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RESEARCH ARTICLE



# Excess Return of US Mutual Funds

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**Abstract:** The paper examines the factors that contribute to the outperformance of mutual funds in relation to the market, with a particular emphasis on the macroeconomic indicators as the key variables of interest. The paper begins by providing a comprehensive literature review on various factors that can impact the performance of mutual funds. The discussion encompasses a wide range of topics, including skill presence, diseconomies of scale, and other challenges associated with generating excess returns for investors.

In the second part of the paper, an empirical analysis is conducted using actively managed US mutual funds to establish a relationship between fund performance and macro-variables, specifically focusing on term and credit spreads. Furthermore, the study considers different returns on positive and negative changes in spreads. The sample consists of funds that primarily invest in various sectors within the United States, with the Standard and Poor's 500 (S&P 500) serving as the benchmark. To assess the performance of funds with active strategies, panel data models are applied, with the excess return over the benchmark as the dependent variable. Different subperiods, including the financial crisis and the COVID-19 period, are examined. Notably, the impact of variables during the pandemic period differs significantly from other subperiods. The findings indicate that positive and negative changes in the spread between corporate bond yields have significant and positive effects across almost all periods, which has practical implications for potential investors. It suggests that active professional portfolio managers have been successful in uncertain periods. To control for external shocks and funds' cross-correlation, double-clustered standard errors are employed, and a series of robustness checks confirm the stability of the results.

**Keywords:** mutual funds, S&P 500 index, excess return, US Treasuries, term spread, credit spread

For potential investors, the question of whether to opt for active or passive management poses a considerable complexity. Traditionally, active management is represented by mutual funds, while passive management is associated with stock indices. The prevailing notion that actively managed funds fail to outperform

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the benchmark has garnered support from numerous researchers, including seminal works such as Jensen (1968), Fama (1970), Malkiel (1995), Gruber (1996), and Carhart (1997), as well as more recent studies like Crane and Crotty (2018).

Jensen's pioneering work in 1968 found no evidence to support the notion that superior returns are typically followed by sustained market outperformance (Jensen 1968). Malkiel's study on the return on investment in equity mutual funds over a 20-year period similarly failed to identify stability in the fund results (Malkiel 1995). Fan and Lin (2020) concluded that the equity market has become increasingly efficient in the past decade. These findings align with the idea that actively managed funds struggle to consistently outperform the market.

However, an opposing perspective is presented in several other papers, such as Goetzmann and Ibbotson (1994), Cremers and Peajisto (2009), Berk and van Binsbergen (2015), and Kurbatskii (2022). These authors challenge the efficient market hypothesis and, through various means, provide evidence of managerial skills. For instance, Daniel et al. (1997) demonstrated that mutual funds achieve returns equivalent to the fees charged. Chen et al. (2000) found that funds investing in growing assets are more likely to exhibit management's ability to identify areas with superior returns. Wermers and Smith (2003) showed that funds with high asset turnover outperformed the S&P 500 from 1975 to 1994. Dahlquist et al. (2000) arrived at similar conclusions when analyzing Swedish funds.

Artamonov et al. (2020) have provided empirical evidence to support the notion that mutual funds' performance is influenced not only by internal characteristics but also by external factors. Their study focused on examining the impact of government bond yields on the excess returns of US mutual funds, incorporating various micro-variables as explanatory factors. By utilizing a sample from the Centre for Research in Security Prices (CRSP) database, which encompassed 376 US funds spanning from 2006 to 2017, the researchers concluded that the yield of US government bonds significantly influenced the mutual fund alpha. Specifically, their hypothesis that mutual funds tend to outperform the market during periods of rising long-term government bond rates was confirmed.

Our research is inspired by several related studies, including the works of Pastor and Stambaugh (2012) and Kacperczyk et al. (2014). Pastor and Stambaugh documented the time-varying nature of skill in active asset management, highlighting that managers exhibit stock-picking abilities during favorable market conditions, while demonstrating better market-timing skills in unfavorable times. Banegas et al. (2018) investigated the relationship between monetary policy shocks and mutual fund performance using data spanning from 2000 to 2017. They revealed that monetary policy can exert a direct and persistent effect on the US mutual fund industry. While Goyal and Welch (2008) and Rapach et al. (2010) considered a broad range of macro variables to predict stock index returns, the factors examined in their studies may not necessarily overlap with those influencing relative fund performance. Therefore, our research question diverges significantly from theirs.

The primary objective of our research is to analyze both micro and macro factors that can facilitate or hinder mutual funds in their pursuit to outperform the market. By exploring these factors, we aim to enhance our understanding of the complexities surrounding mutual fund performance relative to the broader market.

## Micro-approach for substantiating the performance of mutual funds

Researchers are also concerned with the factors that can influence the relative performance of mutual funds in relation to the market. Nearly all studies dedicated to fund performance investigate the specific characteristics of funds as potentially crucial determinants of future profitability. An analysis of fund performance that fails to consider the micro-level approach would be deemed incomplete.

