The Effect of Repo Rates on Swedish Index Branches

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Abstract

This study examines the relationship between the repo rate, lending rate and deposit rate on various price indexes including the Finance and real estate PI (SXS30PI), Technology PI (SX10PI), Industrial goods PI (SX50PI) and Retail PI (SX4040PI) indexes. The authors also use OMX30 which contains companies within all branches to in order to determine if it differs from the others. To answer the research question, the paper uses data from 52 different dates between the years 2012-2020. Our data was collected from the Swedish Central Banks' website and Nasdaq. Our observations were chosen to be on days when the Swedish central bank publishes the repo rate. This study uses a quantitative research method. In summary our results support the partial theory that there is no particular general significant impact between the stock market and interest rates.

Keywords: *repo rate, lending rate, deposit rate, OMX30, Finance and real estate PI, Technology PI, industrial goods PI, Retail PI, event series, qualitative research method*

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1 Introduction

Monetary policy is the economic policy that affects the money supply, lending and interest rates in a country. This policy is conducted by a monetary union or the central bank of the country. Today, the majority of the world's developed countries have independent banks that conduct monetary policy in the country without the influence of politicians. Sweden's central bank is called the Riksbank. It has many responsibilities that are regulated by the Riksbank Act (Riksbanken, 2020). One of them is that money must retain its value over time. The General Council of the Riksbank has clarified that a fixed monetary value is maintained when annual inflation is two percent, which is the Riksbank's inflation target. To avoid surprising the market, Sweden has an open monetary policy which means that changes in the interest rates are predictable. The Riksbank achieves this by publishing forecasts of future rate changes (Riksbanken, 2018).

Household consumption is low in a recession, which reduces the need to borrow money. To encourage consumption and investments, the Riksbank can consider an interest rate cut to stimulate the economy and keep the employment rate from falling. When interest rates are high, fixed-income investments generate good returns, while low interest rates, as today, create the opportunity for investors to have a larger investment portfolio with equity investments. By adjusting the repo rate, the Riksbank can make it cheaper or more expensive for banks to have access to cash which influences the demand for cash in the economy and thus the money supply (Fregert & Jonung, 2018).

Financial markets are important in the field of economic research for many reasons. Changes in monetary policy are quickly visible here. Functioning financial markets are, for example a key factor that influences economic growth which indirectly effects personal wealth. Rising income increases the probability of increased saving and the higher the income, the more common one-time deposits become. Many of those with

savings rely on interest payments from the bank to provide essential income to live on. Interest rates today remain very low by historical standards (Bank of England, 2020). This brings us to the markets because stocks are a common investment of households, either directly or indirectly through funds, both for households' short-term savings and long-term savings, e.g. pension and kids' savings (SEB, 2019). Another important aspect is the balance of wealth between genders. In 2018, Sweden had 1,8 million private shareholders, of which 1,1 million were men and 740 000 were women. Moreover, the shares owned by men have a higher value. The distribution between men and women who own shares has remained virtually unchanged in recent times. (Bourbon, 2019) Number 10 on the list UN Sustainable Development Goals is working for reduced inequalities within and among countries. One of the targets is improving regulation and monitoring of global financial markets and institutions in order to strengthen the implementation of such regulations (UN, 2020).

1.1 Purpose of the study

The aim of this study is to examine the relationship between repo rates, lending rates and deposit rates in Sweden between 2012-2020 and four different Swedish price indexes; Finance and real estate PI (SXS30PI), Technology PI (SX10PI), Industrial goods PI (SX50PI) and Retail PI (SX4040PI) and OMXS30. As previously mentioned, fiscal policies affect both companies and individuals, both of whom may need to act in order to best meet the change so that the economy is affected as positively as possible. In this essay, we will study which industries are most affected by (show correlations) changes in repo rates, deposit rates and lending rates. Since the central bank controls the economy in the country, companies must adapt to the new conditions in the economy and it is therefore interesting to see which industries most affected and hence which industries need to be most prepared to address changes in the new economy.

