the assumption that markets are not efficient[3] and not all relevant information is reflected in market quotations. As a consequence, fund active managers can outperform the market and realize extra profits by setting an appropriate allocation of assets different from that of the benchmark, that is, they can implement *arbitrage strategies*[4]. Assuming that different markets can be differentiated according to efficiency, the less efficient is the market, the wider is the room available for arbitrage, the better actively managed funds should perform as compared to passively managed ones (Stiglitz and Grossman, 1980).

Studies on performances over the past 10 years of actively managed mutual funds show mixed results. In most cases, they do not succeed in outperforming the market in the medium and long period, even though sometimes they do. No need to say that occasionally mutual funds performances are much worse than the reference market index[5].

[2] In real world, perfect markets reach equilibrium and do it in a relatively short time. Therefore, though arbitrage does take place in perfect markets, arbitrage opportunities are limited in duration and entity.
[3] They do not adjust rapidly. Therefore, arbitrage opportunities are persistent and significant.
[4] The simultaneous purchase and sale of an asset in order to profit from a difference in price. It is a trade that makes profits by exploiting price differences of identical or similar financial instruments on different markets, forms or times. Arbitrage exists as a result of market inefficiencies; it provides a mechanism to ensure prices not to deviate substantially from fair value for long periods of time.
[5] We define a fund extra-performance as the difference, net of costs, between the fund return and the return of the reference market index (in our case the return of the ETFs). It can be either positive, negative or zero.

Analyzing emerging markets, through a regression of fund performance over a dummy variable for active management and controlling for a series of variables introducing fund characteristics and risk, Kremnitzer (2012) finds that actively managed funds performances, in terms of net returns before taxes, were on average significantly higher than those of passively managed funds. This result is consistent with the condition of lower efficiency (larger space for arbitrage) that characterize the emerging financial markets considered by the author.

On the contrary, examining data from highly efficient markets, Malkiel (2003) supports passive investment management –for both small and large market capitalizations– maintaining that new information is immediately reflected in market prices (market efficiency). Malkiel furthers his explanation covering the case of *near* market efficiency, in which the costs of getting advantageous information (transaction costs) are too high to exploit the limited market anomalies that can lead to abnormal returns. Poterba et al. (2002), adjusting for taxes, which affect Mutual Funds more than ETFs (tax disadvantage of active funds due to their higher level of trading for portfolio turnover), find similar results. In line with this argument, Garner et al. (2005) and Edelen, Evans and Kadlec (2007) emphasize the cost advantage of passively managed funds over actively managed ones in terms of taxes, while French (2008) also asserts that transaction costs are too high and that it is becoming increasingly important to move towards passively investment strategies.

Cuthbertson et al. (2005) find that, for the active fund management industry as a whole, the vast majority of actively managed funds outperformed the market just because of good luck. Therefore, they suggest that the unbeknownst average investor would be far better investing in passively managed funds. A similar point is made by Fama et al. in their "Luck versus Skill in Mutual Fund Returns" (2010), where they argue that, according to the principle of "equilibrium accounting" of the market (aggregate *alfa*[6] must be zero before costs), if some mutual funds over-perform the market in terms of net returns thanks to active management, there must be other actively managed mutual funds that under-perform it. A logical consequence of the principle of equilibrium accounting is that "after costs, that is, in terms of net returns to investors, active investment must be a negative sum game".

Gruber (1996) finds that independently of the model used to estimate returns, mutual funds have indeed underperformed the market. The author also argues that there are certain ETFs that provide all, or at least most, of the services provided by actively managed funds.

Sharpe and William (1996) investigate on what causes the differences in the performance between Mutual Funds and ETFs, and try to make some forecasts about future performances. They

[6] *Alfa* indicates the over return of a fund against the market benchmark

find that these differences are mainly due to differences in the objectives set by the fund managers, namely differences in expense ratios.

Treynor and Mazuy (1996) try to provide evidence of the mutual fund managers' capability of outguessing whether the general stock market would go up or down and adjusting the composition of their portfolios accordingly. For this purpose, the authors developed a statistical test aimed at seeing if there is evidence that the volatility of the funds was higher in years when the market did well than in years when the market did badly. They find no evidence that fund managers are able to outguess the market. On the same lines, Grinblatt and Titman (1992) analyse how mutual funds' performance relates to past performance and how differences across performances persist over time. As opposed to Treynor et al., the authors find that this persistence is consistent with the fund manager ability to anticipate the market and generate *alfa-returns*. Berk and Van Binsbergen (2007, 2012) not only find that manager skills are relevant, but also that they persist over time. The authors find that current managerial compensation is strongly and positively correlated with future performance of the funds. Chay and Trzcinka (1999) reach the same conclusion as Berk et al..

Chevalier and Ellison (1995) argue that the inefficiency of Mutual Funds is partly due to *agency problems*, i.e. fund subscribers (the principal) have different objectives, that is, to maximize risk-adjusted fund returns, from fund managers (the agent), who instead aim at maximization of the inflow of investment in their fund. The authors bring forward this line of reasoning in 1996 by providing evidence that younger managers produce better performances than older colleagues.

Hamm (2014) investigates whether availability of options for active management of equity funds reduces liquidity (demand for) direct buy of stocks on the stock exchange markets from individual investors who sense as a critical disadvantage their asymmetry of information against organized investors. The author finds that a positive correlation exists between the percentage of shares held by exchange-traded funds (ETFs) and reduced liquidity in the market for the underlying stocks. This argument is also treated by Amihud (2002), who shows that "expected market illiquidity positively affects ex ante stock excess return, suggesting that expected stock excess return partly represents an *illiquidity premium*. This complements the cross-sectional positive return‐illiquidity relationship". These results are in line with the ones of Cherks and Sagi (2007).

Huang and Guedj (2009) elaborated an equilibrium model, working as a simple zero-sum game, to investigate whether ETFs are a more efficient investment tool than open-ended Mutual Funds (OEFs). Among the authors' findings it is the fact that flow-induced trading, though costly to OEF investors, is at the same time beneficial to the investors who cause the flow. From this perspective, the OEFs become a structure providing a kind of insurance to investors subject to liquidity shocks, and therefore performing a beneficial function for risk averse investors. However,

this liquidity implicit insurance has got its cons, since it can have a moral hazard effect and induce excessive trading, reducing OEFs performance. Another result was that investors with higher individual liquidity needs preferentially select investment through OEFs because of their privileged benefits in terms of liquidity insurance. This behaviour is supported by actual data. They show that, despite the concentration of higher-liquidity-need investors in the OEFs, the OEF structure is still viable. This is explained by recalling that flow-induced trading costs depend on aggregate liquidity needs rather than on individual liquidity needs, which cancel out at the fund level. As a result, both OEFs and ETFs can survive in equilibrium with different liquidity customers. The model allows empirical predictions showing that "ETFs are better suited for narrower and less liquid underlying indexes and for investors with longer investment horizons".

Ben-David, Franzoni and Moussawi (2014) study whether exchange traded funds (ETFs) affect volatility of underlying securities, considering the growing importance of these funds on the markets. The authors show that ETFs stocks volatility is significantly higher at intraday and daily level. They estimate that an increase of one standard deviation in ETF ownership of stocks is associated with a 16% increase in their daily volatility, being arbitrage the driving activity generating such volatility. Consistently with this explanation, effects are stronger for stocks with lower bid-ask spread and lending fees. Since ETF management increases stock turnover, it can be concluded that ETF arbitrage generates a significant new layer of security trading to the market.

Dealing with investment strategies in US domestic equity mutual funds, Avramov and Wermers (2006) incorporate predictability in (i) manager skills, (ii) fund risk loadings, and (iii) benchmark returns. Their results suggest that predictability in manager skills is the dominant source of investment profitability strategies.

Kostovetsky (2003) elaborates single and multi-period models to analyse investors' choices between exchange-traded funds (ETFs) and index mutual funds, using cost variables to weigh ETFs advantages and disadvantages confronted with index mutual funds. Small scale investors prefer index mutual funds to ETFs, subject to some conditions analysed, while the length of the holding period has a positive correlation with the economic advantage of ETFs over index mutual funds.

