SCHOOL OF ECONOMICS AND MANAGEMENT

Equity Mutual Fund Flows and Benchmark Portfolios in Sweden

Abstract:
The purpose of our study is to investigate the effect of net flows to mutual funds by isolating the effects of active managed funds and index linked funds on benchmark portfolio returns. We consider factors that cause demand driven price impacts on stocks. We use data from the Stockholm stock exchange and focus on Swedish registered mutual funds, which invest primarily in Sweden. Mutual fund data is obtained from Morningstar. The theoretical basis underpinning our study is the efficient market hypothesis, the price pressure hypothesis and the imperfect substitution hypothesis. Our findings are in line with previous results confirming a positive effect for unexpected net flows to on portfolio returns. However, this is only present for net flows to actively managed funds. We recommend further research of the whole mutual funds market, isolating the effects of different segments.

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1. Introduction

In the late 20th century mutual funds became an important vehicle used by households in developed financial markets such as the United States to invest and save. In the 1990's this extended to Sweden, where the general public's interest in mutual funds increased substantially in a few years. For example, Dahlquist, Magnus and Engstrom (2000) report that in 1997 mutual funds holdings were worth SEK 456 billion almost double the size they were two years prior in 1995 when holdings were worth SEK 242 billion. On the other hand, the growth of bank deposits in the same period saw a smaller increase from SEK 386 billion to SEK 392 billion. The growth trend of mutual funds holdings between 1995 – 1997 has continued in the last 20 years to where Swedish investors, both institutional and private, now invest approximately SEK 4000 billion through a choice of over 2500 mutual funds[1]. The majority of the Swedish population have exposure in the stock market through mutual funds either directly through private investments or mandatory pension contributions. In 2016, the total value of the Swedish mutual funds industry totalled SEK 2427 billion.

Analysing the many characteristics and the performance of mutual funds has become of great interest among academic researchers with the aim of equipping investors with vital insight to evaluate their portfolios. In turn, this can contribute to better decision making when it comes to investing. One of the areas many studies have researched, focuses on the effect net flows to mutual funds have on stock market returns. The majority of research in this area has mainly been conducted using data from the United States. The research is divided along the macro level (see Zheng (1999)) studying the impact aggregate flows have

[1] These findings are reported by the Swedish Investment Fund Association which came into existence in 1979. In 1979 there were a total of 17 mutual funds managing SEK 1 Billion.

on returns and, at the micro level (see Chevalier and Ellison (1997), and Sirri and Tufano (1998)), studying individual fund flows as they compete against each other for investors' cash. In the United States research by Warther (1995) finds that aggregate security returns are highly correlated with unexpected cash flows, but find the effect of expected flows to statistically insignificant. In Sweden at an aggregate level, Anderson (2002) finds evidence for a strong positive correlation between unexpected flows to mutual funds and returns on the stock market.

Kvamvold (2017) examines the effect of changes in the demand for stocks in the Oslo stock exchange that due to changes in net flows to Norwegian mutual funds which primarily invest in Norway. We build our paper on the method used by Kvamvold (2017) to investigate the extent which net flows to Swedish equity mutual exert demand driven price pressure on the Stockholm stock Exchange. We focus on stocks which are part of the major indices the mutual funds use as benchmark portfolios and isolate the effect of index linked and active managed mutual funds. Sweden is a good case to study, as relative to international standards, the Swedish stock Exchange is relatively small and also has a high level of mutual fund investment. This makes it appropriate to study price pressure effects. The similarities that exist between Sweden and Norway allow for a comparison between our study and the results of the study carried out by Kvamvold (2017). On a practical level, this study is important because it seeks to find out how changes in net flows will impact stock prices. This can be used to inform policy action taken by regulatory bodies during times of uncertainty in the market place, as a dramatic increase in redemptions (i.e. investors taking their money out of mutual funds) could result in further downward pressure stoking panic in the stock market. In a study of the United States mutual fund boom, Hale (1994) and

Kaufman (1994) show that the consequences can be severe as they lead to a downward spiral in asset prices.

A key observation raised in the literature is whether mutual funds experience high inflows during periods of high returns in the market and outflows when experiencing low returns. This poses the question, is there a positive feedback loop at work here where changes in net flows are due to changes in returns or are changes in returns due to changes in net flows. Under setting described above, it makes sense for an investor to buy funds that are performing well and sell those performing poorly. Alternatively, the contrarian view says that investors should sell assets once they have gained in value and realise their profits, thus high returns would cause changes in net flows. We address this issue regarding the direction of causality in our study by using lagged values of net flows to mutual funds, so that causation of returns is due to net flows rather than the reverse.

The basis of our study is informed by the price pressures on the stock market that happens as a result of trading action by equity mutual funds. This varies in nature and is of different magnitudes based on whether it is due to an index linked fund rebalancing their portfolio to reflect their benchmark index, or trading by and actively managed fund. Therefore, in addition to the price pressure hypothesis, there are other relevant theories which explain how changes in demand for stocks impact underlying stock values and as a result market returns. In our study we focus on the efficient market hypothesis (EMH) and the imperfect substitution hypothesis by Harris and Gurel (1986).

The contribution our study makes to the literature is twofold. First, it addresses the gap in the literature on the impact net flows to index linked and actively managed mutual funds

respectively have on portfolio returns in Sweden. Similar to the United States, there is a great number of studies in Sweden which focus on mutual funds' performance and portfolio returns at an aggregate level. We detail the history and fundamental differences between index linked and actively managed mutual funds. As a result, they both have a unique appeal to investors with different preferences and differing investing objectives. These underlying differences will have an impact of different magnitudes on net flows and hence portfolio returns. Which is why we isolate net flows to index linked and actively managed mutual funds in order to test the effects they both have on portfolio returns individually. Second, we compare the results of our study to findings by Kvamvold (2017) on the Norwegian market. We use a similar methodology as that used in the study by Kvamvold (2017). There are a number of similarities between Sweden and Norway that make this comparison possible. The growth of mutual funds in the two countries followed a similar growth trend. Additionally, a majority of the public investing in mutual funds individually and, as part of mandatory pension contributions which are invested in mutual funds. This contributes to the high concentration of mutual funds investment in the countries respective stock markets as in each other's stock markets. Although this is the case we, however, do not investigate inter country effects.

Our study is focused on Swedish registered mutual funds, investing primarily in Sweden. We are mindful of the impact that this categorisation has on our study as it only accounts for 25 per cent of mutual funds activity in Sweden[2] in 2018. This means a majority of mutual funds operating in Sweden, although registered elsewhere across the world, are not included. A notable majority are based in other Nordic countries, or registered in

[2] Statistics obtained from Swedish Investment Fund Association, 2018 Annual Report

Luxembourg for tax efficient reasons. In Sweden, there also exist challenges with setting up a fund and operating competitively due to a number of barriers of entry. Khorana, Servaes and Tufano (2004) report incidences in the past where the costs of operating in a market have resulted in mutual funds closing due to not being competitive enough. Our conclusion highlights the inclusion of the whole mutual funds market in Sweden as an area we recommend further studies. The other 75 per cent of the market not covered in our study could contain useful insights. However, the sample size we have constructed covering Swedish registered funds is sufficient scope to critically assess the impact of net flows on portfolio returns.

The remainder of this paper is organised as follows: Section two details a brief history of the advent of mutual funds and historical development of the Swedish mutual fund industry. This is followed by an expansion of the approach we use to build benchmark portfolios. Section three expands the theoretical background relating to how changes in demand for stocks impact their returns. Section four gives an overview of the findings in existing literature. Section five describes the data and its preparation. Section six provides a critical review of our results. Section seven and eight conclude our paper with suggestions of how further research can be developed.

