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Investment Patterns in Times of Uncertainty

An empirical analysis of how Norwegian private investors' fund investment behaviour changes in response to macroeconomic shifts

Christina Aasnæs and Emma W. B. Helgevold

Supervisor: Samuel D. Hirshman

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Christina Aasnæs

Emma W. B. Helgevold

Abstract

In this thesis, we examine the influence of economic shocks and macroeconomic factors on Norwegian mutual fund investments, such as the policy rate, inflation, and unemployment rate, focusing on the oil price drop between 2014-2016 and the COVID-19 pandemic from 2020-2022. By employing regression analyses, we delve into the changes in investment behaviours against the backdrop of economic shocks and uncertainties, integrating theoretical and empirical literature on savings and investor characteristics.

Our analyses reveal that fund type significantly dictated investment preferences, with fixed-income and stock funds attracting substantially more investments than hedge funds. Interestingly, no statistical significance was found for the interaction between the oil price shock and fund types, indicating that this shock did not affect fund investment behaviour as one might have expected. Time-fixed effects, however, revealed a distinct seasonal pattern in investments, with a downturn observed during the middle of the year, potentially a reflection of a "summer slowdown" effect.

Moreover, our findings suggest that while investments in funds have been on an upward trend, increasing annually, the anticipated effects of the oil price drop were not evident in the investment data. For the period between 2018-2022, marked by the COVID-19 pandemic, the pandemic's standalone effect on investment choices was also not statistically significant, contrary to expectations. The included macroeconomic variables did not present statistically significant impacts on fund investments.

This research highlights the complexities of mutual fund investments during economic shocks, revealing that broader market trends and investor preferences for fund types may outweigh the direct impacts of macroeconomic disturbances. The insights presented call attention to the nuanced interplay between investor behaviour and economic shocks, offering a foundation for future studies to build upon in the evolving landscape of financial decision-making.

Keywords – Shocks, unemployment, investments, saving

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1 Introduction

1.1 Research question and motivation

Fund investments for long-term savings have grown increasingly popular among Norwegians in recent years. This thesis will explore how fund investing has been affected by different macroeconomic measures, such as the policy rate, inflation, and unemployment rate. We also investigate the short-term impact of shocks like the 2014 oil price drop and the COVID-19 pandemic.

We have decided to focus on mutual fund-saving because of the mentioned popularity: A survey conducted in 2021 by Opinion for the Norwegian Fund and Asset Management Association (VFF) reveals that 46 percent of the population then had money invested in stock funds. This number equates to approximately 2 million Norwegians who are over 18 years of age. The numbers from 2021 marked a 6-percentage point increase from the previous year, and it was the highest percentage recorded in the annual survey since its inception in 2001. Low interest rates on alternative investments and strong stock market performance may have made fund investments more attractive (VFF, 2021). Several measures have been taken in recent years to attract more female fund investors. Amongst them was Norway's largest bank, DNB, which launched a campaign in September 2019, #huninvesterer (eng. #sheinvests), to decrease the financial gap between men and women by increasing female participation in the financial markets. Since then, the number of female fund investors in DNB has risen by 275 percent (Berset, 2023).

Norwegians are among the world's most indebted people (Jakobsen and Amundsen, 2021). The Central Bank of Norway points out in a report that high debts make Norwegian households vulnerable to loss of income, increased interest rates, or a drop in housing prices (Bache et al., 2023). They also acknowledge that many households in the last year have a tighter private economy than before. From 2021 to 2022, household savings decreased by over 70 percent. The decline in savings was attributed to increased consumption following the reopening of society after the pandemic, combined with rising prices (Hirsch, 2022). We wish to investigate whether these macroeconomic factors influenced Norwegian private investors' fund investments.

This thesis seeks to determine how different economic shocks and macroeconomic factors affect investments in mutual funds. The policy rate is closely linked to inflation, and a higher rate could improve the rate in a typical savings account. However, the policy rate also indicates high inflation, which means the money in accounts may lose its value over time. As Aizenman et al. (2016, p. 2) succinctly put it, "Conventionally speaking, lower interest rate monetary policy is supposed to encourage present-day consumption by lowering the rewards for postponing consumption."

In this context, investing is a subcategory of saving, focusing on Norwegian savers' deposits in various types of funds. Aizenman et al. (2016) suggest that low or negative interest rates discourage saving by penalizing postponed consumption and stimulating immediate consumption and investment. This principle can help us understand why investing in funds has become more prevalent in Norway, especially over the last decade. This period saw several economic shocks affecting financial decisions. Economic shocks are often considered short-term events that affect the entire economy; they are unexpected and sometimes exogenous.

We define shocks as significant, unforeseen events that notably disrupt the normal functioning of the economy, with substantial impacts on individuals' economic standing, like employment levels. Both the oil price drop in 2014 and COVID-19 fits this definition. With this in mind, we present the thesis's research question:

Research question: How do different economic shocks and macroeconomic factors affect Norwegian fund investments?

We will discuss how Norwegians' mutual fund investments have developed in line with the macro variables policy rate, unemployment rate, and the Consumer Price Index (CPI). Further, we will discuss how this development has been before, during, and after economic shocks and to what extent we can detect widespread change in the fund investment pattern of Norwegians.

The thesis will be based on data from 2012-2022, reflecting on a period fraught with incidents with significant economic influence, like the drop in oil prices in 2014 and the COVID-19 pandemic in 2020. Since the precautionary motive for saving arises in contexts of uncertainty, this period is interesting for investigating how increased uncertainty about

future income has affected household decisions on consumption and saving.

1.2 The thesis's structure

The thesis is divided into six main parts and a concluding section. In Chapter 2, we explain what saving is and what drives fund investments. We also introduce the theory of precautionary saving and how low interest rates in the Euro area affect savings. In this chapter, we explain the theoretical framework and foundation for what we use to answer our research question.

Chapter 3 presents the drop in oil prices in 2014 and the COVID-19 pandemic in 2020. In this chapter, we also present these incidents and their consequences.

Further, in Chapter 4, we present the data foundation for our thesis. The data includes comprehensive fund investment data from the Norwegian Mutual Funds Association (VFF), covering ten years and including stock, hedge, combination, and fixed-income funds. Additional data sources included Statistics Norway (SSB) for Consumer Price Index trends, the Central Bank of Norway for monetary policy rates, and The Norwegian Labour and Welfare Administration (NAV) for unemployment figures.

In Chapter 5, we present the method that we later use in the analysis. This part deals with general theory regarding research design, statistical methodologies, and our approaches.

We then present the analysis with corresponding results in Chapter 6. In this part, we look at the research results through graphical representations and various correlations.

These results will be discussed in Chapter 7. Finally, we will present our conclusions and answer the research question. Included is also a discussion of the results, as well as ideas for further research.

2 Literature review

To contextualise our research question, we will discuss what affects an individual's decision to invest in stocks and mutual funds. Also, we will present empirical literature on precautionary saving and unemployment.

2.1 Characteristics and drivers of private investors

Several studies deal with why individuals decide to participate in the financial market, whether it is investing in mutual funds or stocks. Risk preferences play an important role in whether individuals choose to own stocks. This can also explain the variance in investment behaviours among households. Additionally, variations in attitudes towards risk significantly influence how a person's investment portfolio is structured (Guiso and Paiella, 2005). Malmendier and Nagel (2011) found that personal macroeconomic experiences significantly influence financial risk-taking. Individuals with negative stock market experiences are more risk-averse, less likely to invest in stocks, and pessimistic about future returns. Conversely, those with positive market experiences are more willing to take risks and invest more in stocks and bonds. Recent economic events and younger age amplify these effects.

One topic that has been subject to numerous studies is the *stock market participation puzzle*, which, according to Haliassos (2002), is the analysis of what keeps the majority of households out of the stock market, even though if they can expect higher earnings by holding stocks than by holding riskless financial assets. The outcomes of these studies are varied and numerous, but the most apparent reasons stem from the inherent risks associated with stock market investments. Barsky et al. (1997) show that risk tolerance measures are significantly related to holding stocks. Barberis et al. (2006) analyse and find that risk aversion combined with narrow framing is a possible reason for not participating in the stock market. Dimmock and Kouwenberg (2009) finds that for higher loss aversion, there is a decreasing probability of participation. This applies to a greater extent for direct stock holdings than for mutual funds. Cognitive abilities, like mathematical skills, (Christelis et al., 2010), the person's IQ (Grinblatt et al., 2011) as well as educational background (Bertaut, 1998; Guiso, Haliassos et al., 2003) are also found to be associated

with the decision to invest in stocks either directly or indirectly. Zhu (2005) finds that busy people would invest in mutual funds rather than in single stocks.

Hong et al. (2004) find that social households, for example, those who interact with their neighbours, are considerably more likely to invest in the stock market than non-social households. An increase in equity market participation of 10 percent among the people in the relevant community causes an increase of 4 percent probability of investing in stocks (Brown et al., 2008).

Mutual fund investors tend to be older, have greater wealth, and possess higher education levels than the general population (Alexander et al., 1998). While Bailey et al. (2011) find that investors with more knowledge and experience tend to use mutual funds more effectively. Moreover, there is substantial proof that financial literacy plays a significant role in influencing savings and investment choices. Van Rooij et al. (2011) reports that those with a higher degree of financial understanding are associated with greater wealth, are more likely to invest in the stock market and show a greater tendency to prepare for retirement. Lusardi and Mitchell (2007) also finds evidence supporting the connection between financial literacy and saving decisions.

Gruber (1996) and as Elton et al. (2004) find that individual investors opt for funds that charge high fees, especially those living in neighbourhoods with lower wealth and education levels (Malloy et al., 2004) and investors who exhibit overconfidence (Bailey et al., 2011). Müller and Weber (2010) find a positive relationship between financial literacy and the likelihood of passive investing. Van Rooij et al. (2011) saw a sharp increase in stock ownership among those with higher financial literacy. The study shows that basic literacy, defined as fundamental knowledge and basic arithmetic skills, is closely linked to stock market participation. Individuals with higher basic literacy scores are significantly more likely to invest in the stock market. This connection is even more robust when considering advanced literacy, which involves more complex understanding and skills. Stock market participation is mainly found among those with high advanced literacy levels. In comparison, only 8 percent of individuals in the lowest quartile and 15 percent in the second lowest quartile of advanced literacy are involved in stock market investments.

2.2 Precautionary saving

The primary theoretical framework for research on saving has, according to Lusardi (1998), been the life-cycle/permanent income model. This model says that households ought to balance their consumption throughout their lifespan. Consequently, they should accumulate savings before retirement to compensate for the anticipated reduction in income later on and begin utilising these savings upon retirement. An important development of this life-cycle concept is the theory of precautionary saving. This theory highlights that saving is not just for distributing resources across one's life, but also acts as a buffer against unforeseen occurrences, like unexpected changes in income, such as unemployment.

A critical insight from recent years is, according to Lugilde et al. (2019), the realisation that the outcomes predicted by the life-cycle-permanent-income model are not as universally applicable as once believed, especially under conditions of uncertainty. When the model incorporates the possibility of significant income fluctuations during an individual's working life and acknowledges that consumers generally have an aversion to uncertainty, the patterns of saving behaviour become more complex than those described by conventional models. This leads to the conclusion that there is no unified agreement on the strength of the motive for saving in response to uncertainty or the best way to quantify that uncertainty.

Within the model of life-cycle-permanent-income, the presence of savings is often due to the anticipation of a future decrease in income, as foreseen by consumers. In this scenario, saving becomes the optimal method for distributing income over a lifetime's consumption. When consumption choices are subject to uncertainty, and individuals are cautious, preferring to minimise risk, it significantly impacts their current consumption. Consequently, this uncertainty leads to additional savings, known as "precautionary saving". Fundamentally, precautionary saving is linked to uncertainties about future income and, thus, future consumption opportunities, provided that the marginal utility of consumption exhibits a convex characteristic ($u'''(\cdot) > 0$). An increase in uncertainty regarding future income is likely to reduce present consumption, altering the trajectory of the consumption pattern (Lugilde et al., 2019).

2.3 The risk of unemployment

In times of economic downturn, people often feel more uncertain about their future, particularly their income. This increased uncertainty is primarily linked to the rising rates of unemployment. Some researchers, therefore, measure uncertainty by looking at the likelihood of someone still earning a wage in the future. The unemployment rate can, therefore, be a measurement of an economic downturn. In our data analysis, presented later in the thesis, the unemployment rate serves as a variable for how economic shocks affect fund investments.

The impact of unemployment on people's well-being tends to be more severe than what the mere loss of income might suggest. Most people's primary source of income is their job, so losing employment can be the most significant financial setback. Consequently, the risk of experiencing unemployment in the future is often seen as a strong indicator of economic uncertainty (Deaton, 2011).

In his study, Benito (2006) employs two distinct methods to assess uncertainty: the first is based on the self-assessed probability of unemployment within the next year, and the second utilises a probit model to predict the likelihood of job loss. The findings vary notably between these two approaches. The predicted probabilities yield a broader range of job insecurity levels compared to the subjective assessment of job insecurity. Using the self-reported measure, Benito discovers that job insecurity does not reduce current consumption, leading him to conclude that, from this viewpoint, there's no evidence of precautionary saving. However, when he applies the calculated risk measure, he identifies significant precautionary saving behaviours linked to unemployment and job insecurity risks.

For Turkish households, Ceritoğlu finds evidence of precautionary saving (Ceritoğlu, 2013) by using the predicted probability of job loss, while Lugilde et al. demonstrate that, for a sample of Spanish households, this subjective measure does not influence consumption decisions (Lugilde et al., 2018). For the Spanish economy, Barceló and Villanueva (2010) looks into the hypothesis that precautionary saving leads households with a higher risk of job instability to delay their spending. This implies that such households would exhibit greater consumption growth rates compared to those with a lower likelihood of

unemployment, which would maintain more consistent consumption patterns over time. They estimate the probability of job loss based on the employment contract type of the primary income earner. Their findings indicate that consumption growth is more significant in households where income earners face a higher risk of job loss than those with more secure employment (Lugilde et al., 2019).

Banks et al. (2001) show, for British households, evidence of a strong and increasing precautionary motive for saving. When employing macroeconomic indicators to represent uncertainty in the labour market, the typical approach is to use either the observed unemployment rate (Mody et al., 2012) or subjective assessments derived from consumer opinion surveys focusing on unemployment forecasts (Carroll and Dunn, 1997). In both instances, the overarching finding is that savings tend to rise with increased unemployment rates or when expectations about unemployment become more pessimistic.

Mody et al. (2012) analyse the relationship between saving rates and various sources of uncertainty and find a positive correlation between the saving rate and both measures of uncertainty. This suggests that these factors are notably influential in explaining the changes in saving rates across 27 developed countries. Furthermore, the relationship between the unemployment rate and saving rates persists even when adjustments are made for variations in disposable income growth and interest rates.

Bande and Riveiro (2013) use regional data from the 17 Spanish regions. They examine the precautionary reason for saving using two different metrics of uncertainty: the regional unemployment rate and the volatility of future income. They conclude that a precautionary motive for saving exists, particularly in scenarios where the degree of uncertainty is variable and persistent over an extended period (Lugilde et al., 2019).

A study by Juelsrud and Wold (2019) used the oil price drop of 2014 to investigate whether increased uncertainty about one's job situation contributes to higher savings. In this case, engineers were the occupational group with the largest increase in job loss risk. Before the oil price drop, engineers and other high-skilled workers had similar levels of job loss risk. Their results show an annual increase in savings for engineers relative to other high-skilled workers of roughly 1,200 USD, or 3.5 percent. This increase in savings is driven by low-tenured engineers, the group with the highest increase in job loss risk. Since the southwest part of Norway was disproportionately affected, these municipalities

experienced an increase in average savings. This implies that engineers, relative to other high-skilled workers in the oil region, increased their bank deposits.