Agapova (2011) investigates the implications of substitutability of conventional mutual funds and exchange-traded funds (ETFs). Coexistence of these two vehicle types, which refer to the same underlying index return process, is possible but they have different organizational structures. Comparing aggregate fund flows into conventional open-ended funds to flows into ETFs for various underlying indexes, the study gives evidence that conventional funds and ETFs are substitutes, though not perfect ones, and shows that coexistence of them can be explained as a customer effect, segregating the two instruments into different market niches.

Birdthistle's paper (2008) finds that ETFs work according to a pricing mechanism that takes advantage of the utility of arbitrage and offer investors accuracy, efficiency, tax advantages and a range of investment choices, while avoiding many of the structural problems brought about by mutual funds. ETFs provide a positive response to the shortcomings of the actively managed funds.

Barras, Scaillet and Wermers (2010) set up a technique that controls for "false discoveries" or mutual funds with significant alphas achieved only by luck. The authors classify funds into (1) unskilled, (2) zero-alpha, and (3) skilled funds, and show that 75% of funds exhibit zero alpha (net of expenses), consistently with the Berk and Green's equilibrium. In addition, they identify a significant proportion of skilled (positive alpha) funds before 1996, but almost none by 2006. Controlling for false discoveries substantially improves the ability to find few funds with persistent performances.

Chapter II – Data Analysis

Data Description

In this paper, I provide an empirical analysis, based on OLS regression, interpreting data on performances of Mutual funds and ETFs over the past 10 years in Italy, expressed in *monthly returns*. The sample of Mutual Funds and ETFs used in this study consists of the top passively and actively managed *equity funds* listed in FTSE MIB with the largest market capitalizations, quoted in euros. Funds with a market capitalization lower than 65 million euros were not considered due to the inaccessibility to consistent data on their performance over the last decade. Furthermore, a sufficiently large market capitalization allows me to take for given a high *stock turnover* for the funds. The sample consists of 50 mutual funds and 50 ETFs monthly data on performances. The analysis time perspective of 10 years was chosen with the purpose of minimizing contingent market anomalies and turbulence that would otherwise alter funds behavior, disguising performances.

The fundamental variables considered are 1) gross and net monthly returns, 2) entry and management fees, 3) standard deviations.

Data on *total monthly returns* were extracted from the Bloomberg database. It is worth mentioning that monthly returns provide a more accurate econometric analysis than yearly returns. Extracting daily returns would have done the job better, but missing data were too many, which would have led to an unbalanced and therefore non-significant analysis.

Entry and management fees data were extracted from the Morningstar database. I personally typed in the ticker of each fund to find its respective fees. Furthermore, for the purpose of this research, I

make the assumption that my representative investor entered each mutual fund at the beginning of 2005 and never left. This will simplify calculation of net returns, as explained below.
Specific calculations and variables are addressed and illustrated in the relevant paragraphs.

Econometric Approach

The basic initial regression highlighting the underpinnings of this approach is as follows:

$$Y_t = \beta_0 + \beta_1(X_{1t}) + \varepsilon$$

where the dependent variable Y_t is the Mutual Funds portfolio return in month *t*, β_0 is the intercept and X_{1t} is the ETFs portfolio return in month *t*. The regression is run twice, firstly considering gross returns and then net returns. This regression illustrates the basic idea of trying to establish an association/correlation of ETFs representative returns (based on a portfolio elaborated through a process of selection and optimization of funds shown below) on Mutual Funds representative returns (the same as mentioned for ETFs). More specifically, the ultimate goal of this basic regression is to investigate whether the coefficient β_1 is statistically significant and measure its dimension (greater or lower than 1). This will indicate whether, gross and net of fees, Exchange Traded Funds deliver lower or higher returns than Mutual Funds.

Wermers (2000), Carhart (1997) and Gruber (1996) examined whether mutual funds *stocks turnover ratios* are correlated with higher returns to the funds. They found that there is a positive correlation, that is, a higher stock turnover ratio allows, on average, for mutual funds higher returns (thanks to the power of diversification). If we account for turnover ratio, we also need to account for costs that turnover implies. It would be very interesting to investigate on the importance of the turnover ratio and its magnitude for Italian funds. However, due to unavailability of data, such variable has to be omitted from this analysis. It is assumed that the condition that the 50 mutual funds considered in the sample have high turnover ratios due to high market capitalization should at least partially overcome the omission.

Other interesting variables that should be considered are the *market to book equity ratios*[7] and the *price to earnings ratios*. Fama French (1996), Jegadeesh et al (1993) and Chan et al (1996) have shown that these two ratios are statistically significant in the prediction of the patterns in common stock returns, although they have not had a great importance in asset pricing. Due to lack of data, these two ratios have been excluded from the regression as well.

For the purpose of my analysis, which seeks to examine the *excess returns* of actively over passively managed funds and their correlation relation, the variable that resulted fundamental is the *Sharpe Ratio*.

[7] High market to book ratios are consistent with lower returns on equity (dividends).

Controlling for standard deviation is critical, in that we have to adjust the returns for risk. Risk could also be accounted for by the betas of each fund. This is an important control variable because volatility (measured by standard deviations or betas) is highly correlated with the returns of the funds. This is why, we have to consider the *Sharpe Index* (or Sharpe Ratio), which provides the extra-return for unit of risk. It is calculated as the difference between the fund (actively or passively managed) return and the return of a benchmark, in our case the Italian BTP yearly return[8], divided by a measure of variability (standard deviation) of the returns distribution over time. The higher is the variability of returns (and therefore the probability that the extra-return is not achieved), the lower is the value released by the Sharpe Index. Thus, funds with higher Sharpe Indexes should be preferred.

According to this concept, a further regression is elaborated which takes the same formal expression as the previous one:

$$Y_t = \beta_0 + \beta_1(X_{1t}) + \varepsilon$$

but now Y_t represents the Sharpe Ratio of the representative Mutual Funds portfolios in month *t* and X_{1t} represents the Sharpe Ratio of the representative ETFs portfolios in month *t*.

By adjusting the net returns for standard deviation, this analysis hopes to establish the explanatory role of the Sharpe Ratio variable and to determine whether other variables are worth considering.

The next step is to conduct an analysis of the residuals and apply the Gaussian Model to the funds' performance. By means of the econometric and statistical software R, I plotted the probability distribution functions for both portfolios. The same procedure has been followed for the cumulative distribution functions.

Selection of Mutual Funds and ETFs and creation of representative portfolios

Given the samples considered and the purpose of comparing, over a ten-year period, ETFs and Mutual Funds, based on performances as well as on risks, I faced several problems of methodology. Exploring (literally experimenting) various possibilities, I discarded the option of comparing single funds one-by-one, because results would have been tied to and biased by the specificity of the funds considered in each comparison and therefore of no use for a general interpretation. I also discarded the possibility of using sample average values (of returns and

[8] Approximately 1.5% per year. To compute the Sharpe ratio, the yearly BTP return has been transformed in monthly return.

standard deviations), since in this way I would probably have flattened characters of fundamental importance to my analysis (savers' attitude toward profits and risk, effectiveness of active and passive management of funds, etc.) into a few numbers providing a contribution to my purpose close to meaninglessness.

I eventually concluded that the selection criterion for fund comparison most relevant to my objectives was the one based on the ideal perspective of an *ex-post* (in relation to data availability) saver characterized by risk aversion but, at the same time, willing to extract from his/her investment the highest possible profit. According to this approach, I proceeded as follows.

First, I calculated for the period considered (2005-2015) the average 10-year performance of each Mutual Fund and ETF of my sample in terms of returns and standard deviations.

Second, according to such over-the-period average values, I selected from the resulting samples the top four performant ETFs and Mutual Funds.

