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Active Mutual Fund Performance: Pandemic vs Financial Crisis

*A study of Norwegian active mutual funds' ability to create
excess return during uncertain times.*

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Master thesis in Financial Economics

NORWEGIAN SCHOOL OF ECONOMICS

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The writing process has been demanding and educational. We encountered some difficulties on the way, which we managed to solve and learn from. The process of working together towards a common goal have been inspiring. We hope our paper will provide further insight for active management enthusiasts.

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Abstract

The covid-19 pandemic had significant effect on economies and markets all over the world. Therefore, there is high interest in findings around the matter. There is, however, limited research of fund performance during the Covid-19 pandemic. We study the performance of active mutual Norwegian funds with a domestic investment strategy during the pandemic and the financial crisis. By performing three regression models, the Single Index Model, Fama French 3 Factor model and Carhart 4 Factor model, we examine the funds' ability to create excess return.

We do not find any evidence of excess return created during the pandemic. We do however find evidence of significant positive excess return created during the financial crisis by several funds. These funds were on average able to create a significant monthly alpha of 1.26% during the crisis. The best performing funds created a monthly alpha in the interval (1.14%, 1.44%). From our findings it seems like fund managers were able to utilize the uncertainty in the markets during the financial crisis better than during the pandemic.

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1. Introduction

The mutual fund industry in Norway is in continuous growth (Zakariassen & Aamodt-Hansen, 2021). We recently experienced a global pandemic which greatly affected the global economy. Therefore, we find it interesting to examine how Norwegian mutual funds performed during this period. The last 5 years the proportion of the Norwegian population that invest in mutual funds, have increased from 31% to 46%, which highlights the increasing interest in mutual funds (Zakariassen & Aamodt-Hansen, 2021).

Albert Einstein once said, *“In the midst of every crisis, lies great opportunity”*. In the early phases of 2020, the world was struck by the Covid-19 pandemic, a global crisis. The pandemic led to the biggest shock in the stock markets since the financial crisis in 2008. Still in 2022, the markets are experiencing the consequences of the economic shock and political sanctions that followed the pandemic (Desilver, 2022).

During uncertain times as the pandemic, there should be possibilities for skilled fund managers to engage in active management and enhance profits. The basis for our paper revolves around this last statement, and we want to investigate if active mutual funds have been able to exploit the uncertainty in the Norwegian market during the Covid-19 pandemic. The paper is structured around the pandemic as an uncertain subperiod. In addition to the pandemic, we will use the uncertain subperiod of the financial crises in 2008, to compare against. Both these subperiods can be classified as “crises” with significant economic implications.

The two crises are different. The financial crisis was a crisis caused by the financial industry. This crisis affected people’s life through direct economic implications. The pandemic, however, was a more complex crisis. This was originally a health crisis where people were affected by sickness. The pandemic brought significant economic implications through the “fear of sickness” and uncertainty that was created. The uncertainty in the stock markets, has created investment opportunities for investors and interesting research topics for further research and investigation.

We are investigating Norwegian active domestic mutual funds’ performances during the pandemic and the financial crisis. The possible excess return created during these volatile periods will be the main performance measure. The time period we will analyze is October 2007 – May 2022. We will investigate whether the Norwegian active mutual funds listed on

OSE have been able to individually create a return superior to the market during the pandemic and/or the financial crisis, by holding other investment factors constant. When investigating this, we additionally get an indication of how the funds normally perform. To our knowledge this is the first paper which investigate Norwegian active mutual funds performances during the pandemic by comparing it to the financial crisis. In our paper we aim to answer the following research question:

Where Norwegian mutual funds able to create excess return during the global pandemic and/or the financial crisis?

Our findings indicate that the mutual funds did not manage to create significant excess return during the pandemic, while a number of funds managed to create significant excess return during the financial crisis.

The rest of the paper is structured in the following way: The next section contains literature review over old and more recent papers, while section three explains our methodology. The fourth section contains information about our data. In the following section, we will perform our analysis and show our empirical results. In section six we will discuss limitations, while we in section seven will give a conclusive summary of our findings.

2. Literature

In this section we will review some key concepts regarding active management of mutual funds. We will review different relevant papers for our research purpose. The section will go through efficient markets, passive vs active investing, anomalies, factor investing and fund performance. When introducing fund performance, we will investigate how mutual funds normally perform, how they performed during the financial crisis, and how they performed during the pandemic.

2.1 Efficient markets

A market is said to be efficient when the market prices fully reflect the available information. This hypothesis was suggested by Samuelson (1965) and Fama (1965), and today we refer to it as the Efficient Market Hypothesis (EMH). If a market is efficient, then the market prices will only change with new available information. The new information is unpredictable, which makes the change in stock prices unpredictable. The implication of EMH and the unpredictable stock price changes, is that in an efficient market where all public information is reflected in the prices, no market participants can consistently beat the market over time (Bodie, Kane, & Marcus, 2021). If this is true, then there should be no reasons for managers to try and actively beat the market with active management.

A major assumption in EMH is that all investors are rational. Several findings in behavioral finance challenges this assumption. When investors act irrational it can affect mutual funds significantly.

The flock mentality phenomenon (Keynes, 1936) is when a person adapts his behavior to mimic the public behavior and is an example of irrationality. This is something we recently experienced with GameStop. GameStop is a video game store. The company seemed to struggle as video games usually are purchased through the internet. In 2018 only 17% of video games were sold in stores, a decrease from 80% in 2009 (Clement, 2022). GameStop's struggling, resulted in hedge funds taking significant short positions in the stock. Users on the online platform Reddit, came together as a flock, and bought a lot of stocks. This resulted in a short squeeze of the hedge funds (Thorbecke, 2021). This example illustrates that even though funds make rational decisions, they can still lose money due to other investors irrational actions. The funds are "unlucky". The flock mentality phenomenon is just one of several

phenomenon's which suggests that investors act irrational, and thus challenges a main assumption in EMH.

2.2 Passive vs active

Passive and active investors perform respectively passive and active management. The passive investor invests in the general market or an index. He/she aims to eliminate all unsystematic risk by investing in a well-diversified portfolio, so he/she can achieve the market return. An active investor engages in active management and do not believe in fully efficient markets. The active investor's investments deviate from the well diversified market portfolio of the passive investor. The active investor tries to achieve a return superior to the well diversified market portfolio, by exposing himself to unsystematic risk.

2.2.1 Passive investing

The passive investment approach is the approach which investors that believe in EMH will choose. If an investor chooses to invest in an index fund, he is investing passively. The arguments typically used by passive investors, is that the extra return the active funds might produce, is not high enough to compensate for the extra fees. Therefore, they argue that the best investment decision is to invest in an index fund with lower fees and an expected return close to the market. The passive investing strategy have been influential in the development of several known pricing models.

One of the most used pricing models in finance is the Capital Asset Pricing model (CAPM) suggested by William Sharpe (1964). The CAPM is the basis for several other models who aim to explain how investors have been able to exploit mispricing's in the markets to create excess return with active management. Some of these models will be introduced later under the active investing and factor models subsections. The CAPM describes the relationship between risk and return. The model describes the expected return of an asset by a combination of the risk-free rate, beta and the market risk premium. Beta in this model is a description of the non-diversifiable (systematic) risk. The model is based on a lot of strict assumptions, which is not likely to hold. However, it gives good insight into the risk-return trade off. The CAPM assumes that the market is a well-diversified portfolio, thus the unsystematic risk does not

exist in the model. The model does not describe excess return. It only states that an increase in return is offset by higher risk.

The passive investment approach and the belief in EMH is however debated. An interesting paradox was suggested by Grossmann and Stiglitz (1980). The paradox says that if all markets are efficient, then no investors will spend time on collecting information, since that will be a cost for the investor with no opportunity to gain something. If no investors gather information on the market, then new information will not affect the market and the market will eventually collapse.

An alternative hypothesis which builds on the paradox suggested by Grossmann and Stiglitz (1980), is the efficiently inefficient hypothesis developed by Gârleanu and Pedersen (2018). The hypothesis suggests that markets are efficiently inefficient. They argue that the market must be inefficient enough to the degree that the active investors are compensated for their cost of gathering information, and efficient enough to discourage active investors from further active investing. The efficiently inefficient view, together with the Grossman-Stiglitz paradox, suggest that there should be possibilities for active management.

2.2.2 Active investing

Active investing or active management is the contrast to passive investing and the belief in fully efficient markets. The reason for investing in active mutual funds is that you believe in active management. An analysis from Verdipapirfondenes forening (VFF) finds that 75% of the capital invested in mutual funds in Norway, are invested in actively managed funds (Sættem, 2022). This highlights investors market beliefs. The demand for active managed funds in Norway is seemingly higher than for index funds. A common way to define active management is by distinguishing into alpha and beta bets. Where respectively alpha bets refer to stock-picking ability and beta bets to timing ability (Ang, 2014). An active fund manager believes that he can beat the market and create excess return (alpha) by utilizing his timing and stock picking abilities.

A common model used to explain excess return is the Single index Model (SIM) suggested by William Sharpe (1963). The model has the same parameters as the CAPM, but it includes one additional parameter, called alpha. A stock with an alpha is mispriced, meaning that it is over or under-valued in the market. Alpha is needed to create excess return. This model is more

comprehensive than the CAPM, however it provides an explanation on how stocks can make excess returns.

Analysts look at the impact of active management in several markets, with different angles on the analysis. Recent papers such as Foran and O'Sullivan (2017), took an approach there they investigate the market timing ability in active management. They analyzed UK mutual funds and found that a small number of funds were able to successfully time market volatility. While Jiang (2003) who studied actively managed equity funds in the period 1980-1990, struggled to find evidence of timing ability. During volatile periods, which we are analyzing, timing is an essential part of an actively managed fund's performance. If the mutual funds successfully time their trades, it should help them in generating excess return.

The stock picking ability was tested by Cuthbertson, Nitzsche and O'Sullivan (2008). They studied the performance of equity mutual funds in the UK. They found evidence of successful stock picking among a small number of top performing funds. However, they also found evidence of bad stock picking among the worst performing funds.

Frequency of trade can be an important factor in active management if managers get their timing, and stock picking right. Pastor, Stambaugh and Taylor (2017) finds a positive relationship between funds' turnover ratio and their returns amongst U.S. equity mutual funds. For our study, this is interesting as it points in the direction that more active funds might be able to create excess return. These results are supported by a recent US study. Researchers who studied US mutual funds, found evidence of funds that frequently change their exposure to investment factors can create an alpha significantly higher than those who do not (Bessler, Conlon, Mingo-Lopez, & Matallin-Saez, 2022).

2.3 Anomalies and Factor Investing

One of the main reasons for academic's skepticism to fully efficient markets, and an argument for active management, is that anomalies exist in finance. Analysts have through regressions on historical data found that there are statistically significant investment strategies which have historically generated excess return. Factor investing is when an active investor applies an investment strategy where he/she tries to exploit an anomaly (investment factor). The investor

exploits the anomaly by exposing himself to it by betting with or against the anomaly. The investor tries to capture the premium associated with the anomaly/factor.

Some of the most famous anomalies in finance are small minus big (SMB) and high minus low (HML) studied by Fama and French (1992). SMB refers to that firms with a small market value tend to outperform firms with a high market value. HML explains that stocks with a high book to market value tends to outperform stocks with a low book to market value. Fama and French found that these factors helped explain some of the cross-sectional variation in stock returns under the CAPM assumptions. They developed the Fama-French-Factor 3 model (FFF3) where they included the two factors in the CAPM model.

Another important anomaly is the momentum factor studied by Jegadeesh and Titman (1993). Momentum, which is also called winners minus losers (WML), explain the anomaly that firms with previously high returns, tend to outperform firms with previously low returns. Carhart included the momentum factor in the FFF3 model (1997). The model is usually referred to as the Carhart four factor model (C4F). In our analysis we will perform both the FFF3 model and the C4F model on the funds return.

Fama and French (2014) identified two more anomalies, robust minus weak (RMW) and conservative minus aggressive (CMA). The factors control for profitability and investment patterns. RMW explains that firms who previously had robust, stable profitability in recent years tend to outperform firms which previously had weak non-stable profitability. CMA suggests that firms with a conservative investment strategy, outperforms firms with an aggressive investment strategy. They adapted their FFF3 to the Fama-French-Factor 5 model (FFF5), where they included the two variables, respectively RMW and CMA (Fama & French, 2014).

2.4 Fund Performance

Fund performance can be complex to measure because it can be hard to distinguish skillful and lucky investments. An active fund manager which creates superior return to the funds benchmark over a given period, is not necessarily skilled. Therefore, there are several suggested methods to measure fund performance. Although we will not distinguish luck from skill in our paper, we will examine the funds' ability to create excess return during different

periods. As a result, it is interesting for us to examine the differences in fund performances during “normal times”, the financial crisis and the pandemic.

2.4.1 Normal times

The consensus of normal performance among active mutual funds, is that actively managed mutual funds may possess skill and produce excess return, but their fees remove investors' gains. This consensus follows French (2008), Gruber (1996) and Fama and French (2010) findings. They find evidence of underperformance among mutual funds after cost. Fama and French (2010) finds that the average active mutual fund's return before costs, are close to the market portfolio.

However, there is contradictive papers such as Wermers (2000), which find that actively managed mutual funds beat the market, even when including costs. Kosowski, Timmermann, Wermers and White (2006) finds that a sizable minority of managers are able to create an alpha after costs, and thus supports Wermers (2000) findings. The mentioned paper under the subsection of active investing by Cuthbertson, Nitzsche and O'Sullivan (2008) also found evidence of skillful and unskillful management by respectively top and bottom performing funds. This highlights that the consensus of mutual fund performance is threatened.

2.4.2 Financial crisis

The financial crisis affected the stock markets greatly. As a result of that, there has been written several papers on the financial markets and fund performance during the period.

A study on US global funds, found that the managers active stock picking improved the funds' performance by a significant annualized alpha of 2.24%, if the stock picking were based on their available information (Abou Tanos & Jimenez-Garces, 2022). These findings were supported by Petajisto (2013) which found that the most active equity funds outperformed their benchmark indexes even after fees during the financial crisis. This is interesting for us as it seems like some funds were able to utilize their skills during this uncertain period. Therefore, we might find something similar among the Norwegian funds in our study.

The financial crisis differs from the pandemic. The financial crisis in 2008 was a crisis caused by the financial industry, while the global pandemic is a worldwide health crisis. The

pandemic affected the financial markets with the uncertainty that was created and lockdowns within economies.

2.4.3 Pandemic

When the pandemic reached Norway in March 2020, the Norwegian Government introduced the strongest measures ever, in a time of piece (Solberg, 2020). These measurements are known as the lockdown of Norway. The measurements had a significant impact on the Norwegian economy and the Norwegian stock market, Oslo stock exchange (OSE).

Since the pandemic hit quite recently there has not been a lot of research on fund performance during the period. A study performed on Indian equity mutual funds, found that the active funds were unable to create excess return (Maheen, 2021). Alqadhib, Kulendran and Seelanatha (2022) performed a study on Saudi Arabian funds where they applied the Fama French 5 Factor model. Their findings indicate that the mutual funds performed well during the pandemic, and that they were able to create a significant alpha. These findings are interesting for us as there seems to be a varying degree of skill on fund performance across countries during the period.

Even though fund managers may possess skill and make smart investments based on the available information, they may still loose on the investment. A major concern, and especially during a volatile period as the pandemic, is irrational investors. In uncertain times market participants tend to act irrational, which hardens the active management further (Tran & Tran, 2021). During our uncertain subperiods of interest, the financial crisis and the pandemic, where markets are volatile, active management can be challenging. What has been noticeable during the pandemic, is that some stocks have performed extremely well such as MPC Container Ships (Nordnet, 2022), while others have performed extremely poor such as Norwegian Air Shuttle (Nordnet, 2022). For the financial crisis we find similar findings. These findings, together with irrational investors, make stock-picking and timing even more important. We aim to take inspiration from the papers listed in this section, as we explore the performance of active Norwegian mutual funds during the financial crisis and the pandemic.

3. Methodology

In this section, we will explain how we will test the funds performances. The main focus in this paper is excess return created during the financial crisis and the pandemic.

3.1 Time period

We are analyzing the time period from October 2007 to May 2022. We have divided our time period into three different subperiods. The period containing the financial crises, “normal times”, a period with no unusual volatility, and the period containing the global pandemic. The main periods of interest are the volatile subperiods containing the financial crisis and the global pandemic.

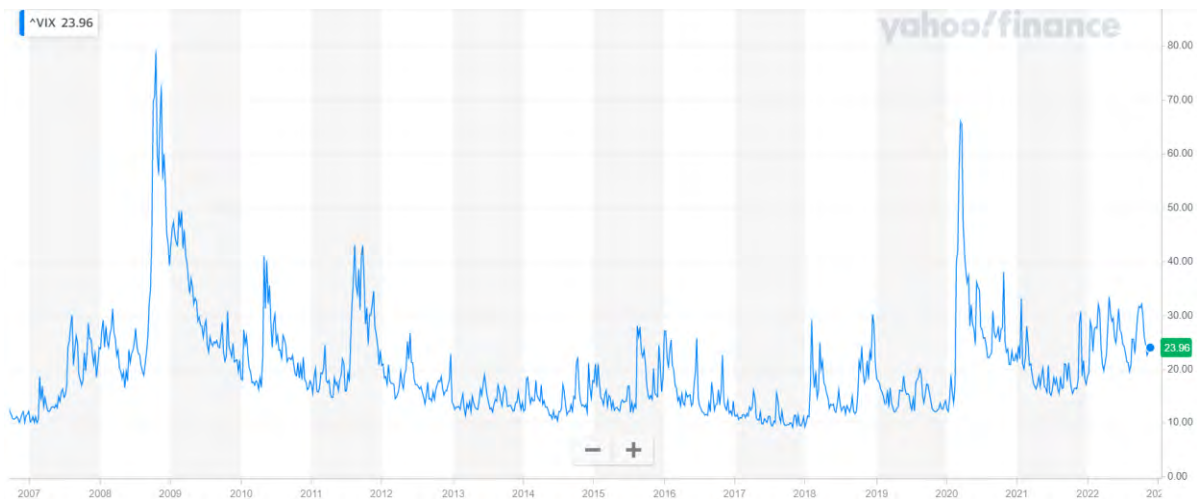


Figure 1: VIX Index (Yahoo Finance, 2022)

The figure above shows the development of the VIX index from 2007 to 2022. The VIX index is an index which is constructed to measure the level of market fear in the S&P index. The VIX index is commonly used as a volatility measure (Edwards & Preston, 2017). For our research purpose, we consider values greater than 50 to be volatility peaks. We observe only two significant peaks over 50 in the distribution. The first peak is the effect of the financial crises in 2008, and the second is the effect of the pandemic in 2020. Based on these volatility peaks we have chosen our subperiods.

The financial crisis period should cover the volatility in the market in the build-up, during and the after-lashes of the financial crises. Therefore, we have chosen the period October 2007 – March 2010. The normal times period should represent a period with normal volatility, where we do not have any unusual shocks in the market. To get the best estimate of “normal times” we use the whole period in between the crises. The period from April 2010 to November 2019 is our normal times period. The global pandemic period should show the recent volatility in the markets which have come from the pandemic and other disturbances in the global economy. The start of the pandemic is recognized as December 2019. Findings from scientists at Ahus, indicates that the first infected Norwegian was infected the same month (Eskild, Mørkrid, Mortensen, & Leegaard, 2022). This month will be the start of our pandemic sub-period. The pandemic period we will analyze is December 2019 – May 2022. Since we want to compare how actively managed funds have performed during the pandemic, with how they performed during the financial crisis, it makes sense to study the two volatile subperiods with the same time horizon. This is a simplification, which will be discussed in our limitation section. The length of our two volatile subperiods will be the same (30 months). The three different subperiods will be included in our analysis, by adding two dummy variables. Their variable names are *Fin* and *Pan*, for respectively the financial crisis in 2008 and the recent pandemic.

