

# The Performance of Blauwtulp's Fund Selection Model

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The open-end fund industry has grown substantially since the recent financial crisis. From 2008 until the end of 2015 the number of European and US open-end funds has grown 10%. This number is 78% and 50% for Asian-Pacific and African funds, respectively. The total number of funds across these four regions grew 25% – from about 68,000 in 2008 to nearly 85,000 in the end of 2015. A single click in the Morningstar database yields over 230,000 different fund investment possibilities. Therefore, finding the “best” possible investment in the universe of funds is a tedious and costly task for those who do not possess sufficient financial expertise or lack the time required for research and to make an informed investment decision. This justifies the existence of independent fund advisors whose aim is to research the fund industry and provide better investment alternatives than any of their clients would find on their own.

Blauwtulp is a private asset management firm specializing in fund selection. Asset management includes the selection and rebalancing of funds and financial instruments in client portfolios. For most clients it is difficult to find a good fund selector. For example due to disclosure requirements it is challenging for investors to find the fund advisor that will invest their money in the most profitable way. Also Blauwtulp's stakeholders should hold interest in the company's ability to select the best funds and its value it add to its clients. Blauwtulp believes that transparency is key and therefore it has carried out an internal research of its ability to select funds. With this paper Blauwtulp aims to communicate to the market how well the company performs in selecting funds by comparing them to the funds that would be selected by an average investor and a reputable fund rating agency – Morningstar.

This paper starts with an outline of how this research was set up and what the results of the selection capabilities of Blauwtulp were. It starts with an introduction into the fund management business and the growth it has gone through and with an overview of the most recent academic research about factors that determine how well funds perform. Some of these factors are also used in the Blauwtulp selection process.

The research shows that the Blauwtulp fund selection model adds value compared to the average investor and the 5-star Morningstar portfolio. It also shows that the Blauwtulp selection model in general adds most value when selecting stock funds. It tends to be less effective – meaning no real differences to the average investor or 5-star Morningstar portfolios - for categories like Conservative Allocation or Commodities Futures and some bond categories. This is – by hindsight – logical since most selection criteria or factors in the Blauwtulp model are derived from academic research done for equity fund selection. There is therefore room for improvement in the selection model, especially for the categories where no value added has been shown. Blauwtulp will use the outcomes of this study to take the selection model to the next level.

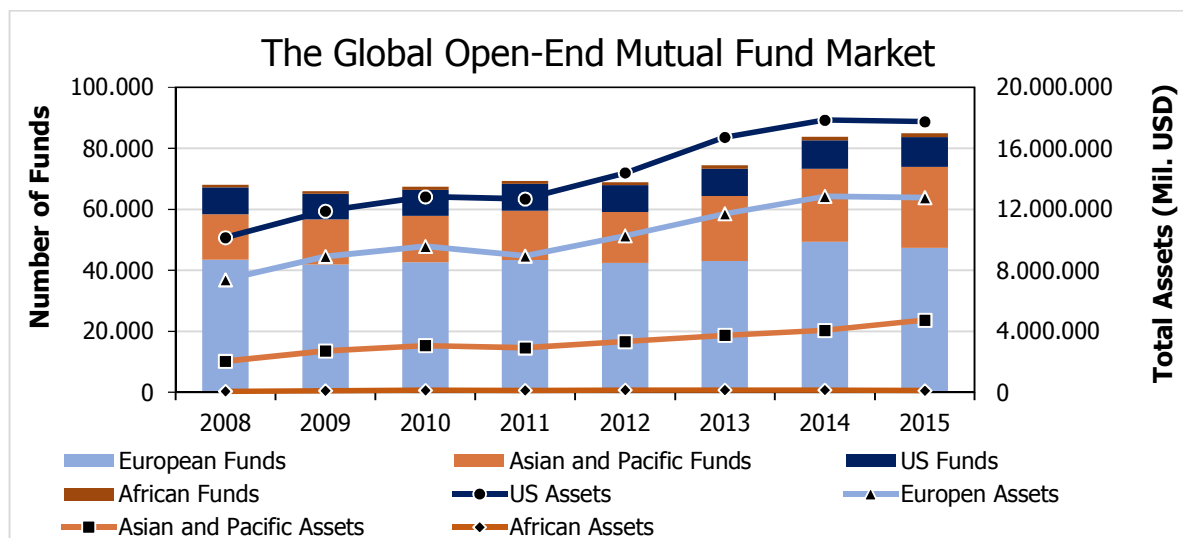
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## I. Introduction

Blauwtulp is a private asset management firm and a fund distributor. The company provides investment advice about income and capital planning, pension planning, risk management, asset management, and other financial solutions for corporates and individuals. Asset management and fund distribution are some of the core activities of the company. Asset management includes rebalancing of an existing portfolio and investing in new financial instruments. Fund distribution is gathering funds (for example, mutual funds or exchange-traded funds), evaluating their perspectives to generate above-average return, and selecting those that are most likely to do so, and advising them to their clients by taking into account their risk preferences. Therefore, its stakeholders hold interest in the company's ability to select the best funds and its value to the society. As a result, this paper evaluates how well Blauwtulp selects and ranks mutual funds by comparing the performance of the selected funds with a number of benchmarks over various performance indicators.



**Figure 1** The Global Open-End Mutual Fund Market since the financial crisis

In the past two and a half decades, the European mutual fund industry has grown 880% while the US mutual fund industry has grown 690%. In figure 1<sup>3</sup> we show how the open-end mutual fund market grew not only in terms of funds (78% in Asia, 50% in Africa, and 10% in Europe and US) but also significantly in terms of total assets – roughly 75% in both US, Europe, and Africa

<sup>3</sup> The data source is the 2016 Factbook of the International Investment Funds Association.

and over 130% in Asia since the recent financial crisis. Currently, an investor searching the Morningstar database will find over 230,000 different fund investment possibilities. Therefore, finding the “best” possible investment in the universe of funds is a tedious and costly task for those who do not possess sufficient financial expertise or lack the time required to make an informed investment decision.

Blauwtulp uses the Fund Selection Model (henceforth, fund selection model) which is internally developed and calibrated model that every two months is run to select funds with various investment objectives. These funds include, for example, those that invest in small, medium or large cap US equity, in Precious Metals, in European Government Bonds, in Real Estate, or in Emerging Markets’ Equity and Fixed Income. The fund selection model relies on a set of variables that have been found in the academic literature to predict fund performance (e.g. fund size, management tenor, fund volatility, and past return). These variables are used to select and rank funds from one to ten – one being the fund that is considered to deliver the lowest return and ten being that which is expected to be the best in its investment category.

In general, in this research, we will investigate whether this selection and ranking criteria yields better funds than the average fund which an investor can pick without a predefined criterion (Index of Funds) and also whether those funds perform better than those given 5-Star rating by Morningstar (5-Star funds). We will look at short-term (1 year) and long-term (over 1 year) investment horizons. We will consider both the total return that the funds produce over each investment horizon as well as the value of the risk-adjusted performance measure.

The paper is organized as follows. Section II is the Literature Review where we outline the state-of-the art literature on the predictors of fund performance. Section III is the Methodology and Data where we outline the methodology of this study along with the data used to conduct our analysis. In Section IV we present the Analysis and Results and finally in section V we provide concluding remarks.

## II. Literature Review

Numerous studies have investigated thoroughly the characteristics of mutual funds as predictors of mutual fund performance. In this section, we will provide a brief discussion on the findings of these studies.

### *General Predictors*

It is intuitive to suppose that future performance can be inferred from past achievements. Indeed, researchers find that lagged raw returns have positive impact on the future performance of the funds (Hendricks et al. 1993, Carhart 1997, and Chen et al. 2004). Risk-adjusted performance measures such as the Alpha from the Fama-French 3-factor model, the Carhart (1997) momentum model, and the recent Fama-French (2015) 5-factor model were all found to predict and have positive impact on mutual fund performance (although to different extent for funds with different investment styles). Although, return is the reflection of all underlying mutual fund characteristics it would be naïve to limit ourselves to the notion that well-performing mutual funds will continue to do so in the future. Berk and Green (2004) using a theoretical model show that past performance will not predict future performance due to two reasons – increase in size accompanied with diseconomies of scale and increasing expenses. The empirical evidence is mixed. Elton, Gruber and Blake (2012) find that neither growth of the fund nor good performance lead to larger expenses. They find that management fees and expense ratios decline in fund size and performance. Also, nearly every study that incorporates expense ratio as explanatory variable finds that it is significantly and negatively related to mutual fund performance and is robust to various specifications (Kacperczyk et al., 2004; Kacperczyk et al., 2008; Huang et al., 2011; Asebedo and Gabel, 2004; Jordan and Riley, 2015; and Jordan and Riley, 2016). Asebedo and Gabel (2004) find that fund size negatively impacts future performance and that liquidity is the primal reason for this. On the other hand, when used as control variable fund size is sometimes found to impact positively future performance (Kacperczyk et al. 2008, Asebedo and Gabel 2004). Scale is not always impacting the performance negatively – Asebedo and Gabel (2004) and Huang et al. (2011) find that fund family size has a positive effect on future returns. This finding is based on the idea that economies of trading commissions and lending fees are prevalent at family level. Ferreira et al (2012b) find that US funds are affected to a larger extent by diseconomies of scale. They note

that US funds that invest in small and illiquid stocks are affected more by the effect of size on the future performance as compared to non-US funds. They argue that performance of international funds is less affected by their size as they have the possibility to invest in more than a single country. Consistent with the finding that large mutual funds may experience fall in performance Morey (2003) shows that 3 years after a fund has been given a 5-star Morningstar rating its performance falls significantly. This is due to the fact that the fund receives large inflows of funds as a result of the rating. This finding is strengthened by Huang et al. (2011) who finds negative relation between previous year flow and current year's performance. Age of the fund has also been found in several studies to be negatively related to performance Kacperczyk et al. (2004, 2008, and 2012). Gottesman and Morey (2006) observe that management tenure is negatively related to performance. The findings of these authors are in conformance with those of previous studies – both manager's age and tenure are negatively related to fund's returns. Furthermore, they find that if the fund manager took a relatively more elite MBA program (the proxy for which is the minimum GMAT score required) then his performance will be superior to the rest. Ferreira et al (2012b) find that funds managed by a single manager perform better on average than team-managed funds. Turnover ratio is important for investors as it largely impacts the returns of mutual funds. They note that this is due to the costs arising from relatively more hierarchical structure of multi-manager funds. The more a mutual fund manager buys and sells securities the more transaction costs are incurred and the lower the net return will be. Accordingly, Kacperczyk et al. (2014) and Asebedo and Grabel (2004) both find that higher turnover ratios are associated with lower future returns. Khorana, Servaes, and Wedge (2007) find that mutual fund's manager ownership stake of the fund has positive effect on future returns. This is either due to the fact that managers have superior information about the future returns of the fund or the stake in the fund serves as an incentive to produce higher returns. Return volatility is one of the important aspects to investors and it has been shown that, historically, funds with higher volatility produce lower long-term returns than funds with lower volatility. Jordan and Riley (2015) show that a dollar invested in the beginning of 2000 in the lowest volatility portfolio of funds would produce 190% return in the end of 2013 as compared to 21% for the highest volatility portfolio of funds. Furthermore, they show that the annualized daily standard deviation of the returns has negative and significant impact on the Carhart 4-factor

Alpha in the subsequent year<sup>4</sup>. Ahimud and Goyenko (2015) show that  $R^2$  (this is the  $R^2$  from the 4-factor Carhart regression) is negatively and significantly related to mutual fund returns and is therefore viable predictor of future performance. Higher  $R^2$  corresponds to lower deviation of the returns and lower selection or activeness of the fund investments.