Most studies find that uncertainty impacts savings, but there is still no agreement on how strong this effect is or the best way to measure uncertainty. This makes it challenging to analyse how uncertainty affects consumption and savings choices. There are many ways to measure uncertainty, and figuring out the optimal one is a challenging (Lugilde et al., 2019).

2.4 Interest rates: Implications in the Euro area

The European Central Bank (ECB) conducted a study in 2022 to determine what happens to households' or consumers' savings when interest rates are very low or below 0.50 percent. As shown in Figure 2.1, their policy rate has been below the Norwegian policy rate for the last ten years. Their findings suggest that consumers' savings decisions are not solely based on real terms, as their subjective expectations regarding future inflation have some influence. However, nominal interest rates seem more significant in average and absolute terms. A logical assumption is that the higher the interest, the more money will be saved. According to the study, that is true when the interest rates are high, but as the interest rates get lower, people are not as motivated to save more. The study from the ECB says that the actual interest rates offered by banks seem to play a more significant role in how much people decide to save. When rates are high, people save more. However, when rates are low, they might not save as much because they do not get as much reward from the interest (Felici et al., 2022).

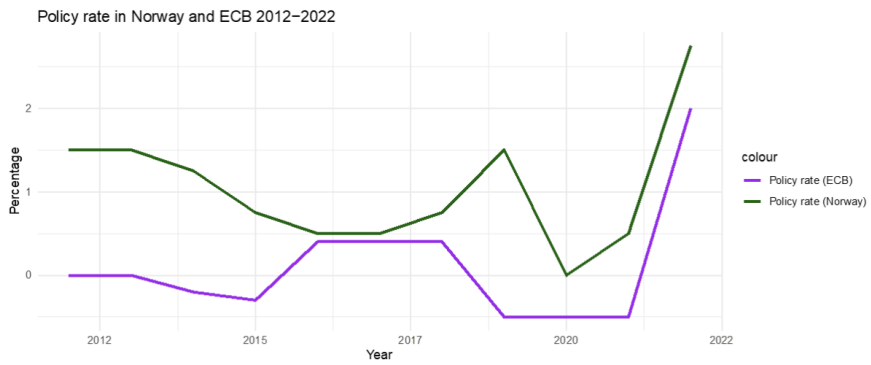

Figure 2.1: Norwegian and European monetary policy. Data source: The Norwegian Central Bank and The European Central Bank.

2.4.1 Savings' reversal

The study also found that for very low levels of nominal rates, for example, below 0.5 percent, the ECB study found evidence of a "savings' reversal". This is where savings start to increase in response to further reductions in nominal rates. Risk-averse savers might save more actively when interest rates drop to ensure they have enough money for retirement or future spending needs. Felici et al. state that this pattern could also be consistent with possible contractionary effects interest rate reductions could have in a confidence-driven liquidity trap. This is where income effects dominate substitution effects, reflecting the persistence of consumers' expectations of the future state of the economy.

A liquidity trap occurs when the interest rate is very low, almost zero, and the central bank cannot boost the economy with its usual methods. In this scenario, since there is no cost to keeping cash because people are not losing out on interest earnings, they tend to save their money instead of spending it, even if there is more money available in the economy (Reinert et al., 2009). The effect of reductions in nominal interest rates on demand and household consumption is likely to fade in influence as the interest rates decline. Reduced nominal rates to very low levels could increase the upward pressure on consumer savings. This is because households want to compensate for the accompanying reduction in nominal interest income (Felici et al., 2022).

3 Background

This thesis section will firstly present what saving is and then discuss the significant events between 2012 and 2022. It will cover the oil price shock that occurred in 2014 and the COVID-19 pandemic that hit in 2020. Additionally, we will present the government policies that were put in place in response to these incidents.

3.1 Saving

In economic theory, savings are typically defined as disposable income minus consumption (Holden, 2016). A person saves when their consumption is less than their income.

The Keynesian consumption function assumes that consumption depends on disposable income. According to Keynes, a marginal increase in disposable income will lead to a specific portion being saved. This saving rate is also assumed to increase as disposable income increases. Keynes believes the saving rate increases with increasing income (NOU 1994: 6, 1994).

Savings can be allocated in three different ways. It can be (i) invested in financial assets such as bank deposits, stocks, or cash, (ii) used to pay off debt, or (iii) utilised to purchase tangible assets like a home or recreational property, which is considered a real investment.

This concept arises from the budget constraint for households, which can be expressed as follows:

$$\begin{aligned} \text{Savings} &= \text{Disposable Income} - \text{Consumption} \\ &= \text{Net Acquisition of Financial Assets} - \text{Net Borrowing} \\ &\quad + \text{Net Investment in Real Capital} \end{aligned} \tag{3.1}$$

The difference between the first two terms on the right side, net acquisition of financial assets minus net borrowing, is called household net financial investment. Net financial investment is thus equal to the portion of disposable income that households do not use for consumption or net real investment. When net financial investment is less than zero, household spending on consumption and net real investment exceeds disposable

income. When net financial investment is low, there is an exceptionally high demand from households, stimulating economic activity. For a given disposable income, households can only increase their savings by reducing consumption. Increased savings generally mean reduced consumption demand (Holden, 2016).

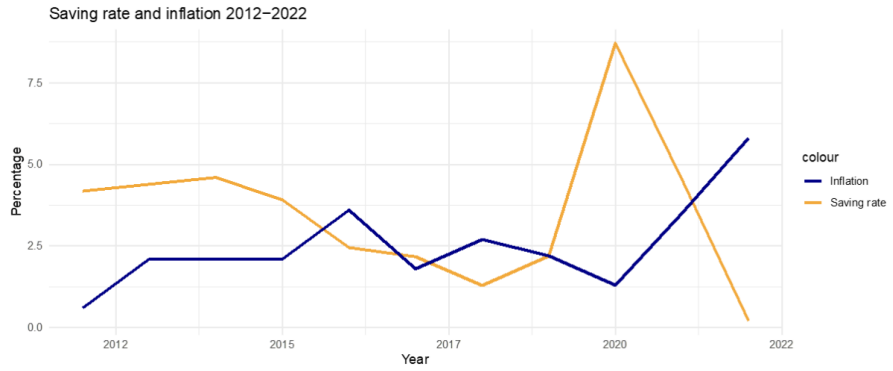

Figure 3.1: Inflation and household's saving rate 2012-2022. Norwegian household's saving rate, in percentage, excluding stock dividends. Data source: Statistics Norway and The Norwegian Central Bank.

Statistics Norway (SSB) defines a household's saving rate as the proportion of disposable income saved by a household (Statistics Norway, 2014). Figure 3.1 shows that the Norwegian saving rate, excluding stock dividends, increased particularly around 2020 when the COVID-19 pandemic hit Norway. It is important to note that the saving rate is not limited to the amount invested in funds.

3.1.1 Factors that affect saving

Economic, demographic, social, and cultural factors determine a household's saving behaviour (Kapounek et al., 2016). Furthermore, according to Weil (1993), consumers have a precautionary savings motive. Their cautious behaviour is strengthened, among others, by more considerable income risk, stronger risk aversion, and higher interest rates.

A large part of savings is for future consumption. Therefore, a direct relationship exists between decisions to save in the present and anticipated variations in future real income. Within an uncertain environment regarding the future, the savings accumulated by cautious individuals aiming to safeguard against potential risks are known as precautionary savings. Decisions regarding consumption and savings, along with the accumulation of wealth, are impacted by various factors. These include the economic circumstances of the consumer

or household, perceived uncertainties, unique attributes of the individual or household, and the presence of limitations in the credit market, among other aspects. Therefore, in a general sense, precautionary savings depend on the personal traits of the individual making these consumption and savings choices and the context in which these decisions occur. This context is mainly influenced by the availability of public insurance schemes and the constraints imposed by credit markets (Lugilde et al., 2019).

Households may employ their savings as a safeguard or a protective measure against unexpected shifts in economic conditions and a tool for redistributing economic resources throughout their life-cycle. Tangible assets accumulated as savings can easily be passed down from generation to generation. Additionally, savings play a crucial role in funding domestic and international investments, thus contributing to economic growth (Kapounek et al., 2016).

The Consumer Confidence Index (CCI) is commonly used to understand consumers' optimism about their country's economic performance (Trading Economics, 2023). This index forecasts households' future consumption and saving trends based on their perceptions of their financial future, economic conditions, unemployment, and saving potential. When the index exceeds 100, it reflects an uptick in consumer optimism about the economy. This leads to a reduced inclination to save and a greater willingness to spend over the coming year. Conversely, a CCI below 100 suggests a negative outlook on economic prospects, often translating into a stronger propensity to save and a decreased tendency to spend (OECD, 2023). Halfway into 2014, in 2020 and early 2022, there were dramatic drops in consumer outlook on the Norwegian economy (Figure 3.2). These can be linked to the fall in oil prices in 2014 and the COVID-19 pandemic in 2020. There is an observable tendency for the saving rate to increase during these periods. In 2022, Russia invaded Ukraine, which could be an explanation for the fall in CCI at that time.

In the context of precautionary saving, we calculated the Pearson correlation coefficient and tested its significance using a t-test. The result gives us a correlation of -0.28, and its significance has a p-value of 0.06. This implies a degree of support in the data for the concept of precautionary saving. The negative correlation is visible in, for example, 2014 and 2020 when the CCI and saving rate are going in opposite directions.

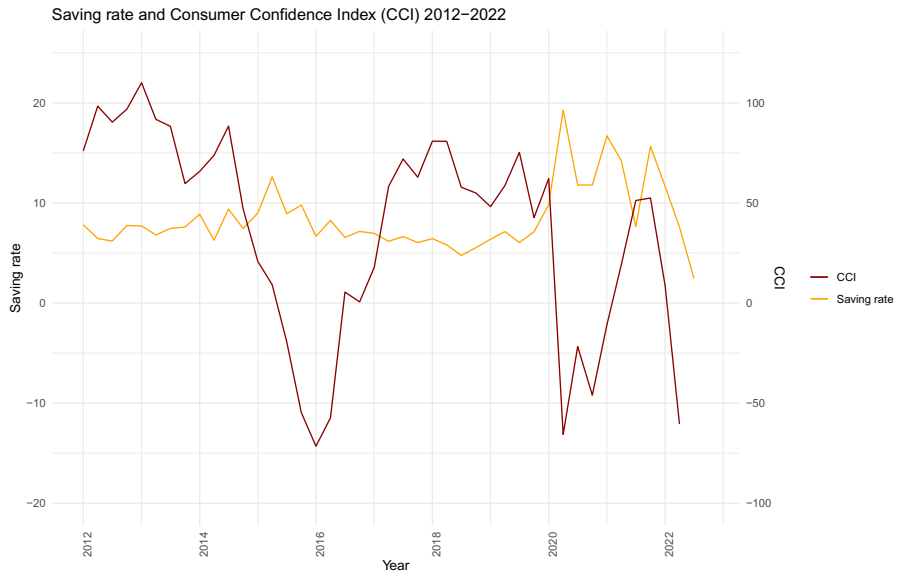

Figure 3.2: Saving rate and CCI for Norway. Data source: Forventningsbarometeret, Finans Norge and Kantar Public.

3.1.2 Norwegian Monetary Policy

The Norwegian Central Bank's main instrument for stabilising inflation and developments in the Norwegian economy is the policy rate. The Monetary Policy and Financial Stability Committee set it eight times a year. When setting the policy rate, The Norwegian Central Bank aims to stabilise inflation by around 2 percent (The Norwegian Central Bank, 2023b).

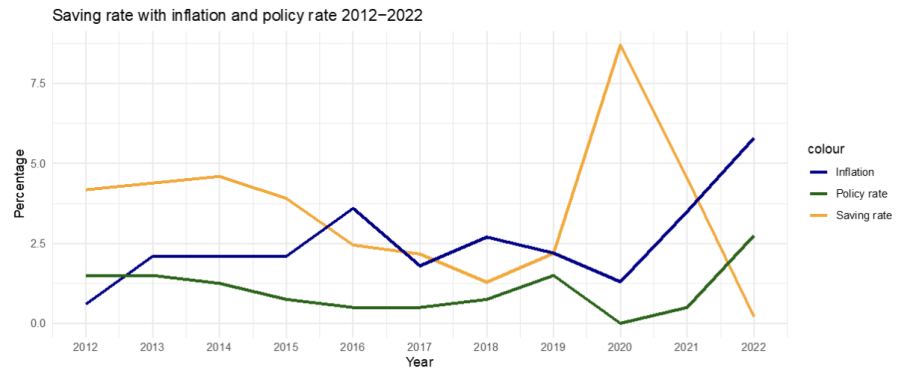

Figure 3.3: Saving rate with inflation and policy rate. Data source: The Norwegian Central Bank and Statistics Norway.

Inflation is typically measured using the Consumer Price Index (CPI), which describes the development of consumer prices for goods and services demanded by private households in Norway (Statistics Norway, 2023). In the last few years, Norwegian inflation has exceeded the Norwegian Central Bank's goal of two per cent annual inflation (Solgård and Østmoe,

2023). The rise in inflation in the later years has led to an increase in the Norwegian policy rate (Figure 3.3). The figure shows a peak in the saving rate around 2020, when the policy rate was reduced following a global lockdown due to the COVID-19 pandemic.

3.2 The oil price drop (2014 – 2016)

The Norwegian economy is sensitive to developments in oil prices. At the beginning of 2014, the petroleum sector accounted for around 24 percent of the GDP and 40 percent of Norwegian exports (Juelsrud and Wold, 2019). GDP per capita is a usual measure of a country's economic performance, and in Norway, this seems to be linked to the oil price (Figure 3.4).

Oil and gas prices fell significantly from the summer of 2014 to the beginning of 2016 (Statista Research Department, 2023). In this period, the price for Brent crude oil sank from 112 USD to 31 USD (Prest, 2018). Increased production and new technology were the primary drivers behind the price drop. Still, the decline in commodity prices suggests that weaker international demand also contributed. Lower prices for oil and gas affected the Norwegian economy through several channels. Demand for goods and services from the Norwegian and global petroleum industry decreased, reducing activity in the supplier industries. This slowed down the growth of the mainland economy (NOU 2016: 15, 2016) and left thousands without jobs, and especially workers in Southern and Western Norway experienced a sudden increase in the risk of unemployment (Juelsrud and Wold, 2019). In November 2015, nearly 73,000 people were employed in the petroleum industry. By June 2016, there were about 8,300 individuals who were unemployed in these industries (Næsheim, 2018).

In February 2021, the Solberg government released its *Long-term Perspectives on the Norwegian Economy 2021*. It refers to estimates from Statistics Norway (SSB) that in 2013, there were approximately 230,000 people employed in Norway who held jobs directly or indirectly related to oil and gas extraction. Following the oil price drop in 2014, many of these jobs disappeared, and by 2018, the number of employed had fallen to about 150,000 (Finansdepartementet, 2021). According to Nilsen (2020), real wage flexibility and increased demand in other export-oriented industries dampened any potential negative employment effects. The oil price drop of 2014, followed by a drop in investment in the

petroleum industry, led to a slight increase in the unemployment rate during the last several years, especially among men. This is because male dominance is prevalent in industries with intense international competition, such as the petroleum industry.