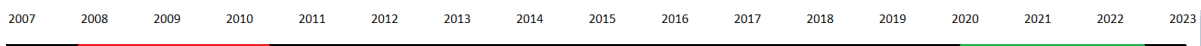


Figure 2: Timeline

The figure above shows a timeline from 2007 to 2023. The red line represents the subperiod of the financial crisis and the green represents the subperiod of the pandemic. The black line in the middle represents normal times.

3.2 Market

The Oslo Stock Exchange All-Share Index (OSEAX) is an index containing all the shares on the Oslo Stock Exchange (Euronext, 2020). It is adjusted for different daily capital events, like removal of constituents who are delisted, inclusion of new listed firms, split-ups and dividend payments (Euronext, 2022). To explore how Norwegian mutual funds have performed during the covid-19 pandemic we have chosen OSEAX, as the market. The performance of the

individual funds, are in this paper, measured against OSEAX. To create excess return, the funds must create a return superior to OSEAX. We will further refer to OSEAX as the market.

3.3 Regressions

In this subsection we will represent the three different regressions which we will perform on the funds' returns. The regressions will contain the dummy variables of the financial crisis and the pandemic. Because of the way we have structured our regressions, these dummy variables cannot be interpreted directly, but must be seen together with the constant to interpret excess returns. The constant will in all our regressions contain the normal times performance. This performance must be included when interpreting the two time-dummies. Therefore, when we search for potential excess return, we must perform F-tests.

Our first regression will be a version of the SIM suggested by Sharpe (1963). The average monthly return will be predicted by an alpha parameter, a market parameter and two dummy variables. The dummy variables represent the two different volatile subperiods, the financial crisis and the pandemic, respectively *Fin* and *Pan*. As a result, the alpha parameter explains the last "dummy" (subperiod) in the regression, normal times. The dummies of the pandemic and the financial crisis are our main points of interest. We will use the following formula:

$$r_i - r_f = \alpha_i + \beta_{1,i}(MKT) + \delta_{1,i}(Fin) + \delta_{2,i}(Pan) + \epsilon_i$$

3-1: SIM

where $r_i - r_f$ is the average monthly return of the mutual fund i over the risk-free rate, α_i is the excess return of the mutual fund i in normal times, $\beta_{1,i}$ is the return explained by the market OSEAX less the risk free rate, $\delta_{1,i}$ is a dummy variable that describes the excess return of the mutual fund i during the financial crisis, $\delta_{2,i}$ is a dummy variable that describes the excess return of the mutual fund i during the global pandemic and ϵ_i is the residual error for fund i . We will perform this regression for all funds i .

Furthermore, we will use Fama and French FFF3 model (1992). The model includes three investment factors in addition to the two dummies. Each individual fund's return will be regressed on these factors, respectively the market (MKT), small minus big (SMB) and high minus low (HML). The model controls for potential bias in the extra added variables compared to SIM. The following formula will be used:

$$r_i - r_f = \alpha_i + \beta_{1,i}(MKT) + \beta_{2,i}(SMB) + \beta_{3,i}(HML) + \delta_{1,i}(Fin) + \delta_{2,i}(Pan) + \epsilon_i$$

3-2: FFF3

where $r_i - r_f$ is the average monthly return of the mutual fund i over the risk-free rate, α_i is the excess return of the mutual fund i in normal times, $\beta_{1,i}(MKT)$ is the return explained by the market risk premium to the market index OSEAX, $\beta_{2,i}(SMB)$ is the return explained by the factor SMB (small firms over big firms), $\beta_{3,i}(HML)$ is the return explained by the factor HML (value firms over growth firms), $\delta_{1,i}$ is a dummy variable that describes the excess return of the mutual fund during the financial crisis, $\delta_{2,i}$ is a dummy variable that describes the excess return of the mutual fund i during the global pandemic and ϵ_i is the residual error. We will perform this regression for all funds i and present the results.

In our final regression, we will use Carhart's C4F model (1997), where we have four factors: MKT, SMB, HML and the momentum factor (WML) in addition to our two dummies. Here, we control for an additional variable compared to the FFF3. The formula is as follows:

$$r_i - r_f = \alpha_i + \beta_{1,i}(MKT) + \beta_{2,i}(SMB) + \beta_{3,i}(HML) + \beta_{4,i}(WML) + \delta_{1,i}(Fin) + \delta_{2,i}(Pan) + \epsilon_i$$

3-3: C4F

where $r_i - r_f$ is the average monthly return of the mutual fund i over the risk-free rate, α_i is the excess return of the mutual fund i in normal times, $\beta_{1,i}(MKT)$ is the return explained by the market risk premium to our market index OSEAX, $\beta_{2,i}(SMB)$ is the return explained by the factor SMB (small firms over big firms), $\beta_{3,i}(HML)$ is the return explained by the factor HML (value firms over growth firms), $\beta_{4,i}(WML)$ is the return explained by the factor WML (winner firms over loser firms), $\delta_{1,i}(Fin)$ is a dummy variable that describes the excess return of the mutual fund i during the financial crisis, $\delta_{2,i}(Pan)$ is a dummy variable that describes the excess return of the mutual fund i during the global pandemic and ϵ_i is the residual error. We will perform this regression for all funds i and present the results.

3.4 Distribution of Alphas

We will also investigate the distribution of the different alphas estimated in the regressions. When interpreting the distribution, we will refer to the normal times coefficient as the normal alpha. The estimated pandemic coefficient of the regressions $\delta_{2,i}$ will be summed with the normal times alpha α_i to form what we will call the pandemic alpha. The estimated financial crisis coefficient of the regression $\delta_{1,i}$ will be summed with the normal times alpha α_i to form what we call the financial crisis alpha.

Normal times alpha = Normal times coefficient = α_i

Financial crisis alpha = Normal times coefficient + financial crisis coefficient = $\alpha_i + \delta_{1,i}$

Pandemic alpha = Normal times coefficient + pandemic coefficient = $\alpha_i + \delta_{2,i}$

3-4: Alpha terms

Where α_i is the estimated normal times coefficient from the regressions for fund i , $\delta_{1,i}$ is the estimated financial crisis coefficient from the regression for fund i , and $\delta_{2,i}$ is the estimated pandemic coefficient from the regressions for fund i .

This implies that the normal alpha is the same as the normal times coefficient, while the pandemic alpha and financial crisis alpha, must not be confused with respectively the pandemic coefficient and the financial crisis coefficient.

3.5 Investigation of top and bottom performing funds

We will conduct an investigation of the top ten and bottom ten performing funds, for the two volatile periods, the financial crisis and the pandemic.

The three different regressions SIM, FFF3 and C4F controls for different investment factors, and will therefore produce different alphas for the individual funds. We will rank the funds in terms of the average alpha for the individual funds across the regressions. They will be calculated in the following way for the financial crisis alpha for fund i :

$$\begin{aligned} & \text{Fund } i\text{'s average financial crisis alpha} \\ &= \frac{(\delta_{1,i} + \alpha_i)_{SIM} + (\delta_{1,i} + \alpha_i)_{FFF3} + (\delta_{1,i} + \alpha_i)_{C4F}}{3} \end{aligned}$$

3-5: Average financial crisis alpha

Where $(\delta_{1,i} + \alpha_i)_{SIM}$ is the financial crisis alpha for fund i calculated from the SIM regression, $(\delta_{1,i} + \alpha_i)_{FFF3}$ is the financial crisis alpha for fund i calculated from the FFF3 regressions, and $(\delta_{1,i} + \alpha_i)_{C4F}$ is the financial crisis alpha for fund i calculated from the C4F regression.

The average pandemic alpha will be calculated in the following way for fund i :

$$\text{Fund } i\text{'s average pandemic alpha} = \frac{(\delta_{2,i} + \alpha_i)_{SIM} + (\delta_{2,i} + \alpha_i)_{FFF3} + (\delta_{2,i} + \alpha_i)_{C4F}}{3}$$

3-6: Average pandemic alpha

Where $(\delta_{2,i} + \alpha_i)_{SIM}$ is the pandemic alpha for fund i calculated from the SIM regression, $(\delta_{2,i} + \alpha_i)_{FFF3}$ is the pandemic alpha for fund i calculated from the FFF3 regressions, and $(\delta_{2,i} + \alpha_i)_{C4F}$ is the pandemic alpha for fund i calculated from the C4F regression.

3.6 F-tests

Since the normal times coefficient is the constant in all our regressions, we need to perform a F-test to search for evidence of excess return created during the two volatile periods, as previously discussed.

The F-tests for the financial crisis will test whether the sum of the normal times constant and the financial crisis coefficient are significantly different from zero (test if the financial crisis alpha is different from zero). If we reject the null hypothesis, this will provide evidence of excess return created during the financial crisis. The test will be performed for all funds, and for all the different regression models introduced. Below we present our null and alternative hypothesis:

$$H_0: \delta_{1,i} + \alpha_i = 0, \quad H_A: \delta_{1,i} + \alpha_i \neq 0$$

3-7: Test financial crisis

where $\delta_{1,i}$ is the estimated dummy variable for the financial crisis for fund i , and α_i is the estimated constant from the regression which represents normal times for fund i .

We will also perform F-tests to search for potential excess return created during the pandemic. The F-tests will test whether the sum of the constant (normal times dummy) and the pandemic coefficient are significantly different from zero (test if the pandemic alpha is different from zero). If we reject the null hypothesis, this will provide evidence of excess return created during the pandemic. This test will, as the last test, be performed for all the funds, and for all the different regressions. The tests, tests the following hypothesis:

$$H_0: \delta_{2,i} + \alpha_i = 0, \quad H_A: \delta_{2,i} + \alpha_i \neq 0$$

3-8: Test pandemic

where $\delta_{2,i}$ is the estimated dummy variable for the pandemic for fund i , and α_i is the estimated constant from the regression which represents normal times for fund i .

3.7 Comparison of results

Lastly, we will compare the findings from all the regressions and tests, for the three different types of regressions. We will investigate whether some of the funds were able to create statistically significant excess return during the two volatile subperiods, and if they were able to do so in more than one of the three different types of regressions.

4. Data

We have collected data on funds from Morningstar Direct. The data contains monthly returns on all the Norwegian mutual funds on Oslo Stock Exchange. We downloaded the returns by sorting after equity funds who have domicile and investment area in Norway. From the downloaded returns of the mutual funds, we removed 11 index funds, who are passive, as they do not apply an active investment strategy. Our data have been carefully extracted. We have used our data with caution to assure the quality of our results.

We downloaded data from October 2007 to May 2022. However, we will divide the period into three subperiods, as previously discussed. Our portfolio of funds consists of a total of 115 entities, after the removal of index funds. We have a diverse portfolio of funds, some have existed for the entire period, some got dissolved while others have only existed for a couple of months. All the funds in our analysis are listed in the appendix.

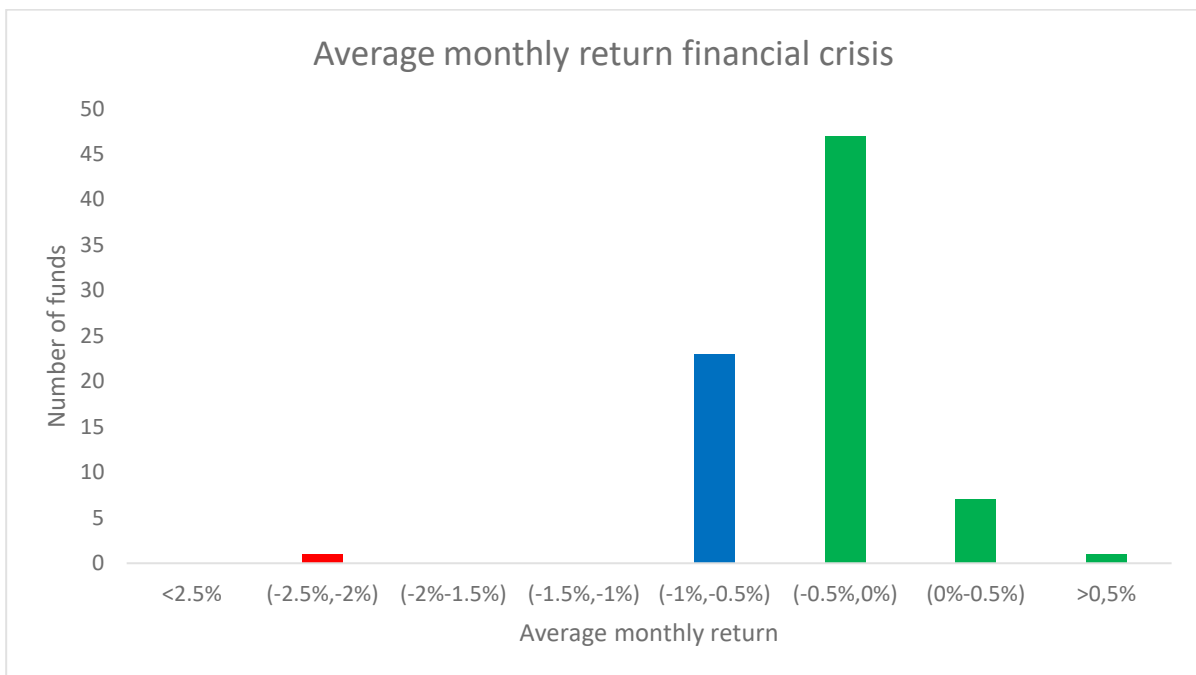


Figure 3: Average monthly return: Financial crisis

The figure shows an overview of all the active mutual funds average monthly return less the risk-free rate, and the average monthly market return less the risk-free rate in the financial crisis period (October 2007 – March 2010). On the y-axis we have the number of funds within a category. The x-axis categorizes funds into groups, based on the average monthly return. The first group contains funds which have an average monthly return less than -2.5%, the second group contains funds which have an average monthly return higher than -2.5% but less than -2% and so on.

We have removed 36 funds from the figure above since they did not operate during the financial crisis. The groups of funds which have a better average return than the market are marked green, while the groups of funds which have a worse average return than the market are marked red. The blue group is the interval containing the market return (OSEAX). The average market return is (-0.90) %. The worst performing group consists of 1 fund, which was dissolved during the financial crisis. The figure shows that the worst performing fund was the only fund that performed worse than the blue group (market performance group). The group containing the market performance has 23 funds, while the groups that performed better than the blue group have 55 funds.

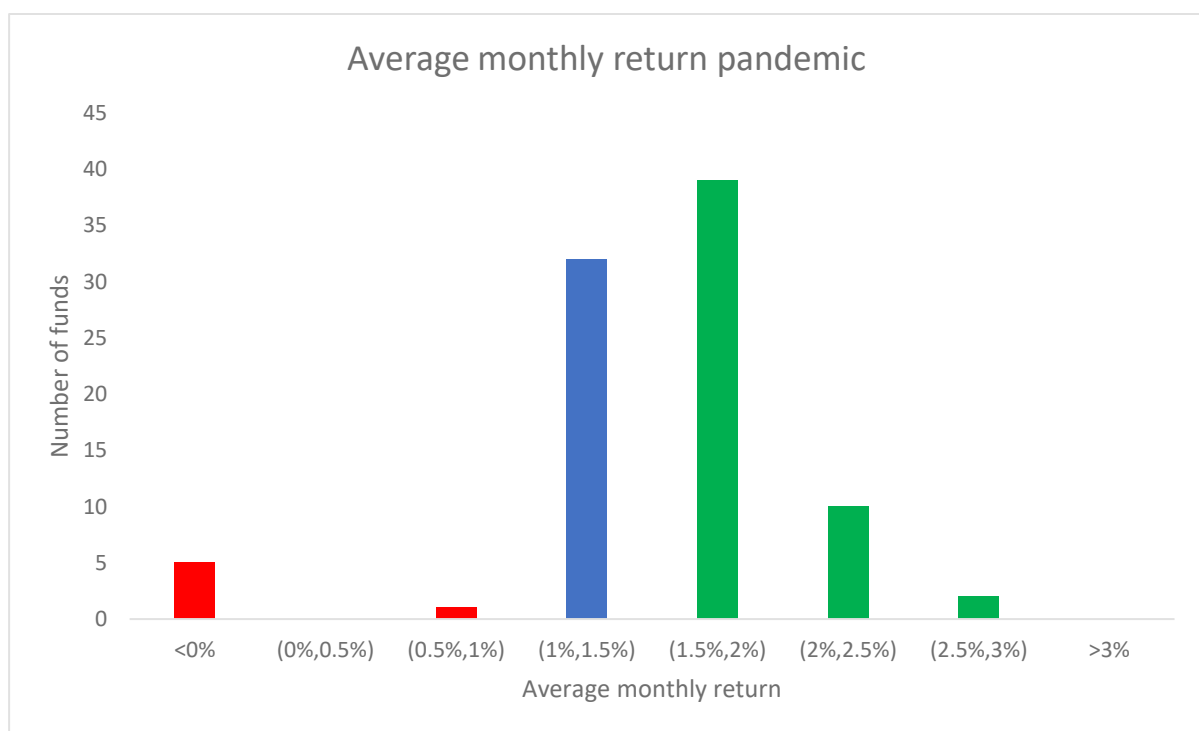


Figure 4: Average monthly return: Pandemic

The figure shows an overview of all the active mutual funds average monthly return less the risk-free rate, and the average monthly market return less the risk-free rate in the global pandemic period (December 2019 – May 2022). On the y-axis we have the number of funds within a category. The x-axis categorizes funds into groups, based on the average monthly return. The first group contains funds which have an average monthly return less than 0%, the second group contains funds which have an average monthly return higher than 0% but less than 0.5% and so on.

We have removed 26 funds from the figure above since they got dissolved before the pandemic. The groups of funds which have a better average return than the market are marked

green, while the groups of funds which have a worse average return than the market are marked red. The blue group is the interval containing the market return (OSEAX). The average market return is 1.24%. In the worst performing fund group, all the funds have in common that they were created during the pandemic, and therefore have fewer observations than the other funds. From the figure we can observe that 50 of the funds performed better than the interval of the market. 33 funds fall in the same group as the market, while 6 funds fall in groups below the market. No funds have been dissolved during the period. All the funds created during the period, have lower average return than the market.

From a professor at the University of Stavanger, Bernt Arne Ødegaard, we collected Norwegian data on the investment factors SMB, HML and WML (2022), the 1-month NIBOR (2022) as the risk-free rate and the OSEAX (2022) as the market. We downloaded data from October 2007 to May 2022. We have data on SMB, HML and the risk-free rate (Rf) for the whole period, while the data on WML is from October 2007 to January 2022. In addition, we have created a variable “Rp” which represents the average monthly return of a portfolio of all the mutual funds in our analysis. All the funds are equally weighted in this variable.

