Do appropriations stimulate investments?

A study of the relationship between appropriations and investments

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Abstract

Investments are necessary for firms in order to stay competitive and grow (Klammer et al., 1991). For funding investments retained earnings have shown to be important in the Scandinavian context (Eklund, 2010), hence an improved cash flow to fund investments would be of importance. By deferring taxes cash flow could be improved. Furthermore, research has shown accelerated depreciation can stimulate investments (Polzin et al., 2018; Ackermann et al., 2016; House & Shapiro, 2008). In this study the Swedish GAAP is investigated and if its possibilities of deferring taxes by using appropriations stimulates investments. We study appropriations, an income statement account which includes accelerated depreciation and tax allocation reserves. Appropriations are no real revenues or costs but actually only accounting transactions in order to steer the before tax income in a desired direction. The aforementioned studies indicate that accelerated depreciation stimulates investments and the importance of internal funds. We therefore hypothesise appropriations should stimulate investments in the companies and that this effect is especially strong in manufacturing companies as these have large assets. Therefore, two models were tested, one with all companies in our sample and a subsample of manufacturing firms. The study uses a sample of the 215 largest non-listed companies in Sweden using five years of accounting data, for the period 2013 to 2017. From this sample a subsample of 59 manufacturing firms was drawn. Investments were measured as the negative cash flow from the investment activities on the cash flow statement. Appropriations are taken directly from the income statement. Aside from the main variables in the study, 12 control variables were included to improve the models. In order to make the study more valid the constructed models were based on previous research performed by (Eklund, 2010; Gugler et al., 2004). A regression analysis was made for carrying out the analysis. The results indicate from the general model show a significant relationship between appropriations and investments made by firms. The model had an R-square of 0.1836 which indicates it can explain 18.36 percent of the variation in investments. However, the second model tested regarding the relationship between investments and appropriations for manufacturing firms did not prove significant. The conclusions drawn from the study is that there is a relationship between appropriations and investments in the firms in general, but nothing specific can be said about manufacturing companies.
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1 Introduction

1.1 Problem Background

In Sweden there is a strong link between accounting and taxation (Tjernberg, 2004). The reported result in a company must be taxed with the current tax rate, however in Swedish GAAP there are opportunities to influence the result in a desired direction. This can be done by reporting appropriations in the income statement which are also reported on the balance sheet as untaxed reserves (Arvidson et al., 2018, p. 245). These policies provide opportunities for companies and should have positive effects. It can be argued that deferring taxes could stimulate investments. In order for a company to be able to grow and be competitive in the long term, investments need to be made (Klammer et al., 1991). Since investments are important and measurable, this study will examine the connection between appropriations and investments.

The tax for companies in Sweden is currently 22 percent, which must be considered as low compared with previous tax rates (Skatteverket, 2019a). Until 1990, the nominal tax rate was 52 percent, because on top of the corporate tax rate a dividend tax of 20 percent was added (Tjernberg, 2004). Despite the high tax rate of 52 percent, the state allowed for several opportunities to reduce the real tax through untaxed reserves. Some of these were investment funds, stock reserves and accelerated depreciations.

After the tax reform in the 1990s, which resulted in a tax rate of 30 percent, the tax rate has subsequently been reduced to the current 22 percent (Skatteverket, 2019a). Appropriations are no actual expenses, these are merely accounting transactions where the purpose is to smooth out the results for the companies over the business cycle (Tjernberg, 2004). This usually means that the companies in good years with positive results report some of their profits as untaxed reserves to reduce the taxable result. This in order to return the reserves to taxation for a year with lower or a negative result. The effective tax rate thus will be lower than the nominal tax rate. Cyclical companies have special use of utilising this accounting measure, in smoothing out uneven earnings. Untaxed reserves are thus a good measure and provide incentives to start companies in cyclical industries.

In today's corporate society, it is of great importance that companies make investments to be able to strengthen their finances and be competitive in the long term (Klammer et al., 1991). Investments are also an important part of society as they contribute with job opportunities and tax revenues, which makes it an interesting research topic. The definition of an investment is a sacrifice of capital made to generate an increase in future capital (Schneider 1944).

There are several previous studies investigating factors influencing investment decisions. Previous research indicates macroeconomic and law-related factors as two important factors affecting the level of investments (Bialowolski & Weziak-Bialowolska, 2014). A significant factor has also shown to be tax policy which has a direct impact on the rate of return (Alam & Stafford 1985; Overesch & Wamser 2010; Santoro & Wei 2012). Furthermore, a number of studies have shown that accelerated depreciation policies can stimulate investment (Polzin et al., 2018; Ackermann et al., 2016; House & Shapiro, 2008). The accelerated depreciation is included in the Swedish accounting for
appropriations as well as tax allocation reserves. These policies allows for deferral of taxes indicating it being of interest to the study.

1.2 Definitions

1.2.1 Investments

Investments in this study are defined as an expenditure in order to generate a positive future cash flow. Investments consist of investments in assets which can be obtained from the cash flow statement in the investment activities. Investments in will be defined as the definition in Swedish GAAP. According to Swedish GAAP (K3 7.6), the investment activities consist of acquisitions and disposals of fixed assets and such investments that are not covered by the term liquid funds.

1.2.2 Appropriations

Appropriations are defined as accelerated depreciation, tax allocation reserves and other untaxed reserves. However, the other untaxed reserves are not a main component and will therefore not be discussed further in this thesis. Accelerated depreciations in a Swedish context means depreciations over plan according to tax rules. The tax allocation reserve is income shielded from taxation. In the Swedish accounting system appropriations are found in the income statement and must also be reported openly in the balance sheet as an untaxed reserve. Another type of financing is group contributions, provided that the company is part of a group. A group contribution is an income transfer which balance the profits between two group companies (Skatteverket, 2019c). In this study, it would be a common funding means for the companies as it relates to the largest non-listed companies in Sweden where many are part of a group. However not all group contributions are recorded as appropriations, and is not a main part of appropriations (Arvidson et al., 2018, p. 245). Therefore, these are not thoroughly discussed in this study.

1.3 Research Gap

Much research has been conducted into accelerated depreciation and its impact on investment (Polzin et al., 2018; Koowattanatianchai et al., 2017; Wielhouwer & Wiersma, 2017; House & Shapiro, 2008). A previous study examined the relationship between accelerated depreciation and investments using a dummy variable for accelerated depreciation. The study showed a positive correlation between accelerated depreciation and investments (Jackson et al, 2009). However, no previous study was found investigating the relationship by using the total sum of appropriation with investments. Previous research has focused exclusively on accelerated depreciation. We noticed a lack of research into the Swedish GAAP which has interesting specifications. The Swedish GAAP allows for extended policies beyond accelerated depreciation in terms of the tax allocation reserves. The tax allocation reserves have a similar nature to accelerated depreciation, but is not connected with an asset. After a literature search it was concluded that these policies have not been investigated before. No prior research of Swedish firms into if appropriations could be linked to investments has been made.
1.4 Research Questions

Appropriations are a good method for giving companies the opportunity to manipulate the result towards a certain direction. Business can therefore prepare for potentially worse periods. More implemented appropriations imply lower earnings hence lower taxes and better cash flow. As a consequence, we thought about how this advantage might affect the company. The following research question was therefore formulated.

