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CAN SMALL-CAP ACTIVE FUNDS SUBSTANTIALLY OUTPERFORM THE MARKET OVER TIME?

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ABSTRACT

The Efficient Market Hypothesis (EMF) persist that active management is useless and that investors should rather adopt a passive investment strategy that is less expensive and less risky. However, several previous pieces of literature in the small-cap industry contrast this point of view. This paper investigates the risk and performance of small-cap equity funds in the USA markets over a ten-year period of 2009-2018. The study period is segmented into sub-investment horizons and the funds sampled are split by group of investment style. Our findings are twofold. Firstly, in contrary to the Efficiency Market Hypothesis (EMF) the size effect in small-stock markets could indeed be a proxy of outperformance for active managers. Given that, top performers are observed among active growth funds. Secondly, surprisingly the great majority of funds selected have managed to gradually generate a positive alpha meaning that active management is not always pointless. Therefore, 56.67% of the whole sample has delivered consecutive excess returns over the three investment horizons and each fund within each investment style has outperformed the market at least once. The two last observations support partially the Efficiency Market Hypothesis (EMF) in the way that not all active funds were able to generate a persistent abnormal return over the long term and that some active portfolio managers could be just lucky in picking up stocks.

Contribution/Originality: The existing study explores the performance of small-cap funds either against their benchmark or between them but this study uses different investment horizons. This study contributes to the existing literature in the sense of findings that Long-term investors should prioritize value/growth funds, while short-investors should invest in value funds.

1. INTRODUCTION

Compared to large-cap stocks, small-cap stocks and mutual funds investing in this market segment often receive little attention from investors, scholars and financial media. Consequently, empirical proofs that may support their achieved performance, risk and characteristics are still scant. Likewise, the great majority of literature treating of the performance of small-equity funds by investment style has been often focused only on a global study period and on value and growth funds, and de facto ignoring blend style. Sometimes considered as penny stocks, Over-The-Counter (OTC) stocks and stocks listed on the pink sheets, small cap markets suffer from an efficient problem relative to its peers (large-cap markets), and so coming into question the Efficient Market Hypothesis (EMH). It can be deductively concluded that market efficiency varies by market equity segment, and factors influencing the extent of mispricing within these markets such as the flow and availability of information, analyst

coverage, transaction costs, and the sophistication of local investors are limited. To supplement this logic, excessive volatility, low volume of transactions, illiquidity, aggressive sale strategies to foster potential investors purchasing stock and higher levels of bid-ask spreads often characterize small companies.

Additionally, small-cap stocks are substantially riskier than large stocks, both in terms of market and idiosyncratic risk. Smaller companies often lack consistent and trustworthy information, overestimating of financial information (income, sales, and so on) disclosed in the annual report occasionally, common fraud schemes, spreading of incorrect information online often aim to manipulate stock prices are all factors exacerbating the risk level in these markets.

Despite these deficiencies, some investors remain attracted by the possibility of earning high returns by investing in this type of stock. As a result, this opens doors for the Alpha hunters (active mutual funds) who develop and implement various active strategies to generate an excess return. The primary motivation herein is to generate more active returns from their basic equity allocation and, most importantly, to seize the advantages of a typical fund's unused capacity by taking productive active risk.

Regarding the apparent inefficiency in the segment of small-stock companies, actively managed fund's strategies seem appropriate to be applied and beat the market in this sense. According to some previous studies carried out about smaller funds' performance, there is a consensus among academics that small-cap funds are able to identify arbitrage opportunities and outperform the market. The size of this excess return, nonetheless, is problematic since a certain number of variables like transaction costs, additional risk, taxes, turnover-related costs have to be taken into account. In any case, if we based our argument on the hypothesis that the riskier a stock, the higher the return; that should be the case of smaller companies, then it should be logic for ones to think of possible higher return in that market segment and this does no longer need to be demonstrated. Thus, the remaining issue is to prove whether this outperformance can be consistent over time or in the long term.

The paper contributes to the existing literature of Small-cap funds in many ways. The research sets out to verify if a small-cap active fund can outperform the market over 10 years by sectioning the whole period in different investment horizons. We also show that the performance among small-cap active funds can strongly vary by style of investment. The remainder of this study looks at the literature of market efficiency in small-caps, the methodology utilized, results and discussion of the analysis.

2. LITERATURE REVIEW

2.1. Efficiency Markey Hypothesis (EMF) and Small-Cap Companies

The concept of EMH finds its paternity with Eugene FAMA who has started to explore it in his academic researches during the 60s. The market efficiency can be split in three dimension namely the functional efficiency (facilitate risk pooling and transferring, mobilize savings), allocation function (direct funds towards the most productive use and foster the development) and informational efficiency (ensure that all available information are incorporated into the price). The latter is the one at the center of financial and economics debates.