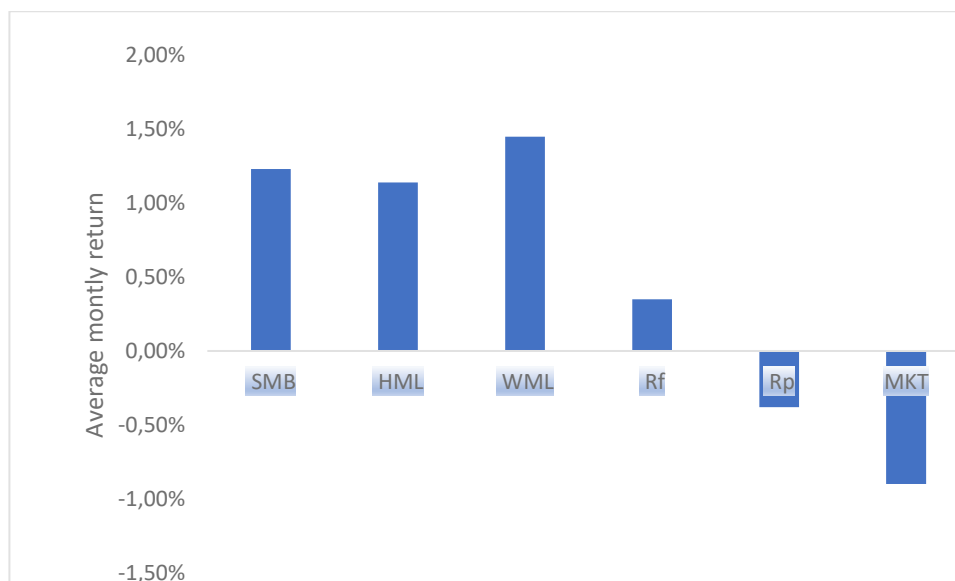


Figure 5: Factors and average return during financial crisis

The figure above, shows the average monthly return of the investment factors (SMB, HML and WML), the risk-free rate, Rp and MKT during the financial crisis. Rf represents the average Norwegian 1-month risk free rate, Rp is a created portfolio of all the active mutual funds less the risk-free rate, and MKT is the OSEAX index less the risk-free rate. The y-axis contains the average monthly return.

The figure above highlights the factors and the risk-free rate from Ødegaard during the financial crisis. The figure shows that the average of the SMB, HML and WML factors are positive, while the MKT factor is negative. The risk-free rate has an average value of approximately 0.35%. We can also see that R_p , the average monthly return of the portfolio of funds is negative. The monthly return of R_p is higher than for the market.

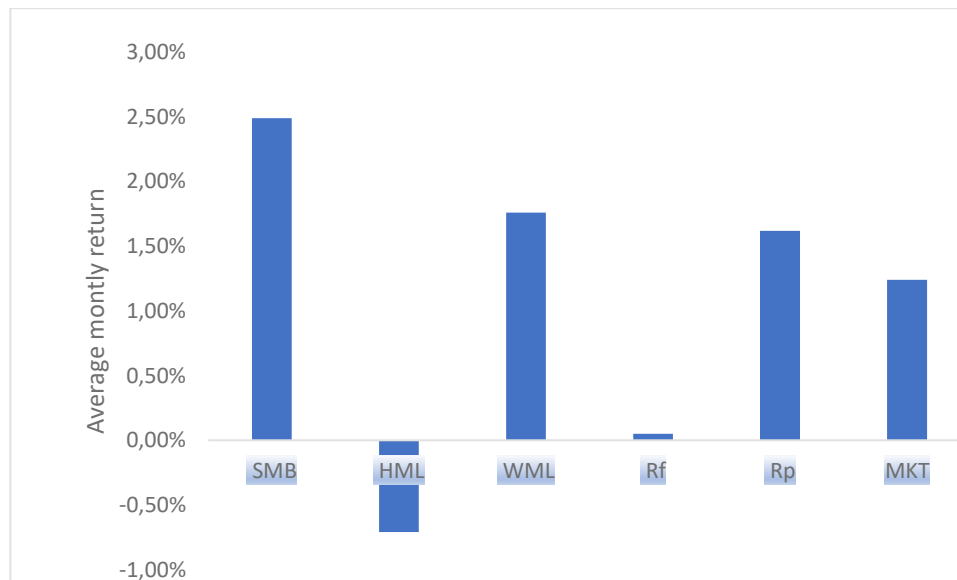


Figure 6: Factors and average return during pandemic

The figure shows the average monthly return of the investment factors (SMB, HML and WML), the risk-free rate, R_p and MKT. R_f represents the average Norwegian 1-month risk free rate, R_p is a created portfolio of all the active mutual funds less the risk-free rate, and MKT is the OSEAX index less the risk-free rate. The y-axis contains the average monthly return.

The figure above shows the factors and the risk-free rate from Ødegaard during the pandemic. From the figure we observe that the SMB and WML factors are positive, while the HML factor is negative. The risk-free rate has an average value of approximately 0.05%, which is historically low. The reason for the low interest rate is measures taken from the Norwegian government as a response to the economic implications of the pandemic. We can also see that R_p , the average monthly return of the portfolio of funds is higher than the average monthly market return.

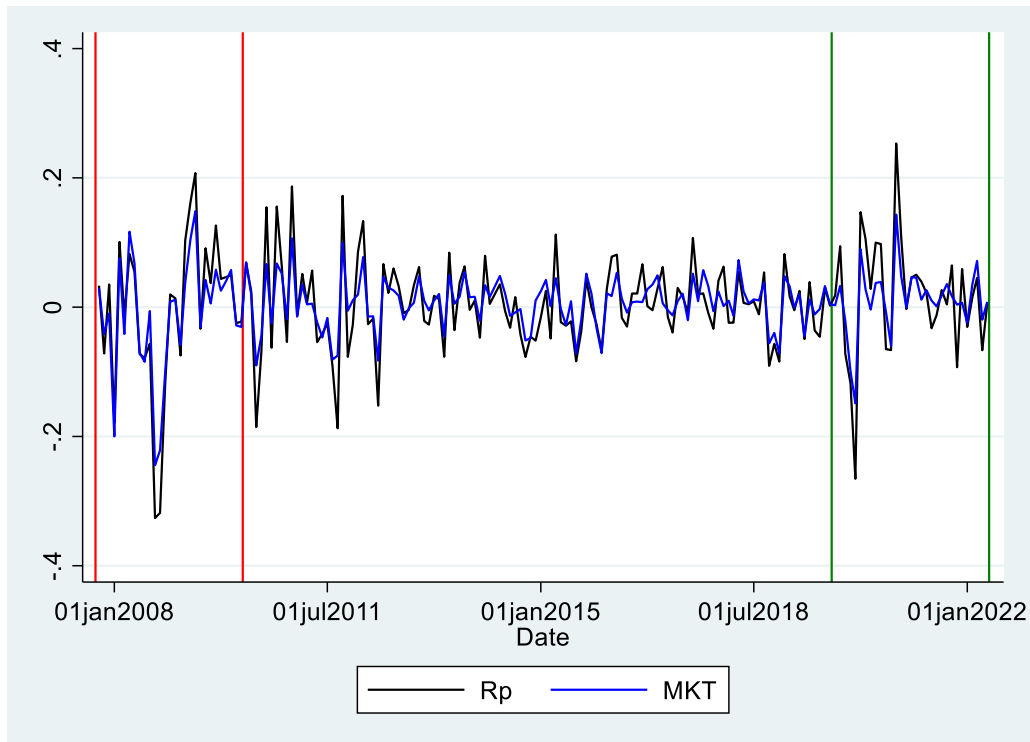


Figure 7: Overview monthly returns Rp and MKT

Figure 7 shows the development of monthly returns for Rp and MKT in the period from October 2007 to May 2022. The area between the vertical red lines represents the financial crisis period. The area between the vertical green lines represents the global pandemic period. The “normal times” period in the analysis is represented by the area between the right red vertical line and the left green vertical line. The monthly returns are represented by decimals where .1 means 10% monthly return.

Figure 7 shows the development in monthly returns for the variables Rp and MKT for our time period. It shows that the two subperiods we are analyzing seems more volatile than the normal times period. It also seems like the black line is more volatile than the blue line. The return of the portfolio of funds seems more volatile than the market return.

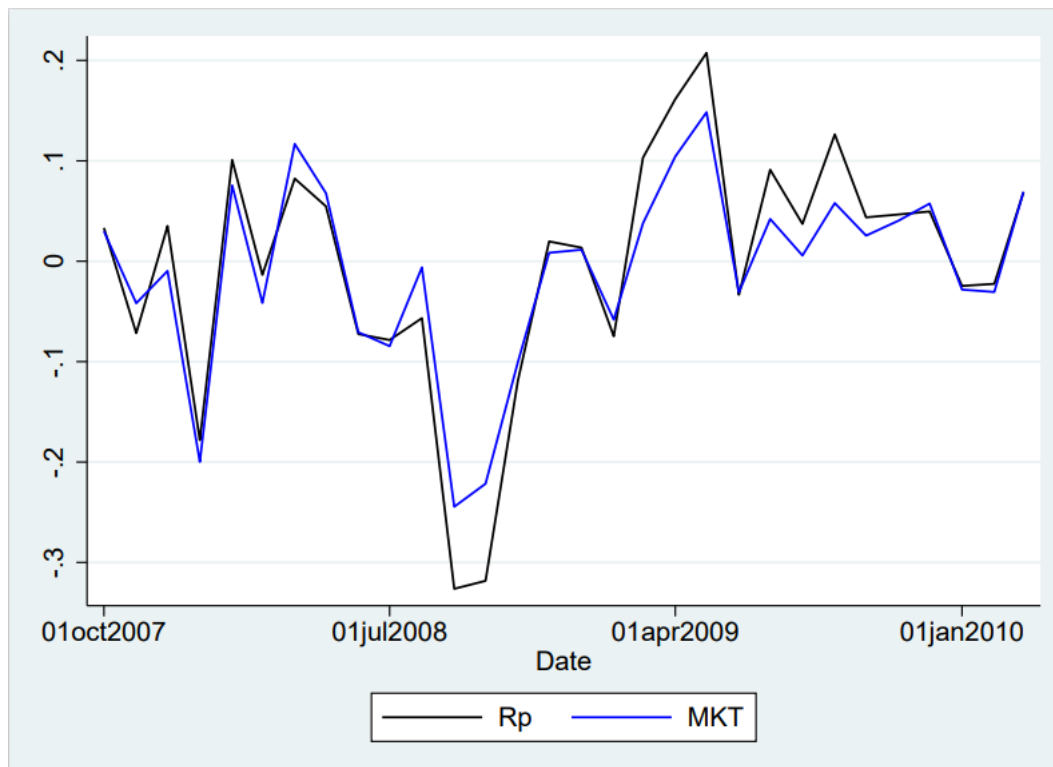


Figure 8: Overview monthly returns: Financial crisis

Figure 8 shows the development in monthly returns for the portfolio of all the active Norwegian mutual funds (Rp) and MKT for the period from October 2007 to March 2010. The black line represents Rp, while the blue line represents MKT. This figure shows the area between the two red lines from figure 7 in more details.

The figure above shows that that the monthly return during the financial crisis has been both positive and negative during the period. The two lines seems to have a strong positive correlation. The black line seems to be a bit more volatile than the blue line.

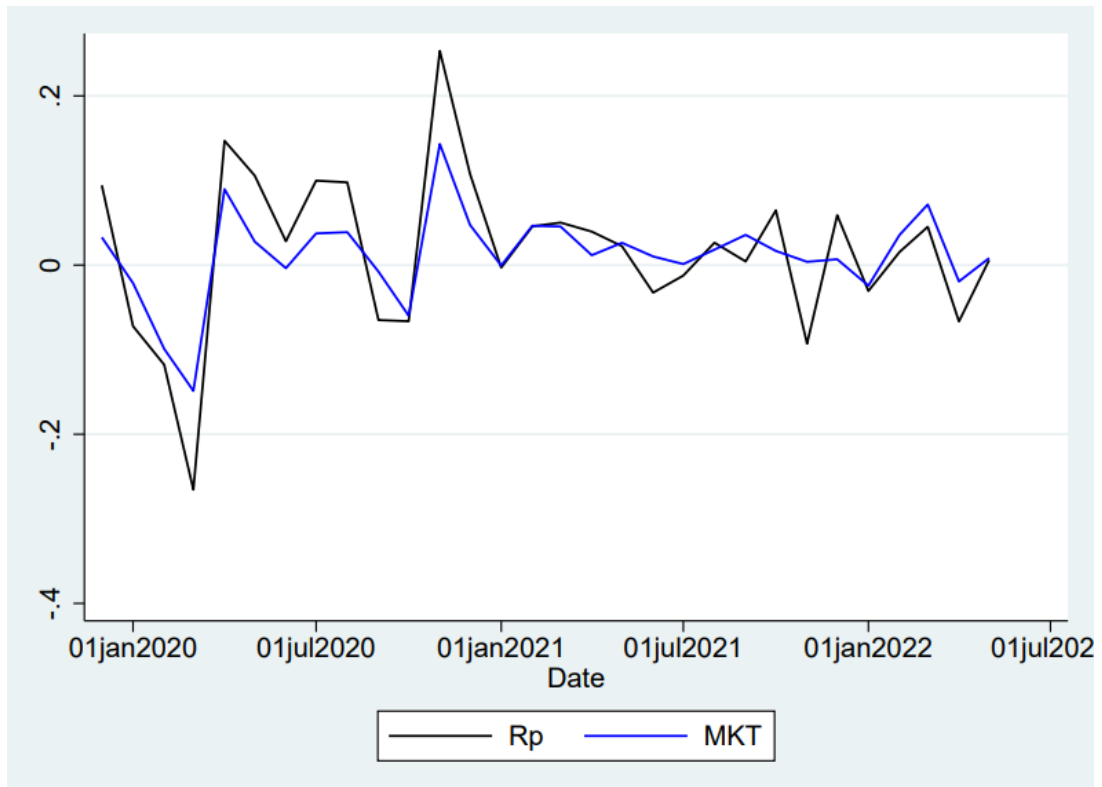


Figure 9: Overview monthly returns: Pandemic

Figure 9 shows the development in monthly returns for the portfolio of all the active Norwegian mutual funds (Rp) and MKT for the period from December 2019 to May 2022. The black line represents Rp, while the blue line represents MKT. This figure shows the area between the two green lines from figure 7 in more details.

The figure above shows that the monthly returns have been positive in some months and negative in others during the pandemic. The two lines seem to follow each other relatively closely. We observe that the black line sometimes lies over the blue line and sometimes below. It seems like the average monthly fund return has a positive relationship with the average monthly return of MKT.

In the upcoming analysis we are going to investigate the returns of each individual fund.

5. Analysis

The research question we aim to answer is whether Norwegian active mutual funds were able to create excess return during the pandemic and/or the financial crisis. This section will be structured in the following way: Firstly, we will investigate the mean return for the portfolio of funds and the market. Secondly, we will analyze the individual funds returns. We will do this by performing the three different regressions introduced in the methodology section, on each fund. We will interpret the results from the regressions, in the order of SIM, FFF3 and C4F, where we in addition will investigate the distribution of the different alphas. Then we will present and analyze the top and bottom performing funds in terms of alpha created during the volatile subperiods. Next, we will conduct the F-tests for all the regressions. Lastly, we will compare the test results from the different regressions and different volatile periods.

5.1 Portfolio return

To give a clear and complementary answer to the research question, we will investigate different characteristics around the monthly returns. We have created an equally weighted portfolio of the funds, which we have called Rp. We start by comparing the average monthly returns of Rp and the market in the three sub-periods to get an initial idea around how the funds have performed.

	Rp	MKT	Rp-MKT
Financial crisis	-0.38416%	-0.90132%	0.51716%
Normal times	0.39703%	0.67935%	-0.28232%
Pandemic	1.62498%	1.23641%	0.38857%

Table 1: Portfolio return

Table 1 above shows the monthly returns in different time periods, where financial crisis represents the time period from October 2007 to March 2010, normal times represents the time period from April 2010 to November 2019 and the pandemic represents the time period from December 2019 to May 2022. Rp is an

equally weighted portfolio of all the active Norwegian mutual funds and MKT is the market risk premium to OSEAX. Rp-MKT is the portfolio minus MKT.

The table shows that the average monthly return for Norwegian mutual funds have been higher during the global pandemic, compared to the two earlier periods. The average monthly return was (-0.38%) during the financial crisis, 0.40% during normal times and 1.62% during the global pandemic. A similar pattern is found for the market performance (MKT). The market gave an average monthly return of (-0.90%) during the financial crisis, 0.68% in normal times and 1.24% during the global pandemic. By comparing the market performance during the pandemic, with the market performance in the two earlier periods, we find an indication of good market performance during the pandemic and poor market performance during the financial crisis.

The result in column 3, shows that the portfolio of funds has an average monthly return during the pandemic, which is 0.39% better than the market. This can indicate that active mutual funds have created excess return during the global pandemic period. The fund managers seem to on average create an excess return that overcomes their average fees. The average annual fees are around 1.4% (Forbrukerrådet, 2019), which is equivalent to approximately 0.116% monthly.

Another interesting finding from the table is that the portfolio of funds has created negative excess return in normal times. The table shows that the market has beaten the portfolio of funds by 0.28%. The excess return created during the global pandemic is less than the excess return created by the funds during the financial crisis. The portfolio of mutual funds has created a monthly excess return of approximately 0.52% during the financial crisis period, which is 0.13% better than during the global pandemic period. To sum up, the results indicates that the fund managers on average, seem to have created excess return in volatile times, and not in non-volatile times. To get a clearer idea on whether the individual funds have been able to create excess return during the volatile periods, we will now perform some regressions. The regressions will control for different risk factors that was not considered in this simple analysis.

5.2 Regressions

When performing the regressions on the mutual funds, we decided to remove some funds from the regression analyses. There were two reasons for the removal. One was that the fund did not operate during the pandemic nor the financial crisis. Hence, the results from the regression would not give us any useful information. We also removed funds which only operated in one of the volatile subperiods and had fewer than 16 observations. With so few observations it is hard to interpret something from the results. This elimination resulted in the removal of 7 of the 115 funds. For the remaining 108 funds we ran the three regression models.

Of the remaining 108 funds, 28 did not operate during the financial crisis, while 25 of them did not operate during the pandemic. This means that of the 108 funds, 55 of them operated during both volatile periods.

	Not active Pandemic	Active Pandemic	
Not active Financial Crisis	7	28	
Active Financial Crisis	25	55	80

83

Table 2: Funds active periods

Where the red square shows the number of funds which were not in the regressions due to the fact that they were not active during the pandemic nor the financial crisis, or that they had to few observations to be included. The upper light green square shows the number of funds only active during the pandemic, the next light green square shows the number of funds only active during the financial crisis, while the dark green square shows the number of funds active in both periods.

We will be running 108 regressions ($55+25+28$) for each regression model. Where 55 of the regressions for each regression model will contain both the pandemic and the financial crisis coefficient, 25 regressions will only contain the financial crisis coefficient and 28 regressions will only contain the pandemic coefficient. The table above shows that we will run 80 regressions ($25+55$) with the financial crisis variable and 83 regressions ($28+55$) with the pandemic variable for each regression model. Hence, we will get corresponding amounts of estimates of the variables for each regression model.

In Stata we ran the three different regressions, respectively SIM, FFF3 and C4F for every individual fund. To investigate whether the funds have created excess return during the financial crisis and the pandemic, we will control and test for different investment strategies/factors in the regression models.

From here and through the rest of the analysis, we will refer to the estimated constant of the regressions, as the normal times coefficient.

For the three different regression models we will observe the sign of the coefficients for the financial crisis and the pandemic. We will in the next subsection investigate these coefficients. We will also investigate the distribution of the different alphas. A reminder when interpreting the alphas as mentioned in the methodology:

The normal alpha is the same as the normal times coefficient, while the pandemic alpha and financial crisis alpha, must not be confused with respectively the pandemic coefficient and the financial crisis coefficient.

Normal times alpha = α_i

Financial crisis alpha = $\alpha_i + \delta_{1,i}$

Pandemic alpha = $\alpha_i + \delta_{2,i}$

5-1: Alpha terms

Where α_i is the estimated normal times coefficient from the regressions for fund i , $\delta_{1,i}$ is the estimated financial crisis coefficient from the regression for fund i , and $\delta_{2,i}$ is the estimated pandemic coefficient from the regressions for fund i .

We start with the investigation of the SIM regressions.