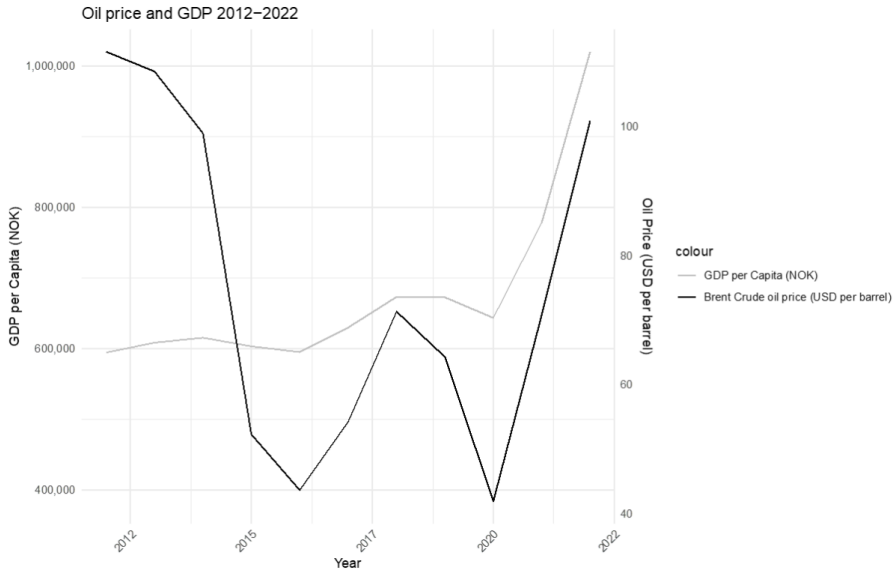

Figure 3.4: Annual average price for Brent crude oil. Brent spot is a commonly used reference index for oil prices. Data source: Statista Research Department and Statistics Norway.

To mitigate the rise in unemployment, a potential strategy is the expansion of employment opportunities within the public sector. However, in this instance, expanding public sector employment to combat rising unemployment was not pursued: There was no particular activity in the ratio between the share of public sector employment and the total number employed in response to the drop in oil prices. Using 2013 as a benchmark, the absolute increase in public employment between 2013 and 2016 was 30,000, while the decrease in private employment was 56,000. The relative employment increase between 2013 and 2018 was 7 percent in the public sector and 0.2 percent in the private sector. also finds an additional factor behind the relatively modest effect the drop in oil prices had on unemployment. There was reduced net migration from countries near Norway, like Sweden and Poland. This contributed to reducing the pressure on the Norwegian labour market.

In the period presented, interest rates were reduced, and fiscal policy was used actively to sustain activity and employment. From October 2014 to March 2016, the Norwegian policy rate went from 1.50 percent to 0.50 percent (The Norwegian Central Bank, 2023b). In addition to fiscal initiatives, the Norwegian government provided financial assistance

to facilitate the reemployment of unemployed engineers from the oil sector. For engineers, the unemployment rate increased from an average of about one percent before the oil price drop to an average of about six percent after the oil price drop (Juelsrud and Wold, 2019). In 2015, the Norwegian government announced plans to spend over 2.5 billion NOK on upgrading public buildings, roads, and railways, particularly in the South and West of Norway. This formed a part of the government's crisis package for the oil counties along the coast, including several projects to combat rising unemployment. According to the incumbent Minister of Transport and Communications, Ketil Solvik-Olsen, the total value of the package was between three and four billion NOK. The 2.5 billion NOK was expected to create approximately one job per million spent (Frafjord and Larsen, 2015).

3.3 The COVID-19 pandemic (2020 – 2022)

Norwegian households increased their savings after the pandemic arrived in Norway in 2020, and society consequently was shut down by the government. Many also began to invest in stocks, and households increased their savings in stocks and equity funds. This occurred despite it being less profitable to save in the form of deposits and despite uncertain economic times. In recent years, researchers and media have paid attention to how households and others have changed their savings during the pandemic.

The Norwegian Central Bank made several decisions to stimulate the Norwegian economy and reduce the economic setbacks following the sharp reduction in economic activity in Norway since the lockdown on March 12, 2020. Following two extraordinary interest rate meetings, the policy rate was reduced from 1.5 percent to 1.0 percent on March 13 before further reduction to 0.25 percent on March 20 (The Norwegian Central Bank, 2023a). On May 7 of the same year, the policy rate was set to 0 percent for the first time in Norwegian history.

As previously mentioned, the policy rate is one of the factors affecting the cost of financing for banks and credit institutions. A lower policy rate makes borrowing in the money market cheaper. Furthermore, changes in the money market rates propagate to the interest rates offered to customers for loans and deposits, and these rates can become lower when the policy rate is further reduced. The purpose of the low policy rate was, among other things, to ensure continued access to loans, especially for companies that experienced a

halt in their activities, so that production and employment could be maintained to some extent (Brynestad et al., 2021).

During the pandemic, as during the oil price drop, several measures were implemented for people and businesses. This includes government support schemes to secure income and jobs. Measures to counteract loss of income for individuals included income protection in the event of loss of work and one's own or children's illness.

Shortly after the lockdown in March 2020, Norwegian unemployment rose to 10 percent, a historically high level. During the fall of 2020, the long-term unemployed rate more than doubled. As the reopening progressed, unemployment significantly decreased, but there were still more unemployed than before the pandemic. The COVID-19 pandemic led to a severe economic setback. Shortly after the lockdown in March, nearly 240,000 people lost their jobs, and unemployment increased to 10 percent, the highest since the 1930s depression. The impact on the labour market must be seen in the context of the pandemic and the measures to limit COVID-19's spread. The increased unemployment was not due to a traditional recession but to periodic lockdowns of parts of society, leading to prolonged unemployment for many (Brander, 2021). One of the sectors that was hit hardest was the sector of accommodation and food services. Out of all the employees in this sector from November 2019 to February 2020, about 30 percent had quit in June 2020. The proportion of those who left the industry was nearly three times higher when the COVID-19 measures were introduced compared to the year before. Many of the employees in this industry are younger, have low education, work part-time and/or have an immigration background (Edelmann and Konci, 2023).

The Norwegian government opted for a different policy. One of the government measures was a compensation scheme for self-employed individuals and freelancers who lost income due to the outbreak of COVID-19. This scheme compensated for some of the income loss that self-employed and freelancers experienced due to the coronavirus outbreak. Self-employed individuals and freelancers who had active business before March 1, 2020, and who lost personal income due to the outbreak of COVID-19 could apply for compensation benefits. The purpose was to compensate for income loss to a certain level that other schemes could not cover. Compensation was provided at 80 percent up to a cap of 6

G[1] converted to an annual amount. Still, the cap was reduced to NOK for NOK with work income, unemployment benefits, care benefits, and sick pay in the benefit period. Incomes earned as self-employed individuals or freelancers during the support period were deducted from the benefit at 80 percent. This way, there was an incentive to continue the business to the extent possible during the support period (Regjeringen.no, 2020).

Norwegian business and industry were also included in the various compensation schemes from the Norwegian government. This included the "Temporary grant scheme for businesses with significant revenue decline (compensation scheme)". The compensation scheme for businesses was an economic support scheme for enterprises with a significant drop in turnover due to measures introduced during the pandemic. The scheme aimed to prevent otherwise viable and adaptable businesses from going bankrupt due to the virus outbreak and infection control measures. The scheme applied to registered taxable enterprises in Norway, mainly companies with a turnover fall of at least 30 percent compared to the previous normal monthly revenue. The compensation scheme covered up to 85 percent of fixed, unavoidable costs, and the subsidy depended on the size of the revenue fall. Some industries were excluded from the scheme, including the financial sector, the power industry, oil and gas extraction, and businesses covered by their support schemes. Approximately 14.5 billion NOK was allocated to the business sector through the compensation scheme from March 2020 to February 2022. Nearly 45 percent of the total amount was given in the first six months. The "Temporary Changes in the Petroleum Taxation Act" covered the petroleum industry. This act aimed to improve the liquidity of oil companies and increase the opportunities to carry out projects by, among other things, providing increased post-tax profitability from the investments (Hoel-Holt and Einarsdottir, 2023). As a result, the government may have lost 30 billion NOK in tax revenues (Skårdalsmo, 2022).

[1]G is the basic amount in the National Insurance Scheme and is used as the basis for calculating Norwegian social security and pension benefits

4 Data

We have collected data on different economic indicators to investigate how they affected the fund investment behaviour of the Norwegian population. The Norwegian Mutual Funds Association (VFF) has provided comprehensive fund investment data for 20 years, serving as our primary data source. The data consists of key figures for subscriptions, redemptions, net subscriptions, and management capital for Norwegian individual customers for various funds. The figures are expressed in NOK 1000 and are collected from January 2003 to September 2023. The funds are divided into four main groups: equity funds, hedge funds, combination funds, and fixed-income funds.

In our analysis, we primarily use the data for money invested for the different types of funds to see how various economic indicators affect fund investments in the Norwegian population. This long-term data was crucial for analyzing Norwegian mutual fund market investment patterns over different economic cycles. However, we chose to use only data from 2012 to 2022 to focus on the drop in oil prices and the COVID-19 pandemic.

Statistics Norway (SSB) is another vital source for our analysis, providing access to extensive datasets on different economic indicators from their data bank. We downloaded datasets on the Consumer Price Index (CPI) and how it has changed monthly over the relevant decade. This data offered granular insights into inflation trends and purchasing power and was a key variable in our analysis. The Central Bank of Norway also has a data bank that allows downloading datasets on monetary variables. We used their data bank to download datasets on the policy rate of every month between January 2012 and December 2022. This data allowed us to examine the impact of monetary policy on investment decisions and market trends.

Lastly, we collected two datasets from The Norwegian Labor and Welfare Administration (NAV). These datasets show unemployment in percent of the labour force every month from January 2012 until December 2022. This allowed us to investigate how unemployment may impact fund investments in the population.

The dataset contained four negative values for money invested over the 10 years we analysed. These values were errors in the dataset, according to VFF. Therefore, in consultation with them, we decided to remove the negative values, since they would have

disrupted the analysis. The final dataset, which includes all variables, resulted in a dataset of cross-sectional time series data, commonly referred to as panel data.

4.1 The different types of funds

A mutual fund is a collective investment vehicle in which many savers pool their money to invest in the securities market. Saving in a mutual fund is, by VFF (2023), considered a good way to save because, historically, it has provided better returns than regular bank savings. There are three main types of mutual funds: equity, fixed income, and balanced funds. The choice of funds that best suits each investor depends, among other factors, on their desired level of risk and investment horizon. The longer one saves, the greater the chances of achieving good returns.

An equity fund comprises at least 80 percent of stocks, often diversified across various industries and countries. Investing in the stock market typically involves a higher risk than putting money in a deposit account. However, since equity funds are composed of multiple stocks, they are less risky than individual stocks. When deposit interest rates are very low, people looking for higher savings returns will consider alternatives with higher expected returns. Historically, the trend in the stock market has been positive and upward despite several shorter periods of economic downturns (Brynestad et al., 2021).

A balanced fund, as the name suggests, combines an equity fund and a fixed-income fund. In contrast, a fixed-income fund is a fund that places its capital in interest-bearing securities like certificates and bonds, while a bond fund is a type of fixed-income fund. States, municipalities, and various public and private enterprises can borrow money by selling interest-bearing securities directly to investors. These securities can then be bought and sold by investors in the securities market. The loan amount is divided into smaller shares suitable for buying and selling. An interest-bearing security entitles the investor to receive a set interest rate from the borrower over the duration of the loan. Interest-bearing papers can have varying maturities, from a few months to several decades. Interest papers with a maturity of up to one year are called certificates. Interest papers with a maturity of more than one year are called bonds. Money market funds invest in interest-bearing securities with a maturity of less than one year. Bond funds invest in bonds, that is, interest-bearing securities with a longer maturity (VFF, 2023).

Hedge funds differ significantly from other fund types, characterized by their largely unregulated structure, flexible investment strategies, sophisticated investors, and considerable managerial investment. Unlike mutual funds, which are SEC-regulated and have strict disclosure requirements, domestic hedge funds operate with minimal regulation under the Investment Company Act of 1940, as they typically are limited partnerships with fewer than 100 investors. Hedge funds primarily cater to institutions and affluent individuals, with minimum investments usually between 250,000 USD and 1 million USD. They are also known for strong performance incentives, often involving a one percent annual management fee and a 14 percent share of annual profits, contingent on surpassing a hurdle rate. At the same time, such incentive structures could potentially encourage excessive risk-taking, and mitigating factors exist, such as substantial personal investment by hedge fund managers and their potential liability as general partners in case of bankruptcy. This contrasts sharply with mutual funds, which limit risky practices like short selling, leverage, and concentrated investments and rarely offer incentive fees to managers (Ackermann et al., 1999).

For our analysis, we used stock funds, combination funds, fixed-income funds, and hedge funds. This data is for Norwegian private investors and, as previously mentioned, provided by The Norwegian Mutual Funds Association (VFF).

4.2 Descriptive statistics

As mentioned earlier, we have collected data on macroeconomic variables and money invested in various types of funds from 2012 to 2022. Table 4.1 shows descriptive statistics for the numerical variables in the dataset for the different types of funds. We observe that the fixed-income funds and stock funds are the largest fund groups. Combination funds are less popular than stock and fixed-income funds and more so for the last few years. Hedge funds have been the least popular fund type over the decade, aligning with the discussion above.

Fund_type	Count	Mean	Median	SD	Min	Max
Combination_funds	131	758609	614473	524574	159976	3500000
Fixed_income_funds	131	1863205	1603184	1197504	604274	7390000
Hedge_funds	130	22272	10654	38670	494	339500
Stock_funds	132	3257034	2286550	2778368	527401	17000000

Table 4.1: Summary statistics by fund type.

We also added the macroeconomic variables Consumer Price Index, policy rate and unemployment to our dataset. The policy rate and unemployment rate are given in percent. The CPI lies between 92.90 and 126.00 and is a number that is set relative to the base year (2015 in our data), which has a value of 100. The descriptive statistics for these variables are presented in Table 4.2.

Statistic	Count	Mean	SD	Min	Median	Max
CPI	524	106.09	8.65	92.90	105.60	126.00
Policy rate	524	0.92	0.59	0.00	0.75	2.62
Unemployment	524	2.83	1.13	1.60	2.60	10.60

Table 4.2: Descriptive statistics for CPI, Policy Rate, and Unemployment

4.3 Graphs on Fund Investments and Funds Sold

Figure 4.1 shows an overview of the data we have used in our analysis. The graph illustrates how much Norwegians have invested in different types of funds during this period. We can see that stock funds and fixed-income funds were the most popular during this time.

We observe a few outliers in the figure. However, we found that removing them did not have a notable impact on the regressions. Therefore, we decided to keep the outliers, as they, after all, provide the correct picture of the investments in this period. We did also not find evidence that these values were wrong, like we did for the negative values in our dataset.

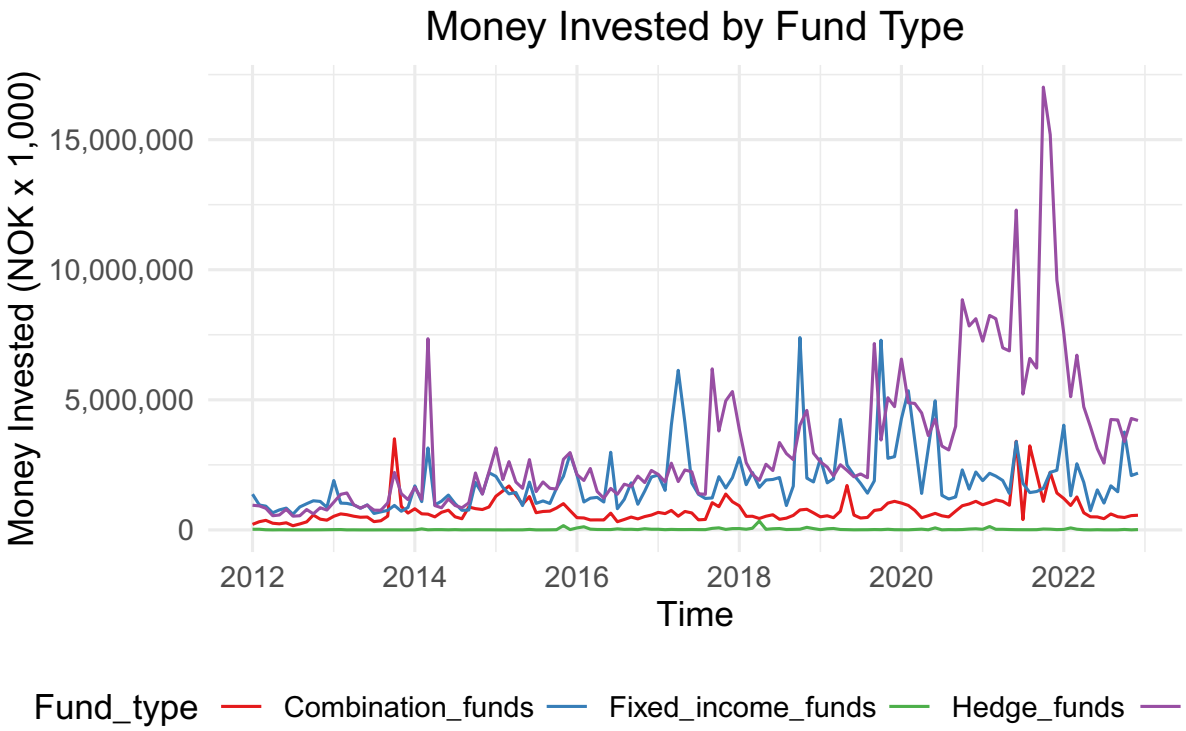

Figure 4.1: Money invested by fund type from 2012 to 2022.

