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Master Thesis

The performance of the owner segments at Oslo Stock Exchange.

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Abstract

Actively managed mutual funds and other large asset managers frequently claim to deliver returns that are above the market average. The sum of these claims may at first glance appear to be incredible, as they require the existence of inferior investors for the average to add up. Motivated by this simple arithmetic fact, we evaluate the claims of above-average performance by seeking to identify the below-average performers. By building a model that utilizes industry sector holding values and the returns of industry equity indices, we study the performance of the owner segments that together constitute the Oslo Stock Exchange, over the 15-year period from 2003 to 2017. Unexpectedly, we conclude that there exists a group of investors who pay the arithmetically required performance penalty for the coexistence of winners. Our results show that private investors together with central and local government did underperform the market average, and thus allowed for a market outperformance by other participants. The model suggests that such outperformance is exhibited by private companies, mutual funds and foreign investors.

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1 Introduction and motivation

The returns of actively managed mutual funds and other large asset managers, such as the managers of the Government Pension Fund Norway (GPFN), are frequently claimed to be higher than the market average return. The sum of these claims of superior, above-average performance may at first glance appear to be incredible. Whenever there is a presence of somebody who is better than average, some investor has to be inferior for the average to add up. For the claims of above-average performance to be credible, the below-average performers also have to be identified. In our thesis, our starting point is the simple arithmetic fact that everybody cannot be better than the average, i.e. the value-weighted index. For each manager who claims above-average returns there must be another investor with below-average returns. The objective of our thesis is to figure out how it all adds up, by analyzing the composition of the average without risk-adjusting. In other words, we seek to identify not only those market participants who, through luck or skills, have received above-average returns ("beaten the market index") but also identify those whose realized returns have been below average. We ask the question: Who are the losers in the Norwegian stock market?

Claims of above-average performance are reasoned by active asset management decisions where portfolio compositions deviate from that of their passive benchmarks. Fund managers and other advocates of active management frequently express their views on the passive vs. active management debate in the media. The manager for one of Storebrand´s actively managed funds, Hans Thrane Nielsen, claims that the features of the Norwegian stock market allow for active fund management to deliver excess returns to investors, even after fees (Eriksen & Linderud, 2017). He argues that there are a number of companies who are not tracked by market analysts, which opens up for information asymmetry and a possibility to benefit from mispricing. Similarly, the director of investments for Skagenfondene, Alexandra Morris, argues that the mispricing will intensify when investors are too passive, as market analyst coverage is important for correct pricing, and that mutual fund investors will benefit from skilled managers in periods of market fluctuations (Morris, 2016). Some advocates of active management base their arguments on the investors´ portfolio decisions rather than market inefficiencies. Alexander Opstad, Head of Equities in DNB Markets,

claims that index fund investors undertake disproportionate amounts of risk relative to the return they obtain, and he opines that investment in active funds will be a better option (Melberg, 2016). Certain fund managers make even bolder claims concerning their personal abilities. The highly recognized fund managers and director of investments at Nordea Investment Management, Robert Næss, guarantees that his funds will outperform the market (Aurstad, 2017; Lunde, 2017). He aims to keep his promise by investing according to his clear investment methodology where he focuses on attractive valuations combined with limited downside. Næss´ claim is indirectly supported by Pareto, a leading provider of financial services, who states that active managers generally keep their promises, and hence are likely to show excess returns over time (Strøm, 2017).

The business concept and objective of active asset management is a consistent outperformance of the benchmark. Some asset managers are also able to exhibit historical returns that align with their objectives. For the period 1998-2016, the GPFN´s 2016 annual report displays an annualized gross excess return on the stock portfolio, of 1,41 above the reference index (A compound of 85 percent in OSEBX and 15 percent in VINXB)[1]. In another report, the GPFN´s returns are claimed not to be caused by coincidence, as they display a significant positive alpha for their stock portfolio (Folketrygdfondet, 2016). A number of actively managed mutual funds are also able to exhibit positive excess returns relative to the OSEFX. An examination of the 10-year annualized excess returns for mutual funds that primarily invest in the Norwegian stock market, indicates that a consistent outperformance of the benchmark is possible[2]; Storebrand Vekst (5,25), Pareto Investment Fund C (3,92), Danske Invest Norske Aksjer Inst II (3,71), Fondsfinans Norge (3,63), Alfred Berg Gambak (3,07), Nordea Norge Verdi (2,64), Delphi Norge (2,12) (Morningstar, 2018).

The large owner shares of the GPFN and the aggregate of mutual funds on the Oslo Stock Exchange (OSE), makes them considerable actors in the market (VPS ASA, 2018a). Hence, for them to collectively outperform the market average,

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[1] All equity indices that we refer to in this paper are defined in Appendix B. This includes OSEBX, OSEFX, OSEAX, OSEEX, VINXB and 11 industry sector indices.
[2] Morningstar reports excess returns relative to "OSE FXLT Mutual Fund Index Linked/TOTX". Morningstar confirmed that this index is identical to the OSEFX. The excess returns are shown in parenthesis.

there must also exist a considerable segment of underperforming investors. From the simple definition of an arithmetic average, it is obvious that not every investor, nor the average investor, can do better than the comprehensive average of the market. If the aggregate of asset managers claim that their returns are higher than average, some of the claims must be incorrect. Given that the market return is the weighted average of all the security returns in the market, this must equal the weighted average return of all market participants for the arithmetic to be valid. Thus, there is a constraint that investments are a zero-sum game where aggregate abnormal return is zero, and the returns on the average actively managed dollar will equal the return on the average passively managed dollar before costs (Sharpe, 1991). There is a possibility that the claims of large institutional asset managers are based on inappropriate representation of the results, which makes returns appear as superior to bolster manager self-esteem (Samuelson, 1974). However, considering that the institutional asset managers in Norway calculate and report investment results according to the Global Investment Performance Standards (CFA Institute, 2010), this ought not be a concern. Regardless of which benchmark is utilized in the claims of above-average performance, our analysis will reveal who wins and who loses in Norwegian stock market, relative to the market average.

The remainder of this thesis is structured as follows; In Chapter 2 and 3, we explain the utilized methodology, before we describe the data collection process and the data we use in the analysis. Chapter 4 is a composite of a theoretical approach presentation and a literature review that reports relevant studies and explains how our research will contribute to the field. In Chapter 5, we present an overview of the Norwegian stock market that focuses particularly on OSE and its owners. Further, in Chapter 6, we present and describe the results of the analysis and discuss how the findings relate to previous research. Finally, in Chapter 7, we summarize the arguments, answer the research question and draw conclusions.

2 Methodology

In his paper on the arithmetic of active management, Sharpe (1991) makes the assertion that the return on the average actively and passively managed dollar will equal before costs. He underscores that it is not impossible for the average institutional active manager to outperform the passive, even after the higher costs of frequent trading and more research. However, for this to be achievable, there must exist non-institutional active managers who pay the added costs of the institutional managers via inferior performance. In our paper, we investigate whether there exist such segments of active managers, who perform inferiorly and make it arithmetically possible for other active managers to outperform the market average. The analysis is carried out by building a model that estimates the returns of the aggregate portfolios for six owner segments that together comprise all the investors at the OSE, utilizing the segments´ industry sector holding values and the returns of industry equity indices.

2.1 Estimating the returns of the owner segments

Throughout this chapter, i represents the owner segments, j the industry sectors and m the market at time t. Our data is organized according to the last trading day of every month, and we therefore make an equality assumption for the month-end values and the values on the first trading day of the subsequent month.

As shown in Equation 2-1, the monthly index returns (r_j) are calculated as the percentage difference in stock index values (I_j) between the last trading days of each month.

$$r_j^t = \frac{I_j^t - I_j^{t-1}}{I_j^{t-1}}$$

<div align="right">2-1</div>

Using the aggregate of the owner segments´ industry sector holding values (H_{ij}) and the total portfolio holding values (H_i), we calculate their month-end percentage distribution in each industry sector (W_{ij}) as shown in Equation 2-2.

$$W_{ij}^t = \frac{H_{ij}^t}{H_i^t}$$

<div align="right">2-2</div>

These percentage shares form the basis for our estimation, as they are used as weights in the calculation of the owner segments´ monthly returns (r_i) in Equation 2-3.

$$r_i^t = \sum_{j=1}^{11} W_{ij}^{t-1} * r_j^t \qquad\qquad \text{2-3}$$

Similarly, we calculated the monthly returns for what we in this paper refer to as "market" (r_m), using the total weight of the industry sectors at OSE (W_{mj}).

$$r_m^t = \sum_{j=1}^{11} W_{mj}^{t-1} * r_j^t \qquad\qquad \text{2-4}$$

The market return is used as the benchmark for evaluating excess returns. We considered the simple arithmetic average to be inappropriate for measuring the owner segments´ average excess returns over a long period of time, as this would treat the monthly returns as independent of each other. We thus decided to use a method that utilizes geometric differences and continuous compounding. This is better suited for analyzing returns over time and is more recognized and widely used in the academia (Ormseth, 2018).

The monthly excess return for an owner segment ($r_{i(excess)}$) is calculated as shown in Equation 2-5, as the natural logarithm of the segment´s return relative to the market return.

$$r_{i(excess)}^t = ln\left(\frac{1 + r_i^t}{1 + r_m^t}\right) \qquad\qquad \text{2-5}$$

To arrive at the monthly average excess return ($\bar{r}_{i(excess)}$) as shown in Equation 2-6, we summarized all the monthly excess returns and divided by the number of periods.

$$\bar{r}_{i(excess)} = \sum_{t=1}^{180} r_{i(excess)}^t /180 \qquad\qquad \text{2-6}$$

Finally, we calculated the annualized excess returns by multiplying the average monthly excess returns from Equation 2-6 by 12.

$$\bar{r}_{i(excess,annualized)} = \bar{r}_{i(excess)} * 12 \qquad\qquad \text{2-7}$$

These excess returns will be used to make inferences about which owner segments that has performed above or below the market average. Owner segments that have achieved average annualized excess returns different from zero, will be classified as winners or losers, depending on whether the excess returns are positive or negative.