5.2.1 Single Index Model

The Single Index Model regression is our most simple model. It contains only one control variable, the market. We are running the following regression for the funds:

$$r_i - r_f = \alpha_i + \beta_{1,i}(MKT) + \delta_{1,i}(Fin) + \delta_{2,i}(Pan) + \epsilon_i$$

5-2: SIM regressions

Where r_i is the return of the fund i , r_f is the Norwegian 1-month risk-free rate, α_i is the excess return created by fund i in normal times, $\beta_{1,i}$ is the exposure against the market OSEAX less the risk free rate for fund i , $\delta_{1,i}$ is the return explained by the financial crisis for fund i , $\delta_{2,i}$ is the return explained by the pandemic for fund i , and ϵ_i is the residual error for fund i . The regressions will be performed for all funds i .

Coefficients

The following findings of the two coefficients are done purely by observing the regression coefficients, without looking at significance.

The financial crisis coefficient is exclusively positive for all funds. There seems to be a positive relationship between the financial crisis and the funds monthly returns.

The pandemic coefficient is negative for 8 of the funds. The rest of them are positive. There seems to be a positive relationship between the majority of the funds monthly return and the pandemic coefficient.

Distribution of alphas

Below we present the distribution of the three alphas. Firstly, we present the normal alpha:

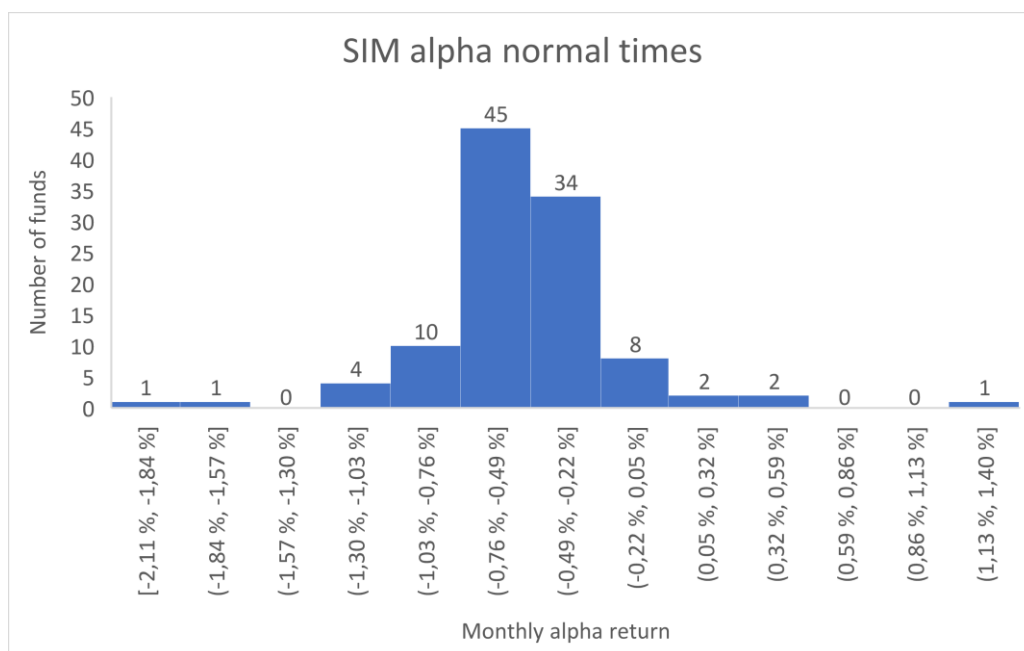


Figure 10: SIM distribution normal alpha

Where the figure shows the distribution of the normal alpha under the SIM regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

We observe that the distribution looks approximately normal. The peak group of the distribution (-0.76%,-0.49%) is negative and contains 45 funds. We see that 95 of the funds, lie in intervals with only negative values. Only 5 funds lie in intervals which have solely positive values. The distribution provides an indication of poor performance during normal times for most of the funds.

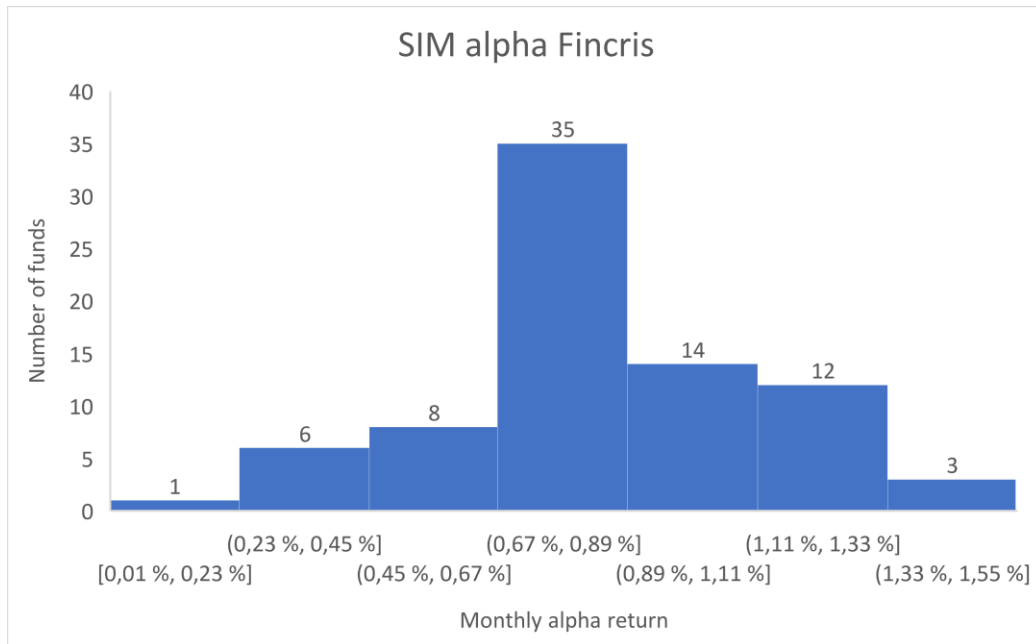


Figure 11: SIM distribution financial crisis alpha

Where figure 11 shows the distribution of the financial crisis alphas under the SIM regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution for the financial crisis alpha is concentrated around the positive interval of (0.67%,0.89%). We observe that all the intervals exclusively contain positive values. Several of the intervals have relatively high alpha values. The distribution indicates that the funds have performed well during the financial crisis and created positive alphas.

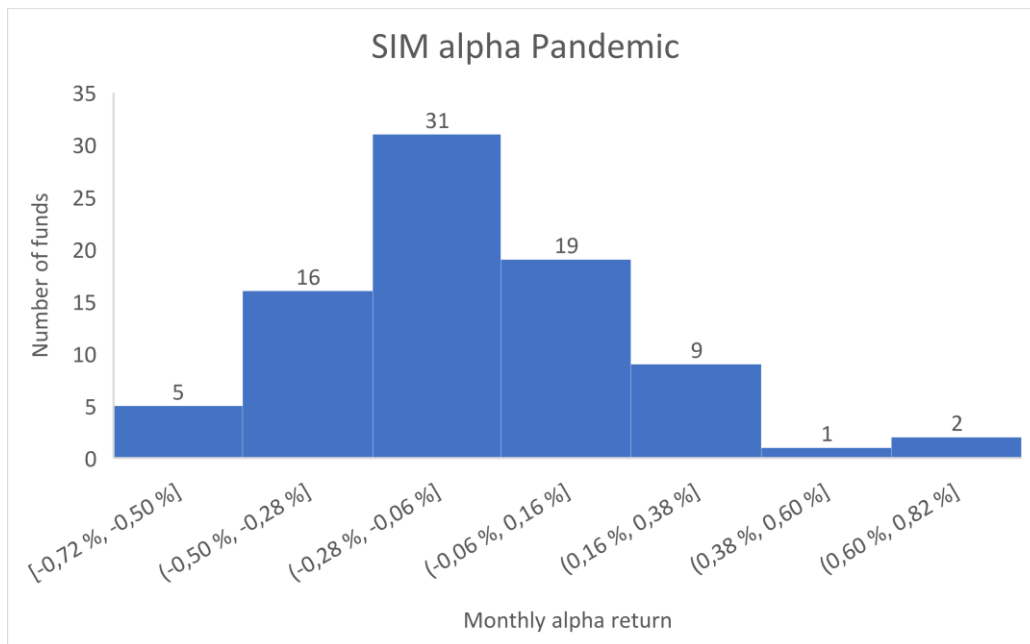


Figure 12: SIM distribution pandemic alpha

Where figure 12 shows the distribution of the pandemic alphas under the SIM regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution of the pandemic alphas is concentrated around the negative interval of (-0.28%, -0.06%), which contains 31 funds. There are 21 funds which falls in alpha intervals below this interval. There are 13 funds which fall in solely positive intervals, while a representable amount of 19 funds falls into an interval containing both negative and positive alpha values. The figure shows that the majority of funds seem to have performed poorly during the pandemic, but there seem to be some well performing funds as well.

5.2.2 Fama French Factor 3 Model

The Fama French Factor 3 model includes the market, and the investment factors SMB and HML. We perform the following regressions:

$$r_i - r_f = \alpha_i + \beta_{1,i}(MKT) + \beta_{2,i}(SMB) + \beta_{3,i}(HML) + \delta_{1,i}(Fincris) + \delta_{2,i}(Pandemic) + \epsilon_i$$

5-3: FFF3 regressions

Where r_i is the return of the fund i , r_f is the Norwegian 1-month risk-free rate, α_i is the excess return created by fund i in normal times, $\beta_{1,i}$ is the exposure against the market OSEAX less the risk free rate for fund i , $\beta_{2,i}$ is

the exposure against the SMB factor for fund i , $\beta_{3,i}$ is the exposure against the HML factor for fund i , $\delta_{1,i}$ is the return explained by the financial crisis for fund i , $\delta_{2,i}$ is the return explained by the pandemic for fund i , and ϵ_i is the residual error for fund i . We will perform the regression for all funds i .

Coefficients

The following findings of the two coefficients are done purely by observing the regression coefficients, without looking at significance.

The financial crisis coefficient is positive for all the funds. There seems to be a positive relationship between the funds monthly return and the financial crisis coefficient.

The pandemic coefficient is positive for 67 funds and negative for 16 funds. There seem to be a positive relationship between approximately 4/5 of the funds monthly return and the pandemic coefficient.

Distribution of alphas

Below we present the distribution of the alphas. We start by presenting the normal alpha:

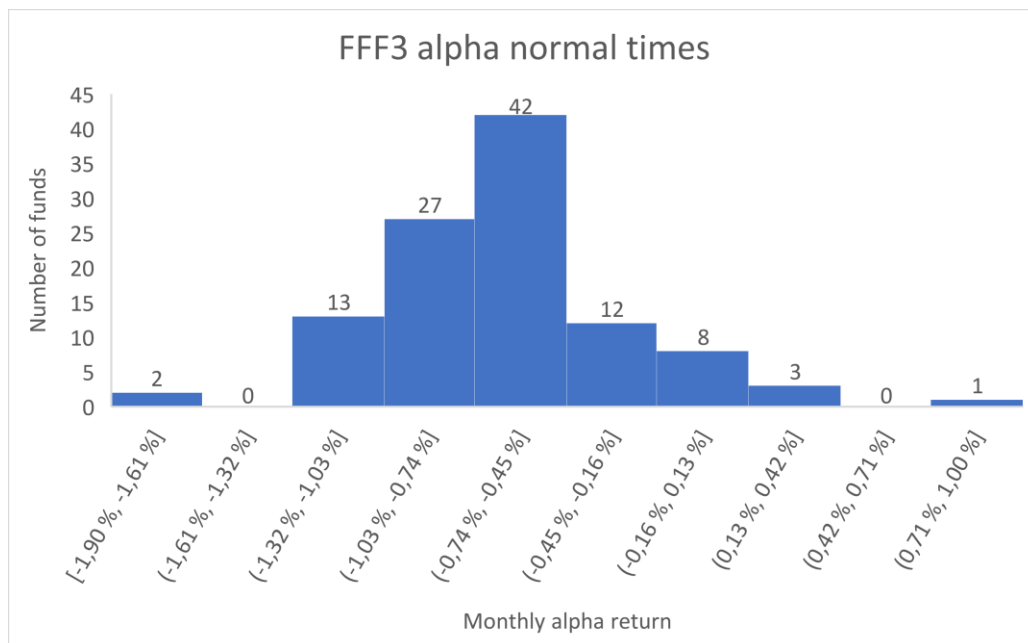


Figure 13: FFF3 distribution normal alpha

Where the figure shows the distribution of the normal alpha under the FFF3 regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution of the normal alpha above, is concentrated around the negative interval of (-0.74%, -0.45%). We can observe from the distribution that 96 of the 108 funds have a negative

normal alpha. Only 4 funds lie in a strictly positive interval. The distribution indicates that most funds seem to have created a negative alpha during normal times.

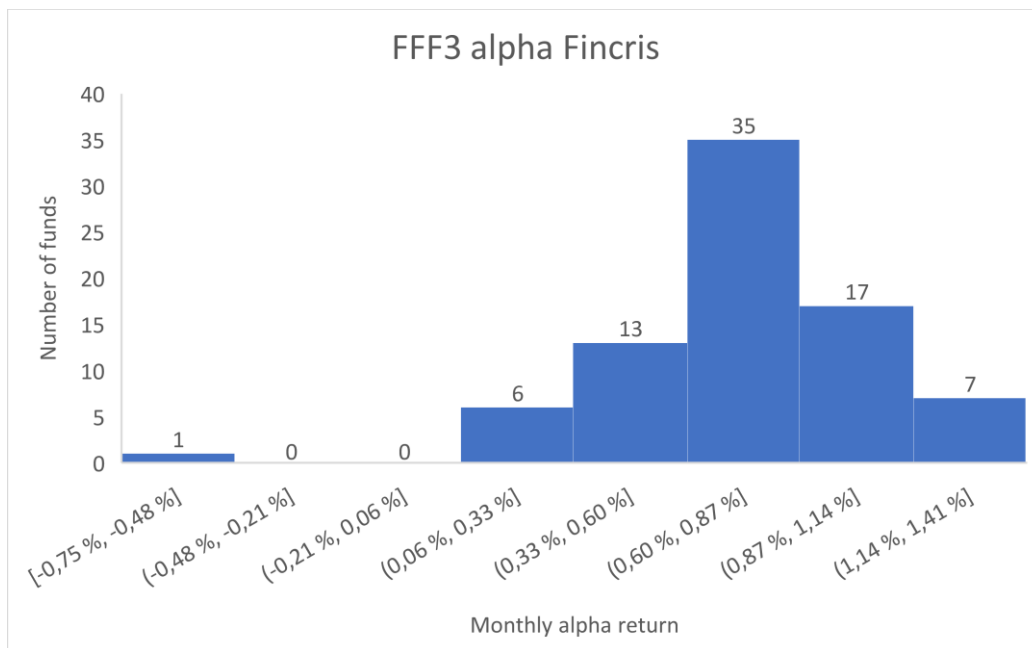


Figure 14: FFF3 distribution financial crisis alpha

Where the figure shows the distribution of the financial crisis alpha under the FFF3 regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

From the distribution of the financial crisis alphas in in figure 14, we observe that all the funds but one, have a positive financial crisis alpha. The negative alpha is in an interval which is quite substantially lower than the rest of the fund's alphas. This fund also got dissolved in the start of 2015. The rest of the alphas are concentrated around the positive interval of (0.60%,0.87%). The distribution indicates that seemingly all the funds but one, created a positive alpha during the financial crisis.

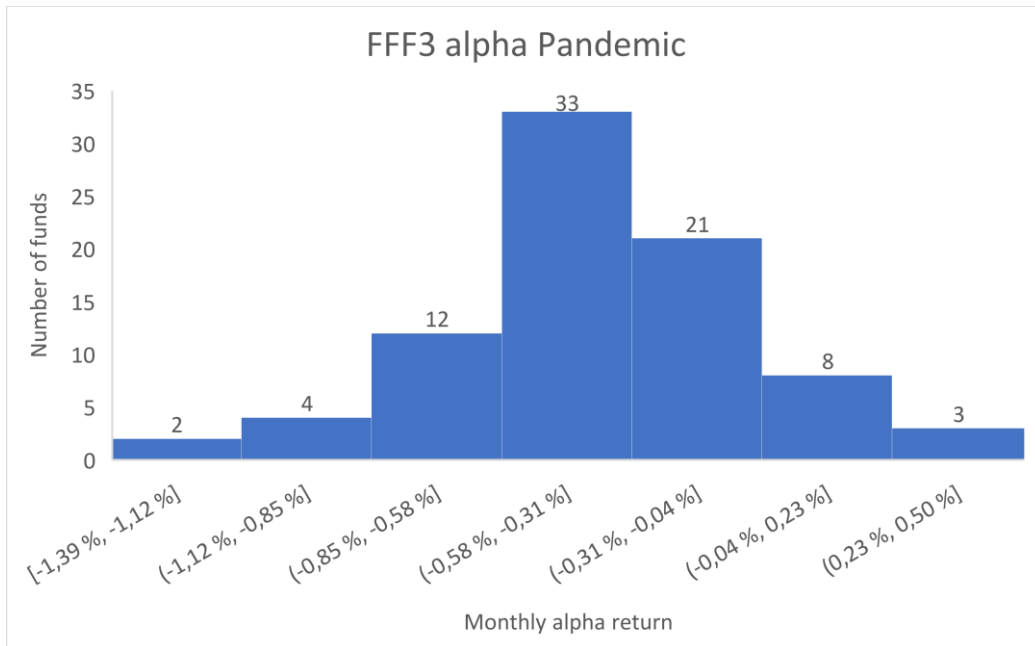


Figure 15: FFF3 distribution pandemic alpha

Where the figure shows the distribution of the pandemic alpha under the FFF3 regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution of the pandemic alphas is concentrated around the negative interval of (-0.55%, -0.31%). We observe that 72 of the funds lie in negative intervals, 3 lie in a positive interval and 8 lie in an interval which includes both positive and negative values. The distribution indicates that the majority of funds created a negative alpha during the pandemic.

5.2.3 Carhart 4 Factor Model

The C4F model is our most comprehensive model. It includes 4 factors, the market MKT, SMB, HML and WML. We perform the following regression:

$$r_i - r_f = \alpha_i + \beta_{1,i}(MKT) + \beta_{2,i}(SMB) + \beta_{3,i}(HML) + \beta_{4,i}(WML) + \delta_{1,i}(Fin crisis) + \delta_{2,i}(Pandemic) + \epsilon_i$$

5-4: C4F regressions

Where r_i is the return of the fund i , r_f is the Norwegian 1-month risk-free rate, α_i is the excess return created by fund i in normal times, $\beta_{1,i}$ is the exposure against the market OSEAX less the risk free rate for fund i , $\beta_{2,i}$ is the exposure against the SMB factor for fund i , $\beta_{3,i}$ is the exposure against the HML factor for fund i , $\beta_{4,i}$ is the exposure against the WML factor for fund i , $\delta_{1,i}$ is the return explained by the financial crisis for fund i , $\delta_{2,i}$ is the return explained by the pandemic for fund i , and ϵ_i is the residual error for fund i . The regressions will be performed for all funds i .

Coefficients

The following findings of the two coefficients are done purely by observing the regression coefficients, without looking at significance.

For the funds that operated during the financial crisis, the financial crisis coefficient is exclusively positive for all funds.

For the funds that operated during the pandemic, the pandemic coefficient seems to be almost exclusively positive. Only 7 funds have a negative value. There seems to be a positive relationship between the pandemic variable and the funds monthly return.