*RQ1: Does an increase in use of untaxed reserves stimulate an increase in the investments made by firms?*

Since manufacturing firms have a large amount of tangible assets as shown from the data. We propose that the untaxed reserves could be even more useful for these companies since they have good possibilities to make accelerated depreciations. The fact that they regularly have to invest in machines and equipment is another reason for this statement. Hence, the second research question was formulated.

*RQ2: Is this effect more pronounced for manufacturing firms?*

![Figure 1. Conceptual model](image)

1.5 Research purpose and contribution

The purpose of this study is to investigate whether there is a relationship between appropriations and investments. In the literature search within the subject, no previous study could be found which examines the relationship on Swedish companies in the same way as this study. Most previous studies in this area focus on accelerated depreciations, since appropriations are a Swedish phenomenon.

Due to this being a relatively unexplored subject, this study can be seen as a starting point for further research. Investments are an important part of society and therefore it is always
a research field of importance. This study is needed for several reasons. Firstly, companies can gain an insight into how they can benefit their operations and increase investments with the help of accounting measures. Second, standard setters can take advantage of the results as they need knowledge about how the accounting standards affects the companies. Research is needed to support decision makers in establishing well founded accounting standards.

1.6 Delimitations

This study is limited to the 215 largest private non-listed companies in Sweden. The selection was limited to include private companies in Sweden with a net turnover of more than 4 billion Swedish crowns. This filtering resulted in 239 companies, which a few had to be excluded because of missing data. For each company included, five years of data was retrieved, which resulted in 1057 observations.

This study is also limited to the fact that investments have been taken from the cash flow statement, which means investments in research are not included. The data was retrieved manually and when time was limited, there was no possibility of including investments in research. However, the study takes the standpoint that investments are defined by the Swedish GAAP.

1.7 Disposition of the thesis

In the following figure the outline of the thesis is presented which consists of seven chapters. In this chapter the problem was defined. In the second chapter the research methodological assumptions and decisions will be explained. In the third chapter theory on which the work builds will be presented. In the fourth chapter the method for how the study practically will be performed is discussed. In the fifth chapter the results are presented. In the sixth chapter an analysis of the findings will be given. The seventh chapters deal with the conclusions of the work, the limitations and future research is suggested.
Figure 2. Disposition of the thesis
2 Theoretical Methodology

2.1 Preconceptions

The previous experiences and beliefs of the authors can influence the results (Bryman & Bell, 2017, p. 60). The researcher's values can affect all parts of the study, such as choosing research method, analysing data and formulating conclusions. Since it is impossible for a researcher to control their values, this can lead to biases or angled results. It is therefore important that the researchers reflect on how their values based on knowledge and experience may affect the study. The bias of the authors can therefore affect validity and objectivity of the work. When performing quantitative studies, the authors might unconsciously leave out some of the findings. Rosdahl and von Essen are both from Sweden and since the study concerns Sweden this is not deemed a problem for the study. However, a lack of knowledge from practical experience working with appropriations might pose a problem. On the other hand, this can be seen as an advantage since the authors do not have set ideas about the phenomena.

Both authors are currently studying at Umeå university von Essen in the international business program and Rosdahl as reading individual courses. Both authors have studied business courses and focusing on accounting. Theoretical knowledge of business related subjects comes from USBE. However, von Essen also did an exchange semester at KEDGE school of Business in Bordeaux. Rosdahl has also completed studies from the Department of food and nutrition, which is an interdisciplinary field.

2.2 Research theory

In social science research, there are essentially two methods for forming theories, deductivism and inductivism. According to Bryman & Bell (2017, p. 42), deductive theory is the most common perception between theory and practice in social science research. In order to carry out research on deductive approach, the researchers should start from previous research to formulate hypotheses which will be tested and then either be revised or accepted. How theory is generated from the deductive approach can be described by figure 3, which is taken from Bryman & Bell (2017, p. 43).

Figure 3. Deductive research approach
Source: Bryman & Bell (2017, p. 43).

Inductivity is the second way to determine the relationship between theory and research, where researchers to the opposite of deductivism create theories based on the collected data. Inductivity can according to Bryman & Bell (2017, p. 45) be explained as:
Figure 4. Inductivism

And deductivism can be explained by the opposite:

Figure 5. Deductivism

Deductivism originates from the positivistic viewpoint while inductivism from the interpretivist view (Bryman & Bell, 2017, p. 58). In this study, however, a deductive approach will be applied when hypotheses are formulated and tested through statistics, which is closely linked to the deductive approach.

2.3 Epistemological Considerations

In this study, positivism is a natural starting point as it is a quantitative study and we believe research should be objective and free from values. Epistemology is about what can be regarded as acceptable knowledge in a subject area (Bryman & Bell, 2017 p. 47). One viewpoint is called positivism which states that social reality is objective, in other words reality is perceived equally by everyone independent of individual and that science must be free from values. This paradigm means one should take into account the already existing research and theories. Examining such phenomena can be done through methods of quantitative design as the goal is to reject or accept hypothesis which has been formed based on existing theories. The opposite of positivism is interpretivism where the basic idea is that reality is subjective and therefore must be a strategy that takes into account the differences of individuals (Bryman & Bell, 2017 p. 49). Within this paradigm, knowledge is created based on research where the researcher interacts with the phenomenon in order to be able to interpret the result.

2.4 Ontological Considerations

The purpose of this study is to study the relationship between appropriations and investments at a quantitative level and therefore the chosen ontological standpoint is objectivism. Ontological assumption deals with the nature of reality where the question
is whether social entities should be perceived as objective units or as constructions of the actors’ perceptions (Bryman & Bell, 2017, p. 52). These two approaches are usually called objectivism and constructivism. Objectivism means social phenomena are independent of the actors, while constructivism claims social phenomena are something actors create in social interaction which is constantly under revision.

2.5 Research Design

How a study is designed is based on the authors assumptions about ontology and epistemology, which should constitute a framework for the chosen research method (Bryman & Bell, 2017, p. 68). Based on a deductive approach where the purpose is to test an existing theory, a quantitative method will be applied. In order to answer the research question whether there is a relationship between investments and appropriations, a regression analysis will be carried out. The regression model consists of the dependent variable investments, the independent variable appropriations and 12 control variables. These will be presented further in the practical method chapter.

![Figure 6. Figure summarizing research assumptions](image)

2.6 Research strategy

This study investigates the relationship between appropriations and investments in order to generalize the result on larger companies. The selection is based on the 215 largest non-listed companies in Sweden. Thereby the selection must be regarded as a non-probability selection, which must be taken into account when generalizing the result.
A quantitative method will be applied where the purpose is to test formulated hypotheses in order to obtain measurable results. The starting point being that reality is objective and the view of the relationship between theory and research is deductive.