Among the various factors examined in studies on mutual funds, the "size of a fund" emerges as a subject of extensive discussion. Typically measured by the total net assets, fund size is perhaps the most widely explored variable in this domain. Large funds possess significant negotiating power due to their operation across a broader range of assets and management of substantial trading volumes. Additionally, they are able to offer services with lower commission payments owing to the magnitude of their transactional activities. Large funds enjoy several advantages over their smaller counterparts. Firstly, they can distribute costs across a more extensive asset base and have greater resources for market analysis. Managers of large funds can capitalize on investment projects that are simply inaccessible to smaller funds. However, large funds also encounter certain challenges and problems for the management company. The scale of investment opportunities represents a key factor for sustainability of results. While small funds tend to concentrate on a limited number of investment positions, large funds strive to maintain their leading positions by actively seeking new promising opportunities in the stock market. Consequently, the effects of utilizing managerial skills begin to blur, leading to diminished economies of scale. For instance, Cremers and Peajisto (2009) demonstrated that small funds are more likely to employ active investment strategies, whereas large funds tend to exhibit a more passive approach. Furthermore, the execution of large transactions by these funds garners substantial attention from competitors in the stock exchange, thereby creating risks of diminishing the expected return on investment, as other funds emulate the strategies of prominent players and vie for a share of the final profit. This phenomenon, referred to as the liquidity constraint hypothesis, was identified by Chen et al. (2004).

Grinblatt and Titman (1989) conducted several studies and found a mixed impact of fund size on returns. In contrast, Chen et al. (2004) demonstrated that fund size has a negative effect on returns, particularly among funds investing in small and illiquid assets, indicating that liquidity is the primary driver of this adverse impact. The authors also highlighted organizational issues within larger funds. Pollet and Wilson (2008) supported Chen et al. (2004) by attributing the decline in profitability resulting from fund consolidation to the challenge of scaling the investment strategy correctly,

primarily due to liquidity constraints. They concluded that when funds experience significant inflows from investors, managers tend to increase their positions proportionally rather than diversifying the portfolio with new assets.

Ferreira et al. (2013) also found that smaller funds tend to outperform, but the dispersion of returns increases with the size of the fund's assets. Similar findings were observed by Dahlquist et al. (2000) for Swedish mutual funds investing in stocks, where a negative relationship between returns and fund size was identified. On the other hand, Chen et al. (2004) revealed that network size has a positive impact on fund performance due to economies of scale. Ferreira et al. (2013) further concluded that network size has a statistically significant positive effect on the performance of mutual funds, both in the US and in other countries. Additionally, funds with the best results are more frequently managed by larger companies.

The age of a fund reflects its ability to thrive in a competitive environment by leveraging managerial expertise. This characteristic can impact performance in various ways. Some researchers argue that younger funds are more motivated to generate high returns in order to establish themselves in the market. Conversely, others contend that the shorter lifespan of younger funds can be a disadvantage, as they may face higher costs and lack sufficient experience in portfolio management during their formative stages. Furthermore, due to their smaller size, new funds are more vulnerable to manipulations of returns and ratings.

The debate surrounding the micro-approach is valuable in exploring the underlying causes of mutual fund insolvency. Specifically, a significant number of researchers argue that the fees charged to investors when joining a fund have a consistently negative effect on returns. However, an alternative hypothesis suggests that higher fees may serve as an indicator of more skilled and successful asset management. The relationship between mutual fund returns and expenses, which encompass management fees, is believed to be rooted in the concept of commissions as an indirect payment from investors to fund managers for their services. The influence of this parameter is subject to varying interpretations among researchers.

Within a sample of US funds, several authors have identified a negative association between commissions and both net returns (excluding commissions) and gross returns (including commissions). However, the impact of commissions on profitability is not universally agreed upon. Some researchers, such as Ferreira et al. (2013), have concluded that the effect of commissions on fund performance is not statistically significant.