Distribution of alphas

Below we present the distribution of the normal alpha under the C4F model:

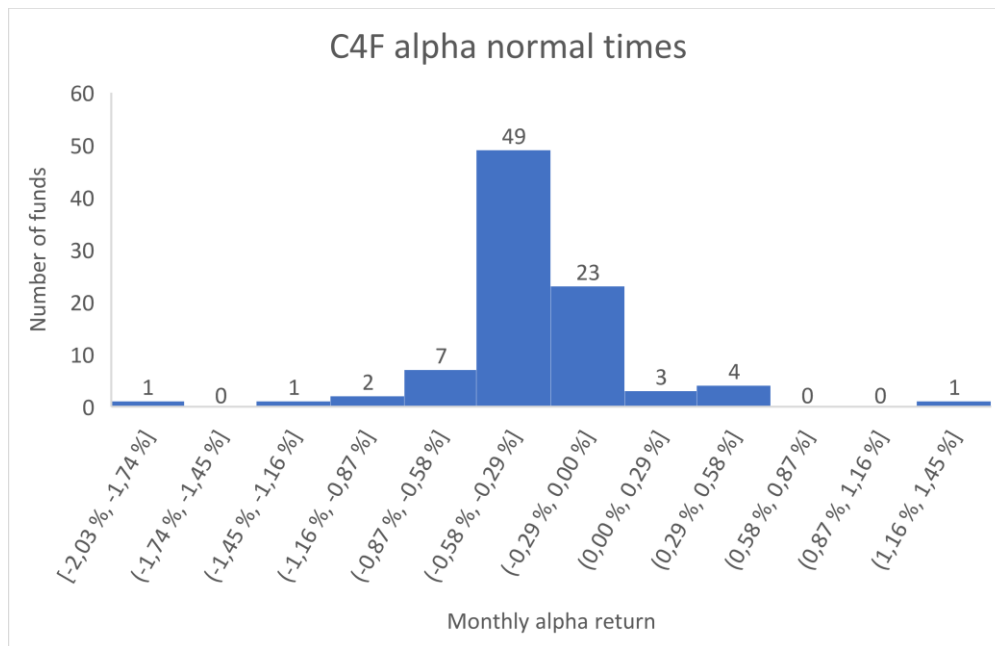


Figure 16: C4F distribution normal alpha

Where the figure shows the distribution of the normal alpha under the C4F regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution of normal alphas in figure 16 shows that 49 of the funds, almost half the portfolio, lies in the negative interval of (-0.58%, -0.29%). There are 11 funds which fall in worse intervals. In addition, 23 funds lie in a negative interval. There are 8 funds which

seemingly created a positive alpha during normal times, while the rest, the majority, seems to create a negative alpha.

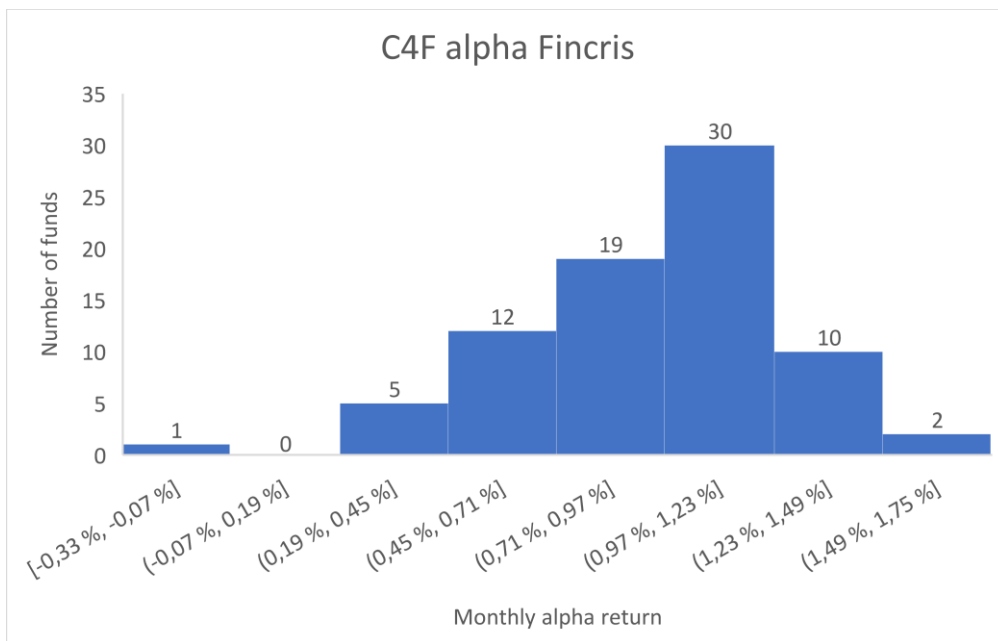


Figure 17: C4F distribution financial crisis alpha

Where the figure shows the distribution of the financial crisis alpha under the C4F regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution of financial crisis alphas is concentrated around the positive interval of (0,97%,1,23%). All the funds but one, lie in positive alpha intervals. This indicates that funds seems to have created a positive alpha during the financial crisis.

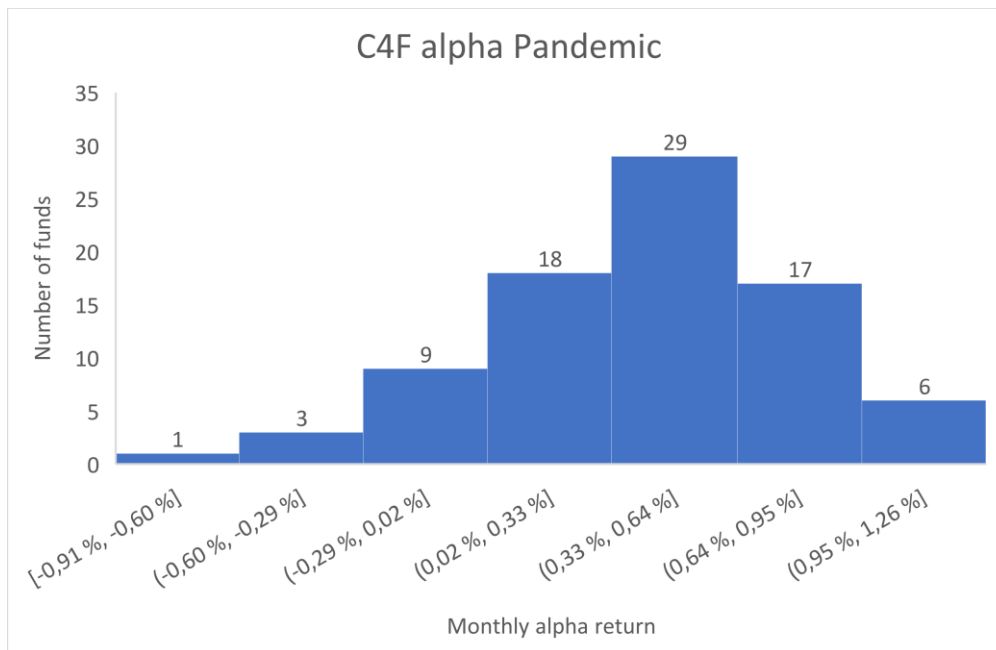


Figure 18: C4F distribution pandemic alpha

Where the figure shows the distribution of the pandemic alpha under the C4F regression. The y-axis explains the number of funds, while the x-axis represents alpha intervals.

The distribution of pandemic alphas is concentrated around the positive interval of $(0,33\%,0,64\%)$. There are 69 funds which have alphas in strictly positive intervals. Only 4 funds create a negative alpha, while 9 of the funds lie in an interval containing both positive and negative values. The distributions indicates that most of the funds seemingly created a positive alpha during the pandemic.

5.2.4 Comparison of distributions

From the provided distributions of alphas for the different regressions we can spot some patterns. Firstly, we spot that the normal alpha distributions are quite similar. They all provide a distribution with a small number of positive alphas, while the rest is negative. Secondly, we observe that the financial crisis alpha distributions are very similar. The distributions contain only positive alphas, with the exception of one alpha in two of the distributions. The pandemic alpha distributions are not similar. The pandemic alpha distribution from the FFF3 regression have most negative alphas of the three different pandemic alpha distributions. The distribution from the SIM regression has fewer negative alphas then from the FFF3, and the distribution from the C4F regressions have even fewer negative alphas. The C4F regression finds the

majority of pandemic alphas to be positive, while the SIM and FFF3 regressions finds the majority of pandemic alphas to be negative.

When we inspect the individual fund's ability to create alphas, we can also see some patterns.

There are only 3 funds which managed to create a positive normal alpha for all the three alpha regression estimates. There are 6 funds which managed it for two estimates, and 6 funds which managed it for one. This means that there are 93 funds which created a negative alpha for all the three regression estimates.

The funds which managed to create a positive financial crisis alpha for one of the regressions models, managed to create a positive alpha for all the regressions, except for 1 fund. This fund created a negative financial crisis alpha for two of the regression models, and a positive for 1.

There were 9 funds which have a positive pandemic alpha for all the three estimates. 10 funds managed it for two of the regressions, 53 funds managed it for one regression, while the remaining 11 fund had exclusively negative alphas.

Interestingly there were only 2 funds which were able to create positive pandemic alphas and positive financial crisis alphas for all the three regression estimates. These two funds seem to be able to create a positive alpha during volatile times. They are respectfully, Storebrand Verdi N and Storebrand Verdi A.

All the different alpha values, for all the individual funds, under all the regression models, can be found in the appendix.

5.3 Top and bottom performing funds

We will in this subsection investigate the top and bottom performing funds for our two volatile subperiods, the pandemic and the financial crisis. We will look at the funds ability to create alpha during these periods. We have taken the average of the alphas for the individual funds across the different regression estimates, to rank the funds in terms of average alpha as discussed in the methodology. We will start by examining the top and bottom performing funds during the financial crisis.

5.3.1 Financial crisis

Below we present the table of the top 10 performing funds in terms of average alpha during the financial crisis:

Financial crisis top performing funds	SIM	FFF3	C4F	Average alpha
Fondsfinans Norge	1,4601 %	1,3025 %	1,5438 %	1,4355 %
Landkreditt Norge	1,4263 %	1,1906 %	1,5112 %	1,3761 %
Terra Norge	1,4392 %	1,1479 %	1,4794 %	1,3555 %
Danske Invest Norske Aksjer Inst II	1,2684 %	1,2635 %	1,4669 %	1,3329 %
Danske Invest Norge II	1,2629 %	1,2544 %	1,4680 %	1,3284 %
Danske Invest Norske Aksjer Inst I	1,2130 %	1,2121 %	1,4101 %	1,2784 %
Danske Invest Norge I	1,1911 %	1,1833 %	1,3992 %	1,2579 %
PLUSS Markedsverdi	1,1270 %	1,1201 %	1,3085 %	1,1852 %
Storebrand Vekst N	1,2848 %	1,0472 %	1,1903 %	1,1741 %
Storebrand Vekst A	1,2847 %	1,0472 %	1,1898 %	1,1739 %

Table 3: Top performing funds during the financial crisis

Table 3 shows the top performing funds from the financial crisis, where the first column shows the names of the funds, the second column shows the alpha return from the SIM-regression, the third column shows the alpha-return from the FFF3-regression, the fourth column shows the alpha-return from the C4F-regressions and the last column shows the average alpha return from the three different regressions. The funds are sorted after highest average alpha.

From the table above we observe that the top 10 performing funds during the financial crisis all have an average alpha across the regression models above 1%. We also observe that the individual fund's alphas do not deviate a lot across the different regression estimates. Danske invest are highly represented with 4 funds. Storebrand have 2 of the top performing funds.

The table below lists the poorest performing funds during the financial crisis:

Financial crisis worst performing funds	SIM	FFF3	C4F	Average alpha
Nordea SMB	0,0120 %	-0,7526 %	-0,3281 %	-0,3562 %
ODIN Norge II (I)	0,4463 %	0,0908 %	0,3909 %	0,3093 %
ODIN Norge II (III)	0,4440 %	0,0965 %	0,3879 %	0,3095 %
ODIN Norge II (II)	0,4500 %	0,0958 %	0,4060 %	0,3173 %
ODIN Norge C NOK	0,3510 %	0,2284 %	0,4097 %	0,3297 %
ODIN Norge D NOK	0,4347 %	0,3119 %	0,4928 %	0,4131 %
ODIN Norge B NOK	0,4349 %	0,3120 %	0,4929 %	0,4133 %
ODIN Norge A NOK	0,4556 %	0,3328 %	0,5136 %	0,4340 %
Nordea Norge Verdi	0,4558 %	0,3475 %	0,5733 %	0,4589 %
Nordea Vekst	0,5636 %	0,3659 %	0,6427 %	0,5241 %

Table 4: Worst performing funds during the financial crisis

Table 4 shows the worst performing funds from the financial crisis, where the first column shows the names of the funds, the second column shows the alpha return from the SIM-regression, the third column shows the alpha-return from the FFF3-regression, the fourth column shows the alpha-return from the C4F-regressions and the last column shows the average alpha return from the three different regressions. The funds are sorted after lowest average alpha.

We observe from the table that the worst performing fund, performs a lot worse than the rest of the funds. This fund is the only fund which has a negative alpha. The fund is Nordea SMB, and the fund got dissolved in the start of 2015. The rest of the poor performing funds have created a positive average alpha during the financial crisis. This indicates that even though they were the worst performing funds in terms of alpha created, they still performed well, but not as well as the rest of the funds. We observe that ODIN Norge and Nordea are the only corporations on the list, with respectively 7 funds and 3 funds.

5.3.2 Pandemic

The table below presents the top performing funds in terms of average alpha during the pandemic:

Pandemic top performing funds	SIM	FFF3	C4F	Average alpha
SR-Bank Norge D	0,3863 %	0,2437 %	1,0518 %	0,5606 %
SR-Bank Norge C	0,3570 %	0,2145 %	1,0223 %	0,5312 %
SR-Bank Norge N	0,3455 %	0,2055 %	1,0098 %	0,5203 %
SR-Bank Norge U	0,3412 %	0,2010 %	1,0042 %	0,5154 %
Storebrand Verdi N	0,3262 %	0,3339 %	0,8807 %	0,5136 %
SR-Bank Norge B	0,3237 %	0,1814 %	0,9888 %	0,4979 %
SR-Bank Norge A	0,3235 %	0,1812 %	0,9886 %	0,4978 %
Storebrand Verdi A	0,2659 %	0,2744 %	0,8181 %	0,4528 %
Norse Utbytte	0,2697 %	0,0932 %	0,8723 %	0,4118 %
Pareto Aksje Norge I	0,0966 %	-0,1109 %	0,8726 %	0,2861 %

Table 5: Top performing funds during the pandemic

Table 5 shows the top performing funds from the pandemic, where the first column shows the names of the funds, the second column shows the alpha return from the SIM-regression, the third column shows the alpha-return from the FFF3-regression, the fourth column shows the alpha-return from the C4F-regressions and the last column shows the average alpha return from the three different regressions. The funds are sorted after highest average alpha.

From the table above we can see that the top performing funds during the pandemic created an average alpha across the regression models in the interval of (0.28%,0.56%). These alphas are a lot smaller than the positive alphas created during the financial crisis by the top 10 performing funds. We can also observe that the individual fund's alphas deviate a lot across the different regression estimates during the pandemic, compared to the financial crisis. SR-Bank is highly represented in the table with 6 of the funds, while Storebrand is represented with 2 funds.

The table below shows the worst performing funds during the pandemic in terms of average alpha created:

Pandemic worst performing funds	SIM	FFF3	C4F	Average alpha
Storebrand Vekst A	-0,5013 %	-1,3862 %	-0,5933 %	-0,8269 %
Storebrand Vekst N	-0,4729 %	-1,3571 %	-0,5649 %	-0,7983 %
DNB SMB R	-0,1254 %	-1,0959 %	-0,9069 %	-0,7094 %
FIRST Norway	-0,7174 %	-0,9036 %	-0,1098 %	-0,5769 %
DNB Norge R	-0,5935 %	-0,9054 %	-0,1303 %	-0,5431 %
DNB Norge Selektiv R	-0,3150 %	-0,7587 %	-0,4766 %	-0,5168 %
FORTE Trønder	-0,4832 %	-1,0496 %	0,0092 %	-0,5079 %
PLUSS Markedsverdi	-0,5362 %	-0,5492 %	0,0338 %	-0,3505 %
Storebrand Norge B	-0,3230 %	-0,7206 %	-0,0010 %	-0,3482 %
Equinor Aksjer Norge	-0,2482 %	-0,6076 %	-0,1544 %	-0,3367 %

Table 6: Worst performing funds during the pandemic

Table 6 shows the worst performing funds from the pandemic, where the first column shows the names of the funds, the second column shows the alpha return from the SIM-regression, the third column shows the alpha-return from the FFF3-regression, the fourth column shows the alpha-return from the C4F-regressions and the last column shows the average alpha return from the three different regressions. The funds are sorted after lowest average alpha.

From table 6 we observe that the worst performing funds during the pandemic, seem to perform a lot worse than the worst performing funds during the financial crisis. All the funds have a negative average alpha. We can also observe that the individual fund's alphas deviate a lot across the different regression estimates during the pandemic, like the alphas did for the best performing funds during the pandemic. We observe that the table lists 3 DNB funds and 3 Storebrand funds as some of the worst performing funds during the pandemic.

5.4 F-tests

The distributions of alphas and the conducted investigation of top and bottom performing funds are not sufficient to find clear evidence of excess return. To test whether the funds were able to create excess return during the two volatile periods we will perform F-tests of the alphas.

To test for excess return created during the pandemic, we will test the following hypothesis for all the three regression models:

$$H_0: \delta_{2,i} + \alpha_i = 0, \quad H_A: \delta_{2,i} + \alpha_i \neq 0$$

5-5: Pandemic tests

where $\delta_{2,i}$ is the estimated dummy variable for the pandemic for fund i , and α_i is the estimated constant from the regression which represents the normal times period for fund i .

To test for excess return created during the financial crisis, we will test the following hypothesis for all the three regression models:

$$H_0: \delta_{1,i} + \alpha_i = 0, \quad H_A: \delta_{1,i} + \alpha_i \neq 0$$

5-6: Financial crisis tests

where $\delta_{1,i}$ is the estimated dummy variable for the financial crisis for fund i , and α_i is the estimated constant from the regression which represents normal times period for fund i .

The results of the tests for the different funds and regression models are presented below:

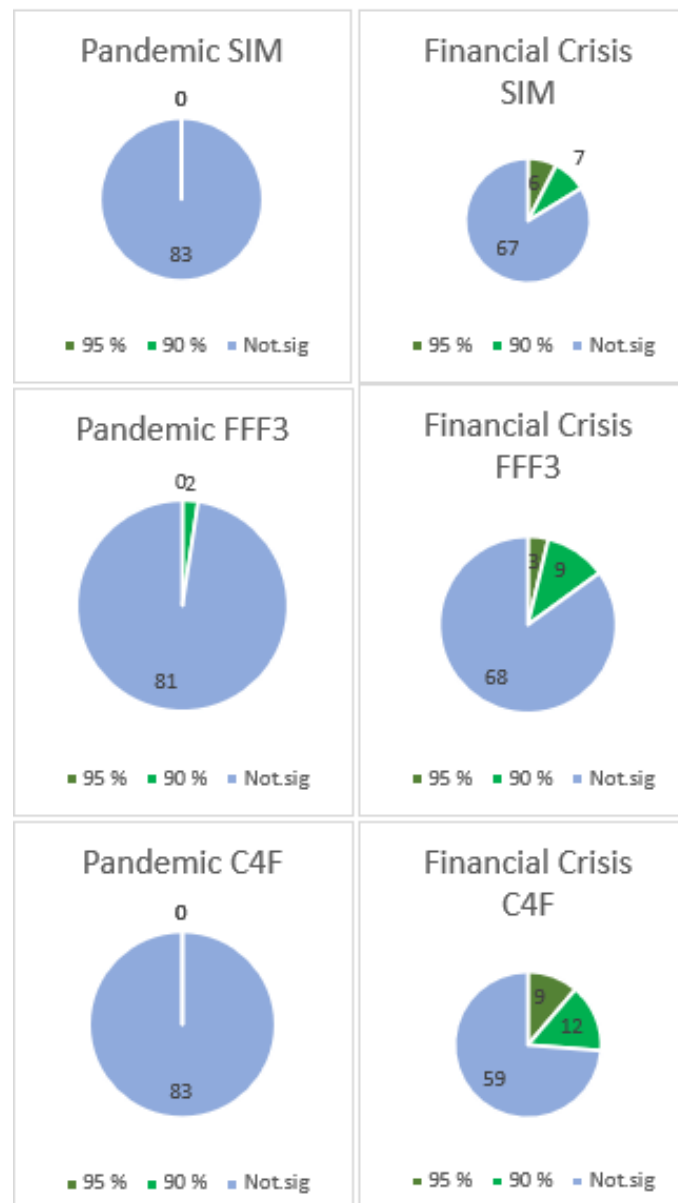


Figure 19: F-tests of alpha in the three regression models: SIM, FFF3, C4F

Where the three diagrams to the left represents the test results for excess return created during the pandemic, the three diagrams to the right represents the test results for excess return created during the financial crisis. The two upper tests are performed on the SIM regressions, the two middle tests are performed on the FFF3 regressions, and the two last tests are performed on the C4F regressions. The blue color in the diagrams are funds that did not create excess return with a significance level 90% and above. The darkest green color represents 95% significance level, and the lighter green color represents 90% significance level.