2.2 Performance attribution analysis

Performance attribution procedures are employed to ascertain which decisions that resulted in superior or inferior performance, without risk-adjusting the performance. Bodie, Kane, & Marcus (2014) describes how the procedures are used to consider timing and selection abilities when one´s portfolio consists of fixed-income securities, equities and money market investments, as well as when the portfolio is pure equity and the choice is between stocks in different industries. Portfolio managers constantly make allocation decisions, and performance attribution procedures are utilized to see how contributions of these decisions add up and explain the performance differences of the portfolios relative to the benchmark.

In this paper, we make use of the concept and techniques from attribution studies to decompose the overall performance and demonstrate that superior or inferior performance can be attributed industry sector allocation decisions that deviate from that of the market portfolio. Given that we consider equities solely, there are no parts of the performances that can be attributed investments in other asset classes like fixed-income securities or the money market. Additionally, our data is expressed on a too low level of detail to evaluate how single security holdings contributed to overall performance.

As a starting point for the performance attribution analysis, we calculate the owner segments´ active weights in an industry sector (w_{ij}) as shown in Equation 2-8. The active weights are defined as the difference between an owner segment´s percentage share in a sector (W_{ij}) and the market´s percentage share (W_{mj}).

$$w_{ij}^t = W_{ij}^t - W_{mj}^t \qquad \text{2-8}$$

Next, we calculate the sector allocation contribution (c_{ij}) as shown in Equation 2-9. The sector allocation contribution is defined as the product of the active weight in a sector and that sector´s index return (r_j).

$$c_{ij}^t = w_{ij}^t * r_j^t \qquad \text{2-9}$$

Summing up the sector allocation contributions for a given month will give the excess return (active return), as the arithmetic difference from the market return shown in Equation 2-10.

$$r_{i(arithmetic\ excess)}^t = r_i^t - r_m^t = \sum_{j=1}^{11} c_{ij}^t \qquad \text{2-10}$$

From this we see that an investor who follows a completely passive strategy, holding a portfolio that is equally weighted in the industry sectors as the market, will obtain zero active returns. Hence, any departure of the owner segments´ returns from the market returns must be due to an active strategy that departures from the passive strategy, in the form of positive or negative active weights.

3   Data

Initially, we aimed to acquire a dataset of the portfolio holdings and transactions for the population of investors on the OSE. This would allow us to analyze the true performance of the owner segments that together constitute the market. By accessing data on the population rather than a sample from a brokerage firm, we wanted to avoid making incorrect inferences about the investors in general. After correspondence with the OSE and the Norwegian Central Securities Depository (VPS), it became apparent that the data collection process was going to be more challenging than expected[3]. Unfortunately, due to a comprehensive and lengthy application process through the Financial Supervisory Authority of Norway ("Finanstilsynet"), we were unable to obtain the data needed for the initial analysis to be feasible within the time span of this thesis. For us to still be able to make inferences about who win and lose in the stock market, and hence retain the original research question, we decided to utilize the data that was available to estimate the results.

Our dataset consists of data obtained from two primary sources, of which one is public statistics available for exporting (VPS ASA, 2018a), and the other is an exclusive database available for students writing thesis for a BI program. We also exported the GPFN´s and their benchmark index´s historical monthly returns from their online download center (Folketrygdfondet, 2018a), and a selection of numbers from the historical state ownership reports (Nærings- og fiskeridepartementet, 2017). In addition, OSE provided us with historical values for the equity index OSEEX.

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[3] See uploaded pdf attachment containing the email correspondence with VPS in the "Main Excel Document"

3.1 VPS

From VPS, we downloaded publicly available statistics on the ownership interests in equities and primary capital certificates (PCCs) listed on OSE. The data is reported in month-end market value of holdings for each category of owner and is presented such that the positions are distributed across the different industry sectors. The reported owner categories are based on the standard for institutional sector classification of Statistics Norway (SSB), while the categories of industry sectors are based on the Global Industry Classification Standard (GICS)[4]. The industry sector distribution also included an "others" category in addition to the 10 GICS sector categories. VPS informed us that this category consists of companies that did not have a GICS code at the time when the statistics were produced, and consequently could not be placed within any of the industry sectors. Due to its negligible values and the lack of performance measure, we decided to exclude the "others" category from our analysis. Furthermore, there was introduced an 11th GICS sector (real estate) to OSE in September 2016 that was not included in the data from VPS. We requested the owner segments´ holding values in the real estate sector from VPS, but they were unable to provide us the numbers[5]. The sector is thus not included in the estimation of monthly returns. As a consequence, we needed to download the total market capitalization value for the last 16 months separately and adjust the dataset, as the percentage shares of the initial 10 sectors would otherwise be overrated in the period.

Given that the statistics separated between listed equities and PCCs, we had to decide whether to limit the analysis to equities, or to consider both equity instruments. As the listed PCCs have very similar characteristics to equities and represent an important part of Norwegian savings banks capital base, we decided to include the PCCs in our dataset. Certain owner segments´ portfolios consist of large relative amounts of PCCs, and omitting the equity instrument could hence lead to estimation results that do not fully reflect their portfolio returns. Although the finance category comprises the holding values of PCCs, we had to download these separately in order to assign the returns from the appropriate index. In our

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[4] See Appendix A for description of the GICS classification system
[5] See uploaded pdf attachment containing the email correspondence with VPS in the "Main Excel Document".

analysis, we thus treat PCCs as a separate industry sector, in addition to the GICS sectors.

The data we obtained from VPS stretches over 181 months, from the 31st of December 2002 to the 31st of December 2017. The data consists of 168 variables in the 72 months where we converted the institutional sector classification[6], and 72 variables in the remaining 109 months. This totals up to 19960 observations when also adding the additional variables needed in the last 16 months due to the introduction of the 11th GICS sector.

3.1.1 Converting the institutional sector classification

SSB implemented a new standard for the institutional sector classification from January 1st, 2012. Thus, VPS´s time series reporting was interrupted as of December 30st 2011 and continued with the revised classification thereafter. As the aim of our thesis is to analyze the performance of the owner segments over time, we are dependent on maintaining the same grouping for the entire analysis in order to make sensible inferences. To enhance quality and avoid biased results caused by cyclical economic conditions, we sought to cover as long of a period as possible. Cutting the time series after 2011 would be harmful for our analysis, and we considered the benefits of converting to a common classification to obtain a longer time span, to outweigh the disadvantages of carrying out an imperfect conversion. Given that the revised classification standard split up some of the previous groups, it would be impossible for us utilize this classification by performing the same operations with the available data. Though, we were able to convert the years after 2011 to the classification standard that was reported prior to this point in time, with an acceptable level of precision.

As of January 2012, we converted the classification of owner segments that was reported by VPS, to the classification that was utilized until December 2011. The conversion was carried out to the best of our ability, using explanatory documents and conversion tables provided by SSB[7]. The starting point was the 10 main categories and four of the subcategories from the new reporting. After performing

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[6] See chapter 3.1.1 for the institutional sector classification conversion.
[7] See SSB (2012) and Tangen (2012).

the merging and transferring operations shown in Table 3-1, we ended up with the six categories from the initial classification.

Table 3-1 – The upper part of the table displays the main categories and subcategories that were downloaded and used as starting point for the conversion of the owner segment classification. The lower part displays the main categories of the initial classification (which we converted to) and the conversion operations that were carried out.

		Main categories	
		Main categories	
	1	Public non-financial corporations	
	2	Private non-financial corporations	
	3	Monetary financial institutions	
	4	Other financial corporations	
	5	Insurance corporations and pension funds	
	6	General government	
New classification	7	Non-profit institutions serving households	
	8	Households	
	9	Rest of the world	
	10	Others	
		Subcategories	
	3c	State lending institutions	
	4b	Unit trusts (Mutual funds)	
	8a	Private unincorporated marked enterprises	
	8b	Cooperative building societies	
		Main categories	
	1	Central and local government	1+6+3c
	2	Private companies	2+(3-3c)+(4-4b)+5+7+8a+8b
Initial classification	3	Mutual funds	4b
	4	Private investors	8-8a-8b
	5	Foreign investors	9
	6	Others	10

Table 3-2 provides an indication of how precise the conversion was. One can see that the owner segments that exhibit the largest percentage point difference, foreign investors and others, are groups that remained unchanged during the conversion. A feature that potentially can explain some of the differences, is that the total market capitalization reported on the 30th and 31st of December differed by approximately NOK 43 million, although there was no trading. Justified by the distant time of the classification revision, VPS were unable to elaborate on what exactly caused the deviation. Though, they assumed that share prices from early January 2012 could have influenced the statistics and hence that the reported numbers were not really representative of December 31st, 2011. Due to this incorrectness in the data, we suffered from the lack of a perfectly suitable basis for comparison.

Table 3-2 – The table displays the six owner segments´ percentage owner share of the market capitalization (equities and PCCs), at the day before and after the classification conversion. The initial classification are numbers reported on the 30th of December 2011, whereas the converted classification are numbers reported on the 31st of December 2011. The percentage point difference is shown in the bottom row.

	Central and local government	Private companies	Mutual funds	Private investors	Foreign investors	Others
Initial classification	39,25	16,45	5,13	3,65	35,49	0,04
Converted classification	39,25	16,40	5,14	3,70	35,11	0,41
	-0,01	0,05	-0,01	-0,05	0,38	-0,37

Though, we were able to confirm that our conversion of the private investors segment is correct, by comparing the holding values of the segment to the holding values of Norwegian private individuals obtained from a separate source. This separate statistic is on the age, gender and place of residence of investors, and does hence include individuals solely. By comparing these portfolio values to our converted segment´s portfolio values in Table 3-3, which according to Table 3-1 should also include only individuals, we see that the difference is unaffected by the conversion.