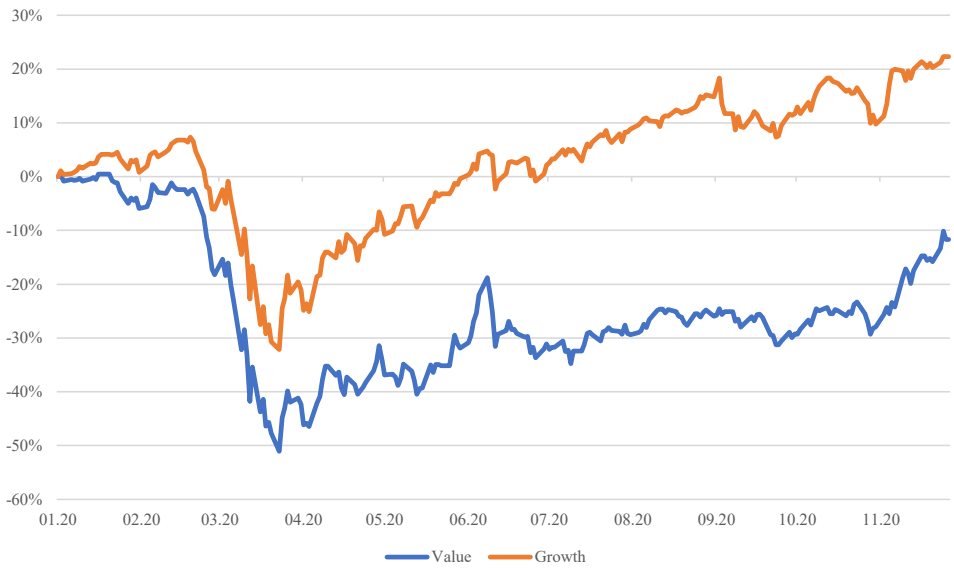


***Figure 1. S&P 500 Pure Value and S&P 500 Pure Growth indices***
*Source: Composed by authors based on Bloomberg data*

The year 2020 should be highlighted. Figure 1 illustrates the performance trends of the S&P 500 Pure Value and S&P 500 Pure Growth indices since the beginning of the year. The Value segment primarily consists of companies from cyclical industries that have been significantly affected by the COVID-19 pandemic. Value stocks are characterized by low valuations based on multiples such as P/E, P/S, P/B, and EV/EBITDA, and they consistently trade below the market average. This segment includes industries such as banks, energy, metals and mining, and industrials. These sectors form the core components of value indexes, such as the S&P 500 Pure Value index, which comprises financials (21%), consumer discretionary (18%), communication services (12%), and five other sectors (each at 8%), including industrials and materials, which are particularly cyclical, as well as technology companies that can also be considered cyclical based on their inclusion in the index (such as Western Digital, HP Inc, Micron, and Intel). On the other hand, defensive stocks, mostly in the HealthCare, Consumer Staples, and Utilities sectors, tend to belong to the quality category.

It is worth noting that value stocks outperformed the S&P 500 in 2022, primarily due to the overweight allocation in energy and underweight allocation in the technology sector. In contrast, the Growth segment is dominated by technology company stocks, which have been perceived as beneficiaries of the crisis. The divergence in performance between Value and Growth in 2020 was the most significant since the peak of the Internet bubble in 2000. This substantial gap, particularly prior to November 9

when news of the Pfizer-BioNTech COVID-19 vaccine's effectiveness emerged, posed significant challenges for value-oriented funds in outperforming the benchmark, even with highly talented and skilled managers. The situation slightly improved in early November when the Value segment regained approximately 10% against the Growth segment within a couple of weeks.

In the subsequent section, we propose utilizing both the macro and micro approaches to examine mutual fund performance, employing panel data models to estimate the impact of various variables on funds' excess returns.

## Empirical research

We compiled a sample of 668 US funds by utilizing data from Bloomberg Terminal covering the period from 2006 to 2020. Our sample exclusively includes active funds, and we excluded funds with high correlation to the benchmark. However, the determination of a fund's activity level is a broad topic that we do not delve into in this study. Various methods exist for measuring activity level (Meier, Rombouts 2009), but they all necessitate access to data on mutual fund portfolio structures, which is often limited or restricted (Frank et al. 2014).

### *Sample selection*

The funds included in our sample satisfied the following criteria:

- Open-end funds.
- Investment portfolio assets consist of equity securities.
- Investment goals fell under the categories of Value, Blend, or Growth.
- Large, mid, or small in terms of market orientation.
- Benchmark – S&P 500.
- Country of domicile – US.
- Index funds, highly specialized funds (such as industry funds), and funds with substantial investments in other assets were excluded.
- Funds with different life periods were included to avoid survivorship bias.

Investors and managers typically compare their performance to an official benchmark, which is why we used this benchmark as the dependent variable. We specifically considered funds with the S&P 500 as the benchmark and manually filtered the sample to exclude funds with different investment strategies. We also examined the correlation and removed funds with either very high or very low correlation, as they would not accurately represent broad market funds despite having the declared benchmark. It was crucial to ensure a valid comparison between our sample and the S&P 500 in order to accurately analyze and assess excess returns.

Our primary objective is to investigate the factors that influence a fund's performance relative to the benchmark. Therefore, we do not consider "alpha," which accounts for risk adjustment, as there is insufficient evidence to suggest that higher returns compensate for higher risk in the stock market. The focus of this paper is to

evaluate managers' ability to outperform the market, taking into account funds with a risk level similar to that of the market. Additionally, we believe that long-term processes need to be understood, and the level of risk, as calculated by the alpha coefficient, is highly dependent on the investment horizon.

Furthermore, the majority of investors primarily assess the success of a fund based on its income relative to the benchmark, without considering the level of risk involved. Notably, this criterion of relative risk level is not utilized by S&P Indices Versus Active (SPIVA) and Morningstar in their evaluations of the number of funds that outperform the benchmark. Stock market indices comprise assets that are readily traded on the stock exchange. As a result, the assets included in the market portfolio, such as Exchange Traded Funds (ETFs), index mutual funds, and other derivatives that offer lower costs for investors, serve as the most apparent and direct alternatives to mutual funds. Mutual funds and market indices have traditionally been seen as competitors for potential investments.

***Variables***

Now let's examine the chosen variables, which were selected based on the aforementioned literature review. It is important to note that we did not incorporate the fund's lifetime as a factor since it is typically a formal feature. A fund could exist for 20 years without any significant assets and then experience substantial growth due to a couple of successful years, or vice versa. Regarding the fund's size, we decided to include it in our models due to the conflicting findings from previous studies.