P-values from all the F-tests is placed in the appendix.

5.4.1 Single Index Model (SIM)

From the first pandemic figure above, we observe that none of the funds were able to create excess return during the pandemic with a significance above 90%.

From the first financial crisis figure, we observe significance. We see that the amount of funds which were able to create excess return during the pandemic is 6 at the 95% level and 7 at 90%. The last 67 funds were not able to create excess return with a significance level of 90% or above. All the funds who have a significant excess return created a positive alpha.

The figures do not provide any evidence of excess return created by the funds during the pandemic. However, we find evidence of excess return created during the financial crisis by several funds.

5.4.2 Fama French Factor 3 Model (FFF3)

From the pandemic tests we can observe that there are 2 funds which managed to create excess return at the 90% level. The remaining 81 funds were not able to create excess return at a significant level at 90%. Both the funds which created excess return at a significant level of 90%, created a negative alpha.

From the financial crisis tests we observe that there are 3 funds that managed to create excess return at the 95% level and 9 that created excess return at the 90% level. The last 68 funds did not have a significant alpha. All the funds with a significant excess return, created a positive alpha.

From the figures we find evidence of two funds which created negative excess return during the pandemic. In addition, the figures provide evidence of positive excess return created during the financial crisis by 12 funds.

5.4.3 Carhart 4 Factor Model (C4F)

From the pandemic figure we observe that no funds were able to create excess return with a significance level of 90%.

From the financial crisis figure we observe that 9 funds created excess return at the 95% significance level while 12 did at the 90%. 59 funds were not able to create excess return with a significant level of 90%.

From the tests of the C4F regression we do not see any evidence of excess return created during the pandemic. For the financial crisis we see strong evidence of funds creating excess return. 21 funds created excess return with a significance level above 90%. All of these funds created a positive alpha.

5.4.4 Comparison of tests

The F-tests for excess return created during the pandemic are not significant for all alphas except 2. These two alphas created a negative excess return in the FFF3-regressions. The funds who created negative excess return with a significance of 90% in the FF3-regressions were “Storebrand Vekst N” and “Storebrand Vekst A”.

The F-tests for alpha created during the financial crisis were significant at the 90% level or above for 13 funds in the SIM-regressions, 12 funds in the FFF3-regressions and 21 funds in the C4F-regressions. All the significant alphas were positive. This provides evidence that some of the 81 funds which operated during the financial crisis were able to create a positive excess return during the period.

5.5 Comparison and discussion of F-tests and alpha distribution

In this subsection we will combine the findings from the F-tests with the observations from the alpha tables in section 5.3. We will investigate if some of the top and bottom performing funds during the two volatile periods, were the funds which managed to create statistically significant excess return.

All the F-tests for excess return created during the pandemic, showed that the different funds were not able to create any excess return. Except for two tests in the FFF3 regression, where two funds created a statistically significant negative excess return. The two funds who had significant negative alphas, were the two funds which were listed as the worst performing funds from the list provided in table 6. Their average alphas can be found in this table.

Since we do not find any funds which were able to create a significant excess return for more than one regression model during the pandemic, our findings indicate that no funds were able to create significant excess return during the period.

The F-tests for the financial crisis shows signs of several funds that were able to create a significant positive excess return for the different regressions.

When examining F-tests for the individual funds under the financial crisis there are several funds which created excess return for more than one test. This provides evidence that the funds were in fact able to create excess return during the financial crisis. The funds who were significant for all the F-tests are listed below.

Funds	SIM Tests sig.lvl	FFF3 Tests sig.lvl	C4F Tests sig.lvl
Danske Invest Norske Aksjer Inst I	95%	95%	95%
Danske Invest Norge II	95%	95%	95%
Danske Invest Norske Aksjer Inst II	95%	95%	95%
Terra Norge	95%	90%	95%
Landkreditt Norge	95%	90%	95%
Fondsfinans Norge	95%	90%	95%
Danske Invest Norge I	90%	90%	95%
PLUSS Markedsverdi	90%	90%	95%
PLUSS Aksje	90%	90%	95%
KLP AksjeNorge P	90%	90%	90%
KLP AksjeNorge S	90%	90%	90%
KLP AksjeNorge N	90%	90%	90%

Table 7: Funds with significant excess return during the financial crisis

Where the first column shows the name of the funds, the second column is the funds significance level under SIM, the third column is the significance level under FFF3, and the fourth column is the significance level under C4F.

From the table above we see the funds which created excess return at the highest significance levels. “Danske Invest Norske Aksjer Inst I”, “Danske Invest Norge II” and «Danske Invest Norske Aksjer Inst II» were able to create excess return at the 95% level for all the tests. Danske Invest seem to have performed well for several of their different funds, as they also have another fund on the list. We find strong evidence of excess return created by the listed funds in table 7.

Of the top 10 performing funds listed in table 3, we find that the top 8 performing funds, created a statistically significant alpha for all the regression models by inspecting table 7. Their average alphas are listed in table 3. In addition to these 8 funds, we find evidence of significant excess return created by 4 more funds. The funds are respectfully KLP AksjeNorge P, KLP AksjeNorge S, KLP AksjeNorge N and PLUSS Aksje. They all have almost the same individual average alpha across the regression models of approximately 1.14%.

Overall, when comparing excess return created during the pandemic and the financial crisis, we find that seemingly no funds were able to create excess return during the pandemic, while several managed to create positive excess return during the financial crisis.

6. Limitations and further research

In the following section we will explain some limitations, assumptions and simplifications in our research.

6.1 Volatile subperiods

When choosing the volatile sub-time periods, we make some simplifications. First, we assume that the two volatile crises have the same length (30 months). The actual length of the two crises is difficult to measure, and the crises do not necessarily have the same length. The reason for our choice is to have a sufficient number of observations for both periods, and to try and capture not just the peak of the crises, but also the buildup and the after lashes. An idea for further research is to isolate the highest peaks on the VIX curve presented in figure 1 and analyze them with a narrower horizon.

When choosing the starting and finishing points of our subperiods we must also make an educated guess. Another idea for further research is to change the subperiods horizon by changing the starting point, finishing point, or both.

Changing the length of the periods, or the starting or finishing point of the period, might give different results than what we got.

6.2 Regressions

In our regression models we also make some simplifications and assumptions.

Firstly, there will always be a possibility of omitted variable bias, no matter how many variables we control for. It is possible to control for additional investment factors, for instance the extra investment factors in Fama and French five factor model, RMA and CMA (2014). Significant world events, which effect the stock markets are also something which could affect the models. This includes new policies, conflicts, wars and so on.

Secondly, our regressions are structured in a way which make a simplification. In the construction of our regression models, we assume that the mutual funds behave in the same manner during the two volatile periods as they would do normally.

6.3 Lack of observations

Another limitation to our research is the lack of observations in our two volatile subperiods (30 observations). We are using monthly returns. It is possible to run our regression models for weekly or daily returns. In this way it might be easier to find significance. Doing this will also make it easier to narrow the subperiods as discussed under the “time period limitations”, and possibly still find significance. On the other hand, is it likely that this method will produce more noise in the estimates.

6.4 Other possible constraints

We have as mentioned in the data section, carefully extracted our data and used it with caution to assure the quality of our results. However, there will always be possibilities for human errors when computing numbers through models.

The paper has been written as a master thesis over one semester. This means that there are time and resource constraints.

7. Conclusion

In this paper we have investigated the performance of Norwegian active mutual funds during the pandemic and the financial crisis. The performance of the funds has been measured against OSEAX, and whether the funds were able to create excess return (alpha). We have analyzed the period from October 2007 to May 2022, with emphasis on the period from December 2019 to May 2022 as the global pandemic period and the period from October 2007 to March 2010 as the financial crisis period. We have used different regression methods to analyze the performance. We conducted SIM, FFF3 and C4F on the fund's monthly returns.

We do not find any evidence of excess return created during the pandemic. This means that we cannot reject that the active mutual funds created an alpha different from zero. Several funds had a higher average monthly return than the market during the pandemic. Despite this higher return, we do not find evidence of significant excess return.

We find evidence of excess return created during the financial crisis for several funds. There are multiple funds that managed to create a significant positive alpha in this period. These funds managed to create an average monthly alpha of 1.26%.

During normal times we do not test for excess return as it is not part of our main analysis. However, when we examine the distribution of the normal alphas in section 5.2, there seems to be a vast majority of negative alphas.

To conclude it seems like it was easier for fund managers to create excess return during the financial crisis than during the pandemic. This is also quite intuitive as the pandemic crisis is much more complex than the financial crisis. The general market performance during the financial crisis was poor, while the general market performance during the pandemic was high, compared to normal times. This probably made most investors with less insight to active management unhappy with the performance of the funds during the financial crisis, and happy during the pandemic. Even though we find that several funds created a positive excess return during the financial crisis, and non during the pandemic.

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Appendix

Abbreviations

CAPM: Capital Asset Pricing Model

CMA: Conservative Minus Aggressive

C4F: Carhart 4 Factor

FFF3: Fama French Factor 3

FFF5: Fama French Factor 5

EMH: Efficient Market Hypothesis

HML: High minus Low

MKT: Market

OSE: Oslo Stock Exchange

OSEAX: Oslo Stock Exchange All-Share Index

RMW: Robust Minus Weak

SIM: Single Index Model

SMB: Small Minus Big

WML: Winners Minus Losers

Abbreviations in dataset

Mutual Funds	Variable	Mutual Funds	Variable	Mutual Funds	Variable
Handelsbanken Norge	F1	ODIN Norge D NOK	F41	KLP AksjeNorge N	F81
ODIN Norge II (I)	F2	Sbanken Framgang Sammen	F42	Alfred Berg Norge Transition C (NOK)	F82
ODIN Norge II (II)	F3	Equinor Aksjer Norge	F43	Pareto Aksje Norge N	F83
Formue Diversifiserte Norske Aksjer	F4	Storebrand Norge Fossilfri A	F44	KLP AksjeNorge P	F84
Storebrand Norge Institusjon	F5	DNB SMB N	F45	Delphi Norge A	F85
FIRST Norge Verdi	F6	DNB SMB R	F46	Eika Norge	F86
Delphi Vekst	F7	FIRST Generator A	F47	Storebrand Vekst A	F87
NB Aksjefond	F8	Storebrand Verdi N	F48	Danske Invest Norge I	F88
Storebrand Optima Norge B	F9	Landkreditt Utbytte I	F49	Danske Invest Norge Vekst	F89
DNB Norge Selektiv (II)	F10	DNB Norge A	F50	Danske Invest Norge II	F90
Alfred Berg Norge +	F11	DNB Norge N	F51	Fondsfinans Norge	F91
DNB Norge (Avanse I)	F12	DNB Norge R	F52	Alfred Berg Aktiv C (NOK)	F92
DNB Norge Selektiv	F13	DNB Norge Selektiv A	F53	Alfred Berg Norge C (NOK)	F93
DNB Norge (III)	F14	DNB Norge Selektiv N	F54	Alfred Berg Gambak C (NOK)	F94
DNB Norge (I)	F15	DNB Norge Selektiv R	F55	Nordea Norge Verdi	F95
Alfred Berg Norge Etisk	F16	FIRST Norway	F56	Nordea Avkastning	F96
Alfred Berg Aktiv II	F17	SR-Bank Norge A	F57	Nordea Kapital	F97
Nordea Vekst	F18	SR-Bank Norge B	F58	PLUSS Markedsverdi	F98
Nordea SMB	F19	SR-Bank Norge C	F59	PLUSS Aksje	F99
DNB Norge (Avanse II)	F20	SR-Bank Norge D	F60	Pareto Aksje Norge I	F100
Terra Norge	F21	DNB Norge C	F61	DNB Norge D	F101
Eika SMB	F22	DNB Norge Selektiv C	F62	Pareto Aksje Norge A	F102
Handelsbanken Norge	F23	Storebrand Norge B	F63	Storebrand Norge A	F103
Storebrand Norge H	F24	Fondsfinans Utbytte	F64	Storebrand Aksje Innland	F104
ODIN Norge II (III)	F25	Delphi Norge N	F65	Storebrand Norge I	F105
Landkreditt Norge	F26	Storebrand Vekst N	F66	Storebrand Verdi A	F106
DNB SMB A	F27	Storebrand Norge N	F67	C WorldWide Norge	F107
Danske Invest Norske Aksjer Inst II	F28	Storebrand Norge Fossilfri N	F68	Pareto Investment Fund A	F108
FIRST Generator S	F29	Norse Utbytte	F69	DNB Norge Selektiv E	F109
FORTE Norge	F30	Holberg Norge B	F70	Danske Invest Norske Aksjer Inst I	F110
Nordea Norge Pluss	F31	Norne Aksje Norge	F71	Alfred Berg Humanfond C (NOK)	F111
Landkreditt Utbytte A	F32	Alfred Berg Norge N (NOK)	F72	Holberg Norge A	F112
FORTE Trønder	F33	Alfred Berg Gambak N (NOK)	F73	ODIN Norge C NOK	F113
Pareto Investment Fund B	F34	ODIN Norge F NOK	F74	Pareto Aksje Norge B	F114
Pareto Investment Fund C	F35	SR-Bank Norge N	F75	C WorldWide Norge III	F115
Alfred Berg Norge I (NOK)	F36	SR-Bank Norge U	F76		
Pareto Aksje Norge C	F37	C WorldWide Norge Fossilfritt+	F77		
Pareto Aksje Norge D	F38	FIRST Opportunities	F78		
ODIN Norge A NOK	F39	Alfred Berg Norge Transition I (NOK)	F79		
ODIN Norge B NOK	F40	KLP AksjeNorge S	F80		

The mutual funds column lists the funds in the analysis, the second column shows the variable names of the funds. The shadowed funds were not a part of our regression analyses.

Descriptive statistics

Overview data during the period October 2007 – May 2022

Variable	Obs	Mean	Std. Dev.	Min	Max
F1	119	.0047	.0884	-.3699	.2253
F2	97	-.0026	.0834	-.314	.1726
F3	97	-.0026	.0837	-.3125	.1785
F4	22	-.0207	.1296	-.3295	.1922
F5	37	.0028	.069	-.1741	.1677
F6	122	.0072	.0829	-.3438	.2287
F7	72	.0007	.0981	-.3251	.1841
F8	72	.0014	.1038	-.3348	.2116
F9	138	.0032	.081	-.3583	.1959
F10	143	.0022	.0813	-.3086	.2195
F11	78	.0044	.1019	-.3557	.2225
F12	77	.003	.1037	-.3602	.2102
F13	143	.0015	.0814	-.3105	.2191
F14	142	.0018	.0802	-.3163	.2093
F15	77	.0032	.0993	-.3169	.2086
F16	78	.0035	.1037	-.3541	.2174
F17	60	.0005	.1139	-.3407	.2264
F18	88	-.0001	.0977	-.3392	.2189
F19	88	-.0091	.0929	-.3028	.1896
F20	84	.0029	.0997	-.3601	.2112
F21	72	.0033	.1063	-.33	.2174
F22	72	.0013	.0995	-.3191	.2166
F23	119	.0048	.0892	-.3703	.2289
F24	80	.0046	.0985	-.356	.1974
F25	97	-.0026	.0839	-.3097	.1826
F26	104	.0001	.0882	-.31	.2002
F27	176	.0055	.0928	-.3327	.2891
F28	176	.0058	.0799	-.3192	.2665
F29	140	.0104	.0922	-.3453	.4397
F30	134	.0056	.0705	-.2608	.2301
F31	133	.0055	.0697	-.2931	.255
F32	111	.0068	.0564	-.2586	.22
F33	112	.008	.0731	-.3386	.2815
F34	176	.0063	.0893	-.3542	.3031
F35	176	.0065	.0893	-.3542	.3036
F36	97	.0064	.0597	-.2472	.2096
F37	82	.0098	.0681	-.2889	.2738
F38	82	.0102	.0681	-.2886	.2743
F39	176	.003	.075	-.3099	.2244
F40	176	.0028	.075	-.3101	.2242
F41	176	.0029	.075	-.3101	.2242
F42	76	.0109	.0626	-.2474	.2086
F43	71	.0102	.0641	-.2306	.237
F44	61	.0092	.0638	-.2112	.2236
F45	176	.0055	.0927	-.3327	.2892
F46	42	.0185	.1058	-.3071	.2793
F47	140	.0105	.0951	-.359	.4629
F48	176	.0046	.0791	-.333	.2421
F49	47	.0078	.0726	-.2583	.2205
F50	176	.0032	.082	-.3165	.2574
F51	176	.0032	.082	-.3165	.2576
F52	42	.0089	.0845	-.2664	.2579
F53	176	.0048	.0838	-.3105	.2638
F54	176	.0049	.0838	-.3105	.2639

F55	42	.0131	.0855	-.2506	.2586
F56	42	.0086	.0813	-.2938	.2309
F57	40	.016	.0837	-.2607	.2622
F58	40	.016	.0836	-.2607	.2622
F59	40	.0164	.0837	-.2605	.2626
F60	40	.0167	.0837	-.2603	.263
F61	176	.0037	.0821	-.3163	.2576
F62	176	.0054	.0837	-.3086	.2639
F63	37	.0112	.0867	-.2552	.2591
F64	32	.0176	.081	-.2494	.1791
F65	176	.0057	.0836	-.3292	.2749
F66	176	.0068	.0861	-.3653	.2744
F67	176	-.006	.135	-.9989	.2588
F68	61	.0093	.0638	-.2112	.2238
F69	38	.0129	.0703	-.1864	.1985
F70	176	.004	.0813	-.3089	.2643
F71	15	.0075	.0489	-.0912	.064
F72	176	.0053	.0808	-.3527	.2221
F73	176	.0066	.0807	-.3492	.2148
F74	11	-.0094	.0131	-.0485	-.0045
F75	40	.0162	.0836	-.2607	.2622
F76	40	.0162	.0837	-.2607	.2622
F77	5	-.0337	.0378	-.0858	.0072
F78	145	.0065	.0809	-.2894	.2545
F79	3	-.0259	.043	-.071	.0147
F80	176	.0049	.0838	-.3627	.2604
F81	176	.0049	.0838	-.3627	.2604
F82	1	-.0219	.	-.0219	-.0219
F83	1	-.012	.	-.012	-.012
F84	176	.0049	.0838	-.3627	.2604
F85	176	.0056	.0836	-.3292	.2739
F86	176	.0035	.0808	-.3279	.2204
F87	176	.0067	.0861	-.3653	.2744
F88	176	.005	.0801	-.3246	.2661
F89	176	.006	.083	-.3253	.2536
F90	176	.0055	.0799	-.3215	.2668
F91	176	.0061	.0838	-.3257	.2644
F92	176	.0055	.0815	-.3385	.2241
F93	176	.0053	.0808	-.3527	.2221
F94	176	.0065	.0807	-.3492	.2148
F95	176	.0049	.0773	-.314	.2354
F96	176	.005	.0847	-.3418	.2502
F97	176	.0047	.0831	-.3371	.2469
F98	176	.0046	.0804	-.3258	.2238
F99	176	.0043	.0767	-.2996	.2015
F100	176	.0044	.0795	-.329	.2745
F101	176	.0039	.0822	-.3162	.2579
F102	176	.0031	.0779	-.3288	.267
F103	176	.0049	.0828	-.3541	.2586
F104	176	.0047	.079	-.3327	.233
F105	176	.0052	.0798	-.3518	.2465
F106	176	.0044	.0791	-.333	.2412
F107	176	.0037	.0812	-.3421	.2227
F108	176	.0059	.0893	-.3545	.3022
F109	176	.0056	.0839	-.3105	.2641
F110	176	.0056	.08	-.3259	.2662
F111	176	.0049	.0803	-.3482	.2119
F112	176	.004	.0813	-.3089	.2638
F113	176	.0021	.075	-.3107	.2237
F114	176	.0032	.0793	-.3276	.273
F115	176	.0044	.0812	-.3419	.2234
MKT	176	.005	.0535	-.2445	.1484

Rf	176	.0015	.0012	.0001	.0064
SMB	176	.0153	.0493	-.2882	.2195
HML	176	-.0066	.0587	-.2811	.174
WML	172	.017	.0463	-.1631	.1639

The table above shows an overview of all the mutual fund returns and the market return in the time period

(October 2007 – May 2022), where column 1 (Variable) represents the different funds, column 2 (Obs) represents the number of observations for each fund, column 3 (Mean) represents the monthly average return for each fund, column 4 (Std. Dev.) represents the monthly standard deviation of each fund returns, column 5 (Min) represents the minimum monthly return for each fund in the period and column 6 (Max) represents the maximum monthly return for each fund in the period.