Figure 4.2 shows an overview of fund sales over the decade. Funds sold in this period will not be used in our analysis. There are several reasons for this exclusion. We concentrate on fund investments over sales to provide a focused analysis of how macroeconomic factors impact individual saving and investing decisions. This approach allows us to examine proactive financial behaviours in response to economic shifts. Additionally, fund sales involve complex and varied decision-making elements like personal finance, tax considerations, and behavioural influences, which can introduce extraneous variables not within our study's scope. It can, however, be useful to have an overview of the fund selling activity, shown in Figure 4.2.

We also observe a few outliers on the graph for funds sold, approximately at the same time as for money invested. This indicates elevated levels of activity in these time periods, although we have not determined the cause of this.

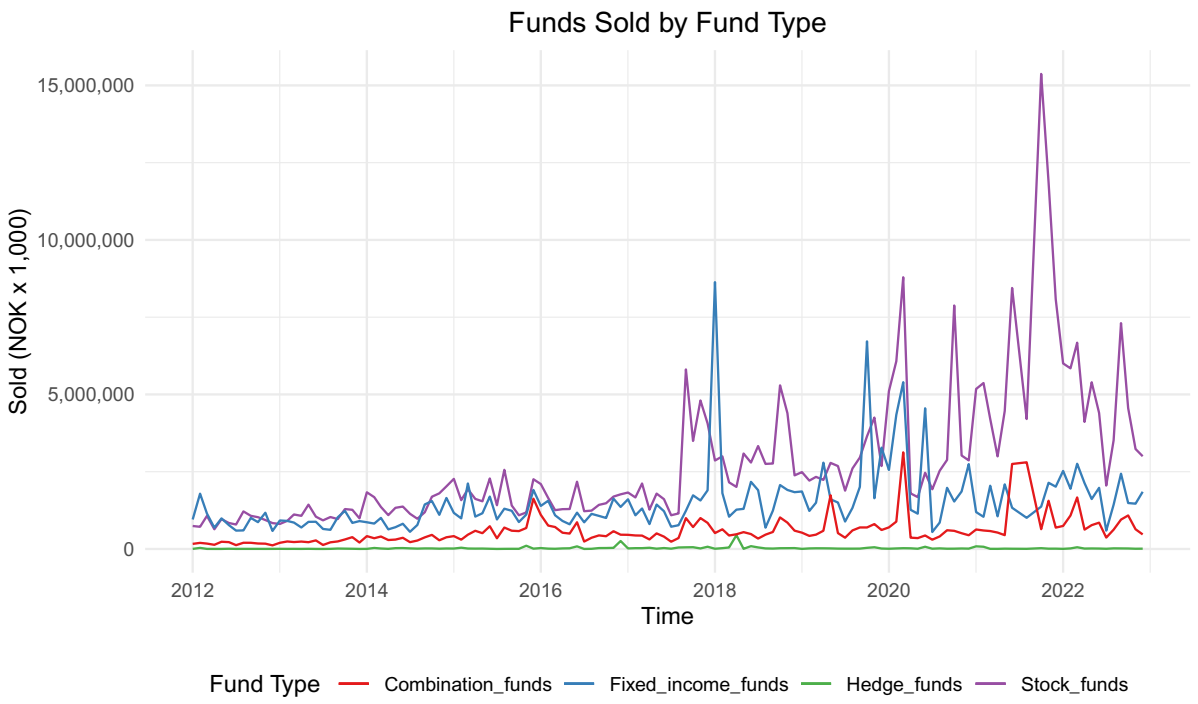

Figure 4.2: Fund selling by fund type from 2012 to 2022.

5 Methodology

For our method, we decided to perform multiple linear regressions with our data to help us answer our research question. The regressions quantify the extent to which economic shocks, like the drop in oil prices and the COVID-19 pandemic, may have affected the flow of investments into various types of funds. This analytical approach allows us to isolate and understand these variables' individual and combined effects on investment behaviour. Moreover, by disentangling these effects, we can offer insights into the resilience of financial markets and investors' risk appetite during turbulent periods.

We needed to make regression models for each desired period to perform the regressions. Furthermore, to define the shocks in the time series data, we had to examine how the two events affected fund investments. We decided to conduct regressions using the shocks as dummy variables. This means that the period during which a particular shock occurred was assigned the value of 1, while the period outside of the shock was assigned the value of 0.

Defining the periods of shocks can be challenging. The oil price drop is considered to have started in July 2014 and lasted until December 2016. This is because the oil price began to plummet in the summer of 2014, and OPEC decided to cut production, a decision that came into effect in January 2017 (Giil, 2019). However, we have decided to look more closely at the price drop's first economic shock. The price drop lasted for 2.5 years, more than 1/3 of the period we have run regressions on. Since the economy also adapts to changes over time, we decided that the definition of the shock of the oil price drop dummy variable is the fourth and last quarter of 2014: October, November and December 2014.

As for COVID-19, although the disease emerged in late 2019, the first COVID-19 measures came into effect in March 2020 in Norway. In February 2022, all measures were finally lifted in Norway, often seen as the end of the direct pandemic effects. However, like with the oil price drop, we wanted to look at the first shock the event gave to the economy. Therefore, we will define the dummy variable COVID-19 pandemic as March, April and May 2020, as these were the first months with the COVID-19 measures.

The data was divided into two distinct periods: 2012-2017 and 2018-2022. This bifurcation was strategically chosen to allow for a two-year buffer period devoid of shocks, enabling us

to assess the economic fluctuations during the oil price drop more accurately. Additionally, we aimed to include approximately one year after the conclusion of the relevant shock. Consequently, the period from 2012 to 2017 was selected to analyze the impact of the oil price drop, while the years 2018 to 2022 were chosen to study the economic repercussions of the COVID-19 pandemic.

The general equation for multiple linear regression with $p-1$ independent variables is written as:

$$y_i = \beta_0 + \beta_1 x_{i,1} + \beta_2 x_{i,2} + \cdots + \beta_{p-1} x_{i,p-1} + \varepsilon_i, \quad i = 1, \ldots, n. \tag{5.1}$$

We used this to prepare regression models for the two periods, examining how the economic shocks may have affected fund investment. In regression analysis with categorical variables like the fund types in our data, one category has to be omitted. This becomes the reference category, and all other categories will be compared to it. This must be done to avoid perfect multicollinearity among the independent variables, the dummy variable trap.

In the regressions, the variable for combination funds was the omitted variable. This means that the coefficient for the other fund types in the regression output tells the difference in the dependent variable, log money invested, between the baseline, combination funds, and the different types of funds, holding all else equal.

The progress resulted in the following models:

In the model from 2012-2017, we explore how the oil price crash might have affected fund investments and therefore employ the following model:

$$\begin{aligned}\log(\text{money\_invested}) = \beta_0 &+ \beta_1 \text{Fund\_typeFixed\_income\_funds} \\ &+ \beta_2 \text{Fund\_typeHedge\_funds} \\ &+ \beta_3 \text{Fund\_typeStock\_funds} + \beta_4 \text{Oil\_price\_drop} \\ &+ \beta_5 \text{factor(Quarter)Q2} + \beta_6 \text{factor(Quarter)Q3} \\ &+ \beta_7 \text{factor(Quarter)Q4} \\ &+ \beta_8 \text{factor(Year)2013} + \beta_9 \text{factor(Year)2014} \\ &+ \beta_{10} \text{factor(Year)2015} + \beta_{11} \text{factor(Year)2016} \\ &+ \beta_{12} \text{factor(Year)2017} \\ &+ \beta_{13} \text{Fund\_typeFixed\_income\_funds:Oil\_price\_drop} \\ &+ \beta_{14} \text{Fund\_typeHedge\_funds:Oil\_price\_drop} \\ &+ \beta_{15} \text{Fund\_typeStock\_funds:Oil\_price\_drop} + \varepsilon\end{aligned} \tag{5.2}$$

In 2018-2022, we investigated how COVID-19 may have influenced fund investments. Hence, we use a slightly different model, which is as follows:

$$\begin{aligned}\log(\text{Money\_invested}) = \beta_0 &+ \beta_1 \text{Fund\_typeFixed\_income\_funds} \\ &+ \beta_2 \text{Fund\_typeHedge\_funds} \\ &+ \beta_3 \text{Fund\_typeStock\_funds} + \beta_4 \text{Covid\_pandemic} \\ &+ \beta_5 \text{factor(Quarter)Q2} + \beta_6 \text{factor(Quarter)Q3} \\ &+ \beta_7 \text{factor(Quarter)Q4} \\ &+ \beta_8 \text{factor(Year)2019} + \beta_9 \text{factor(Year)2020} \\ &+ \beta_{10} \text{factor(Year)2021} + \beta_{11} \text{factor(Year)2022} \\ &+ \beta_{12} \text{Fund\_typeFixed\_income\_funds:Covid\_pandemic} \\ &+ \beta_{13} \text{Fund\_typeHedge\_funds:Covid\_pandemic} \\ &+ \beta_{14} \text{Fund\_typeStock\_funds:Covid\_pandemic} + \varepsilon\end{aligned} \tag{5.3}$$

After making regression models to explore how the two shocks affected investments in the two periods, we also wanted to examine how other macroeconomic variables affected investments. This resulted in two new regression models, extended with the Consumer Price Index (CPI), policy rates, and unemployment rates, in percent of the workforce.

The extended regression for 2012-2017 has the same model as the previous one for the same period. Still, it has the independent variables Consumer Price Index (CPI), policy rate and unemployment rate added to explore how they might affect money invested in funds. The model is as follows:

$$\begin{aligned}
\log(\text{money_invested}) = \beta_0 &+ \beta_1 \text{Fund_typeFixed_income_funds} \\
&+ \beta_2 \text{Fund_typeHedge_funds} \\
&+ \beta_3 \text{Fund_typeStock_funds} + \beta_4 \text{Oil_price_drop} \\
&+ \beta_5 \text{CPI} \\
&+ \beta_6 \text{Unemployment} + \beta_7 \text{Policy_rate} \\
&+ \beta_8 \text{factor(Quarter)Q2} \\
&+ \beta_9 \text{factor(Quarter)Q3} + \beta_{10} \text{factor(Quarter)Q4} \\
&+ \beta_{11} \text{factor(Year)2013} \\
&+ \beta_{12} \text{factor(Year)2014} + \beta_{13} \text{factor(Year)2015} \\
&+ \beta_{14} \text{factor(Year)2016} \\
&+ \beta_{15} \text{factor(Year)2017} \\
&+ \beta_{16} \text{Fund_typeFixed_income_funds:Oil_price_drop} \\
&+ \beta_{17} \text{Fund_typeHedge_funds:Oil_price_drop} \\
&+ \beta_{18} \text{Fund_typeStock_funds:Oil_price_drop} + \varepsilon
\end{aligned} \tag{5.4}$$

Lastly, we made a model for 2018-2022 with added macroeconomic variables, which has the following model:

$$\begin{aligned}
\log(\text{money_invested}) = \beta_0 &+ \beta_1 \text{Fund_typeFixed_income_funds} \\
&+ \beta_2 \text{Fund_typeHedge_funds} \\
&+ \beta_3 \text{Fund_typeStock_funds} \\
&+ \beta_4 \text{Covid_pandemic} + \beta_5 \text{CPI} \\
&+ \beta_6 \text{Unemployment} + \beta_7 \text{Policy_rate} \\
&+ \beta_8 \text{factor(Quarter)Q2} \\
&+ \beta_9 \text{factor(Quarter)Q3} + \beta_{10} \text{factor(Quarter)Q4} \\
&+ \beta_{11} \text{factor(Year)2019} + \beta_{12} \text{factor(Year)2020} \\
&+ \beta_{13} \text{factor(Year)2021} + \beta_{14} \text{factor(Year)2022} \\
&+ \beta_{15} \text{Fund_typeFixed_income_funds:Covid_pandemic} \\
&+ \beta_{16} \text{Fund_typeHedge_funds:Covid_pandemic} \\
&+ \beta_{17} \text{Fund_typeStock_funds:Covid_pandemic} + \varepsilon
\end{aligned} \tag{5.5}$$

As one can see from the regression equations, we chose to log-transform the dependent variable. This is because we saw that our data was highly skewed, which is quite common for financial data. Performing a logarithmic transformation can help normalize the residuals and stabilize variance across the range of predictions. Since our data was skewed, we found it reasonable to perform a log transformation to improve the distribution. We then made a new histogram for the log-transformed dependent variable with a more satisfactory distribution. The histograms of the data before and after the logarithmic transformation are presented in the appendix. Boxplots and scatterplots of the different variables on the raw data are also presented in the appendix.

After applying the logarithmic transformation and running the regressions, we performed diagnostic plots on all regressions to ensure that the models were not violating the regression assumptions. The diagnostic plots were satisfactory, which allowed us to be content with the regression models.

Because of the logarithmic transformation in the dependent variable, this is a log-linear model, and the coefficients have to be interpreted in a certain way (Pennsylvania State University, 2023). When interpreting coefficients from the regressions in this thesis, we use the following model to see the percent change in the dependent variable with one unit change in the independent variable:

$$(e^{\beta} - 1) \times 100 \tag{5.6}$$

While the non-transformed model might be more straightforward to interpret regarding actual money invested, the log-transformed model has certain advantages. These are handling skewness, stabilizing variance, and potentially providing a better overall fit, which it did in our models.

After the new models with logarithmic transformation, we performed residual diagnostics with a satisfactory outcome. All of the diagnostic plots are presented in the appendix. We also decided to control for time-fixed effects when working with the regressions. This was also helping with the overall robustness of the model. Then, we also control for general changes related to time when looking at the effects of the different independent variables on money invested.

By including dummy variables for quarter and year, we aim to isolate the specific impact of our variables of interest from the broader, systemic changes that occur over time. This approach mitigates the risk of omitted variable bias from failing to account for such temporal factors. Regulatory changes, economic cycles, and market sentiment can change investment patterns across the financial sector and are often not captured by the other variables in the model. Therefore, controlling for time-fixed effects allows us to attribute changes in investment levels to the fund characteristics and other explanatory variables more accurately, enhancing the credibility and specificity of our results.

6 Results

For the first two regressions, shown in Tables 6.1 and 6.2, we focus on the isolated effects of the drop in oil prices and the COVID-19 pandemic on fund investments. As mentioned, these have been incorporated as dummy variables in our dataset. We examine the periods 2012-2017 and 2018-2022 separately.

Various factors influence fund investments among the population. To ascertain how different macroeconomic variables might affect investment decisions, we have collected data on the Consumer Price Index, policy rates and unemployment rates for the entire period. As described earlier, we added the monthly values to the dataset. We added them to the new regression models to find out how the different variables may have affected the fund investments, as shown in Tables 6.3 and 6.4.