2. Mutual Funds

2.1 History of Mutual Funds

The forerunner to mutual funds first came into existence in the year 1822, when an order by King William I of the Netherlands created Societe Generale des Pays-Bas to promote his kingdom's financial interests in Brussels. At first, his intentions were for Societe Generale to provide simple banking services. However, over time Societe Generale gradually stopped providing all banking related services and started to concentrate on simplifying small investments on behalf of the kingdom's loans abroad. There is a consensus among historians that this was the first investment company in the world. By carrying out investment activities, primarily investing in securities, Societe Generale became what can be considered the first mutual fund. It pooled funds from individuals and put them to work generating returns. Prior to the formation of Societe Generale, there were small scale investment activities which began in the year 1774 in Amsterdam but with limited success. The failure of the small scale investments was witnessed across the whole of continental Europe wherever it was tried. The modern version and rise in popularity of investment companies as we know them today started in the United Kingdom at the end of the 19th century. These companies were originally organized as investment trusts and were the precursor of closed-ended funds in the United States when securities were first issued to the public.

At first, investment trusts in the United Kingdom did not have their own employees but rather their management, as well as financing were outsourced and performed by a third party company. The objective of these companies was to allow investors to come together and spread their investments across a number of stocks in order to reduce the risks they

faced. In addition to reducing risks, the company reduced the financial cost of managing each individual trust. The reduction in costs was as a result of placing the management and control of many trusts under one fiscal agent. In doing this, many trusts which were managed by the same entity were seen as one. At the same time, their financial and management costs were covered as one, which made it easier to rationalize and cut costs if necessary. Soon the idea of organizing investments as trusts became attractive across the colonies of the United Kingdom. The literature[3] documents great difficulty faced by the founders of investment trusts in spreading them across the colony. Incidents of corruption and misconduct resulting in the misuse of funds invested were widely present. This did not stop investment trusts gaining popularity, and the fiscal agents who managed them started to court investors with limited exposure to investments at home. The promise of greater portfolio diversification and higher returns as a key selling point led to an increase in their popularity. Investment trusts operations became more sophisticated which led to them no longer being as transparent as when they started. This led to an increase in debt as management borrowed money using their investments as security. The increase in investment trusts in the market place, and greater risk undertaken by management at the time led to a speculation bubble in the 1880. This contributed to what was a major financial crisis in 1890. For Investment funds in existence at the time, this became a period of reflection and resulted in more conservative policies being put in place.

In the United States, investment companies came to prominence during the bull market of the 1920s. Similar to investment trusts in the United Kingdom, the investment funds were

[3] The history of the rise of investment companies is documented in The Rise of Mutual Funds: An Insiders's View by Mathew P. Fink.

closed-end and collected money from investors before proceeding to list shares and trade on the stock exchange. The funds either traded at premiums or discount. The first time mutual funds as we now know them came into existence in United States in 1924 in Boston. Closed ended funds were relatively more popular than mutual funds in the time before the financial crisis of 1929. The financial crisis of 1929 was disastrous for the financial system in the United States. For the average Americans who had invested in closed ended funds and mutual funds, the adverse repercussions were massive with the majority losing all their investments. The 1929 financial crash, although greater in magnitude than the 1890 financial crash in the United Kingdom, led to calls for greater regulation of all investment companies by the government.

The year 1924 and the events which followed the financial crisis in 1929 were critical for the expansion of investment companies which took place. A new type of investment company known as an open ended fund was created. These open ended funds had the same characteristics as the mutual funds we know today. The funds were created with the intention of regaining shareholder confidence. Shareholders now had the ability to redeem their shares at a price equal to the portfolio's current price. On the other hand, new investors could buy into the portfolio at the current price as well. The first mutual fund in this form, was the Wellington Fund and it was established in 1928. It mainly invested in stocks and bonds. The new open ended funds, maintained the important characteristics of closed-end funds, such as portfolio diversification and professional management. At the same time, they had an advantage over closed ended funds by getting rid of the shortcomings of selling shares at a discount and allowed additional borrowing, which resulted in the funds taking a hold of market share quickly. In the United States, the assets

held by open ended funds increased to USD 93 million in the period from 1927 to 1929. In the same time period, there was a decrease of 3 per cent on aggregate levels holdings of close ended fund assets. The small decrease in deposits in closed ended over this period was due to Investors still being attracted to the higher returns, which was as a result of them using debt to leverage their operations. Additionally, this complemented the good historical performance of closed ended funds. A good environment that maintain the status quo at the time.

2.2 Swedish mutual funds market: A European context

In Sweden, there exists a unique link between the mutual fund industry and the pension system as employees must choose which funds to invest some of their mandatory pension contributions. Prior to this being mandated by law, the Ahlen family, proprietors of Ahlen & Holm and Tempo department store chain created Aktietjanst Foundation in 1958 with the purpose of encouraging investment in equities among their employees. A new fund, named Koncentra, was created to handle employees' pension contribution during their working life. The new fund was divided into three, with one of the three arms being an open ended fund which had the characteristics of modern investment funds similar to those seen in the United States. Although the funds were geared towards investing for retirement, the open ended fund also encouraged participation in investing from the employees by accepting deposits and redemptions on a rolling basis.

At the inception of the Swedish Investment Fund Association in 1979 Sweden had only 17 mutual funds registered with a combined asset base of SEK 1 billion. The general public did

not have much interest in investing through mutual funds prior to the 1980s. It is argued that the turning point came shortly after the early 1980s by the introduction of Allemansfonder in the market, which caused steady growth in the mid 1990s. By outperforming the market, Allemansfonder caught the attention of the general public. On possible reason to explain its performance was its tax exemption status. This was later changed in 1990, but at 20 per cent was still lower than capital gains tax of 30 per cent. After the tax free funding period came to an end, the capitalization of Allemanfonder funds decreased and investments from the general public in those funds reduced substantially. Finally, in 1997 the tax subsidy was lifted and since then all funds registered in Sweden are subject to the same rules.

There has been a shift in how Swedish registered funds invest, with holdings both in Sweden as well as all over the world. On the other hand, the attractive returns in Sweden over the past few years have led to international mutual funds investing in Sweden. We, however, choose to limit the scope of our study to Swedish registered fund which invest in Sweden. The mutual funds market in Sweden is more open with an increase in companies that offer investment management services. In addition to the increase in companies in the market, the drive to increase pension savings explains the growth that has been witnessed. The concentration of firms investing has also increased and is no longer concentrated among large banks. In 1999, 85 per cent of net fund asset were under the management of just four large banks. This reduced to 59 per cent share in 2014. There has also been an increase in mutual funds that invests in line with benchmark indices, as opposed to actively managed funds. Over 85 per cent of the net total of funds invested between the years 2010 to 2015

was invested in index linked funds[4]. The fees funds charge investors in equity mutual funds in Sweden are on average lower that those faced by their counterparts in Europe. In Sweden fees average 1.37 per cent compared to the European average of 1.79 per cent. This can explain the disparity between the higher withdrawals in Sweden compared to other markets in Europe.

In their annual report about the state of mutual funds in Europe, the European Fund and Asset Management Association (EFAMA) reports that the total value of funds invested in Europe was EUR 11,666 billion at the end of 2017. Across the continent there is an increase in individuals investing through mutual funds but on average Sweden has a much higher concertation at over 50 per cent of the population invested in mutual funds. A similar figure is reported in Norway. The picture follows a similar trend with the number of mutual funds deposits in Europe between 2008- 2017 increasing by over 150 per cent. The literature identifies three main investor groups which hold a majority of the total funds invested. The groups identified manage approximately EUR 10,518 billion of investment funds, which is more than 90 per cent of the total funds invested at the end of 2017. The three investment groups are insurance companies and pension funds (ICPFs), households and other financial intermediaries (OFIs).