Overview data during the period December 2019 – May 2022 (Pandemic period)

Variable	Obs	Mean	Std. Dev.	Min	Max
F27	30	.0243	.1232	-.2974	.2891
F28	30	.0148	.0893	-.2509	.2665
F29	30	.0256	.1397	-.3453	.4397
F30	30	.0134	.0937	-.2608	.2301
F31	30	.0169	.1011	-.2931	.255
F32	30	.0119	.0879	-.2586	.22
F33	30	.0143	.1156	-.3386	.2815
F34	30	.0157	.1182	-.354	.3031
F35	30	.0161	.1183	-.3537	.3036
F36	30	.0152	.087	-.2472	.2096
F37	30	.0165	.0976	-.2889	.2738
F38	30	.0169	.0977	-.2886	.2743
F39	30	.0147	.0876	-.2583	.2244
F40	30	.0145	.0876	-.2588	.2242
F41	30	.0146	.0876	-.2584	.2242
F42	30	.0147	.0867	-.2474	.2086
F43	30	.0143	.0879	-.2306	.237
F44	30	.0124	.0853	-.2112	.2236
F45	30	.0245	.1229	-.2971	.2892
F46	30	.0224	.1211	-.3071	.2793
F47	30	.0267	.1467	-.359	.4629
F48	30	.02	.0848	-.2246	.2421
F49	30	.0123	.0879	-.2583	.2205
F50	30	.0134	.0952	-.2668	.2574
F51	30	.0137	.0953	-.2666	.2576
F52	30	.0138	.0953	-.2664	.2579
F53	30	.0173	.0978	-.2509	.2638
F54	30	.0176	.0978	-.2507	.2639
F55	30	.0167	.0968	-.2506	.2586
F56	30	.0112	.0931	-.2938	.2309
F57	30	.0226	.0937	-.2607	.2622
F58	30	.0226	.0937	-.2607	.2622
F59	30	.0229	.0938	-.2605	.2626
F60	30	.0232	.0938	-.2603	.263
F61	30	.0136	.0952	-.2665	.2576
F62	30	.0175	.0978	-.2506	.2639
F63	30	.0162	.0944	-.2552	.2591
F64	30	.0177	.0837	-.2494	.1791
F65	30	.016	.1029	-.2519	.2749
F66	30	.0123	.1046	-.2641	.2392
F67	30	.016	.0944	-.2551	.2588
F68	30	.0126	.0853	-.2112	.2238
F69	30	.0178	.0768	-.1864	.1985

F70	30	.0163	.1053	-.3075	.2643
F71	15	.0075	.0489	-.0912	.064
F72	30	.0151	.0869	-.2475	.2091
F73	30	.0188	.09	-.2484	.2071
F74	2	-.0299	.0263	-.0485	-.0113
F75	30	.0228	.0937	-.2607	.2622
F76	30	.0227	.0938	-.2607	.2622
F77	5	-.0337	.0378	-.0858	.0072
F78	30	.0198	.1062	-.2894	.2545
F79	3	-.0259	.043	-.071	.0147
F80	30	.0166	.0966	-.263	.2604
F81	30	.0166	.0966	-.263	.2604
F82	1	-.0219	.	-.0219	-.0219
F83	1	-.012	.	-.012	-.012
F84	30	.0166	.0966	-.263	.2604
F85	30	.0156	.1029	-.2519	.2739
F86	30	.0125	.0867	-.2343	.2204
F87	30	.012	.1046	-.2641	.2387
F88	30	.0142	.0894	-.253	.2661
F89	30	.0157	.1005	-.2551	.2536
F90	30	.0146	.0895	-.252	.2668
F91	30	.0155	.0946	-.251	.2644
F92	30	.0165	.0904	-.2635	.2111
F93	30	.0148	.087	-.2475	.2091
F94	30	.0184	.09	-.2484	.2071
F95	30	.0152	.0951	-.2979	.2354
F96	30	.0157	.1007	-.2924	.2502
F97	30	.0131	.0958	-.2739	.2469
F98	30	.0118	.0888	-.2496	.2238
F99	30	.0114	.085	-.2342	.2015
F100	30	.0171	.0977	-.2884	.2745
F101	30	.0138	.0953	-.2664	.2579
F102	30	.0156	.0967	-.2881	.267
F103	30	.0158	.0944	-.2551	.2586
F104	30	.0151	.0846	-.2204	.233
F105	30	.0162	.0871	-.2295	.2465
F106	30	.0194	.0847	-.2252	.2412
F107	30	.0127	.0871	-.2319	.2227
F108	30	.015	.1182	-.3545	.3022
F109	30	.0177	.0978	-.2505	.2641
F110	30	.0147	.0893	-.2515	.2662
F111	30	.0148	.0868	-.2472	.2088
F112	30	.0159	.1052	-.3076	.2638
F113	30	.014	.0875	-.2587	.2237
F114	30	.0159	.0976	-.2894	.273
F115	30	.0135	.0871	-.2309	.2234
MKT	30	.0124	.053	-.1487	.1431
Rf	30	.0005	.0004	.0001	.0014
SMB	30	.0249	.084	-.2882	.2195
HML	30	-.0071	.0974	-.2811	.174
WML	26	.0176	.0586	-.157	.1639

The table above shows an overview of all the mutual fund returns and the market return in the global pandemic period (December 2019 – June 2022), where column 1 (Variable) represents the different funds, column 2 (Obs) represents the number of observations for each fund, column 3 (Mean) represents the monthly average return for each fund, column 4 (Std. Dev.) represents the monthly standard deviation of each fund returns, column 5 (Min) represents the minimum monthly return for each fund in the period and column 6 (Max) represents the maximum monthly return for each fund in the period. The 26 first funds are removed since they got dissolved before this period.

Overview data during the period October 2007 – March 2010 (Financial crisis period)

Variable	Obs	Mean	Std. Dev.	Min	Max
F1	30	-.0046	.1327	-.3699	.2253
F2	30	-.0064	.1077	-.314	.1726
F3	30	-.0064	.1074	-.3125	.1715
F4	22	-.0207	.1296	-.3295	.1922
F6	18	.0185	.1286	-.3438	.2287
F7	30	-.0042	.1157	-.3251	.1783
F8	30	-.0033	.1242	-.3348	.2116
F9	30	-.0042	.1235	-.3583	.1959
F10	30	-.0034	.1208	-.3086	.2195
F11	30	-.0038	.1277	-.3557	.2225
F12	30	-.0055	.1279	-.3602	.2102
F13	30	-.0043	.1211	-.3105	.2191
F14	30	-.0044	.1226	-.3163	.2093
F15	30	-.0051	.1225	-.3169	.2086
F16	30	-.0037	.1308	-.3541	.2174
F17	30	-.0055	.1263	-.3407	.2264
F18	30	-.0073	.1268	-.3392	.2189
F19	30	-.0113	.113	-.3028	.1795
F20	30	-.005	.1283	-.3601	.2112
F21	30	.0013	.1296	-.33	.2174
F22	30	-.0002	.1185	-.3191	.2166
F23	30	-.0046	.1328	-.3703	.2289
F24	30	-.0039	.124	-.356	.1974
F25	30	-.0065	.1074	-.3097	.1713
F26	30	.0023	.1184	-.31	.2002
F27	30	-.0053	.1239	-.3327	.2072
F28	30	.0003	.1224	-.3192	.1991
F34	30	-.0028	.1298	-.3542	.2393
F35	30	-.0028	.1298	-.3542	.2393
F39	30	-.0065	.1075	-.3099	.1714
F40	30	-.0067	.1074	-.3101	.1711
F41	30	-.0067	.1074	-.3101	.1711
F45	30	-.0053	.1239	-.3327	.2072
F48	30	-.0063	.1219	-.333	.1845
F50	30	-.005	.1225	-.3165	.2086
F51	30	-.005	.1225	-.3165	.2086
F53	30	-.0043	.1211	-.3105	.2191
F54	30	-.0043	.1211	-.3105	.2191
F61	30	-.0044	.1226	-.3163	.2093
F62	30	-.0034	.1208	-.3086	.2195
F65	30	-.0018	.1205	-.3292	.2146
F66	30	.0005	.127	-.3653	.2744
F67	30	-.0045	.1276	-.3541	.2055
F70	30	-.0023	.1123	-.3089	.196
F72	30	-.004	.1278	-.3527	.2221
F73	30	-.0055	.1259	-.3492	.2148
F74	9	-.0048	.0002	-.0053	-.0045
F80	30	-.0016	.127	-.3627	.2272
F81	30	-.0016	.127	-.3627	.2272
F84	30	-.0016	.127	-.3627	.2272
F85	30	-.0018	.1205	-.3292	.2146
F86	30	-.0009	.1245	-.3279	.2132
F87	30	.0005	.127	-.3653	.2744
F88	30	-.0005	.1229	-.3246	.1983
F89	30	-.0059	.1192	-.3253	.2095
F90	30	.0003	.1221	-.3215	.1992
F91	30	.0018	.1223	-.3257	.2086

F92	30	-.0051	.1261	-.3385	.2241
F93	30	-.004	.1278	-.3527	.2221
F94	30	-.0055	.1259	-.3492	.2148
F95	30	-.0068	.1127	-.314	.202
F96	30	-.0047	.1272	-.3418	.2173
F97	30	-.004	.1263	-.3371	.2179
F98	30	-.0012	.1235	-.3258	.2101
F99	30	-.0011	.1156	-.2996	.1941
F100	30	-.0031	.1137	-.329	.1907
F101	30	-.0042	.1229	-.3162	.2103
F102	30	-.0037	.1118	-.3288	.1877
F103	30	-.0045	.1276	-.3541	.2055
F104	30	-.0053	.1227	-.3327	.2042
F105	30	-.0039	.124	-.3518	.1986
F106	30	-.0063	.1219	-.333	.1845
F107	30	-.0062	.1253	-.3421	.2098
F108	30	-.0028	.1298	-.3542	.2393
F109	30	-.0032	.1214	-.3105	.221
F110	30	-.0003	.1234	-.3259	.205
F111	30	-.0048	.1265	-.3482	.2119
F112	30	-.0023	.1123	-.3089	.196
F113	30	-.0076	.1074	-.3107	.1703
F114	30	-.0038	.1131	-.3276	.1887
F115	30	-.0055	.1253	-.3419	.2115
MKT	30	-.009	.0934	-.2445	.1484
Rf	30	.0035	.0017	.0013	.0064
SMB	30	.0123	.0478	-.0785	.1121
HML	30	.0114	.0474	-.1582	.0769
WML	30	.0145	.0494	-.088	.1028

The table above shows an overview of all the mutual fund returns and the market return in the financial crisis period (October 2007 – March 2010), where column 1 (Variable) represents the different funds, column 2 (Obs) represents the number of observations for each fund, column 3 (Mean) represents the monthly average return for each fund, column 4 (Std. Dev.) represents the monthly standard deviation of each fund returns, column 5 (Min) represents the minimum monthly return for each fund in the period and column 6 (Max) represents the maximum monthly return for each fund in the period. 35 funds are removed since they were not active during this period.

Alphas of regressions

Funds	SIM			FF3			C4F			Average alpha		
	Nor alpha	Pan alpha	Fin alpha	Nor alpha	Pan alpha	Fin alpha	Nor alpha	Pan alpha	Fin alpha	Normal	Pandemic	Fin
F1	-0.16 %	0.83 %	0.83 %	-0.19 %	-0.19 %	0.69 %	-0.20 %	0.68 %	0.68 %	-0.19 %	-0.19 %	0.73 %
F2	-0.78 %	0.45 %	0.45 %	-0.84 %	-0.84 %	0.09 %	-0.46 %	0.39 %	0.39 %	-0.46 %	-0.46 %	0.31 %
F3	-0.78 %	0.45 %	0.45 %	-0.85 %	-0.85 %	0.10 %	-0.47 %	0.41 %	0.41 %	-0.70 %	-0.70 %	0.32 %
F4	0.42 %			0.13 %			0.60 %			0.38 %		
F5												
F6	-0.55 %		0.63 %	-0.51 %		0.62 %	-0.22 %		0.90 %	-0.46 %		0.72 %
F7	-0.28 %		0.76 %	-0.27 %		0.37 %	-0.02 %		0.64 %	-0.19 %		0.59 %
F8	-0.28 %		0.93 %	-0.16 %		0.53 %	0.26 %		0.99 %	-0.06 %		0.81 %
F9	-0.44 %		0.80 %	-0.47 %		0.71 %	-0.28 %		0.89 %	-0.40 %		0.80 %
F10	-0.55 %		0.91 %	-0.49 %		0.95 %	-0.26 %		1.15 %	-0.43 %		1.00 %
F11	-0.07 %		0.92 %	0.15 %		0.81 %	0.41 %		1.08 %	0.16 %		0.94 %
F12	-0.17 %		0.76 %	0.14 %		0.73 %	0.44 %		1.04 %	0.14 %		0.85 %
F13	-0.61 %		0.82 %	-0.55 %		0.86 %	-0.32 %		1.06 %	-0.49 %		0.91 %
F14	-0.58 %		0.79 %	-0.54 %		0.82 %	-0.34 %		1.00 %	-0.49 %		0.87 %
F15	-0.13 %		0.76 %	0.11 %		0.77 %	0.30 %		0.97 %	0.09 %		0.83 %
F16	-0.25 %		0.96 %	-0.03 %		0.87 %	0.21 %		1.13 %	-0.02 %		0.99 %
F17	0.02 %		0.74 %	0.34 %		0.42 %	0.52 %		0.72 %	0.30 %		0.63 %
F18	-0.51 %		0.56 %	-0.37 %		0.37 %	-0.05 %		0.64 %	-0.31 %		0.52 %
F19	-1.57 %		0.01 %	-1.81 %		-0.75 %	-1.33 %		-0.33 %	-1.57 %		-0.36 %
F20	-0.40 %		0.81 %	-0.23 %		0.76 %	0.00 %		1.02 %	-0.21 %		0.87 %
F21	-0.31 %		1.44 %	-0.12 %		1.15 %	0.19 %		1.48 %	-0.08 %		1.36 %
F22	-0.46 %		1.14 %	-0.45 %		0.47 %	-0.06 %		0.90 %	-0.32 %		0.83 %
F23	-0.16 %		0.84 %	-0.16 %		0.71 %	-0.18 %		0.69 %	-0.17 %		0.75 %
F24	-0.22 %		0.88 %	-0.10 %		0.80 %	0.08 %		1.01 %	-0.08 %		0.90 %
F25	-0.78 %		0.44 %	-0.82 %		0.10 %	-0.46 %		0.39 %	-0.69 %		0.31 %
F26	-0.81 %		1.43 %	-0.71 %		1.19 %	-0.32 %		1.51 %	-0.61 %		1.38 %
F27	-0.65 %	0.64 %	0.78 %	-1.30 %	-0.44 %	0.39 %	-1.02 %	0.30 %	0.56 %	-0.99 %	0.17 %	0.58 %
F28	-0.45 %	-0.21 %	1.27 %	-0.45 %	-0.21 %	1.26 %	-0.12 %	0.71 %	1.47 %	-0.34 %	0.10 %	1.33 %
F29	-0.81 %	0.10 %		-1.09 %	-0.43 %		-0.63 %	0.41 %		-0.84 %	0.03 %	
F30	-0.55 %	-0.49 %		-0.78 %	-0.78 %		-0.40 %	0.29 %		-0.58 %	-0.33 %	
F31	-0.71 %	-0.19 %		-0.91 %	-0.50 %		-0.62 %	0.36 %		-0.75 %	-0.11 %	
F32	-0.34 %	-0.18 %		-0.50 %	-0.35 %		-0.29 %	0.70 %		-0.38 %	0.06 %	
F33	-0.60 %	-0.48 %		-1.07 %	-1.05 %		-0.59 %	0.01 %		-0.75 %	-0.51 %	
F34	-0.40 %	-0.29 %	1.07 %	-0.64 %	-0.66 %	0.97 %	-0.30 %	0.49 %	1.16 %	-0.45 %	-0.15 %	1.07 %
F35	-0.38 %	-0.25 %	1.07 %	-0.62 %	-0.62 %	0.98 %	-0.27 %	0.53 %	1.16 %	-0.42 %	-0.11 %	1.07 %
F36	-0.54 %	-0.05 %		-0.81 %	-0.33 %		-0.55 %	0.24 %		-0.63 %	-0.05 %	
F37	-0.39 %	-0.07 %		-0.49 %	-0.21 %		-0.20 %	0.54 %		-0.36 %	0.08 %	
F38	-0.35 %	-0.03 %		-0.45 %	-0.17 %		-0.16 %	0.58 %		-0.32 %	0.13 %	
F39	-0.58 %	-0.05 %	0.46 %	-0.75 %	-0.34 %	0.33 %	-0.45 %	0.53 %	0.51 %	-0.59 %	0.04 %	0.43 %
F40	-0.61 %	-0.07 %	0.43 %	-0.77 %	-0.36 %	0.31 %	-0.47 %	0.51 %	0.49 %	-0.62 %	0.02 %	0.41 %