#### *“Customized” Predictors*

It was found that authors design “custom” measures of fund performance. For example, “Return Gap” suggested by Kacperczyk et al. (2008) which is the difference between actual net fund return and the net holdings return. They state that this measure incorporates mutual funds opaque benefits and costs.<sup>5</sup> They find that this measure can be used to effectively predict fund performance. Huang et al. (2011) build upon this measure and looked at the difference in the volatilities of both the net fund return and that of the portfolio of investments (they state that this is novel approach to measuring risk-shifting). They find that, funds characterized with higher values of this measure exhibit poorer performance than those with relatively levels of risk-shifting. Cremers and Petajisto (2009) introduce a measure of active management – Active Share. This measure compares the holdings of the mutual fund with the holdings of its benchmark index of performance. They find that the “most active” funds exhibit strong performance persistence and that the funds which score high on Active Share have significantly higher before and after expenses performance.<sup>6</sup> The last customized predictor is the Modified Information Ratio (Lavinat et al., 2015). The Information Ratio is the fund’s return less the return of its benchmark (for example Carhart Alpha) divided by the tracking error of the same benchmark. The authors note that the IR is not informative as funds that have high IR may still produce sub-optimal returns. The authors alter the Information Ratio by subtracting from the numerator “target by the investor Alpha”<sup>7</sup>. In this way, they create a benchmark which “punishes” lower tracking error compared to a high one or an investor demanding high alpha will also require high tracking error. They state that this measure provides considerably more

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<sup>4</sup> They confirm this finding in a study Jordan and Riley (2016) where they study skill and persistence of fund returns.

<sup>5</sup> Benefits include trading between disclosure dates, IPO purchase, and security lending. Costs arise from hidden trading costs and commissions as well as investor externalities. See for example, Kacperczyk et al (2008).

<sup>6</sup> They find that tracking error does not predict future abnormal returns.

<sup>7</sup> Target Alpha is simply a constant the authors set – in the range between 0 and 900 bp.

predictive power for future mutual fund returns as compared to other measures identified in the literature.

### *Observing the Market*

Cao et al. (2013) finds that liquidity timing by managers can predict future mutual fund performance effectively. They note that the managers are able to time the liquidity in the market and exploit this timing – they reduce their exposures when the market is expected to be less liquid. Further, Kacperczyk et al. (2014) finds that managers who can “time” the business cycle and adjust their skill produce higher returns. They create a “Skill Index” which incorporates this timing ability and find that it predicts future alpha.<sup>8</sup> Finally, Kacperczyk et al (2005) create an Industry Concentration Index<sup>9</sup> which measures how much the mutual fund portfolio drifts from the market portfolio. The larger the Industry Concentration index the more the mutual fund is investing in a few sectors. They find that funds which score higher on this index also have better performance than funds with more diversified portfolios.

### *Country-Specific Predictors*

Ferreira et al. (2012b) are the only ones to examine the effect of country-specific characteristics on mutual fund performance. They find that level of financial development and the extent of liquidity of the stock market are positively related to mutual fund performance. Also, funds located in countries with higher investor protection, stronger legal institutions, and more rigorous law enforcement perform relatively better.

From this review, we can conclude that the predictors of mutual fund performance are many and of various complexities with different degrees of predictive power. The measures span from simple raw return measures, through mutual fund and manager characteristics, to highly customized ones. In table 1 we present a summary of the literature review by outlining the effect that the predictors of performance have on mutual fund return. In this table, we can also see that the research of mutual fund performance is focused mainly on equity mutual funds.

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<sup>8</sup> For more information on the construction of this index we refer the reader to Kacperczyk et al (2014).

<sup>9</sup> It is closely related to the Herfindahl Index – the authors note that their correlation is 0.93.

Predictor	Effect on Mutual Fund Return	Number of publications with similar findings	Authors	Type of Funds Examined
Lag of the 1-year return (also risk adjusted and load adjusted)	Positive	3	Hendricks et al. (1993), Carhart (1997), Chen et al. (2004)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
4-Factor Alpha / 6-Factor Alpha	Positive	3	Carhart (1997), Elton, Gruber, and Blake (2012), Jordan and Riley (2016)	(Actively Managed) Equity Mutual Funds (Domestic US or Global), and Mixed Funds
Fund Size in last year (or Size)	Positive	3	Kacperczyk et al. (2008), Asebedo and Grabel (2004), Ferreira et al. (2012)	(Actively Managed) Equity Mutual Funds (Domestic US or Global), Positive for non-US Funds
	Negative	3	Chen et al. (2004), Huang et al. (2011), Kacperczyk et al. (2014)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Fund Family Size	Positive	3	Chen et al. (2004), Huang et al. (2011), Ferreira et al. (2012)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Active Share	Positive	1	Cremers and Petajisto (2009)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Lagged R-squared	Negative	1	Amihud and Goyenko (2015)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Industry Concentration	Positive	1	Kacperczyk et al. (2005)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Expense Ratio	Negative	6	Kacperczyk et al. (2004), Kacperczyk et al. (2008), Huang et al. (2011), Asebedo and Grabel (2004), Jordan and Riley (2015), Jordan and Riley (2016), Carhart (1997)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Fund Age	Negative	4	Kacperczyk et al. (2004), Kacperczyk et al. (2008), Ferreira et al (2012b), Kacperczyk et al. (2014)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Prior Year Return Gap	Positive	1	Kacperczyk et al. (2008)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Risk Shifting	Negative	1	Huang et al. (2011)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Asset flow in the previous year	Negative	2	Huang et al. (2011), Morey (2003)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Market Liquidity Timing	Positive	1	Cao et al. (2013)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Skill Index	Positive	1	Kacperczyk et al. (2014)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Turnover	Negative	3	Kacperczyk et al. (2014), Asebedo and Grabel (2004), Carhart (1997)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Modified Information Ratio	Positive	1	Livnat et al. (2015)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Volatility	Negative	2	Jordan and Riley (2015), Jordan and Riley (2016)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Morningstar Post-2002 Revision	Positive	1	Morey and Gottesman (2006)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Value Line and Pre-2002 Morningstar Revision	Positive (in some cases)	1	Morey (2002b)	(Actively Managed) Equity Mutual Funds (Domestic US or Global), Bond Funds
Manager's Tenure	Negative	3	Golec (1996), Chevallier and Ellison (1999a), Gottesman and Morey (2006)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Manager's Age	Negative	3	Golec (1996), Chevallier and Ellison (1999a), Gottesman and Morey (2006)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
GMAT Score/Better school or MBA	Positive	1	Gottesman and Morey (2006)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Single manager	Positive	1	Ferreira et al (2012b)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)
Manager ownership stake	Positive	1	Khorana, Servaes, and Wedge (2007)	(Actively Managed) Equity Mutual Funds (Domestic US or Global)

**Table 1** Predictors of actively managed equity mutual funds' performance



### **III. Methodology and Data**

The aim of this research is to assess whether the model selects funds that would outperform funds that are randomly selected and funds that have been given 5-Star Morningstar rating in the past. In doing this we also test whether the fund selection model ranks well funds from different categories. The ranking of the funds is based largely on the factors described in the literature to have predictive power of funds' returns. We do this in three steps.

#### *Step 1*

Firstly, we investigate how well the fund selection model ranks mutual funds on average – that is, we do not take into account the different types of funds that the company offers. We do this by creating an equally-weighted (EW) portfolio of funds within each category in each of the three selections. We investigate three cases when selections were made – one as of December, 2012; second as of December, 2013; and the third is as of December, 2014. The number of fund categories increases over time. However, the number of funds within each category is roughly constant or on average 94 funds across the three selection. In table 2, for each selection, we show the different categories and the corresponding number of funds within each of them along with the total number of funds. After we have created an EW portfolio of each category we create an EW portfolio of all categories. This means that we create a portfolio of funds where the return of each fund from each category is given the same weight.

In this first step we compare the performance of each portfolio to a portfolio of funds that were ranked 5-Stars as of selection date as well as with the universe of funds of each category as of the selection date<sup>10</sup>. We do this over the period starting from selection date until and including September, 2016 as well as over 1-year since selection. We present the performance, firstly, by showing how €1,000 develop as a result of the return produced by each portfolio. To demonstrate visually whether the fund selection model ranks mutual funds correctly we create equally weighted portfolios for the bottom 50%, top 50%, top 25%, and top 10% of the funds using Blauwtulp's rating methodology, which as noted ranks the funds using mostly the factors

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<sup>10</sup> We create the index of funds by selecting all available funds within each category at each selection date. For example, Commodity Broad Basket in 2012 is selected by taking all funds established before December, 2012 (selection date) and creating an EW portfolio of them – an index of the category. We do this for each selection and each category and then we create an EW portfolio of all EW category portfolios – an index of all category indexes.

identified in the literature to have predictive power of future returns. In this way, we also can see whether on average the fund selection model ranks mutual funds correctly.

For comparison, we include those funds which were given a 5-Star rating by Morningstar<sup>11</sup>. We also create an index of funds – that is, we use the universe of funds within each category to create an EW portfolio of those funds available to investors. We also compare the performance of the funds selected by Blauwtulp on risk-adjusted return basis as well as on total return over 1-year period and from selection date until September, 2016.

#	Category	Selection		
		2012	2013	2014
1	Commodity Broad Basket	94	91	94
2	Equity Sector Natural Resources	92	95	99
3	Equity Sector Precious Metals	88	70	89
4	Conservative Allocation	96	97	98
5	Moderate Allocation	96	98	98
6	Real Estate Equity/FoF	97	98	99
7	Euro Government Bonds	94	98	99
8	Euro Global Bond/World Bond	95	97	97
9	Global Convertibles/Convertibles	98	99	99
10	Euro Corporate Bond	96	98	99
11	Global High Yield/High Yield	96	99	99
12	Global/World Equity Large Cap Blend	96	95	99
13	US Large Cap Growth/Blend	98	99	96
14	Euro Large Cap Growth/Blend	98	98	99
15	Euro Small Cap	95	85	86
16	World Emerging	95	97	99
17	Asia Excl. Japan	97	99	98
18	Frontier Markets (Africa)	—	82	16
19	Japan	—	98	97
20	China	—	98	98
21	US Small Cap	—	61	—
22	Aggressive Allocation	—	—	98
23	Flexible Allocation	—	—	98
24	Emerging Markets Fixed Income	—	—	97
25	World Equity Medium/Small Cap	—	—	99
26	Euro Large Cap Value	—	—	99
<b>Average number of funds</b>		<b>95</b>	<b>93</b>	<b>94</b>
<b>Total number of funds</b>		<b>1621</b>	<b>1952</b>	<b>2349</b>

**Table 2** Summary of the funds offered by Blauwtulp

<sup>11</sup> For “Commodity Broad Basket” Morningstar ratings were not available.

### *Step 2*

In order to examine how well the fund selection model performs, within each category, we repeat the analysis from the first step. However, this time we show how it performs per category. We do this by creating EW portfolios using Blauwtulp's ranking model of the bottom 50%, top 50%, top 25%, and top 10% for each category. We again compare this performance to that of 5-Star funds and that of the index of funds.