Fama (1965) defines the first time an efficient market in his academic work focusing on stock prices analysis by concluding that stock prices follow a random walk. He argues that a market is efficient if and only if all the information relevant to each stock can be immediately integrated into his price. In other words, "A market in which prices always fully reflect available information is called Efficient" So a market is considered as efficient is it can transmit reliable signals (information) for investors to make rational investment decisions.

The term Efficient Markets Hypothesis can be categorized in three different versions (Harry, 1967) namely weak efficiency, semi-strong efficiency, and strong efficiency, which align with the fact that market efficiency can be verified by market segment.

Three years later, C. Jensen in valuating mutual funds' performance concluded that on average the funds apparently were not quite successful enough in their trading activities to recover even their brokerage costs. This

has led (Jensen, 1978) to further the definition of market efficiency in a rigorous way by postulating that "the markets on which the prices of quoted assets incorporate the information relating to them are considered efficient in such a way that an investor cannot, by buying or selling that asset, extracts an excess profit over the transaction costs generated by this asset". We have, therefore, evolved from an initial efficiency synonym of random price market to an efficiency in which it is impossible to make a consistent gain. Fama and French (1988a) found a huge negative autocorrelation between the expected return of a stock portfolio and its variance on a year horizon. Poterba and Summers (1988) showed that stock returns show positive autocorrelation over short periods and negative autocorrelation over longer horizons, coming to reinforce the belief that no consistent excess return can be made in the long term.

Some scholars radically oppose the EMF and the mainstream of those economists are behavioral economists. Porter and LeRoy (1981) highlight the excess volatility by comparing the fundamental value of a firm to its market value. They showed that stock prices exhibit excessive volatility relative to fundamentals, especially dividends. According to them, the volatility of a sum is less than the volatility of these components. This volatility, thus, puts in difficulty the assumption of financial market efficiency. Furthermore, the efficiency assumption does not require that all players in the market be perfectly rational. What is needed is that the proportion of rational investors is sufficient to ensure that the fundamental value of an asset is at the equilibrium level of the price. This can then open doors to noisy traders who are likely to cause the market price to diverge durably from its fundamental value if their number is higher.

De Bondt and Thaler (1989) through the Winner's Curse experience outlined that it is possible to generate an annual excess return of 5 to 8% by buying the looser portfolio and selling the winner portfolio. This is explained by the perceived risk that fundamentally deviates from the real risk, hence a significant excess profit in the future.

Jegadeesh and Titman (1993; 2001) and Jegadeesh and Titman (1993) works also support this point of view. In portfolios formed on the basis of prior five-year returns, they found that extreme prior losers outperformed extreme prior winners by 5–10% per year during the subsequent five years. Haugen (1995) in his book "The case against Efficiency Markets" has also strongly rejected the EMF by basing his argument on the over-reaction of the market.

2.2. Anomalies Considerations

An alternate way to explain inefficient markets and abnormal return yielded is to focus on anomalies observed in the markets.

The size Effect is viewed as one of the most compelling arguments to justify the abnormal profit in small-cap markets. The smaller a company, the higher the chances of failure, the riskier it security is, and the higher the required return by investors.

Banz (1981) published an article highlighting a "small firm effect": the rates of return observed on small-caps were on average higher than those of large companies. He showed that this effect can be persistent on a 40 years horizon and concluded that there are shortcomings in the pricing model. Breituft *et al.* (2016) revised the small firm effect in the USA markets over 17 years by analyzing the S&P 500 index and S&P 600 index. Test on the differential of average returns has evidenced the presence of a significant size effect and this was underpinned by the differences in both volatility and liquidity between small-cap and large-cap companies. Xiao (2016) also confirmed the presence of the size premium in the French stock market but stresses that the conditional beta fails to justify differences in the excess return between small- and large-cap securities. A paper by Yves *et al.* (2017) equally showed the existence of small firm effect in the French stock market.

Jeffrey *et al.* (1989) also found a significant negative relationship between return and the size effect. They, however, ascertained that this relation amplified mostly in January (January effect). Ritter (1988) also found pronounced January seasonal in his works: the difference in average yields between small-cap and large-cap in the first nine days of January was 8.17%. Recently, Elfakhani *et al.* (1998) have shown the existence of a negative size

effect in Canada. They outlined that over the period from 1985 to 1992 (period of low taxation on capital gains), the size-related risk premium decreased substantially.

The value/Growth effect is another explanatory variable that has been used to identify a relation between stock return and their Price to Book ratio (P/B).