Funds	SIM			FFF3			C4F			Average alpha		
	Nor alpha	Pan alpha	Fin alpha	Nor alpha	Pan alpha	Fin alpha	Nor alpha	Pan alpha	Fin alpha	Normal	Pandemic	Fin
F41	-0,61 %	-0,06 %	0,43 %	-0,77 %	-0,35 %	0,31 %	-0,47 %	0,51 %	0,49 %	-0,62 %	0,03 %	0,41 %
F42	-0,57 %	-0,17 %		-0,76 %	-0,49 %		-0,60 %	-0,02 %		-0,64 %	-0,23 %	
F43	-0,57 %	-0,25 %		-0,79 %	-0,61 %		-0,59 %	-0,15 %		-0,65 %	-0,34 %	
F44	-0,35 %	-0,20 %		-0,58 %	-0,68 %		-0,39 %	-0,04 %		-0,44 %	-0,30 %	
F45	-0,65 %	0,67 %	0,78 %	-1,29 %	-0,41 %	0,39 %	-1,02 %	0,33 %	0,57 %	-0,99 %	0,20 %	0,58 %
F46	0,56 %	-0,13 %		0,04 %	-1,10 %		0,31 %	-0,91 %		0,30 %	-0,71 %	
F47	-0,87 %	0,14 %		-1,17 %	-0,41 %		-0,67 %	0,50 %		-0,90 %	0,08 %	
F48	-0,58 %	0,33 %	0,59 %	-0,56 %	0,33 %	0,57 %	-0,34 %	0,88 %	0,72 %	-0,49 %	0,51 %	0,63 %
F49	0,09 %	-0,37 %		-0,05 %	-0,53 %		0,48 %	0,79 %		0,17 %	-0,04 %	
F50	-0,69 %	-0,41 %	0,77 %	-0,80 %	-0,55 %	0,77 %	-0,50 %	0,16 %	0,99 %	-0,66 %	-0,27 %	0,84 %
F51	-0,69 %	-0,38 %	0,77 %	-0,80 %	-0,52 %	0,77 %	-0,50 %	0,19 %	0,99 %	-0,66 %	-0,24 %	0,84 %
F52	-0,60 %	-0,59 %		-0,78 %	-0,91 %		0,09 %	-0,13 %		-0,43 %	-0,54 %	
F53	-0,57 %	-0,04 %	0,86 %	-0,70 %	-0,23 %	0,82 %	-0,47 %	0,23 %	1,00 %	-0,58 %	-0,01 %	0,89 %
F54	-0,57 %	-0,01 %	0,86 %	-0,70 %	-0,20 %	0,82 %	-0,46 %	0,26 %	1,00 %	-0,58 %	0,02 %	0,89 %
F55	0,13 %	-0,31 %		-0,11 %	-0,76 %		0,36 %	-0,48 %		0,13 %	-0,52 %	
F56	-0,06 %	-0,72 %		-0,17 %	-0,90 %		0,44 %	-0,11 %		0,07 %	-0,58 %	
F57	-1,05 %	0,32 %		-1,11 %	0,18 %		-0,14 %	0,99 %		-0,77 %	0,50 %	
F58	-1,05 %	0,32 %		-1,11 %	0,18 %		-0,13 %	0,99 %		-0,77 %	0,50 %	
F59	-1,02 %	0,36 %		-1,08 %	0,21 %		-0,10 %	1,02 %		-0,73 %	0,53 %	
F60	-0,99 %	0,39 %		-1,05 %	0,24 %		-0,07 %	1,05 %		-0,71 %	0,56 %	
F61	-0,64 %	-0,39 %	0,83 %	-0,75 %	-0,53 %	0,83 %	-0,45 %	0,18 %	1,05 %	-0,61 %	-0,25 %	0,90 %
F62	-0,52 %	-0,01 %	0,95 %	-0,64 %	-0,20 %	0,91 %	-0,40 %	0,26 %	1,09 %	-0,52 %	0,01 %	0,98 %
F63	-0,85 %	-0,32 %		-1,14 %	-0,72 %		-0,06 %	0,00 %		-0,69 %	-0,35 %	
F64	1,16 %	0,06 %		0,77 %	-0,09 %		1,24 %	0,74 %		1,06 %	0,24 %	
F65	-0,46 %	-0,14 %	1,08 %	-0,66 %	-0,47 %	0,98 %	-0,52 %	0,24 %	1,04 %	-0,55 %	-0,12 %	1,03 %
F66	-0,23 %	-0,47 %	1,28 %	-0,80 %	-1,36 %	1,05 %	-0,56 %	-0,56 %	1,19 %	-0,53 %	-0,80 %	1,17 %
F67	-2,11 %	-0,04 %	0,75 %	-1,90 %	0,12 %	0,55 %	-2,03 %	0,77 %	0,35 %	-2,01 %	0,28 %	0,55 %
F68	-0,35 %	-0,17 %		-0,58 %	-0,65 %		-0,39 %	-0,02 %		-0,44 %	-0,28 %	
F69	-0,73 %	0,27 %		-0,85 %	0,09 %		-0,19 %	0,87 %		-0,59 %	0,41 %	
F70	-0,64 %	0,01 %	0,95 %	-0,87 %	-0,38 %	0,80 %	-0,48 %	0,89 %	1,01 %	-0,66 %	0,17 %	0,92 %
F71												
F72	-0,43 %	-0,21 %	0,85 %	-0,48 %	-0,29 %	0,84 %	-0,30 %	0,40 %	0,94 %	-0,40 %	-0,04 %	0,88 %
F73	-0,27 %	0,20 %	0,67 %	-0,42 %	-0,03 %	0,61 %	-0,38 %	0,58 %	0,58 %	-0,35 %	0,25 %	0,62 %
F74												
F75	-1,05 %	0,35 %		-1,11 %	0,21 %		-0,14 %	1,01 %		-0,77 %	0,52 %	
F76	-1,05 %	0,34 %		-1,11 %	0,20 %		-0,14 %	1,00 %		-0,77 %	0,52 %	
F77												
F78	-0,77 %	0,00 %		-1,27 %	-0,78 %		-0,86 %	0,52 %		-0,97 %	-0,09 %	
F79												
F80	-0,62 %	-0,12 %	1,14 %	-0,75 %	-0,34 %	1,05 %	-0,48 %	0,37 %	1,23 %	-0,62 %	-0,03 %	1,14 %

Funds	SIM			FF3			CAF			Average alpha		
	Nor alpha	Pan alpha	Fin alpha	Nor alpha	Pan alpha	Fin alpha	Nor alpha	Pan alpha	Fin alpha	Normal	Pandemic	Fin
F81	-0.62 %	-0.12 %	1.14 %	-0.75 %	-0.34 %	1.05 %	-0.48 %	0.37 %	1.23 %	-0.62 %	-0.03 %	1.14 %
F82												
F83												
F84	-0.62 %	-0.12 %	1.14 %	-0.75 %	-0.34 %	1.05 %	-0.48 %	0.37 %	1.23 %	-0.62 %	-0.03 %	1.14 %
F85	-0.46 %	-0.17 %	1.08 %	-0.66 %	-0.50 %	0.98 %	-0.52 %	0.21 %	1.04 %	-0.55 %	-0.15 %	1.03 %
F86	-0.71 %	-0.45 %	1.15 %	-0.81 %	-0.65 %	1.03 %	-0.52 %	0.14 %	1.22 %	-0.68 %	-0.32 %	1.13 %
F87	-0.23 %	-0.50 %	1.28 %	-0.80 %	-1.39 %	1.05 %	-0.56 %	-0.59 %	1.19 %	-0.53 %	-0.83 %	1.17 %
F88	-0.53 %	-0.27 %	1.19 %	-0.54 %	-0.28 %	1.18 %	-0.19 %	0.65 %	1.40 %	-0.42 %	0.03 %	1.26 %
F89	-0.27 %	-0.13 %	0.64 %	-0.62 %	-0.62 %	0.58 %	-0.26 %	0.47 %	0.79 %	-0.38 %	-0.09 %	0.67 %
F90	-0.47 %	-0.23 %	1.26 %	-0.47 %	-0.24 %	1.25 %	-0.13 %	0.70 %	1.47 %	-0.36 %	0.07 %	1.33 %
F91	-0.48 %	-0.21 %	1.46 %	-0.61 %	-0.48 %	1.30 %	-0.27 %	0.34 %	1.54 %	-0.46 %	-0.12 %	1.44 %
F92	-0.41 %	-0.07 %	0.75 %	-0.51 %	-0.24 %	0.69 %	-0.37 %	0.42 %	0.76 %	-0.43 %	0.04 %	0.73 %
F93	-0.43 %	-0.24 %	0.85 %	-0.48 %	-0.32 %	0.84 %	-0.31 %	0.38 %	0.94 %	-0.41 %	-0.06 %	0.88 %
F94	-0.27 %	0.16 %	0.67 %	-0.42 %	-0.08 %	0.61 %	-0.38 %	0.54 %	0.58 %	-0.36 %	0.21 %	0.62 %
F95	-0.34 %	-0.05 %	0.46 %	-0.38 %	-0.17 %	0.35 %	0.00 %	0.93 %	0.57 %	-0.24 %	0.23 %	0.46 %
F96	-0.51 %	-0.22 %	0.84 %	-0.64 %	-0.45 %	0.76 %	-0.36 %	0.42 %	0.92 %	-0.50 %	-0.08 %	0.84 %
F97	-0.49 %	-0.46 %	0.89 %	-0.57 %	-0.57 %	0.86 %	-0.32 %	0.36 %	0.99 %	-0.46 %	-0.22 %	0.91 %
F98	-0.52 %	-0.54 %	1.13 %	-0.52 %	-0.55 %	1.12 %	-0.27 %	0.03 %	1.31 %	-0.44 %	-0.35 %	1.19 %
F99	-0.52 %	-0.50 %	1.09 %	-0.53 %	-0.51 %	1.09 %	-0.31 %	0.01 %	1.24 %	-0.45 %	-0.33 %	1.14 %
F100	-0.59 %	0.10 %	0.87 %	-0.68 %	-0.11 %	0.72 %	-0.20 %	0.87 %	1.06 %	-0.49 %	0.29 %	0.88 %
F101	-0.62 %	-0.37 %	0.86 %	-0.73 %	-0.51 %	0.86 %	-0.43 %	0.20 %	1.08 %	-0.59 %	-0.23 %	0.93 %
F102	-0.70 %	-0.02 %	0.78 %	-0.80 %	-0.24 %	0.64 %	-0.34 %	0.71 %	0.96 %	-0.61 %	0.15 %	0.79 %
F103	-0.50 %	-0.17 %	0.82 %	-0.59 %	-0.32 %	0.74 %	-0.37 %	0.35 %	0.88 %	-0.49 %	-0.05 %	0.82 %
F104	-0.48 %	-0.18 %	0.71 %	-0.52 %	-0.26 %	0.68 %	-0.33 %	0.25 %	0.82 %	-0.44 %	-0.06 %	0.74 %
F105	-0.47 %	-0.09 %	0.86 %	-0.53 %	-0.20 %	0.80 %	-0.31 %	0.34 %	0.95 %	-0.44 %	0.02 %	0.87 %
F106	-0.59 %	0.27 %	0.59 %	-0.57 %	0.27 %	0.57 %	-0.35 %	0.82 %	0.72 %	-0.51 %	0.45 %	0.63 %
F107	-0.55 %	-0.47 %	0.64 %	-0.64 %	-0.57 %	0.67 %	-0.52 %	0.09 %	0.72 %	-0.57 %	-0.32 %	0.68 %
F108	-0.45 %	-0.36 %	1.07 %	-0.68 %	-0.73 %	0.97 %	-0.34 %	0.42 %	1.16 %	-0.49 %	-0.22 %	1.07 %
F109	-0.50 %	0.00 %	0.97 %	-0.62 %	-0.19 %	0.93 %	-0.39 %	0.27 %	1.11 %	-0.50 %	0.02 %	1.00 %
F110	-0.46 %	-0.23 %	1.21 %	-0.46 %	-0.22 %	1.21 %	-0.13 %	0.69 %	1.41 %	-0.35 %	0.08 %	1.28 %
F111	-0.46 %	-0.23 %	0.76 %	-0.51 %	-0.30 %	0.76 %	-0.35 %	0.37 %	0.84 %	-0.44 %	-0.05 %	0.79 %
F112	-0.64 %	-0.03 %	0.95 %	-0.87 %	-0.41 %	0.80 %	-0.48 %	0.85 %	1.00 %	-0.66 %	0.14 %	0.92 %
F113	-0.68 %	-0.11 %	0.35 %	-0.84 %	-0.40 %	0.23 %	-0.54 %	0.47 %	0.41 %	-0.69 %	-0.02 %	0.33 %
F114	-0.71 %	-0.02 %	0.79 %	-0.80 %	-0.23 %	0.64 %	-0.32 %	0.75 %	0.98 %	-0.61 %	0.16 %	0.81 %
F115	-0.49 %	-0.38 %	0.71 %	-0.58 %	-0.49 %	0.73 %	-0.46 %	0.18 %	0.79 %	-0.51 %	-0.23 %	0.74 %

Tests for excess return

Fund	SIM		FFF3		C4F	
	FinTest	PanTest	FinTest	PanTest	FinTest	PanTest
F1	0,1984		0,2939		0,3141	
F2	0,5229		0,8969		0,581	
F3	0,5213		0,8918		0,5678	
F4	0,6611		0,8935		0,5229	
F5						
F6	0,4775		0,488		0,3208	
F7	0,2992		0,6139		0,3948	
F8	0,1854		0,4464		0,1554	
F9	0,1946		0,2556		0,1628	
F10	0,1322		0,1246		0,0673	
F11	0,1383		0,1994		0,0932	
F12	0,2276		0,2471		0,1098	
F13	0,1742		0,1641		0,0916	
F14	0,1674		0,1635		0,0949	
F15	0,1819		0,1815		0,1054	
F16	0,1184		0,1615		0,0796	
F17	0,2766		0,5427		0,3151	
F18	0,3859		0,5763		0,3336	
F19	0,9889		0,3543		0,6863	
F20	0,1963		0,2292		0,1169	
F21	0,0319		0,0845		0,0306	
F22	0,1718		0,5536		0,265	
F23	0,1969		0,2825		0,3073	
F24	0,1323		0,1845		0,1014	
F25	0,5289		0,8917		0,5887	
F26	0,0353		0,082		0,0289	
F27	0,4135	0,501	0,6602	0,6292	0,5282	0,7585
F28	0,0371	0,7276	0,0405	0,7336	0,0163	0,2899
F29		0,9119		0,622		0,6551
F30		0,5124		0,3023		0,7211

Fund	SIM		FFF3		C4F	
	FinTest	PanTest	FinTest	PanTest	FinTest	PanTest
F31			0,7649		0,4472	0,609
F32			0,7982		0,6251	0,3725
F33			0,5553		0,196	0,9916
F34	0,1461		0,6962	0,1862	0,3819	0,5434
F35	0,1461		0,7343	0,1861	0,4096	0,5131
F36			0,9312		0,5797	0,7175
F37			0,9143		0,769	0,4965
F38			0,9619		0,8133	0,464
F39	0,4991		0,9382	0,6223	0,6205	0,4435
F40	0,5188		0,9129	0,6442	0,5987	0,462
F41	0,5189		0,9244	0,6443	0,6092	0,462
F42			0,7853		0,4427	0,976
F43			0,6837		0,3192	0,8212
F44			0,7926		0,362	0,9595
F45	0,4138		0,4824	0,6606	0,65	0,5251
F46			0,9022		0,2417	0,4129
F47			0,8751		0,649	0,6033
F48	0,311		0,5788	0,3409	0,581	0,2296
F49			0,6276		0,5133	0,3554
F50	0,2049		0,5006	0,212	0,3778	0,1056
F51	0,205		0,5315	0,212	0,4033	0,1056
F52			0,3876		0,2022	0,8634
F53	0,1853		0,9525	0,2099	0,733	0,132
F54	0,1852		0,9851	0,2098	0,7633	0,1318
F55			0,6632		0,2997	0,5847
F56			0,3481		0,262	0,9048
F57			0,6631		0,8185	0,2862
F58			0,663		0,8183	0,2861
F59			0,6309		0,786	0,2705
F60			0,6033		0,7578	0,2573

Fund	SIM		FFF3		C4F	
	FinTest	PanTest	FinTest	PanTest	FinTest	PanTest
F61	0,1709	0,5233	0,1772	0,3968	0,0857	0,7874
F62	0,1437	0,9832	0,1645	0,7622	0,1007	0,724
F63		0,6769		0,3655		0,9991
F64		0,9343		0,9115		0,4484
F65	0,1231	0,8468	0,1629	0,5141	0,1402	0,7547
F66	0,1289	0,5759	0,1899	0,0958	0,1396	0,5248
F67	0,7249	0,9856	0,7967	0,957	0,873	0,7501
F68		0,8178		0,3808		0,9843
F69		0,7115		0,9031		0,3476
F70	0,2164	0,9905	0,3003	0,6297	0,1838	0,2883
F71						
F72	0,1551	0,7224	0,1663	0,6356	0,125	0,5529
F73	0,3098	0,7629	0,3621	0,9616	0,3857	0,4352
F74						
F75		0,6412		0,7944		0,2758
F76		0,646		0,7992		0,2794
F77						
F78		0,9968		0,3623		0,5585
F79						
F80	0,0687	0,8444	0,0934	0,5945	0,0505	0,5935
F81	0,0687	0,8444	0,0934	0,5945	0,0505	0,5935
F82						
F83						
F84	0,0687	0,8444	0,0934	0,5945	0,0505	0,5935
F85	0,1232	0,8084	0,1629	0,483	0,1404	0,7894
F86	0,0712	0,4802	0,108	0,3163	0,0559	0,8433
F87	0,129	0,5534	0,19	0,089	0,1399	0,5044
F88	0,0534	0,6578	0,0584	0,6592	0,0236	0,3352
F89	0,3826	0,8642	0,4207	0,3968	0,2662	0,5534
F90	0,0409	0,7056	0,0451	0,7057	0,0178	0,3066

Fund	SIM		FFF3		C4F	
	FinTest	PanTest	FinTest	PanTest	FinTest	PanTest
F91	0,0285	0,7478	0,0506	0,4766	0,0195	0,6356
F92	0,2296	0,9096	0,2691	0,7081	0,2285	0,5491
F93	0,1553	0,692	0,1664	0,6059	0,1253	0,5764
F94	0,3103	0,811	0,3623	0,9104	0,3867	0,4669
F95	0,5133	0,9453	0,6215	0,8084	0,4084	0,2275
F96	0,1873	0,724	0,2331	0,4928	0,1484	0,5525
F97	0,1518	0,4614	0,1687	0,3719	0,1105	0,6004
F98	0,0589	0,3679	0,0641	0,3707	0,0314	0,9596
F99	0,0559	0,3797	0,0589	0,3785	0,0336	0,9867
F100	0,2191	0,8912	0,3105	0,8779	0,1253	0,251
F101	0,1572	0,5423	0,1634	0,413	0,0778	0,7654
F102	0,2599	0,9747	0,3611	0,7402	0,1588	0,3415
F103	0,2019	0,795	0,2526	0,624	0,1792	0,6276
F104	0,2024	0,7437	0,2244	0,6534	0,1502	0,6955
F105	0,1358	0,8813	0,17	0,7388	0,1031	0,5988
F106	0,3109	0,6507	0,3411	0,6499	0,2301	0,217
F107	0,2784	0,4323	0,2672	0,3487	0,2317	0,8885
F108	0,1462	0,6272	0,1864	0,3336	0,112	0,602
F109	0,1347	0,9952	0,1543	0,7744	0,0943	0,7142
F110	0,0449	0,7072	0,0481	0,7233	0,0203	0,3008
F111	0,1998	0,6966	0,2082	0,6226	0,1659	0,5814
F112	0,2164	0,9711	0,3003	0,5965	0,184	0,3087
F113	0,6022	0,8658	0,735	0,5589	0,5404	0,5294
F114	0,2598	0,9723	0,3625	0,7449	0,153	0,323
F115	0,2318	0,5193	0,2238	0,4189	0,1917	0,789

Where FinTest is the tests of excess return during the financial crisis, PanTest is the tests of excess return during the pandemic. The values given under each test, are the p-values of the F-tests we conducted