In their report EFAMA, report that ICPFs held the highest amount of investment funds in 2017, with an increase in the combined share of total funds invested of 9.2 per cent relative to 2008. This is in line with the role that pensions played in increasing the popularity of

[4] This statistic is as reported by the Swedish Investment Fund Association.

mutual funds after regulation made pension saving mandatory in Sweden. On the other hand, households registered a share decrease in the pool of investment funds to the amount of 7.3 percent between the same period. A picture that is at odds with the increase in households investing in mutual funds in Sweden. In Europe, we however see a notable slowdown in the decrease which has resulted in the household share remaining stable since 2012. Other financial intermediaries saw a rise in their investment fund holdings with an increase in net inflows each year over the last 10 years since the financial crisis, with the only exception being 2008. Of significant note in the 2018 annual report by EFAMA, there was significant trade reported in 2017, when net inflows to registered investment funds in Europe were at a record high to the amount of EUR 654 billion. In the decade (2008 – 2017), insurance companies and pension funds became the biggest investors in mutual funds. The result is a contribution of EUR 1,758 billion to total funds invested. The registered contribution of other financial intermediaries and households was EUR 937 billion and EUR 308 billion respectively.

2.3 Active and Passive Mutual Funds

In our study, we focus on the effects of the two types of mutual funds. They are divided along index linked funds and active managed funds. In the literature, Fama (1972), Sharpe (1966) and French (2008) contribute to the discussion regarding which of the two types of mutual funds generate better returns for investors. This is because active managed fund and index linked funds have different characteristics, notably the difference in fees associated with investing through either of the two types. This had led to a great deal of discussion among investors who question whether the premium attached to investing with

active managers does result in significantly better results. One reason for this is due to investors not wanting average returns and, generally, aiming for their investments to outperform the market. A large number of investors who invest in mutual funds are not adequately informed and face a difficult decision in gauging the skill level of managers who manage active funds. This is where investor's sentiment becomes an important factor while investing. To this effect there is extensive literature which uses net flows to mutual funds as proxy for the investor sentiment. We extend our study to investigate whether this is also the case among Swedish investors.

Investors interested in active managed funds are usually after a hands on approach, which requires a portfolio manager to analyse the market and pick winner stocks to create a portfolio which will outperform the market, while also taking into account the risks preferences of the investors. Investors who invest in this way aim to beat market returns by taking full advantage of short-term price fluctuations. They also believe fund managers possess a superior skill in picking winner stocks. For these reasons, active fund manager will charge higher fees for the fundamental analysis they carry out. Fund managers will try to predict stock price movements and have free choice on when they trade.

On the other hand, passive investing is viewed by investors to be a mid to long term strategy of investing. Investors are primarily not interested in short price fluctuations, but rather on holding a benchmark portfolio index to generate returns. Therefore, investors invest in an index linked fund which tracks a specific index. Its holdings are updated regularly to make sure the weights of the constituent stocks in the index are reflected in

their portfolio. Passive investors believe that market returns over time will be positive, and that there is a significant challenge in outperforming the market by investing in active managed funds. It is because of this that they have a preference in investing in index linked mutual funds.

In the literature, there is a mixed conclusion regarding which of the two types of mutual funds investors should choose. In their research paper, Grinblatt and Titman (1989) find the difference in performance between active and indexed linked mutual funds can be put down to the skill level of fund managers to generate abnormal returns. The study finds that the persistence of abnormal returns cannot be explained by a number of the other market factors they investigate. These include the size of the fund, past returns of the fund, dividend yield, CAPM beta, skewness and interest rate sensitivity. To support the notion of fund managers having superior skills in picking funds, Kacperczyk and Seru (2007) find that fund managers are not as sensitive to changes in available public information to all market participants. This is evidence that there are fund managers who indeed have superior skill. On the other hand, the notion of fund managers with a superior skill level is denounced by Carhart (1997,) who concludes that the performance of a fund cannot be attributed to any superior skill that fund managers possess. However, in order to explain the abnormal returns in his study, differences in transactional costs and expenses explain the differences in returns.

There are a number of advantages and disadvantages for both actively managed and index linked mutual funds. Indexed linked funds in general have lower fees than actively managed

funds. In the literature, this has been shown at times to contribute to actively managed funds underperforming relative to index linked funds over the long run. One caveat to this, however, is that not all actively managed funds are costly. Although the level of active management differs across different funds, the difference in fees across actively managed funds does not differ greatly. For index linked funds there is a greater level of transparency given, the benchmark index is known to investors. A buy-and-hold strategy will also lead to greater tax efficiency, as there are not big capital gains tax for regularly repeated trades. Trading levels in index linked funds are lower than in actively managed funds. The use of one specific index as a benchmark can be limiting to index linked funds. The choice of investment stocks is limited and can lead to a small variance, no matter the level of changes the market is undergoing. By tracking the market, the returns of index linked funds will never be as big as some of the returns which active managers may achieve. This is however, the outcome when holding portfolios with lower risk profiles.

2.4 Benchmark portfolios

In our study we construct benchmark indices using stocks from the Stockholm stock exchange in order to analyse the impact that net flows have on given benchmarks. Benchmark portfolios are a tool used to capture the performance of a section of the stock market over a period time. Our sample consists stocks from January 2009 to December 2018. We investigate the impact net flows to mutual funds have on the returns of benchmark portfolios. The mutual fund's performance over the sample period will vary due to the fund's composition, the net assets under management, and management decisions on how the fund should be invested. In order to get insight into changes in the stock

market, we use three broad indices to capture developments in the market. The indices that we use are as follows; first we use the OMX Stockholm 30 (OMX30), which is a value weighted index of the 30 largest stocks in the market with good liquidity, second, we use the OMX Stockholm Mid Cap (OMXSMCPI), and finally we construct a market index using the remaining stocks in the market by controlling for the stocks which are already constituent in the first two indices.

3. Theoretical background

In this section we detail the theoretical hypothesis discussed in the literature regarding the effect that changes in demand for stock have on returns. The three hypotheses we focus on are as follows:

1. Efficient market hypothesis
2. Price pressure hypothesis
3. Imperfect substitution hypothesis

3.1 Efficient market hypothesis

In their paper, Fama and Malkiel (1970) introduced the Efficient Market Hypothesis (EMH) which states that at any given time, stock prices fully reflect all available information. Therefore, any changes in stock prices that is unanticipated is due to changes in the information set of investors. According to this hypothesis, the efficiency form determines the information set each investor has and for this reason, some investors are able to generate abnormal returns, whereas others are not. The introduction of new information to the market place will result in price changes, which will remain unchanged until the introduction of new information. Applying this to the mutual funds industry, we can say that if all investors have the same information, the net flows to mutual funds will move in the same direction as the changes in the stock prices, i.e. if stock prices in the Stockholm stock exchange are increasing (decreasing), the net flows to mutual funds in Sweden will increase (decrease). This positive correlation comes about as the result of new information entering the market place and not due to demand driven price impacts. Research by Edelen and Warner (2001) confirms that the existence of a positive correlation between portfolio

returns and mutual funds flows is due to new information entering the market, also known as positive feedback trading.

In another paper, Fama (1960) states that a frictionless market to be one where there are no transaction costs in trading and all information is available to all market participants. In addition, all investors are in agreement on the implications of the current information on the current price and distributions of future prices of each security. These are some of the properties of perfectly competitive markets. In such a market, the current price of a security fully reflects all available information. The paper goes one step further and categorises three different forms of efficient market hypothesis regarding stock prices: The first, weak-form efficiency factors in all historical prices and returns information, the second, semi-strong-form efficiency factors in all publicly available information in addition to the information contained in the weak form efficiency and third, strong-form efficiency which includes all private insider information in addition all the information in weak and semi-strong from efficiency. When the market is under strong from efficiency it is impossible for investors to generate abnormal returns from their investment activities.

Since the seminal research paper by Fama and Malkiel (1970) on the efficient market hypothesis, other studies have shown that, efficiency market hypothesis by itself is not well defined and empirically testable. In order for efficient market hypothesis test to be carried out additional structures have to be put in place e.g. the preferences of investors and information set structures. By testing for EMH and the additional hypothesis as well, a rejection of the joint hypothesis does not tell which aspect of the joint hypothesis is inconsistent with the data. The challenge in determining whether stock prices are too

volatile because the markets are not efficient, or due to risk aversion among investors lead to what is known as the joint hypothesis problem. Campbell, Lo and MacKinlay (1997) concluded new statistical tests are required in order to distinguish among the joint hypothesis being tested. They however, believe that these tests will in their own right require auxiliary hypothesis which will only lead to more questions about their validity.