### *Step 3*

In the final step, we investigate how well the fund selection model ranks the funds selected using the cross-section of funds. For each selection and within each category, for each fund we create the average return and corresponding standard deviation over 1-year as well as over the period starting from selection date until September, 2016<sup>12</sup>. We regress the Blauwtulp rating on both return and the risk-adjusted measure. The risk adjusted measure is defined as the average return divided by the standard deviation, over certain period. The regression model is defined as follows:

$$\mathbf{Return}_i = \beta_0 + \beta_1 \mathbf{Blauwtulp\ Grade}_i + u_i \quad \text{Equation (1)}$$

The grade given by Blauwtulp to each fund ranges from 1 until 10 – one being the worst fund within the particular category and 10 being the best. We run this regression for each category for each of the three selections. In this way, we see whether 1 point higher grade given by Blauwtulp coincides with 1 percentage point higher average return (either risk-adjusted or simply average return) when considering the period starting from selection until September, 2016 and 1-year after selection. By doing so, we test whether the fund selection model is able to rank mutual funds correctly. If  $\beta_1 > 0$  and is significant at the 10% level then we can conclude that the fund selection model works – that is, if a fund is given 1 point higher grade then its average return after selection will be higher than a fund that was given 1 point lower.

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<sup>12</sup> In order to tackle the possible non-stationarity of the time series we take the difference between the returns. To have a meaningful standard deviation measure we have to assume stationarity of the data or that the mean and variance of the distribution is normal and does not change over time. This means that to have a comparable standard deviation across funds we have to assume that their returns are generated from the same random process. This is often not the case especially for long-time series when the manager is likely to introduce at least incremental changes to his/her investment strategy and even worse major change of the investment style of the fund altogether. We checked for non-stationarity using Dickey-Fuller test and concluded that in many cases the time-series is non-stationary. For more information see Harding , 2002. We use robust standard errors to correct for potential presence of heteroskedasticity.

## IV. Analysis and Results

### 1. The Performance of the Fund Selection Model on Average

As noted earlier, the first step of the analysis, is to compare on average how well the fund selection model performs as compared to 5-Star Morningstar funds and the universe of all funds within each category (index of funds). We consider the period from selection date until September, 2016 (henceforth, entire period) and over a 1-year post-ranking investment horizon.

#### Selection 2012

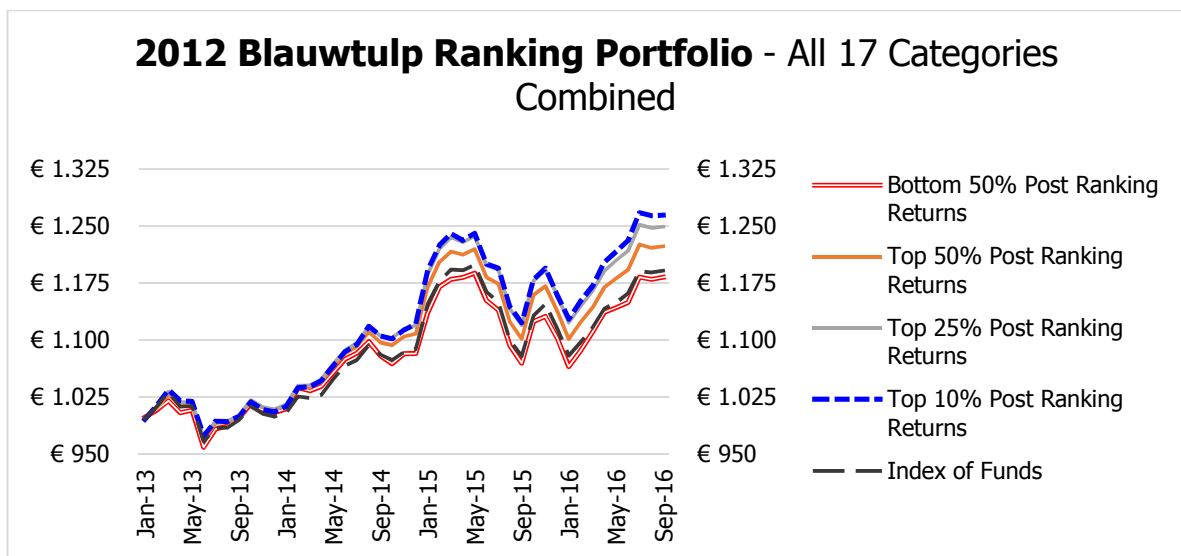


Figure 2 Selection Dec. 2012 compared to an Index of Funds over the full-time period

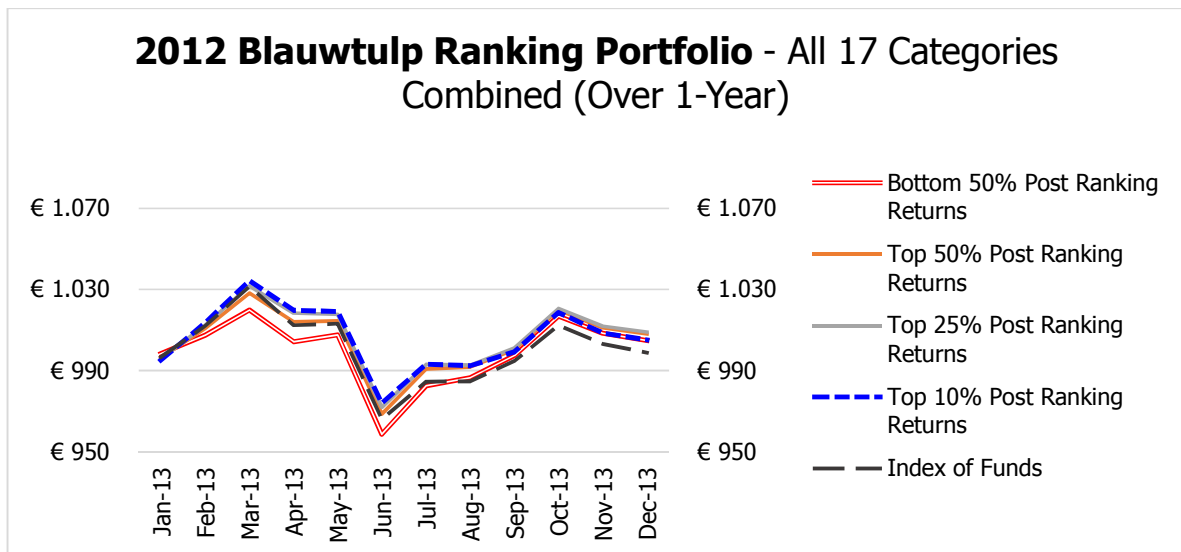


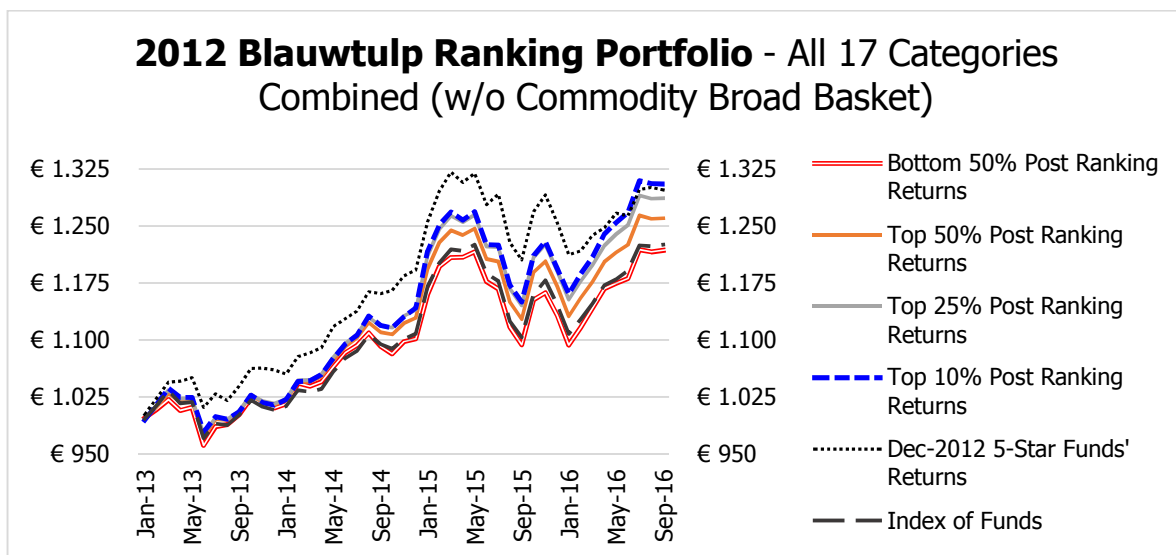
Figure 3 Selection Dec. 2012 compared to an Index of Funds over the 1-year period

**2012 Selection Performance Summary vs Index**

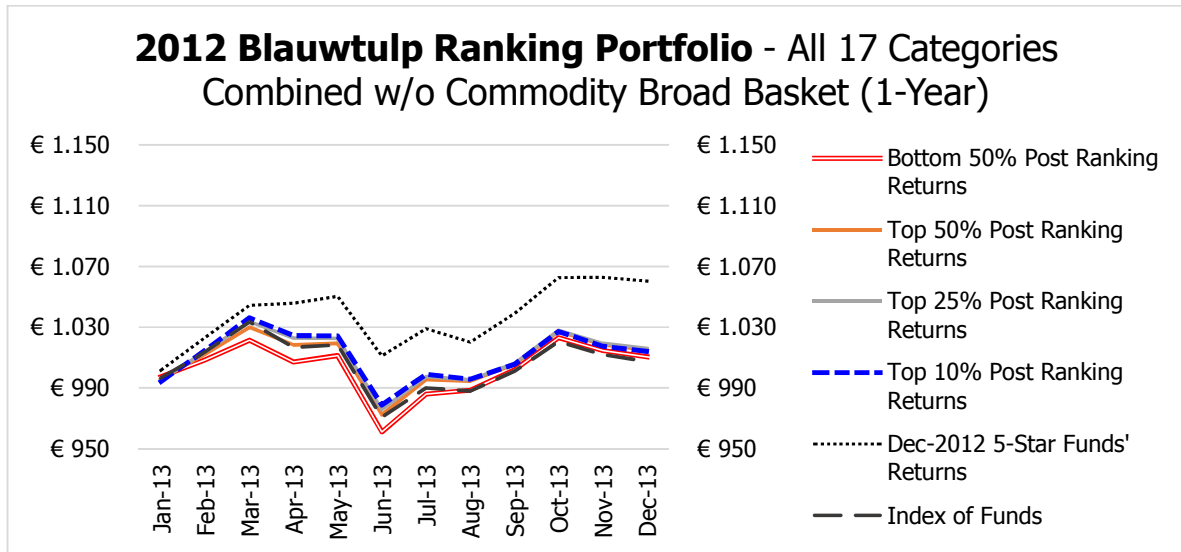
	Bottom 50%	Top 50%	Top 25%	Top 10%	Index of Funds
Total Return (until Sep-2016)	18.27%	22.32%	24.91%	26.43%	19.15%
Risk-Adjusted Performance	0.19	0.23	0.25	0.26	0.20
Total Return (1-Year)	0.48%	0.80%	0.89%	0.51%	-0.11%
Risk-Adjusted Performance	0.05	0.04	0.05	0.03	0.00

**Table 3** A summary of the performance of the Dec. 2012 selection against the Index of Funds

In figures 2 and 3 and table 3 we show how well the 2012 selection performs against the index of funds over the entire period and over 1-year period on the basis of total return and risk-adjusted performance. From figure 1, we can see that over the entire period the top 10% funds perform better than all other funds and outperform the index by 7.3 percentage points (henceforth, pp). The findings are similar on basis of risk-adjusted performance. This means that the fund selection model ranks funds correctly over the entire time horizon. From figure 2 it can be seen that the total return is the highest for the top 25% funds and then falls. In combination with the findings with respect to risk-adjusted performance we can conclude that over the 1-year horizon the fund selection model does not rank correctly mutual funds. Nevertheless, it beats the index of funds according to this criterion as well by producing 0.62pp higher total return. In what follows we examine how well the fund selection model performs against 5-Star funds.



