

Time to Come Out of the Closet

A Study of Active Fund Management in Sweden

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Abstract: We study the performance of mutual funds and relate it to Active Share on the Swedish fund market, a market where a large portion of funds claim that they engage in more active management than what they really are. During the 09/30/2005 to 09/30/2014 time period we find with statistical significance that a portfolio consisting only of low Active Share large cap funds has underperformed relative to its benchmark. We are unable to reject the null hypothesis that a corresponding portfolio consisting of high Active Share large cap funds have performed equal to its benchmark. We find, with statistical significance, that a high Active Share level is a fund characteristic associated with a high alpha. Further we study Active Share over time and find that Swedish funds seem to shift their level of Active Share as market conditions change. These results are in line with studies performed on the U.S. market. Finally, by using game theory we illustrate that a market equilibrium exists where some funds purports to be more active than what they really are. Based on our findings we suggest a change in information disclosure policy.

Keywords: Active Share, Closet Indexing, Mutual Fund Performance

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1 Introduction

Recently, the actively managed fund industry has been a hotly debated topic in the Swedish media³. The debate concerns the recent finding that a large number of Swedish funds marketing themselves as actively managed are in fact quite passive, holding a much higher portion of assets under management in their benchmark index than justified. Evidence for this is provided in a paper by Cremers et al (2015). When Pedro Matos, one of the authors, comments the finding on the public service broadcaster Sveriges Radio he notes that *"Sweden stands out as one of the countries where a large majority of the funds that claim to be active are what we call closet indexers."* When comparing countries based on what percentage each country's truly active funds represent in relation to total net assets in 2010, Cremers et al find that Sweden has the second least active fund market among the countries studied⁴. Moreover, when studying the number of closet indexers, Sweden is again in second place in terms of highest percentage of closet indexers in relation to total net assets. In other words, it seems like the average Swedish mutual fund is quite lazy.

Despite the fact that the gross returns of a fund holding a majority of its assets in its benchmark will be very similar to a passive index fund tracking the same benchmark, many closet indexers are charging management fees as if they engaged in truly active management. The result is a net return lower than the equivalent passive index fund. Investors putting their savings in an actively managed fund pay for the possibility of reaching positive excess net returns. Investors putting their savings in closet index funds pay for something they likely will never get⁵.

³See for instance Dickson (2014)

⁴Cremers et al find that Liechtenstein, the Netherlands, Denmark, Luxembourg and Norway represents the top four countries in terms of high Active Share in 2010. In the opposite end of the spectrum they find Switzerland, Sweden, Belgium and Poland.

⁵Important to note is that there are some closet index funds charging fees equivalent to passive index funds. Closet indexing is only disadvantageous to investors when there is a discrepancy between the fees paid and the fund management received.

According to Cremers et al (2015) more competitive fund markets are expected to be composed of a lower fraction of closet indexers compared to less competitive markets. Thus the high fraction of closet indexers in Sweden could be an indication of a non-competitive Swedish fund market. As emphasized by Flam and Vestman (2014), Swedish households invest extensively in Swedish equity mutual funds and overall invest more extensive in mutual funds than most other countries. Consequently, from a socio-economic perspective it is important that the fund market is efficient. A market where funds can charge fees for work never performed is clearly not.

Flam and Vestman (2014) conclude that Swedish explicitly active equity mutual funds underperform relative to their benchmark, during the 2002-2013 time period. In the light of the fact that a large majority of Swedish mutual funds are closet indexers this result may not be very surprising. If Swedish equity mutual funds have not been trying to beat the market while charging fees as if they had, how could their excess return net of fees have been positive? Based on research by Cremers and Petajisto (2009) and Petajisto (2013) showing that high Active Share funds outperform their benchmark and Cremers et al (2015) showing that closet indexing in Sweden is extremely common, we believe that the results of Flam and Vestman could be elaborated by taking into consideration Active Share.

Further we hope to shed light on the question whether or not Swedish funds have been persistently inactive in recent times or if their level of Active Share fluctuates. Cremers et al (2015) suggest that Active Share is an extremely persistent fund characteristic. However, Kacperczyk et al (2012) show that mutual funds tend to engage more in stock-picking in market upswings and less stock-picking in market downturns. The measure used by Kacperczyk et al to identify stock-picking differs substantially from the Active Share measure⁶. However their findings suggest that managers adjust invest-

⁶Stock picking as defined by Kacperczyk et al measures the comovement of a fund's holding of each stock relative to the market, with the unsystematic component of the stock return.

ment behavior over the business cycle. Chevalier and Ellison (1999) find evidence for herding behavior among fund managers as a result of career concerns. Kacperczyk et al (2012) find that the labor market for fund managers deteriorates in recessions. Consequently, fund managers should be more defensive due to career concerns in recessions. When herding, fund managers reallocate their portfolios to resemble that of their peers. Several studies, such as Carhart (1997), show that the average fund underperforms its benchmark with the size of its fee. If the average fund has a gross return equal to its benchmark index, herding should result in funds holding a portfolio similar to the index. Petajisto (2013) finds that closet indexing increases in declining markets when studying U.S. data. We hypothesize that the average Active Share in the Swedish market will shift as market conditions change.

In sum, we seek to investigate the relationship between active fund management, as measured by Active Share, and fund performance in the Swedish market, a market that appears to be a non-competitive. In order to do this we study the Active Share of 91 Swedish domestic all-equity mutual funds during the 2005-2014 time period and relate it to fund performance. Furthermore, by studying Active Share over time we seek to investigate the behavior of Swedish mutual fund managers as market conditions change. This is attempted by studying the effect on average Active Share around the time of the Lehman Brothers bankruptcy in mid-September 2008.

We make a distinction between large cap and small/mid cap funds for a more precise Active Share computation and fund evaluation. By constructing two portfolios updated quarterly where one only consists of large cap funds with an Active Share above 50% while the other only consists of large cap funds with an Active Share below 50%, we find that the low Active Share portfolio has underperformed net of fees relative to its benchmark. This result is statistically significant at the 5% level. We are unable to reject the null hypothesis that the high Active Share portfolio has performed equal

to its index net of fees. We perform the same regression on two portfolios of low and high Active Share small/mid cap funds and are unable to reject the null hypotheses that either portfolio has performed equal to their benchmark. We illustrate the effect of Active Share on long-term returns by showing the cumulative returns of the portfolios of funds.

We find that the mean Active Share dropped at the time of the 2008 financial crisis. This result is statistically significant at the 1% level. Swedish mutual funds seem to have shifted to a more passive strategy immediately after the Lehman Brothers collapse. Since then the mean Active Share seems to have increased as the market conditions have improved peaking at the end of our sample period. This increase seems to be a result of an industry-wide shift towards more active management rather than a result of an addition of high Active Share funds following the crisis. This result stands in contrast to research performed on the U.S. market where Petajisto (2013) finds that closet indexing has increased after the recent financial crisis. We find that the average autocorrelation of the Active Share in our sample is lower than the average autocorrelation computed by Cremers et al (2015).

We find a statistically significant positive relationship between mean Active Share and estimated alpha, indicating that a high Active Share is a fund characteristic associated with high relative performance in the Swedish fund market.

Finally, we use game theory to illustrate that there is a possible market equilibrium where some fund managers choose to be passive while other choose to be active. In this setting fund managers maximize their payoff when all funds engage in closet indexing and fund managers have an incentive to withhold information necessary to evaluate their level of activeness. Based on our findings we suggest a change in information disclosure policy whereby funds are required to account for their level of activeness.

2 Previous Research

The Active Share measure⁷ was first introduced by Cremers and Petajisto (2009). Prior to the introduction of the Active Share measure, fund activeness had traditionally been evaluated on the basis of the tracking error volatility of the fund, i.e. the standard deviation of the difference between fund portfolio and index returns. Active Share on the other hand measures the portion of a fund's holdings that differ from its benchmark index holdings. By using this measure, Cremers and Petajisto separates actively managed mutual funds into truly active funds and closet index funds. By studying U.S. domestic all-equity mutual funds, Petajisto (2013) finds that the most active funds in terms of Active Share outperform their benchmark net of fees. Cremers and Petajisto (2009) also find evidence when looking at U.S data showing that funds with a high Active Share outperform their benchmark net of fees and that the Active Share measure can predict fund performance.