3.2 Price pressure hypothesis

In the market place there are times when demand and supply shocks cause temporary changes in stock prices without new information entering the market place. This can be explained by the price pressure hypothesis. For example, the trading activities of large institutional investors such as pension funds and mutual funds will result in prices deviating from their fundamental value in the short term. In the literature, the price pressure hypothesis is discussed by Schleifer (1986), Harris and Gurel (1986) and Pruitt and Wei (1989). In their research they explore alternatives to the efficient market hypothesis. In the case of Swedish mutual funds market and its effects on returns, research is carried out by Anderson (2002). One of the pertinent questions these papers seek to answer is how to differentiate between trading in the market that is due to price pressures and which is due to new information entering the market place. The changes in stock prices in the short term are necessary, so that current holders of securities have an incentive to sell. Under neoclassical capital market theory, we know demand for securities is perfectly elastic. Therefore, the market absorbs the demand and supply shocks, with no changes in stock prices as the shocks do not convey new information. The inflated price as a result of the increase in trading volumes is temporary in the short term, and is expected to change back to the securities fundamental value (Lou (2012)). In the short term, it is possible to predict

positive returns in the short term and negative returns in the long run due to trading caused by expected flows to mutual funds.

3.3 Imperfect substitution hypothesis

Securities that are imperfect substitutes for each other will undergo permanent price changes in the face of demand and supply shocks, which do not bring new information to the market place. This change in prices caused by changes in demand can be explained by imperfect substitution hypothesis. In the literature, the imperfect substitution hypothesis is documented by Miller and Scholes (1972), Kraus and Stoll (1972), Hess and Frost (1982) and Kaul, Mehrotra and Morck (2000). The habitat view of investing presented by Barberis, Scheilfer and Wurgler (2005) is similar to the imperfect substitution hypothesis in that it assumes securities are not perfect substitutes. It observes that a majority of investors will hold a portfolio that is a subsample of all securities in the market place. The literature also discusses an index premium which is present when stocks are first added to an index. The addition of a stock to an index results in the stock co-moving with the other stocks in the index. There is evidence of this phenomenon documented in the S&P 500 index by Barberis, Scheilfer and Wurgler (2005), Goetzmann and Massa (2003), Durnev, Morck and Young (2001) and in the Nikkei 225 Index by Greenwood (2008). A change by investors in the stocks they are holding in their portfolios will result in a change by a common factor in returns for all stocks in the portfolio. The portfolio is an example of a habitat. In addition to this, the benchmark portfolios we construct in this study are examples of habitats.

4. Literature Review

This section discusses the extensive literature that exists analyzing the mutual funds industry, particularly, the effect that a number of different characteristics of mutual funds have on stock market returns. This is an area that is of great interest to investors. The findings of the research are important to many investors as they change the allocations of the portfolio across different classes of securities based on them. In our study, we are interested in the impact that net flows to mutual funds have on benchmark returns in Sweden. One of the first papers to study this relationship is carried out by Warther (1995), who investigates the relationship between aggregate net flows to mutual funds and stock returns in the United States. Warther (1995) finds there is a highly positive correlation between unexpected net flows and stock returns. On the other hand, there is a negative correlation between expected net flows and stock returns. Investigating the impact net flows to mutual funds in Sweden at aggregate level is done by Dahlquist, Engstrom and Soderlind (2000) and Anderson (2002).

Research by Warther (1995) in the United States is the foundation for the study by Dahlquist, Engstrom and Soderlind (2000) in Sweden, which finds the performance of mutual funds varies across time and is based on the size of the fund. In their research they consider a relatively large number of characteristics which includes net flows, fund size, turnover and proxies for expenses but to name a few. The paper is particularly notable because of the many factors it uses in its models. On the other hand, focusing on Norway, Kvamvold (2017) only considers the impact of net flows without including any other factors. Results from prior research on the performance of mutual funds contain results which have

a mixed conclusion for different categories of funds. Dahlquist, Engstrom and Soderlind (2000) find results which support the notion that actively managed funds generate higher returns, whereas index linked funds perform worse. The findings confirm the conclusions made by Warther (1995) in the United States. There results in Sweden are later confirmed by Anderson (2002). There is a positive relationship between previous performances and net flows, as well as persistence in performance for money market funds.

There are extensive findings in previous literature concerning risk-adjusted mutual funds returns and the performance of the stock market. The direction of causation studied is from stock returns and the effect on mutual fund returns. According to the research by Agnesens (2013), the following factors have a statistically significant impact (size of impact in brackets) on mutual fund performance: lagged fund size (negative effect), lagged mutual fund performance (positive effect) and lagged family size (positive). The research by Agnesens (2013) is arguably similar to the approach used by Dahlquist, Engstrom and Soderlind (2000), and applied in the United States similar to Warther (1995). It shows that the decomposition of the performance of mutual funds into market alphas and market factor exposures contributes to the statistically significance of the results.

Using monthly data, Anderson (2002) and Qureshi, Ismail and Gee (2017) in their research find no evidence of positive feedback trading. However, they find that market volatility increases as net flows to equity mutual funds increase. This effect is expected as investor activity impacting deposits and withdrawals means that fund managers trade to utilise new funds or create funds for redemptions. The impact of this is a change in the level of assets

each mutual fund holds. In the paper by Qureshi, Ismail and Gee (2017) they however find this to induce positive feedback trading among investors. Qureshi, Ismail and Gee (2017) investigate market volatility in emerging markets in Asia and concluded that institutional investors are attracted to riskier and volatile securities due to their desire to achieve above average market returns. The result is an impact on equity mutual funds which drives positive feedback trading in stocks making prices to change more quickly. In regards to price reversals, they find a weak and insignificant relationship. This finding is similar to the conclusion by Anderson (2002) in Sweden where the effect of unexpected net flows has on aggregate returns does not stem from price pressures.

Jank (2012) explores the relationship between mutual fund flows and the real economy. In his paper, Jank (2012) confirms the findings by Anderson (2002) and concludes the positive co-movement of net flows into equity funds and the stock market returns is explained by a common response to macroeconomic news. The basis for this assertion is that mutual fund flows are due to the forward looking nature of investors. In times of poor economic performance investors will move their money in search of higher returns, which means investing in riskier fund categories. While Jank (2012) states that stock market returns are explained by a response to macroeconomic news, Kvamvold (2017) finds that the information set of investors does not explain the similar findings in the Norewegian market. Kvamvold (2017) concludes that the main factor that causes changes in stock prices is the change in demand. This is uniform across net flows to every category of mutual funds.

In the past research papers focused on investigating the relationship between mutual fund flows and underlying asset returns. In recent years' focus has shifted with some researchers now investigating the relationship between Exchange Traded Funds (ETFs) and the impact they have on market returns. This is due to the growth in popularity of ETFs. A good example is the study by Staer and Sottile (2014) using U.S. fund level data, modified to take account of a flow reporting bias. The study focuses on finding whether there is evidence of a price impact across different sub samples of ETFs and across different time periods. There is evidence of price pressure reversal as the horizon being investigated increase. The research by Staer and Sottile (2014) concludes that although there are differences in ETF flows and mutual funds, they both contain information which is useful in predicting market returns. The major contribution this research makes is that the time- horizon being observed is an important factor when looking into the effect of net flows on market returns and mutual funds' performance.

5. Data

5.1 Stock Market Data

In order to investigate the impact mutual funds net flows, have on benchmark portfolio returns in Sweden we obtain data from f main sources: Morningstar, Bloomberg, Swedish House of Finance and Sverige Riksbank. First, using the Swedish House of Finance database we obtain stock prices information for all listed stocks on the Stockholm stock exchange[5]. Specifically, obtaining the last traded daily price and dividend payments for all stock listed from January, 2009 through to December 2017. The price had been adjusted for corporate action to make the time series comparable over time. The sample contains 2202 trading days. Throughout the period there are stocks that are listed or delisted which results in the stocks not having trading data for the whole period. We choose to include a stock in our final sample if it has traded for more than half the trading days in the sample. The final sample contains 344 stocks which are used to construct benchmark portfolios.