**Figure 4** Selection Dec. 2012 compared to 5-Star funds over the full-time period



**Figure 5** Selection Dec. 2012 compared to 5-Star funds over the 1-year period

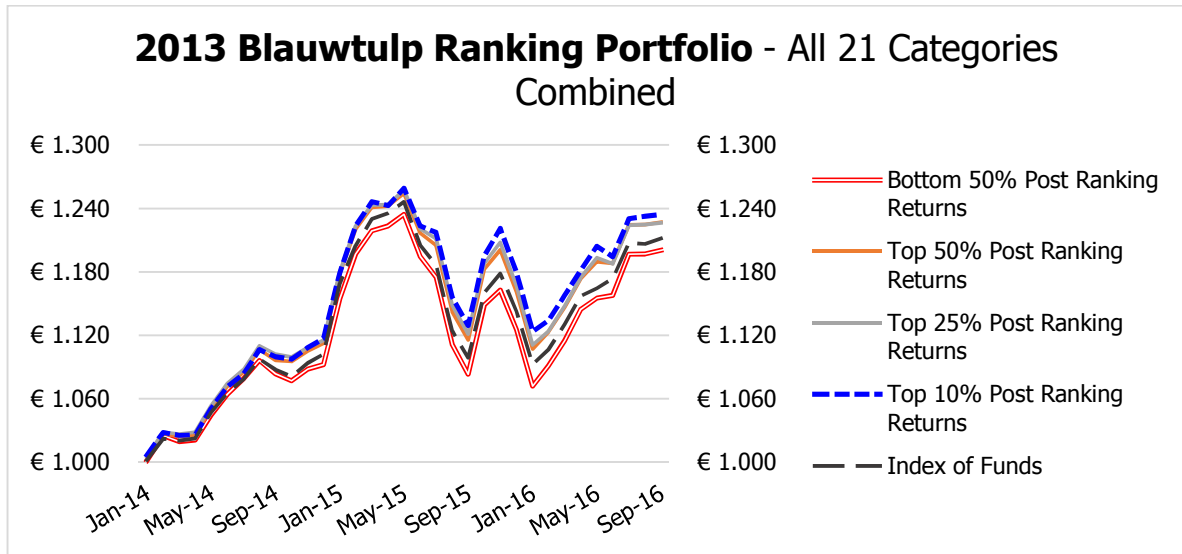
<b>2012 Selection Performance Summary vs 5-Star</b>					
	Bottom 50%	Top 50%	Top 25%	Top 10%	5-Star
Total Return (until Sep-2016)	21.80%	26.04%	28.67%	30.53%	29.77%
Risk-Adjusted Performance	0.21	0.25	0.27	0.28	0.29
Total Return (1-Year)	1.06%	1.52%	1.61%	1.41%	6.04%
Risk-Adjusted Performance	0.05	0.07	0.08	0.07	0.34

**Table 4** A summary of the performance of the Dec. 2012 selection against 5-Star funds

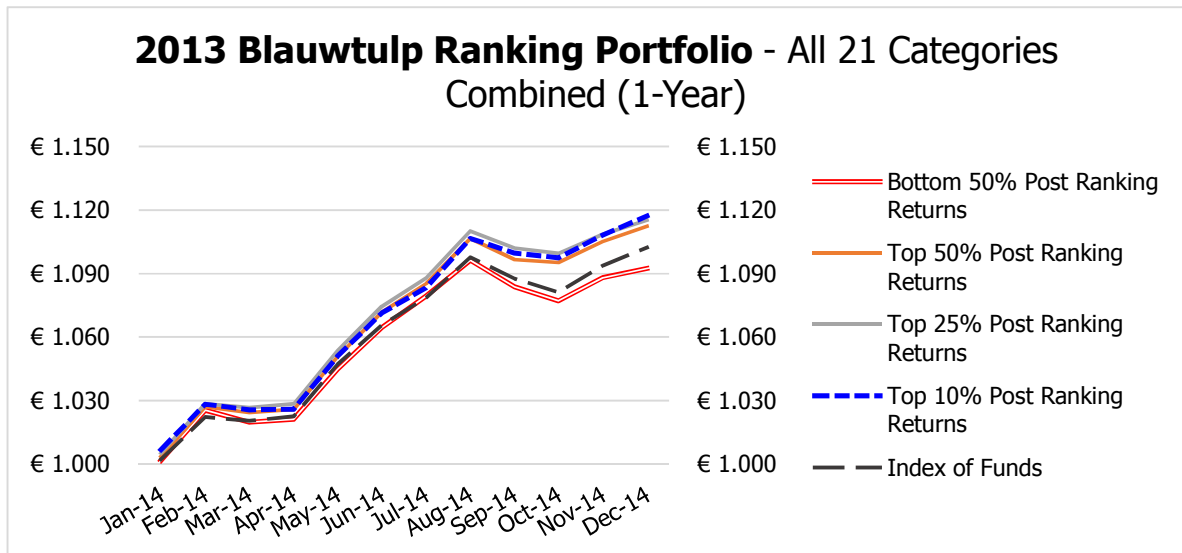
In figure 4 and 5s we see that the top 10% funds beat the 5-Star funds only slightly producing about 0.77pp higher total return. On risk adjusted basis top 10% perform slightly worse. On 1-year basis the fund selection model produces lower return than 5-Star regardless of the percentile chosen. The smallest difference – that between top 25% and 5-stars – is negative 4.43pp.

### **Selection 2013**

Similar to the selection for December, 2012, in the following text we present the performance of the fund selection model for the selection of December, 2013.



**Figure 6** Selection Dec. 2013 compared to an Index of Funds over the full-time period



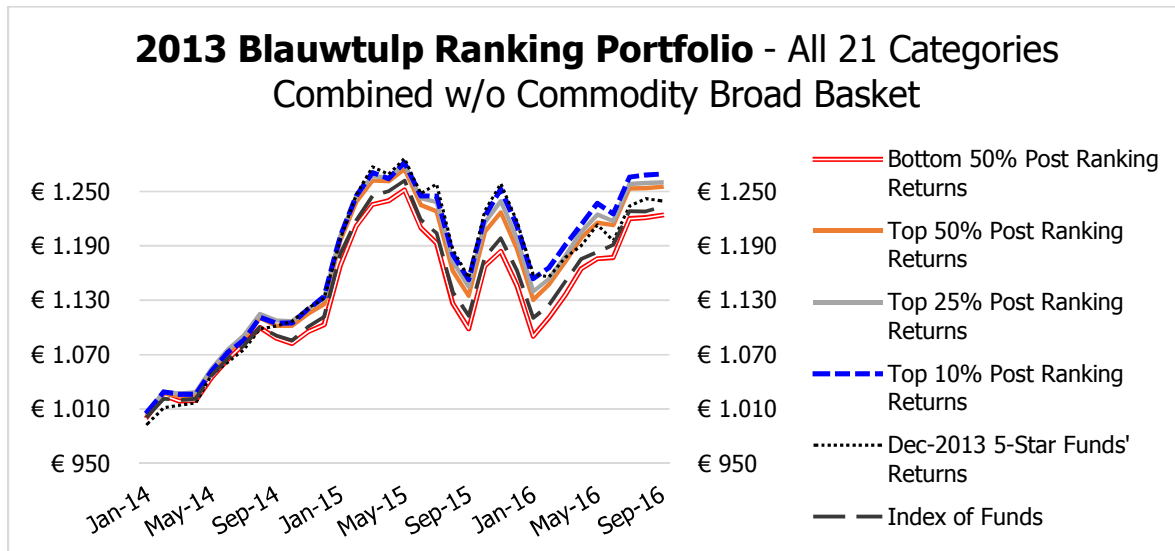
**Figure 7** Selection Dec. 2013 compared to an Index of Funds over the 1-year period

<b>2013 Selection Performance Summary vs Index</b>					
	Bottom 50%	Top 50%	Top 25%	Top 10%	Index of Funds
Total Return (until Sep-2016)	20.06%	22.69%	22.64%	23.45%	21.16%
Risk-Adjusted Performance	0.23	0.26	0.26	0.27	0.25
Total Return (1-Year)	9.24%	11.24%	11.53%	11.72%	10.23%
Risk-Adjusted Performance	0.63	0.81	0.85	0.88	0.62

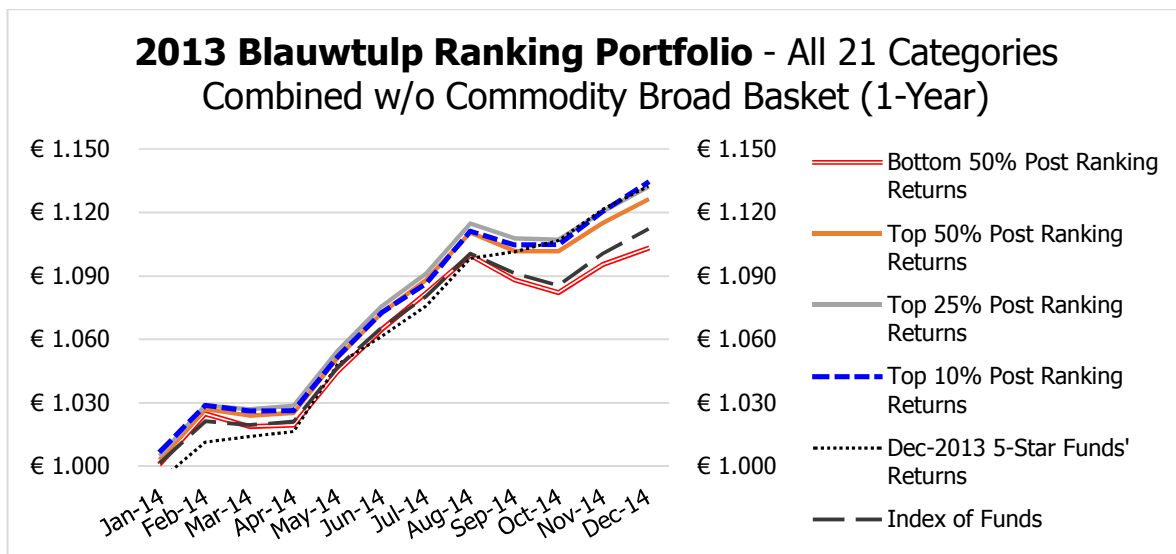
**Table 5** A summary of the performance of the Dec. 2014 selection against the Index of Funds

In figures 6, 7 and table 5 we present the performance of the funds selected on December, 2013 for the subsequent year and over the entire period. We can see that for the entire period the funds (top 10%) outperform the index by 2.29pp. Over the course of 1 year we observe the same

pattern and the outperformance of the top 10% is 1.49pp. In both cases the risk-adjusted performance is superior to that of the index of funds. Next, we move on to the comparison with 5-Star funds.