Numbers of scholars such as Fama and French (1992) have been long interested in this approach to explain the average return on US stocks. In their early work, they found that cross-sectional monthly returns in the USA market were better explained by combining the Market-to-Book ratio and the Market capitalization (size) than the market volatility (β). Later in 1995, they will go on further their empirical research by analysis 25 small companies from the New York Stock Exchange and argue that low-BE/ME stocks are more profitable that High BE/ME stocks for four years before and at least five years after ranking dates although the growth rates of earnings of low and high BE/ME stocks become more similar in the years after portfolio formation.

The three-factor model proposed by Fama and French that has expanded on the CAPM by adding risk size and value risk factors to the market risk will be later contradicted by Lakonishok *et al.* (1994) who rather adopted a psychological explanation incumbent to investors. They think that the patterns observed from the French and Fama model are due to investors who extrapolate past performance too far in the future, and then lead them to incorrectly pricing low BE/ME stocks (value stocks) over high BE/ME stocks (growth value or Glamour stocks). Further, during the readjustment process of this anomaly by the market, value stocks generate on average higher returns than growth companies. Daniel and Titman (1997) in their paper titled "Evidence on the characteristics of cross-sectional variation in Stock Return "also reject the three-factor model in favor of the characteristic model. Late explorations over the psychological factor include (Maulina and Nuzula, 2018) who investigated the influence of investor sentiment on large and small-cap returns. By using Turnover ratio, Share turnover, Dividend premium and Advance decline ratio as proxies, they found that all the variables used positively affect small-stock performance except the dividend factor. This is certainly due to the scarcity of dividend payments in small-cap companies.

Other researchers in Canada, for instance, Elfakhani *et al.* (1998) have also found compelling results. By examining the relationship between average return, size and book-to-market of a panel of data from 1975 to 1992, they found a positive persistent relation between B/M and average return. They, however, noticed the effect can be mostly explained by the changes in tax rates rather than by the small firm effect. Results showed that the size effect amplifies during the period of lower capital gains tax and obviously attenuates when the tax rate goes up.

Several authors have rather investigated lags and biases in the book value to explain the movements inherent to the Book-to-market ratio and its ability to forecast future ROE. One of the most significant papers written about is from Beaver and Ryan (2000) who showed that the book-to-market ratios move in "a series of relatively small-variance, predictable steps, and so there is a negative relation between M/B and future return on equity.

By contrast, other researchers have found that the value/growth anomaly is not captured in every market. Two recent studies comparing Value stock performance against that of Growth stock have been carried out by Gerry and Perez (2018a;2018b). The first one (2018a) focusing on the South Korean stock market has been based on the period 1996-2016. Results of the differential of the average monthly returns among investment style as well as among market capitalization indicate that there is no significant value/growth effect in the majority of the sub-periods analyzed.in the. The second study (2018b) was rather realized in the Philippine stock market from 1998 to 2017. Conclusions are quite similar to their previous outcome, therefore they once more found no outperformance of value stock over growth stock nor domination of small stocks over large caps in this case. In the same vein, a paper by Heng-Hsing (2015) has tested the same effects in the Johannesburg stock market over 16 years and found an insignificant existence of value/growth effect. He did, however, find a strong small firm size regardless of the style of investment.

A further approach employed to reject the EMF is the Weekend Effect. This approach postulates that there is a fall in Monday's stock prices following a rise in the previous trading day, which is usually Friday. A great number

of papers have been focusing on this peculiar subject so far in different financial markets (small and large companies) over the world.

A first variant of the day-of-the-week effect is the "Weekend drift effect weekend" which is the one most considered and then resumes the entire approach. Cross (1973) was first to report the anomaly of negative Monday returns through an article titled "The Behavior of Stock Prices on Fridays and Mondays," he showed that the average return on Fridays exceeded the average return on Mondays, and that there is a difference in the patterns of price changes between those days. We can then consider that there is probably a strong correlation between the Friday and Monday return. French (1980) work come to support this assertion. By analyzing 500 large firms on the NYSE over a 24-year period, he found that the average returns on Monday were significantly negative overall and during each of the five-year sub-periods. Harris (1986) showed a timing difference in which the negative Monday return occurred for large companies and for small firms.

Ajayi *et al.* (2004) reported negative Monday returns in Estonian and Lithuanian Markets. However, positive Monday returns were founds in Russian Markets from 1999s to 2002. Wong and Ho (1986) by examining the Singapore Stock Exchange All Share Index and six sectoral indexes have also reported a weekly seasonal pattern. In other emerging markets like the Turkey market numbers of studies have been undertaken on different indexes. Berk and Güven (2003); Dicle and Hassan (2007); Cinko and Avci (2011) have shown evidence of the weekend effect, with a higher return on Tuesday and Monday in the BIST index, while lower returns were found on Thursday and Friday. These findings are actually consistent with the fact the day-of-the-week effect exists in most of the market, but the days in which higher or lower returns can be observed may also be varied in different markets. This can, therefore, be attributed to the reverse weekend effect which has been explored by some academicians. Brusa *et al.* (2005) for instance, recently showed the existence of a reverse weekend effect in the South African markets.