Third, I took these eight funds (4 ETFs plus 4 Mutual Funds) as the components of two "optimal" (based on the chosen criteria as explained below) portfolios, one ETF portfolio and one Mutual Fund portfolio.

Fourth, I created the two portfolios attaching weights to each of the selected funds for each of the years of the period. To optimize the portfolio, I applied the *Markovitz Portfolio Theorem.* I calculated the variance-covariance matrix for each year and then minimized the variance, finding the optimal weights for each fund. I did so for both Mutual Funds and ETFs portfolios.

Finally, I repeated the process illustrated at the previous points twice: first considering gross returns and then considering net returns, obtaining in the end four portfolios, which are summarized in the following tables.

YEAR/MF	*BPBAZPA IM Equity*	*GESPACI IM Equity*	*GEFARES IM Equity*	*SYMAZEU IM Equity*	*Gross μ*	*σ*
2015	0.000	0.000	100.000	0.000	28.640	1.760
2014	0.000	0.000	0.386	0.614	20.354	1.880
2013	0.000	0.335	0.304	0.361	18.162	4.040
2012	0.232	0.000	0.000	0.768	13.689	4.926
2011	0.000	0.000	0.588	0.412	-9.408	10.618
2010	0.068	0.268	0.000	0.664	14.042	3.060
2009	0.000	0.000	0.519	0.481	29.179	11.411
2008	0.194	0.000	0.000	0.806	-10.362	12.859
2007	0.315	0.023	0.000	0.662	29.811	2.837
2006	0.000	0.031	0.255	0.714	14.244	3.452
2005	0.114	0.000	0.000	0.886	31.765	2.306

Table 1 – Optimal weights, gross returns and standard deviations for the period 2005-2015 for portfolios of Mutual Funds.

YEAR/ETF	FXC IM Equity	SPYR GR Equity	SPYH GR Equity	STR FP Equity	Gross μ	σ
2015	0.744	0.000	0.122	0.134	28.418	1.890
2014	0.301	0.187	0.512	0.000	19.625	3.736
2013	0.084	0.000	0.738	0.177	23.005	4.127
2012	0.000	0.000	0.766	0.234	12.710	4.927
2011	0.271	0.000	0.729	0.000	-9.823	10.864
2010	0.230	0.000	0.585	0.185	13.102	2.946
2009	0.347	0.000	0.653	0.000	27.299	13.011
2008	0.000	0.000	1.000	0.000	-11.250	13.308
2007	0.113	0.000	0.790	0.098	28.675	3.288
2006	0.000	0.212	0.586	0.202	13.862	3.479
2005	0.000	0.050	0.717	0.233	31.745	3.558

Table 2 - Optimal weights, gross returns and standard deviations for the period 2005-2015 for portfolios of ETFs.

YEAR/MF	BPBAZPA IM Equity	GESPACI IM Equity	GEFARES IM Equity	SYMAZEU IM Equity	Net μ	σ
2015	0.150	0.020	0.730	0.000	25.710	2.230
2014	0.000	0.260	0.580	0.160	16.941	2.590
2013	0.000	0.661	0.235	0.014	18.162	4.040
2012	0.625	0.000	0.375	0.000	11.554	5.280
2011	0.000	0.000	0.779	0.221	-11.944	11.287
2010	0.816	0.039	0.136	0.010	12.292	3.515
2009	0.000	0.613	0.046	0.341	26.747	12.133
2008	0.835	0.000	0.000	0.165	-13.154	13.583
2007	0.955	0.023	0.000	0.022	26.215	3.879
2006	0.579	0.144	0.277	0.000	12.788	3.647
2005	0.446	0.000	0.510	0.040	28.552	3.040

Table 3 - Optimal weights, net returns and standard deviations for the period 2005-2015 for portfolios of Mutual Funds.

YEAR/ETF	FXC IM Equity	SPYR GR Equity	SPYH GR Equity	STR FP Equity	Net μ	σ
2015	0.450	0.110	0.218	0.220	28.418	1.890
2014	0.000	0.232	0.520	0.250	19.025	2.936
2013	0.043	0.000	0.846	0.111	22.675	3.665
2012	0.000	0.152	0.239	0.609	12.549	5.192
2011	0.743	0.000	0.257	0.000	-10.066	11.040
2010	0.174	0.091	0.479	0.255	11.918	3.446
2009	0.347	0.000	0.653	0.000	27.000	13.379
2008	0.000	1.000	0.000	0.000	-13.472	13.222
2007	0.724	0.065	0.211	0.000	28.364	3.290
2006	0.440	0.154	0.386	0.020	13.227	3.553
2005	0.010	0.269	0.572	0.150	30.789	2.671

Table 4 - Optimal weights, net returns and standard deviations for the period 2005-2015 for portfolios of ETFs.

For all tables, the second to fifth columns report, under the component fund denomination, the share (weight) of the fund included in the optimal portfolio for the year in the correspondent first column. The sixth and seventh columns report, respectively, the portfolio return and standard deviation for the year. In short, optimizing as explained for each year and grouping performances (returns and standard deviation) under the labels of four portfolios (ETFs and Mutual Funds, gross and net) characterized by a kind of "variable geometry" in terms of weights, I meant to simultaneously take into account in two synthetic variables (return and standard deviation) the chosen criteria and, particularly, the savers' attitude toward profits and risk as well as effectiveness of active and passive management of funds.

One last point of procedure is worth addressing at this stage. Once defined in terms of components' weights as shown on an year basis, the representative portfolios are projected back, in terms of performances, on their monthly original basis (as in the sample) to be more adequately suited for an econometric analysis.

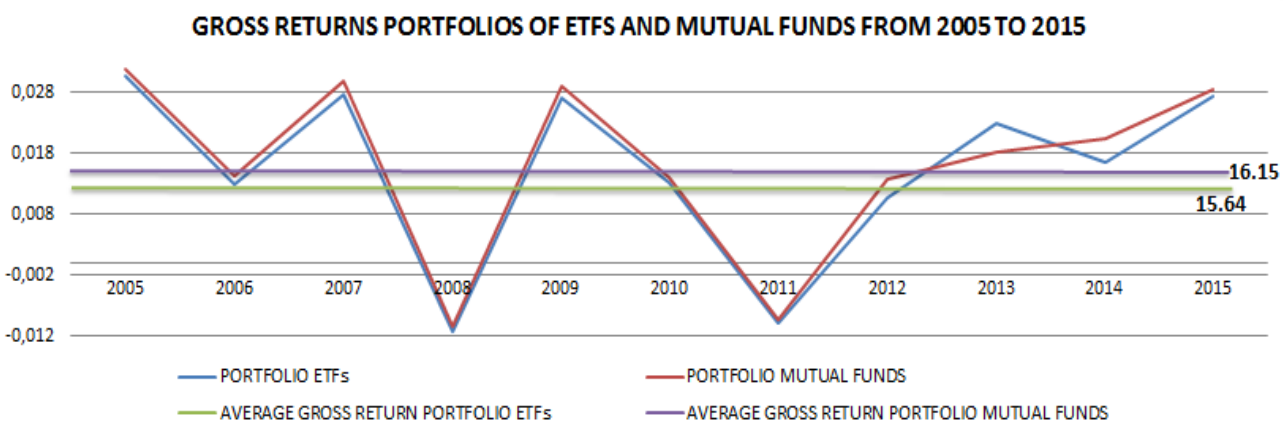
The process of representative portfolios generation illustrated in this paragraph sets the required balanced (in terms of the criteria assumed) entities for a consistent and meaningful comparison between ETFs and Mutual Funds. The comparison will take place in the next chapter.

Chapter III – Analysis and Results

Gross returns overview: regression analysis

Gross returns refer to returns of representative portfolios before taxes and fees. I firstly use gross monthly returns, not adjusted for risk, to provide a general comparative overview of actively and passively managed funds gross returns for the past ten years in the Italian financial market.

In Graph 1 gross returns of Mutual Funds and ETFs representative portfolios and their overall averages (straight lines) over the last decade are plotted.