**Figure 8** Selection Dec. 2013 compared to 5-Star funds over the full-time period



**Figure 9** Selection Dec. 2013 compared to 5-Star funds over the 1-year period

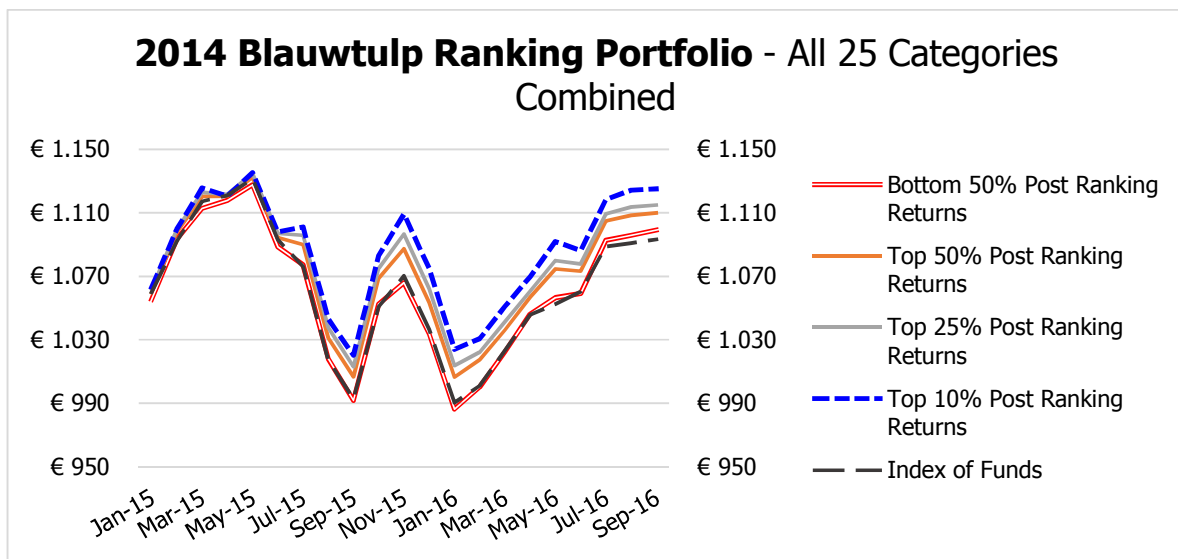
<b>2013 Selection Performance Summary vs 5-Star</b>					
	Bottom 50%	Top 50%	Top 25%	Top 10%	5-Star
Total Return (until Sep-2016)	22.38%	25.52%	25.97%	26.90%	23.98%
Risk-Adjusted Performance	0.25	0.28	0.29	0.30	0.26
Total Return (1-Year)	10.29%	12.58%	13.17%	13.40%	13.21%
Risk-Adjusted Performance	0.68	0.90	0.97	0.94	1.04

**Table 6** A summary of the performance of the Dec. 2013 selection against 5-Star funds

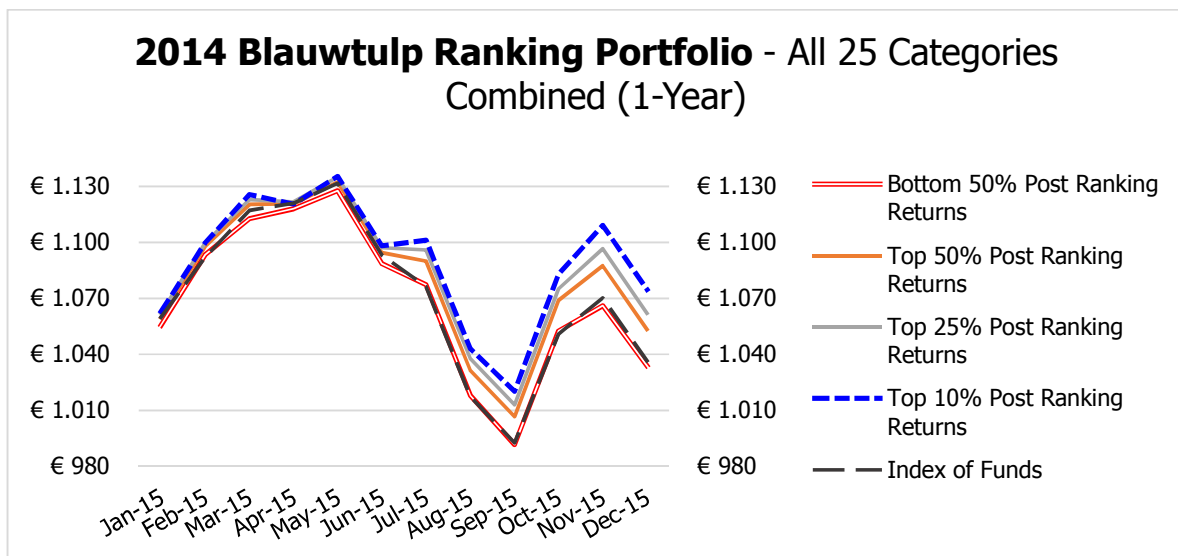


In figures 8 and 9 and table 6 we present how well the fund selection model performs as compared to 5-Star funds over the entire period and one-year investment horizon. Over the full time period the top 10% funds produce 2.92pp higher return than the 5-Star Morningstar returns. This can be observed for risk-adjusted performance as well. When considering a 1-year investment horizon the top 10% funds outperform the 5-Star fund by 0.19pp, however their risk-adjusted performance is slightly lower. Therefore, the top 10% funds gained this extra return at the expense of higher risk over this one year.

**Selection 2014**



**Figure 10** Selection Dec. 2014 compared to an Index of Funds over the full-time period



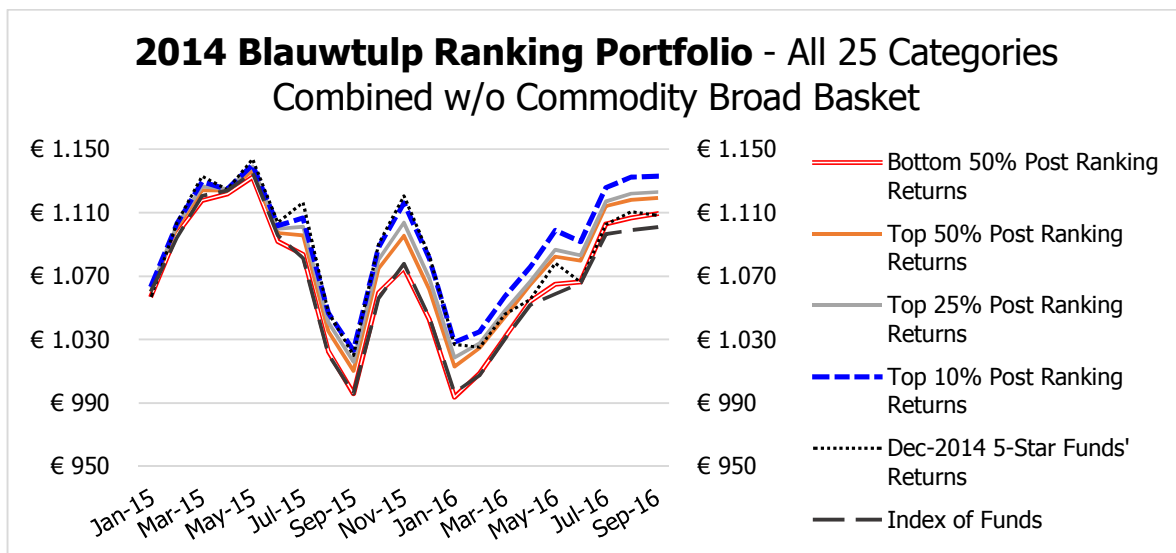
**Figure 11** Selection Dec. 2014 compared to an Index of Funds over the 1-year period

**2014 Selection Performance Summary vs Index**

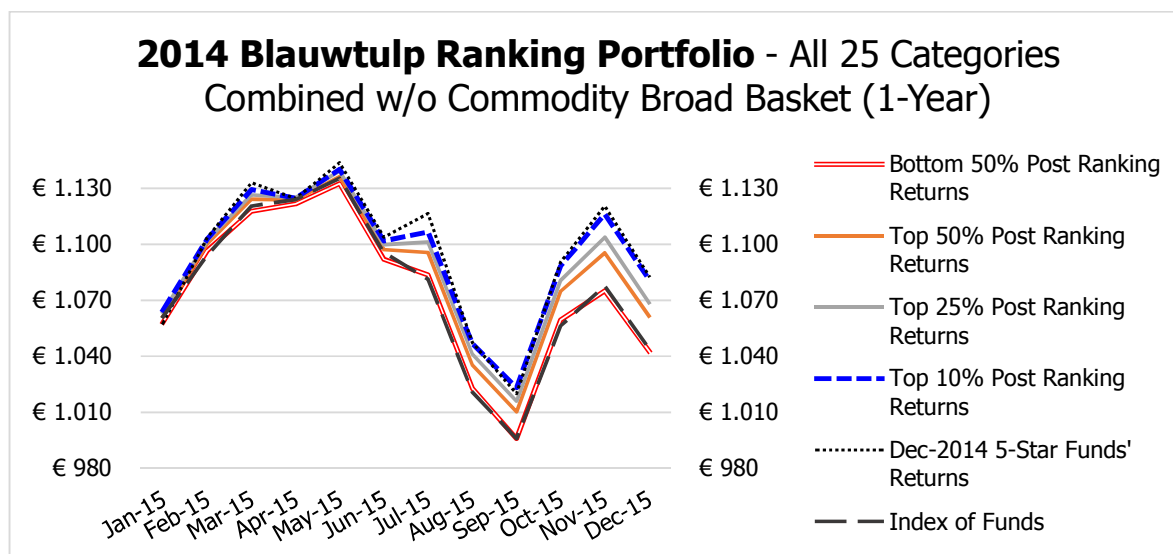
	Bottom 50%	Top 50%	Top 25%	Top 10%	Index of Funds
Total Return (until Sep-2016)	9.93%	11.01%	11.50%	12.51%	9.32%
Risk-Adjusted Performance	0.16	0.18	0.18	0.20	0.15
Total Return (1-Year)	3.39%	5.35%	6.20%	7.48%	3.65%
Risk-Adjusted Performance	0.09	0.14	0.15	0.18	0.10

**Table 7** A summary of the performance of the Dec. 2014 selection against the Index of Funds

Similar to the selection of December, 2013 here we again observe that over the short and long investment horizon the fund selection model is effective in choosing funds that outperform the index of funds. In particular, over the entire time period the top 10% funds produce 3.19pp higher return while over 1-year period these funds produced 3.83pp higher return, as compared to the index of funds. Furthermore, the risk-adjusted performance of the top 10% is also higher than that of the index. Next, we turn our attention to 5-Star funds.



**Figure 12** Selection Dec. 2014 compared to 5-Star funds over the full-time period



**Figure 13** Selection Dec. 2014 compared to 5-Star funds over 1-year period

2014 Selection Performance Summary vs 5-Star					
	Bottom 50%	Top 50%	Top 25%	Top 10%	5-Star
Total Return (until Sep-2016)	10.93%	11.92%	12.29%	13.29%	10.84%
Risk-Adjusted Performance	0.17	0.19	0.19	0.20	0.17
Total Return (1-Year)	4.29%	6.16%	6.88%	8.12%	8.30%
Risk-Adjusted Performance	0.11	0.15	0.16	0.19	0.29

**Table 8** A summary of the performance of the Dec. 2014 selection against 5-Star funds

The selection of 2014 confirms earlier findings of superior performance against 5-Star funds in the long run but lower or similar performance over 1-year horizon. In particular, when considering the entire time period the top 10% funds produce 2.45pp higher return than 5-Star funds. The findings are similar in terms of risk-adjusted performance. Over 1-year period the funds return 0.18pp less than 5-Star funds and also exhibit lower risk-adjusted performance.