Cremers et al (2015) study the Active Share of equity mutual funds across 32 countries. They show that active funds are more active and charge lower fees when they face stronger competitive pressure from explicit indexing. Furthermore, they find that average alpha is higher in countries with a high fraction of explicit indexers in relation to total net assets compared to countries with a low fraction of explicit indexers. Their findings suggest that explicit indexing improves competition in the mutual fund industry. By calculating the average autocorrelation on fund level, Cremers et al find that that Active Share is a very persistent fund characteristic over time, having a near perfect positive serial correlation of 0.95. This indicates that funds do not change strategy in terms of portion of active market bets too often. Further by studying the fees charged by truly active funds and closet indexers Cremers et al show that Swedish truly active funds charged fees almost identical to Swedish closet indexers in 2010.

⁷For a definition of Active Share please refer to the Methodology section.

By looking at 124 actively managed Swedish equity mutual funds, using data between 2003-2013, Flam and Vestman (2014) show that Swedish equity mutual funds underperform relative to their index after expenses, indicating that investors are better off investing in passive index funds. Further they find no persistence in fund performance over time. This is in line with research performed on the US market, such as Carhart (1997). Flam and Vestman do not separate between truly active and closet index funds. To the best of our knowledge, no one has previously studied the relationship between Active Share and fund performance on the Swedish market, a market characterized by a very large fraction of closet index funds. Hence we believe that this study fills a gap in the literature.

3 Data

Swedish mutual funds operating under the UCITS directives⁸ have to, on a quarterly basis, report their portfolio holdings to Finansinspektionen, a Swedish central administrative authority that monitors and analyses trends in the financial market. The portfolio holdings on fund level are available to the public through Finansinspektionen's web site. In Sweden, a majority of the funds are regulated under the UCITS. However some funds, labeled special funds by Finansinspektionen, are instead regulated under the AIFM⁹ directive. Flam and Vestman (2014) include both UCITS and AIFMD regulated funds in their study. Compared to their sample, we lack 46 funds that have not reported portfolio weights to Finansinspektionen. Out of these 46 funds 11 are based abroad and are therefore exempt from reporting their holdings.

The index used to compute the Active Share measure and to evaluate fund per-

⁸UCITS stands for Undertakings for Collective Investment in Transferable Securities and is a set of European Union directives aiming to allow investment funds to operate freely throughout the EU.

⁹The AIFMD or Alternative Investment Fund Managers Directive is a EU directive regulating alternative investment fund managers operating in the EU.

formance of the small/mid cap funds is the CSRXSE, Carnegie Small Cap Return Index Sweden¹⁰, where dividends are reinvested. For the large cap group we use the SIX-PRX, SIX Portfolio Return Index, an index taking in consideration the regulations of the UCITS directives and where dividends are reinvested. Return and portfolio weight data for SIXPRX and CSRXSE have been obtained from the SIX Trust database.

Fund return data have been obtained from Morningstar and is net of fees. In this paper we take an investor perspective when evaluating fund performance. What investors ultimately should care about is their investment's net return. Some funds that according to this study have a negative alpha during the period might have positive excess gross returns.

As a proxy for the risk-free interest rate we use the one-month STIBOR interbank lending rate. Historical monthly STIBOR rates are publicly available through the web page of Riksbanken, the central bank of Sweden.

In this paper we study mutual funds marketing themselves as domestic Swedish all-equity mutual funds. These funds often hold a small portion of fund holdings in foreign stock. Mutual funds are also required to hold a certain amount of liquid assets for transaction purposes. Some of the funds in our sample also invest in other Swedish all-equity mutual funds.

Finansinspektionen is missing fund portfolio data for a few quarters in 2004 and 2005. In order to avoid data imputation we set the time-frame of this study to 09/30/2005 to 09/30/2014 for which continuous portfolio data is available. A time-frame starting in 2002 would make alpha estimates more comparable to the ones estimated by Flam and Vestman (2014).

Table 1 reports summary statistics for the two fund types in our sample. The

¹⁰Despite its name, the CSRXSE index also includes companies listed on the Nasdaq OMX Nordic Mid Cap list.

average large cap fund in our sample has a 94 month lifespan within the 2005-2014 timeframe. The average number of large cap funds active in an given quarter is 55. For the small/mid cap group the average lifespan within the period is 96 months and the average number of funds active in a quarter is 15. The total number of large cap funds included in our study is 72 while the equivalent number for the small/mid cap group is 19.

Table 1: Descriptive Statistics, Data Set

	Large Cap Funds			Small/Mid Cap Funds		
	mean	sd	N	mean	sd	N
Average fund lifespan	94	25		96	24	
Average nr of funds each quarter	55	7		14	2	
Total nr of funds			72			19
Observations	5873			1554		

Notes: The numbers have been rounded to the nearest integer. Average fund lifespan is expressed in number of months

3.1 Data Issues

Funds not regulated by UCITS do not have to report their portfolio weights to Finansinspektionen. The UCITS directives for instance require that funds do not invest more than 10% of fund capital in one single stock (Commission Regulation 2009/65). Swedish equity mutual funds holding more than 10% in a single stock are classified as special funds by Finansinspektionen and are not included in our study¹¹. Our sample therefore suffers from a potential sample selection bias. For a discussion on the likely effect this will have on our results please refer to the Potential Biases in Results section.

¹¹The special fund category also includes various funds not marketed to the public such as hedge funds.

Dual-class shares are common in the Swedish share class system. Naturally, the SIXPRX or CSRXSE indices do not include multiple share classes of a single company stock. For instance, a small fraction of the large cap funds in our sample hold a class of shares not included in the SIXPRX. If a fund holds an A-class share not included in the index we treat the holding as a holding outside the SIXPRX universe. Consequently, funds holding a class of shares not included in the indices will have a slightly higher Active Share than justified. However, the difference in market value between different share classes would lead to a misleading portfolio weight if for instance an A-class share was treated as a B-class share.

For a small number of funds in our sample, Finansinspektionen is missing portfolio holding data for one or two quarters. In some cases this is a result of a fund not reporting data to Finansinspektionen. In at least one case the missing data is due to formatting errors.

4 Methodology

We have divided our sample into two groups, separating funds investing in small/mid cap companies from funds investing in large cap companies¹². Small/mid cap funds are normally evaluated based on their return relative to a small/mid cap index rather than a full cap index. Furthermore, small/mid cap funds would be given a misleadingly high Active Share measure if their holdings were compared to a full cap index.

We have computed an Active Share measure for 91 Swedish equity mutual funds during the 2005-2014 time period. Not all of the 91 funds have been in business during

¹²Nasdaq OMX categorize Swedish companies based on their market capitalization (market cap) into large cap, mid cap and small cap companies. The large cap list consists of companies with a market cap of 1 billion Euro or more. The mid cap list consists of companies with a market cap less than 1 billion Euro but more than 150 million Euro. The small cap list consists of companies with a market cap of less than 150 million Euro.

the entire period. The composition and number of funds in a given quarter will therefore differ.

4.1 Active Share Computation

The Active Share measure introduced by Cremers and Petajisto (2009) is defined as:

$$\frac{1}{2} \sum |w_{fund,i} - w_{index,i}| \quad (1)$$

where $w_{fund,i}$ is the portfolio weight of asset i in the fund and $w_{index,i}$ is the portfolio weight of asset i in the index. The sum is taken over the universe of all assets in the benchmark and the fund. An all equity mutual fund only investing in long positions and never shorting will have an Active Share between 0% and 100%. For a truly active fund the theoretical minimum level of Active Share is 50%. Compared to the average return of itself, 50% of the value of an index's components will show above-average returns while the other 50% will show less-than-average returns. A fund manager holding more than 50% of fund capital in the index should know that a part of that holding will experience a less-than-average return. A holding above 50% in the index can thus be labeled as a means to reduce risk relative to the index and not an active market bet¹³. In this paper we label funds with an Active Share above 50% as truly active. Researches and practitioners often use 60% as a cut-off point for truly active management. The choice of cut-off point is however somewhat arbitrary. There is no precise way of determining true active management based on Active Share other than that it requires a level of at least 50%. As further discussed in the Results section, the conclusions drawn in this paper would not change if a cut-off point of 60% were to be used.