Graph 1 – Total returns of Mutual funds and ETFs from 2005 to 2015 in Italy

The graph shows that both portfolios (of Mutual Funds and ETFs) have followed the same business cycles and, quite obviously, are strictly correlated. Furthermore, we can observe that mutual funds have delivered, *on average*, higher gross returns to investors compared to those of ETFs (purple line for mutual funds and green line for ETFs). Two years draw particular attention, because they may be considered as large outliers and therefore taken in special account in the econometric analysis: 1) year 2008 and 2) year 2011.

In 2008, the worldwide financial crisis made all countries nil down: some mutual funds lost up to 50% of their *net asset value* (NAV). In Italy, the loss of mutual funds and ETFs has been, on average, 35%.

2011 has also been a disastrous year for mutual funds as well as for ETFs. Data from Morningstar reveal that only about 10% of the Mutual Funds that invested in large-capitalization stocks outperformed the FTSE MIB in 2011. This underperformance of the actively managed funds may be due to large capital outflows, a flat market and high volatility.

Overall, over the past 10 years, the average *excess gross return* (not adjusted for risk) of Mutual Funds over ETFs has reached 3.84%, including years 2008 and 2011 in the analysis, and 4.36%, excluding such years.

This is a reasonable result if we consider that *active management* is expected to provide investors with:

- access to superior knowledge that has not been already reflected in market prices (implement arbitrage strategies to profit from market inefficiencies);
- diversification of unsystematic risk[9], which is realized by constructing and modifying the investment portfolio: the best performant mutual funds have incredibly high *stock turnover* ratios[10] (Wermers, 2000). For example, UBI PRAMERICA AZIONI EUR has had a turnover ratio of 167% in 2014.

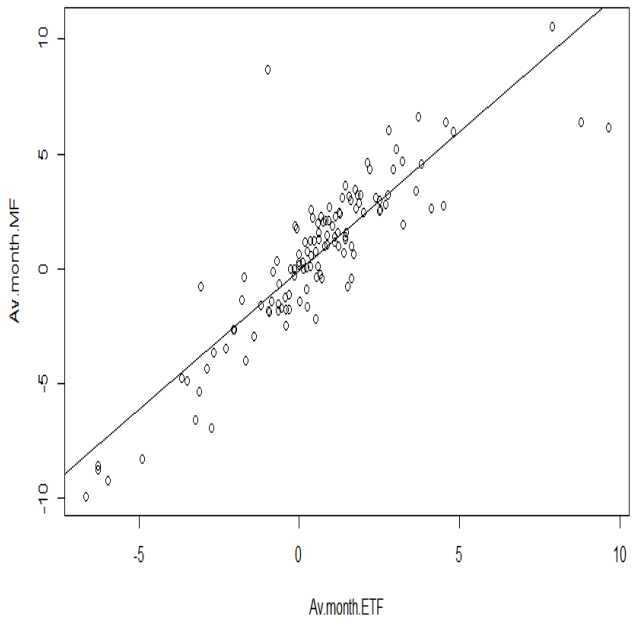
In order to evaluate performances, it may be interesting to consider fund *asset classes*. On average, in the first decade of this century, Italian mutual funds' portfolios were actually composed of 44% of Italian Government's securities, short (BOT, CCT) and long (CTZ, BTP) term, 6% of national companies' shares, 30% of foreign Governments' securities, and 20% of foreign companies' shares.

[9] It is important to underline that here we are talking of non-systematic or random risk, because systematic risk, also called market risk –as, for example, those caused by macroeconomic crises as the one we are living in these years– cannot be eliminated through diversification.

[10] The stock turnover ratio represents how many times a fund's inventory is sold and replaced over a period.

The representative portfolios gross returns reflect these paths, though with a less dramatic intensity. Losses in 2008 went down to – 10,4% for the Mutual Funds portfolio and – 11,2% for the ETFs portfolio, while in 2011 performances were – 9,4% and – 9,8%, respectively. The average *excess gross return* (not adjusted for risk) of Mutual Funds over ETFs portfolios in the period was 0,51%.

That Mutual Funds and ETFs performances are correlated is theoretically quite obvious and clearly shown empirically in Graph 1 as well as in Graph 3 (shown further below). However, to the purposes of this paper it is important to realize how strong this correlation is and investigate whether other variables have an impact on mutual funds' performance over the period. To get substance for the first point, it is important to increase the number of *degrees of freedom*. This is why the analysis will be based on monthly percentage returns. I therefore regress the gross monthly percentage returns of the Mutual Funds portfolio on the gross monthly percentage returns of the ETFs portfolio and then I replicate the regression considering net monthly returns.



<u>Graph 2</u> – Regression between Mutual Funds (dependent variable) portfolio and ETFs (independent variable) portfolio gross average monthly % returns.

Coefficients	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.143	0.134	1.067	0.51
Eff. GRR P.ETFs	1.18	0.072	16.38	<2e-16
#observations	496			
Adj. R-squared	0.82			

Heteroskadasticity robust standard errors used

The R^2 adjusted that results from this regression is 0.82, which reflects the fact that the variations of ETFs portfolio gross returns explain 82% of the variations of Mutual Funds portfolio gross monthly returns.

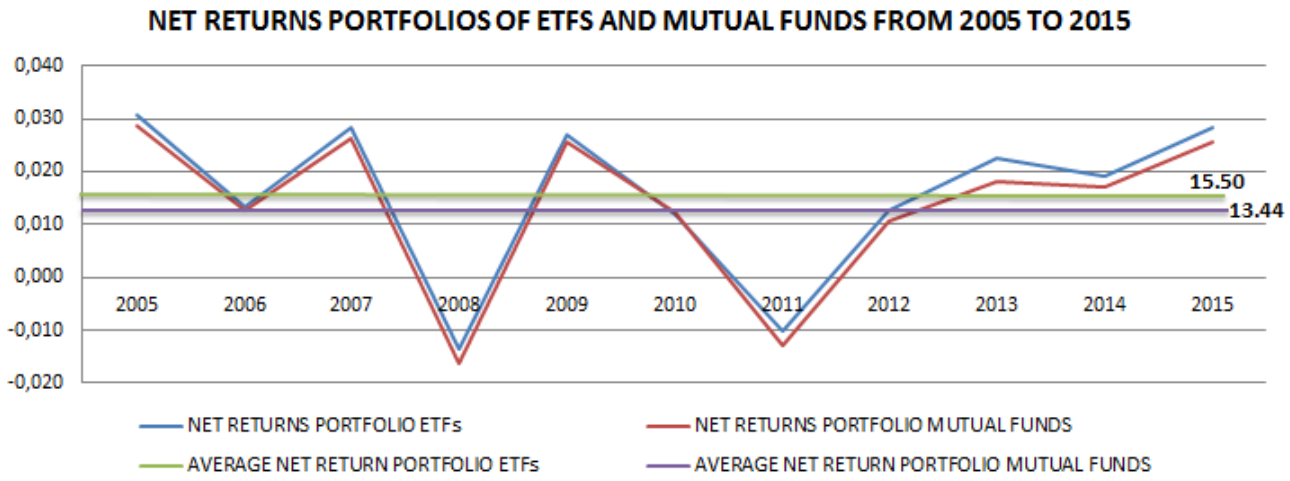
Furthermore, the coefficient of the Efficient Gross Rate of Return of the ETFs Portfolio (Eff. GRR. P. ETFs) is equal to 1.18 and it is statistically significant (*t-test* = 12.76).

This means that for a 1% increment of the ETFs portfolio performance we have a more than a proportional increase (1,18%) in the Mutual Fund portfolio performance, which can be taken as a measure of the value added by active management in relation to passive management of funds as far as gross returns are concerned.

We next analyze the patterns of the net monthly returns of Mutual Funds and ETFs representative portfolios and see how, in practice, ETFs have a clear cost advantage compared to actively managed funds.