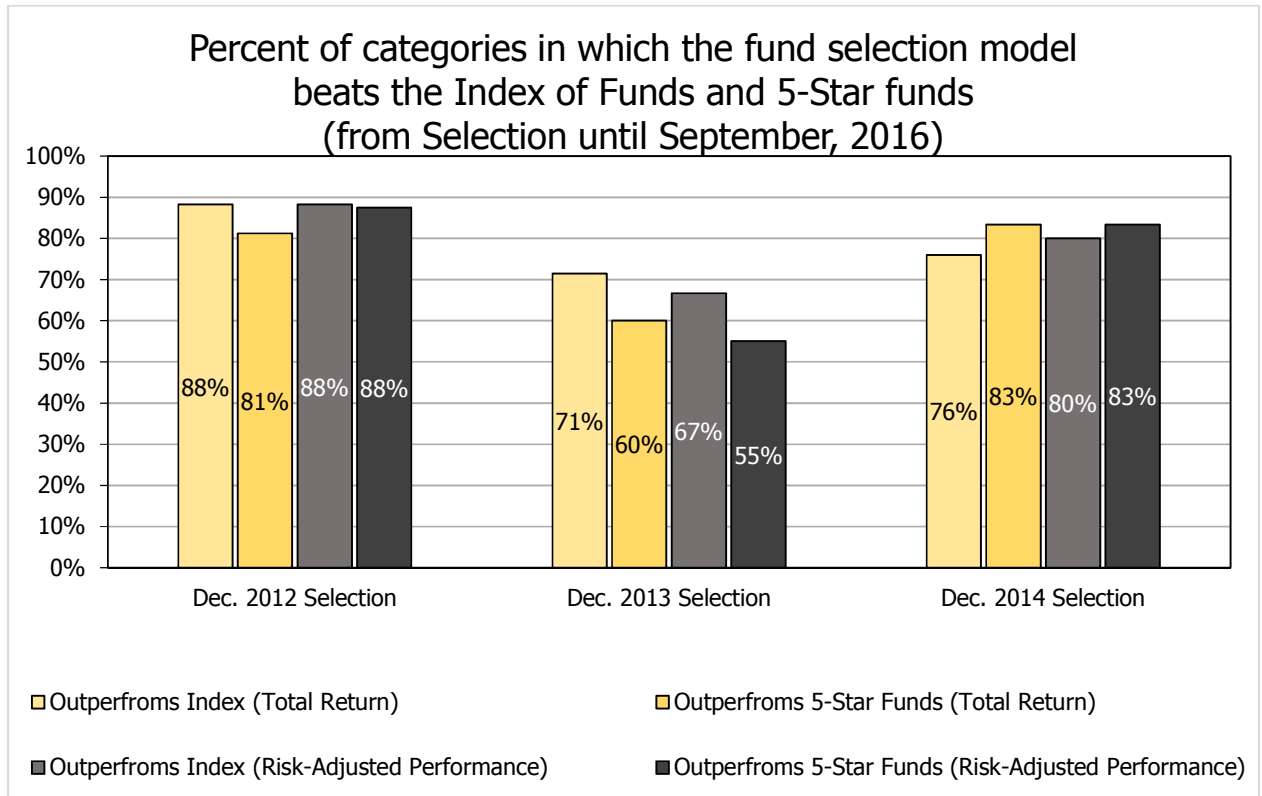
In conclusion, for the full-time period and the top 10% funds, we saw that the December, 2012 selection performed well by beating both the Index of Funds (7.3pp more total return) and the portfolio of 5-Star funds (0.77pp more total return). The December, 2013 selection exhibited similar results by outperforming the Index of Funds (2.3pp more total return) and the portfolio of 5-Star funds (2.9pp more total return). The results are confirmed by the December, 2014 selection. The portfolio of funds in this selection produces 3.2pp more total return as compared to the Index of Funds and roughly 2.5pp more return than the portfolio of 5-Star funds. Therefore, when considering the full-time period on average the fund selection model is consistent in choosing funds that beat Index of Funds and those funds given the highest rating by

Morningstar. When looking the 1-year performance of the fund selection model we see that for all three selections December, 2012/2013/2014 the total return of the top 10% portfolio of funds is higher than that of the Index of Funds by 0.6pp, 1.5pp, and 3.8pp respectively. However, for this short-term investment horizon the portfolio of 5-Star funds performed better on average across the three selections except in 2013 when the top 10% funds produced 0.19pp higher total return. In 2012 the 5-Star funds produced 4.6pp higher total return. Nevertheless, this number was only 0.18pp in 2014. The results are similar when considering risk-adjusted performance over the full-time and 1-year investment horizons. We believe that the relatively poorer performance in the short-term as compared to Morningstar is due to the factors used by the fund selection model to rank mutual funds. In contrast to Morningstar, that uses past returns to arrive at its Star-ranking, the fund selection model encompasses a number of predictors of mutual fund performance that have been found typically to predict performance over longer than one year period (e.g. management tenor/age, fund volatility, and fund size).

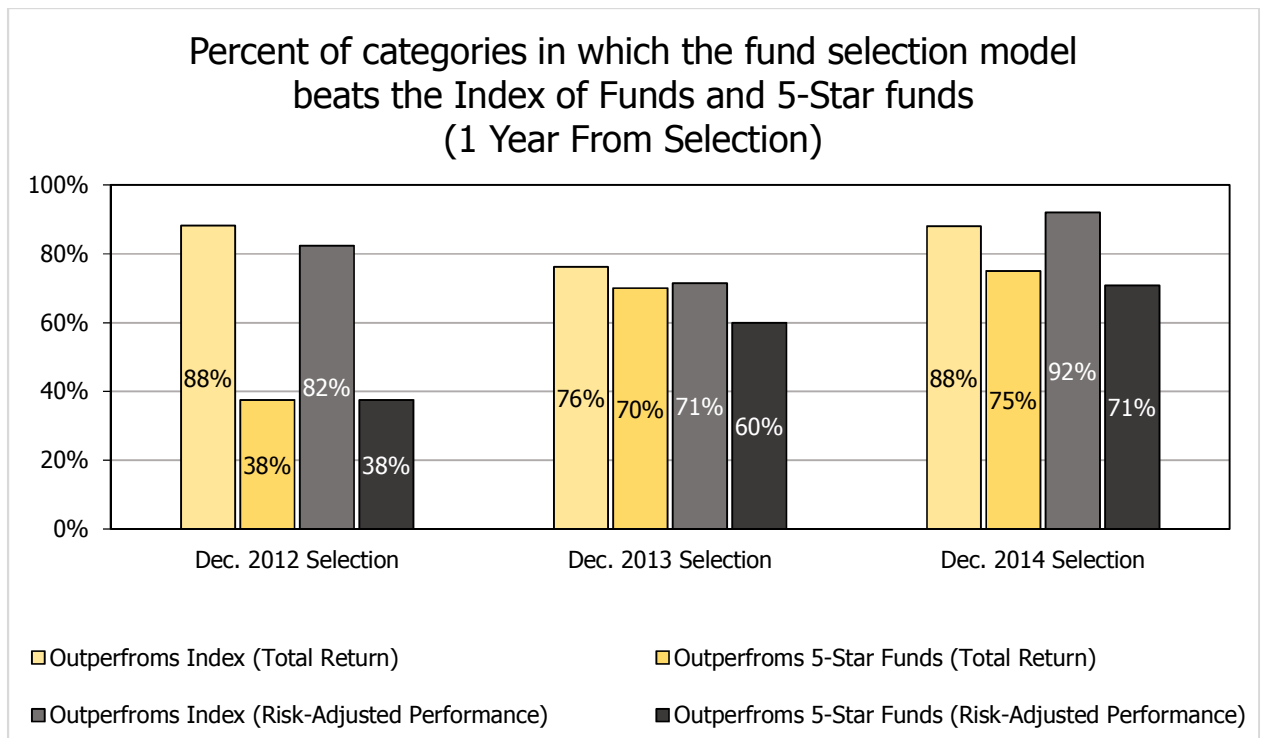
## *2. The Performance of the Fund Selection Model by Category*

This part of the analysis aims to show in how many of the categories the funds selected beat the index of funds and those funds given 5-Star rating by Morningstar at the time of the selection. We again assess performance over the entire time period and over one year using total return and risk-adjusted performance measure. In figures 13 and 14 it becomes clear in how many out of all categories, for the three selections, the funds outperformed either the Index of Funds or the portfolio of 5-Star funds. For example, for the December, 2012 selection over the full-time period the portfolios of funds in the top 25% or top 10% in the 15 out of the 17 (88%) categories beat (produced higher total return) the Index of Funds in each of these categories. In addition, in Appendix 1 we also present whether the categories outperformed the defined benchmarks over the same time periods and the same measures of performance.

In figure 14 we can see that over the three selections the funds selected beat the index of funds on average 79% of the cases (categories) when considering total return. Again, in terms of total return the funds outperform 5-Star funds 75% of the cases. When considering risk-adjusted performance the findings are similar – on average in 78% of the cases the funds beat the index of funds and in 75% of the cases they outperform the 5-Star funds.



**Figure 14** The frequency with which Blauwtulp’s funds beat the benchmarks – full time period



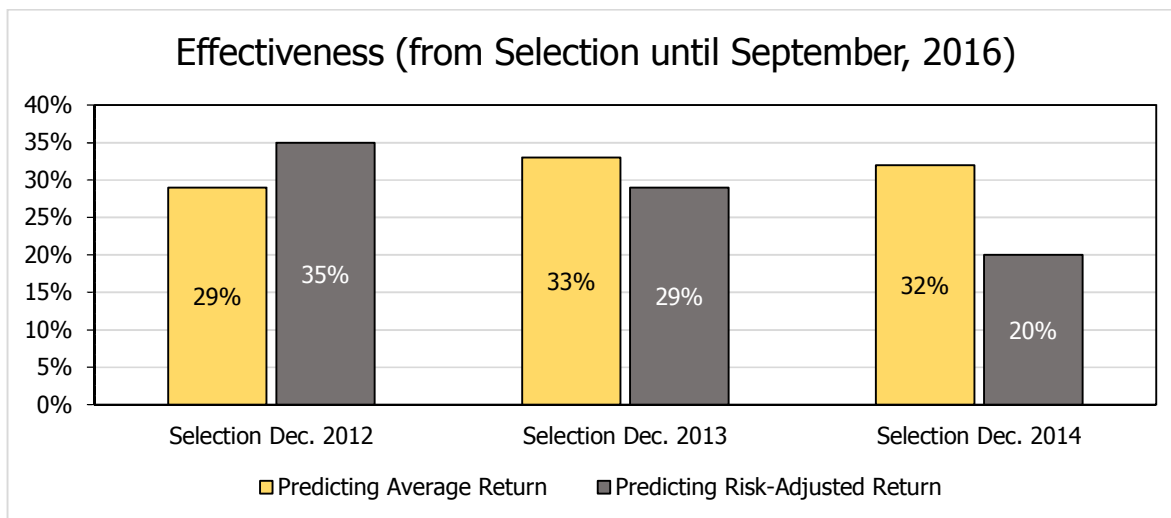
**Figure 15** The frequency with which Blauwtulp’s funds beat the benchmarks – 1-year period

In figure 15 we present the same analysis, however, this time we consider a one-year investment period. We can see that over the three selections, on average, the funds beat the index of funds more often than what we saw in figure 14 – in terms of total return the funds outperform the index 84% of the times (of the categories) and in terms of risk-adjusted measure they do so in 82% of the cases. However, when considering 5-Star funds this number is lower as compared to the entire time period. Specifically, when considering the total return the average is 61% and in terms of risk-adjusted performance it is 56%, on average across the three selections.