The stock prices information is used to calculate daily logarithmic returns for all individual stocks. The stocks are allocated to the respective indices which they belong using information obtained from NASDAQ Inc. about the make up the OMX Stockholm 30 (OMX30) and OMX Stockholm Mid Cap (OMXSMCPI) during our sample period. Therefore, we create three sets of returns series which are as follows:

1. Index OMX30 return series (Portfolio A).

[5] Swedish House of Finance database was accessed on 27/04/2019

2. Index OMXSMCPI[6] return series (Portfolio B), excluding the stocks which are contained in the OMX30 index.
3. Return series for the remainder of the stocks in the whole market (Portfolio C), made up of all stocks in our sample excluding stocks in both OMX30 and OMXSMCPI indices.

We adopt the same approach as Kvamvold (2017) in constructing the benchmark portfolios used in our study. This approach is also similar to that used by NASDAQ[7] to construct the actual OMX index used in market trading. Therefore, the indices we construct will have similarities to the actual market indices with the differences explained by the degree of accuracy we have used. We construct valued weighted portfolios using the individual stock returns which are constituent in the three indices above. In each month we assume 22 trading days and the sum weighted log-returns on portfolio A, B and C for the last 22 trading days to create monthly observations. The portfolio returns are denoted $R_{A,t}$, $R_{B,t}$ and $R_{C,t}$.

The OMX Stockholm 30 is the leading share index in the Stockholm stock Exchange. It has always consisted of 30 of the most traded stocks. The small number of constituent stocks is to make sure that all underlying stocks have good liquidity. Because of this OMX 30 is widely used as an underlying asset in derivative products. The composition of the index is revised semi-annually to reflect trading volumes in the past six months. The number of stocks in the OMX Stockholm Mid Cap varies between 100 and 138.

[6] In building OMXSMCPI index we exclude the stocks which are contained in the OMX30 Index

[7] NASDAQ Inc. and its affiliates, NASDAQ STOCKHOLM AB own and calculate the stock index OMX Stockholm 30 to be used in trading and clearing contracts related to the index.

5.2 Mutual Funds Data

We focus on Swedish registered mutual funds with Sweden as primary investment region. This definition is consistent with that used by the Swedish Investment Fund Association (Fondbolagens förening) and Morningstar to categorise funds according to their investment style, and not purely their stated investment objectives. For our study this means Swedish registered funds with at least 75 per cent of total assets invested in Swedish equities. At an aggregate level (total net flows for all mutual funds) the definition above is used by the Swedish Investment Fund Association to calculate and publish aggregate monthly net flows data, which has been used to study unexpected flows to equity mutual funds and stock returns on the Swedish stock market by (Anderson, 2002).

According to the above criteria, there are 130 mutual funds in our sample period. We obtain monthly observations for Net Assets Values (NAVs) for all individual funds from Morningstar[8]. The NAVs accounts for the fund's total asset base net of fees and expense. They are reported in euros (EUR) millions which we convert to Swedish Kronor (SEK) millions. We drop funds from our sample that report NAVs on a quarterly basis, as well as funds that are not active at the start of our sample period. We remain with 76 mutual funds in our sample, with 8 considered to be index linked and 68 are active managed by fund managers. We categorise all fund with "index" in their name as index linked and all the others to be active mutual funds. Additionally, we collect all mutual funds monthly returns.

Determining the degree to which a fund is under active management is near impossible. Some funds which claim to have active management often choose to invest closely

[8] Morningstar Direct database was accessed on 26/04/2019

according to either the OMX30 or OMXSMCPI indices which is similar to an index linked fund that uses the indices as their benchmark.

Using a similar approach to that used by Dahlquist, Magnus and Engstrom (2000) we estimate monthly mutual funds net flows using NAVs and the monthly returns. The idea here is to find the change in net assets not explained by the performance of the fund. Therefore, we determine the net flow of new money into fund i over the period $t-1$ to t, $F_{i,t}$ by using the following formula:

$$F_{i,t} = NAV_{i,t} - NAV_{i,t-1}(1 - R_{i,t-1})$$

where NAV_{it} denotes net asset value of fund i at time t and $R_{i,t}$ is the funds monthly return between time $t-1$ and t. The approximation of net flows assumes any increase or decrease in NAVs that is not explained by capital gains return in the same period is due to flows attributed to managing the fund. These flows include signings, redemptions, administrative costs, commissions and loading fees to name a few. The individual mutual funds net flows are summed to create F_{active} and F_{index} which are aggregate net flows to index linked and actively managed funds respectively.

The net flow levels to index linked and actively managed equity mutual funds in Sweden do not change much over the sample period. Monthly net flows to index linked funds are on average 9.35 per cent and 90.65 per cent to actively managed funds. Figure 1 and 2 show the respective net flows to F_{active} and F_{index} in our sample period which are normalised to January 2009, which is the beginning of our sample. It is evident that growth of net flows to index linked funds increase at a faster rate. Our use of net flows as an explanatory variable

for changes in stock returns in consistent with the literature on this subject. The figures show that the data is stationary across the sample period with an increase in volatility after the year 2015 for both active and index linked funds. Over the sample period, the monetary value of the highest net outflow from index linked funds in a given month is SEK 11.6 billion and SEK 53.5 billion for active managed funds. On the other end of the scale, the highest net inflow to index linked funds and active managed funds is SEK 7.6 billion and SEK 45 billion respectively.

Figure 1: Net flows to actively managed funds

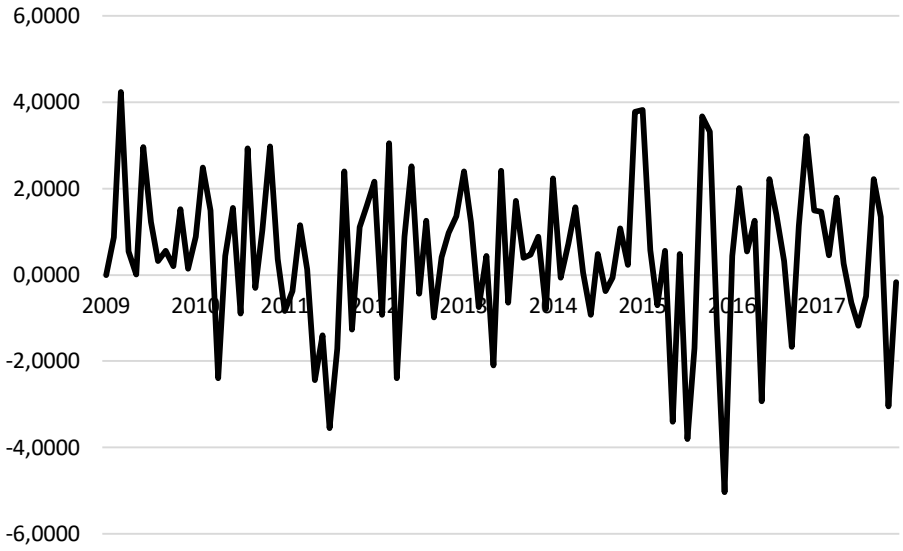

Figure 1: The value of net flows to actively managed mutual funds in Sweden. The values are in SEK billions and normalized to January 2007 values. The data used to calculate the net flows was obtained from Morningstar.

The stock market data and mutual funds data are denoted in SEK and EUR currencies respectively. We choose to work in SEK given the region of interest is Sweden. We obtain

the monthly EUR – SEK exchange rate[9] from the Swedish Riksbank for our sample period which is used to convert mutual funds net flows data to SEK.