Given that the conversion of private investors is correct and that we did not make any changes to mutual funds, foreign investors and others, the only room for error is in the two remaining categories. Considering that SSB have a clear distinction between governmental and private institutions, we are confident that these two are also fairly accurate. Nevertheless, given that the purpose of this paper is to provide an estimate of the segments´ performance over time, we consider the precision of the conversion to be satisfying.

Table 3-3 – The table shows the year-end portfolio values (equities and PCCs) for the private investors segment of our analysis (column 3), and the corresponding values for "Norwegian private individuals" (column 2) obtained from a separate VPS statistic (VPS ASA, 2018b). The displayed values are from the three years prior and after our classification conversion, separated by the dashed line. Column 4 shows the value differences.

Year	Social statistics from VPS	Private investors portfolio value	Difference
2009	60656678470	60656678469	1
2010	68578032146	68578032147	-1
2011	54512648711	54512648710	1
2012	57887214001	57887213999	2
2013	70733891065	70733891065	0
2014	66302608194	66302608195	-1

3.2 "Oslo Børs Informasjon"

Our second primary source of our data is Oslo Børs Informasjon (OBI), a database that contains company information and financial market data for Norwegian listed companies. This database has restricted access for students writing a thesis for a BI program.

We acquired daily values for 12 equity indices, for the 15-year period 2003-2017. The indices were the OSEAX and 11 sector indices corresponding to the GICS sectors of which the data from VPS is categorized according to; OSE10GI, OSE15GI, OSE20GI, OSE25GI, OSE30GI, OSE35GI, OSE40GI, OSE45GI, OSE50GI, OSE55GI and OSE60GI[8]. The 3771 daily values for each index totaled up to 45252 observations.

4 Theoretical approach and literature review

Both positive and negative excess returns must stem from investment decisions that deviate from the benchmark. That is, a market participant classified as an active investor, is any investor that holds a portfolio that does not always equal the one held by the passive investor. Since active investors act on perception of mispricing, they have to trade frequently, which leads to the term "active". Oppositely, passive investors have a strategy to replicate the market index, since they believe that markets are efficient and hence that there is absence of systematic arbitrage. Sharpe (1991) describes a passive investor as an investor who holds a portfolio consisting of all the listed securities, weighted according to the value-weights in the market. Given that the market return is the weighted average of all the security returns in the market, it is apparent it will equal the return obtained by the passive investors.

The claims of superior performance that motivated our research question suggest that active management can result in the identification of securities that are not correctly priced. From an efficient market theory point of view, an investor should not be able to benefit from actively trying to identify mispriced securities. That is, the investors in an efficient market would have no incentive to uncover new information, given that the time and resources would not generate higher

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[8] See Appendix Table 1 for a listing of the GICS sectors and their associated indices.

investment returns (Fama, 1970). The claims of superior performance would hence challenge the efficient market view. However, in this paper we will not attempt to make inferences about the efficiency of the Norwegian stock market. Without risk-adjusting the performances, we will simply investigate whether some owner segments have systematic stock selection abilities that result in positive excess returns, and if so, we will simultaneously identify the underperforming segments.

The consensus in academia appears to be that there exist certain groups of investors who perform superiorly, as well as other groups who underperform their benchmarks. Evidence from Taiwan indicates that a group of non-institutional active managers exists, and that their underperformance allow the institutional active managers to perform superiorly (Barber, Lee, Liu, & Odean, 2008). Their results show that there exist systematic and economically wealth transfers in the financial markets, primarily between individual and institutional investors, where the aggregate portfolio of the former suffers an annual performance penalty of 3,8 percentage points, while the latter earn net abnormal returns of 1,5 percentage points. The institutional investors in their analysis are split into four groups, corporations, dealers, foreigners and mutual funds, that all gain from trade. The evidence of an institutional segment of investors that gain on the behalf of a non-institutional segment is hence in line with Shape´s (1991) assertions about the arithmetic of active management. Evidence from Norway also indicate that investor groups both underperform and perform superiorly as a result of their active management. It is the active individual investors who is found to make poor investment decisions in general, even though a sizeable share of the segment is able to consistently outperform the market (Che, Norli, & Priestley, 2009).

Evidence that point towards the possibility of talent among individuals is implicitly supportive of the view that active fund management can be beneficial, given that these individuals can possibly be hired as mutual fund managers. Berk and Green (2004) demonstrate the possibility for the existence of skills among mutual fund managers, by showing that the lack of evidence on net-of-fees performance persistence is a result of competition among investors. They argue that rational, self-interested fund managers respond by increasing their own compensation when funds under management increase as a result of superior past

performance. Similarly, Samuelson (1974) emphasizes that there could exist decision-makers who consistently do better than the average, but that they have no incentive to give away their earned rent.

The view that mutual fund managers keep the rents for themselves is challenged by the recent findings of the Consumer Council of Norway, where it is examined whether private investors should choose actively or passively managed funds. The results show that the aggregate of actively managed Norwegian funds delivers a net excess return of 0,86 percent above the benchmark, in contrast to negative net excess returns for Global funds, Europe funds and Nordic funds (Ormseth, 2018). The author thus recommends mutual funds that manage their assets actively, over the alternative passively managed index fund, implicitly suggesting that investors will benefit. However, the equal-weighting of returns does not reject Berk & Green´s (2004) hypothesis about decreasing returns to scale, nor Samuelson´s (1974) theory about skilled decision-makers´ incentives. Nevertheless, the study still provides evidence that active management of Norwegian equites can result in higher returns than the benchmark.

Further evidence on the existence of winners and losers is found on the OSE. Ødegaard (2010) analyzes how direct state ownership affects company value and presents evidence suggesting the existence of a state discount in the stocks where the government has direct ownership interests. He finds that the risk-adjusted excess return (alpha) for the portfolio is negative, though not significantly different from zero. Nilsen (2010) looks closer into the GPFN and specifically their portfolio of Norwegian stocks. Employing data from the period 1998-2009, the author performed a regression analysis on the portfolio returns and the classical Fama and French three-factor model and found a statistically significant annualized alpha of 2,16 percentage points. The author suggests that the excess return is due to great active management, not exposure to the systematic risk-factors in the model. His results hence support the GPFN´s claims of superior returns and adds to the literature supportive of active management.

There seems to be a limited focus in the research area of equity investor performance, where most of the attention is given to the ones who claim to deliver returns above the market average. The aim of previous research has typically been

to test the allegations of superior returns through actively managing assets or to analyze the performance of a particular group of investors. To our knowledge, there are few studies that analyze the relative performance of all the owner segments that constitute a stock market, nor is there any research that intentionally attempts to identify the losers in the stock market. We will contribute to the literature by looking closer into the arithmetic behind the average returns of investor segments, to see how it all adds up in a model that does not risk-adjust. In this way, we investigate the commonly asked question if someone beats the market, from a different angle than what is previously done. Instead of merely attempting to identify the winners, we will seek to identify the losers who make it possible for other market actors to perform superiorly to the average. By limiting the scope of our analysis to the Norwegian market and OSE, we will also contribute to the research on Norwegian equity and its owners, by comparing our results to findings from other countries. Our paper will hence be related to the literature on equity investor performance and active asset management, and we will improve the credibility of previous research by providing evidence on the long-term performance of various owner segments.

5   The Norwegian stock market

The Norwegian market consists primarily of three different marketplaces, Merkur Market, Oslo Axess and OSE (Oslo Børs ASA, 2018a). Merkur Market is a multilateral trading facility, where the admission requirements and the continuing reporting are less comprehensive than the two other markets. Although, they are still required to publish half-yearly accounts and publicly disclose inside information on their own initiative, without any delay. Oslo Axess is an authorized and fully regulated marketplace and is suited for companies that do not fulfil all the requirements for admission to be listed on OSE. There are some benefits associated with listing on a regulated marketplace, and companies with less than three years of record could gain positive market attention being listed at Oslo Axess. OSE is a stock exchange listing in accordance with EU requirements and Norwegian stock exchange legislation. For larger companies with a wide distribution of shareholders and an established track record, OSE would be the obvious choice (Oslo Børs ASA, 2018b).

5.1 Oslo Stock Exchange

In 2016, OSE was ranked number one in Europe for the number of oil service and shipping companies, in addition to being number one globally for both number of companies and market capitalization for the seafood sector. The strong position in these sectors attracts companies, investors and investment banks from all over the world, and the stock exchange is hence considered a natural choice when shipping, offshore and energy companies are going public (Landsnes, 2016). We find that the OSE is listed close to the median when it comes to market capitalization and number of shares listed, compared to other European exchanges, which suggests that it is a mature market. At the year-end 2017, the OSE ranks 6th out of 16th European stock exchanges based on market capitalization and 8th based on the number of listed companies (FESE, 2018).

Some market actors argue that the conditions in the Norwegian market differs from more mature markets, and that it therefore allows for mispricing of securities. The arguments are commonly that companies in the global stock markets, typically the U.S. market, have been more widely researched by Wall Street analysts, resulting in less mispriced shares. The stock price of Apple Inc. is analyzed frequently by investors, managers and analysts globally, while the least traded stocks in on the OSE are far less analyzed. Bente A. Landsnes, the President and Chief Executive Officer of OSE, makes the assertion that the Norwegian stock and bond markets are efficient in terms of listing process, capital-raising and infrastructure (Landsnes, 2016). Good analyst coverage from both local and international investment banks is pointed out as one of the reasons for the alleged efficiency. Using examples displaying the number of analysts covering large, medium and small cap companies, Landsnes demonstrates that the coverage is generally as good as for companies listed e.g. on Xetra, in New York or in London.

5.2 Ownership distribution at the OSE

OSE is a composite of owner segments that is commonly grouped according to SSB´s standard for institutional sector classification, equal to the categories in the reporting from VPS that we make use of in this paper. The ownership distribution at OSE is constantly changing, and the largest historical fluctuations have been in the ownership shares of foreign investors and central and local government, as

seen in Figure 5-1. From Figure 5-2 we see that foreign investors own the largest share (38,42%), followed by central and local government (33,90%), private companies (18,10%), mutual funds (5,19%), private investors (3,87%) and others (0,51%) (VPS ASA, 2018a). The GPFN is the largest institutional investor at the OSE, owning approximately 5,2 percent of the market capitalization and 10 percent of OSEBX (Folketrygdfondet, 2017).