1.2 Research question

Is there a connection between an announcement of a repo rate change and changes in the stock market? What does this connection possibly look like and does it differ between our chosen industries?

2 Previous studies

In the last decades, many studies have examined the impact of monetary policy on asset prices, for example stock returns and interest rates. In the United States, the effect of surprises in monetary policy on several interest rates was studied by (Kuttner, 2001) and (Cochrane & Piazzesi, 2002). (Rigobon & Sackc, 2004), (Bernanke & Kuttner, 2005) and more recently (Kontonikas, et al., 2013) how changes in monetary policy influence the stock market. The most important findings of these studies were that monetary shocks have a significant effect on asset markets and that an unexpected decrease (increase) in the policy rate is associated with an increase (decrease) in stock prices. Nevertheless, little is known about the underlying reasons of these market reactions.

(Andrén, 2001) examined differences in interest rate sensitivity for various industries and concluded that industries rarely affected by changes in the stock market as a whole. However, he was able to see a pattern of a more negative response in the financial industry compared to other industries. To summarize, he concludes that there is no clear pattern or significant difference over time in the United States. (Andrén, 2001) discusses the competitive situation as a possible justification for the industries' different interest rate sensitivity. On the other hand, another study by (Loo & Lastrapes, 1998) investigates how different industries are influenced by interest rate changes and stated that there are significant differences between industries, but they do not state what the differences are caused by. (Stow, 1991) stated that companies in industries that are relatively "price-inelastic", meaning that the demand for services and products is not dependent on price changes nor is interest-sensitive towards companies with elastic demand-are not affected to raise the price for any higher costs.

A similar and more recent study by (Fausch & Sigonius , 2018) examines the monetary policy of the European Central Bank (ECB) on the German stock market and states that the overall variations in stock market returns reflect amendments in expectations.

Furthermore, a strong stock market reaction was observed when interest rates were negative.

(Ioannidis & Kontonikas, 2008) examined monetary policy effects on the stock market in 13 countries during the period 1972–2002. The 13 countries examined were Sweden, France, Belgium, Spain, Italy, Switzerland, Canada, Germany, Japan, the Netherlands, the United States, the United Kingdom and Finland. Ioannidis and Kontonikas stated that the Central Bank influenced the share price through changes in the repo rate and their conclusion was that changes in monetary policy clearly affect the stock market.

(Kabraiel & Yildirim, 2015) show that there is no unambiguous correlation between Sweden's central bank announcements of the federal funds rate and Swedish stock prices during 2004-2015. However, they found different elasticities for different branches, but no significant correlation. (Krugman, 2009) states that countries today are very integrated so a financial crisis in Sweden can be caused by a crisis somewhere else in the world.

(Waud, 1970) argues that financial markets do not react to changes in interest rates. He examined whether an announcement of a change in the policy rate affects the market and concluded that there is a connection at time zero, but that this is probably due to a leak and an expectation in the market of the interest rate change. Furthermore, he believes that markets build up expectations since they know when the central bank will have a meeting.

3 Theory

3.1 Index

Index is a group of company stocks that are ordered and weighed together and can thus be used as a comparative number. The indexes are often divided into different categories depending on which industry a company operates in. Often when it is said that the stock market falls or rises, it is a stock index that is being referred to. One of the most common stock indexes in Sweden is OMXS30, which has divided the 30 most traded shares on the Stockholm Stock Exchange, and whose market capitalization is about 60% of the entire stock exchange (Avanza, 2016). But there are also, for example, industry indexes that group together companies and shares in the same industry, such as industrial goods, technology, retail, finance and real estate, etc. Most indexes are market weighted. This means that each share affects the index in relation to its size on the stock exchange. For example, if the value of all Volvo shares in total is 15% of the value of the entire OMXS30, the OMXS30 will be 15% controlled by Volvo's price rises and falls.