We observe that the time-fixed effects change from the original model when adding the new variables. This was unexpected, but we suspected this might be due to multicollinearity when adding the macroeconomic variables. In the dataset, we observe that the Consumer Price Index generally increased with each year in this period. Since it seemed to correlate with the year, we created a correlation matrix to investigate how the variables might correlate. The correlation matrix showed a high positive correlation between CPI and Year. We also ran additional regressions for the two regressions with added variables, where we did not include CPI as a variable. The correlation matrix is presented in the appendix. In the regression for 2012-2017 without CPI, most of the original statistical significance returned, which supports our expectation. Because of this, we find that the regressions without the added macroeconomic variables likely show the correct yearly fixed effects. Therefore, we will not comment on the time-fixed effects in 6.3 and 6.4. The regressions without the Consumer Price Index (CPI) are also presented in the appendix.

6.1 Regression 2012-2017

Table 6.1 presents the regression results of the model for 2012-2017 and shows the determinants of the log-transformed money invested in various fund types. The models incorporate fund types as categorical variables, an oil price drop indicator, and interaction terms for fund types with the oil price drop. The model also controls for fixed effects for

quarters and years.

The constant term of 12,886 is statistically significant at the one percent level. It represents the log of money invested for the baseline fund type (combination funds) when all other variables are held at zero. The F-statistic is also statistically significant at the 1 percent level, which indicates that the model is significant overall, meaning that the independent variables have a statistically significant effect on the dependent variable as a group.

The coefficients for fixed-income and stock funds are 0.803 and 0.947, respectively, and statistically significant at the 1 percent level. When applying the logarithmic formula, it indicates that fixed-income and stock funds are associated with 123.2 and 157.8 percent more money invested compared to the baseline category outside of the oil price drop period, all else equal. This suggests a strong preference for these types of funds during the period. The coefficient for hedge funds is -4.497 and also statistically significant at the 1 percent level, and is thus associated with 98.89 percent less money invested than the baseline category.

The coefficient for the oil price drop is not statistically significant. This indicates that the price drop is not a notable determinant of money invested in the baseline category, combination funds. This may suggest that the investment decisions in combination funds are not overly sensitive to the drop in oil prices or that other unobserved factors might be mitigating the impact.

Time-fixed effects reveal insights into the temporal dynamics affecting investments in the omitted variable, combination funds. The statistically significant negative coefficients for Q2 and Q3 imply a seasonal pattern where investment is lower in this category in the middle quarters of the year compared to Q1, which is the baseline. The coefficients indicate 28.44 and 40.95 percent less money invested compared to Q1. Annual fixed effects indicate a general upward trend in investments in the baseline from 2014 to 2017, with a statistically significant increase at the 1 percent level in all years except 2013.

Regarding the interaction terms between the different fund types and the oil price drop dummy, none of them are statistically significant in this regression. They are all negative but only show slightly less money invested than the baseline. This implies that the effect of the oil price drop does not differ much when looking at the interactions between the

different fund types and the oil price drop dummy compared to the baseline in the same period.

Table 6.1: Regression Results 2012-2017

	Dependent variable:
	log_Money_invested
Fund_typeFixed_income_funds	0.803***
	(0.120)
Fund_typeHedge_funds	−4.497***
	(0.120)
Fund_typeStock_funds	0.947***
	(0.120)
Oil_price_drop	0.071
	(0.441)
factor(Quarter)Q2	−0.334***
	(0.118)
factor(Quarter)Q3	−0.528***
	(0.117)
factor(Quarter)Q4	0.046
	(0.125)
factor(Year)2013	0.044
	(0.143)
factor(Year)2014	0.622***
	(0.157)
factor(Year)2015	0.740***
	(0.143)
factor(Year)2016	0.935***
	(0.144)
factor(Year)2017	1.188***
	(0.143)
Fund_typeFixed_income_funds:Oil_price_drop	−0.041
	(0.586)
Fund_typeHedge_funds:Oil_price_drop	−0.566
	(0.586)
Fund_typeStock_funds:Oil_price_drop	−0.119
	(0.586)
Constant	12.886***
	(0.145)
Observations	287
R^2	0.918
Adjusted R^2	0.914
Residual Std. Error	0.703 (df = 271)
F Statistic	202.537*** (df = 15; 271)
Note:	*p<0.1; **p<0.05; ***p<0.01

6.2 Regression 2018-2022

Moving on to the next period, we show the regression results in Table 6.2. The constant term is 13.820 and significant at the 1 percent level. This indicates that the expected log of money invested is approximately 13.820 when all other variables are held at zero. The F statistic is 195.435 and statistically significant at the 1 percent level. This implies that the model as a whole is statistically significant.

All the fund types have statistically significant coefficients at the 1 percent level. Fixed-income and stock funds have positive coefficients of 1.015 and 1.749, respectively. Applying the logarithmic formula translates to 175.90 percent and 474.89 percent more money invested than the baseline category. The coefficient for hedge funds of -3.914 means 98.00 percent less money invested compared to the baseline.

The coefficient for the COVID-19 pandemic is negative and implies a slight decrease in combination funds in the first months of the COVID-19 pandemic. However, the coefficient is not statistically significant, which implies that the pandemic as a variable alone did not have a notable impact on money invested in the baseline fund.

Regarding the time-fixed effects, the coefficient for Q3 is -0.596 and shows a statistically significant negative association at the 1 percent level. This indicates 44.90 percent lower investment levels in combination funds in Q3 compared to Q1, which is the baseline. The coefficient for Q2 is -0.253 and statistically significant, but at the 5 percent level. When applying the logarithmic formula, this means 22.35 percent less money invested than in Q1. The coefficient for Q4 shows no statistically significant difference from Q1.

The yearly coefficients for 2019 and 2020 are not statistically significant, indicating no substantial change in investment levels compared to 2018, which is the baseline year. However, the coefficient for 2022 of -0.359 is significant at the 1 percent level, translating to 30.16 percent less money invested compared to the baseline. 2021 also has a coefficient of 0.230, which is statistically significant at the 10 percent level, indicating 25.86 percent more money invested than in 2018.

Lastly, the interaction terms between the COVID-19 pandemic dummy and the fund types are slightly positive. This implies a slight increase of money invested in fixed-income funds, hedge funds and stock funds when compared to the baseline, but the effect is not

statistically significant.

Table 6.2: Regression Results 2018-2022

	Dependent variable:
	log_Money_invested
Fund_typeFixed_income_funds	1.015***
	(0.122)
Fund_typeHedge_funds	−3.914***
	(0.123)
Fund_typeStock_funds	1.749***
	(0.122)
Covid_pandemic	−0.355
	(0.403)
factor(Quarter)Q2	−0.253**
	(0.121)
factor(Quarter)Q3	−0.596***
	(0.121)
factor(Quarter)Q4	0.030
	(0.120)
factor(Year)2019	−0.209
	(0.133)
factor(Year)2020	−0.031
	(0.145)
factor(Year)2021	0.230*
	(0.134)
factor(Year)2022	−0.359***
	(0.133)
Fund_typeFixed_income_funds:Covid_pandemic	0.360
	(0.607)
Fund_typeHedge_funds:Covid_pandemic	0.083
	(0.545)
Fund_typeStock_funds:Covid_pandemic	0.258
	(0.545)
Constant	13.820***
	(0.141)
Observations	237
R^2	0.925
Adjusted R^2	0.920
Residual Std. Error	0.650 (df = 222)
F Statistic	195.453*** (df = 14; 222)
Note:	*p<0.1; **p<0.05; ***p<0.01

6.3 Regression 2012-2017 with added variables

Table 6.3 shows the regression results for 2012-2017 with the extended model, which includes the Consumer Price Index (CPI), policy rate and unemployment rate to explore how they might affect money invested in funds in total. Since we have already presented the oil price drop results and decided not to comment on the time-fixed effects, as mentioned earlier, we will focus on the added macroeconomic variables in this section.

When looking at the added variables, none of the coefficients are statistically significant. The Consumer Price Index (CPI) has a positive coefficient, implying a marginal rise in the log of money invested. Unemployment and policy rates show negative coefficients, which might imply a slight decrease in money invested when the unemployment rate and policy rate increase. However, since it is not statistically significant, they do not have a notable effect on money invested.

In summary, the regression model for 2012-2017 with the added macroeconomic variables suggested that there is no clear evidence that they affect money invested in funds.

Table 6.3: Regression Results 2012-2017 extended

	Dependent variable:
	log_Money_invested
Fund_typeFixed_income_funds	0.803***
	(0.119)
Fund_typeHedge_funds	−4.497***
	(0.120)
Fund_typeStock_funds	0.947***
	(0.119)
Oil_price_drop	0.117
	(0.441)
CPI	0.105
	(0.108)
Unemployment	−0.545
	(0.370)
Policy_rate	−0.355
	(0.542)
factor(Quarter)Q2	−0.576***
	(0.163)
factor(Quarter)Q3	−0.743***
	(0.167)
factor(Quarter)Q4	−0.368
	(0.238)
factor(Year)2013	−0.110
	(0.270)
factor(Year)2014	0.346
	(0.493)
factor(Year)2015	0.175
	(0.710)
factor(Year)2016	−0.132
	(1.101)
factor(Year)2017	−0.284
	(1.259)
Fund_typeFixed_income_funds:Oil_price_drop	−0.041
	(0.584)
Fund_typeHedge_funds:Oil_price_drop	−0.566
	(0.585)
Fund_typeStock_funds:Oil_price_drop	−0.119
	(0.584)
Constant	5.157
	(10.712)
Observations	287
R^2	0.919
Adjusted R^2	0.914
Residual Std. Error	0.701 (df = 268)
F Statistic	170.058*** (df = 18; 268)
Note:	*p<0.1; **p<0.05; ***p<0.01

6.4 Regression 2018-2022 with added variables

For this regression, we have used the same model as in 6.2 and added the same independent variables as in 6.3. In this part, we will also not comment on the time-fixed effects, as discussed earlier, and focus on the added variables. The results are presented in Table 6.4.

The Consumer Price Index and policy rate have negative coefficients, implying a slight decrease in the log of money invested when these variables increase. The coefficient for unemployment was slightly positive, which might indicate a slight increase in money invested with an increase in this variable. However, none of the added macroeconomic variables are statistically significant in this regression. This implies that these variables did not have a notable impact on the money invested.

In summary, the regression model for 2018-2022 with the added macroeconomic variables suggested that there is no clear evidence that the Consumer Price Index, policy rate, and unemployment rate affect money invested in funds.

Table 6.4: Regression Results 2018-2022 extended

	Dependent variable:
	log_Money_invested
Fund_typeFixed_income_funds	1.016***
	(0.122)
Fund_typeHedge_funds	−3.912***
	(0.122)
Fund_typeStock_funds	1.751***
	(0.122)
Covid_pandemic	−0.554
	(0.544)
CPI	−0.090
	(0.059)
Unemployment	0.051
	(0.071)
Policy_rate	−0.015
	(0.133)
factor(Quarter)Q2	−0.134
	(0.147)
factor(Quarter)Q3	−0.347*
	(0.191)
factor(Quarter)Q4	0.365*
	(0.208)
factor(Year)2019	0.016
	(0.173)
factor(Year)2020	0.220
	(0.301)
factor(Year)2021	0.869*
	(0.519)
factor(Year)2022	0.970
	(0.806)
Fund_typeFixed_income_funds:Covid_pandemic	0.377
	(0.608)
Fund_typeHedge_funds:Covid_pandemic	0.082
	(0.542)
Fund_typeStock_funds:Covid_pandemic	0.257
	(0.542)
Constant	23.245***
	(6.300)
Observations	237
R^2	0.927
Adjusted R^2	0.921
Residual Std. Error	0.647 (df = 219)
F Statistic	162.942*** (df = 17; 219)
Note:	*p<0.1; **p<0.05; ***p<0.01

7 Discussion

For our discussion, we will combine our findings with existing literature. Further, we will present our thesis's limitations and robustness before suggesting future research directions, identifying unexplored areas that emerged from our study.

7.1 Implications of results 2012-2017

We find that during the 2012-2017 period, the investment dynamics in the fund market were significantly influenced by fund type. The regression results (Table 6.1) reveal that fixed-income and stock funds had statistically significant positive coefficients. Fixed-income and stock funds were associated with 132.2 and 157.8 percent more money invested than in the baseline, respectively, indicating that these funds were preferred in this period. Hedge funds had 98.89 per cent less money invested than the baseline fund. Such a solid negative association suggests that hedge funds may have been less attractive to investors. None of the interaction terms between the oil price drop dummy and the different fund types were statistically significant. This was unexpected, as one might predict notably fewer fund investments during an economic shock. At the same time, in the context of precautionary saving, we also considered it possible that there could be more fund investment in such a period of uncertainty.

The time-fixed effects showed a statistically significant negative impact for the second and third quarters. This implies a notable seasonal pattern, where people invest less in funds during the middle of the year compared to the first quarter. There can be many reasons for this, including the psychological factors associated with entering a new year. For many, it is the chance for a fresh start and the opportunity to make sound personal and financial decisions. This could make fund investments in Q1 relatively high compared to Q2 and Q3. Reduced investments in these quarters can be due to a "summer slowdown" phenomenon: Meaning that the reduced activity in Q2 and Q3 may be attributed to seasonal factors such as the summer holiday period, during which many decision-makers take vacations. This could potentially lead to fewer investment activities. Other factors that could be relevant are budget and tax cycles. Around the turn of the year, there is high activity in companies and funds regarding their plans, annual results, and similar

matters, which could trigger investment opportunities.

When controlling for the yearly effects, all years except 2013 showed a statistically significant increase in fund investments. Therefore, there was a general upward trend in these years. This was expected as fund investments have become more popular and easily accessible among the general population. In this regression (Table 6.1), it seemed like the time-fixed effects were more impactful on money invested in funds than the oil price drop had in itself.

For the extended regression model, depicted in Table 6.3, additional variables were added to elucidate the influences on fund investments. We added the variables Consumer Price Index (CPI), policy rate, and unemployment rate. Including these variables refined our understanding of the investment landscape during this period. However, none of the coefficients for the added macroeconomic variables were statistically significant.

Most works do find evidence of an effect of uncertainty on savings. However, there is no consensus about the intensity of this reason for saving, nor on which is the most appropriate measure to approximate uncertainty (Lugilde et al., 2019). As mentioned in the literature review, several studies (Banks et al., 2001; Benito, 2006; Carroll and Dunn, 1997; Ceritoğlu, 2013; Deaton, 2011; Juelsrud and Wold, 2019; Mody et al., 2012) have examined unemployment as a measure of uncertainty. Our results indicate that unemployment in this period has not been a good measure of uncertainty or that the general Norwegian population did not experience uncertainty. Another reason could be that the drop in oil prices directly affected a smaller part of the Norwegian population, such as the Southern and Western parts of Norway. These potential geographical differences would not have appeared in our model. However, it is interesting that engineers experienced the highest job loss risk in this period and area (Juelsrud and Wold, 2019). As mentioned before, research shows that they increased their bank deposits in this period. At the same time, they belong to a group which, according to Alexander et al. (1998); Bertaut (1998); Guiso, Haliassos et al. (2003), is more likely to invest in funds: They have higher education and a high income and is therefore associated with the decision to invest in mutual funds. Briefly explained, engineers have the proper prerequisites for investing in funds but, for unknown reasons, have chosen not to do so.

In summary, the results suggest that the type of fund is a significant predictor of money

invested. There are great differences between the funds, where stock and fixed-income funds are the most popular, while hedge and combination funds are the least popular, as we also saw in the descriptive statistics. Therefore, money invested compared to the baseline will differ greatly across the funds. The interaction terms between the oil price drop and the different types of funds were not statistically significant, indicating that the oil price drop did not have a notable impact on money invested.

The different time-fixed effects significantly impacted money invested, with a substantial decrease in money invested in the second and third quarters. The fact that the years 2014-2017 had a statistically significant increase in money invested indicates that investing in funds has become more popular over the years. This trend may have obscured the impact of any fluctuations due to the oil price drop, given that there has been such a substantial increase in fund investments, but it is hard to determine. State aid may also have contributed to reducing the effect of the fall in oil prices on fund investments. In addition, the shock was probably not perceived as dramatic in other parts of the country as in the southwest parts of Norway. Since the rest of the nation was likely not as affected, the fund investments in the other areas might have made up for less investments in the affected areas.