The second part of the weekend effect is the "weekend volatility effect" which describes a situation where the volatility of the weekend return is different from other weekdays. Fama (1965) analyzed 30 stocks from the Down-jones Index over a 5-year period and found that the predicted variance of the price return of Friday's close to Monday's close is merely 22 percent greater than that of the other normal trading days. French (1980) later reached a similar conclusion after studying a stock portfolio formed from the Standard & Poor's index. More recently, Bayar and Kan (2012) claimed that the Monday's volatility is highest and studies in different markets are likely to lead to various conclusions.

The causes of this phenomenon can be explained in different ways. A first possible explanation lies in the timing of information released by the firms during the week. Managers often tend to diffuse positive information during the trading days, while bad news is often spread in day-offs. As a result, the negative effects of bad information on the weekend are systematically integrated in the following trading days (on Monday) by investors which can only receive and process information in off sessions. This attitude aiming to lessen the negative impact of bad information on the weekend rather appear to have a reversal consequence on Monday returns. Damodaran (1989) however, mitigates the information hypothesis by stipulating that firm earnings and dividends can only explain 2.3 % and 1.1 %, in turn, of the week effect. Some papers also approach the problem by a behavioral analysis. Zilca (2017) for example, designed four different mood templates combining two similar approaches to identify and explain the day-of-the-week effect in the in U.S. stock markets. Mood scores obtained from the surveyors show that fluctuations of the average daily abnormal returns are well correlated with the state of mood within the day.

Others prefer to adopt an explanation based on the settlement delay. From a pragmatic point of view, the number of maximum days to settle a stock is clearly defined and concise. However, the date at which a transaction is realized during the trading days can cause some delays to the settlement. Lakonishok and Levi (1982) have offered a primary explanation of the intra-week abnormal daily returns by studying the gap of payment delay that can occur for a stock purchased on Friday and one other that can be bought on any day during the week. While the

former may be paid in the following eight business days, the latter is likely to be paid 10 days after. They argue that, because of this two-day gap in payment for purchased stocks, which generates an additional interest rate, investors are willing to pay more for common stock on a Friday than other days of the week. This attitude explains in part why the Mondays' returns can be negative. Gibbons and Hess (1981); Keim and Robert (1984) have explored the hypothesis of measurement errors as potential reasons by analysis biases across different prices in various weekdays, and they concluded that measurement errors cannot fully explain the weekend effect.

3. METHODOLOGY AND DATA COLLECTION

The paper investigates the performance of a sample of thirty equity small-cap funds in the USA market over a 10-year period from January first to December end 2018. By doing so, we have decided to select 30 small funds from the Russel Benchmark 2000 which is the index measuring the performance of the smallest companies in the USA markets. A number of 10 funds have been picked up by style of investment (Blend, Growth and value funds) to form the full sample of the study.

Furthermore, the funds selected have supposed to be among the best into their category since each of them is well ranked with at least 3 stars by Morningstar which is one of the most popular and reputed research specialized in rating and provide information, data, and trend about mutual funds, ETF over the world. Also, each fund is considered actively managed since they exhibit a portfolio turnover far above the average and others have a very high turnover ratio.

In examining the performance of mutual funds, we firstly use the trailing return (with adjusted dividend) methodology which is with the rolling return approach, the two widely methodologies for comparing mutual funds among them and with their Benchmark. Additionally, risk measure metrics have been computed for each fund and regrouped by style of investment over the corresponding sub-category.

Secondly, by computing the monthly total returns for each fund, some statistic metrics conventionally admitted (Sharpe, 1994) have been computed to determine their risk-adjusted performance.

To screening the different funds selected, we flicked into different research websites providing financial data and others oriented to funds like Morningstar, USA news finance. Then the desired number of 30 funds were selected according to their inception date, the portfolio turnover ratio, style of investment and rating. One downside of selecting funds with respect to the inception date is that some funds with a higher rating cannot be studied since their creation date was not prior to January 1st, 2009. As it is common for institutional investors to hold several funds in the same index, we have avoided to select more than one fund belonging to the same institutional investor and from a similar style of investment. Finally, the historical monthly prices (monthly close adjusted prices) of selected funds were downloaded from yahoo Finance and adjusted of periodical dividend to perform different calculus.

Regarding the risk analyzing, the standard deviation of each mutual fund was determined. R squared and the Beta (market-related risk) for the fund were also calculated by using the CAPM model.

$$\beta_f = \frac{COV(rf,rb)}{Var(rb)}$$

Where, β_f is the beta of the mutual fund, $COV(rf,rb)$ is the covariance of the monthly return of the fund (rf) with the monthly return of the Russell (2000) (rb), and $Var(rb)$ is the covariance of Russell (2000) index.