Figure 2: Net flows to index linked mutual funds

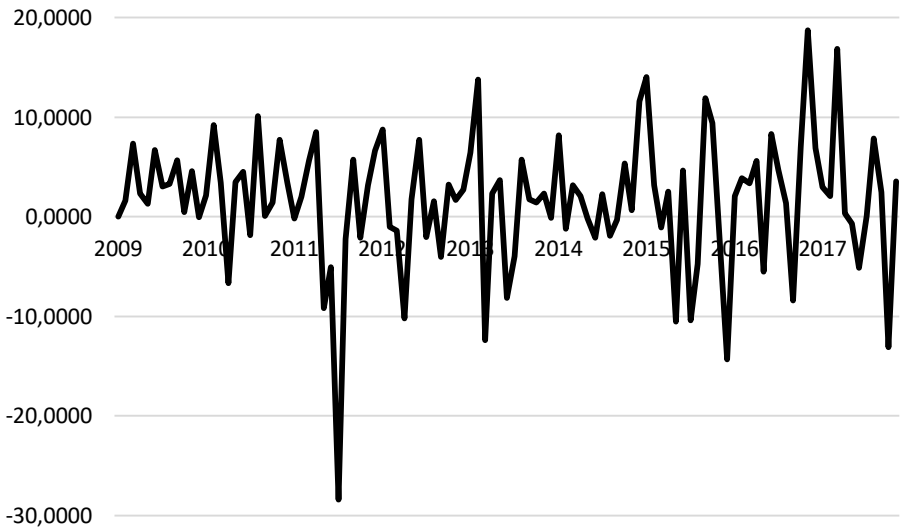

Figure 2: The value of net flows to index linked mutual funds in Sweden. The values are in SEK billions and normalized to January 2007 value. The data used to calculate the net flows was obtained from Morningstar.

Table 1: Descriptive statistics

	F_{index}	F_{active}	R_A	R_B	R_C
Mean	2.1313	0.4806	0.0251	0.0327	0.0155
Standard deviation	6.6337	1.7481	0.1269	0.1002	0.0503
Correlation					
F_{index}	1.00				
F_{active}	0.82	1.00			
R_A	0.60	0.69	1.00		
R_B	0.59	0.61	0.74	1.00	
R_C	0.47	0.57	0.84	0.70	1.00

Table 1: This table presents the descriptive statistics for the five variables constructed (the sum of index linked and actively managed mutual funds net flows, and the three monthly index portfolio returns denoted A, B and C. The monthly returns are calculated as the sum of daily logarithmic total daily returns for the last 22 days.

[9] Swedish Riksbank database was accessed on 27/04/2019

6. Empirical Results: A net flow effect in portfolio returns

6.1 Statistical tests

We subject the three constructed portfolio indices to two statistical tests to investigate their statistical characteristics. The tests we use are the Durbin-Watson test and the Breusch-Pagan test. The Durbin Watson test is used to check whether the residuals of the portfolio returns, which is the dependent variable in our model have any autocorrelation. The null hypothesis of the Durbin Watson test is that there is no autocorrelation among all residual terms after a regression has been carried out. This test is used to check whether the residual terms of the current period are linearly dependent in the residual terms of past periods. We then use the Durbin Watson value and the respective p-values, to determine whether the null hypothesis of no autocorrelation is rejected or not. Our motivation for carrying out this test is because, the existence of autocorrelation among residuals the efficiency of regression model is lowered and the estimated standard errors and t-statistics will be incorrect. Therefore, any conclusion made when auto correlation is present without taking any action will be incorrect.

The Breusch-Pagan tests for heteroscedasticity in carried out on the dependent variable. It has a null hypothesis of homoscedasticity which means that the residual terms in a regression model have a constant variance. On the other hand, heteroscedasticity means the residual terms have a variance that is significantly different with each change of the variables i.e. over the period of our sample the variance of the residuals of portfolio returns change with each monthly observation, and has a different underlying distribution. The consequence of residual terms being heteroscedastic is that our regressions may be specified incorrectly. These tests carried out investigate two underlying assumptions

necessary for Ordinary Least Squares (OLS) regression. The p-value results for the Durbin Watson and Breusch Pagan test are reported in Table 2. All the results presented are larger than 0.5 which means that the respective null hypotheses cannot be rejected.

Table 2: P-values from Durbin Watson and Breusch Pagan Test

	Durbin Watson Test P-Value	Breusch Pagan Test P-Value
Portfolio A	0.753	0.914
Portfolio B	0.628	0.549
Portfolio C	0.684	0.876

Table 2: For each of the return portfolios constructed we test for autocorrelation and heteroscedasticity using the Durbin Watson test and Breusch Pagan tests respectively. The P-value of the test outcomes are reported above. The respective null hypotheses are explained in the text.

6.2 Hypotheses and initial empirical observations

The holdings of an index linked mutual fund, replicates the holdings of a given index which is used as a benchmark. Therefore, in our study, the funds which have been identified as index linked will either be replicating OMX30 or OMXSMCPI, which we have labelled as portfolio A and B. They, however, will not trade in portfolio C as it consists of stocks which are no included in the two indices. In table 1 we can see that correlation between index linked mutual fund net flows and portfolio A and B are much higher than that of portfolio C. In the Stockholm stock exchange, the OMX30 index is used as an underlying asset for futures contract. Index linked mutual funds using the index to increase their exposure to the market could possibly explain the high correlation that exists between portfolio A and net flows to index linked mutual funds. The freedom that active fund managers have however means that they can pick stocks across the whole market. In search for greater return, we see that the correlation across all the three portfolios is quite similar.

The main assumption that our study makes is that net flows to mutual funds are caused by the decisions made by investors. Research by Lou (2012) shows that fund managers when faced with an increase in outflows will sell some of the positions they hold to pay out redemptions and on the other hand inflows will lead to an increase in purchasing of stocks. Therefore, this explains why mutual funds net flows are correlated with stock market returns in the three portfolios in the case that net flows matter for stock prices. Therefore, our hypotheses investigations are two fold, covering the impact of demand driven returns and the returns driven by the market information set. Using this as a foundation our hypotheses are as follows:

1. Aggregate net flows to index linked mutual funds in Sweden are positively related to portfolios returns of the two major indices in our sample, portfolio A and B, but not to the market index of remaining stocks, portfolio C.
2. Aggregate net flows to actively managed funds in Sweden are positively related to all three constructed portfolios A, B and C. Portfolio C is an index for the remainder of stocks market in the whole market.

The descriptive statistics presented in table I give a summary of the variables we have in our sample. There are five variables, namely the net flows to both index linked and actively managed mutual funds, portfolio return series for tow indices, OMX30 and OMXSMCPI as well as the remainder of the market stocks index. Of the three return series, portfolio B, has the highest means of returns at 3.27 per cent followed by portfolio A and portfolio C with 2.51 per cent and 1.55 per cent respectively. The volatility of the returns series is as expected among the portfolios. Portfolio one has the highest level of volatility given it

contains the stocks with the highest liquidity in the stock market and the most actively traded shares. This is followed by portfolio B and C respectively. A comparison of volatility is done by comparing the standard deviations reported. The estimated correlation coefficients of the net flows to F_{active} and the portfolio return series are higher compared to the estimated correlation coefficients to F_{index}. This tells us that net flows to F_{active} are more correlated with the returns of the portfolios than F_{index}. The correlation value between the two net flow variables is 0.82. This is very high and could suggest that the information sets held by the two sets of investors of investors could be the same.