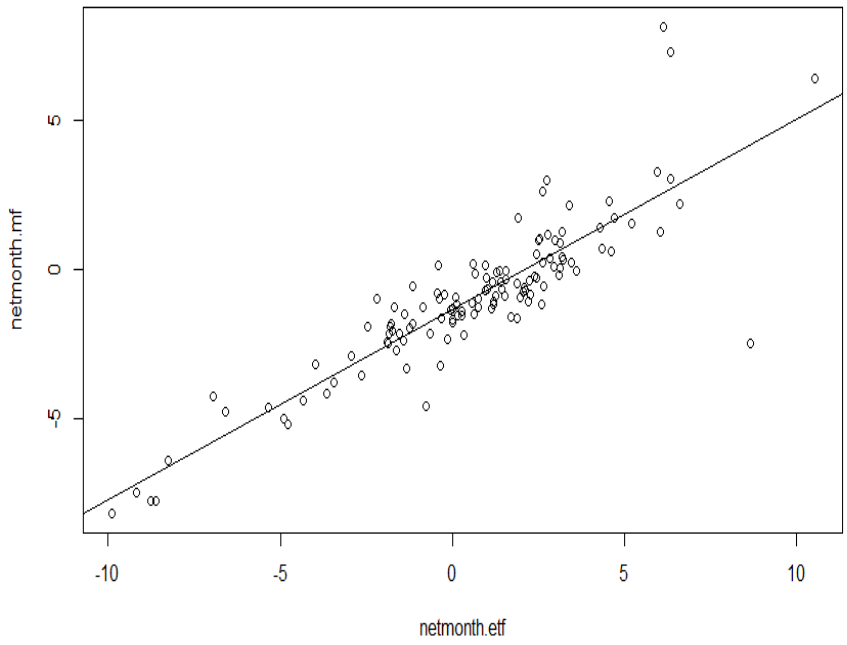
Net returns overview: regression analysis

Net returns refer to returns after taxes and fees. Due to unavailability of data, net returns of the past decade have been calculated by considering only entry and management fees. Graph 3 presents these results and the trend of the net returns (not adjusted for risk) of Mutual Funds and ETFs portfolios over the period 2005-2015 in Italy. It is easily observable that, net of expenses, passively managed funds deliver, *on average*, higher returns to investors than actively managed funds. The green horizontal line represents the average net return of the ETFs portfolio over the past 10 years, whereas the purple horizontal line represents the average net return of the Mutual Funds portfolio over the past 10 years. In particular, the *excess net return* of ETFs over mutual funds from 2005 to 2015 has reached 2.06%.



<u>Graph 3</u> – Net returns of Portfolios of Mutual funds and ETFs from 2005 to 2015 in Italy.

According to theory, active management strategy of mutual funds is assumed to be anticyclical (selling when quotations rise and buying when they fall), thus helping stabilize the market and reducing risk. Reality shows that this is not necessarily true and that, on average, funds' attitude on the market is often pro-cyclical thus increasing instability and risk. This may reduce the potential advantage that mutual funds may possibly have over ETF as well as reinforce a *positive correlation* between the two instruments, increasing the complexity of the analysis.



<u>Graph 4</u> – Regression between net monthly percentage returns of Mutual Funds Portfolio (dependent variable) and net monthly returns of ETFs Portfolio (independent variable).

Coefficients	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-0.995			<2e-16
Eff. NRR P.ETFs	0.71	0.06	11.83	<2e-16
#observations	496			
Adj. R-squared	0.83			

Heteroskadasticity robust standard errors used

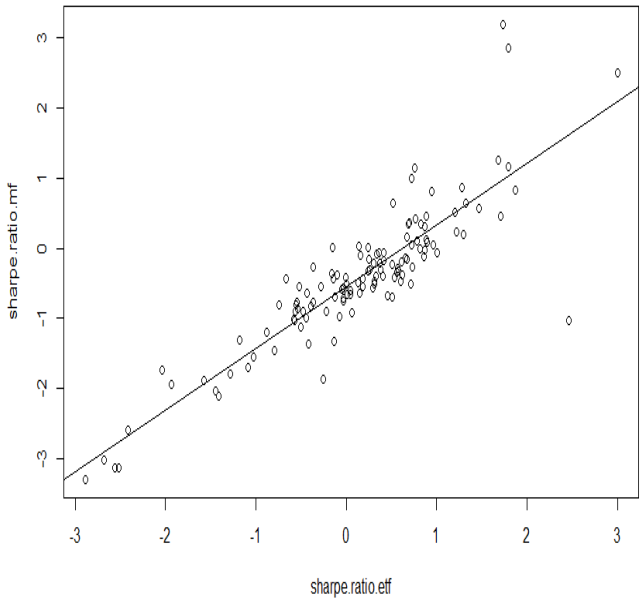
The R^2 adjusted that results from this regression is 0.83, which reflects the fact that the variations of the ETFs portfolio net returns explain 83% of the variations of the Mutual Funds portfolio net returns.

Furthermore, the coefficient of the Efficient Net Rate of Return of the ETFs Portfolio (0.71) is statistically significant (*t-test* = 11.83) and shows that, on average, a 1% Eff. NRR P. ETFs increase corresponds to a 0.71% in NRR P. MF. Also, the negative intercept reflects the excess return between the active and passive funds. When we consider net returns, the excess returns of the Mutual Funds portfolio with respect to those of the ETFs portfolio are negative (-0.995).

These results show that the active management added value found in the gross return analysis turns into a loss when net returns are considered. Such outcome is confirmed by the *negative correlation* found between mutual funds returns and entry and management fees. This may appear a counterintuitive result for investors, who probably expect that more talented managers, who are paid higher fees, should be able to generate higher returns for mutual funds. Actually, it might be an indication that the professional outcome of active managers is not worth the fees that pay their work. These results are in line with Chordia (1996).

Sharpe ratios: regression analysis

As mentioned in Chapter II (Descriptive Statistics), it is fundamental to consider the Sharpe Ratio of the Mutual Funds and ETFs portfolios. The purpose of this additional regression is to provide a further evidence on the performance of the funds. More specifically, regressing the Sharpe Ratio of the Mutual Funds portfolio on the Sharpe Ratio of the ETFs portfolio, controlling for risk, should provide a more robust argument on the effective return difference between the two categories of financial intermediaries. However, it is important to note that the estimate of Sharpe ratios is likely to be more accurate for Mutual Funds than for ETFs, due to the lower volatility of the actively managed funds (Lo, 2002). What follows is the result of this regression.



Graph 5 – Regression between Sharpe Ratio of ETFs portfolio (x-axis) and Sharpe Ratio of Mutual Funds portfolio (y-axis)

Coefficients	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-0.46	0.041	-11.22	<2e-16
Eff.SHR.P.ETFs	0.89	0.08	11.13	<2e-16
#observations	496			
Adj. R-squared	0.86			

Heteroskadasticity robust standard errors used

It is clear from Graph 4 that there is a positive relation between the Sharpe Ratio of Mutual Funds portfolio and that of the ETFs. This is shown by the correlation coefficient equal to 0.89, which indicates that a 1% increase in the ETFs' Sharpe Ratio corresponds to a 0.89% in the Mutual Funds' Sharpe Ratio. A t-test of 11.13 also indicates that these results are statistically significant. What is more interesting is the coefficient itself. Being lower than 1, it provides a further proof of the over-performance of ETFs over that of Mutual Funds.