As emphasized by Cremers and Petajisto (2009), for a complete picture of fund

¹³For an elaborated definition of Active Share please refer to Cremers and Petajisto (2009)

activeness both tracking error and Active Share should be considered. Tracking error is the preferred measure for factor-timing funds while Active Share is the preferred measure for stock-picking funds. In this paper we base our definition of an active fund on the magnitude of its Active Share alone. Some funds that we consider truly active might not make the list if tracking error is also considered. There is however a close relationship between Active Share and tracking error. A high Active Share usually results in a high tracking error. In a theoretical setting, where asset returns can be explained by a single factor model, the relationship between tracking error and Active Share can be expressed as¹⁴:

$$TE = \left[\beta_a^2 Var(f) + AS^2 \cdot \frac{2\pi}{N} \cdot \overline{\sigma_e^2} \right]^{0.5} \quad (2)$$

where β_a^2 is the active exposure to the risk factor of the portfolio, $Var(f)$ is the variance of the factor, N is the number of assets a fund is taking exposure to and $\overline{\sigma_e^2}$ is the average idiosyncratic variance of all assets in the universe available to the fund.

Cremers and Petajisto (2009) also find empirical evidence for the relationship between Active Share and tracking error. When examining the relationship between Active Share and a number of possible explanatory variables, they find that tracking error can explain 13% of the variance in Active Share, by far the most closely related variable of the ones tested.

4.2 Regressions

We estimate alpha by running ordinary least squares (OLS) regressions using a single factor model as in Jensen (1968) defined as:

¹⁴Evidence for this is provided in a research paper by Manny Hunjan and Steve Sapra of the asset management company PIMCO.

$$r_i - r_f = \alpha + \beta \cdot (r_M - r_f) + \epsilon_i \quad (3)$$

where r_i is the return of portfolio i at time t , r_f is the one month STIBOR interbank lending rate at time α is the net excess return, β is a factor loading and r_M is the index return at time t (which for the large cap fund is SIXPRX and for the small/mid cap group is CSRXSE). Funds with a lifespan of less than 36¹⁵ months are excluded when estimating alpha on fund-level in order to avoid misleading estimates resulting from too few observations.

In order to evaluate fund performance based on Active Share we rank funds by Active Share each quarter during the period and construct two equally weighted portfolios of funds. One portfolio contains only funds which had an Active Share above 50% at the nearest reporting date¹⁶ while the other portfolio only contains funds which had an Active Share below 50%. Thus, the portfolios are updated each quarter and are held until the following quarter reporting date. For each month we generate the return for the equally weighted portfolios by dividing the monthly return of each fund with the total number of monthly observations and then summing these up in the respective portfolios.

$$Portfolio\ monthly\ return = \sum_{i=1}^n \frac{1}{n} \cdot Monthly\ return_i \quad (4)$$

where $monthly\ return_i$ is the monthly return of fund i at time t , and n the number of funds belonging to the high or low Active Share portfolio at time t .

To avoid survivorship bias funds with a lifespan less than 36 months are included when constructing the portfolios. We then evaluate the performance of the portfolios using a one-factor (CAPM) regression on the excess return of the market and the excess

¹⁵The number of funds with a lifespan of less than 36 funds in our sample is 11.

¹⁶By reporting date we mean the date for which funds are required to report their portfolio weights to Finansinspektionen, i.e. the final date of each quarter.

return of the portfolios of funds.

Since we are not including funds for which portfolio weight data is not available, we also make alpha estimates for a larger data set including 28 additional funds that, according to our classification, should be considered Swedish equity mutual funds¹⁷. This is to assess potential biases that may occur if these additional funds appear to be disproportionately distributed among high or low performing funds.

To further test the relationship between alpha and Active Share we run an OLS regression between estimated alpha and mean Active Share for the large and small/mid cap groups as follows:

$$\hat{\alpha}_i = \beta_0 + \beta_1 \cdot \overline{AS}_i + \epsilon_i \quad (5)$$

where $\hat{\alpha}$ is the estimated alpha and $\overline{AS}$ is the mean Active Share of fund i .

In all our regressions we use robust standard errors to control for possible heteroscedasticity in the error terms.

4.3 Opportunistic Behaviour

In order to test the level of opportunistic behavior among active fund managers we compare the Active Share level for 59 large cap funds operating at the portfolio reporting date prior to the Lehman Brothers bankruptcy September 15 2008, and at the reporting date following the bankruptcy¹⁸. To test if the average Active Share differs between the two quarters we perform a matching pair's t-test.

Opportunistic behaviour is also examined by looking at the average autocorrelation

¹⁷This extended list of funds to a large extent resembles the list of funds studied by Flam and Vestman (2014) with the exemption that we lack fund return data for funds based abroad.

¹⁸59 is the number of large cap funds active at both reporting dates.

of Active Share at fund level¹⁹. Autocorrelation measures the tendency for an attribute to remain the same from one observation to the next and hence, we can estimate autocorrelation of the Active Share measure to determine the level of persistency over time. Obviously, the autocorrelation is affected by the length of the time between observations in the given variable. Given that Active Share data is available on a quarterly basis, the Active Share should, in theory, have a relatively high autocorrelation since it is unlikely that fund managers make substantial reallocations during this time period. We estimate autocorrelation by looking at the relationship between Active Share and itself with a time lag of one quarter. For the purpose of computing autocorrelation, funds with less than 36 observations are excluded since the number of observations greatly affects the measure. The autocorrelation formula is defined as:

$$\rho = \frac{Cov(AS_i, AS_{i-k})}{\sigma_i \cdot \sigma_{i-k}} \quad (6)$$

where AS_i is the Active Share for the original time-series and AS_{i-k} is a one-quarter lagged version AS_i .

Finally, we look at basic descriptive statistics, such as standard deviation, minimum and maximum values for Active Share on fund level in order to investigate behavior among fund managers.

¹⁹Autocorrelation is a mathematical tool for finding repeating patterns and is measured by looking at the relationship between a given time series and a lagged version of itself over various time periods.

5 Results

5.1 Descriptive Statistics

Figure 1 shows the average Active Share of all large cap funds in our sample from 09/30/2005 to 09/30/2014. Bear in mind that the number and composition of funds will vary over time. Leading up to the financial crisis of 2008 the average Active Share remained on a stable level around 35% before dropping to around 32% at the 12/31/2008 reporting date. Since then, average Active Share has increased reaching 45% in 2014. It appears like Swedish mutual funds have been taking increasingly active positions in recent years. Since the low point in late 2008, Active Share has increased in a similar fashion as the SIXPRX. This might be an indication that Swedish mutual funds act opportunistically when deciding their level of active market bets. However, in contrast to the average Active Share of the large cap funds, the average Active Share of the small/mid cap funds seem to follow a more random pattern (See figure 2). Also, average Active Share for the small/mid cap funds appears to be higher overall than the average Active Share for the large cap group.

Figure 1: Average Active Share Over Time, Large Funds

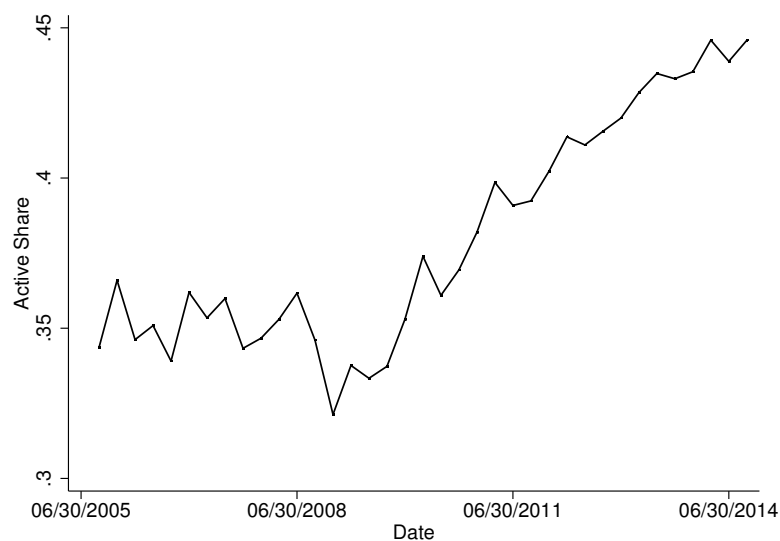


Figure 1 illustrates the mean Active Share of the large cap group each quarter between 09/30/2005 and 09/30/2014. The number and composition of funds differ between quarters.