To elucidate the variations in the funds' excess returns, we included the following micro- and macro-variables:

- Spread between the logarithm of the fund's return and the logarithm of the S&P 500 return, referred to as *"excess.return"* (as the dependent variable).
- Spread between the 10-Year Treasury Constant Maturity Rate and the Three-Month Treasury Bill rate, denoted as *"spread.tres."*
- Spread between Moody's Aaa Corporate Bond Yield and Moody's Seasoned Baa Corporate Bond Yield, denoted as *"spread.moodys."*
- *Style*, represented as a factor with three levels: Blend, Growth, and Value.
- Fund expense ratio, indicated as *"expr."*
- Fund marginal stated fee, indicated as *"fee."*
- Fund turnover, denoted as *"turn."*
- Percentage of top 10 holdings, referred to as *"TopTen."*
- Fund's total assets, denoted as *"size."*

Regarding the spreads, we consider both positive and negative changes over a specific period and separately analyze the returns associated with these changes.

**Hypotheses**

Now let's outline the main hypotheses of the study:

a) The spread between long-term and short-term interest rates is a significant factor in determining the mutual fund's excess return, which is the difference between the fund's return and the benchmark return.

b) The spread between corporate bond yields, serving as an indicator of sensitivity to risk, has a positive impact on fund performance.

Previous research does not appear to have incorporated all of these variables, although Campello et al. (2008) did consider corporate bond yields to construct firm-specific measures of expected equity returns. Regarding the other variables, based on the literature review, we anticipate observing negative signs for the expense ratio, fund fee, and turnover, while positive coefficients are expected for the percentage of top 10 holdings and the fund's total assets.

***Descriptive statistics***

Table 1 contains basic descriptive statistics for the funds' characteristics.

***Table 1. Descriptive statistics for fund characteristics***

| Statistic | N | Min | Mean | Median | Max | St.Dev |
|---|---|---|---|---|---|---|
| expr | 661 | 0.00 | 1.07 | 1.01 | 4.36 | 0.54 |
| TopTen | 664 | 5.23 | 41.52 | 38.79 | 100.00 | 16.73 |
| size | 666 | 0.01 | 4891.33 | 340.94 | 405245.60 | 24760.45 |
| fee | 653 | 0.01 | 0.68 | 0.70 | 1.50 | 0.29 |
| turn | 662 | -0.66 | 67.05 | 36.00 | 1128.92 | 116.88 |

*Source:* Composed by authors

For the Style factor, there were 266 Blend funds, 124 Growth funds and 166 Value funds.

**Model definition**

We employed a panel data approach to analyze the fund excess return, utilizing time series data for the S&P 500 and interest rates, as well as cross-sectional data for other variables. The study covered the period from December 2005 to July 2020, with data collected on a monthly basis. It is worth noting that the characteristics of the funds remained relatively stable over time.

To estimate the relationship, we employed a panel regression model in the following form, where Δ represents the first difference in time:

$$excess.return_{it} = \beta_0 + \beta_1\Delta^+(spread.tres)_t + \beta_2\Delta^-(spread.tres)_t + \beta_3\Delta^+(spread.moodys)_t + \beta_4\Delta^-(spread.moodys)_t + x_i'\gamma + \mu_i + u_{it}$$

Here $\Delta^+$and $\Delta^-$ denote the positive and negative changes over a period respectively, e.g. $\Delta^+(spread.tres)$=max($\Delta(spread.tres)$,0) and $\Delta^-(spread.tres)$= min($\Delta(spread.tres)$,0).

$x_i' = (Style, expr, fee, turn, TopTen, \log(size))$ is the vector of the fund characteristics. Since regressors in $x_i$ are constant over time, the coefficients $\gamma$ could not be estimated for fixed effects (FE) panel regression. Therefore, only pooling and random effects (RE) regressions were considered.

To perform a robustness check, the models were considered on the following time subperiods:

- Dec 2005 – Nov 2007
- Dec 2007 – Jun 2009
- Jul 2009 – Jan 2020
- Dec 2005 – Jan 2020 (excluding the COVID-19 pandemic period)
- Feb 2020 – Jul 2020
- Dec 2005 – Jul 2020 (whole time interval)

These specific subperiods were selected in consideration of the recessions that occurred in the United States: 2008-2009, characterized by a recession and accommodative monetary policy, and 2020, marked by another recession. During recessions, the relationship between bonds and stocks may undergo changes as investors become concerned about the current state of the economy, and expectations for recovery from the recession impact profitability (lower yield in times of economic distress). In periods of relative stability, the yield is influenced by various factors, including inflation, supply and demand dynamics for bonds, economic indicators, banking sector conditions, actions and statements from the Federal Reserve, as well as external and internal policies.

*Diagnostic tests*

Diagnostic tests were based on Bera, Sosa-Escudero and Yoon robust tests for AR(1) serial correlation and for Res (Bera et al. 2001). The results of tests are presented in Tables 2 and 3.