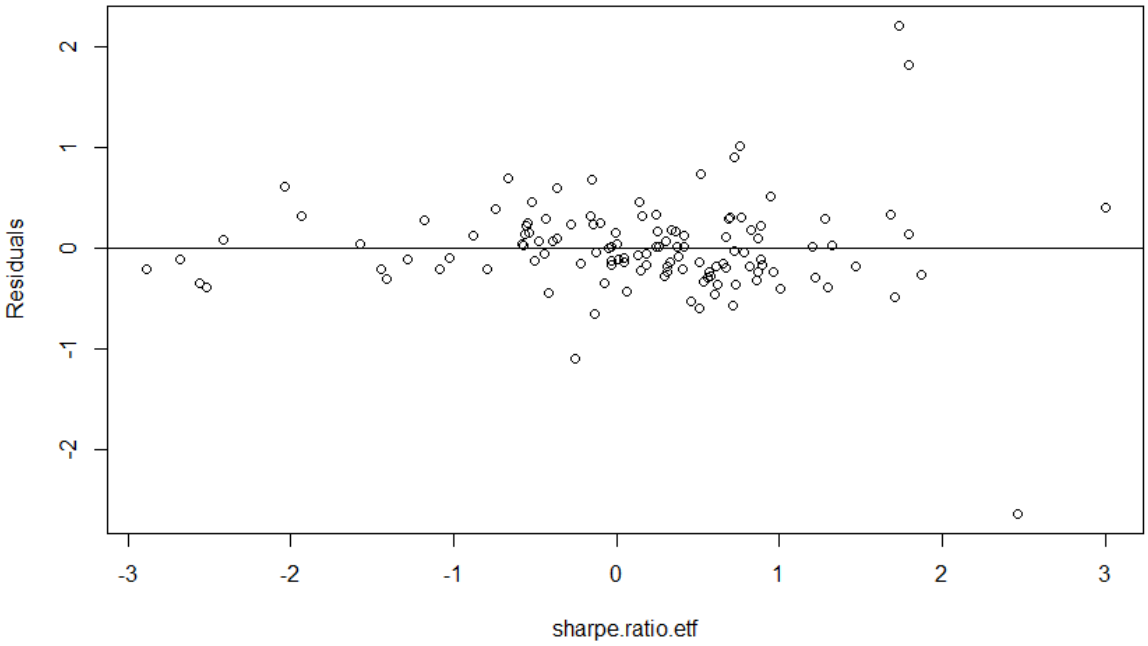
The analysis conducted brings to the conclusion that, even though we control for risk through the Sharpe Ratios regression, we find out that, over the period, the ETFs portfolio keeps outperforming the Mutual Funds portfolio. This may be interpreted as an evidence that active management fees still do not pay back investors in terms of returns and volatility jointly considered. However, it must also be noticed that a partial compensation has emerged, since

now, controlling for risk, the correlation coefficient has gone up to 0,89 from the previous 0,71, showing a significant increase with respect to the case when only net returns were considered.

Analysis of the Residuals

The analysis of the residuals is necessary to establish whether a linear model fits the data well or if it is more appropriate to use a non-linear model. Furthermore, it is possible to see if there is correlation between the error term (the residuals) and the independent variables. That is, to investigate on whether other variables are worth considering.

I plotted the residuals against the Sharpe Ratio of the ETFs portfolio (independent variable). The results are displayed in Graph 6.



<u>Graph 6</u> – Residual plot: on the y-axis the residuals of the dependent variable, on the x-axis the Sharpe Ratio of the ETFs portfolio;

Two conclusions can be drawn from Graph 6.

1) The Residual plot shows a fairly random pattern, which indicates that the linear model used fits well the data taken into consideration.
2) The trend line that best fits the scatter of points is a straight horizontal line with intercept on the y-axis equal to zero. This provides a proof that the residuals and the independent

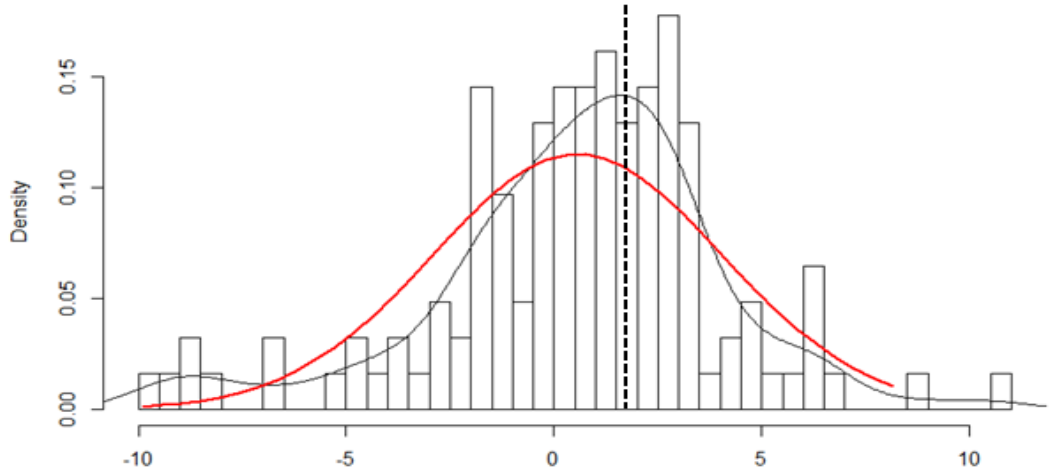
variable are not correlated. A further confirmation is a p-value equal to 1 obtained by regressing the residuals on the Sharpe Ratio of the ETFs portfolio.

As a consequence, further variables would not add relevant information to the regression.

Probability Density Functions

It is also interesting to take a look at the probability density function of the Mutual Funds' and ETFs portfolios. Graph 7 and Graph 8 plotted below display the results obtained. The following analysis is mainly based on the interpretation of the Skeweness and Kurtosis[11] values for the two portfolios.

Graph 7 presents the data distribution of the ETFs portfolio Sharpe Ratio, compared to that of the normal distribution (Gaussian Model). The dotted line represents the mean value of the Sharpe Ratio. As it is easily observable the data distribution of the ETFs portfolio is not perfectly symmetric, although the deviation from the standard model is minimal.



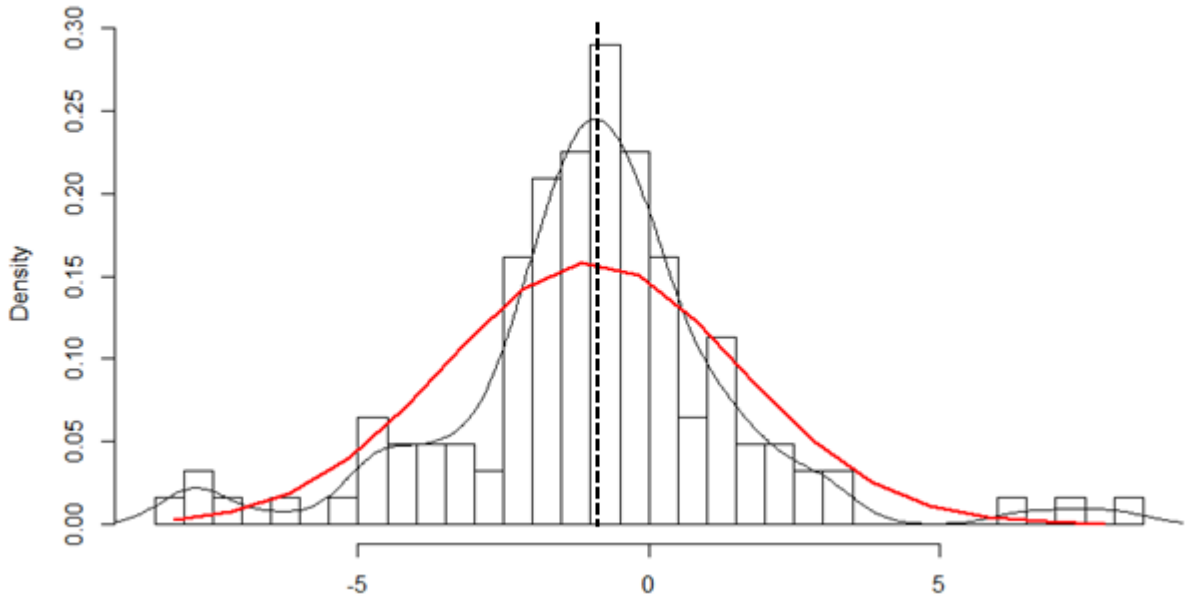
<u>Graph 7</u> – Probability Density function of the Sharpe Ratio of ETFs against the standard Probability Density function (red line)

The distribution is slighlty long-tailed to the the left, which indicates a negative Skeweness value. Infact, the Skeweness is equal to -0.58[12]. For what concerns the Kurtosis, the ETFs portfolio

[11] The Skewness establishes how symmetrical the distribution is and the Kurtosis determines whether the shape of the data distribution matches the Gaussian distribution.
[12] A symmetic distribution has a Skeweness equal to zero.

has a K value of 2.38. This results provide evidence on the not perfectly symmetry of the data, but again this value does not deviate significantly from the standard value of *Prism* equal to 3.