Figure 2: Average Active Share Over Time, Small/Mid Cap Funds

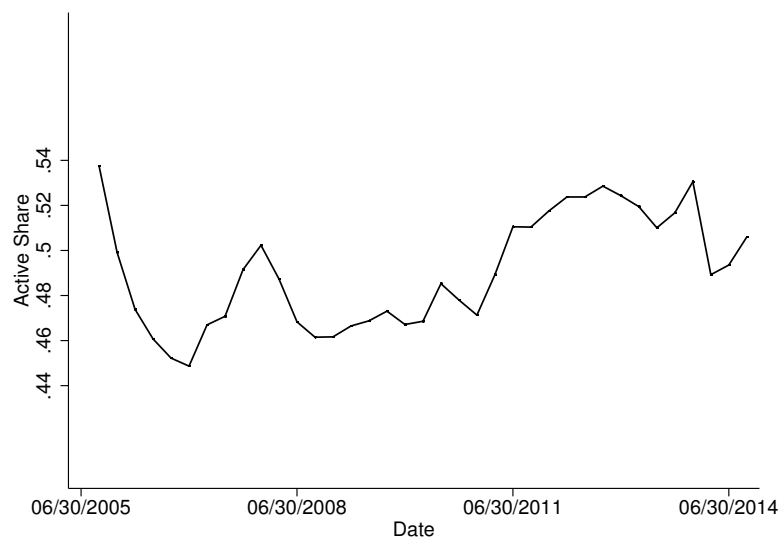


Figure 2 illustrates the mean Active Share of the small/mid cap group each quarter between 09/30/2005 and 09/30/2014. The number and composition of funds differ between quarters.

One might suspect that the increase in average Active Share of the large cap funds in recent years is a result of recently started funds with a more active investment strategy, rather than an industry-wide shift towards more active management. However by looking at the number of years funds with an Active Share above 50% on the 09/30/2014 reporting date have been in operation, this possibility seems unlikely. As reported in table 2, almost all large cap funds that were truly active at the 09/30/2014 reporting date have been active over the whole time period indicating that the effect on average Active Share of recently started funds with a high Active Share should be small.

Table 2: Descriptive Statistics, Funds in Operation 09/30/2014

ID	AS (Min)	AS (Mean)	AS (Max)	AS (Std. Dev.)	N
2	.2399306	.3973896	.6195458	.1276909	109
30	.1994128	.5215176	.6479125	.1285697	109
33	.310859	.6088418	.9106221	.1947955	109
34	.2850658	.440155	.5337088	.0592916	109
41	.2207169	.4290939	.6539941	.1323502	106
43	.4985011	.6278612	.7287436	.0663162	109
46	.4137098	.53758	.618028	.0399147	109
53	.4667873	.5639349	.6523826	.0443156	109
56	.2787805	.4312494	.6396867	.1047967	109
65	.6257712	.7008911	.7703158	.0356618	109
66	.6668257	.7417405	.8320541	.0522762	109
71	.4173869	.5126117	.6204674	.0419432	109
72	.2212121	.4034914	.5899293	.1353854	52
79	.5495958	.6504472	.7719699	.0521008	109
80	.2939051	.4482298	.5215908	.0556159	64
87	.5993876	.7197008	.8477353	.0815223	46
91	.4901725	.5255765	.5871494	.0265539	19

The table presents descriptive statistics for funds with an Active Share above 50% on the 09/30/2014 reporting date. AS (Min), AS(mean) AS(Max) and AS(Std. Dev) are the minimum, mean, maximum and standard deviation of Active Share for each fund. N is the number of months a fund has been in operation .

The ratio of truly active large cap funds to total number of large cap funds each quarter is illustrated in figure 3. There appears to be a trend towards a larger number of truly active large cap funds in the Swedish fund market.

Figure 3: Percentage of Truly Active Large Cap Funds.

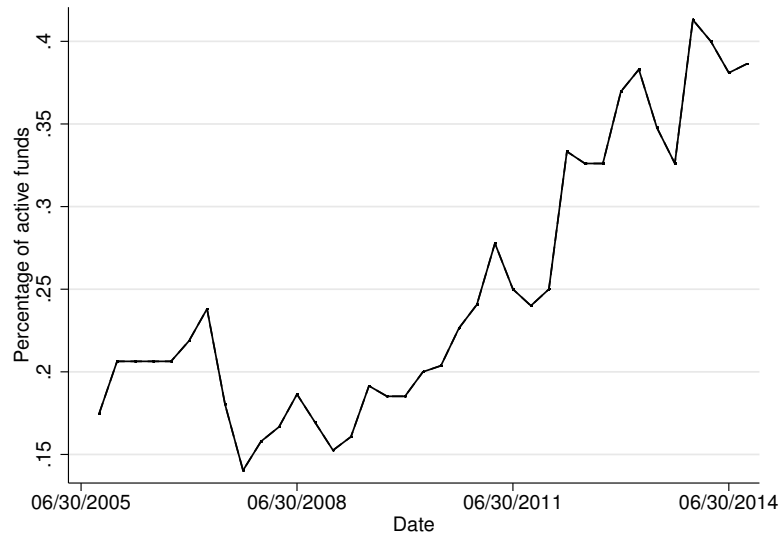


Figure 3 illustrates the percentage of truly active large cap funds to total number of funds each quarter between 09/30/2005 and 09/30/2014.

Figure 4 illustrates the market value of assets managed by truly active large cap funds in relation to the market value of assets of all large cap funds in our sample. Apart from a substantial drop at the 09/30/2014 reporting date, there appears to be a slight upward going trend towards a higher portion of actively managed assets after the 2008 financial crisis.

Figure 4: Percentage of Actively Managed Assets, Large Cap Funds.

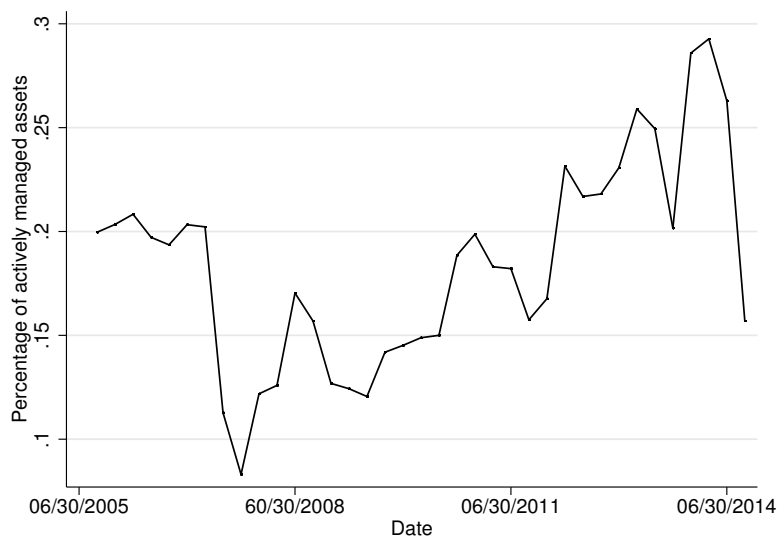


Figure 3 illustrates the market value of assets managed by truly active large cap funds in relation to the market value of assets of funds each quarter between 09/30/2005 and 09/30/2014.

Table 3 presents descriptive statistics for the best and worst performing large cap funds in our sample, ranked by their alpha. It highlights the fact that large cap funds having a high alpha also seems to have a high average Active Share compared to the low alpha group. Only three of the worst performing funds have at some point during the 2005-2014 timeframe been truly active, and none of these funds have an average Active Share above 50%. In contrast, nearly all of the best performing funds have been truly active at some point in time. Also evident by looking at the standard deviation, maximum and minimum values of Active Share for these funds is that Active Share can shift substantially on fund level. Some funds have evidently at some point been truly active (with an Active Share above 60%) while at another point been very passive (with an Active share below 30%). In table 4, the small/mid cap funds are ranked by their alpha. There appears to be no discernible relationship between Active Share and alpha for this group.