***Table 2. Bera, Sosa-Escudero and Yoon locally-robust test for AR(1) serial correlation sub-random effects***

| | chi-sq.stat | p.value |
|---|---|---|
| Dec05-Nov07 | 42.883 | 0 |
| Dec07-Jun09 | 186.250 | 0 |
| Jul09-Jan20 | 5632.095 | 0 |
| **Dec05-Jan20** | 1565.257 | 0 |
| Feb20-Jul20 | 5.117 | 0.024 |
| **Overall** | 1293.273 | 0 |

*Source:* Composed by authors

***Table 3. Bera, Sosa-Escudero and Yoon locally-robust test (one-sided) for unobservable effects sub-AR(1) errors***

| | z.stat | p.value |
|---|---|---|
| Dec05-Nov07 | -4.334 | 1 |
| Dec07-Jun09 | -1.890 | 0.971 |
| Jul09-Jan20 | 1.872 | 0.031 |
| **Dec05-Jan20** | -5.443 | 1 |
| Feb20-Jul20 | 0.973 | 0.165 |
| **Overall** | -5.577 | 1 |

*Source:* Composed by authors

*Model estimation*

For all periods, we have evidence for serial correlation. Individual effects are significant only in the period Jul 2009 – Jan 2020. Table 4 therefore presents pooling model for all periods except the period Jul 2009 – Jan 2020. To control common external shocks and correlation across funds we used double-clustered standard errors by Driscoll & Kraay.

***Table 4. Estimation results for panel models for subperiods***

| | Periods | | | | | |
|---|---|---|---|---|---|---|
| | Dec05-Nov07 (Pl) | Dec07-Jun09 (Pl) | Jul09-Jan20 (RE) | **Dec05-Jan20 (Pl)** | Feb20-Jul20 (Pl) | **Overall (Pl)** |
| $\Delta^{+}$*(spread.tres)* | 0.031 | -0.015 | 0.056** | 0.021 | -0.606*** | 0.015 |
| | (0.026) | (0.022) | (0.023) | (0.016) | (0.007) | (0.016) |
| $\Delta^{-}$*(spread.tres)* | -0.036 | 0.024 | -0.017 | -0.008 | 0.090*** | -0.006 |
| | (0.028) | (0.034) | (0.017) | (0.013) | (0.001) | (0.012) |

| | | | | | | |
|---|---|---|---|---|---|---|
| $\Delta^{+}$*(spread.moodys)* | 0.348*** | 0.102*** | 0.010 | 0.086*** | 0.084*** | 0.099*** |
| | (0.103) | (0.016) | (0.049) | (0.015) | (0.003) | (0.017) |
| $\Delta^{-}$*(spread.moodys)* | -0.289 | 0.043* | 0.047 | 0.038*** | 0.398*** | 0.038*** |
| | (0.264) | (0.022) | (0.038) | (0.013) | (0.043) | (0.013) |
| *StyleGrowth* | -0.0002 | -0.002 | 0.001* | 0.0005 | 0.011*** | 0.001 |
| | (0.001) | (0.003) | (0.001) | (0.001) | (0.002) | (0.001) |
| *StyleValue* | -0.001 | 0.0003 | -0.001** | -0.001* | -0.011*** | -0.001** |
| | (0.001) | (0.002) | (0.0004) | (0.0004) | (0.001) | (0.0005) |
| *expr/1000* | 0.104 | -4.497 | -0.716* | -1.124** | -0.650 | -1.123** |
| | (0.966) | (2.986) | (0.402) | (0.559) | (3.323) | (0.551) |
| *fee/1000* | 2.220 | 8.580 | -1.223 | 0.654 | 2.233 | 0.709 |
| | (2.518) | (6.951) | (1.072) | (1.381) | (4.001) | (1.354) |
| $turn/10^6$ | 2.341 | -1.466 | -3.252*** | -2.057** | -2.957 | -2.111** |
| | (2.678) | (4.626) | (0.906) | (0.987) | (11.059) | (0.987) |
| $TopTen/10^5$ | -1.197 | 7.734*** | -1.567* | -0.485 | 5.134 | -0.247 |
| | (2.638) | (2.179) | (0.947) | (0.950) | (7.148) | (0.976) |
| *log(size)/1000* | 0.709** | -1.396 | 0.319*** | 0.150 | 1.236*** | 0.171 |
| | (0.278) | (0.984) | (0.108) | (0.184) | (0.183) | (0.180) |
| *Constant* | -0.020*** | 0.011 | -0.004 | -0.003 | 0.067*** | -0.003 |
| | (0.006) | (0.012) | (0.003) | (0.002) | (0.005) | (0.002) |
| Observations | 12374 | 10209 | 58997 | 81580 | 2180 | 83760 |
| $R^2$ | 0.113 | 0.162 | 0.038 | 0.068 | 0.720 | 0.085 |
| Adjusted $R^2$ | 0.112 | 0.161 | 0.038 | 0.068 | 0.718 | 0.085 |
| F-stat | 101.068*** | 363.78*** | 125.60*** | 302.15*** | 1245.36*** | 415.61*** |

*Note.* * - p<0.1; ** - p<0.05; *** - p<0.01. Driscoll-Kraay s.e. in parentheses. PL stands for pooling model, RE stands for random-effect model.