Graph 8 presents the data distribution for the Mutual Funds portfolio Sharpe Ratio in comparison with the standard normal distribution. Also for the Mutual Funds portfolio Sharpe Ratio the data is not perfectly symmetric distributed. The dotted line represents the mean value of the Sharpe Ratio.



<u>Graph 8</u> – Probability Density function of the Sharpe Ratio of Mutual Funds against the standard Probability Density function (red line)

The distribution is slightly long-tailed to the right. This indicates a positive value of Skewness, which is equal to 0.15. As for the case of ETFs, this value does not deviate significantly from the standard value of 0. For what concerns the Kurtosis, its value is 2.79, which is very close to 3.

Although rules of thumbs are arbitrary, the most widely used rule of thumb is to set a deviation benchmark equal to 1 to establish the validity of the symmetric distribution: if the Skewness and the Kurtosis deviate by more than 1 from the standard values, then the distribution asymmetry is substantial and cannot be neglected.

The data distribution is a powerful tool to establish the probability of loss/gain of the two portfolios with respect to their mean values of the Sharpe Ratios.

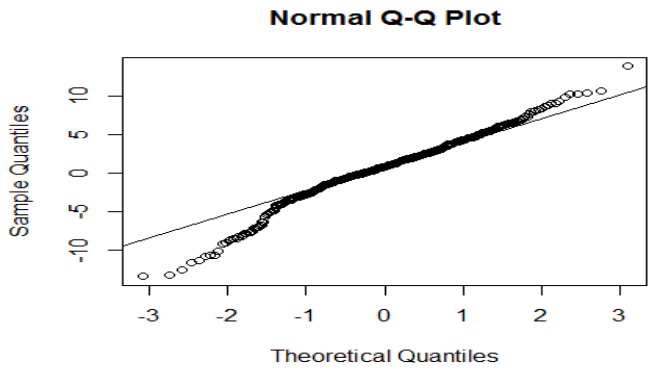
For the case of ETFs, the probability of obtaining a return lower than the mean value of the Sharpe Ratio is greater than the probability of obtaining superior returns. The contrary is true when we consider the portfolio of Mutual Funds.

From this we can conclude that ETFs returns are associated with a higher variance (risk) than Mutual Funds are, which is in line with the literature and with the results obtained in the previous sections.

The Shapiro-Wilk Test

The data used and the models applied for this empirical research assume the normal distribution. Therefore, it is necessary to test whether the *normality* assumption holds. For this purpose, I use the *Shapiro Test*, which, by means of the null hypothesis principle, checks whether the sample is normally distributed.

The null hypothesis of this test is that the data of the sample are normally distributed. If the p-value is greater than the significance level chosen, then the null hypothesis fails to be rejected and the sample is normally distributed. It is important to complement this analysis with the QQ-normal plot, which displays normal distribution if the points lie on a straight diagonal line. These results have been plotted in Graph 9 and Graph 10.



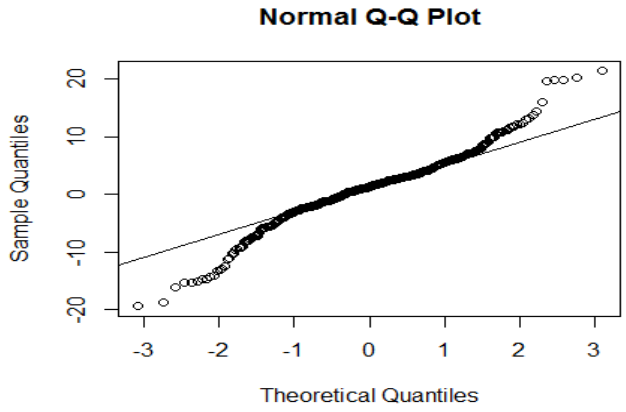
<u>Graph 9</u> – Shapiro Test for the Mutual Funds Portfolio

The results for the Shapiro-Wilk coefficient and the corresponding p-value are summarized in the table below.

Shapiro-Wilk Coeff.	*p-value*
0.9752	0.0992

Although some slight deviations from the diagonal, the p-value provides evidence for the failure to reject the null hypothesis, and therefore the sample data used to represent the Mutual Funds portfolio is normally distributed.

For what concerns the distribution of the data that represent the sample of ETFs, the results can be observed through Graph 10, which is what follows next.



<u>Graph 10</u> – Shapiro Test for the ETFs Portfolio

Shapiro-Wilk Coeff.	*p-value*
0.9574	0.0103

Also for the case of ETFs, the p-value is greater than the standard alpha levels[13], which confirms that the sample data are normally distributed.

Summary and conclusions

In spite of much theoretical discussion, actual performances of ETFs and Mutual Funds have not often been investigated with reference to the Italian market, one of reasons probably being that ETFs are relatively new in the FTSE MIB. The empirical research conducted in this paper uses data

[13] 1%,5% and 10%

on ETFs and Mutual Funds that cover the period 2005-2015 to study various issues concerning performance and risk by means of creating four portfolios (ETFs and Mutual Funds, gross and net) by optimizing ex-post returns and standard deviations across time. Component funds are weighted year-by-year and provide the portfolio with a "variable geometry" in terms of weights, simultaneously taking into account the savers' attitude toward profits maximization and risk aversion as well as the effectiveness of active and passive management of funds.

Regressing the Mutual Funds portfolio over the ETF portfolio in terms of gross returns, I found that for a 1% increment of the ETFs portfolio performance we have a more than a proportional increase (1,18%) in the Mutual Fund portfolio performance, which can be taken as a measure of the value added by active management in relation to passive management of funds as far as gross returns are concerned. On the contrary, when the regression is conducted for net returns, a 1% increment of the ETFs portfolio performance corresponds only to a 0.71% increase in the Mutual Funds portfolio performance, showing that ETFs have a clear cost advantage when considering net performance.

These results are in line with previous literature. Sharpe and William (1996) find that differences in Mutual Funds and ETFs performances are mainly due to differences in the objectives set by the fund managers, namely differences in expense ratios. Also Rompotis (2008) reports a cost advantage of ETFs over Mutual Funds in terms of expense ratios.

The results show that the active management added value found in the gross return analysis turns into a loss when net returns are considered. Such outcome is confirmed by the *negative correlation* found between mutual funds returns and entry and management fees. This may appear a counterintuitive result for investors, who probably expect that more talented managers, who are paid higher fees, should be able to generate higher returns for mutual funds.

To get further evidence on the previous results, I shifted the entire analysis on the Sharpe Ratios for net return portfolios and found that, despite adjustment for risk, ETFs still deliver higher net returns than Mutual Funds. This is shown by the correlation coefficient equal to 0.89, which indicates that a 1% increase in the ETFs' Sharpe Ratio corresponds to a 0.89% increment of the Mutual Funds' Sharpe Ratio.

The analysis conducted brings to the conclusion that, even though we control for risk through the Sharpe Ratios regression, we find out that, over the period, the ETFs portfolio keeps outperforming the Mutual Funds portfolio. This may be interpreted as an evidence that active management fees still do not pay back investors in terms of returns and volatility jointly considered. However, it must also be noticed that a partial compensation has emerged, since now, controlling

for risk, the correlation coefficient has gone up to 0,89 from the previous 0,71, showing a significant increase with respect to the case when only net returns were considered.