For each fund and style of investment, the fore-mentioned statistics metrics annualized have been determined over 3-year, 5-year and 10-year investment horizons.

The Sharpe ratio is calculated as follows:

$$\text{Sharpe Ratio} = \frac{Rp - Rf}{\sigma}$$

Where Rp is the average monthly return corresponding to the needed period, Rf is the risk-free rate or the USA Treasury Bills matching with the investment horizon, and σ is the standard deviation of the fund over the same period.

The Treynor ratio which is a slightly different version the above ratio is calculating as follows:

$$\text{Treynor Ratio} = \frac{Rp - Rf}{\beta}$$

Where Rp is the average monthly return corresponding to the needed period, Rf is the risk-free rate or the USA Treasury Bills matching with the investment horizon, and β is the beta of the fund of the same period.

Lastly, the Jensen Alpha which is the most observed and important risk-adjusted performance metric for mutual funds. It aims literally to measure the abnormal return realized by a mutual fund, then by this fact, it measures the ability of active managers to outperform the market. Its formula is as follows:

$$\alpha = Rp - [Rf + \beta \cdot (Rm - Rf)]$$

Where Rp is the average monthly return, Rf is the risk-free rate or the USA Treasury Bills, β is the beta of the fund during the same period, and Rm is the Russell 2000 index monthly return.

4. EMPIRICAL RESULTS AND DISCUSSION

Table 1 reports some primary and useful descriptive statistics for different mutual funds grouped by style of investment (Blend, Growth, and Value) over different time horizons. Regarding the findings of the table, nearly all the funds within each category have experienced an average negative trailing return for the 3-month, 6-month and 1-year periods. This may be due to the changing cycle in stock markets that took place after September 2018, meaning that markets have entered a downward cycle after a long period of bull market. However, the other three investment time horizons covered by the study clearly show that about 99 % of the 30 funds were able to generate positive trailing returns for their investors, with the 10-year returns outstripping the 5 and 3-year returns in each style. The volatility of returns in each style shows that, after being increased for the first-three time horizon with acceleration in the 1-year period, the dispersion around the mean started slowing down but has continued to gradually increase.

A first observation that can be drawn is that Growth funds seem to be riskier than value and Blend funds and this is confirmed by looking at their standard deviation which is higher in almost every time horizon. Blend funds whose portfolio is simply a combination of growth and value stocks offer a balanced portfolio for investors seeking diversification, yielding less risk but with also lower returns.

Table 2 summarizes the data for having a global look at the funds examined compared to their benchmark. It can be seen that not even the benchmark or any index fund would have displayed positive trailing returns for the different time horizons studied. This obviously indicates that stock prices have been dropped by the 2018 year-end,

thereby, leading to a 1-year negative historical returns. This situation is reversed only when trailing returns are examined beyond the scope of one year. Overall, over the six different time horizons, active small-cap funds provide an average higher historical return in the 10-year period.

Table-1. Summary of trailing return and standard deviation by fund style (in percentage).

Period		Blend funds		Growth funds		Value funds	
		Return	STD	Return	STD	Return	STD
3-Month	Median	-9.794	5.829	-16.097	8.582	-16.381	9.520
	Mean	-11.010	6.588	-16.655	8.914	-12.903	9.520
	MAX	-0.592	9.805	-7.742	15.968	23.497	14.530
	MIN	-21.736	4.537	-24.115	4.881	-23.259	3.839
6-Month	Median	-15.894	5.257	-20.432	8.928	-22.387	7.871
	Mean	-18.082	6.085	-21.252	8.916	-20.829	7.871
	MAX	-10.666	8.972	-12.434	12.868	11.287	9.918
	MIN	-26.716	3.748	-28.677	6.425	-31.275	5.255
1-Year	Median	-14.775	18.752	-14.494	30.396	-21.318	27.363
	Mean	-15.808	20.815	-13.632	29.169	-18.971	27.363
	MAX	-7.865	29.273	-2.962	36.541	17.827	34.027
	MIN	-23.434	15.315	-21.783	20.833	-28.332	16.844
3-Year	Median	6.710	15.984	11.135	21.284	5.181	18.608
	Mean	7.572	16.772	11.420	20.976	7.046	18.608
	MAX	12.028	20.319	19.633	29.203	17.882	32.865
	MIN	3.283	14.192	6.734	15.987	2.614	16.206
5-year	Median	3.610	17.276	5.384	20.865	2.292	19.110
	Mean	3.875	17.111	5.023	22.688	2.861	19.110
	MAX	7.065	20.172	7.828	43.118	10.061	32.361
	MIN	0.657	13.904	2.198	15.638	-1.312	15.233
10-Year	Median	12.993	19.237	13.851	20.575	12.445	20.869
	Mean	13.079	19.674	14.146	22.175	12.409	20.869
	MAX	14.577	22.409	17.873	34.438	14.236	30.800
	MIN	10.547	17.288	11.814	17.487	10.729	17.274

Table-2. Global summary of average return and volatility (in percentage).