The opposite of quantitative method is qualitative method where the aim is to understand underlying phenomena. Qualitative method is often conducted with interviews which are kept open or semi-open in order to interpret the result. The disadvantage of this type of method is that the research tends to become subjective as the researcher interacts with the phenomenon, therefore the research becomes more difficult to replicate (Bryman & Bell, 2017, p. 393). Based on these disadvantages with the qualitative method and our view of research, the choice ended up on applying a quantitative method.

2.7 Ethics in Business Research

According to Bryman & Bell 2017, ethical principles in business research usually apply to four main areas which are:

- The requirement for confidentiality and that no one takes harm by the study
- The consent requirement, there is no lack of consent from the participants
- If there is any invasion on the participant's privacy
- If there is any form of deception

In the following sections, these principles will be explained in more detail, since these are important to take into account for researchers when conducting studies. It will also be explained how these affect the study.

2.7.1 The requirement for confidentiality

Confidentiality means information about respondents or observed objects should be treated with respect and no external part should be able to access personal data or other ethically sensitive information (Bryman & Bell, 2017, p. 146). In this study, the 215 largest non-listed companies in Sweden will be analysed. Since this is public information, there is no risk that the study can cause any harm to participants and hence the first requirement can be considered fulfilled. In addition, the researcher must also follow the utilization requirement, which means ensuring the information is only used for research purposes.

2.7.2 The consent requirement

The requirement for consent from participants is an important part of the ethical guidelines in business research (Bryman & Bell, 2017 p. 150). This study compiles data from a database with public information and therefore it is practically impossible to obtain the consent of all companies. However according to ASA’s Code of Ethics, (cited in Bryman & Bell, 2017, p. 151) researchers have determined that research is allowed to be carried out on public documents without consent.

2.7.3 Invasion of privacy

The requirement that the researcher should not encroach with the participant's private life is closely linked to the consent requirement (Bryman & Bell, 2017, p. 154). The
participants in this study are not private persons, therefore there is no risk of intrusion of any individual's privacy.

2.7.4 Deception

Deception occurs when the researcher withholds important information to participants or describes the investigation as something other than what it is (Bryman & Bell, 2017, p. 154). According to SRA: Ethical guidelines, (cited in Bryman & Bell, 2017, p. 155) it is commonplace in business research with false predictions. However, this should not occur as researchers can get a bad reputation, which can lead to difficulty in obtaining funds and collaborations. Since this study is based on secondary data, we assess there is no risk of deception.

2.8 Literature Review

The purpose of this section is to introduce the reader to how the subject was chosen and how the method of literature research has been used to find the research gap between appropriations and investments.

2.8.1 Selection of Topic

The subject of this study was chosen based on the researchers interest in accounting. In particular, appropriations were considered particularly interesting to study as these entail a reduced tax payment, which is an advantage for companies. With this starting point, thoughts arose about advantages this could provide. Then questions were posed about what effects appropriations could have on companies and if this advantage really contributes to any difference. When appropriations can be seen as an interest-free loan from the state, a conclusion could be drawn that this might lead to an increase in investments. After searching for literature on the subject a research gap was identified, where no previous studies have investigated the relationship between appropriations and investments.

2.8.2 Selection Method and Criticism

The purpose of searching literature was to gather relevant information to gain an increased knowledge of the subject, which resulted in an identified research gap. All through this study, reliable sources have been used to strengthen reasoning and arguments. Essentially scientific, peer reviewed articles were used. When there was a lack of science-related articles, literature in scientific method and other reliable sources was used to support arguments. The literature has been collected through Umeå University's databases such as Business Source Premier but also through Google Scholar. There are a lot of previous research studying factors that influence investment decisions and also some about accelerated depreciations. In contrast, there is less research on the relationship between appropriations and investments, which means the keywords needed to be specified. Examples of keywords used in different combinations are “accelerated depreciation”, “untaxed reserves”, “impact on investment”, “investment incentives”, “stimulate investment” and “tax allocation reserve”.
3 Theoretical Frame of Reference

3.1 Untaxed reserves origin

In this thesis, accelerated depreciations are defined as depreciation over plan according to tax rules. However, accelerated depreciations has historically a broader meaning internationally. Overall this means that companies are allowed to make larger depreciation in early years, unlike a straight line depreciation.

Accelerated depreciations was introduced to belligerent economies during the World War One because of an unexpected high wear and tear on factory equipment. This due to the large increase in production of weapon and ammunition (Koowattanatianchai et al., 2017). In United Kingdom, it was allowed to make large depreciations in the early years as a substitute for the large loss in asset value due to the massive use of the machines. The United States also introduced a system for accelerated depreciation due to the same reason. Then during the Second World War, accelerated depreciation was reinstated and several other nations also used the system. After the war, accelerated depreciation was permanently introduced due to various complaints. Among other things linear depreciation was said to not reflect the asset's actual loss of value over the period.

3.2 Untaxed reserves in the Swedish accounting system

Untaxed reserve is an item in the balance sheet consisting of both equity and a tax liability. The purposes of untaxed reserves are among other things, that companies should be able to smooth out their tax burden between years of worse and better results (Skatteverket, 2019b). Business analysts usually consider one part as equity and one part as a deferred tax liability. In the income statement the change in untaxed reserves are booked as appropriations. The appropriations are booked as a cost when the reserves increase and a revenue when decreasing the untaxed reserve. However, these are not real revenues or costs but merely the difference between accounting standard and tax law. This gives management the ability to decide when tax payments will be made given the rules regarding how appropriations can be used. In good years, a larger part of the profit could be set aside for untaxed reserves and in poorer years the reserves are returned to taxation. Untaxed reserves can arise for instance in the form of accelerated depreciation and provisioning to the tax allocation reserves. The two are the main components of untaxed reserves (Arvidson et al., 2018, p. 245). However according to the standard from Bokföringsnämnden the standard setter for Swedish GAAP. Untaxed reserves should be divided into three sub accounts: tax allocation reserves, accumulated accelerated depreciation and other untaxed reserves (Bokföringsnämnden, 2017).
3.2.1 Accelerated depreciation in Sweden

Accelerated depreciation means on a tax basis, that a larger amount is depreciated for tax purposes than the planned depreciation in order to reduce the result for the year. The difference between planned and tax depreciation should be reported openly in the balance sheet as untaxed reserves. In the Swedish accounting system there are two rules, the main rule and the complementary rule (Arvidson et al., 2018, p. 246). The main rule allows companies to depreciate with 30 percent each year on the book value of the asset implying a degressiv depreciation policy. Meaning a larger amount is depreciated the first year and depreciated amount gets smaller each year. An example is an asset acquired for 10 000 SEK year one can be depreciated to 7000 SEK (10 000*0,7), next year the asset can be depreciated to 4900 SEK (7000*0,7). What this implies is that the book value of the asset will never reach zero (Arvidson et al., 2018, p. 247). The complementary rule allows companies to depreciate the asset with 20 percent of acquisition value each year, meaning the asset will be fully depreciated within five years. The book value of an asset need never be higher than if the complementary rule has been applied (Arvidson et al., 2018, p. 248).
3.2.2 The tax allocation reserve

The tax allocation reserve allows for a part of the profit to be placed in an untaxed reserve to reduce the taxable profit for the year. As accelerated depreciation, this means companies can smooth out the taxable result over several years. Limited liability companies can according to the legislation set aside 25 percent of the year-end result after other appropriations to be protected from taxation. The sums are recorded in separate funds and can then be used however the company sees fit. The tax allocation reserve by deferring taxes is essentially a free loan provided by the government. However, from 2005 for limited liability companies a small interest has been added. The fee consists of taking the government borrowing rate per the 30th of November for 72 percent of the fund value. The deposited sum must be returned to taxation no later than six years from being deposited. Tax allocation reserves can be used with advantage for cyclical companies where the reversal can take place during years with negative results in order to reduce the effective tax rate for the company (Arvidson et al., 2018, p. 262).