Table 3: Ten Best and Ten Worst Large Cap Funds in Terms of Alpha

Rank	Alpha	Market Value	Cum. Return	(AS Min)	AS (Mean)	AS (Max)	AS (Std. Dev.)	N
1	.0026997	184	1.595692	.6668257	.7417405	.8320541	.0522762	109
2	.0013027	12700	1.752748	.4972742	.6217486	.7161962	.0604304	109
3	.0011671	5850	1.534816	.3988979	.4757322	.5896772	.0514647	109
4	.0011266	911	1.312675	.310859	.6088418	.9106221	.1947955	109
5	.0003422	364	.0441769	.1518774	.3386569	.4169887	.0780377	45
6	.000276	1380	1.492365	.1994128	.5215176	.6479125	.1285697	109
7	.0001653	15600	1.372711	.1782853	.2730544	.4518324	.083797	109
8	.0001273	241	1.248095	.6257712	.7008911	.7703158	.0356618	109
9	-.000449	2100	1.206684	.4667873	.5639349	.6523826	.0443156	109
10	-.000455	8880	1.252017	.1476405	.1839363	.3083066	.0309026	109
54	-.0021079	59	-.0747863	.2561081	.3038493	.372992	.0399987	45
55	-.0021724	49	.7798238	.2787805	.4312494	.6396867	.1047967	109
56	-.0025687	93	.2255591	.1724842	.2437432	.3441344	.0526105	66
57	-.002726	3800	.5383334	.260083	.2895168	.3730558	.0296492	106
58	-.0028122	130	1.001236	.2939051	.4482298	.5215908	.0556159	64
59	-.0030424	131	-.0155821	.2580948	.2969373	.371676	.0320791	78
60	-.003179	59	.1774291	.2598788	.2963135	.3724815	.0349872	66
61	-.0032249	1711	.4579982	.259703	.2962432	.3740556	.0277547	106
62	-.0033713	433	-.0678057	.2596941	.2977058	.3736028	.0341358	69
63	-.0036049	402	-.0367628	.3914799	.4956471	.631056	.0698812	45
Total	-.0012787	2510	.7553938	.272945	.3688515	.4743127	.0572021	

Table 3 presents the ten best and ten worst performing funds in the large cap fund group. Market Value is the average market value in millions SEK of the funds holdings and AS (Min), AS(mean), AS(Max) and AS(Std. Dev) are the minimum, mean, maximum and standard deviation values of Active Share. Cum. Return is the cumulative return within the timeframe of this study. The bottom row presents the average values of all funds in the large cap fund group.

Table 4: Small/Mid Cap Funds Ranked By Alpha

Rank	Alpha	Market Value	Cum. Return	(AS Min)	AS (Mean)	AS (Max)	AS (Std. Dev.)	N
1	.002013	153	.6543107	.4935097	.6607106	.7533928	.0626765	43
2	.0017069	7820	1.918957	.3956053	.5260705	.6421876	.0798789	109
3	.0013709	307	1.871999	.5944431	.7927158	.9161062	.08741	109
4	.0008324	4980	1.962164	.2006163	.2338625	.2915716	.0210683	109
5	.0006845	1240	.6053971	.481436	.5559108	.6335521	.0467669	40
6	.0005702	1310	1.751734	.3552748	.4263029	.4706911	.0240538	109
7	.0005234	2110	1.739295	.3560907	.4259402	.4652131	.023414	109
8	-.0001776	419	.209069	.4716425	.5930627	.7288598	.0950786	75
9	-.0003413	5450	1.527453	.1325667	.3439478	.4961757	.1334865	109
10	-.0004081	1670	1.575888	.3069542	.4005557	.6175121	.0775676	109
11	-.0008057	2660	1.42174	.2768474	.4347036	.7513266	.1497259	109
12	-.0010393	4670	1.352557	.1995135	.2688337	.5770937	.0777542	109
13	-.001336	1980	1.285729	.4037196	.5519918	.6731321	.0554564	109
14	-.0020154	1280	.3339392	.4595596	.6323681	.7839943	.0924842	90
15	-.0027028	215	.5051126	.4569569	.5944088	.7637485	.0842395	93
16	-.0032601	115	.8454546	.5598624	.6030984	.6987479	.0355777	57
17	-.0045226	64	.2540463	.3448865	.5025589	.6289366	.103623	37
Total	-.000524	2140	1.165579	.3817344	.5027672	.6407201	.0735448	

Table 4 ranks all funds in the small/mid cap group by their alpha. Market Value is the average market value of the funds holdings in millions SEK and AS (Min), AS(mean) AS(Max) and AS(Std. Dev) are the minimum, mean, maximum and standard deviation values of Active Share. Cum. Return is the cumulative return within the timeframe of this study. The bottom row presents the average values of all funds in the small/mid cap fund group.

To get a sense of the distribution of alpha based on Active Share we divide the large cap funds, based on their average Active Share, into three equally sized groups. Figure 5 in the appendix illustrates that the distribution of alphas among the three groups differ where the high Active Share group has a distribution more centered around zero while the lower Active Share groups have a distribution more tilted towards negative alphas.

5.2 Regression Results

Table 5 presents the regression results for the equally weighted portfolios of funds. The leftmost column presents the alpha estimates for the large cap portfolio consisting of high Active Share funds. The second leftmost column presents alpha estimates for the large cap portfolio consisting of low Active Share funds. The regressions results implies that the high Active Share large cap portfolio has been performing close to its benchmark, while the low Active Share large cap portfolio has been underperforming its benchmark. The stars (*) after each variable indicates the significance level of the results. Hence, the alpha of the portfolio investing in high Active Share funds is statistically insignificant, meaning that the null-hypothesis that alpha is zero cannot be rejected. The third column of table 5 presents the alpha estimates for the small/mid cap portfolio consisting of high Active Share funds. The rightmost column presents alpha estimates for the small/mid cap portfolio consisting of low Active Share funds. As indicated by the absence of stars (*) we cannot reject the null hypotheses that either of the portfolios of funds have performed equal to the CSRXSE index.

Table 5: Regression Output, Portfolios of Funds

VARIABLES	Large Cap Funds		Small/Mid Cap Funds			
	High Active Share	Low Active Share	High Active Share	Low Active Share	High Active Share	Low Active Share
	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess return
Market Excess Return	1.014*** (0.0342)	1.020*** (0.0120)	0.954*** (0.0187)	0.984*** (0.0128)		
Alpha	-0.000300 (0.00108)	-0.00131** (0.000543)	0.000135 (0.00144)	-0.000249 (0.000648)		
Observations	109	109	109	109		
R-squared	0.952	0.988	0.933	0.986		

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5 presents the one factor regression results of the high and low Active Share portfolios of large and small/mid cap funds. Observations is the number of months in the 09/30/2005 - 09/30/2014 timeframe.

As mentioned in the Methodology section, researchers and practitioners often use 60% as the cut-off point separating truly active funds from closet indexers. One might argue that the results above would differ if we labeled only funds with an Active Share higher than 60% as truly active. However as evident by table 10 in the appendix, if we run the same regressions with a portfolio consisting of funds with an Active Share of 60% and above, the conclusion remains the same: we cannot reject the null hypothesis that this group of funds have performed equal to the SIXPRX index.

Figure 6 in the appendix illustrates the cumulative returns for the two large cap portfolios of funds and the SIXPRX index. It is clear that the high Active Share portfolio has performed close to the index, while the low Active Share fund is underperforming. The figure shows that the cumulative returns for the portfolio with high Active Share funds have been higher compared to the SIXPRX index during certain points in time. In contrast, the low Active Share group seems to consistently underperform the high Active Share portfolio, as well as its benchmark index.

Figure 7 in the appendix shows the cumulative returns for the small/mid cap portfolios and the CSRXSE index. Both portfolios seem to follow their index closely, indicating that their alphas net of expenses should be close to zero.

Table 6 reports the regression results for the relationship between estimated alpha and mean Active Share for the large and small/mid cap groups. Large cap funds with a high mean Active Share have performed better in terms of alpha net of expenses than funds with a low mean Active Share. The t-statistic of the slope coefficient is 2.54, enabling us to reject the null hypothesis at the 5% level of significance. In contrast, the small/mid cap funds show no statistically significant evidence of a relationship between Active Share and alpha.

Table 6: Regression Output, Relationship Between Alpha and Active Share

VARIABLES	Large Cap Funds Alpha 1-factor	Small Cap Funds Alpha 1-factor
Active Share (Mean)	0.00289** (0.00114)	-0.000116 (0.00281)
Constant	-0.00222*** (0.000394)	-0.000466 (0.00126)
Observations	63	17
R-squared	0.143	0.000
Robust, standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

Table 6 presents the regression results of the relationship between average Active Share and estimated alpha for the large cap fund group. Observations is the number of funds in the large and small/mid cap group.