7.2 Implications of results 2018-2022

Transitioning to the 2018-2022 time span, the focus shifts to the impact the COVID-19 pandemic had on fund investments (Table 6.2. The time-fixed effects of this model are not as noticeable as the previous one. However, 2021 had a positive impact, significant at the 10 percent level, indicating an increase in money invested compared to the baseline year. The regression also shows that 2022 had a negative impact on investments, significant at the 1 percent level, implying that less money was invested in 2022 compared to the baseline. The second and third quarters showed a statistically significant negative coefficient, indicating substantially less money invested in these quarters. A year mid-quarters with this generally experienced less money invested compared to the first quarter in this period.

The coefficients for all the different fund types were statistically significant, like in the previous period. Fixed-income and stock funds had notably more money invested during this period than the baseline category. Hedge funds had substantially less money invested

than the baseline. This might be due to the increased interest in fund investments in the past years.

The COVID-19 pandemic, while a defining event of this era, did not show a significant standalone effect on the log of money invested in the baseline. The same applies to the interaction terms, which were also not statistically significant, implying that the pandemic did not have a notable impact on money invested when looking at the different fund types. However, we know that fund investments increased during the pandemic (VFF, 2021), which could indicate that investors directed their investments towards funds during the pandemic, possibly in search of capitalisation on new market opportunities. However, our regression explores how the first three months affected investments in funds, something that might have caused the model not to pick up this trend. In addition, we removed the variable for fixed-income funds from March 2020, because it was negative. This was done in consultation with VFF, because this was an error in the dataset. More details are available in Chapter 4, where we presented the data. It turned out that this variable was not available. The fact that we removed it may have affected our result, as there is missing data for investments in fixed-income funds for this month.

For the subsequent period of 2018-2022 (Table 6.4), the model maintains the added variables for a comparative analysis. None of the coefficients for CPI, policy rate and unemployment rate were statistically significant. This implies that these variables do not have a significant impact on individuals" investment patterns. Unemployment soared during the first months of the pandemic, something one would have thought would affect investments in funds. However, we did not find this to be the case. One explanation could be that most people who lost their jobs during the pandemic had lower education and often worked in service professions like restaurants and hotels (Edelmann and Konci, 2023). Research shows that people in this occupational group are not typical fund investors. This may be part of the explanation as to why unemployment at that time did not seem to affect fund investments significantly.

Another critical aspect to note in this context is that even though the unemployment level was record-high early in the pandemic, the Norwegian government and the Norwegian Central Bank took extensive measures to stimulate the economy. This is by drastically reducing the policy rate and giving financial support to businesses and people (Hoel-Holt

and Einarsdottir, 2023; Regjeringen.no, 2020). By supporting companies, the Norwegian government indirectly secured jobs. Also, with limited consumption opportunities, many people had more money than usual because of the many lockdowns. These could have given households more money to invest overall, so-called "forced saving".

7.3 Robustness and limitations

Our study, while robust in its approach, recognises several limitations. This thesis primarily concentrates on the Norwegian mutual funds market from 2012 to 2022. The rationale for selecting this time frame and geographic focus stems from the significant economic events within this period, including the drop in oil prices in 2014 and the COVID-19 pandemic in 2020, which present two unique cases in recent Norwegian history. It is essential to acknowledge that the findings and implications drawn from this research are context-specific and may not be fully applicable to other regions or time frames.

Our research is focused on mutual funds, as opposed to traditional savings accounts or direct stock investments. This choice stems from mutual fund's growing popularity and relevance in the Norwegian financial landscape. Mutual funds offer diversification and professional management, making them an attractive option for a wide range of investors, especially in a context where low interest rates render savings accounts less appealing and individual stock investments potentially riskier for the average investor.

For the study, we have investigated the impact of macroeconomic variables like the policy rate, inflation, and unemployment rates on mutual fund investments. These variables are pivotal in understanding Norway's economic climate and investor behaviour. The policy rate influences the cost of borrowing and the return on savings, inflation affects the actual value of savings, and unemployment rates can signify the economy's overall health, impacting consumer confidence and investment behaviour. While other macroeconomic variables, such as GDP growth rate, government debt levels, and consumer spending patterns, could also influence mutual fund investments, they have been excluded from this study. The decision to omit these variables is based on a focused approach to understanding the most direct and immediate factors affecting mutual fund investments. However, it is acknowledged that these additional variables could provide a more comprehensive economic picture and should be considered in future research.

However, it is crucial to recognise that the chosen variables are influenced by many domestic and international factors, making it challenging to isolate the effects of individual variables. This complexity must be considered when evaluating the study's outcomes. The impact of the types of campaigns that aim to increase female investors, like the one DNB started in 2019, is, for example, not considered in the thesis.

The analysis conducted in this study is inherently reliant on available data, primarily sourced from the Norwegian Fund and Asset Management Association (VFF), Statistics Norway (SSB), and economic reports. While efforts have been made to ensure data accuracy and relevance, there are inherent limitations in data completeness and potential biases in survey methodologies. These constraints may impact the robustness of the findings and their interpretation. We have used specific quantitative methods in this thesis, which, while rigorous, are not without limitations. The potential for omitted variable bias and the limitations inherent in the statistical models should be acknowledged. These factors may influence the study's conclusions and should be considered when interpreting the results. One obvious limitation is that we do not have extensive knowledge about who is represented in our data. During the period studied with several economic shocks, it is a natural assumption that wealthier people may have fared better and, therefore, had better possibilities to invest in funds. Less wealthy people are, therefore, perhaps underrepresented in this data.

Given the study's focus on Norway, the extent to which the findings can be generalised to other contexts is limited. Norway's unique economic and financial landscape may mean that the results are not directly applicable to other countries or economic systems. While our research aims to inform economic and monetary policy, translating academic findings into practical policy advice is complex. The dynamic nature of economic systems and the interplay of various factors mean that policy implications should be cautiously approached.

7.4 Further research

There is currently an ongoing war in Europe and the Middle East. High inflation with higher interest rates, higher electricity costs, and a decreasing disposable income are all factors that could affect Norwegian fund investments. Further research could take a closer

look at the behavioural aspects of funds saving and how people are affected by Norway's geopolitical and economic instability in 2023.

Fund investments have remained strong and increased despite these instabilities (Bogen, 2023). Our dataset shows that the general savings rate is declining towards the end of 2022. This relationship would be interesting to examine more closely in a research context.

The time-fixed effects revealed a notable seasonal pattern, with investments dipping in the middle of the year. This pattern could reflect investors' behavioural tendencies and requires further exploration.

For both periods, the unemployment rate increased, indicating uncertainty for those who experienced job loss risk. Two occupational groups were hit the hardest during the two shocks: engineers in the oil region and those employed in the accommodation and food services sector. It would be interesting to investigate how different occupational groups invest and save during times of uncertainty.

Furthermore, the effects of macroeconomic variables like policy rates, inflation, and unemployment rates were explored but did not show significant impacts in our analysis. This observation opens avenues for future research, especially in understanding the nuanced relationship between these macroeconomic factors and mutual fund investments.

8 Conclusion

In this master's thesis, we have analysed the Norwegian mutual fund market from 2012 to 2022, a period marked by significant economic events. This conclusion sums up our key findings and reflects on the broader implications of our research.

Our analysis reveals that the type of fund is a critical determinant of investment dynamics in the Norwegian market. From 2012 to 2017, fixed-income and stock funds appeared as the preferred investment instrument, significantly outperforming the baseline regarding total investments. In contrast, hedge funds were vastly less mainstream compared to the baseline. This trend underscores the investors' preference for stability and growth potential, represented by fixed-income and stock funds, over the more volatile hedge funds.

Interestingly, the drop in oil prices during this period did not exhibit a direct, significant impact on fund investments. This finding challenges the conventional understanding of the sensitivity of Norwegian investments to oil price fluctuations. Instead, we suggest that other factors, including the Norwegian government's interventionist policies in turbulent times, may have contributed to reducing the impact of the shocks on people's economies.

The transition to the 2018-2022 period, dominated by the COVID-19 pandemic, presented a different investment landscape. Although the pandemic caused a global economic shock, its direct effect on fund investments was less pronounced than anticipated. Our analysis shows a subtle response, with fixed-income funds experiencing a relative decrease in investments during the early months of the pandemic, while stock and hedge funds saw a relative, but not significant, increase. This response may have been influenced by the Norwegian government's comprehensive economic interventions, possibly cushioning the pandemic's impact on investment behaviours. We must be careful not to draw conclusions from data that does not explain the cause.

In conclusion, economic shocks and macroeconomic factors do not seem to affect investments significantly in a negative or positive direction. However, our results suggest that the type of fund is a significant predictor of log money invested. Thus, it appears that it is not random between funds, whether a lot or a little is invested in the respective types of funds. Also, seasonal effects seem to impact investment patterns significantly, indicating that time of year plays an important part in people's decision to invest in funds.

In addition to the time of year, coefficients for all years, except for 2013, were statistically significant and positive in the period 2012-2017, providing evidence of an upward trend for fund investments.

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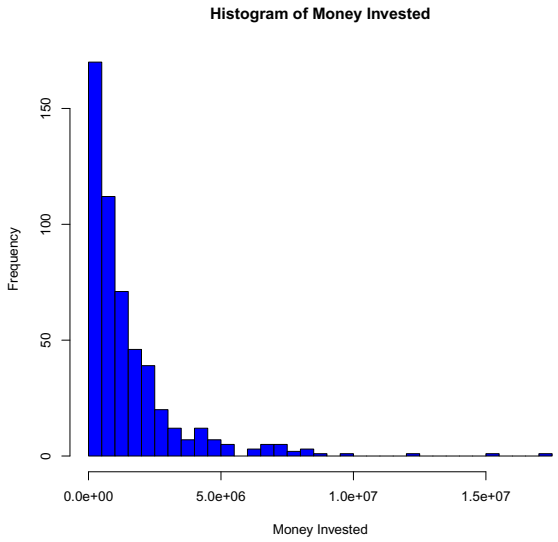
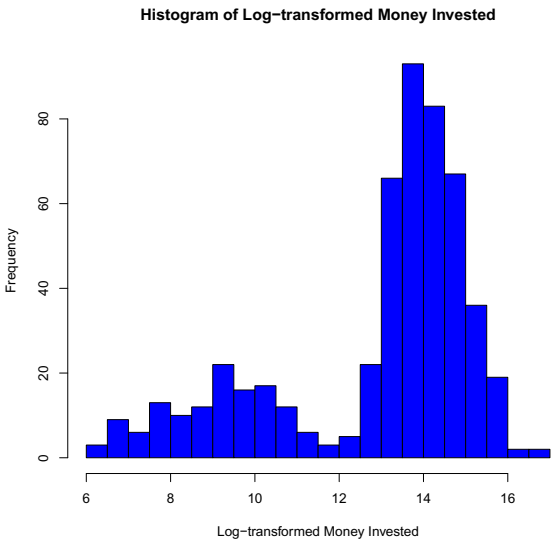
Appendices