Figure 5-1 – The line chart illustrates how the ownership distribution at OSE has changed over the period that we examine in this paper. Holdings in both equities and PCCs are included. The vertical dashed line at December 2011 represents the point where we converted the owner segment classification. Source: (VPS ASA, 2018a).
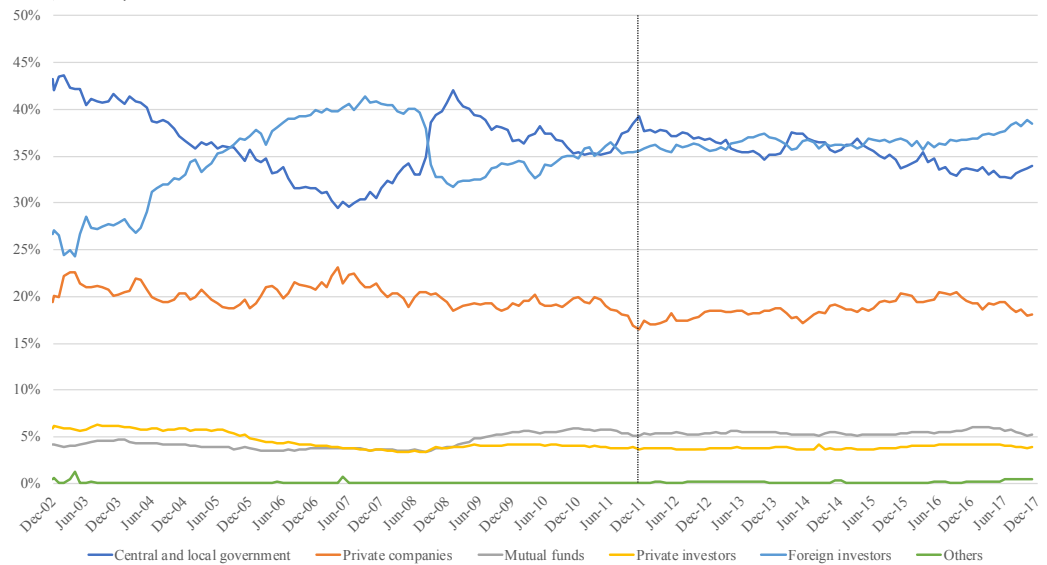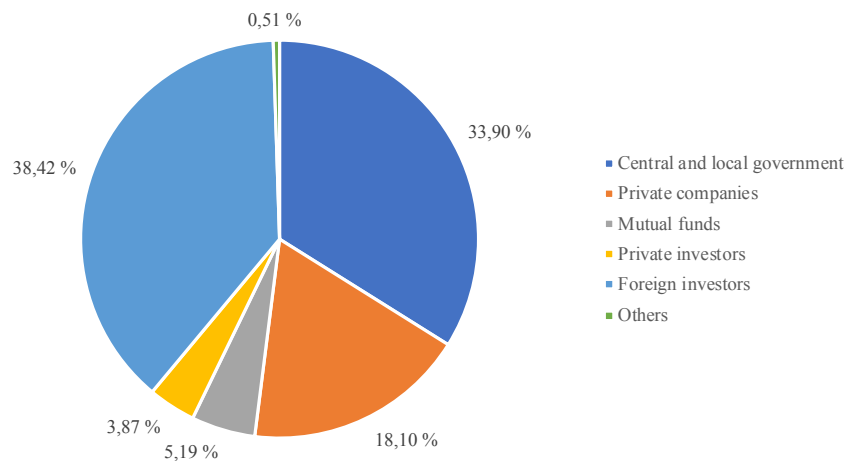

Figure 5-2 – The pie chart illustrates the percentage ownership distribution at OSE on the 31st of December 2017. Holdings of both equities and PCCs are included. Source: (VPS ASA, 2018a).

5.2.1   Central and local government

A considerable portion of the Norwegian industry and businesses is owned by the central and local government. The 33,90 percent share of market capitalization makes this category the second largest owner segment at the OSE, behind foreign investors. The state´s overall objective of equity ownership is to facilitate value creation in the Norwegian economy. Their aim can hence differ from other owner segments, as it is not solely to chase returns by investing in underpriced companies. For instance, a number of businesses are fully owned and governed by the state to enhance efficiency by correcting market failure. Nevertheless, state ownership also occurs as shareholding in companies that are listed on OSE. The state had direct ownership in eight listed companies at year-end 2017, a share that was valued NOK 716 billion, approximately 28,75% of the total market capitalization (Nærings- og fiskeridepartementet, 2018). The objective of holding listed shares is managing the assets of the Norwegian people and promoting state interests in the business activities (Ødegaard, 2010). Retaining key competence and head office functions in Norway are other reasons for governmental ownership in listed companies. The state has both direct ownership managed by the ministries, and indirect through underlying agencies or portfolio investments like the GPFN (Regjeringen, 2018).

The indirect ownership through the GPFN is managed by the wholly state-owned company "Folketrygdfondet". The purpose of the fund is to facilitate government savings to finance the rising expenditures related to public pension (Nilsen, 2010). There are no capital inflows, but the returns are added, and rebalancing is thus necessary to maintain the target weights. According to the management mandate determined by the Ministry of Finance, equity investments and fixed-income securities constitutes 60 and 40 percent, respectively, of which 85 percent of equity investments is in Norwegian equities and 15 percent in Nordic equities (Lovdata, 2010). Additionally, the management mandate states the fund´s strategy is premised on seeking to maximize returns while keeping the risk at a moderate level, by actively managing the funds. Hence, the GPFN is a part of the government owned segment of the OSE that chases return rather than value creation.

5.2.2 Private companies

The third largest owner segment on the OSE is private companies, which constitutes 18,10 percent of the market capitalization. This segment consists primarily of limited companies, where the company has a legal identity of its own and the members´ liabilities are limited to what they have invested in the company. Private companies also comprise private non-profit institutions serving consumers, life insurance/private pension funds, saving banks, and other subcategories with low relative weights (VPS ASA, 2018a). Professional private investors often establish a private limited company, typically a holding company, in order to own shares in other companies and manage the yields. In this way, the dividends and the gains on future sales of enterprise will be virtually tax-free for the holding company (Altinn, 2017). The opportunity to defer full taxation is an advantage for a holding company, compared to owning shares privately. Keeping that in mind, several private investors have indirect ownership interests through the private company segment.

5.2.3 Mutual funds

With a market capitalization of 5,19 percent, mutual funds are the fourth largest owner segment. A mutual fund, commonly known as an open-end fund or open-end investment company, trades securities on behalf of individual investors (Bodie et al., 2014). The investment company collects funds from the individual investors and make investments in a potentially wide range of securities or other assets. Each investor owns a share of the portfolio proportionate to the amount invested by the investment company. In this way, the small investors benefit from large-scale investing with reduced investment fees and diversified risk. The management companies collect a management fee for operating the funds and offers an entire collection of funds to the customer. In this way, the companies make it easy for an investor to invest in assets from different market sectors and switch asset to obtain a desirable portfolio.

5.2.4 Private investors

Private investors are the second smallest owner segment, holding 3,87 percent of the total market capitalization. This segment comprises wage earners, pensioners, recipients of property income and social security, students etc. In other words, individuals who have private owner interests in equities. There were more than

365,000 individuals, or approximately 6,89 percent of the Norwegians population, in this owner segment at the year-end of 2017 (AksjeNorge, 2017; SSB, 2018). The annual statistics from AksjeNorge also display that the equity ownership of the private investors aggregates up to more than NOK 100 billion and that an average portfolio at OSE is NOK 276,000. At the end of the same year, approximately 76,85 percent of the segment´s holding value was held by private investors that were older than 50 years, while only 23,15 percent was held by investors younger than 50 years (VPS ASA, 2018b). The majority of the owner segment were residents in Oslo and Akershus, and about 77,71 percent of them were male.

5.2.5   Foreign investors

The largest owner segment at the OSE at the year-end 2017, was foreign investors with their owner share of 38,42 percent of the market capitalization. This segment accounted for approximately 2/3 of all trades at the OSE in 2016, indicating that they are the most frequent traders (Landsnes, 2016). Thus, foreign investors are of great importance to the Norwegian stock market, and their portfolio inflows to the domestic equity market contributes to more efficient pricing of the assets, through covered market analysis. The owner segment consists of investors from several countries, which in 2016 was dominated by The Unites States and The United Kingdom with more than half of the segment, respectively 32,8 percent and 19,1 percent. Europe (excluding the Nordics, Luxembourg, Cyprus & Switzerland) had a share of 12,1 percent, Luxembourg 11,7 percent and The Nordics (excluding Norway) 8,8 percent. The aggregate share of the remaining countries was approximately 15,6 percent (Landsnes, 2016). It is important to notice that foreign investors also comprise Norwegian emigrants, including wealthy individuals who have emigrated for tax purposes.

5.2.6   Others

There exists a group of owners that is difficult to place within one of the previous owner segments, for unknown reasons. VPS classifies this owner segment as "others" with an owner share of 0,51% percent of the market capitalization.

6 Results and Analysis

6.1 Presentation and description of results

The main results of our analysis are presented in Table 6-1. During the estimation period of 15 years, three owner segments stand out as superior to the market average, while three segments exhibit excess returns that are inferior to the average. Private companies distinguished themselves as the winners with an average annualized excess return of 0,65. The second-best performer is mutual funds, with a return that averaged 0,33 above the market. Foreign investors´ performance was marginally better than the market, as the segment´s excess returns was 0,02. Below the market average, we find central and local government, private investors and others. The excess return of -0,11 makes central and local government the best of the inferior segments, followed by private investors with an excess return of -0,35. The average annualized excess return of -1,69, places others at the very bottom, performing worse than all the other owner segments. However, given that this segment consists of investors who are difficult to categorize, classifying them as losers has little contribution value to the research area.