5.3 Paired T-test and Autocorrelation Results

Table 7 presents the paired t-test studying the difference in average Active Share of the large cap funds between the second and fourth quarter of 2008. The second column presents the number of observations, i.e. the number of mutual funds active at the two specific points in time. The third column presents the mean for each variable, indicating that there is a drop between the two measuring points. The calculated t-value of -5.5367 is statistically significant at the 1% level. It seems like a shift towards less active management occurred at the time of the Lehman Brothers collapse, supporting the hypothesis that fund managers shift Active Share level when market conditions change.

Table 7: T-test of Difference in Active Share Before and After the Lehman Brothers Collapse

Variable	Obs	Mean	Std. Er	Std. Dev	95% conf. Interval	
Active share(2008Q4	59	.3212731	.0189997	.1459393	.2832411	.3593051
Active share(2008Q2)	59	.3616738	.0191157	.1468305	.3234096	.3999381
Difference	59	-.0404007	.0072969	.0560485	-.055007	-.0257944

t = -5.5367

Degrees of freedom = 58

Table 7 reports statistics for the paired t-test of differences in mean Active Share between the reporting dates prior to and following the Lehman Brothers collapse in September 2008. Obs is the number of funds active at both measuring points

Table 8 reports autocorrelation measures in Active Share. The average autocorrelation in Active Share level among the large cap funds is 0.74. The equivalent figure for the small/mid cap group is 0.7. Thus there is, not surprisingly, a strong correlation between Active Share in given quarter and the Active Share the preceding quarter. However when computing an average autocorrelation in Active Share for equity mutual funds in 32 countries Cremers et al finds a considerably higher autocorrelation of 0.95²⁰. On average Swedish equity mutual funds seems to be changing Active Share more often compared to the average of the countries included in Cremers' et al study.

Table 8:

Fund type	Autocorrelation	N
Large cap fund	.7442988	63
Small/mid cap fund	.7055822	17
Total	.7360715	

Table 8 presents the the average autocorrelation of the Active Share measure on fund level of the large cap group and the small/mid cap group. N is the number of funds in each fund category.

²⁰The time period of Cremers' et al study is 2002-2010 which should be comparable in length to the 2005-2014 period of this study. Further, the frequency of observations within the periods is to the best of our knowledge the same. For a detailed description of the data source used by Cremers et al please refer to Ferreira and Matos (2008).

5.4 Potential Biases in Results

This section aims to further investigate how the data issues that were addressed earlier can impact our results.

Although funds market themselves as Swedish equity mutual funds, some of them invest a small fraction of fund holdings in assets outside their benchmark indices. By definition of the Active Share measure, holdings not included in the benchmark index will be regarded as an active position. For an ideal Active Share computation, funds must only invest in stocks included in their benchmark's asset universe. The distortion in Active Share resulting from investments outside the SIXPRX/CSRXSE indices should however be small enough to be omissible. In theory a fund posing as a large cap fund could hold substantial positions in small/mid cap companies. Their Active Share might then be higher than justified. This type of fund should perhaps best be evaluated against a small/mid cap index. It would however be difficult to identify this type of fund if it purports to be a large cap fund to the public. Funds investing in this way is only a hypothetical scenario and we consider it unlikely that funds try to deceive investors in this way.

Furthermore, only funds regulated under UCITS are included in our sample. Swedish equity mutual funds holding more than 10% in a single stock are labeled special funds by Finansinspektionen and do not have to report their portfolio weights. This category of funds is by definition more likely to have a higher Active Share measure than UCITS funds. Some special funds have reported portfolio weights to Finansinspektionen during the period but for comparability purposes special funds have been excluded altogether. The ratio of truly actively managed funds to total number of funds would probably be higher if these funds were taken into consideration. As evident by table 9 in the appendix however, even if all of the funds for which portfolio data is unavailable have a uniformly high or low Active Share, the effect on the results of this study, if these

funds had been included, would probably net out.

We estimate fund alpha using a single factor model. A Fama and French (1993) three factor model²¹ or a Carhart (1997) four factor model²² assigning excess returns to several systematic risk factors may give a different result. When looking at fund performance for swedish equity mutual funds between 1999 and 2009 however, Flam and Vestman (2014) does not end up with substantially different results using one, three and four factor models when evaluating Swedish equity mutual funds.

The CSRXSE index includes both mid cap and small cap companies. Pure small cap funds will therefore be given a somewhat higher Active Share than justified. However, finding a perfect match between every fund's investment universe and a benchmark index appears to be an almost impossible task.

6 Analysis

Before drawing any conclusions based on our results we want to emphasize that the small number of small/mid cap funds in our sample limit us from making any major inferences regarding small/mid cap Swedish equity mutual funds. For instance what seems to be a more volatile movement in Active Share is probably an effect of a small sample size. We will therefore focus our analysis on the large cap fund group.

Our results provide evidence that large cap funds with a high Active Share perform better relative to large cap funds with a low Active Share in the Swedish fund market. Using 50% as a cut off point for active management we cannot rule out the possibility that high Active Share funds have performed equal to the SIXPRX index net of fees.

²¹Fama and French add two systematic risk factors to the classical CAPM framework in order to incorporate the fact that small cap stocks and stocks with a low price-to-book ratio tend to outperform the market.

²²Carhart builds on the work by Fama and French by adding a fourth systematic risk factor controlling for the momentum effect of stock returns.

Closet indexers show statistically significant negative excess net returns. The average large cap fund is a closet indexer in the Swedish fund market and average Active Share has been consistently below 50% during the recent 9 years. However it seems like many funds engage in Active Share adjustments over time to suit current market conditions. This is in line with findings by Petajisto (2013). It should be pointed out that a t-test and autocorrelation estimates do not fully answer the question whether or not fund managers shift Active Share levels in an opportunistic manner. A more thorough study of the behavior of funds over a longer time period would probably be required in order to draw any strong conclusions.

Petajisto (2013) finds that the fraction of assets managed by closet indexers in the U.S. market increased after the recent financial crisis. This trend is not discernible when looking at large cap funds in our sample.

The poor net excess returns of closet indexers might not come as a surprise. The closet indexer will by definition follow its benchmark closely before fees. After fees the returns are likely to be less than the benchmark's. One may wonder how closet indexers manage to charge a fee as if they engaged in truly active management and why the majority of equity mutual funds in Sweden are closet indexers. We propose that the answer might lie in the ratio of knowledgeable investors in the market. If investors are not able to accurately evaluate the quality of the funds available to them, how should they be able to separate closet indexers from truly active funds? If closet indexers can charge the same level of fees without having to incur the cost for truly active management, what is the incentive for any fund to be truly active? In the following section we illustrate that a pure strategy Nash equilibrium exist where some funds choose a passive (closet index) strategy while others choose a truly active strategy.

6.1 Using Game Theory to Illustrate Active Share Choices

In the following game fund manager 1 is competing with fund manager 2. Both players have two options: managing their fund actively, denoted by A, and managing their fund passively, denoted by P. Regardless of management style the funds charge a management fee, denoted by F, to their investors. Thus, the size of the fee does not reveal any information about the activeness of the fund manager. Active management is associated with a cost for collecting and analyzing company information, denoted by C. There are two types of investors: informed investors who base their investment decision on the relative quality (as measured by level of activity) of the fund manager, and uninformed investors who randomly allocate their resources to either fund manager 1 or fund manager 2. The fraction of informed investors in the market is denoted by δ

The game has the following structure:

		Fund Manager 2	
		A	P
Fund Manager 1	A	$\frac{1}{2}(F-C)$ $\frac{1}{2}(F-C)$	$\frac{1-\delta}{2}(F)$ $\frac{1+\delta}{2}(F-C)$
	P	$\frac{1+\delta}{2}(F-C)$ $\frac{1-\delta}{2}(F)$	$\frac{1}{2}(F)$ $\frac{1}{2}(F)$

If both fund managers choose to be active (A, A), both informed and uninformed investors will distribute their resources evenly across the two funds. Thus, the payoff for either fund will be $\frac{1}{2}(F-C)$. If fund manager 1 chooses to be passive while fund manager 2 chooses to be active (P, A), the informed investors will choose fund 2 while the uninformed investors still allocate their resources equally between the funds. Consequently, the payoff of fund manager 1 will be $\frac{1-\delta}{2}(F)$, and the payoff for fund manager 2 will be $\frac{1+\delta}{2}(F-C)$. The reverse will be true if fund manager 1 chooses to be active while fund

manager 2 chooses to be passive (A, P). If both funds opt for passive management (P, P) either fund will have a payoff of $\frac{1}{2}(F)$.