*Source:* Composed by authors

Based on these results, the following empirical conclusions can be drawn at a significance level of 5%:

- The positive change in the spread between long-term and short-term US government Treasury bond yields is a significant factor in the periods from July 2009 to January 2020 and from February 2020 to July 2020. The impact is positive in the period from July 2009 to January 2020 and negative in the period from February 2020 to July 2020.
- The negative change in the spread between long-term and short-term US government Treasury bond yields is a significant factor only in the period from February 2020 to July 2020.

- The positive change in the spread between corporate bond yields is positive and significant in all periods except from July 2009 to January 2020. The strongest positive impact on excess return was observed in the period from December 2005 to November 2007.
- The negative change in the spread between corporate bond yields is positive and significant in the periods from December 2005 to January 2020, from February 2020 to July 2020, and across the entire time range. The strongest positive impact on excess return was observed in the period from February 2020 to July 2020.
- The management style *StyleGrowth* is significant and positive only in the period from February 2020 to July 2020. It can be concluded that in the extraordinary situation of 2020, investors who preferred growth stocks outperformed the market regardless of their skills. The management style *StyleValue* is significant and negative in the periods from July 2009 to January 2020, from February 2020 to July 2020, and across the entire time range.
- The variable *expr* is significant and negative in the period from December 2005 to January 2020 and across the entire time range.
- The variable *fee* is positive and insignificant in all subperiods.
- The variable *TopTen* is positive and significant only in the period of the financial crisis from December 2007 to June 2009.
- The variable *turn* is significant in the periods from July 2009 to January 2020, from December 2005 to January 2020, and across the entire time range.
- The variable size is positive and significant in the periods from December 2005 to November 2007, from July 2009 to January 2020, and from February 2020 to July 2020.

## Possible applications

The significance and overall positivity of the credit spreads for active managers validate their ability to generate profits during periods of market uncertainty. Based on the significance of the term spread during the COVID-19 subperiod, the practical implications of the findings can be summarized as follows:

1. Equity fund managers should adjust their portfolios in anticipation of significant changes in the US Treasury (UST) market.
2. Although our analysis focuses on equity funds, it does not imply that the findings are limited to this specific type of fund. If we had access to a list of hedge funds that exclusively invest in stocks, we would include them as well. However, the applicability of our findings extends to other funds that also invest in stocks. Large hedge funds typically have multiple management teams specializing in different areas such as stocks, bonds, options, etc. Therefore, the research findings can be of interest to stock managers who can draw relevant conclusions. Hedge funds or balanced funds can utilize UST instruments to hedge their stock investments and mitigate the impact of stock market fluctuations.

## Robustness checks

We conducted several robustness checks by examining different specifications. Given that the spreads are identical for all funds, we did not include panel regressions with two-way effects. Similar to the previous section, each regression in the series was fitted on the same subperiods. The following tables present the estimation results for a specific set of models.

***Table 5. Estimation results for RE panel models with individual effects and a linear trend for subperiods. Driscoll-Kraay robust s.e. in parenthesis***

| | Periods | | | | | |
|---|---|---|---|---|---|---|
| | Dec05-Nov07 | Dec07-Jun09 | Jul09-Jan20 | **Dec05-Jan20** | Feb20-Jul20 | **Overall** |
| $\Delta^{+}$*(spread.tres)* | 0.029 | -0.016 | 0.056** | 0.020 | -1.657*** | 0.014 |
| | (0.023) | (0.019) | (0.023) | (0.016) | (0.001) | (0.017) |
| $\Delta^{-}$*(spread.tres)* | -0.048* | 0.013 | -0.017 | -0.007 | 0.246*** | -0.004 |
| | (0.027) | (0.031) | (0.018) | (0.014) | (0.0001) | (0.013) |
| $\Delta^{+}$*(spread.moodys)* | 0.364*** | 0.089*** | 0.009 | 0.085*** | -0.247*** | 0.099*** |
| | (0.101) | (0.026) | (0.051) | (0.014) | (0.0002) | (0.017) |
| $\Delta^{-}$*(spread.moodys)* | -0.282 | 0.078 | 0.050 | 0.039*** | 0.996*** | 0.039*** |
| | (0.265) | (0.066) | (0.042) | (0.013) | (0.0004) | (0.013) |
| *StyleGrowth* | -0.0002 | -0.002 | 0.001* | 0.001 | 0.011*** | 0.001 |
| | (0.001) | (0.004) | (0.001) | (0.001) | (0.002) | (0.001) |
| *StyleValue* | -0.001 | 0.0003 | -0.001** | -0.001* | -0.011*** | -0.001** |
| | (0.001) | (0.002) | (0.0004) | (0.0004) | (0.001) | (0.0005) |
| *expr/1000* | 0.104 | -4.509 | -0.702* | -1.091* | -0.603 | -1.081* |
| | (0.964) | (3.279) | (0.406) | (0.565) | (3.450) | (0.557) |
| *fee/1000* | 2.220 | 8.600 | -1.274 | 0.563 | 2.364 | 0.594 |
| | (2.518) | (7.639) | (1.083) | (1.394) | (4.164) | (1.366) |
| *turn/$10^6$* | 2.341 | -1.444 | -3.265*** | -2.075** | -3.027 | -2.140** |
| | (2.671) | (5.094) | (0.911) | (0.993) | (11.464) | (0.996) |
| *TopTen/$10^5$* | -1.197 | 7.725*** | -1.570* | -0.448 | 5.247 | -0.214 |
| | (2.638) | (2.395) | (0.950) | (0.952) | (7.286) | (0.980) |
| *log(size)/1000* | 0.709** | -1.395 | 0.327*** | 0.166 | 1.280*** | 0.193 |
| | (0.278) | (1.082) | (0.115) | (0.187) | (0.207) | (0.184) |
| *trend/100* | -0.049 | 0.148 | -0.001 | -0.002 | -3.428*** | -0.002 |
| | (0.033) | (0.205) | (0.004) | (0.002) | (0.002) | (0.002) |
| *Constant* | -0.016* | -0.035 | -0.003 | -0.001 | 6.167*** | -0.001 |
| | (0.008) | (0.058) | (0.007) | (0.004) | (0.007) | (0.004) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Observations | 12374 | 10209 | 58997 | 81580 | 2180 | 83760 |
| $R^2$ | 0.119 | 0.171 | 0.038 | 0.069 | 0.747 | 0.086 |
| F Statistic | 1670.9*** | 2097.6*** | 2332.4*** | 6005.5*** | 6414.0*** | 7830.2*** |