A Diagnostic plots for the raw data



(a) Histogram of Money Invested



(b) Histogram after log transformation

Figure A.1: Histograms before regressions

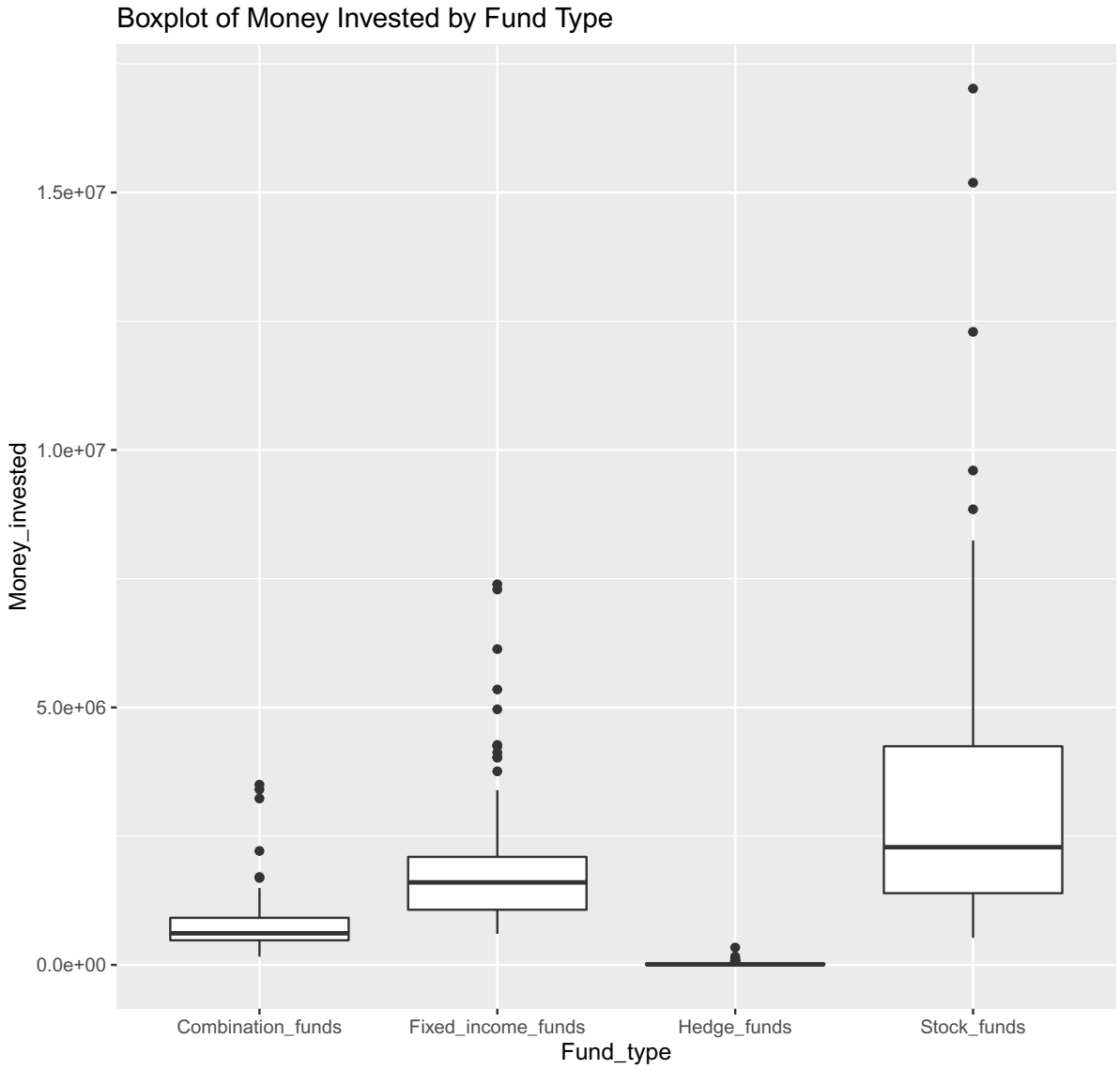


Figure A.2: Boxplot of Money Invested by Fund Type

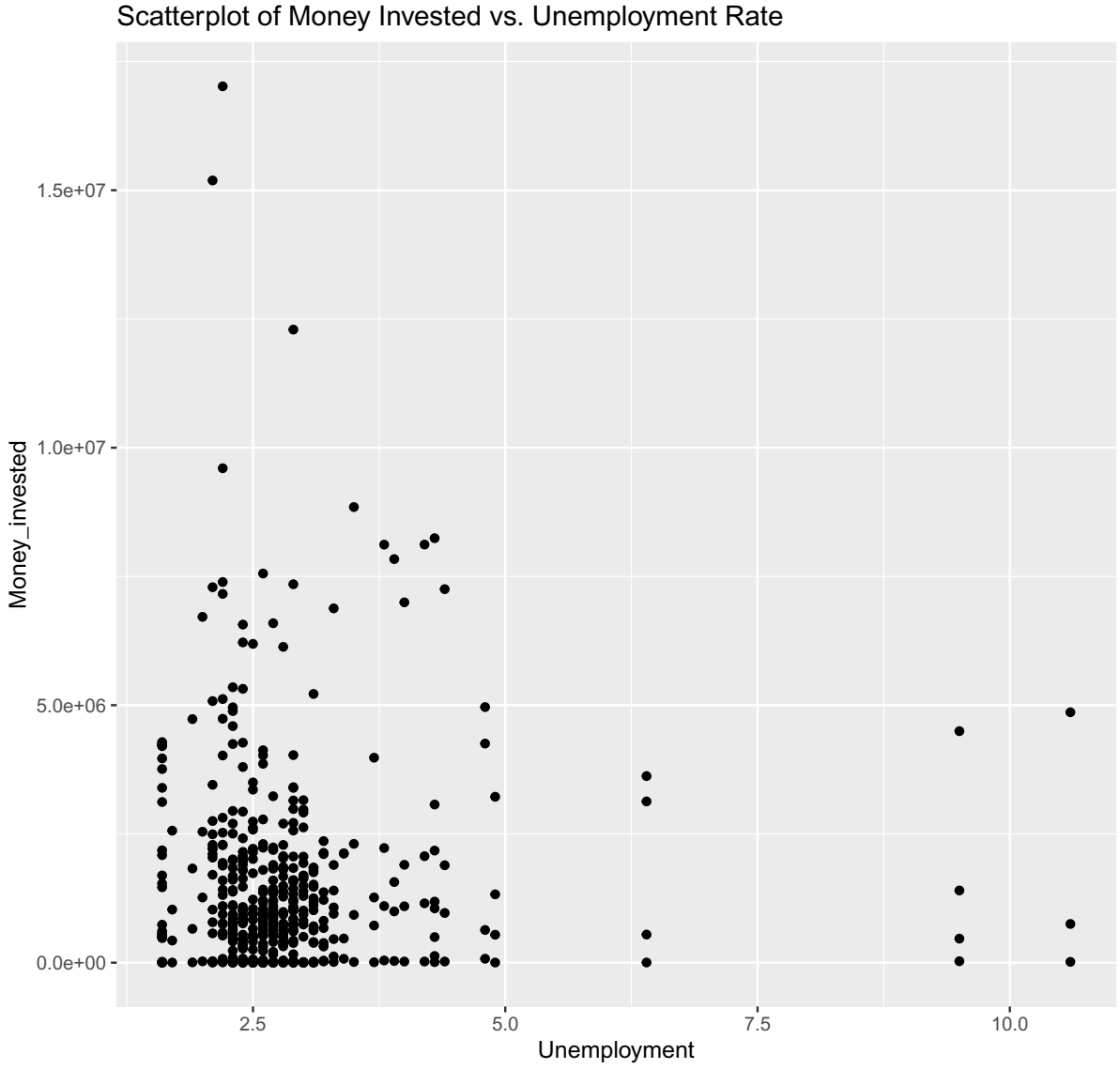


Figure A.3: Scatterplot of Money Invested vs. Unemployment Rate

Figure A.4: Scatterplot of Money Invested vs. Consumer Price Index

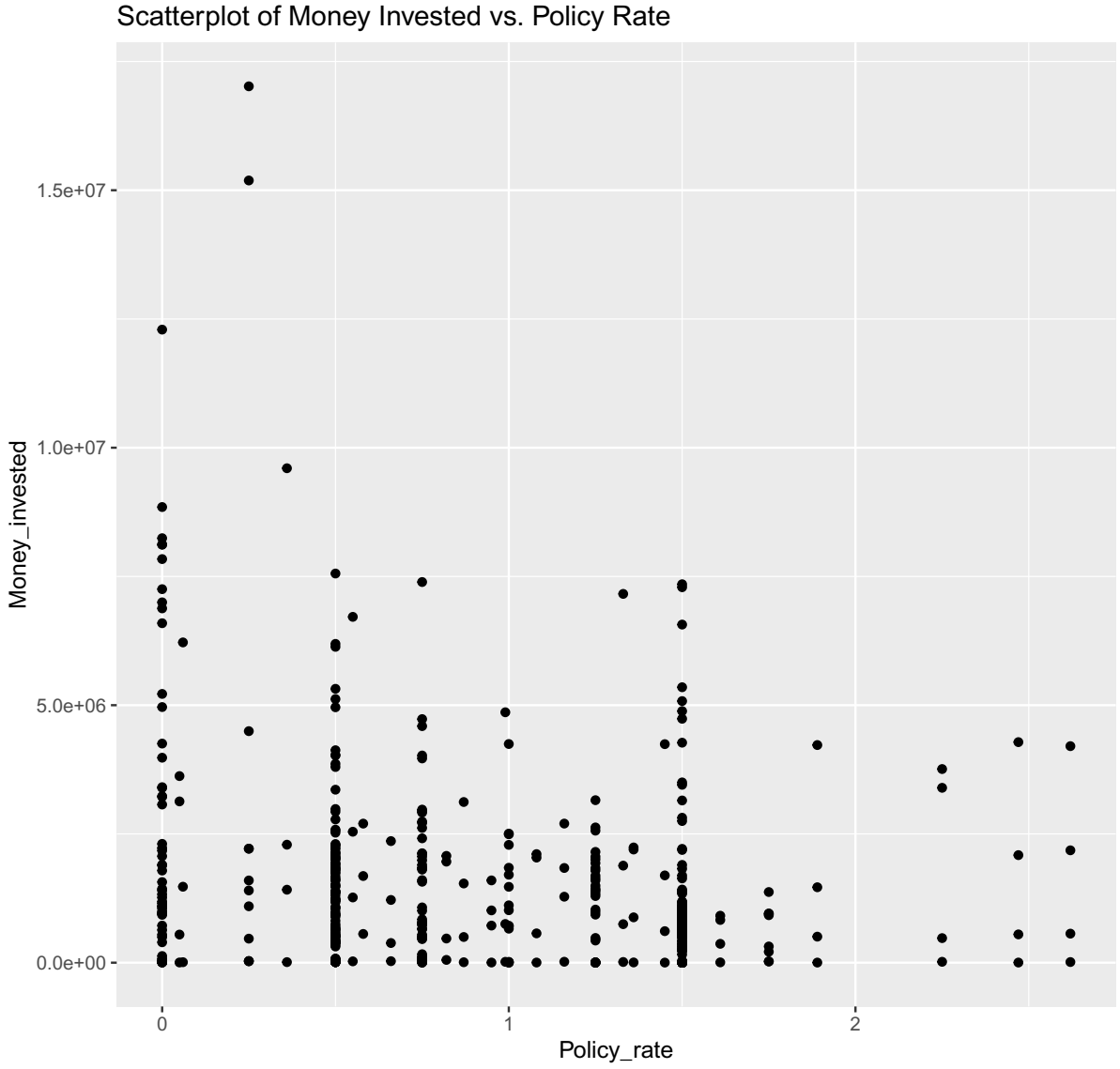


Figure A.5: Scatterplot of Money Invested vs. Policy Rate

B Diagnostic plots for the regressions

Figure B.1: Histograms for all regressions

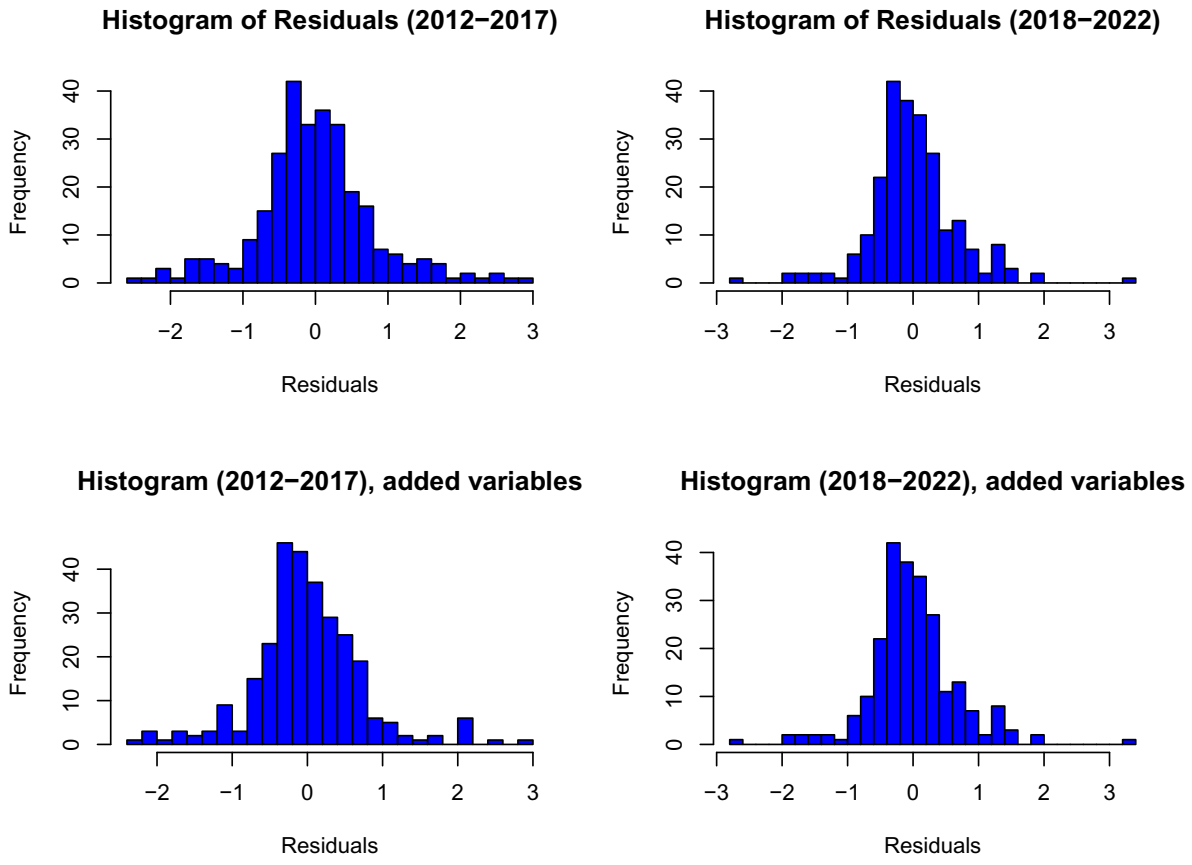


Figure B.2: Diagnostic plots 2012-2017

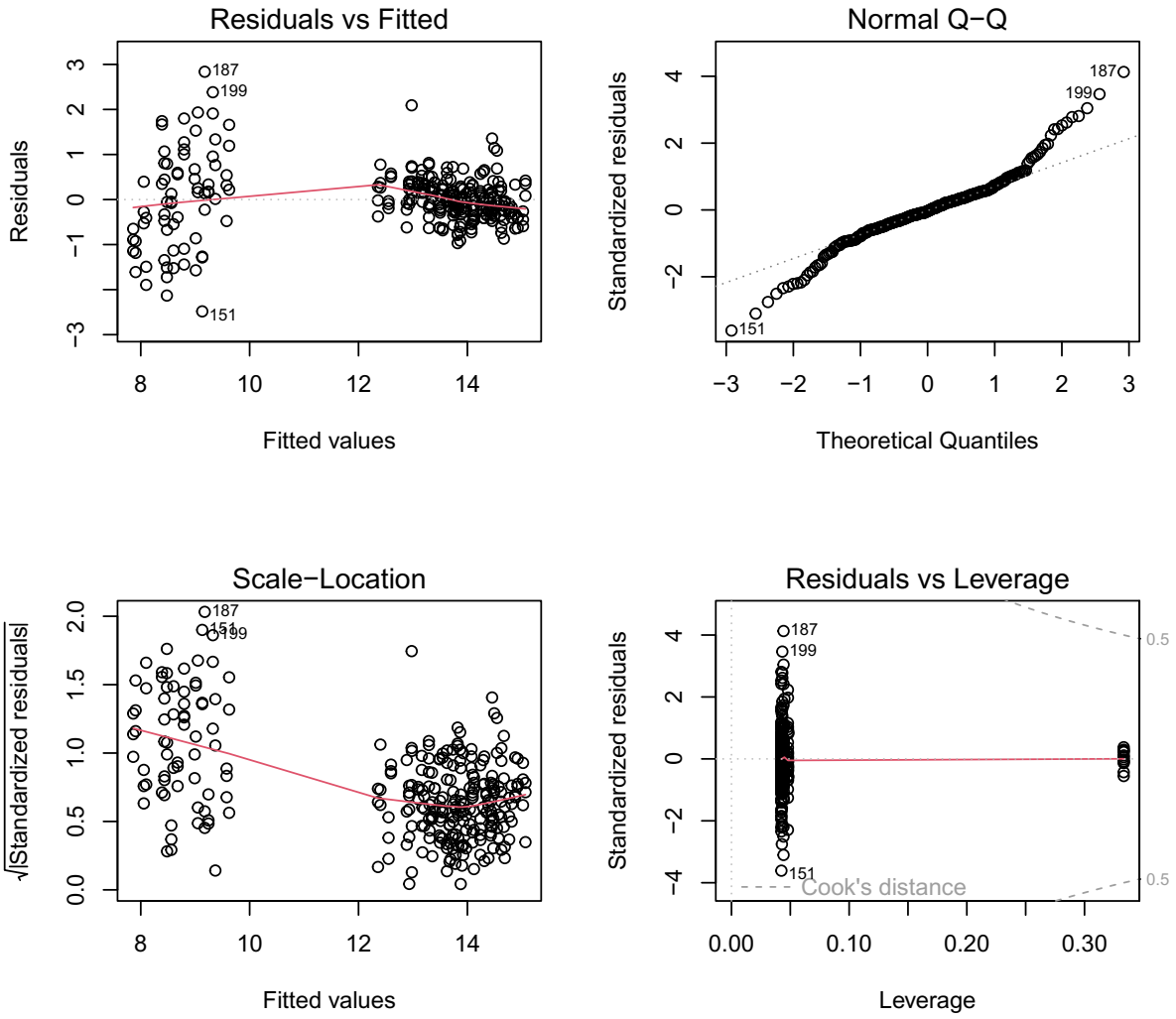


Figure B.3: Diagnostic plots 2018-2022

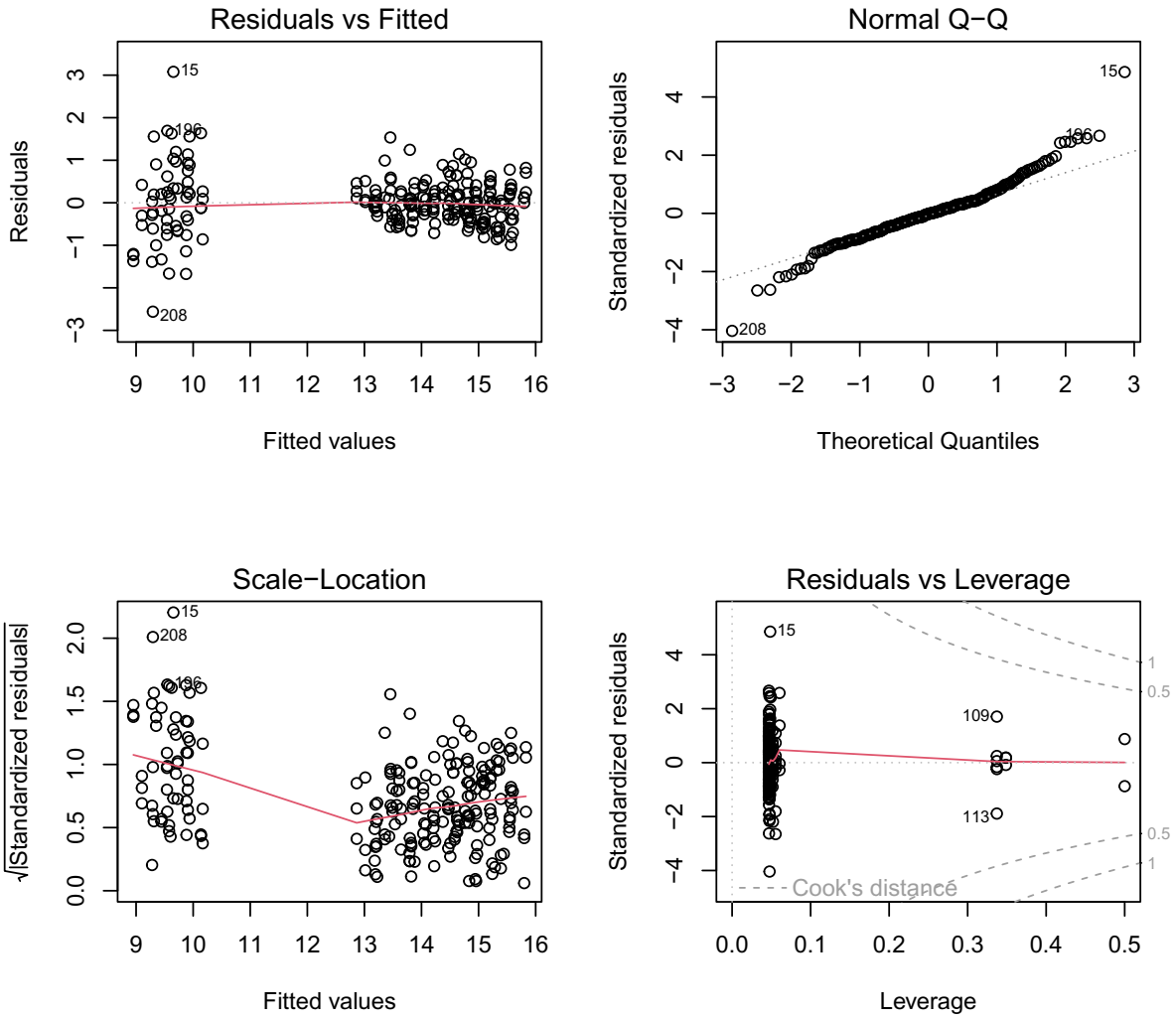


Figure B.4: Diagnostic plots 2012-2017 added Variables

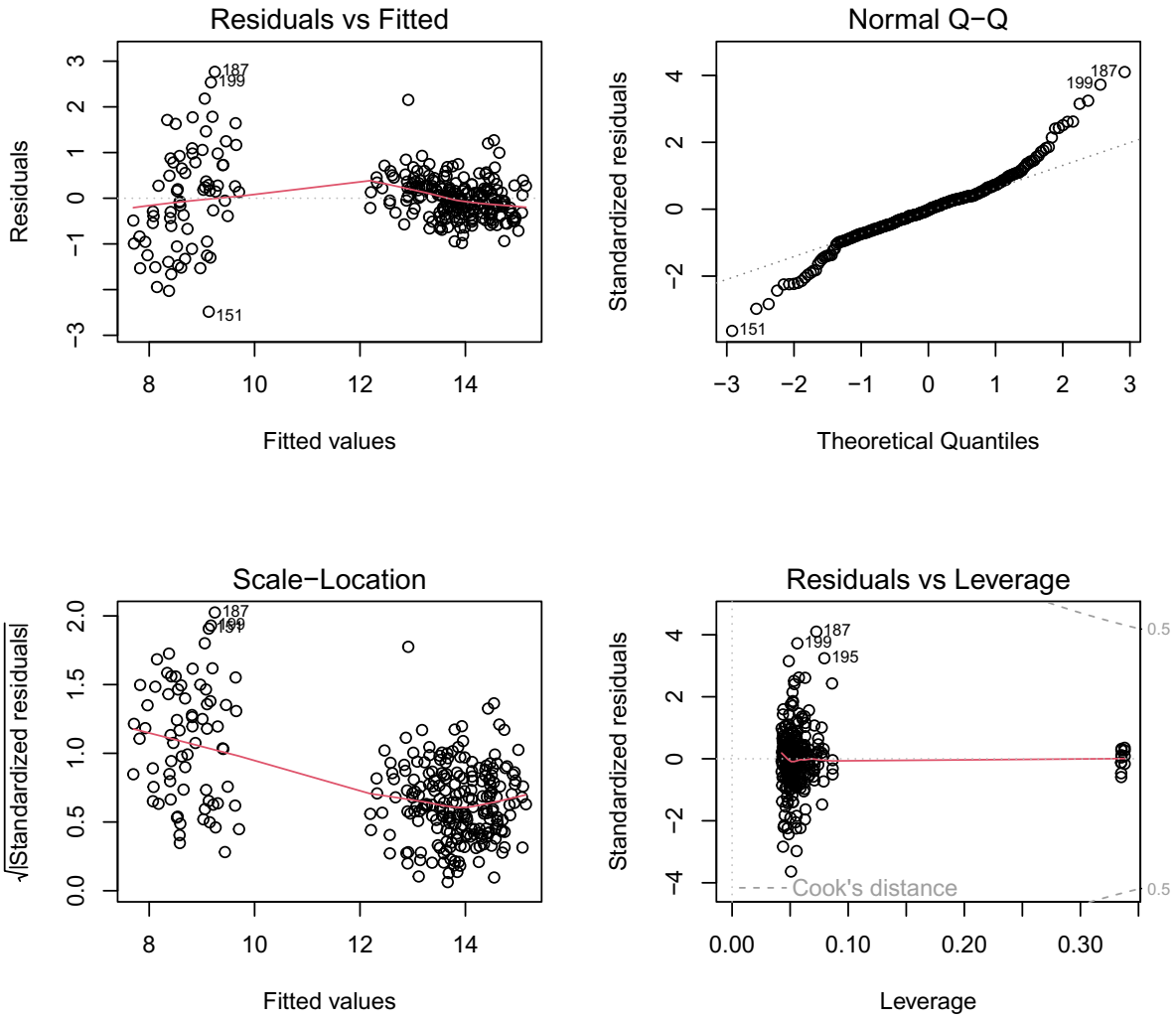
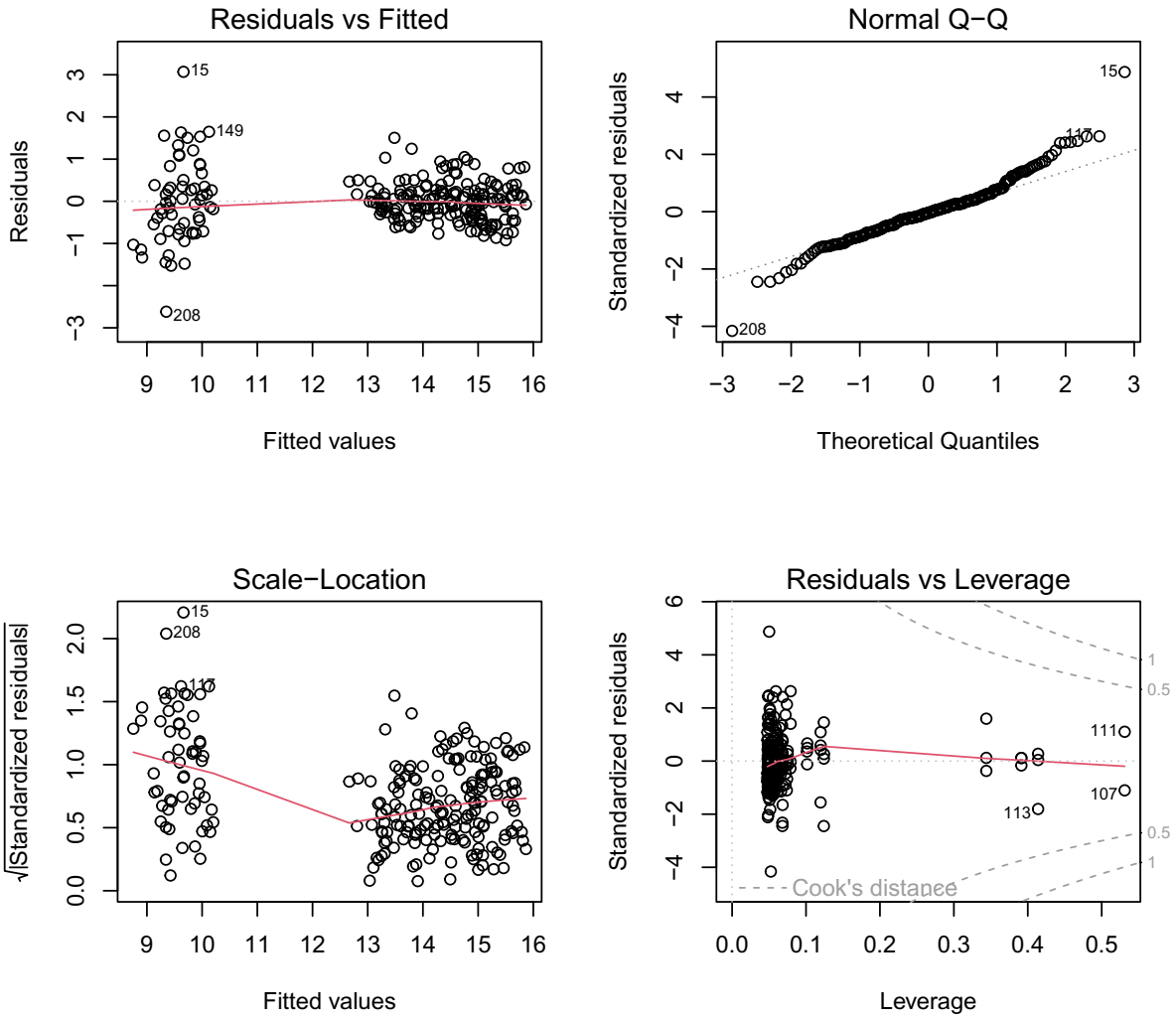
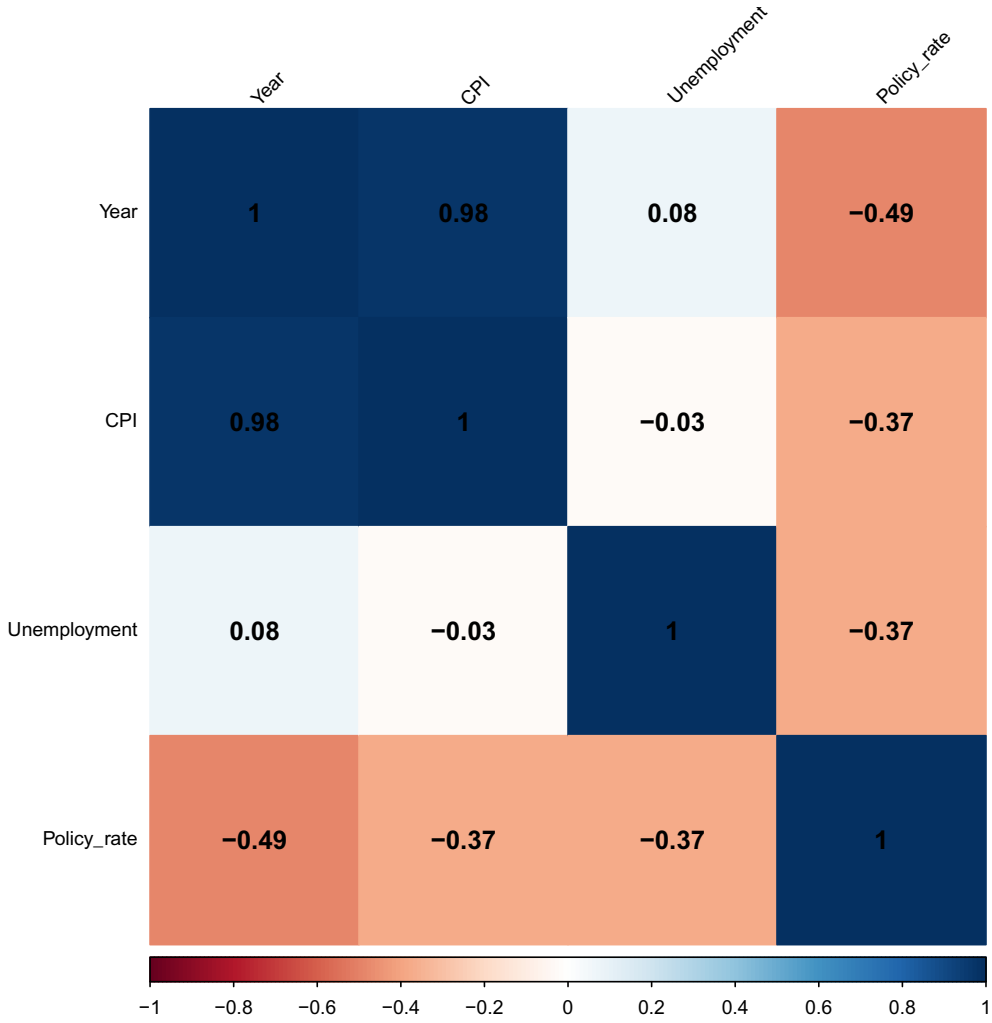


Figure B.5: Diagnostic plots 2018-2022 added Variables



B.1 Correlation matrix

Figure B.6: Correlation matrix between Year, CPI, Policy Rate and Unemployment



C Regression with added variables, without CPI

Table C.1: Regression Results 2012-2017 extended

	Dependent variable:
	log_Money_invested
Fund_typeFixed_income_funds	0.803***
	(0.119)
Fund_typeHedge_funds	−4.496***
	(0.120)
Fund_typeStock_funds	0.947***
	(0.119)
Oil_price_drop	0.118
	(0.441)
Unemployment	−0.653*
	(0.353)
Policy_rate	−0.491
	(0.523)