For a (P, A) or (A, P) market equilibrium two conditions have to be simultaneously met:

$$(1) \frac{1+\delta}{2}(F - C) > \frac{1}{2}(F), \text{ and}$$

$$(2) \frac{1-\delta}{2}(F) > \frac{1}{2}(F - C)$$

Solving for δ , gives that $\delta > (\frac{F}{F-C} - 1) = \delta_1$ and $\delta < (1 - \frac{F-C}{F}) = \delta_2$

If $C > 0$ the interval between δ_1 and δ_2 is positive and thus, for any value of δ such that $\delta_1 < \delta < \delta_2$, the market equilibrium is where one fund manager chooses to be active while the other manager chooses to be passive. For $\delta < \delta_1$, (P, P) is the equilibrium and for $\delta > \delta_2$, (A, A) is the equilibrium. The highest attainable profit for the funds is in the (P, P) equilibrium. Consequently, fund manager 1 and fund manager 2 have an incentive to keep the ratio of informed investors in the market as low as possible. One way of doing so would be in the form of an implicit cartel where the two market constituents withhold information necessary to evaluate the quality of the funds.

An explanation as to why closet indexing is so common in Sweden might lie in the market conditions of the Swedish fund market. Looking at mutual fund fees by country in 2010 Cremers et al (2015) show that fees for closet index funds and truly active funds are close to identical in the Swedish market. If closet indexers charged lower fees than truly active funds, investors would be able to discern the level of activeness simply by studying the fees. As shown in the game setting above, it lies in the closet indexers best interest not to signal its level of activeness by charging a low fee.

When investing in funds, retail investors without any deep knowledge in portfolio theory or asset allocation, probably find it difficult to accurately evaluate the quality of the funds available to them. As repeatedly shown in the field of behavioral finance, individuals often make irrational investment decisions. For instance, retail investors

often base their investment decision primarily on the past performance of funds. Several studies, including Vestman and Flam (2014), show that past performance of funds is of little, if any, indicative value when forecasting future returns. Further, research in the field of financial literacy, such as Calvet et al (2009), show that financial sophistication varies considerably among households. A possible source of ill-informed investment decisions among households could be that some of the largest providers of domestic mutual funds in the Swedish market are the major Swedish banks. Bank customers with mortgages and other bank engagements might be more prone to invest their savings in the funds provided by their bank without thoroughly evaluate the quality of them. Hence it would not be surprising if a portion of the investors in the Swedish fund market act randomly when selecting funds in the sense that they are equally likely to invest in a truly active fund as they are to invest in a closet indexer.

Rational investors should only be willing to pay for active management if they believed that the fund manager was able to achieve an excess return higher than, or at least as high as, the fees paid for the management. The only way a fund can achieve a return higher than that of their benchmark index is if its holdings differ from the components of the index. As Cremers and Petajisto (2009) emphasize, a certain level of Active Share is necessary in order for a fund to beat the market. Hence, the probability that a closet indexer beats the market after fees is lower than the probability that a truly active fund beats the market. For overall portfolio diversification purposes, a rational investor would not pay a premium for active management. If investors realized that a given fund, posing as an actively managed fund, in fact was a closet indexer and that the probability of the fund beating the market after fees therefore was slim, they would probably choose not to invest.

The game above illustrates that closet indexers can survive in market equilibrium. In the Swedish fund market there might be an incentive for the fund industry constituents

not to compete by means of advertising their level of activeness. If fees for active management can be charged without actually having to perform costly research and analysis associated with truly active management, why bother being truly active? By definition however, the gain made by closet indexers is realized at the expense of their investors. Clearly a market equilibrium where customers pay for a product they do not receive is not efficient.

Based on the observed low level of average Active Share and the similar level of fees charged by funds independent of Active Share it seems like the Swedish fund market is in an inefficient state. If the information gap between funds and investors were to be reduced, an equilibrium where most explicitly active funds are in fact actively managed might be attainable.

7 Conclusion

We suggest a change in information disclosure policy whereby actively managed funds are required to account for their level of activeness. We consider Active Share to be a comprehensive and useful tool for analyzing the activeness of all-equity mutual funds and as such would be a suitable candidate for a measurement required to be disclosed. Although Cremers and Petajisto (2009) find Active Share to have a predictive capability, a high Active Share is never a guarantee for a high return. However it indicates the level of ambition by which the management aims to beat the market and as such paints a picture of the kind of management investors are paying for. As previously pointed out, paying for active management that is in fact passive does not lie in the best interest of investors. In other words, it is time that passive funds posing as active come out of the closet.

Our results indicate that there is a significant difference in performance between

high and low Active Share funds in the Swedish market. Clearly, investing in a closet index fund seems to be an irrational decision. Our results suggest that investing in high active share large cap funds will render a net return close to the SIXPRX index. A retail investor updating a portfolio of high Active Share funds on a quarterly basis, to end up with a return achievable simply by holding a passive index fund, is however an unrealistic scenario. One can never expect a single fund to outperform its benchmark on the basis of its Active Share level alone and hence, we would not recommend investors to base their investment decision on Active Share in isolation. As Flam and Vestman (2014), Carhart(1997) and many others have shown, there appears to be little persistence in mutual fund performance over time. Based on the assumption that markets are relatively efficient we come to the conclusion that retail investors do best investing in inexpensive index funds. We suspect however that the level of competition on the Swedish fund market can be improved and we hypothesise that a change in policy could facilitate such an improvement. Higher competition could result in higher fund alphas as the research by Cremers et al (2015) suggest. Perhaps then investing in actively managed Swedish equity funds would no longer be a poor investment decision.

8 Future Research

In this paper, we have explored the relationship between active fund management and fund performance in the Swedish market. Moreover, we have investigated the behavior of Swedish mutual fund managers when market conditions change. However, we have not looked deeper into why the fraction of closet indexers is so high in Sweden. Cremers et al (2015), have studied potential factors that could drive this disparities, concluding that the number of explicit index funds in a market can be one explanation. Although Sweden is a country having one of the highest fractions of closet indexing, it still has a moderately high percentage of explicit indexers. This leads us to think

that there can be other reasons causing this market inefficiency. In this paper we have proposed that the answer might lie in the information gap between fund managers and investors. One might also think that the size of the market has an effect. In a relatively small country like Sweden fund managers have much fewer stocks to pick from compared to fund managers in large countries such as the U.S. In order to comply with UCITS requirements, limiting funds from holding large stakes in a single company, funds perhaps end up indexing more than what they would like to. However Cremers et al (2015) finds that countries smaller than Sweden such as Norway and Denmark had a much lower portion of closet indexers in relation to total net assets in 2010 indicating that market size is not a key determinant for fund activeness in a country. Future research might provide more a comprehensive picture why countries such as Sweden have such a high portion of closet indexers.

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10 Appendix

Table 9: Ten Best and Ten Worst Performing Funds in the Extended Data Set

Rank	Alpha	t	p-value	N
1*	.0033724	2.542625	.0128593	85
2	.0025325	1.520039	.1314235	110
3*	.0021261	1.086207	.279806	110
4*	.0013087	.8220015	.4128871	110
5*	.0012732	.5885893	.5575637	95
6	.0012028	.5761716	.565698	110
7	.0011428	1.233679	.2200005	110
8*	.0005386	.5740955	.5672053	101
9	.0004584	.3913243	.69749	45
10*	.0002125	.1117834	.911236	95
83	-.0031361	-2.988369	.0037362	81
84	-.0032724	-2.939026	.004513	69
85	-.0032804	-3.850917	.0001999	110
86*	-.0033217	-1.113626	.2689041	79
87	-.0033628	-1.192692	.2393823	46
88	-.0034609	-3.009111	.00364	72
89*	-.0035832	-1.166218	.246907	84
90*	-.003641	-1.566083	.1232809	55
91*	-.0038169	-1.614937	.1127462	51
92*	-.0110373	-1.764036	.0840894	50
Total	-.0013872	-.5879249	.2721784	83.4

Table 9 presents the ten best and ten worst performing funds in the extended data set. The stars (*) after each rank number symbolizes funds not included in our Active Share data set. The results shows that the performance among excluded funds varies, where some funds have a high alpha (four funds among the top five) while others have a low alpha (four funds among the bottom five).