Table 6-1 – The table displays percentage logarithmic returns for the market and the six owner segments that we consider in this paper, and the excess returns relative to the market in percentage points, over the time period January 2003 to December 2017. In the upper part, we have averages of the segments´ monthly returns, while the lower part of the table shows the corresponding returns in annualized terms.

		Central and local government	Private companies	Mutual funds	Private investors	Foreign investors	Others	Market
Monthly	Average returns	1,11	1,18	1,15	1,09	1,12	0,98	1,12
	Average excess returns	-0,01	0,05	0,03	-0,03	0,00	-0,14	0,00
Annualized	Average returns	13,34	14,11	13,79	13,10	13,47	11,77	13,46
	Average excess returns	-0,11	0,65	0,33	-0,35	0,02	-1,69	0,00

The performances of the various owner segments are also graphically presented in Figure 6-1. One can see that their performance relative to the market shifts over the time span, and that there is no segment that is distinguished as superior during the entire period. Though, from a visual interpretation, it appears that the two segments that exhibited the worst performance in Table 6-1, also lie below the market line in the majority of the time. That is, the evidence suggests that these segments systematically achieve below-average returns.

Figure 6-1 – The figure shows the relative performance of the owner segments during our sample period, from December 2002 to December 2017. The starting point is a value of 100 that is adjusted for the monthly returns. The vertical dashed line at December 2011 represents the point where we converted the owner segment classification.
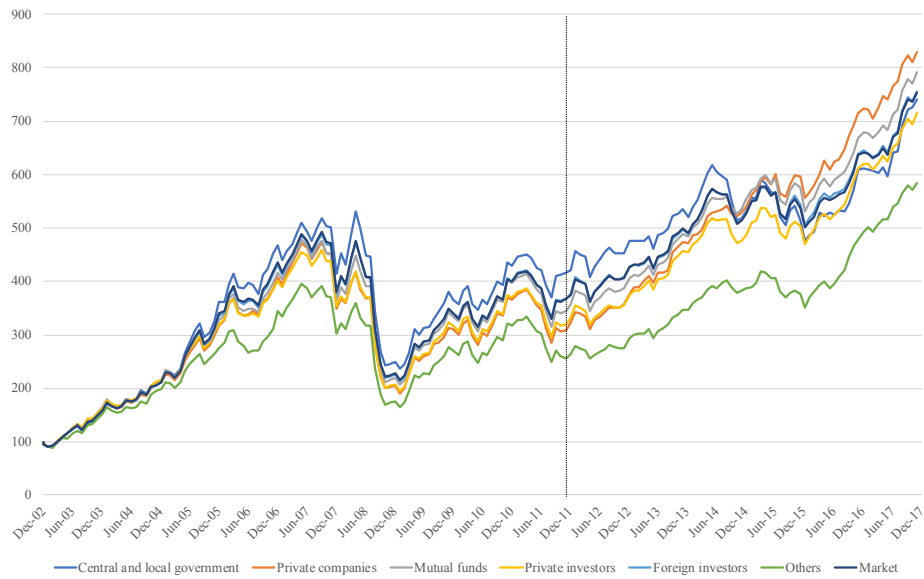
The ability to hold the right securities at the right time is the key to achieve superior returns on an investment portfolio. Similarly, holding the wrong securities at the wrong time will result in inferior performance. The owner segments in our analysis are aggregates of portfolio managers that constantly make sector allocation decisions. From Figure 6-2, we see that there are large variations in performance of the industry sectors, suggesting that deliberate sector allocation is crucial if superior returns are to be achieved. Table 6-2 displays the average returns corresponding to the industry sectors in the figure. Consumer staples, telecom and utilities are the industry sectors that exhibit the best performance in the time period, with respective annualized returns of 17,57, 16,00 and 15,78. Materials, industrials and IT exhibit respective returns of 9,92, 10,21 and 11,35, which makes them the three industry sectors that perform the worst. The energy sector, which constitute the largest share of OSE, had an average annualized return of 12,17.

Figure 6-2 - The figure shows the relative performance of the GICS sectors and the PCCs during our sample period, from December 2002 until December 2017. The starting point is a value of 100 that is adjusted for the monthly returns.
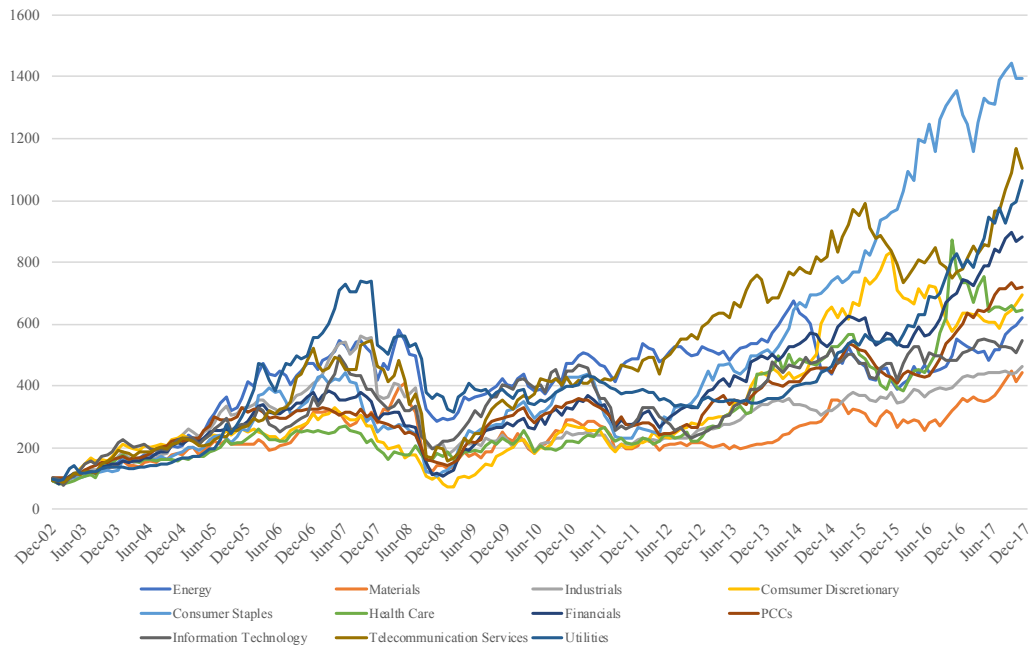

Table 6-2 – The table displays the average percentage monthly and annualized logarithmic returns for the industry sectors, over the time period January 2003 to December 2017.

	Average monthly returns	Average annualized returns
Energy	1,01	12,17
Materials	0,83	9,92
Industrials	0,85	10,21
Comsumer discretionary	1,08	12,92
Consumer staples	1,46	17,57
Health care	1,04	12,45
Financials	1,21	14,51
PCCs	1,10	13,17
Information technology	0,95	11,35
Telecommunication services	1,33	16,00
Utilities	1,31	15,78

We have analyzed how the contributions of sector allocation decisions add up and explain the performance differences of the portfolios relative to the benchmark. The active weights in Table 6-3 give an indication of how the investments of each owner segment have been distributed across the industry sectors in the time period of which the excess returns in Table 6-1 are estimated. For an owner segment to achieve a return that differ from the market, their weights in the industries must also differ from the market. The active weights demonstrate not only that there

have been substantial variations in the ownership interests, but also that the segments have been very different in the degree of active management, represented by the amount of deviation from the market weights. What characterizes the Norwegian stock market and OSE, is the large relative weight of the energy sector, which averaged on 45,68 percent in the period. We see large variations in the active weights in the energy sector, implying that the sector returns will constitute differing weights of the portfolio returns. For example, the returns on central and local government´s portfolio is largely determined by their average share of 59,36 percent in the energy sector, whereas the returns of private companies are far less determined by energy returns, as the share of the sector in their portfolio averaged on 26,85 percent. Thus, to counterbalance the underweighting in energy, private companies had positive active weights in most of the remaining industry sectors.

Table 6-3 – The table displays the owner segments´ average active weights in the industry sectors during the time period December 2002 to December 2017. The rightmost column shows the average market weights in the industry sectors and is the number from which the point differences are calculated to obtain the active weights.

	Central and local government	Private companies	Mutual funds	Private investors	Foreign investors	Others	Market
Energy	13,68	-18,83	-10,33	-15,90	-0,16	-18,54	45,68 %
Materials	0,27	-2,88	1,84	-0,26	1,21	-1,60	7,61 %
Industrials	-5,53	7,30	5,89	6,49	0,17	3,67	7,97 %
Consumer Discretionary	-2,90	5,25	1,99	-0,06	-0,22	0,43	3,70 %
Consumer Staples	-4,42	4,87	2,29	1,01	1,43	-0,50	5,77 %
Health Care	-0,53	0,35	0,80	1,18	0,11	1,00	0,64 %
Financials	-3,77	7,21	-1,22	1,82	0,05	1,17	12,97 %
PCCs	-1,13	1,57	0,49	8,08	-0,83	13,07	1,19 %
IT	-2,35	1,84	3,38	4,14	0,37	8,02	3,02 %
Telecom	6,78	-8,41	-4,22	-6,39	-0,89	-6,96	10,10 %
Utilities	0,10	1,87	-0,71	0,07	-1,03	0,44	1,14 %

The combination of central and local government´s large owner share at OSE and their active weight of 13,68 in Energy and 6,78 in Telecom, caused the remaining owner segments to be underweighted in these sectors. Similarly, we see positive active weights for the smaller owner segments in the industries where central and local government have negative active weights. That is, the government´s role on the OSE has great influence on the investment opportunities of the smaller owner segments, given that the government´s deviations from the market portfolio places them within the definition of an active manager. As the arithmetic laws require the

need for investors that are underweighted in an industry whenever there are other investors that are overweighed, a large positive or negative active weight in an industry for the government will prevent the aggregate of smaller owner segments from being overweighed or underweighted in the same industry. The holdings of foreign investors do not result in the same need for counterbalancing, even though their owner share at OSE has averaged at approximately the same as central and local government. This can be explained by the small active weights in the industry sectors, implying that foreign investors have held a portfolio that is quite similar to the market portfolio.