3.2.3 Other untaxed reserves

Group contributions can be recorded according to a main rule and an alternative rule. According to the main rule the funds from the mother company to the subsidiary as well as the other way around should be recorded in equity. According to the alternative rule the contribution is recorded as an appropriation (Skatteverket, 2019c).
3.3 Capital budgeting

The financial management of the firm is to a great extent about decisions regarding dividends, financing and investments. Investment decisions are taken by performing capital budgeting. While financing is how funds are generated capital budgeting is how funds should be put to use (Dayanada, 2002, p. 1). Capital budgeting is used for deciding which projects should be chosen and how much in investments are needed. From a shareholder perspective this is about maximize wealth. (Harris & Ravi, 1996).

When performing capital budgeting there is said to be three types of investment projects. These are contingent project, independent project and mutually exclusive projects. Independent projects are the ones which if they are accepted or rejected does not affect other decisions. This means there is no interaction between the projects and the firm has enough resources to accept several projects. Mutually exclusive projects are the choice between options. If one project is accepted this means another one has to be rejected. Contingent investment projects are the ones that have interaction between each other. If one project is implemented it can have effects on if other projects are beneficial. This means when evaluating a project which is contingent the effect on other projects has to be calculated in the model for evaluating the project (Dayanada, 2002, p. 4).

However, a company cannot accept all projects that would provide a positive cash flow, since they are limited to the amount of capital in the firm. Therefore, firms must perform different calculations to determine which project that gives the highest return. Investment decisions are among the most important decisions made by managers as these have a positive effect on society (Harris & Raviv, 1996) and affect the company positively in the long term (Klammer et al., 1991). It is widely accepted that companies base investment decisions on the expected rate of return compared to alternative investments. To evaluate investments in companies, the CFO usually uses net present value techniques (Klammer et al., 1991).

One common method for evaluating projects is the net present value method (NPV). This method is implemented by discounting future cash flows generated by the investment (Berk & DeMarzo, 2017, p. 100). In practice this is about implementing the investments with the highest net present value. Research has shown the net present value method has increasingly become a common method to evaluate investments. Graham & Campbell (2001) showed 75 percent of firms used the method as opposed to 1977 when only 10 percent used the model (Gitman & Forrester, 1977). Furthermore, Hartwig (2012) show in a study that Swedish firms make use of capital budgeting methods to a lesser extent then companies from continental Europe and The United States.

Investments can also be evaluated through the internal rate of return rule (IRR), which goes on to compare investments based on the project which provides the highest IRR. The IRR is calculated by setting NPV equal to zero to obtain the internal rate of return that corresponds to the return on the investment (Berk & DeMarzo, 2017, p. 248). However, there are disadvantages with the IRR. The method cannot be used when there is more than one IRR or when the IRR cannot be identified, which means all investments are either positive or negative (Berk & DeMarzo, 2017, p. 251). Therefore, NPV is often used as a complement for the IRR.
A third common method for evaluating investments is the payback rule, which is to accept projects that pay back the investment cost within a certain time, usually 5 years (Berk & DeMarzo, 2017, p. 252). This method does not have the same reliability as the NPV rule because it does not take into account the cost of capital and the time value of money. However, it is frequently used by the companies, probably because it is a simple method to apply and understand.

Harris & Ravi (1996, p. 1140) claims that in practice capital allocations to a large extent actually are determined by capital budgeting procedures. However, the authors bring up problems of divisions inside the firm having capital limits set up by management. These limits have the consequence that some positive NPV projects get rejected, which goes against the decision rule.

Klammer & Walker (1984) show that investment decisions are not based solely on different valuation techniques. Previous research has shown psychological factors affect managers' investment decisions. For example, previous research has shown managers with several choices for investments tend to delay decisions (Sawers, 2005).

From the use of the capital budgeting decision rules it could be argued that appropriations could distort NPV calculations as some of the cash flow for taxes would be moved in the future. This would in turn affect the net present value of individual projects. This is also a view supported by Clancy & Collins, (2014) which finds firms using accelerated depreciation have higher capital expenditures. Managers are said to be more likely to replace assets which has been depreciated in a higher pace.

### 3.4 Neoclassical investment theory

Neoclassical investment theory claims investments should be increased up to a point where the marginal return that can be expected is equal to the cost of capital (Jorgenson, 1963). According to the neoclassical theory, investments which generate a return greater than the cost of capital are efficient. A problem which several studies run into is that there can exist expectations of investment opportunities in the future which cannot be observed (Eklund, 2010, p. 795). Brainard & Tobin (1968); Tobin (1969) created the Q-theory of investment in order to deal with these future opportunities. According to this model the investments of the firm are determined by the Tobin Q. The Tobin Q is the market value of the firm divided by the replacement cost of capital which is the value of the assets if they had been replaced today. Performing this calculation, investments can be anticipated. Nonetheless several studies among them (Fazzari et al., 1988; Gugler et al., 2004; Eklund, 2010) test models which show other factors affecting investments as well. This means frictions between the theoretical world and reality exists. In this study the investigated companies are non-listed. Because of this the Tobin Q cannot be used, since the companies do not have a market value that can be used to calculate Tobin’s Q.

### 3.5 Financing of the firm

According to Modigliani & Miller, (1958) the cost of capital from the economic theorist perspective to the owners of a firm is the same as return from bonds. Therefore, firms which act rationally would want to increase their investments as long as the return is greater than this return. In their research Modigliani & Miller, 1958, 1961 put forward
theorems which claim financial structure of the firm in a perfect market will not affect value of the firm and the investments. Therefore, the type of funding is not of importance whether it is retained earnings, equity or debt. On the other hand, several studies have shown that the type of funding affect the investment decision (Fama & Babiak, 1968; McDonald et al., 1975; Peterson & Benesh, 1983; Yang & Lee, 1989).