I also investigated on the probability of generating a gain/loss with respect to the mean return of the portfolios (through the probability density functions) and found that ETFs deliver higher returns paired with a higher probability of "loss" with respect to the mean value, compared to that of Mutual Funds. This may be due to the higher volatility of ETFs.

A Shapiro Test confirmed the validity of the above results.

Trying a wider interpretation, it can be hypotized that multiple and unexpected shocks in the years of crisis, to which the sample considered mostly refers, have probably made it difficult even for talented managers to profitably anticipate the market, even though the extraordinary trading arbitrage situations occurred in the period should have increased in number and quality profitable opportunities. On the other end, we should take into account that, according to theory, active management strategy of mutual funds is assumed to be anticyclical (selling when quotations rise and buying when they fall), thus helping stabilize the market and reducing risk. Reality shows that this is not necessarily true and that, on average, funds' attitude on the market is often pro-cyclical thus increasing instability and risk. In other words, while investors would have expected active management of Mutual Funds to exploit and take advantage of cycles, arbitraging across time, they have to find out that their supposed talent led them not much farther than to bandwagoning the market.

Bibliography

Agapova, A. (2011). "Conventional mutual index funds versus exchange-traded funds". *Journal of Financial Markets*, *14*(2), 323-343.

Amihud, Y. (2002). "Illiquidity and stock returns: cross-section and time-series effects". *Journal of financial markets*, *5*(1), 31-56.

Avramov, D., & Wermers, R. (2006). "Investing in mutual funds when returns are predictable". *Journal of Financial Economics*, *81*(2), 339-377.

Barras, L., Scaillet, O., & Wermers, R. (2010). "False discoveries in mutual fund performance: Measuring luck in estimated alphas". *The Journal of Finance*,*65*(1), 179-216.

Ben-David, I., Franzoni, F., & Moussawi, R. (2014). "Do ETFs Increase Volatility?" (No. w20071). *National Bureau of Economic Research*.

Berk, J. B., & Van Binsbergen, J. H. (2012). "Measuring managerial skill in the mutual fund industry" (No. w18184). *National Bureau of Economic Research.*

Berk, J. B., and R. Stanton (2007), "Managerial Ability, Compensation, and the Closed-End Fund Discount". *The Journal of Finance*, 62, 529–556.

Birdthistle, W. A. (2008). "Fortunes and Foibles of Exchange-Traded Funds: A Positive Market Response to the Problems of Mutual Funds", The. *Del. J. Corp. L.*, *33*, 69.

Carhart M. (1997), "On the persistence of Mutual Fund Performance", *The Journal of Finance.*

Chalmers R., Edelen M., and G. B. Kadlec, (2001), "On the Perils of Intermediaries Setting Security Prices: The Mutual Fund Wildcard Option". *Journal of Finance, 61, 2209–2236.*

Chay, J. B., & Trzcinka, C. A. (1999). "Managerial performance and the cross-sectional pricing of closed-end funds". *Journal of financial economics, 52(3), 379-408.*

Chen, J., Hong, H., Huang, M., & Kubik, J. D. (2004). "Does fund size erode mutual fund performance? The role of liquidity and organization". *American Economic Review*, *94*(5), 1276-1302.

Cherkes, M., J. Sagi, and R. Stanton (2007), "A Liquidity-Based Model of Closed-End Funds," *The Review of Financial Studies, Forthcoming*.

Chevalier, J. A., & Ellison, G. D. (1995). "Risk taking by mutual funds as a response to incentives" (No. w5234). *National Bureau of Economic Research*.

Chevalier, J., & Ellison, G. (1996). "Are some mutual funds managers better than others? Cross-Sectional Patterns in Behavior and Performance" (No. w5852). *National Bureau of Economic Research*.

Chordia, T. (1996). "The structure of mutual fund charges". *Journal of financial Economics*, *41*(1), 3-39.

Christoffersen, S. E. K., and D. Musto (2002), "Demand Curves and the Pricing of Money Mangement". *The Review of Financial Studies, 15, 1499–1524*.

Cuthbertson K., Nitzsche D., O'Sullivan N. (2005), "Mutual Fund performance: skill or luck?"

Edelen, R. M., Evans, R. B., & Kadlec, G. B. (2007). "Scale effects in mutual fund performance: The role of trading costs". *Available at SSRN 951367*.

Fama E.F., French K.R. (2010), "Luck versus Skill in the Cross-Section of Mutual Fund Returns", *The Journal of Finance*, Vol. LXV n. 5.

French, K.R. (2008), "The cost of Active investing", *The Journal of Finance*.

Garavito, F. (2008). "Mutual Fund Incubation: Innovation or Marketing Tool?". *Available at SSRN 1344642*.

Gardner, R. and Welch J. (2005). "Increasing After-Tax return with Exchanged-Traded Funds", *Journal of Financial Planning*.

Gastineau, G. L. (2004). Protecting fund shareholders from costly share trading. *Financial Analysts Journal*, *60*(3), 22-32.

Grinblatt, M., & Titman, S. (1989). "Mutual fund performance: An analysis of quarterly portfolio holdings". *Journal of business*, 393-416.

Grinblatt, M., & Titman, S. (1992). "The persistence of mutual fund performance". *The Journal of Finance*, *47*(5), 1977-1984.

Gruber M. (1996), "Another Puzzle: The Growth in Actively Managed Funds", *Journal of Finance.*

Hamm, S. J. (2014). "The effect of ETFs on stock liquidity". *Available at SSRN 1687914*.

Hasbrouck, J. (2009). "Trading costs and returns for US equities: Estimating effective costs from daily data". *The Journal of Finance*, *64*(3), 1445-1477.

Huang, J. C., & Guedj, I. (2009). "Are ETFs Replacing Index Mutual Funds?". In *AFA 2009 San Francisco Meetings Paper*.

Jegadeesh, N (1993), "Returns to buying winners and selling losers: implications for stock market efficiency", *Journal of Finance*.

Jensen, M. C. (1968). "The performance of mutual funds in the period 1945–1964". *The Journal of finance*, *23*(2), 389-416.

Khorana, A., & Servaes, H. (2004). "Conflicts of interest and competition in the mutual fund industry". *Available at SSRN 240596*.

Kostovetsky, L. (2003). "Index Mutual Funds and Exchange-Traded Funds (Digest Summary)". *Journal of Portfolio Management*, *29*(480-92).

Kremnitzer K. (2012), "Comparing Active and Passive Fund Management in Emerging Markets", *Economic Department of University of California*, Berkeley.

Lo A. (2002), "The Statistics of Sharpe Ratios", *Financial Analyst Journal*.

Malkiel, B.G. (2003), "Passive Investment Strategies and Efficient Markets", *European Financial Management.*

Poterba J., Shoven (2002), "Exchange Traded Funds: A New Investment Option for Taxable Investors", *National Bureau of Economic Research*.

Ryan G. (2014), "Maximizing the Power of Diversification", *Consulting and Advisory Journal*

SEC (2012), “Investor bulletin: Exchange-traded funds (ETFs)”, *Office of Investor, Education and Advocacy*.

Sharpe, William F. "Mutual fund performance." *Journal of business* (1966): 119-138.

Shin, S., & Soydemir, G. (2010). Exchange-traded funds, persistence in tracking errors and information dissemination. *Journal of Multinational Financial Management*, *20*(4), 214-234.

Shleifer, A., and R. W. Vishny, 1997, “The Limits of Arbitrage”. *The Journal of Finance, 52, 35–55.*

Stiglitz J.E., Grossman S.J. (1980), “On the Impossibility of Informationally Efficient Markets”, *The American Economic Review*.

Treynor, J., & Mazuy, K. (1966). “Can mutual funds outguess the market”. *Harvard business review*, *44*(4), 131-136.

Wermers, R. (2000), “Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transaction Costs, and Expenses”, *The Journal of Finance*.

Witmer, J. (2012). “Does the buck stop here? A comparison of withdrawals from money market mutual funds with floating and constant share prices” (No. 2012-25). *Bank of Canada Working Paper.*