To illustrate how excess returns are a result of active weights in the industry sector, we have performed a performance attribution analysis of a month´s return for central and local government, as shown in Table 6-4. The analysis demonstrates that the active weights in each industry sector multiplied by the sector return, equals the contribution from the sector allocation decisions. For example, the active weight of 19,84 in energy had a negative contribution of -1,28 to the excess returns of that month, due to energy´s return of -6,43. On the other hand, the underweighting of -4,76 in consumer staples contributed positively to the excess return by 0,39, due to the sector´s poor return of -8,26. The contributions from the sector allocation decisions in Table 6-4 summed up to -1,03, which is equal to the arithmetic difference between the returns of central and local government and the market for that month. That is, the analysis shows how overweighting in industry sectors that perform well will result in positive contributions to the excess return, and negative contributions if the performance is poor. Conversely, underweighting results in negative contributions to the excess return when industry sectors have positive returns and positive contributions when returns are negative.

Table 6-4 – The table shows an example of performance attribution analysis for the January 2003 returns, for the owner segment central and local government. The portfolio and market weights are from the beginning of the month and the active weights displays their percentage point difference. The sector allocation contribution is the product of the active weights and the sector returns.

Industry sector	Portfolio weight	Market weight	Active weight	Sector return	Sector allocation contribution
Energy	67,22	47,38	19,83	-6,43	-1,28
Materials	0,78	4,20	-3,42	-3,89	0,13
Industrials	2,26	8,14	-5,88	-0,08	0,00
Consumer discretionary	0,87	4,37	-3,50	-6,79	0,24
Consumer staples	1,56	6,32	-4,76	-8,26	0,39
Health care	0,71	1,49	-0,77	-8,81	0,07
Financials	6,79	12,71	-5,93	-0,37	0,02
PCCs	0,11	1,24	-1,13	3,57	-0,04
IT	0,81	3,35	-2,54	2,61	-0,07
Telecom	17,99	9,57	8,42	-6,10	-0,51
Utilities	0,89	1,20	-0,31	-1,86	0,01
					-1,03

In Table 6-5, we have calculated the arithmetic average of the monthly sector allocation contributions over the period that we investigate, as we in Table 6-4 have calculated for a single month. We display these averages to illustrate how the allocation decisions have contributed to the excess returns over the time span of our analysis, even though the arithmetic average of excess returns is inappropriate for making inferences about long time performance. The owner segments´ monthly average returns in the bottom row thus differs from the logarithmic averages that we presented in Table 6-1. Though, using the arithmetic average, one can see how each owner segment´s monthly sector allocation contributions adds up to a number that equals the difference between that sector´s and the market´s average return for the entire period. We recognize the pattern from Table 6-3, where central and local government are overweighed in energy and telecom, which has resulted in average positive contributions of 0,21 and 0,09, respectively. However, the negative contribution from being underweighted in most of the remaining industries have outweighed the positive contributions, and the owner segment ended up with a monthly negative excess return of -0,0008. The other five owner segments had negative contributions from their average negative active weights in the energy and telecom sector, but they were not all able to allocate their funds in other industry sectors in a way that outweighed the negative contributions. The active asset management of private companies, mutual funds and foreign investors resulted in respective average monthly excess

returns of 0,0547, 0,0283 and 0,0034. Private investor and others actively managed their assets in a poor way, resulting in inferior average monthly excess returns of -0,0372 and -0,1455, respectively.

Table 6-5 – The table displays the arithmetic average of the monthly sector allocation contributions from January 2003 to December 2017 for each of the owner segments. The bottom row summarizes the average contributions.

	Central and local government	Private companies	Mutual funds	Private investors	Foreign investors	Others	Market
Energy	0,21	-0,24	-0,15	-0,26	-0,02	-0,39	0,00
Materials	-0,01	0,00	0,03	0,00	0,01	0,02	0,00
Industrials	-0,02	0,00	0,08	0,05	0,01	0,07	0,00
Consumer Discretionary	-0,05	0,09	0,03	0,01	-0,01	0,00	0,00
Consumer Staples	-0,09	0,11	0,04	0,04	0,03	-0,01	0,00
Health Care	-0,01	0,00	0,01	0,02	0,00	0,01	0,00
Financials	-0,07	0,13	-0,01	0,05	0,00	0,02	0,00
PCCs	-0,02	0,02	0,00	0,10	-0,01	0,13	0,00
IT	-0,04	0,03	0,05	0,06	0,01	0,10	0,00
Telecom	0,09	-0,12	-0,06	-0,09	-0,02	-0,07	0,00
Utilities	0,00	0,03	-0,01	0,00	-0,01	-0,02	0,00
	-0,0008	0,0547	0,0283	-0,0372	0,0034	-0,1455	0,0000

At the year-end 2017, the GPFN´s and the government´s direct owner share of the market capitalization was approximately 5,08 and 28,75 percent, respectively (Folketrygdfondet, 2018b; Nærings- og fiskeridepartementet, 2018). The combined share of 33,83 is similar to the owner share of central and local government in equities solely, which was 33,65 at the same time. This difference could be caused by rounding's in the annual reports or our classification conversion. We find our results remarkable when considering the returns of central and local government, given that this owner segment comprises both the GPFN and the government´s direct ownership. The GPFN have claimed to perform superiorly on average for the entire period of their existence, which implies that central and local government´s average annualized excess return of -0,11 in Table 6-1 must be due to either mistakenly reported returns from the GPFN, or sufficiently negative excess return by the remainder of the owner segment so that the value-weighted excess return is -0,11. To investigate this further, we have attempted to evaluate the performances of the GPFN and the government´s direct ownership separately.

Using data from a different source, we calculated the GPFN´s excess return for the same period as the main analysis. Table 6-6 shows that the fund did in fact have positive annualized excess returns of 0,41 for the period, and the numbers hence confirm their claim of superior performance. Though, for the exact period that we consider, the returns were not as superior as in the periods of their reported numbers. That is, the excess returns from their 2017 annual report for the past 5 and 10 years, and for the period 1998-2017, are all substantially higher than 0,41 (Folketrygdfondet, 2018b). Although these excess returns are from the GPFN´s entire stock portfolio, which consist of 15 percent stock that are not listed at OSE, we find it reasonable to assume that the majority of the excess return stems from OSE stocks. The superior performance by the GPFN thus conform with their claims and reporting, and with the findings of Nilsen (2010).

Table 6-6 – The table shows the average percentage monthly and annualized logarithmic excess return for the GPFN, over the time span January 2003 to December 2017. The returns are from the fund´s entire stock portfolio, and the excess returns are therefore calculated based on a composite index of 85% in the OSEBX and 15% in the VINXB.

	GPFN
Monthly excess return	0,03
Annualized excess return	0,41

Given that the performance of the GPFN requires an inferior performance by the remainder of the owner segment, which consists primarily of the government´s direct ownership in the industry, we also examined these historical returns in more detail. Using the historical ownership reports published by the government, we managed to estimate the returns on their portfolio of directly owned shares by subtracting the direct returns from the reported total returns. From Table 6-7 it is clear that the average total return of 14,80 is unsuited for evaluating the excess returns relative to OSEAX, as the OSEAX returns does not account for received cash dividends and will exhibit an excess return of 1,34. However, when we excluded the direct returns after the best of ours ability, the average total return decreased to 12,73 and the excess return to -0,74. This indicates that the government´s direct ownership interests in listed companies has resulted in below-average returns over the period of our analysis, possibly explained by their objectives of investing at the OSE. The underperformance by central and local government in Table 6-1 can hence be explained by the government´s negative

excess return, which outweighs the GPFN´s positive excess return in the same period.

Table 6-7 – The table shows the percentage annual average logarithmic returns and excess returns for the government´s portfolio of directly owned listed companies, for the period 2003-2017. The first column of the table displays the total return including direct returns from received dividends, while the returns in the second column are excluding the direct returns. The excess returns are calculated using OSEAX as benchmark. Source: (Nærings- og fiskeridepartementet, 2017).

	Total return	Total return w/o direct return	OSEAX
Annual average	14,80	12,73	13,47
Annual average excess	1,34	-0,74	0,00

The evidence of negative excess returns on the government´s portfolio relates to the findings of Ødegaard (2010), where it is suggested that a state discount is present. Another owner segment that underperforms in our analysis is private investors, a finding that is in line with multiple studies within the research area. Equal to Barber et al. (2008), we find that the aggregate of private investors make poor investment decisions, while the aggregate portfolio of institutional investors such as mutual funds and corporations, gain from active trading. Similarly, Che et al. (2009) find that active trading is generally harmful for private investors on OSE, which is also in line with our results.

Furthermore, the aggregate of mutual funds on the OSE turned out as superior to the market average in our analysis and is hence in accordance with the results of the Consumer Council of Norway (Ormseth, 2018), suggesting that active asset management can be beneficial in the Norwegian stock market. As the managers of mutual funds are individuals, our results also relates to the view that talented investors might exist, in accordance with Berk & Green (2004), Che et al. (2009) and Samuleson (1974). Though, our evidence on mutual fund performance is on an aggregate gross-of-fees level and does therefore not contribute to the discussion of whether the mutual fund investors benefit from the earned rents of mutual fund managers.

To summarize, the results of our estimation model show that an active management strategy, where the portfolio differs from the market average, can give both positive and negative excess returns. That is, the decisions about asset allocation in the different industry sectors have resulted in average returns that are

not equal to the market return. Without risk-adjusting the performances, the evidence suggests that a departure from the passive management strategy can result in superior or inferior returns on average over several periods. Hence, one can question whether the conditions at the OSE are entirely efficient, as it appears that systematic excess returns can be achieved. The results thus conform with the mutual funds´ and the GPFN´s claims about delivering above-average returns through active management.