factor(Quarter)Q2	−0.530***
	(0.156)
factor(Quarter)Q3	−0.657***
	(0.141)
factor(Quarter)Q4	−0.248
	(0.203)
factor(Year)2013	0.106
	(0.151)
factor(Year)2014	0.786***
	(0.190)
factor(Year)2015	0.794**
	(0.309)
factor(Year)2016	0.801
	(0.531)
factor(Year)2017	0.808
	(0.556)
Fund_typeFixed_income_funds:Oil_price_drop	−0.041
	(0.584)
Fund_typeHedge_funds:Oil_price_drop	−0.567
	(0.584)
Fund_typeStock_funds:Oil_price_drop	−0.119
	(0.584)
Constant	15.424***
	(1.416)
Observations	287
R^2	0.919
Adjusted R^2	0.914
Residual Std. Error	0.701 (df = 269)
F Statistic	180.050*** (df = 17; 269)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table C.2: Regression Results 2018-2022 extended

	Dependent variable:
	log_Money_invested
Fund_typeFixed_income_funds	1.015***
	(0.122)
Fund_typeHedge_funds	−3.913***
	(0.123)
Fund_typeStock_funds	1.750***
	(0.122)
Covid_pandemic	−0.601
	(0.544)
Unemployment	0.058
	(0.071)
Policy_rate	−0.133
	(0.108)
factor(Quarter)Q2	−0.254**
	(0.125)
factor(Quarter)Q3	−0.569***
	(0.122)
factor(Quarter)Q4	0.118
	(0.130)
factor(Year)2019	−0.126
	(0.146)
factor(Year)2020	−0.152
	(0.173)
factor(Year)2021	0.117
	(0.149)
factor(Year)2022	−0.226
	(0.155)
Fund_typeFixed_income_funds:Covid_pandemic	0.374
	(0.609)
Fund_typeHedge_funds:Covid_pandemic	0.083
	(0.543)
Fund_typeStock_funds:Covid_pandemic	0.258
	(0.543)
Constant	13.729***
	(0.254)
Observations	237
R^2	0.926
Adjusted R^2	0.921
Residual Std. Error	0.648 (df = 220)
F Statistic	171.998*** (df = 16; 220)
Note:	*p<0.1; **p<0.05; ***p<0.01

>