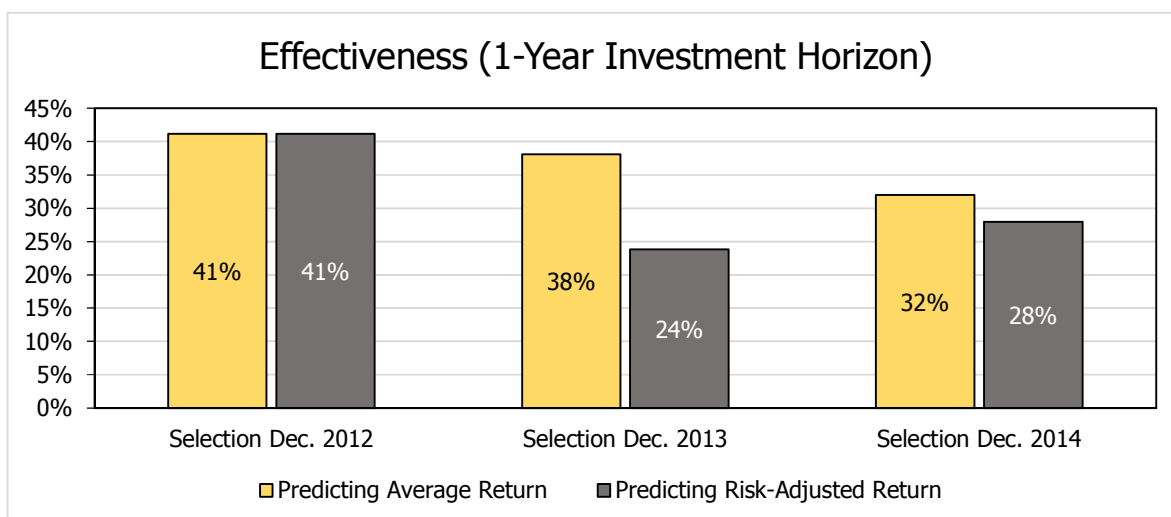
To conclude, from this analysis we can draw further conclusions from the analysis in Step 1. Specifically, when considering the full-time period, we see that because the top 25% or top 10% portfolios of funds in each category outperform the Index of Funds or 5-Star funds the overall return of all of these portfolios collectively produces higher returns than the Index and 5-Star funds. Often in over 80% of the categories the funds performed better than the Index and 5-Star funds, in both measures total return and risk-adjusted performance. Despite the fact that these values fall to below 70% in 2013, as we saw in Step 1, the top 10% still performed better than the Index and 5-Star portfolios, according to both measures of performance. The results from Step 1, are also confirmed when considering the 1-year investment horizon. As we saw the fund selection model produced funds with relatively lower performance as compared to 5-Star funds for selections 2012 and 2014 but not for selection 2013. This is what we saw here for the 2012 selection as well. In the December, 2012 selection only in 38% of the categories the funds performed better than the 5-Star funds. It is intriguing to observe that these values are over 70% for the December, 2014 selection, however the average total return was 0.18pp lower. This means that, in the categories where the funds performed worse than the 5-Star funds this underperformance was large enough to offset the overperformance in the rest of the categories.

### *3. The Predictive Power of the Fund Selection Model*

In this final step, as noted in the section Methodology and Data section, we explore how well the fund selection model is able to predict fund return. In figures 16 and 17 we present our aggregate findings – we show in how many of the cases the fund selection model is able to predict future fund returns. In Appendix 2 we also show our findings for each specific category.



**Figure 16** The frequency of effective prediction of the fund selection model – full time period



**Figure 17** The frequency of effective prediction of the fund selection model – full time period

In figure 17 we see that over the three selections, the model predicts average returns in 31% of the cases and in terms of risk-adjusted return it does so in 28% of the cases, on average. When considering a 1-year investment horizon these numbers are 37% and 31% respectively.

In summary, these values appear rather low given the well-documented in the literature predictive power of the variables used in the fund selection model to rank funds. However, as noted, the studies paid attention exclusively to actively managed equity mutual funds and in most cases for funds in the US. Also, there are subjective weights attached to each of the predictors of performance. Furthermore, as we saw in table 2 Blauwtulp selects funds from a range of categories and investment styles, some of which include exchange-traded funds, index fund,

fund-of-funds, mixed funds, bond funds, and others. None of these have been explicitly explored in all of the prior studies and the time-periods observed usually are before year 2010 and here we explore only for years after 2012.



## V. Conclusion

In this study, we explore how well Blauwtulp's fund selection model is selecting and ranking funds in different categories. We do this in three steps, each aimed at examining different dimensions of the model. In the first step, we compare how a portfolio comprised of all funds from all categories offered ranked at the end of 2012, 2013, and 2014 performs against two benchmarks – an index portfolio of similar funds to those selected and a portfolio of funds that were rated 5-Stars at the time of each ranking. In the second step we look more closely at those categories which performed better than the two benchmarks. Finally, we check what is the predictive power of the custom-made ranking scale.

When considering the top 10% portfolios of funds, over the full-time period (that is, December 2012, 2013, 2014 until September, 2016), from selections 2012, 2013, and 2014 we see that the return that these portfolios generated over the Index of Funds is 7.2, 2.3, and 3.2 percentage points respectively. This translates to an average of 4.3 percentage points higher return as compared to the index, on average across the three selections. These results are confirmed when we apply a stricter ('tougher') benchmark for comparison – 5-Star rated Morningstar portfolio of funds. In this case Blauwtulp's funds generate 0.8, 2.9, and 2.6 percentage points higher return than the 5-Star funds, for selections 2012, 2013, and 2014, respectively. On average this is 2.1 percentage points higher return than the 5-Star funds, across the three selections.

With regard to the 1-year investment horizon, when comparing the top 10% 2012, 2013, and 2014 portfolios with the Index of Funds we see that Blauwtulp's selected funds provided 0.6, 1.5, and 3.8 (or an average of 2) percentage points more return than the index, respectively. Turning to the comparison with 5-Star funds we see that these numbers are (4.6), 0.2, and (0.2), (or negative 1.5 on average) percentage points more (less) return generated by Blauwtulp's portfolios. These findings, as noted earlier, show that Blauwtulp's fund selection model is more long-term return oriented and thus when compared to Morningstar (which uses a short-term return oriented methodology) over a single year investment horizon it produces relatively lower return.

When we look at a category-by-category basis we find that over the entire time period and across the three selections, in terms of total return, in about 80% of the categories the top 25% or top

10% of the funds perform better than the index, and in 75% of the categories the funds outperform the 5-Star funds. In a one-year investment horizon, the funds outperform the index in 84% of the categories but only in 61% of the categories as compared to the 5-Star funds. If we measure performance on a risk-adjusted basis the results are similar.

Finally, the predictive power of the ranking scale of the fund selection model shows that it ranks funds according to out-of-sample return correctly in about 31% of the categories when considering the full-time horizon but 37% over 1-year horizon.

Although these values appear low, these values would be zero had the model not existed. Furthermore, the fund selection model uses widely accepted by the academic community factors that were found to predict the performance of *only* equity mutual funds (majorly situated and sold in US), therefore it is expected that these factors may not fully predict the future return of other funds such as exchange-traded funds, index fund, fund-of-funds, bond funds and others which have also largely international and/or European.

However, despite its relatively low predictive power, as noted earlier, the model is able to select on average those funds that would perform the better than 5-Star Morningstar funds and better than an index of similar funds. Although, the funds already perform better than most other benchmarks, this study highlights the idea that there is still room for improvement which will result in larger return generating ability of the fund selection model. Bearing this in mind, this study suggests that the academic literature lacks focus on the prediction of return of (mutual) funds other than those are actively managed open-ended Equity Mutual Funds.

## VI. References

- Amihud, Y., & Goyenko, R. (2013). Mutual fund's R2 as predictor of performance. *Review of Financial Studies*, 26(3), 667-694.
- Asebedo, G., & Grable, J. E. (2004). Predicting Mutual Fund Over-Performance Over A Nine-Year Period. *Journal of Financial Counseling and Planning*, 15(1).
- Cao, C., Chen, Y., Liang, B., & Lo, A. W. (2013). Can hedge funds time market liquidity?. *Journal of Financial Economics*, 109(2), 493-516.
- Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of finance*, 52(1), 57-82.
- Chen, J., Hong, H., Huang, M., & Kubik, J. D. (2004). Does fund size erode mutual fund performance? The role of liquidity and organization. *The American Economic Review*, 94(5), 1276-1302.
- Chevalier, J., & Ellison, G. (1999). Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance. *The journal of finance*, 54(3), 875-899.
- Cremers, K. M., & Petajisto, A. (2009). How active is your fund manager? A new measure that predicts performance. *Review of Financial Studies*, 22(9), 3329-3365.
- Elton, E. J., Gruber, M. J., & Blake, C. R. (2012). Does mutual fund size matter? The relationship between size and performance. *Review of Asset Pricing Studies*, ras001.
- Ferreira, M. A., Keswani, A., Miguel, A. F., & Ramos, S. B. (2012). The determinants of mutual fund performance: A cross-country study. *Review of Finance*, rfs013.
- Ferreira, M. A., Keswani, A., Miguel, A. F., & Ramos, S. B. (2012). The flow-performance relationship around the world. *Journal of Banking & Finance*, 36(6), 1759-1780.
- Golec, J. H. (1996). The effects of mutual fund managers' characteristics on their portfolio performance, risk and fees. *Financial Services Review*, 5(2), 133-147.
- Gottesman, A. A., & Morey, M. R. (2006). Manager education and mutual fund performance. *Journal of empirical finance*, 13(2), 145-182.
- Hendricks, D., J. Patel, and R. Zeckhauser, 1993, Hot hands in mutual funds: The persistence of performance: 1974 88, *Journal of Finance* 48, 93 130
- Huang, J., Sialm, C., & Zhang, H. (2011). Risk shifting and mutual fund performance. *Review of Financial Studies*, 24(8), 2575-2616.
- Jordan, B. D., & Riley, T. B. (2015). Volatility and mutual fund manager skill. *Journal of Financial Economics*, 118(2), 289-298.
- Kacperczyk, M., Nieuwerburgh, S. V., & Veldkamp, L. (2014). Time-Varying Fund Manager Skill. *The Journal of Finance*, 69(4), 1455-1484.
- Kacperczyk, M., Sialm, C., & Zheng, L. (2005). On the industry concentration of actively managed equity mutual funds. *The Journal of Finance*, 60(4), 1983-2011.

Kacperczyk, M., Sialm, C., & Zheng, L. (2007). Industry concentration and mutual fund performance. *Journal of Investment Management*, 5(1), 50.

Kacperczyk, M., Sialm, C., & Zheng, L. (2008). Unobserved actions of mutual funds. *Review of Financial Studies*, 21(6), 2379-2416.

Khorana, A., Servaes, H., & Wedge, L. (2007). Portfolio manager ownership and fund performance. *Journal of financial economics*, 85(1), 179-204.