As there are different industry indexes, there are also different types of indexes: the most common are price index, *PI*, and gross index, *GI*. Price index measures how the share prices on the stock exchange develop and gross index measures how the share prices develop and also counts all share dividends that companies make (Nasdaq, 2020). The fact that there are several indices means that they do not have to fall or rise as the other indices do, and that there are shares that overperform and underperform the index of which the share is a part (Avanza, 2016).

3.2 The effective market hypothesis

Whether interest rate changes have a direct effect on share prices depends on the efficiency of a market and whether the interest rate decision was expected or not (Waud, 1970). If a market is efficient, the interest rate decision should affect the price directly in the market. (Malkiel & Eugene, 1970) state that a market is efficient when all available information is reflected in the price of the shares. They divided efficiency into three different developmental modes: the weak, the semi-strong and the strong form. A weak form of efficiency is when all historical information is combined in the pricing. It removes the need for expected excess returns, because the weak form is based on historical prices. A semi-strong form of efficiency is when all public information is united in prices. This semi-strong efficiency examines the market's valuations quickly after an interest rate announcement. The last form of efficiency is the strongest one and it arises when all information, even private, is reflected in the pricing.

(Rozeff, 1974) and (Ehrmann & Fratzscher, 2004) confirmed that the advertising effect affects the semi-strong form of efficiency because prices are adjusted directly. However, these studies were conducted on the American Stock Exchange, and it should be noted that the Swedish Stock Exchange has similarities regarding access to information and trading. As a result, the market will quickly be affected by new information in the event of an interest rate announcement and combine the information in the valuation of the shares, e.g. that the investor uses available market information to see if the company is overvalued or undervalued. The idea behind the effective market hypothesis is that every newly released piece of information on the market influences the share price downwards or upwards and against its fundamental value. However, studies show that the Swedish market is not considered to be a semi-strong efficiency (Lindvall & Rangert, 2012)

3.3 The advertising effect

(Waud, 1970) began to study the effect of advertising on the stock market by focusing on the effect of interest rate changes had on the stock market and how much of this effect can be attributed to economic realities. He concluded that there is an advertising effect on the stock market and that there is an effect before the announcement date on the shares due to expectations from the market. (Demiralp, 2001) also came to similar conclusions when he studied the advertising effect and its consequences for effective market theory. Other studies that also confirmed the effective market hypothesis are (Prather & Bertin , 1999), (Chen, et al., 1999) and (Smirlock & Yawitz, 1985). These researchers concluded that the share price quickly reflects the new information contained in announcements concerning interest rate changes.

3.4 The effect of interest rates on the stock market

According to (Seiler, et al., 1998), a change in the key interest rate is a sign of where the economy is heading and therefore it is likely that the stock market will be impacted in connection with the announcement of a change in the key interest rate. The stock market reacts negatively to changes in the policy rate. The Riksbank (Riksbanken, 2018) holds that higher interest rates lead to a reduction in household consumption and that it becomes more attractive to save. Saving leads to a postponement of consumption to the future. Another factor is that higher interest rates increasesthe amount you pay on existing loans, e.g. mortgages, which means that you have less money left for consumption, which reduces consumption. Another consequence of higher interest rates is that the present value of the future return is reduced, in as much as it becomes more expensive to borrow money for companies, which leads to a reduction in corporate investments. When both consumption and investments are reduced, the economy contracts, which negatively impacts the stock market.

4 Method

4.1 Event study

This paper will be conducted using the event study method. The event study was first introduced in the 1930s by James Dolley and has since evolved into several stages. Doing an event study involves identifying a specific event and then measure the effects of that event. Provided that the players in the market act rationally, the penalty is that this is immediately reflected in the share prices. For its sake, one can measure the financial impact of an event by observing stock prices over a short period. This makes it possible to determine the impact of an economic event by monitoring share prices for a short period. The procedure of an event study comprises of (MacKinlay, 1997):

1. Identify the event
2. Identify the event window
3. Decide the period to look at
4. Decide on what method to calculate the actual return and the percentage change in the interest rates
5. Implementation
6. Empirical compilation
7. Analysis
8. Conclusion

4.1.2 Event and course of events

The first step is to determine the event that the study will examine. In this case, the event is the announcement of the new repo rate. The publication date is the event day and is set as time 0, *T0*. Based on time T0, we formed an event window. In this study, the event window is the opening and closing of the stock exchange from the publication date. The opening price of the indices is set as time -1, *T-1* and the closing price of the

indices is time +1, *T1*. The window extends from the same day for the publication date until the market closes the same day.