*Source:* Composed by authors

***Table 6. Estimation results for FE panel models with individual effects for subperiods. Driscoll-Kraay robust s.e. in parenthesis***

| | Periods | | | | | |
|---|---|---|---|---|---|---|
| | Dec05-Nov07 | Dec07-Jun09 | Jul09-Jan20 | **Dec05-Jan20** | Feb20-Jul20 | **Overall** |
| $\Delta^+$*(spread.tres)* | 0.041 | -0.011 | 0.060*** | 0.025 | -0.628*** | 0.018 |
| | (0.030) | (0.023) | (0.023) | (0.016) | (0.008) | (0.016) |
| $\Delta^-$*(spread.tres)* | -0.036 | 0.025 | -0.017 | -0.007 | 0.109*** | -0.004 |
| | (0.028) | (0.035) | (0.017) | (0.013) | (0.001) | (0.013) |
| $\Delta^+$*(spread.moodys)* | 0.334*** | 0.092*** | 0.006 | 0.077*** | 0.087*** | 0.093*** |
| | (0.106) | (0.016) | (0.050) | (0.014) | (0.004) | (0.018) |
| $\Delta^-$*(spread.moodys)* | -0.302 | 0.044* | 0.042 | 0.038*** | 0.405*** | 0.037*** |
| | (0.260) | (0.022) | (0.038) | (0.013) | (0.042) | (0.013) |
| Observations | 15229 | 12565 | 72481 | 100275 | 2699 | 102974 |
| $R^2$ | 0.045 | 0.067 | 0.021 | 0.043 | 0.589 | 0.056 |
| F Statistic | 347.10*** | 390.66*** | 561.95*** | 1288.70*** | 1082.75*** | 1691.73*** |

*Source:* Composed by authors

***Table 7. Estimation results for FE panel models with individual effects and a linear trend for subperiods. Driscoll-Kraay robust s.e. in parenthesis***

| | Periods | | | | | |
|---|---|---|---|---|---|---|
| | Dec05-Nov07 | Dec07-Jun09 | Jul09-Jan20 | **Dec05-Jan20** | Feb20-Jul20 | **Overall** |
| $\Delta^+$*(spread.tres)* | 0.038 | -0.012 | 0.060*** | 0.025 | -1.647*** | 0.018 |
| | (0.026) | (0.020) | (0.023) | (0.016) | (0.004) | (0.017) |
| $\Delta^-$*(spread.tres)* | -0.047* | 0.013 | -0.015 | -0.006 | 0.260*** | -0.003 |
| | (0.027) | (0.032) | (0.018) | (0.014) | (0.001) | (0.014) |
| $\Delta^+$(spread.moodys) | 0.349*** | 0.079*** | 0.003 | 0.077*** | -0.233*** | 0.093*** |
| | (0.105) | (0.026) | (0.052) | (0.014) | (0.002) | (0.019) |
| $\Delta^-$*(spread.moodys)* | -0.294 | 0.080 | 0.047 | 0.039*** | 0.985*** | 0.037*** |
| | (0.261) | (0.066) | (0.043) | (0.013) | (0.002) | (0.013) |

| | | | | | | |
|---|---|---|---|---|---|---|
| trend/100 | -0.047 | 0.155 | -0.002 | -0.002 | -3.325*** | -0.002 |
| | (0.035) | (0.208) | (0.005) | (0.003) | (0.006) | (0.003) |
| Observations | 15229 | 12565 | 72481 | 100275 | 2699 | 102974 |
| $R^2$ | 0.092 | 0.124 | 0.031 | 0.050 | 0.682 | 0.062 |
| F Statistic | 295.61*** | 335.84*** | 455.41*** | 1038.37*** | 958.07*** | 1361.06*** |

*Source:* Composed by authors

We observe that the significance and the signs of spreads' effects do not change with respect to the baseline model.