Morey, M. (2002). Rating the raters: An investigation into mutual fund rating services. *The Journal of Investment Consulting*, 5(2), 30-50.

**VII. Appendix 1 – Categories that perform better than the Index of Funds and 5-Star funds.**

#	Selection Dec. 2012	Total Return				Risk-Adjusted Performance				
		Outperforms Index		Outperforms 5-Star Fund		Outperforms Index		Outperforms 5-Star Fund		
		Full Time	1-Year	Full Time	1-Year	Full Time	1-Year	Full Time	1-Year	
1	Commodity Broad Basket	✓	✓	—	—	✓	✓	—	—	
2	Equity Sector Natural Resources	✓	✓	✗	✗	✓	✓	✗	✗	
3	Equity Sector Precious Metals	✓	✗	✓	✗	✓	✓	✓	✗	
4	Conservative Allocation	✗	✓	✓	✓	✓	✓	✓	✓	
5	Moderate Allocation	✓	✓	✓	✓	✓	✓	✓	✓	
6	Real Estate Equity/FoF	✓	✓	✗	✗	✓	✗	✗	✗	
7	Euro Government Bonds	✓	✗	✓	✗	✗	✗	✓	✗	
8	Euro Global Bond/World Bond	✓	✓	✓	✗	✓	✓	✓	✗	
9	Global Convertibles/Convertibles	✗	✓	✓	✗	✓	✓	✓	✗	
10	Euro Corporate Bond	✓	✓	✗	✗	✓	✓	✓	✗	
11	Global High Yield/High Yield	✓	✓	✓	✗	✓	✓	✓	✗	
12	Global/World Equity Large Cap Blend	✓	✓	✓	✓	✓	✓	✓	✓	
13	US Large Cap Growth/Blend	✓	✓	✓	✗	✓	✗	✓	✓	
14	Euro Large Cap Growth/Blend	✓	✓	✓	✗	✓	✓	✓	✗	
15	Euro Small Cap	✓	✓	✓	✓	✗	✓	✓	✗	
16	World Emerging	✓	✓	✓	✓	✓	✓	✓	✓	
17	Asia Excl. Japan	✓	✓	✓	✓	✓	✓	✓	✓	
18	Frontier Markets (Africa)	—	—	—	—	—	—	—	—	
19	Japan	—	—	—	—	—	—	—	—	
20	China	—	—	—	—	—	—	—	—	
21	US Small Cap	—	—	—	—	—	—	—	—	
22	Aggressive Allocation	—	—	—	—	—	—	—	—	
23	Flexible Allocation	—	—	—	—	—	—	—	—	
24	Emerging Markets Fixed Income	—	—	—	—	—	—	—	—	
25	World Equity Medium/Small Cap	—	—	—	—	—	—	—	—	
26	Euro Large Cap Value	—	—	—	—	—	—	—	—	
	Effectiveness	88%	88%	81%	38%	88%	82%	88%	38%	
	If the top 10% or top 25% of the funds outperform the reference category					✓				
	If the top 10% or top 25% of the funds do not outperform the reference category					✗				
	Not available					—				

**Table 1 Selection December, 2012.**

Selection Dec. 2013		Total Return				Risk-Adjusted Performance			
		Outperforms Index		Outperforms 5-Star Fund		Outperforms Index		Outperforms 5-Star Fund	
		Full Time	1-Year	Full Time	1-Year	Full Time	1-Year	Full Time	1-Year
#									
1	Commodity Broad Basket	X	X	—	—	X	X	—	—
2	Equity Sector Natural Resources	✓	✓	X	X	✓	✓	X	X
3	Equity Sector Precious Metals	✓	✓	✓	✓	✓	✓	✓	✓
4	Conservative Allocation	X	✓	X	✓	X	X	X	X
5	Moderate Allocation	✓	✓	✓	✓	✓	✓	✓	✓
6	Real Estate Equity/FoF	X	X	X	✓	X	X	X	X
7	Euro Government Bonds	✓	✓	✓	✓	✓	✓	✓	✓
8	Euro Global Bond/World Bond	✓	✓	X	X	X	✓	X	X
9	Global Convertibles/Convertibles	X	X	X	✓	X	X	X	✓
10	Euro Corporate Bond	✓	✓	✓	✓	✓	X	✓	X
11	Global High Yield/High Yield	X	X	X	X	X	✓	X	X
12	Global/World Equity Large Cap Blend	✓	✓	X	X	✓	✓	X	✓
13	US Large Cap Growth/Blend	✓	✓	✓	✓	✓	✓	✓	✓
14	Euro Large Cap Growth/Blend	✓	✓	✓	✓	✓	✓	✓	✓
15	Euro Small Cap	✓	✓	✓	✓	✓	✓	X	✓
16	World Emerging	✓	✓	✓	✓	✓	✓	✓	✓
17	Asia Excl. Japan	✓	✓	X	X	✓	✓	X	X
18	Frontier Markets (Africa)	✓	✓	✓	✓	✓	✓	✓	✓
19	Japan	✓	✓	✓	✓	✓	✓	✓	X
20	China	X	X	✓	X	X	X	✓	✓
21	US Small Cap	✓	✓	✓	✓	✓	✓	✓	✓
22	Aggressive Allocation	—	—	—	—	—	—	—	—
23	Flexible Allocation	—	—	—	—	—	—	—	—
24	Emerging Markets Fixed Income	—	—	—	—	—	—	—	—
25	World Equity Medium/Small Cap	—	—	—	—	—	—	—	—
26	Euro Large Cap Value	—	—	—	—	—	—	—	—
Effectiveness		71%	76%	60%	70%	67%	71%	55%	60%
If the top 10% or top 25% of the funds outperform the reference category						✓			
If the top 10% or top 25% of the funds do not outperform the reference category						X			
Not available						—			

Table 2 Selection December, 2013.

Selection Dec. 2014		Total Return				Risk-Adjusted Performance			
#		Outperforms Index		Outperforms 5-Star Fund		Outperforms Index		Outperforms 5-Star Fund	
		Full Time	1-Year	Full Time	1-Year	Full Time	1-Year	Full Time	1-Year
1	Commodity Broad Basket	✓	✓	—	—	✗	✓	—	—
2	Equity Sector Natural Resources	✗	✓	✗	✗	✓	✓	✗	✗
3	Equity Sector Precious Metals	✓	✓	✓	✓	✓	✓	✓	✓
4	Conservative Allocation	✗	✗	✗	✗	✓	✓	✗	✗
5	Moderate Allocation	✓	✓	✓	✓	✓	✓	✓	✓
6	Real Estate Equity/FoF	✗	✓	✓	✓	✗	✓	✓	✓
7	Euro Government Bonds	✓	✓	✓	✓	✓	✓	✓	✓
8	Euro Global Bond/World Bond	✗	✓	✓	✗	✗	✓	✓	✗
9	Global Convertibles/Convertibles	✓	✓	✓	✓	✓	✓	✓	✓
10	Euro Corporate Bond	✓	✓	✓	✗	✓	✓	✓	✗
11	Global High Yield/High Yield	✗	✓	✗	✓	✗	✓	✗	✓
12	Global/World Equity Large Cap Blend	✓	✓	✓	✓	✓	✓	✓	✓
13	US Large Cap Growth/Blend	✓	✓	✓	✓	✓	✓	✓	✓
14	Euro Large Cap Growth/Blend	✓	✓	✓	✓	✓	✓	✓	✓
15	Euro Small Cap	✓	✓	✓	✓	✓	✓	✓	✓
16	World Emerging	✓	✓	✓	✓	✓	✓	✓	✓
17	Asia Excl. Japan	✓	✓	✓	✓	✓	✓	✓	✓
18	Frontier Markets (Africa)	✓	✓	✓	✓	✓	✓	✓	✓
19	Japan	✓	✓	✓	✓	✓	✓	✓	✓
20	China	✓	✗	✓	✓	✓	✗	✓	✓
21	US Small Cap	—	—	—	—	—	—	—	—
22	Aggressive Allocation	✗	✗	✗	✗	✗	✗	✗	✗
23	Flexible Allocation	✓	✓	✓	✓	✓	✓	✓	✓
24	Emerging Markets Fixed Income	✓	✓	✓	✓	✓	✓	✓	✗
25	World Equity Medium/Small Cap	✓	✓	✓	✓	✓	✓	✓	✓
26	Euro Large Cap Value	✓	✓	✓	✗	✓	✓	✓	✗
Effectiveness		76%	88%	83%	75%	80%	92%	83%	71%
If the top 10% or top 25% of the funds outperform the reference category						✓			
If the top 10% or top 25% of the funds do not outperform the reference category						✗			
Not available						—			

Table 3 Selection December, 2014.

**VIII. Appendix 2** – The categories in which there is significant relationship between the Blauwtulp’s score and out-of-sample return of the funds in that category.

Category	Predicting Average Return						Predicting Risk-Adjusted Return					
	Until Oct-2016			Over 1-Year			Until Oct-2016			Over 1-Year		
	2012	2013	2014	2012	2013	2014	2012	2013	2014	2012	2013	2014
Commodity Broad Basket	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✗	✓
Equity Sector Natural Resources	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✓	✓
Equity Sector Precious Metals	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗
Conservative Allocation	✗	✓	✗	✓	✗	✗	✗	✓	✗	✓	✗	✗
Moderate Allocation	✗	✓	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗
Real Estate Equity/FoF	✓	✓	✗	✓	✓	✗	✗	✗	✗	✗	✓	✗
Euro Government Bonds	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗
Euro Global Bond/World Bond	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
Global Convertibles/Convertibles	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
Euro Corporate Bond	✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Global High Yield/High Yield	✗	✗	✓	✗	✗	✓	✓	✗	✓	✗	✗	✓
Global/World Equity Large Cap Blend	✗	✗	✓	✓	✗	✗	✓	✗	✗	✗	✗	✗
US Large Cap Growth/Blend	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
Euro Large Cap Growth/Blend	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Euro Small Cap	✓	✗	✓	✓	✗	✓	✗	✗	✗	✓	✗	✓
World Emerging	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Asia Excl. Japan	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗
Frontier Markets (Africa)	—	✓	✓	—	✓	✗	—	✓	✓	—	✓	✗
Japan	—	✓	✓	—	✓	✗	—	✓	✓	—	✓	✗
China	—	✗	✗	—	✗	✗	—	✗	✗	—	✗	✗
US Small Cap	—	✗	—	—	✓	—	—	✗	—	—	✗	—
Aggressive Allocation	—	—	✓	—	—	✓	—	—	✗	—	—	✗
Flexible Allocation	—	—	✗	—	—	✓	—	—	✗	—	—	✗
Emerging Markets Fixed Income	—	—	✓	—	—	✓	—	—	✓	—	—	✓
World Equity Medium/Small Cap	—	—	✗	—	—	✓	—	—	✗	—	—	✓
Euro Large Cap Value	—	—	✗	—	—	✗	—	—	✗	—	—	✗
Overall†	✓	✗	✗	✓	✓	✗	✗	✓	✗	✗	✓	✗
Effectiveness‡	29%	33%	32%	41%	38%	32%	35%	29%	20%	41%	24%	28%

† Overall is done by ignoring categories - that is, running an overall regression without dividing the data into separate categories.

In this way, we show whether the benchmark ranks funds well between categories.

‡ Effectiveness is calculated by dividing the number of categories in which the model works by the number of categories available in the selection year.

Predicts ✓  
 Does not predict ✗  
 Category does not exist —