The number of days in an event window varies in different studies and there are advantages and disadvantages in having both long and short periods. The larger the selection, the smaller the margin of error that can occur due to the length of the event window. According to the law of large numbers, the effect of errors on the mean value is small with a large selection. The market reacts quickly to new information and therefore one should possibly assume that price change occurs quickly (MacKinlay, 1997). Furthermore, MacKinlay believes that a short period of time often is more reliable than a long one. The risk that other events overlap with the event you want to investigate increases as the size of the event window increases. Since the Riksbank releases its report after the stock exchange opens, we compared the opening price with the closing price the day the announcement is made. The reason why we choose to make our observations on the days when the Riksbank publishes the repo rate are based on the established effective market hypothesis (EMH). This theory in economics states that prices fully reflect all available information. A direct implication of this is that it is impossible to predict future prices because market prices only react to new information (Waud, 1970). The Riksbank releases its report after the stock exchange opens and therefore it is likely that the stock market will be affected by the announcement of the new policy rate. Based on this, we wanted to examine which industry is most likely to react to changes in the repo rate, lending rate and the deposit rate.

4.2 Data and descriptive statistics

Secondary data is data that is available and already collected. It is derived from primary data and can be used to generate new questions because it is not completely analyzed in a survey (Bryman & Bell , 2017). This study uses secondary data in the results section. The repo rates, lending rates and deposit rates are obtained from the Riksbank's website (Riksbanken, 2020). Data is collected from February 2012- October 2020. This gives us 52 distinct observation dates for each variable that are similarly distributed over time. The Riksbank usually holds a press conference 5-6 times a year to notify the public about interest rate changes. Should a change in the repo rate be presented, the new interest rate will take effect approximately two to three days after the publication of the new interest rate decision (Riksbanken, 2020). The dates that we used in our study were when the new repo rate was announced. We retrieved the exact same dates for the lending and deposit rates. Table 1 and 2 presents descriptive statistics of the variables of this thesis.

Table 1

Variable	*Obs*	*Mean*	*Standard dev.*	*Min.*	*Max.*
Repo rate	52	0.721	0.660	-0.50	1.50
Lending rate	52	0.781	0.682	0.10	2.25
Deposit rate	52	-0.608	0.678	-1.25	0.75
OMXS30	52	0.169	1.197	-3.91	2.68
Indrustrial goods	52	0.272	1.306	-3.83	3.15
Real estate and finance	52	0.192	1.295	-4.06	3.05
Retail	52	-0.037	1.136	-2.54	2.98
Technology	52	-0.016	1.894	-9.05	3.05

Table 2

Variable	*Obs*	*Raise*	*Drop*	*Unchanged*
Repo rate	52	9	2	42
Lending rate	52	6	6	41
Deposit rate	52	11	2	40
OMXS30	52	26	26	1
Indrustrial goods	52	28	25	0
Real estate and finance	52	26	27	0
Retail	52	26	27	0
Technology	52	23	30	0

4.3 Calculation

The Riksbank releases its report 15 minutes after the stock exchange opens, hence we compare the index's opening price with the closing price on that day. The reason why we have chosen to make our observations on the days when the Riksbank publishes the repo rate is based on the established effective market hypothesis (EMH). We examine the percentage change in the index price from today's opening to closing. We refer to this percentage change to the actual return for the index. If an index increases or decreases by a certain value, we can state the increase or decrease in percent. Likewise, with the increase or decrease in interest rates. We obtain this percentage change by calculating the difference divided by the original value. The calculation of the percentage change in our indices and the percentage change in interest rates under the event window is as follows on the examples below and has been calculated in Excel:

4.3.1 The actual return

If an index increases in value from 100 SEK/index to 102 SEK/index we know that it has increased in price by 2 SEK/index. The actual return will then be:

(The difference between the closing and opening price) / (the original value, which is opening) = (102-100) / 100 = 2/100 = 0.02 = 2%

If an index instead decreases from 100 SEK to 98 SEK during the day, we can say that it has decreased by the difference / the original value = (98-100) / 100 = -2/100 = -0.02 = -2%. The index has thus decreased by 2%.

4.3.2 The percentage change in interest rates

If an interest rate increases in percentage from 1% to 1.2%, we know that it has increased by 0.2 percentage points. The percentage change will then be:

(The difference between the new interest rate and the original interest rate) / (the original interest rate) = (1.2-1) / 1 = 0.2 / 1 = 0.2 = 20%

If an interest rate instead decreases from 1% to 0.8% during the day, we can say that it has decreased by the difference / the original value = (0.8-1) / 1 = -0.2 / 1 = -0.2 = -20%. The index has thus decreased by 20%

4.4 Linear regression

The significance of the event studies will be tested using a linear regression. A linear regression has been chosen since it only is the actual return the study has chosen to examine. Linear regression analysis enables analysis of the influence of an independent variable on a dependent variable. Linear regression attempts to model the relationship between two variables by fitting a linear equation to data. (Körner & Wahlgren, 2015)

The actual return is used as the dependent variable since it is assumed to be affected by the new ones the percentage change in interest rates. It is these variables that will constitute the regression model for each analysis being tested. To see how the relationship between the variables relate to each other, one performed regression analysis and then the regression relationship can be determined. This is done to see the individual effect of interest rates on the various indexes.

The linear regression can be demonstrated as the following:

$$\text{Return} = \beta_1 * \Delta \text{ in intrest rate} + \varepsilon_t$$

Return is the depended variable and is calculated in 4.3.1
β_1 is the slope of the regression line
Δ in interest rate is the independent variable and is calculated in 4.3.2
ε_t is the error term

4.4.2 R-squared

R-squared (R^2) is a statistical measure that indicates the proportion of the variance for a dependent variable that is explained by the independent variables in a regression model. It is a measurement of how close the data is to the regression line and to what extent the variance of one variable explains the variance of the second variable. So, if the R^2 of a model is 0.25, then approximately a quarter of the observed variation can be explained by the model's inputs. (Körner & Wahlgren, 2015)

4.5 Tests

4.5.1 Autocorrelation

In our data, an autocorrelation problem occurs if it is linearly related to a lagged version of itself. The difference between the fitted model and the data is called residuals. If they are correlated, we have autocorrelation.

To examine autocorrelation in our data we look at the Durbin-Watson test statistic. The reason why we choose to conduct a Durbin-Watson test is that it is a well-known test and is found in most statistics and econometrics programs. Thus, we consider it to be a test that is widely accepted to measure autocorrelation. The Durbin-Watson test is easy to perform and easy to interpret. The null hypothesis states that autocorrelation does not exist and then the residuals of our data are not correlated. For this test, three possible outcomes are possible: If the Durbin-Watson test statistics = 2 the null hypothesis cannot be rejected and there is no autocorrelation in our data. If the Durbin-Watson test statistics is between 0-2, then we have positive autocorrelation with an increasing severity towards 0. If the Durbin-Watson test statistics is between 2-4, then we have negative autocorrelation with an increasing severity towards 4. (Andersson, et al., 1994)