Donaldson (1961) was first with proposing the hypothesis of a pecking order of finance. Myers (1984) builds on this and provide evidence that firms prefer to use retained earnings for financing and hold their dividend pay-out ratios accordingly. Before making use of external funds the firms will sell portfolio assets. If external financing is needed debt will be taken and if this is not enough convertible bonds will be used. Equity financing will only be used as a last resort. Myers & Majluf (1984) investigates the problems of asymmetric information. The asymmetry in information may lead to management giving up profitable investments when equity financing is required. The reason is that the new investors will see issue of equity as something negative and therefore the price of the share will drop. The management will act on behalf current owners and if the expected drop in share price is more than the investment can generate it is not in the current shareholder’s interest. Therefore, Myers & Majluf (1984) demonstrate firms prefer relying on internal funds and in use of external financing favouring debt to equity. However, the pecking order theory is not unchallenged in trying to explain capital structure, a rivalling theory is Trade-off theory. In short trade-off theory claim that firms tries to keep debt at a level at which marginal cost and marginal benefits of debt are equal to each other (Kraus & Litzenberger, 1973; Scott, 1977; Kim, 1978). The study however takes a position of pecking order theory.

Several scholars Gugler et al., (2004) and Eklund (2010) have shown the retained earnings from the firm has a positive relationship with investments in underinvesting firms. Furthermore, Gugler et al., (2004) argue that by taking into account investment opportunities, the relationship between retained earnings and investments is due to cash flow being a source of finance. The study shows firms are underinvesting as a consequence of cash shortage while other firms are overinvesting because of managerial discretion, that is letting managers to act freely.

Eklund (2010) provided evidence in a study that Scandinavian firms have particularly strong dependence on retained earnings for investments independent of the investment opportunities. The tested hypothesis were that overinvesting firms should have problems of managerial discretion while underinvesting firms should have problems of asymmetric information. However, none of these hypotheses could explain the results. Eklund (2010) suggests the tax system in the Scandinavian countries could be one explanation as to why Scandinavian firms are reliant on retained earnings for funding investments.

The pecking order theory shows a preference using internally generated funds which strengthens the argument that management of earnings which frees up internal funds should be of firm interest. The study by Eklund (2010) provide evidence that Scandinavian firms are relying on internally generated funds to a high degree in order to fund investments. This is particularly interesting since this study investigates Swedish companies. Appropriations would improve liquidity and cash flow for investments, essentially working the same way as retained earnings. It can be argued that appropriations is a type of financing by deferring taxation. Appropriations could be said to create something in between debt and retained earnings. This would indicate that
appropriations have a higher position in the pecking order and therefore appropriations would be used to a high degree for financing investments.

3.6 Previous Empirical Findings

The following section describes the research done on accelerated depreciation which is a component of untaxed reserves. Accelerated depreciation allows a company to write off the value of an asset quicker than under conventional practice and thereby lowering income (House & Shapiro, 2008). The general idea of what this implies is allowing for companies to claim more depreciation expenses in the first years of the assets life. Accelerated depreciation will shield income from taxation. By taking the time value of money in consideration, the tax payment made in the future will be less worth than today. This leads to an increase in the net return after taxes for the investments, in assets which qualifies for the accelerated depreciation programs. There are four components having an impact on this effect. Partly the discount rate and the life of the asset which controls how long it takes to reverse the tax effect. Also the tax rate and the chosen depreciation method are important determinants. The reason for this is because these four components determines how strong the effect of accelerated depreciation becomes through time value money (Koowattanatianchait, 2017, p. 117).

Coen (1971) describes two reasons why accelerated depreciation could stimulate investments. The first being, the after tax rate of return can be improved. The second reason is the improved cash flow. The two effects are called “rate of return effect” and “liquidity effect”. Södersten (1982) argues that deferring the tax payments by accelerated depreciation can be interpreted as getting a loan without having to pay interest. Thereby lowering the cost of capital, referring to the weighted average of the cost of equity and debt. The deferred tax can be seen as a form of debt and or equity.

Ackermann et al., (2016) find that accelerated depreciation increases the willingness to invest compared to depreciation using straight-line model. Polzin et al., (2018) investigates how accelerated depreciations is used by farmers in Michigan. The authors look into how two types of tax depreciation methods are used and how these affect investments and cost of capital for the farmers. Deprecation schemes which allow for large amounts of allowances (depreciation) deducted during the first year of use. A sample of 66 farms in Michigan were investigated. The authors concluded the use of accelerated depreciation created a decrease in cost of capital. The study also shows an increase in investments, by showing changes in investment elasticity. Further the authors argue through accelerated depreciation the cost of the asset is lowered and thereby investments easier meet the required rate of returns for them to be made. On the other hand, research shows bonus depreciation in the agricultural industry only had a small impact on investments (Williamson et al., 2016). Nonetheless previous studies have shown bonus depreciations can reduce the effective tax rate by several percentage points (Gravelle, 2014).

Even though accelerated depreciation might lower the cost of investing in the company it might not lead to investments of good quality. Koowattanatianchait et al., (2017) argue firms can misuse accelerate depreciation. This is done by undertaking bad investment projects in order to take advantage of the tax benefit. In a congressional research report from The United States accelerated depreciation measures were evaluated on the basis of
advantages and disadvantages (Guenther, 2018). The advantages are said to be a reduction of the cost of capital as has been mentioned previously, hence stimulating investments in the assets with the depreciation option. Accelerated depreciation is also said to improve the cash flow for investing firms. The disadvantage discussed is the accelerated depreciation measure might interfere with the allocation of capital. This could stimulate firms to make decisions which might not be productive for society, but create good returns as an effect of the deferral of taxes.

Because accelerated depreciations imply lower cost of capital and improved cash flow, it could be seen as an interest-free loan as Södersten (1982) argues. Thereby it is logical to think appropriations will increase investments in the companies. As mentioned earlier, there are much previous research indicating this being the case. On the other hand, there is research suggesting accelerated depreciation does not have a particular impact on investment decisions. There is research arguing other factors having a better effect stimulating corporate investments. According to Hanna & Christoffer, (2010) the investment effect of accelerated depreciations is minimal because it does not change the actual results. They argued investment tax credit is a better stimulus for investment decisions because it leads to higher net income.

According to Garrison & Noreen (2003), the choice firms do regarding accounting measures normally have no impact on investment decision. However, previous research has speculated that the depreciation method might have an impact on investment decisions (Titard, 1993). Jackson et al., 2009; argues that accelerated depreciation results in lower book value than linear depreciation. Thereby their main research hypothesis was that companies using accelerated depreciation make larger capital investments than companies using linear depreciation. In their study, a regression analysis was carried out where the dependent variable was investment and independent variables was among other things a dummy variable whether the company used accelerated depreciation or not. The study showed a positive correlation between capital investment and accelerated depreciation, but there was no correlation between accelerated depreciation and investment in R&D.

These previous findings suggest in regards to accelerated depreciation that there might be a stimulating effect created from its use. As accelerated depreciation is a component of untaxed reserves this would indicate that using appropriations would have a similar effect. The tax allocation reserve which also defer taxes would probably have a similar effect on investments. This assumption is drawn because they provide a temporary tax shelter like accelerated depreciation. However, the tax allocation reserves are not connected directly with an asset which incentivizes the firms to buy that particularly asset, this might lower the effect on investment. It could on the other hand be argued that tax allocation reserve provides a much larger tax shelter which could cover more investments.