Period		Median	Mean	Max	Min	25th percentile	75th percentile	Index
3-Month	Return	-14.492	-13.523	23.497	-24.115	-20.839	-10.472	-2.250
	STD	8.275	8.135	15.968	3.839	5.574	9.751	5.072
6-Month	Return	-21.562	-20.054	11.287	-31.275	-26.483	-15.980	-10.082
	STD	7.636	7.597	12.868	3.748	6.267	9.151	4.622
1-year	Return	-18.964	-16.137	17.827	-28.332	-21.653	-11.950	-6.195
	STD	25.419	25.422	36.541	15.315	19.580	29.740	14.856
3-Year	Return	7.206	8.679	19.633	2.614	5.083	11.732	12.582
	STD	18.224	19.377	32.865	14.192	16.194	21.752	14.187
5-Year	Return	3.301	3.920	10.061	-1.312	2.202	6.007	5.491
	STD	18.222	19.864	43.118	13.904	16.611	20.652	14.350
10-Year	Return	13.025	13.211	17.873	10.547	12.503	13.984	12.787
	STD	20.279	20.985	34.438	17.274	18.486	21.937	17.578

For examining the risk profile of each fund, we have computed both their R-Squared and the Beta as both of them are indispensable and cannot be separated just like return and risk. So, the computations have been done from a 3-year time horizon to have a better number of observations. Only some funds have a high 3-year historical beta or above 1 (see Table 3). The average beta for growth funds is the one closest to the benchmark beta (1). Regarding the 5-year horizon, the pattern did not change, but it can be seen that the average of historical returns within each fund style is nearly perfectly correlated to the market in the 10-year horizon. This way to look back over a long period can lead to misinterpretation for investors because the risk profile of a company can change over the long

term. The average beta of each style actually denotes a gradual decrease, a synonym of the fact that several of the funds analyzed may have enhanced their profile of risk related to the market.

Table-3. Risk measure metrics by fund style (in percentage).

		Blend fund		Growth fund		Value fund		Global	
Period		**R^2**	**β**	**R^2**	**β**	**R^2**	**β**	**R^2**	**β**
3-Year	Mean	0.519	0.857	0.433	0.902	0.358	0.795	0.431	0.865
	Mean	0.553	0.861	0.431	0.890	0.366	0.839	0.450	0.864
	Max	0.889	1.056	0.845	1.066	0.769	1.551	0.889	1.551
	Min	0.356	0.646	0.099	0.648	0.067	0.338	0.067	0.338
5-year	Median	0.486	0.813	0.405	0.927	0.366	0.813	0.393	0.861
	Mean	0.521	0.831	0.435	0.889	0.377	0.804	0.445	0.842
	Max	0.909	1.004	0.871	1.023	0.800	1.097	0.909	1.097
	Min	0.247	0.681	0.035	0.566	0.184	0.551	0.035	0.551
10-Year	Median	0.753	0.958	0.637	0.932	0.645	0.956	0.687	0.942
	Mean	0.718	0.934	0.596	0.911	0.608	0.923	0.641	0.922
	Max	0.956	1.057	0.906	0.998	0.908	1.255	0.956	1.255
	Min	0.373	0.779	0.143	0.740	0.192	0.673	0.143	0.673

In order to validate these fund's beta, it is crucial to observe their corresponding R-squared. A quick screening allows noticing that most of the higher beta obtained in various time horizons are unreliable, which means that a great number of funds' returns cannot be explained by the movements of their benchmark. More precisely, only 20% of blend funds examined have an acceptable R-squared for the 3-year period, a similar percentage for the 5-year period and 70 % for the 10-year horizon. Growth funds exhibited the same pattern for the two-first periods and 10% for the 10-year period. The proportion for value funds is half less than that of growth and blend funds for 3 and 5-year periods, and only 20% in the 10-year time horizon. Thereby, any fund with a high beta but low a (< 0.7) R-squared is meaningless since the corresponding fund's performance cannot be explained by its index.

4.1. An Obvious Domination of Active Growth and Value Funds

It is conventionally admitted that small-cap active equity funds have greater potential to beat their corresponding index than their large and mid-cap counterparts. At the same time, it is also recognized that small-cap active growth funds are more likely to surpass other funds 'style (Value and Blend). The similar argument is valid when it comes to comparing Blend and Value funds performance. So, it could be surprisingly if the empirical results tell another story. Table 4 highlights different risk-adjusted performance metrics of the examined funds grouped by style of investment over 3-year, 5-year and 10-year periods.