4.5.2 Heteroscedasticity

Heteroscedasticity can be caused by: extreme outliers in our dataset, misspecification in the estimated model or skewness in the distribution of our explanatory variables in our data set. Our results can only be trusted if there is no heteroscedasticity in our model. (Breusch & Pagan, 1979) To examine heteroscedasticity, we use a Breush-Peguan-Godfrey test in Eviews for every regression. The null hypothesis of the test is that homoscedasticity exists. To be able to reject the null hypothesis our P-value must be below 0,05. (Eviews, 2020)

4.6 Validity and rentability

Validity describes to what extent empirics actually measure what they in theory intended to measure. Validity is often much more difficult to determine than reliability as it is not possible to calculate it but only to interpret and estimate. Internal validity is considered low as the analysis has focused on a change in the repo rate and does not take other factors into account that may affect the index. (Gustavsson, 2004) This study examined data at an interval of ten years to make the study as valid as possible despite the fact that we have not taken into account other elements that may affect the index prices. Research has not placed much emphasis on other elements that can affect relationships such as inflation and cyclical differences. The purpose of this study is to look at the general relationship and therefore, these elements are considered irrelevant to this study.

Reliability can be defined as the relative absence of random measurement errors. The smaller the error terms, the higher the reliability of the survey. Completely avoiding error terms in empirical terms is impossible. However, it is important to be aware of how reliable the survey is. (Gustavsson, 2004) The reliability of this paper is considered to be high as the investigation is already supported by existing theories. Inter-assessor reliability and internal reliability are strong as the data used is strongly interconnected and answers our question. Collected data has been processed with empirics. To ensure that the analysis is valid, all the data has been examined. Since the investigation has used secondary sources, it is important to be critical of these sources by looking at how information was obtained, their sources and the period over which the data was acquired.

5 Results

Table 3: regression results for OMXS30

Dependent variable	Independent variable	β_1	Std-error	T-stat	Prob	R-square
OMXS30	Repo rate	0.0006	0.0026	0.2189	0.8276	0.0010
OMXS30	Lending rate	0.0001	0.0024	0.0491	0.9610	0.0001
OMXS30	Deposit rate	0.0018	0.0025	0.7119	0.4798	0.0100

The regressions with OMXS30 as a dependent variable estimate a weak positive correlation with our chosen interest rates. However, the result is not statistically significant.

Table 4: regression results for Industrial good

Dependent variable	Independent variable	β_1	Std-error	T-stat	Prob	R-square
Industrial goods	Repo rate	0.0014	0.0028	0.4910	0.6256	0.0048
Industrial goods	Lending rate	0.0010	0.0027	0.3448	0.7320	0.0024
Industrial goods	Deposit rate	0.0023	0.0027	0.8588	0.3945	0.0150

The regressions with Industrial goods as a dependent variable estimate a weak positive correlation with our chosen interest rates. However, the result is not statistically significant.

Table 5: regression results for Real estate and finance

Dependent variable	Independent variable	β_1	Std-error	T-stat	Prob	R-square
Real estate and finance	Repo rate	-0.0003	0.0028	-0.01091	0.9135	0.0002
Real estate and finance	Lending rate	-0.0005	0.0027	-0.2135	0.9318	0.0009
Real estate and finance	Deposit rate	0.0011	0.0027	0.4256	0.6722	0.0036

The regression with real estate and finance as a dependent variable estimates a weak negative correlation with repo rate and lending rate, while it estimates a weak positive correlation to deposit rate. However, the result is not statistically significant.

Table 6: regression results for Retail

Dependent variable	**Independent variable**	**β_1**	**Std-error**	**T-stat**	**Prob**	**R-square**
Retail	Repo rate	0.0013	0.0024	0.5478	0.5478	0.0060
Retail	Lending rate	0.0010	0.0023	0.4291	0.6697	0.0010
Retail	Deposit rate	0.0019	0.0023	0.8119	0.4207	0.0130

The regression with retail as a dependent variable estimates a weak positive correlation with our chosen interest rates. However, the result is not statistically significant.