3.7 Research Hypotheses

Previous research has shown a pecking order of financing and its impact on investments, implying a preference for internal finance (Myers & Majluf 1984). Research have also shown accelerated depreciation has a stimulating effect on investment (Polzin et al., 2018; Ackermann et al., 2016) Furthermore House & Shapiro, (2008) shows a small positive effect on investments from a temporary accelerated depreciation policy. Though some authors argue this effect being minimal (Hanna & Christoffer, 2010). One of the major
components of appropriations is accelerated depreciation together with tax allocation reserve which also allows for sheltering more revenues from taxation. Eklund (2010) shows the importance of retained earnings for financing investments in Scandinavian firms. This indicates that Swedish firms are relying on internally generated funds to a higher extent compared to firms in other countries. Therefore, it could be argued that Swedish firms could make more investments if internally generated funds could be kept inside the firm. It could be argued that when applying capital budgeting measures such as NPV evaluations, the deferral of taxes implied using appropriations would move some negative cash flows to the future for individual projects. Thereby through the effect of time value of money increase the net present value. This would result in more projects been deemed profitable.

We therefore hypothesize that appropriations stimulate investments.

**H1 As appropriations are taken, lowering the year-end result the total amount spent on investment increases**

Because manufacturing companies naturally have a need to buy machines and keep plants for production they generally hold a lot of assets and have a need to regularly invest in new equipment. Therefore, they also have a lot of possibilities to use accelerated depreciation. The manufacturing companies would also benefit a lot from a cheaper type of financing as they need large amount of capital to buy new machines and equipment.

We therefore hypothesize that appropriations stimulate investments for manufacturing firms to a greater extent compared to companies operating in other industries.

**H2 A model using only manufacturing companies have a higher degree of explanation**
4 Practical Method

4.1 Starting point

Forming the analysis methodology for the statistical analysis inspiration was taken from Eklund (2010) which builds on the methodology of Gugler et al., (2004). The use of methodology from previous peer reviewed papers strengthens the validity of the work. Eklund (2010) used ordinary least square (OLS) in order to investigate the relationship between retained earnings and investments. This study uses Eklund’s model as a foundation and tries to incorporate the variable of interest, appropriations, into the model. Eklund’s model included aside from retained earnings, a variable for sales growth. In the previous research by Eklund, (2010) and Gugler et al., (2004) Tobin’s Q was also used. However, this was not possible since the companies of interest were non-listed companies which means they do not have a market value which can be used for estimating Tobin’s Q. This fact deserves a word of caution since this study uses companies as opposed to previous work.

Eklund (2010) divided the investments and retained earnings by the capital stock in order to make the data a bit more normalized, which was also done in this study. Capital stock was defined in the article as the total assets from the previous year.

4.2 Data Collection

The data was accessed through the database business retriever which Umeå university library provides access to. The database provides access to the-year end reporting of Swedish firms. Data summaries were created consisting of numbers from the balance sheet and the income statement. The data was however not only collected from the balance sheet and income statement. The investment data was collected from the cash flow statement which required manually checking the cash flow statement in the year-end report for the years of interest of each company.

Rearranging the data in excel and using manual input of data increases the risk of errors occurring in the data because of the manual input. Nonetheless this was the only way the necessary data could be collected. To mitigate these kinds of problems routines and mechanization of the collection process were implemented. However, the problem of the human error remains an issue.

4.3 Sample Selection

In the following section describes how the sample was selected, in table 1 a brief summary of the steps is given. By giving so much detail into how the sample was selected, replicability should be high.

The data collections started from all companies in Sweden. In a first step all limited liability companies in Sweden were selected, this was 607 969 companies. After this the largest companies were targeted with setting the selection criteria at Swedish companies with an annual sales figure exceeding 4 billion Swedish crowns. After this the sample was down to 460 companies. In the following step company groups were excluded since they are not allowed to record untaxed reserves on the balance sheet. Then the sample was down to 250 companies. Listed companies were also excluded for the same reason.
that company groups were excluded, which decreased the sample with 11 companies down to 239 companies. Furthermore, companies from the financial industry were also excluded since they have more loans than firms from outside the sector. The meaning of high leverage does probably not have the same meaning as in other sectors which might affect the results (Fama & French, 1992). After taking this measure 12 companies were excluded from the sample leading to a sample of 227 companies.

A data report for five years (2013-2017) was created in Business retriever for Company name, book year, appropriations, change in sales, sector of industry, total assets and operating margin. Some of the variables in this study needed to be calculated and the method also required the main variables to be divided with last year total assets. Therefore, some additional data was exported in reports from Business retriever. The data collected were after tax profits, dividends and depreciation for year 2013 to 2017 in order to calculate retained earnings. The total assets needed for calculating the other variables for each company was also collected for years between 2012 and 2016. Furthermore, investment data was collected manually by opening the year-end report of each company for each year retrieving data from the cash flow statement. Taking this step generated a total of 1135 book years.

Some of the companies had missing data for all years. This was either caused by being newly started companies, bankruptcy or had a rapid growth. If companies in past years used a simpler form of reporting, not enough required information was available. Because of this a total of 11 companies were excluded from the sample taking it down to 216 companies and 1080 observations. Company years with missing data causing 18 observations to be excluded. This might pose a problem since data from companies and years will be left out for certain types of companies.

In a final step when variables were calculated, some missing data from previous years made certain variables impossible to calculate or undefined. This was because for example dividing by zero which is impossible. A total of 5 observations were excluded for this reason. The sample therefore decreased to 1057 observations. The company Edu Holding AB was excluded in total because of this taking the sample down to 215 companies. After these adjustments the sample included 215 companies from 9 different sub groups of industry and 1057 accounting years of data.

Variables for the observations which were not divided by last year total assets were kept in the data. For operating margin 1061 observations were recorded, for sales growth and for total assets 1062 observations were recorded. When STATA performs the regression analysis it drops all incomplete data, therefore only 1057 observations were used in the regression analysis.
Table 1. Steps taken in drawing the sample

<table>
<thead>
<tr>
<th>Steps</th>
<th>Companies</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: First started from all companies in Sweden</td>
<td>607,969</td>
<td>3,039,845</td>
</tr>
<tr>
<td>Step 2: All limited liability companies in Sweden</td>
<td>460</td>
<td>2,300</td>
</tr>
<tr>
<td>Step 3: Annual sales figure exceeding 4 billion Swedish crowns</td>
<td>250</td>
<td>1,250</td>
</tr>
<tr>
<td>Step 4: Company groups were excluded</td>
<td>239</td>
<td>1,195</td>
</tr>
<tr>
<td>Step 5: Companies listed were excluded</td>
<td>227</td>
<td>1,135</td>
</tr>
<tr>
<td>Step 6: All companies from the financial industry were excluded</td>
<td>216</td>
<td>1,080</td>
</tr>
<tr>
<td>Step 7: Companies with missing data for all years were excluded</td>
<td>216</td>
<td>1,062</td>
</tr>
<tr>
<td>Step 8: Company years with missing data were excluded</td>
<td>215</td>
<td>1,057</td>
</tr>
<tr>
<td>Step 9: Excluding companies and observations with undefined variables</td>
<td>59</td>
<td>295</td>
</tr>
<tr>
<td>Final Sample</td>
<td>215</td>
<td>1,057</td>
</tr>
</tbody>
</table>

For the sub sample drawn in order to investigate manufacturing companies, all companies operating in other industries were dropped. This resulted in a sample of 59 companies and 295 observations. In this sample there were no problems data being undefined for certain variables.