Table-4. Risk adjusted-performance by style of investment (in percentage).

Period		Blend			Growth			Value		
		Jensen	**Treynor**	**Sharpe**	**Jensen**	**Treynor**	**Sharpe**	**Jensen**	**Treynor**	**Sharpe**
3-Year	Median	-0.011	0.061	0.340	0.046	0.123	0.556	0.027	0.053	0.280
	Mean	-0.003	0.070	0.384	0.058	0.136	0.577	0.042	0.060	0.294
	Max	0.065	0.143	0.858	0.168	0.255	0.834	0.119	0.129	0.723
	Min	-0.039	0.031	0.175	-0.003	0.070	0.383	-0.014	0.018	0.113
5-Year	Median	0.009	0.035	0.248	0.048	0.084	0.372	0.019	0.036	0.146
	Mean	0.011	0.037	0.211	0.057	0.094	0.354	0.020	0.028	0.137
	Max	0.044	0.080	0.438	0.128	0.169	0.427	0.040	0.045	0.240
	Min	-0.022	-0.011	-0.072	0.003	0.036	0.210	-0.006	-0.006	-0.033
10-Year	Median	0.015	0.123	0.631	0.026	0.138	0.659	0.107	0.123	0.581
	Mean	0.013	0.122	0.621	0.034	0.145	0.644	0.091	0.117	0.560
	Max	0.021	0.132	0.683	0.089	0.202	0.788	0.126	0.131	0.711
	Min	0.003	0.113	0.534	0.011	0.122	0.424	0.014	0.089	0.414

Though approximately all the funds falling into each investment style have made their way to generate a positive Sharpe and Treynor ratios over the three periods, growth funds are still leading the race. More interesting, by looking merely on the Jensen ratio which is the one measuring the ability of an active fund manager at generating an excess return for his investor, we can notice that the great majority of small-cap growth and value funds have managed to beat their respective benchmark during the three sub-periods covered. Their higher average Alpha is recorded in the 5-year period with 16.8% by the growth style. Blend style even with a negative alpha in the 3-yeat period has gradually generated an excess return over the 5-year and 10-year periods, meaning that investing in these funds would have better adapted for patient and long-term horizon investors. However, the positive alpha earned by the blend style remains too marginal and meaningless compared to another style of funds.

This outperformance is, therefore, a clear evidence that greater opportunities in this market segment could arise from better dispersion of funds invested by risk-takers, peculiarly by pledging money in growth fund where managers possess good stock-picking skills. This can be supported by Malcolm *et al.* (2004) and Gregory (2005) works who found that "growth-centric fund managers who possess security-selection ability tend to purchase stocks that earn higher returns upon subsequent earnings announcements and sell stocks off that earn lower returns".

However, this outperformance should be looked at with a critical view. Since Alpha measures a fund's performance relative to its beta, this latter should be reliable, which means that it has to be valid regarding whether a fund does or not have a high correlation with their corresponding index.

Statistics in Table 5 sums up the three risk-adjusted performance metrics for each time horizon. Once the excess returns of the entire sample of funds studied are averaged, not surprisingly we end up with the greatest alpha in the alpha in the 10-year investment horizon. This can be justified by the fact the higher average excess return recorded in blend and value funds appears in that period and comes to compensate the decrease in excess return observed within the growth style. Another pragmatic explanation often claimed by professionals is that small-cap funds tend to underperform in the short-term, but have the potential to provide higher returns over a long period. In other words, the high volatile inherent to this market segment and risk undertaken by these funds in the short term are likely to become less meaningful due to superior return over time. This also implies that small-cap segments better fit patient and long-term investors. But this assumption should not be taken for granted, not necessarily all small funds can beat the market in the long run.

Table-5. Summary of risk-adjusted performance metrics (in percentage)

Metrics		Sharpe	Jensen	Treynor
3-Year	Median	38.727	2.160	7.256
	Mean	41.826	3.228	8.857
	Max	85.794	16.782	25.456
	Min	11.340	-3.930	1.812
5-Year	Median	24.389	3.207	4.215
	Mean	23.423	2.937	5.301
	Max	43.804	12.771	16.930
`	Min	-7.188	-2.193	-1.064
10-Year	Median	61.219	2.281	12.798
	Mean	60.794	4.609	12.824
	Max	78.830	12.602	20.192
	Min	41.383	0.271	8.915

The number of outperforming funds by style is exhibited in the Table 6. It shows that the different funds studied have gradually managed to enhance their performance. More than half of the sample was able to outperform the market in the 3-year. At least 83% of them earned a positive alpha in the 5-year time horizon and the full sample generated a positive excess return in the 10-year.