Table 7: regression results for Technology

Dependent variable	**Independent variable**	**β_1**	**Std-error**	**T-stat**	**Prob**	**R-square**
Technology	Repo rate	0.0044	0.0040	1.0876	0.2820	0.0231
Technology	Lending rate	0.0038	0.0038	0.9836	0.3300	0.0190
Technology	Deposit rate	0.0043	0.0039	1.1205	0.2678	0.0245

The regression with technology as a dependent variable estimates a weak positive correlation with our chosen interest rates. However, it has the highest β_1 for all regressions in this study. The result is not statistically significant.

Table 8: results of Breush-Peguan-Godfrey and Dublin-Watson statistic test

Dependent variable	**Independent variable**	**Prob. Chi-Square (1) / P-value**	**Durbin-Watson**
OMX30	Repo rate	0.4858	2.0778
OMX30	Lending rate	0.4728	2.0757
OMX30	Deposit rate	0.3844	2.0931
Industrial goods	Repo rate	0.9915	2.1534
Industrial goods	Lending rate	0.9944	2.1472
Industrial goods	Deposit rate	0.7921	2.1696
Real estate and finance	Repo rate	0.7588	2.4104
Real estate and finance	Lending rate	0.8431	2.4137
Real estate and finance	Deposit rate	0.6492	2.4141
Retail	Repo rate	0.2744	2.0060
Retail	Lending rate	0.2671	1.9986
Retail	Deposit rate	0.1837	2.0175
Technology	Repo rate	0.5019	1.7402
Technology	Lending rate	0.5762	1.7271
Technology	Deposit rate	0.4046	1.7423

Checking for heteroscedasticity in the Breush-Peguan-Godfrey test in table 8, all regressions got a P-value above 0.05 which makes it possible for us to consider the regressions as homoscedastic and good estimates. As for the Durbin-Watson test, we see that our values for OMXS30 are around 2.0 with no autocorrelation, around 2.1 for industrial goods indicating minor negative autocorrelation but not as much as for the real estate and finance regressions where we had a value slightly above 2.4. For retail, the results show no autocorrelation. Technology tended to show some positive autocorrelation with values around 1.7.

6 Analysis

The purpose of this event study was to investigate whether there is a significant correlation between repo rates, lending rates and deposit rates on four different Swedish price indexes and OMX30, in Sweden between 2012-2020. This gave us 52 variables to use. Our variables contain data from Riksbanks publication date of the rates, which was the event day and was set as time T0. Based on time T0, an event window was formed. For the purposes of this study, the event window was the opening and closing of the stock exchange from the publication date and is set as T-1 to T1. Since the Riksbank releases its report after the stock exchange opens, we compared the opening price with the closing price the day the announcement is made. The reason why we choose to make our observations on the days when the Riksbank publishes the repo rate are based on the established effective market hypothesis (EMH). Our variables contain time series data. We investigated our research question by performing 15 linear regression models in Eviews and our results are presented in table 5.3 – 5.8.

From table 5.3-5.7 we concluded no significant results. This is in line with studies by (Andrén, 2001), (Loo & Lastrapes, 1998) and (Bomfim, 2003) who find no particular general significant impact between the stock market and interest rates. This can be explained with the help of the theory by (Malkiel & Eugene, 1970) regarding the effective market hypothesis. This theory points out that the market is already prepared for expected changes that the Riksbank has previously announced.

As the events in our study occur on T0, it can be discussed whether it was the realization itself that was the reason for the values of the actual return or whether there were other factors that caused the significant relationship for the event window that are not included in the regression analysis. Our results of a low level of significance indicates there are other factors that affect indexes that are not included in the regression. Hence, there are possibilities that the result may be influenced by such price-

affecting events that have caused an effect on the stock exchange, and that previous surveys include surveys on the American Stock Exchange while our study examines industries on the Swedish Stock Exchange. Differences in the markets could be the reason for the different results.