Table 3: Autoregressive model regressions

Dependent variable	F_{index}			F_{active}		
Constant	1.51 (2.27) **	1.75 (2.34) **	1.71 (2.38) **	0.44 (2.48) **	0.49 (2.68) ***	0.47 (2.48) **
Lag 1	0.08 (1.84) *	0.09 (1.87) *	0.09 (1.93) *	0.03 (3.35) ***	0.04 (3.41) ***	0.03 (3.31) ***
Lag 2		-0.15 (-1.45)	-0.14 (-1.39)		-0.13 (-1.27)	-0.10 (-1.09)
Lag 3			-0.01 (-0.13)			-0.04 (-0.36)
R^2	6.70%	2.69%	2.63%	12%	17%	14%
AIC	52.6	64.9	69.5	42.3	42	41.4
N	104	104	104	104	104	104

*Table 3: Results for each autoregressive models which we simulated up to AR (3). The respective net flows for both index linked and actively managed funds reported in SEK billion are dependent variables. AIC is the Akaike Information Criterion. We use constructed monthly data from May 2009 through to December 2018. t-values are reported in parentheses. *, ** and *** indicate significance level at the 10 per cent, 5 per cent and 1 per cent respectively.*

6.3 Model using expected and unexpected net flows

In our study we want to determine whether net flows to mutual funds co-move with returns in the stock market using the portfolio returns we have estimated. We isolate the respective flows to index linked and active mutual fund. In accordance with conclusions in existing literature, we also consider fund flows to be predictable. Research by Warther (1995) and Anderson (2002) uses autoregressive model (AR model) to determine magnitude of net flows which are expected and unexpected. As stated earlier, the conclusions they made are

in agreement that returns are correlated with unexpected net flows to mutual funds but uncorrelated with expected net flows in both the United States and Sweden.

To capture the expected and unexpected flows, we run and autoregressive regressions on both the net flows and use estimated net flows as the expected net flows and the residuals as the unexpected net flows. We use Akaike Information Criterion (AIC) to determine which AR model has the best explanatory power. For both the flows to index linked and active mutual funds an AR (1) model has the best explanatory power. The results are presented in table 3 for the three autoregressive models estimated. The expected and unexpected net flows estimated using by an AR (1) model are denoted $\hat{F}_{index}$, $\hat{F}_{active}$ and $\tilde{F}_{index}$, $\tilde{F}_{active}$ respectively. These estimations are used to explain the returns of the index portfolios constructed by estimating the following equation:

$$R_{i,t} = \alpha_0 + \alpha_1 \hat{F}_{index,t} + \alpha_2 \tilde{F}_{index,t} + \alpha_3 \hat{F}_{active,t} + \alpha_4 \tilde{F}_{active,t} + \varepsilon_t$$

where *i* represents constructed portfolios A, B and C. The estimated results for the equation above presented in table 4. We find similar results to existing literature, unexpected net flows to active managed funds are statistically significant and positively related to the returns of all three portfolios. The unexpected net flows to actively managed funds have a standard deviation of 0.763. We use the standard deviation to analyse the expected change in monthly returns, given one standard deviation increase in net flows. We find that for three portfolios increase as follows; portfolio A will increase 2.29 percentage points per month, portfolio B will increase 1.53 percentage points per month and portfolio C will increase 3.06 percentage points per month. A comparison of the results for Sweden and the

findings reported by Kvamvold (2017) for Norway show the same positive effect for unexpected net flows on portfolio return. However, the impact in Sweden is larger. Controlling for currency conversions one explanation for this is the relative difference in size of the mutual funds industry in Sweden having greater NAVs. The estimates used in the calculation for changes which occur as a result of an increase in unexpected net flows to actively managed funds are all statistically significant. One explanation for these changes is the freedom which fund managers have to determine where in the market they invest. They are no restricted to a certain index.

The positive relationship identified between net flows and active managed funds also extends to index linked funds, but, the estimates are not statistically significant for all three portfolios. This is only applicable to portfolio A and portfolio B which have statistically significant results. The results which we find here are expected, as index linked funds always select a benchmark portfolio and invest in stocks that are constituent in the index. Therefore, given that portfolio C does not have any stock which index linked funds invest in, it is not expected to be statistically significant. In the case of unexpected net flows to index linked fund, the standard deviation is 0.281. This means that an increase of one standard deviation in unexpected net flows results in an increase in returns of 0.28 percentage points per month.

Table 4: OLS regression results

Dependent variable	R_A	R_B	R_C
α_0	0.10 (1.74) **	0.16 (2.30) **	0.12 (1.31)
$\hat{F}_{index}$	-0.01 (-1.65) *	-0.01 (-0.46)	0.01 (0.26)
$\tilde{F}_{index}$	0.01 (1.88) *	0.01 (1.73) *	0.00 (0.95)
$\hat{F}_{active}$	0.31 (1.70) **	0.46 (2.09) **	0.28 (0.95)
$\tilde{F}_{active}$	0.03 (4.84) ***	0.02 (3.23) ***	0.04 (3.70) ***
R^2	50%	44%	35%
N	104	104	104

*Table 4: Results of OLS regressions with the constructed index portfolios returns as the dependent variables. The expected and unexpected net flows estimated by autoregressive AR (1) model are the independent variables. Monthly data from May 2009 through to December 2018 is used. Portfolio returns are in SEK billions. t-values are reported in parentheses. *, ** and *** indicate significance level at the 10 per cent, 5 per cent and 1 per cent respectively.*

The results above could be driven by the overall attitude of investor, henceforth called investor sentiment. Investor sentiment is the general feeling that market participants have regarding the prices changes of stocks traded in the market place. Lee et al (1991) believes that the impact investor sentiment has on small stocks is larger than the impact on larger stocks. In our case, investor sentiment would have a larger effect on portfolio A given it consists of largest stocks in the stock market and a smaller effect on portfolio C which has the smallest stocks in the stock market. The results presented in table three, however, do not support the existence of investor sentiment in the Stockholm stock exchange. The question of whether the information set of the whole market which investors holds is the driver of returns in our study can be answered by comparing the statistical significance of results for $\tilde{F}_{index}$, in portfolio A and lack of significance of results in portfolio C. Although, we find support for the efficient market hypothesis as the estimated results confirms hypothesis one in our study by showing that net flows to mutual funds have an effect on portfolio returns that index linked mutual funds use as benchmarks.

Table 5: OLS regressions with lagged variables results

Dependent variable	R_A	R_B	R_C
α_0	0.14 (1.62)	0.13 (1.49)	0.17 (1.59)
$\hat{F}_{index,t-1}$	0.02 (0.32)	0.01 (0.26)	0.01 (0.14)
$\tilde{F}_{index,t-1}$	-0.02 (-0.51)	-0.01 (-0.36)	-0.00 (-1.24)
$\hat{F}_{active,t-1}$	0.30 (1.17)	0.21 (0.73)	0.32 (0.93)
$\tilde{F}_{active,t-1}$	0.05 (0.49)	0.02 (1.09)	0.01 (0.04)
R^2	5%	8%	35%
N	103	103	103

*Table 5: Results of OLS regressions with the constructed index portfolios returns as the dependent variables. The expected and unexpected net flows estimated by autoregressive AR (1) model are the independent variables. The independent variables are lagged for one month to control for the causation direction. Monthly data from June 2009 through to December 2018 is used. Portfolio returns are in SEK billions. t-values are reported in parentheses. *, ** and *** indicate significance level at the 10 per cent, 5 per cent and 1 per cent respectively.*

One of the issues identified prior to our study in determining the direction in which causation takes effect. We want to make sure that we estimate the changes in portfolio return due to changes in net flows and not the other way around. Therefore, we lag the independent variables, expected and unexpected net flows by one month to investigate whether the return reversals described above are present. Additionally, if the net flows from prior periods negatively affect portfolio returns in the following period, then we cannot reject the price pressure hypothesis. The estimated results used lagged variables are reported in table 5. None of the results are statistically significant. We can therefore conclude that price reversals are not present in the market place. This creates a challenge in our study in isolating the difference between the price pressure hypothesis and the imperfect substitution hypothesis. The reason for this is we are unable to determine how quickly price reversals happen and at extremes, price reversals can happen within a day of trading or across many years.

One aspect that stands out in the approach we have used is the inclusion of only net flows to mutual funds as an explanatory variable in our model. We do, however, consider the time varying as by investigating lagged variable of net flows. Although the approach we take is consistent with the current literature on this subject, there is a chance a number of other market factors not included in our model also explain benchmark portfolios returns. For example, the Fama-French factor models. The time constraints of this study mean we were not able to further explore the addition of other variables in our model outside the scope of the study by Kvamvold (2007) which considers the impact investor sentiment has on feedback trading. The results are presented in section 6.4.