4.4 Multivariate Model

In this section, the variables studied will be presented and justified why they are relevant to the regression model. There will also be an explanation why regression is a relevant method for this study.
Descriptive model for the used regression:

\[
\frac{I}{Kt-1} = \beta_0 + \beta_1 \frac{Re}{Kt-1} + \beta_2 \frac{Appropriations}{Kt-1} + \beta_3 \text{Operating margin} \\
+ \beta_4 \text{Sales growth} + \beta_4 \text{Total assets} + \beta_5 \text{Data/media} + \\
\beta_6 \text{Construction/Engineering consultancy} + \beta_7 \text{Leisure} \\
\beta_8 \text{Services/economics/administration} + \beta_9 \text{Healthcare} + \beta_10 \text{Energy/drain} + \\
\beta_11 \text{Transport} + \beta_12 \text{Manufacturing} + \beta_13 \text{Trading companies} + \epsilon
\]

The model for testing the hypothesis is the one presented above with investments as the dependent variable. Each variable has a coefficient \(\beta\) and the model intercept is \(\beta_0\). The model error term is also included as \(\epsilon\).

**Figure 9. Conception model with operationalisation**

### 4.4.1 Investments

In order to measure the investments of companies in the sample the negative cash flows from the cash flow statements were collected. By collecting this information, the investments expenditures as defined by Swedish GAAP were used as a measure of investments. One weakness of this approach is that it does not catch all R&D expenditures which could be considered as investments. This is due to the fact that according to Swedish GAAP (K3) 18.11 does not consider research expenses as an item which should be recorded as an asset (Bokföringsnämnden, 2017). Scholars including Gugler et al., (2004) and Eklund (2010) have used a variable to measure investments which includes R&D expenses. However, this data is hard to come by and the study uses the definition for investments as defined by K3. This variable like in the study performed by Eklund (2010) was divided by last year total assets.
4.4.2 Appropriations

The variable for Appropriations was simply taken from the income statement of the companies as appropriations is a predefined concept from Swedish GAAP (K3). As mentioned earlier includes accelerated depreciations, tax allocation reserves and other untaxed reserves. To improve normality of the data, appropriations was divided by last year total assets, exactly like Eklund (2010).

\[
\text{Appropriations} = \frac{\text{accelerated depreciation} + \text{tax allocation reserve} + \text{other untaxed reserves}}{\text{total assets}_{t-1}}
\]

4.4.3 Control variables

Since there are several factors which have an impact on investment decisions, the model has been expanded with a number of control variables. Control variables were added to the model because they can contribute valuable information and have an impact on the relationship between accelerated depreciation and investment. In the text below, the control variables will be presented and explained how they have been measured and why they are included.

4.4.4 Retained earnings:

If a company retains the profits within the firm instead of distributing it to owners, shareholders should expect these permanent profits to generate benefits for the company. Myers (1984) argues firms prefer to use retained earnings for financing. Eklund (2010) further shows that Scandinavian companies are heavily dependent on retained earnings for funding investment. Therefore, retained earnings were included as a control variable. The variable is calculated as after tax profits minus dividends plus depreciation, the same way Eklund (2010) calculated the variable. Important to note here is that the depreciation is only the one according to plan and the accelerated depreciation is recorded under appropriations. The variable like in the study performed by Eklund (2010) was divided by last year total assets.

\[
\text{Retained earnings} = \frac{\text{after tax profit} - \text{dividend} + \text{depreciation}}{\text{total assets}_{t-1}}
\]

4.4.5 Sales growth:

Previous research shows investments correlates positively with growth in sales (Eklund, 2010). Other research shows that companies with increasing net sales invest more in R&D which is a part of the investments (Coad & Rao, 2010). The consequence of increasing net sales should result in increased cash flow which will improve the opportunity to invest. Thereby the ratio“change in net sales” was included as a control variable. Change in sales is calculated as current year sales divided by last year sales. This is the same way Eklund (2010) calculated the variable.
Sales growth = \frac{sales_t - sales_{t-1}}{sales_{t-1}}

4.4.6 Operating margin/Profitability:

A previous survey study has shown that profitability is an important factor for large companies to determine the level of investments (Alam & Stafford 1985). Profitable companies normally have a stable liquidity and hence borrow at a low interest rate. Thereby operating margin was included as a proxy variable to measure profitability. Operating margin is calculated as operating income divided by revenue.

\[
\text{Operating margin} = \frac{\text{operating income}}{\text{revenue}}
\]

4.4.7 Firm size:

The variable firm size is explained by total assets. In general, larger firms have good quality in its accounting and are well known to lenders which should make it easier to get access to loans. Previous research shows larger firms spend more on R&D (Fishman & Rob, 1999), which is why this variable has been included.

4.4.8 Industry

Depending on the industry a company operates, the need for investment may differ. For example, a service company does not need to invest much in tangible assets compared to manufacturing companies. In a Polish questionnaire study investigating the impact of external factors on companies’ investment decisions, it was found that factors differ depending on which industry the company operates in (Bialowolski & Weziak-Bialowolska, 2014). When company data was collected from the business retriever, the companies had been sorted according to which industry they operate in, but as some industries consisted of few companies, new variables were created where similar industries were merged.

For the reason that investments differ between industries, we also decided to run the analysis on only manufacturing companies, as these have large asset values in the form of machines and equipment, which gives these companies good opportunities for accelerated depreciations. Furthermore, manufacturing companies have different investing needs than other companies.
### Table 2. Variable definitions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re/Kt-1</td>
<td>Retained earnings/capital stock the year before</td>
</tr>
<tr>
<td>Appropriations/Kt-1</td>
<td>Appropriations/capital stock the year before</td>
</tr>
<tr>
<td>Operating margin</td>
<td>The operating margin for each company at each financial year</td>
</tr>
<tr>
<td>Sales growth</td>
<td>Change in net sales in percent</td>
</tr>
<tr>
<td>Total assets</td>
<td>Total assets which reflects the size of the company</td>
</tr>
<tr>
<td>Data/media</td>
<td>Dummy for companies in the data, telecom, science and research industry</td>
</tr>
<tr>
<td>Construction/Engineering consultancy</td>
<td>Dummy for companies in the construction and engineering industry</td>
</tr>
<tr>
<td>Leisure</td>
<td>Dummy for tourism, culture, hotel and restaurant companies</td>
</tr>
<tr>
<td>Services/economics/administration</td>
<td>Dummy for companies operating in staffing agencies, business services, real estate, economics and administration</td>
</tr>
<tr>
<td>Healthcare</td>
<td>Dummy for healthcare companies</td>
</tr>
<tr>
<td>Energy/drain</td>
<td>Dummy for energy and drain companies</td>
</tr>
<tr>
<td>Transport</td>
<td>Dummy for companies in the transport industry</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Dummy for companies in the manufacturing industry</td>
</tr>
<tr>
<td>Trading Companies</td>
<td>Dummy for companies in the retail or wholesale industry</td>
</tr>
</tbody>
</table>