6.2 Evaluating the model

To evaluate our estimation model, we adjusted the dataset to account for ownership interests in equities only. In this way, we were able to compare the model output, represented by the value-weighted returns of the industry sector equities, to the returns of the value-weighted OSEAX. As OSEAX consists solely of stocks listed on the OSE, the inclusion of PCC holdings in a measure for comparison would be inappropriate. We also adjusted the model to account for the introduction of the 11th GICS sector in 2016, by utilizing the returns of the associated industry index. This adjustment was also done to make the basis for comparison as good as possible, given that the real estate sector is included in OSEAX.

Table 6-8 displays the difference between the average returns from the model and OSEAX, and is hence a measure of how precisely we managed to replicate the true average market returns, represented by the OSEAX returns. The estimation error of the annualized returns adds up to 0,0088, which suggests that our model produced estimations that were quite accurate. We did expect a small deviation, given that we decided to exclude the unknown industry sector "others" from the analysis. If we had access to a performance measure for this sector and could properly account for the contribution to the market average, we would expect that the estimation error would be even closer to zero. Nevertheless, the low estimation error still gives us a confirmation that the data we obtained from VPS and OBI is suitable for joining together in the building of an estimation model.

Table 6-8 – The table shows the estimation error of model, as the percentage point difference between the average return of shareholdings solely (market excl. PCCs) and the average return of the OSEAX.

	Market excl. PCCs	OSEAX	Estimation error
Average monthly returns	1,12	1,12	0,0007
Average annualized returns	13,47	13,47	0,0088

The errors of the estimation model are also displayed in Figure 6-3. One can see that the estimation error is centered around zero in the majority of the time period. Though, there are certain months where the error is considerably large relative to the average monthly estimation error of 0,0007, displayed in Table 6-8. For example, we see these relatively large errors in March 2006, July 2007 and October 2007. An examination of the data material reveals that some industry sectors experience considerable changes in the percentage share of market capitalization. From Table 6-9, we see that from February 2006 to March 2006, the industrials sector´s share increased by 3,67 and that the consumer staples sector decreased by -3,12 percentage points. Similarly, from June 2007 to July 2007, industrials increased by 5,49 while IT decreased by -5,22, and from September 2007 to October 2007, materials increased by 5,00 while energy decreased by -6,33 percentage points. Given that such abnormal changes in sector shares appear in months where the sector returns are seemingly normal, the deviations appear to be caused by value transfers between the sectors. After investigating the matter, we found that possible explanations for such value transfers can be mergers or divestitures. For example, we find it reasonable to assume that the October 2007 change in industry sector shares was a result of the merger between the energy company Statoil and the energy division of Hydro, which resulted in a transfer of Hydro´s remaining aluminum division to the materials sector (Ryggvik, 2018). Our estimation model is unable to account for value transfers between the industry sectors and will consequently produce returns that differ from the OSEAX in months where such transfers occur. These deviations from the OSEAX appear as spikes in Figure 6-3 and will affect the average estimation errors in Table 6-8.

Figure 6-3 – The figure is a time series visualization of monthly logarithmic return differences between the aggregate of shareholdings and the OSEAX. The months are labelled on the horizontal axis, and the percentage point differences are labelled on the vertical axis. The vertical dashed line at December 2011 represents the point where we converted the owner segment classification.
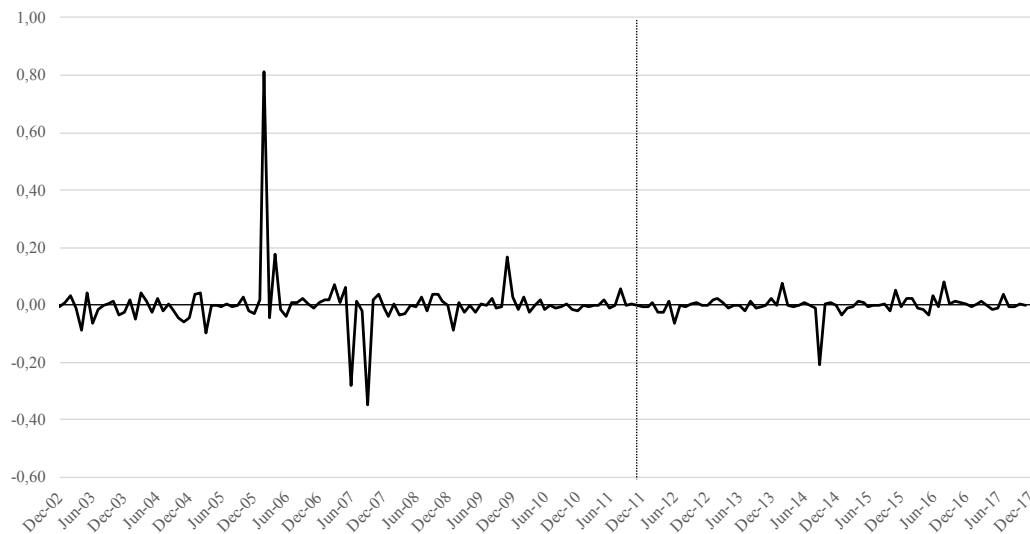

Table 6-9 – The table displays the percentage point change from the previous month in the industry sectors´ share of the market capitalization. The three months in the table are the ones that exhibit the largest estimation errors in Figure 6-3.

	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health Care	Financials	IT	Telecom	Utilities
Mar-06	0,66	-0,10	3,67	-0,17	-3,12	0,01	-0,31	0,18	-0,98	0,15
Jul-07	0,01	-0,24	5,49	-0,09	0,27	0,01	0,16	-5,22	-0,48	0,07
Oct-07	-6,33	5,00	0,69	-0,21	-0,53	0,31	0,04	-0,09	1,10	0,02

The estimation model´s inability to account for transfers between industry sectors also applies for transfers between owner segments. That is, if one segment sells shares to another segment in the beginning of a month, the model will assign the returns on these shares to the former segment until the turn of the month, even though the latter segment held the shares in the majority of the time. However, this will only be an issue if the transfer occurs between investors that are in different owner segments. A value transfer between investors in the same owner segment will not affect the aggregate holding value if we ignore bid/ask spreads and other transaction costs, and the model will hence assign the monthly returns correctly. The wrongly assigned returns due to the monthly data observations is the greatest limitation of the model and could potentially result in misestimates.

One example of a model misestimate is the rare occurrence of directly government owned share sales, which brings along very large transactions and change of ownership. On the 6th of July 2004, the government reduced their owner share in Statoil by 116,76 million shares (more than 1% of the market

capitalization at OSE), by selling their stocks to both Norwegian and foreign institutional investors, and private investors (Nærings- og Handelsdepartementet, 2005). The estimation model assumes that the central and local government segment held these stocks until the 31st of July and assigned returns accordingly, implying that the returns on a substantial portion of the market was incorrectly assigned for 24 days. However, the government executes such transactions infrequently and their portfolio of stocks remains unchanged during the majority of months, meaning that the model will assign returns correctly. In spite of the model´s weakness in not accounting for transactions, we assume that mistakenly assigned returns will alternately favor the owner segments during the time span of our estimate, and that the effects will even out to some degree.

7 Conclusion

In this paper, we have investigated the performance of the segments that had equity ownership interests in the form of equities or PCCs at the OSE, in the 15-year period 2003-2017. We asked the question of who the losers are in the Norwegian stock market, motivated by large asset managers´ frequent claims of above-average performance. With the starting point in the simple arithmetic fact that everybody cannot be better than the average, we have investigated the credibility of the superior return claims from a new angle. We sought to identify not only those market participants that have received above-average returns, but also the ones who have underperformed the average and thus made it possible for other participants to outperform the average. Using the owner segments´ beginning of month portfolio weights in each industry sector, we estimated the aggregate portfolio returns by assigning returns from the equity indices corresponding to the industry sectors. Furthermore, we decomposed the overall performances in an attribution analysis.

The results of our estimation model show that the Norwegian stock market consists of both winners and losers. Except from the non-identifiable owner segment others, private investors stand out as the segment that performed worst on average and is hence the losers in the time period of our analysis. Together with central and local government, who also achieved below-average returns, these owner segments have paid the necessary performance penalty for the

remaining segments to achieve above-average returns. Of the winning owner segments, private companies exhibited the highest average excess return, followed by mutual funds and foreign investors. The attribution analysis demonstrated how superior or inferior performance can be attributed sector allocation decisions that deviate from that of the market portfolio. That is, we showed that any departure of the owner segments´ returns from the market return, must be due to an active strategy that departures from the passive strategy in terms of industry sector weighting in the aggregate portfolios. Our analysis hence showed that the ability to hold the right securities at the right time was the key to achieve superior returns, and that holding the wrong securities at the wrong time resulted in inferior performance.

Our results suggest that some owner segments have systematic abilities that result in positive excess returns, and that a group of investors pay the added cost for this to be achievable. Given the reasoning of Sharpe (1991), we did not expect our results to comply with the claims of superior performance that motivated our research question. We were thus surprised to see that the GPFN and the aggregate of mutual funds appear to deliver returns that are above-average, and that the government´s stock portfolio performs poorly. The indications of potentially benefitting from an active management strategy challenges the efficient market view of Fama (1970). However, as we do not risk-adjust the returns, we cannot draw inferences about whether the superior returns are a result of higher risk exposure. We suggest that the next research step to be done in the future is an extension of our estimation model, that can provide more accurate results by making fewer assumptions. That is, we suggest that a comprehensive analysis is performed, utilizing both portfolio holdings and transactions, like the one we aimed to perform if we were granted access to the necessary data.

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Appendices

Appendix A – The GICS system

The GICS classification system was introduced by Morgan Stanley Capital International as a grouping of companies into industry sectors. In the later years, this standard has been adopted by many stock exchanges, including OSE. The OSE groups the companies according to the definition of its principal business activity, each company is assigned to a sub-industry, corresponding industry, industry group and sector. All the listed companies must be placed under one of the given categories. Historically, there has been 10 GICS sectors, but the number was amended in 2016 by removing real estate from the financial sector and creating a new sector (MSCI INC, 2018).