Table-6. Number of outperformers by style.

Period	Growth	Value	Blend	Global
3-Year	9	8	2	19
5-Year	10	9	6	25
10-Year	10	10	10	30

This can actually be interpreted as a good global performance for the sample analyzed. We can tend to explain this by various reasons. Firstly, most of the fund managers of the sample selected may possess above-average stock-picking ability, and thus are able to earn positive a risk-adjusted return. Then we can consider that they are relatively and genuinely skilled, and contrasting the assumption claimed by the advocates of the Efficiency Market Hypothesis (EMF) who believe that active managers are just lucky in picking up good stocks, they do not rely on their skills, and as a result they may not able to generate sustainable excess return over time. However, this outperformance should be regarded cautiously since fees were not taken into account in our case, then the net-of-fees alpha would have been somewhat different.

Also, based upon some researches and reports, academicians and specialists have proved that the economic cycle tends to influence small-stock returns. Chan and Chen (1991) explain that small-firm stocks are often those which have poorly performed in the past in the contractionary phase and tend to recover quickly after the end of the tough and do better over time. Likewise, Daniel and Titman (1997); Lemmon and Portniaguina (2006) affirm that small stock performance may be linked to investors' sentiment. These later often attribute a greater value to small stocks in expansionary phase and a lower value in the recessionary phase as they perceive penny stocks riskier in the contractionary period. In the same vein, by examining five distinct expansionary cycles experienced in the US economy since 1979, a research on the FTSE Russel Report (2016) has reported a strong average US small stock premiums during the bullish market and also a substantial countercyclical performance in the bearish market.

5. CONCLUSION

This study analyzed the performance of small-cap active equity funds in the USA markets over three different sub-periods , and by balancing the sample of selected funds for each investment style, so that to make a comparison between fund style and with their benchmark. Even if the EMF continues maintaining that active management is useless, that it is a zero-sum game or sometimes worse than a zero-sum game, the results of our study show that less efficient markets like small-stock markets can effectively provide abnormal return opportunities for greater risk-taking. At an early stage, such size effect seems to be better captured by mostly growth and value funds whose characteristics often give them a natural potential to do so.

These findings are of importance for fund portfolio managers, specialists, scholars and particularly for investors since they should be aware of the robustness of outperformance those funds can effectively provide. Future exploration can be to further study the small-cap equity funds universe by style in foreign markets and to seek why some small-fund managers cannot grasp opportunities appearing in less or inefficient markets. A study over the skills of small-cap fund-oriented managers by style can be also done in this sense.

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Appendix: Name of different funds.

Tickers	Fund name	Inception date
	Blend funds	
GCSAX	Goldman Sachs Small Cap Eq Insghts A	1997
IYSAX	Ivy Small Cap Core A	1997
LZSCX	Lazard US Small-Mid Cap Equity Instl	1991
MSSFX	Litman Gregory Masters Smlr Coms Instl	2004
NEJYX	Natixis Vaughan Nelson Small Cap	2006
NSCRX	Nuveen NWQ Small-Cap I	2004
OFSAX	Olstein Strategic Opportunities A	2006
SLPAX	SEI Small Cap A (SIIT)	1996
VSTCX	Vanguard Strategic Small-Cap Equity Inv	2006
WSMVX	Wilshire Small Company Value Instl	1996
Growth funds		
FCCGX	Fidelity Advisor Small Cap Growth C	2004
FIMPX	Nuveen Small Cap Growth Opp I	2005
LAGWX	Lord Abbett Developing Growth A	1973
MGSEX)	AMG Managers Special Equity N	1986
QUAYX	AB Small Cap Growth Advisor	1996
OPOCX	Oppenheimer Discovery A	1986
QISGX	Federated MDT Small Cap Growth	2005
SGPIX	ProFunds Small Cap Growth Inv	2001
SSETX	Dreyfus/The Boston Co Small Cap Gr I	1996
TCMSX	TCM Small Cap Growth	2004
Value funds		
ANSIX	Ancora Special Opportunity	2004
AVFIX	American Beacon Small Cap Val Inst	1998
FCVAX	Fidelity Advisor Small Cap Value A	2004
FRVLX	Franklin Small Cap Value A	1996
FSCCX	Nuveen Small Cap Value I	1994
PMRRX	PNC Multi Factor Small Cap Value A	1994
SCMVX	Schneider Small Cap Value	1998
SVUIX	Guggenheim Mid Cap Value Inst	2004
SESVX	SEI Small Cap Value F (SIMT)	1994
CSCVX	CornerCap Small-Cap Value Investor	1992