## Discussion and conclusion

The significant impacts of spreads on the excess return can be explained through various channels. Typically, declining yields indicate economic slowdown or concerns in the market, leading investors to shift from risky stocks to defensive ones. It is assumed that equity funds tend to have a chronic underweight position in defensive stocks compared to the benchmark. Defensive stocks are generally more expensive and may generate lower returns in the long run compared to riskier stocks. Managers may have a tendency to buy popular stocks, as they can yield significant gains (or losses), and it is easier to market portfolios with such shares to clients. Thus, all else being equal, declining yields or prolonged periods of low yields are expected to have a negative impact on the performance of funds relative to the benchmark.

Low yields in the bond market can push bond investors towards the stock market in search of higher returns above inflation. However, these investors often lack expertise in individual stock selection and instead invest in the entire market through exchange-traded funds (ETFs). This results in a substantial influx of funds into ETFs, particularly into shares of the largest companies that form the core holdings of such funds. This influx complicates the task for active investors, as they primarily invest in other stocks with the goal of outperforming the benchmark.

In 2022, inflation has been on the rise globally, accompanied by increasing interest rates. Investors have started shifting towards companies with stable cash flow, even if they are relatively expensive. Notably, technology giants like Apple, Microsoft, and Alphabet have remained resilient in the technology sector while other stocks have experienced significant declines since the beginning of the year. However, as these three companies hold a significant weight in the NASDAQ index, which active fund managers cannot replicate, all 20 major US active technology funds that we track have underperformed the benchmark. It is important to note that this is a localized effect.

The shape of the US Treasury (UST) curve can be viewed as an indicator of investors' risk appetite, making it meaningful to consider the spread between corporate bonds (Baa-rated according to Moody's) and risk-free Aaa-rated bonds. We observe that this spread has a significant impact on the excess return of actively managed funds.

Regarding the applicability of our research to Russia, the situation is uncertain due to the dominant participation of individual investors on the Moscow Exchange. The share of institutional investors in Russia is relatively small on a global scale. Therefore, it remains an open question whether our findings hold true for individual investors in Russia. Further data accumulation in the current market realities will help shed light on this matter.

In conclusion, we find that the spread between 10-year and three-month bonds has an impact on the excess returns of actively managed funds during the COVID-19 period. Several factors may contribute to this effect. When the spread narrows and the US Treasury (UST) curve flattens, defensive stocks tend to outperform the riskier segment of the market. It is possible that the negative results observed among managers during this period stem from their portfolios being underweight in defensive stocks. This finding has practical implications. While our analysis focused on a refined sample of equity funds that typically do not take long or short positions in bonds, there are many mixed funds and hedge funds that invest in both stocks and bonds. These funds have the ability to hedge their alpha through positions in US Treasuries. Additionally, active funds can utilize leveraged ETFs on long Treasury bonds as a means to hedge alpha. Since such ETFs are considered equities, it allows funds to align with their investment mandates. The understanding that excess returns are influenced by spread movements can serve as a catalyst for adjusting management strategies within portfolios.

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# Избыточная доходность взаимных фондов в США

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В статье анализируются факторы, облегчающие и затрудняющие взаимным фондам задачу превзойти рынок. Важнейшими из включённых в модель факторов являются макроэкономические индикаторы, отобранные на основе обзора литературы. Вводная часть статьи посвящена аспектам в управлении фондами, начиная с наличия навыков и заканчивая экономией от масштаба, а также другими трудностями в получении избыточной доходности для инвесторов. Во второй части статьи проведён эмпирический анализ активно управляемых взаимных фондов США для установления связи между избыточной доходностью фондов и макропеременными, такими как спред между краткосрочными и долгосрочными ставками и кредитный спред. Более того, отдельно учитывается влияние положительных и отрицательных изменений спредов. Эконометрическая часть работы основывается на выборке, которая была составлена из фондов, заявляющих в качестве бенчмарка индекс S&P 500 и инвестирующих в основном в различные секторы США. Для изучения результативности фондов с активными стратегиями используются модели панельных данных с избыточной доходностью в качестве зависимой переменной.
В статье рассматриваются периоды финансового кризиса и период пандемии COVID-19. В период пандемии коэффициенты при переменных значительно отличаются от остальных временных отрезков. Положительные и отрицательные изменения спреда между доходностями корпоративных облигаций оказались значимыми и положительными почти на всех периодах, что может быть важно с практической точки зрения для потенциальных инвесторов и подразумевает, что активные профессиональные портфельные управляющие преуспевают в периоды неопределённости. Двойные кластеризованные стандартные ошибки используются для контроля внешних шоков и кросс-корреляции фондов, а проведённая проверка модели на устойчивость подтверждает стабильность результатов.

**Ключевые слова:** взаимные фонды, индекс S&P 500, избыточная доходность, казначейские облигации США, спред процентных ставок, кредитный спред

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