Appendix B – Equity indices

An index is a weighted average representing the sample of the total market and a market-capitalization-weighted average of a statistic and specific list of securities. An index should contribute as a benchmark for performance evolution and an indicator between risk and reward that varies over time (Lo, 2016). The indices following indices are the ones we present in our paper, and are described according to Oslo Børs ASA (Oslo Børs ASA, 2017).

The Oslo Børs Benchmark Index (OSEBX)
OSEBX comprises of the most traded shares listed on OSE and is an investible index. This is the index used to measure the return on the Norwegian stock market. The index composition changes semi-annually, with respectively review dates on 1 December and 1 June. The number of shares for each security is fixed in the period between the review dates, with exception of adjustments for corporate actions with priority for existing shareholders. The index is adjusted for dividend payments.

The Oslo Børs Mutual Fund Index (OSEFX)
OSEFX is a capped version of OSEBX. The index has limits for the maximum weight of a security, and for the aggregate weight of large-weighted securities. A single security cannot exceed 10% of the total market value of the index, while the combined weight of securities exceeding 5% must be a maximum of 40%.

The Oslo Børs All-share Index (OSEAX)

OSEAX consists of all shares listed on OSE. The index is adjusted for dividend payments and corporate actions daily. The current outstanding number of shares is applied in the index.

The Oslo Børs Equity Certificate Index (OSEEX)

OSEEX is an index that is categorized within the special indices at OSE and is not based on the GICS system. The index consists of the Norwegian savings banks.

The VINX Benchmark index (VINXB)

VINXB consists of the largest and most traded securities on OSE and the NASDAQ OMX Nordic Exchange, representing the majority of the industries. Only the part of the share capital that is considered available for trading is included in the index, meaning that the weight of the securities is based on the free floated market value. To offer high investability and low transaction costs, the index revises twice a year. The index is therefore intended to be a cost-effective index which an investor could fully replicate.

Industry sector indices

The industry sector indices consist of all shares listed on OSE related to the same sector, industry group and industry GICS-level. The 11 unique industry sectors and their associated indices are listed in Appendix Table 1.

Appendix Table 1 - The table shows the GICS sectors and their associated indices.

GICS sectors	Indices
10 Energy	OSE10GI
15 Materials	OSE15GI
20 Industrials	OSE20GI
25 Consumer Discretionary	OSE25GI
30 Consumer Staples	OSE30GI
35 Health Care	OSE35GI
40 Financials	OSE40GI
45 Information Technology (IT)	OSE45GI
50 Telecommunication Services	OSE50GI
55 Utilities	OSE55GI
60 Real Estate	OSE60GI

Appendix C – Preliminary thesis report

BI Norwegian Business School - campus Oslo

GRA 19502

Master Thesis

Component of continuous assessment: Forprosjekt, Thesis
MSc

Who are the losers in the Norwegian stock market?

Start: 01.01.2018 09.00

Finish: 15.01.2018 12.00

Study Programme: MSc in Business, Major in Finance
Supervisor: Espen Henriksen

Who are the losers in the Norwegian stock market?

The returns of actively managed mutual funds and other large asset managers, such as the managers of the Government Pension Fund Norway ("Folketrygdfondet"), are frequently claimed to be higher than the market average return. We find the sum of these claims of superior, above-average performance to be incredible. Whenever there is a presence of somebody who is better than average, some investor has to be inferior to the average for the average to add up. For the claims of above-average performance to be credible, the below-average performers also have to be identified. In our thesis, we wish to contribute to the research by seeking to identify the losers in the Norwegian stock market.

The Oslo Stock Exchange is a composite of owner sectors that vary in weight. Foreign sectors own the largest share (38,67%), followed by general government (33,36%), private non-financial corporations (11,52%), other financial corporations (6,86%) and households (3,80%) (VPS, 2016). The Government Pension Fund Norway is the owner of approximately 5,2 percent of the market capitalization and 10 percent of The Oslo Børs Benchmark Index (OSEBX) (Folketrygdfondet, 2017). This makes the fund the largest institutional investor on the Oslo Stock Exchange, and hence a considerable actor in the stock market. For the period 1998-2016, the fund´s 2016 annual report displays an average annual gross return on the stock portfolio, of 1,41 percent above the reference index.

Numerous well-known Norwegian fund managers clearly state that the objective of their actively managed funds, is a consistent outperformance of the benchmark (Delphi, 2018; DNB, 2018; Nordea, 2018; Pareto, 2018; Storebrand, 2018). Some of the mutual funds that primarily invest in the Norwegian stock market, are also able to exhibit returns that align with their objectives. Using the Oslo Børs Mutual Fund Index (OSEFX) as benchmark, Delphi Norge achieved an annualized excess return of 2,51 percent in the past 10 years (Delphi, 2018), while the annualized excess return since their startup in 2001, is 2,7 percent for Pareto Aksje Norge C and 3,6 percent for Pareto Aksje Norge I (Pareto, 2018). Pareto, a

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leading provider of financial services (including active fund management), states that active managers generally keep their promises, and hence are likely to show excess returns over time (Strøm, 2017). An analysis conducted by Alfred Berg, a Norwegian investment/fund manager, has shown results that are also supportive of active management. Investigating all Norwegian mutual funds with a minimum history of five years in the period 1996-2017, they claim to have found evidence that the majority of actively managed funds beat the index over time (Stenvaag, 2017).

The arithmetic average of investor returns, is the sum of all returns divided by the number of investors. From this simple definition, it is obvious that not every investor, nor the average investor, can do better than the comprehensive average of the market. If the aggregate of asset managers claim that their returns are higher than average, some of the claims must be incorrect. William F. Sharpe elaborates on this issue and asserts that the returns on the average actively managed dollar will equal the return on the average passively managed dollar before costs, if management styles are defined in sensible ways (Sharpe, 1991). He argues that this assertion is only dependent on basic arithmetic, and hence that it will always hold. Given that the market return is the weighted average of all the security returns in the market, this must equal the weighted average return of all market participants for the arithmetic to be valid. Thus, there is a constraint that investments are a zero sum game where aggregate abnormal return is zero. From this constraint, it is clear that there must, by necessity, be inferior investors present if the market has a presence of exceptional investors who earn superior returns.

Despite this, large institutional asset managers frequently claim that they "beat" the market, whose return is equal to the average of the sum of investors. It is a possibility that these claims are based on an inappropriate use of benchmark, which makes returns appear as superior. Samuelson (1974) exemplifies such inappropriateness with using geometric-mean, indexes, which can be outperformed by merely holding its stocks in its proportions, to bolster manager self-esteem. Though, Sharpe (1991) underscores that it is not impossible for the average institutional active manager to outperform the passive, even after the higher costs of frequent trading and more research. However, for this to be

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achievable, there must exist non-institutional active managers (individual investors) who pay the added costs of the institutional managers via inferior performance.

Our contribution

There seems to be a limited focus in this research area, where most of the attention is given to the managers who claim to deliver returns above the market average. In the literature on the performance of mutual and pension funds, it appears as difficult to separate manager skill from luck, as well as finding evidence of performance persistence. However, it is found evidence that consistent superior ability is displayed by a substantial number of individual investors (Che, Norli, & Priestley, 2009). These findings suggest that there exist talented individuals, who possibly are hired as fund managers. Thus, it can be seen as supportive of the view that some mutual fund managers possess superior abilities. Berk and Green (2004) also demonstrate the possibility for a high level of skill among managers, by showing that the lack of evidence on performance persistence is a result of competition among investors. The authors show that rational, self-interested fund managers respond by increasing their own compensation, as new capital flow in as a result of superior past performance. Similarly, Samuelson (1974) emphasizes that there could exist decision-makers who consistently do better than the average, but that they have no incentive to give away their earned rent. Most of the literature hence seem to agree that talent exists, even though mutual fund investors cannot expect to benefit from their superior performance. The research on individual investors generally find that they pay a performance penalty for active trading (Barber & Odean, 2000; Che et al., 2009), which indicates that there might exist a group of inferiorly performing investors.

If institutional asset managers do deliver superior returns on average, by necessity there is also a segment of managers that underperform on average. The investors in this segment are the ones we will seek to identify. To our knowledge, there is not much prior research that focuses particularly on the losers in the stock market. Our paper will hence be related to the literature on equity investor performance, with a focus on the losers in the stock market. We will limit the scope of our analysis to the Norwegian market.

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Data and research method

We wish to obtain a dataset of the portfolio holdings of the population of investors on the Oslo Stock Exchange. By accessing data on the population rather than a sample from a brokerage firm, we want to avoid making incorrect inferences about the investors in general. That is, we wish to obtain a dataset that is fully representative of the investors trading in the stock market.

Obtaining data that contains information about the performance of equity investors, is crucial for this analysis to be feasible. To begin with, we want to get an overview of the distribution of stockholders, in order to understand the proportions of stocks held by mutual funds, individual investors and other investors. A sensible categorization of the investor segments is necessary to evaluate the historical returns and make inferences about the segments that underperform relative to the index. Given that the data contains stock market portfolio holdings of some interval, e.g. monthly, we will calculate the returns as the percentage gain or loss during the interval. To calculate the average return over time, a geometric mean will be utilized. If r is the rate of return and n is the number of periods, the geometric mean is given by formula:

$$\sqrt[n]{(1 + r_1) * (1 + r_2) * ... * (1 + r_n)} - 1$$

This way of calculating the mean is better suited for tackling continuous data than the standard arithmetic mean, given that the numbers are not independent of each other. It is the geometric means for the various investor segments that will be analyzed, to evaluate the performance of the investor portfolios. Segment that have lower return than the market during the span of the dataset, can hence be classified as a stock market losers. The market average is the combined average of all investor segments, and is what will be used as benchmark. From the results, we will be able to tell if the trading activity of some segments creates an opportunity for the average institutional asset manager to deliver superior returns. Thus, we should be able to make inferences about whether the claims of superior returns among institutional asset managers can be true, based on the results of our analysis. We plan to utilize software for descriptive statistics to perform the actual data analysis, in order to describe and understand the features of the data set.

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