Table 10: Regression Output, Portfolio of Funds using a 60% Cut-Off Point

VARIABLES	Large Cap Funds			Small/Mid Cap Funds		
	High Active Share	Low Active Share	High Active Share	High Active Share	Low Active Share	Low Active Share
	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess return
Market Excess Return	0.974*** (0.0458)	1.021*** (0.0129)	0.938*** ((0.0237)	0.986*** (0.0138)		
Alpha	-3.86e-06 (0.00145)	-0.00128** (0.000562)	0.000207 (0.00163)	-0.000434 (0.000724)		
Observations	109	109	109	109		
R-squared	0.914	0.987	0.914	0.983		

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

table 10 presents the one factor regression results of the high and low Active Share portfolios of large and small/mid cap funds using 60% as a cut-off point for active management. Observations is the number of months in the 09/30/2005 - 09/30/2014 timeframe.

Figure 5: Distribution of Alpha by Rank of Active Share, Large Cap

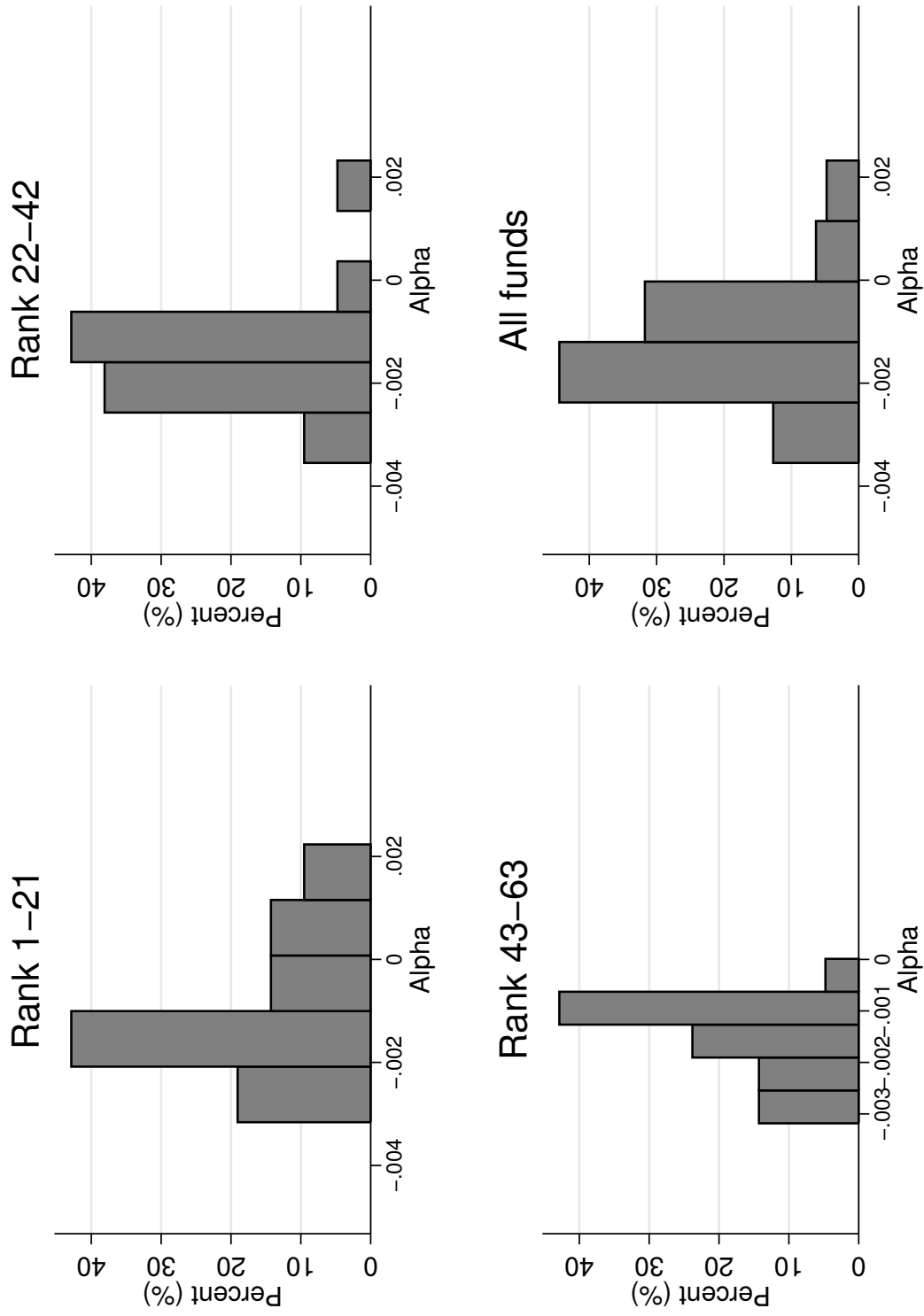


Figure 5 illustrates the differences in distribution of alpha depending on level of average Active Share. Rank 1-21 represents the highest Active Share group, rank 22-42 represents the second highest Active Share group and Rank 43-63 represents the lowest Active Share group.

Figure 6: High and Low Active Share Portfolios Vs. SIXPRX, Large Cap

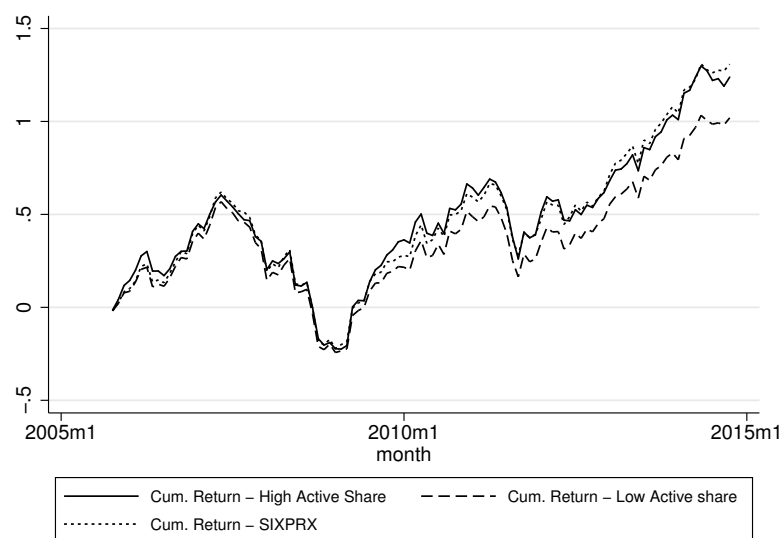


Figure 6 illustrates the cumulative returns for the large cap portfolios of funds on a monthly basis during the 09/20/2005 - 09/30/2014 time period. The dotted line represents the cumulative return of SIXPRX, the solid line represents the cumulative return of the high Active Share portfolio and the dashed line represents the cumulative return of the low Active Share portfolio.

Figure 7: High and Low Active Share Portfolios Vs. SIXPRX, Small/Mid Cap

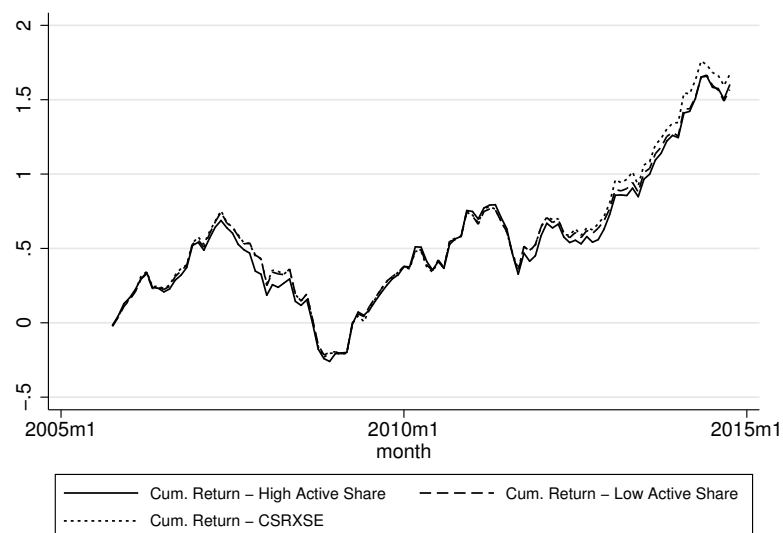


Figure 7 illustrates the cumulative returns for the small/mid cap portfolios of funds on a monthly basis during the 09/20/2005 - 09/30/2014 time period. The dotted line represents the cumulative return of SIXPRX, the solid line represents the cumulative return of the high Active Share portfolio and the dashed line represents the cumulative return of the low Active Share portfolio.