If we analyze our results regarding reductions and increases in the dependent variables, a difficult-to-interpret result of certain variables stands out, as the study's connection of the changes presents unclear reactions to the various industries. We find it hard to draw any general conclusions about the differential effect interest rates has on the various industries, but we assume that this might be due to viable competitiveness and price elasticity of the various companies (Stow, 1991). Companies that are highly competitive and have price-elastic services or goods tend to demonstrate a higher degree of interest rate sensitivity, such as the retail industry.

From table 2, we can see that the interest rates used in this study have not changed significantly during the investigated time period. Nevertheless, indexes have changed a lot during this period and in fact the stock market has been quite volatile. General trends can be seen in some industries, but even within an industry there are winners and losers. An example is the real estate sector, where we can find shares that during periods moved in a similar way, while there are examples of real estate shares that deviated sharply from the industry average, both in a positive and negative direction. If you look at how different industry indexes have developed on the stock exchange, there are of course always some industries that perform better than others during certain time periods. Since different companies weigh differently, an index might not always reflect the well-being of the whole branch. If we look at retail, a change in coffers for H&M will have a significantly greater impact on the industry's index than Kappahl. In other words, a good development for a certain industry index can be due to the strong growth of a heavyweight in the industry. All the other shares included in the same industry index may in principle be performing rather poorly, which would not be reflected in the industry's index development.

A possible explanation as to why studies do not yield any significant results might depend on the economic cycle that the global economy is in. Companies that perform both well and poorly exist in all sectors depending on the time period studied. This makes it difficult to draw any general conclusions.

We did not find a significant connection between an announcement of a repo rate change and changes in the stock market. We found a weak positive correlation with our chosen interest rates and OMXS30, Technology PI (SX10PI), Industrial goods PI (SX50PI) and Retail PI (SX4040PI) indexes, while Finance and real estate PI (SXS30PI) showed a weak negative correlation with repo rate and lending rate. We therefore conclude Finance and real estate PI as the index who stands out in this study.

7 Limitations of the study

According to the Durbin-Watson test, our data suffered from some degree of positive autocorrelation. This makes our error term dependent on each other over time. The problem with positive autocorrelation is that it makes hypothesis testing unreliable. Our least square estimates are still biased linear but not efficient. In additional, the conventionally computed R^2 may be an unreliable measure of true R^2. (Gujarati & Porter, 2003)

The consequence of not including relevant variables in our regression model made it impossible to accurately determine the regressor which resulted in variable bias. We suspect our model suffers from the omission of variable bias and unknown omitted variable bias, indicating that we might have failed to include unknown explanatory variables.

Using the event study method has been criticized because no additional information may be added to the market during the event window (Wells, 2004). Despite this criticism, Wells believes that this assumption is a requirement for the implementation and event study. The results of this study were calculated under the assumption that all other factors were expected to be constant and that no further information was required.

8 Conclusion

The purpose of the study was to see how the various industry indexes reacted to changes in interest rates. To analyze the market's reaction, we chose to perform an event study where the obtained data was analyzed using a linear regression modeling. The analysis was performed on data obtained from 2012 to 2020. The indexes examined were Technology, Finance and Real Estate, Industrial Goods, Retail and OMXS30 on the Swedish stock exchange. According to theory, there is a negative correlation between the policy interest rate and the stock market valuation. Our results showed a positive correlation between all interest rates and all the industries studied except for real estate and finance on repo rate and lending rate. In our study, our results are not significant. Our study is in line with previous event research indicating no particular general significant impact between the stock market and interest rates.

9 Future research

In this study, only the impact of the repo rate, deposit and lending rates were analyzed, which does not take into account other significant factors that may affect the stock market. We examined four industries, which also contributes to difficulties in drawing conclusions about how the Swedish market as a whole is affected when announcing repo rate changes.

Possible future research could involve viewing the effects of Covid-19 on the financial markets, perhaps even a comparative study looking at the similarities or possible dissimilarities with what are considered regular financial crises. Another interesting area is the effect free stock trading is having on traditional stock markets. A recent example is where Redit users drove up the share price of GameStop which cost several hedge fund managers billions of dollars.

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