6.4 Investor sentiment and feedback trading

The current literature on the relationship between net flows and returns finds net flows often used as a proxy for investor sentiment. In other words, the feelings of investors regarding the direction of changes in stock prices will impact whether they deposit or withdraw funds from mutual funds. In the study of the Norwegian market Kvamvold (2017) argues that trading in Exchange Traded Funds (ETFs) is a better proxy for investor sentiment compared to net flows to mutual funds in the short run. A key difference between ETFs and mutual funds is the nature in which they operate. ETFs are continuously traded on the stock market similar to stocks, as well as being cheaper and more tax efficient Poterba and Shoven (2002) whereas mutual funds trade once a day when the market is closed. Similar to index linked funds, ETFs will closely track a given index as a benchmark. Therefore, ETFs are considered to be innovative products which bring together the advantages of open ended and closed ended funds. The continuous trading of ETFs allows for trading flexibility and greater liquidity, which captures information efficient and the sentiment of traders better. A

study by Gutierrez et al (2009) finds support for investor sentiment being an important component in the trading of ETFs given the returns and volatility of Asian ETFs which are traded in U.S. being more correlated with U.S. markets than Asian markets.

An ETF can have positive or negative exposure to the market. In the case of an ETF having positive exposure to the market, it is referred to as a bull and as a bear in the case of negative exposure. Positive and negative exposure are characterised by ETFs which take a position in both leveraged and unleveraged stocks for positive exposure and only leveraged stocks in the case of negative exposure. The difference between trading volumes of ETFs, which have positive and negative exposure in stocks, is used as a proxy for investor sentiment. We obtain the daily price and daily market trading value for ETFs traded on the Stockholm stock exchange from Bloomberg. We only consider ETFs that have exposure to stocks in the OMX30 index. These are stocks which are contained in portfolio A. We take the difference of the daily market trading for ETFs and construct a proxy for investor sentiment. Investor sentiment is added as an independent variable and estimated using the following equation:

$$R_{i,t} = \alpha_0 + \alpha_1 \hat{F}_{index,t} + \alpha_2 \tilde{F}_{index,t} + \alpha_3 \hat{F}_{active,t} + \alpha_4 \tilde{F}_{active,t} + \alpha_5 sentiment_t + \varepsilon_t$$

The estimated results are presented in table 6. Similar to earlier results when investor sentiment was not controlled for, the positive relationship between unexpected net flows to actively managed funds is statistically significant. The effect of the magnitude to both index linked and actively managed funds has also remained relatively similar. In our discussion above we mention the contrarian view, where investors sell motivated by prices increases

to realise returns as evidence for causation of changes in flows due to returns changes. The negative estimated coefficients for the independent variable sentiment suggest that the majority of investors in the market place hold contrarian views. On the other hand, all coefficients are not statistically significant. For example, both expected and unexpected net flows to index linked funds are not significant. This tells us that if the information set held by investors is the driver for changes in net flows impacting portfolio returns then it is only with individual investors specific to individual stocks in the portfolios and not at an aggregate level. The results we find here confirm a demand driven impact on stock returns due to the impact trading by mutual funds has when they experience changes in net flows as investors deposit and redeem funds. Alternatively, the opposite of the contrarian view explains this result. Positive feedback trading exists and changes in net flows to mutual funds result in portfolio return changes. However, our study concludes this is not the case in Sweden. Results are presented in table 7 and there is no statistical significance in all the estimated coefficients.

Table 6: OLS regression results controlling for investor sentiment

Dependent variable	R_A	R_B	R_C
α_0	0.10 (1.68) *	0.15 (1.24)	0.12 (1.26)
$\hat{F}_{index}$	0.13 (0.68)	-0.01 (-0.48)	0.01 (0.32)
$\tilde{F}_{index}$	-0.04 (-0.73)	0.03 (1.55)	0.01 (0.14)
$\hat{F}_{active}$	0.31 (1.73) *	0.47 (2.13) **	0.28 (0.96)
$\tilde{F}_{active}$	0.03 (4.94) ***	0.03 (3.34) ***	0.04 (3.75) ***
$Sentiment$	-0.06 (-1.99) **	-0.02 (-1.49)	-0.01 (-0.93)
R^2	18%	11%	7%
N	104	104	104

*Table 6: Results of OLS regressions with the constructed index portfolios returns as the dependent variables. The expected and unexpected net flows estimated by autoregressive AR (1) model are the independent variables. We control for Investor sentiment constructed using ETF data. Monthly data from May 2009 through to December 2018 is used. Portfolio returns are in SEK billions. t-values are reported in parentheses. *, ** and *** indicate significance level at the 10 per cent, 5 per cent and 1 per cent respectively.*

The results for the impact of investor sentiment on portfolio A's returns is statistically significant. The estimated coefficient structure suggests an existence of information efficiency to varying degrees. However, there is no evidence of positive feedback trading in the data given the coefficient for investor sentiment is negative. A possible explanation for this is the use of ETFs as complements of mutual funds. Investors will use mutual funds and ETFs together to hedge risk which will not create price pressures in the market.

Table 7: OLS regression for feedback trading

Dependent variable	F_{index}			F_{active}		
α_0	-0.14 (-0.22)	0.14 (-0.21)	0.08 (0.12)	-0.02 (-0.13)	-0.02 (-0.10)	-0.01 (0.01)
$R_{A,t-1}$	8.63 (1.20)			1.37 (0.72)		
$R_{B,t-1}$		5.08 (0.79)			0.65 (0.39)	
$R_{C,t-1}$			4.41 (0.87)			-0.10 (-0.08)
R^2	1.37%	0.05%	0.07%	0.05%	0.04%	0.01%
N	104	104	104	104	104	104

*Table 7: Results of OLS regressions with the expected and unexpected net flows estimated by autoregressive AR (1) model as the dependent variables. The lagged portfolio returns for the three portfolios are the independent variables. We control for Investor sentiment constructed using ETF data. Monthly data from May 2009 through to December 2018 is used. Portfolio returns are in SEK billions. t-values are reported in parentheses. *, ** and *** indicate significance level at the 10 per cent, 5 per cent and 1 per cent respectively.*

7. Conclusions

The main findings of our study confirms the existing results in literature which show a positive relationship between unexpected net flows and portfolio returns at an individual mutual fund level. The addition we make is in isolating this effect along net flows to index linked and actively managed mutual fund. We find that this result is only statistically significant for net flows to actively managed funds. The addition of investor sentiment does not prove to be statistically significant. This supports the approach that is widespread in literature of only considering the impact of net flows without other factors. The Stockholm stock exchange is sensitive to changes in unexpected net flows. Therefore, policy makers should be wary of any increase in uncertainty among investors and be ready to take action to calm fears. An increase in redemptions by investors is likely to lead to a downward spiral in prices if not contained.

8. Further research

In this study we have identified two main additions to the approach we have taken which will contribute to understanding the findings of this paper. The first is the addition of other market factors to the model used in estimating the impact net flows has on portfolio returns. This could possibly contribute to a change in the observed relationship between net flows and portfolio returns. This could be especially insightful when net flows are lagged as the results we find are not statistically significant. The second addition would be to consider the impact of the whole Swedish mutual fund market. In our study, we consider Swedish registered mutual funds, investing primarily in Sweden. We find this makes up only 25 per cent of the mutual funds market in Sweden. The returns in Sweden are above the average world index return Anderson (2002) which means that inevitably international funds will be attracted to invest in Sweden, as well as Swedish funds are registered outside the country for tax efficiency reasons. Expanding the scope and studying the whole market, with interest in isolating the different segments of the market will verify the results we find but also expand our understanding of the whole Swedish market. Additionally, this study can be divided to look at the impact of Nordic mutual funds and the rest of the world. Nordic mutual funds investing in Sweden account for around 15% of the market. The findings will equip policy makers and regulators with better knowledge of how changes in net flows impact demand on the stock market. This is particularly useful when taking action during times of uncertainty.

9. References

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