### 4.5 Regression analysis

The relationship between investments and appropriations will be analysed through a linear regression, where the purpose is to test how the dependent variable investments change as a response to a change in the independent variable appropriations. Linear regression is also called ordinary least square (OLS). The advantage of using it is, that it makes the sum of the squares as small as possible and it gives the highest degree of explanation (R-square) (Kennedy, 1998, p. 46). The disadvantage of studying linear relationships is that it does not need to be a cause and effect relationship. It is thus not possible to say whether the independent variable explains the dependent variable. There may be other variables that are not included in the model that explains the relationship.
In order to perform OLS a certain number of assumptions needs to be fulfilled to give accurate results, which will be discussed below.

4.8 Trimming/Winsorise

As in the work of Eklund, (2010), this study had problems of non-normality occurring related to extreme outliers. Trimming of the data by removing outliers in the 1th and 99th percentile was performed. The results of the trimming did not solve for the problem of non-normality. Winsorizing at a 1 percent level was performed instead which gave more satisfactory results yielding the residuals to be normally distributed. Winsorizing makes the data more normally distributed which is a prerequisite for statistical testing to be valid. Unlike trimming which means removing extreme values, winsorising means extreme observations are replaced by a value that is not as extreme (Tukey, 1962).

4.6 Testing for Multicollinearity

Multicollinearity is a problem which arises in multiple regression analysis when two or more independent variables correlate with each other (Collis & Hussey, 2014 p. 274). Multicollinearity can affect the result and give unreliable estimates which give insignificant results even though the independent variables correlate individually with the dependent variable. To verify this potential multicollinearity problem, the Variance Inflation Factor (VIF) in the model were tested. VIF values above 10 are generally considered to be high and indicate that multicollinearity exists.

4.7 Testing for Heteroscedasticity

When carrying out linear regression, potential problems can arise in terms of distorted and biased results. One of these problems is heteroscedasticity. Homogeneous residuals, which means constant variance is one of the main assumptions using linear regression. Heteroscedasticity means the error terms has a non-constant variance (Kennedy, 1998, p. 43). The consequence of this is distorted variables which leads to inaccurate results. For example, it can lead to a tilted regression line (Kennedy, 1998, p. 119-120). According to Kennedy (1998, p. 127), heteroscedasticity could be a problem when using data from a sample that is not from the same size. In this study, the largest non-listed firms in Sweden were chosen and hence the studied variables could differ in size. To test the assumption for homogenous variables, the Breusch-Pagan / Cook-Weisberg Test has been conducted. The null-hypothesis in this test is that the residuals has a constant variance. If it proves that the null-hypothesis is rejected, the alternative hypothesis is accepted which means the residuals could be heteroscedastic and hence the risk of inaccurate results increases. To handle the problem with heteroscedasticity, a robust regression was made to minimize the effect by non-constant variables. By doing this, observations can be checked by minimizing absolute values from the model, which can lead to a more representative result (Kennedy, 1998, p. 300-303). This was performed by utilising the predefined robust command in STATA by typing “, robust” after the regression.
5 Results

5.1 Descriptive Statistics

The data which has been studied and analysed is summarized in table 3. The second column in the table visualizes the number of observations which consist of the observed company’s data from five annual reports between 2013-2017. Since 215 companies have been analysed, a loss of 18 observations occur regarding I/Kt-1, Re/Kt-1 and Appropriations/Kt-1. For operating margin, a number of 14 observations were missing and for sales growth and total assets 13 were missing.

The third column shows the mean of the observations, where the I/Kt-1 shows investments through assets the year before are around 0.09. This means investments amount to an average of about nine percent of the company’s total assets in the previous year. Regarding appropriations, this variable shows that the companies allocate on average 0.76 percent to appropriations of last year total assets.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/Kt-1</td>
<td>1,057</td>
<td>0,0913452</td>
<td>0,2546197</td>
<td>0</td>
<td>2,322536</td>
</tr>
<tr>
<td>Re/Kt-1</td>
<td>1,057</td>
<td>0,0374021</td>
<td>0,1008728</td>
<td>-0,2609594</td>
<td>0,5927928</td>
</tr>
<tr>
<td>Appropriations/Kt-1</td>
<td>1,057</td>
<td>-0,0075939</td>
<td>0,0613389</td>
<td>-0,4817643</td>
<td>0,1667412</td>
</tr>
<tr>
<td>Operating margin</td>
<td>1,061</td>
<td>6,202828</td>
<td>11,17441</td>
<td>-31,3</td>
<td>60,5</td>
</tr>
<tr>
<td>Sales growth</td>
<td>1,062</td>
<td>10,70365</td>
<td>49,31563</td>
<td>-56,7</td>
<td>427,69</td>
</tr>
<tr>
<td>Total assets</td>
<td>1,062</td>
<td>1,25E+07</td>
<td>2,91E+07</td>
<td>277640</td>
<td>2,34E+08</td>
</tr>
</tbody>
</table>

5.2 Testing for Multicollinearity

As discussed in the practical method, the independent variables must be tested for multicollinearity to ensure the tests shows reliable results. Before the results of the regression analysis can be discussed the VIF values were evaluated. This was done using a VIF test where variables with a higher VIF value than 10 should be excluded. Table 4 shows the VIF values in the model. The table show VIF values are around 1 with the highest VIF value of 1,37 for manufacturing companies. The VIF values can therefore be considered small and thereby we argue there is no problem of multicollinearity in the sample.
Table 4. VIF test

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>1.37</td>
<td>0.731360</td>
</tr>
<tr>
<td>Operating margin</td>
<td>1.27</td>
<td>0.787436</td>
</tr>
<tr>
<td>Re/Kt-1</td>
<td>1.18</td>
<td>0.846332</td>
</tr>
<tr>
<td>Data/media</td>
<td>1.17</td>
<td>0.854978</td>
</tr>
<tr>
<td>Leisure</td>
<td>1.16</td>
<td>0.865697</td>
</tr>
<tr>
<td>Energy/drain</td>
<td>1.14</td>
<td>0.877271</td>
</tr>
<tr>
<td>Services/economics/administration</td>
<td>1.14</td>
<td>0.878605</td>
</tr>
<tr>
<td>Construction/Engineering consultancy</td>
<td>1.12</td>
<td>0.890426</td>
</tr>
<tr>
<td>Appropriations/Kt-1</td>
<td>1.11</td>
<td>0.903352</td>
</tr>
<tr>
<td>Total assets</td>
<td>1.09</td>
<td>0.915069</td>
</tr>
<tr>
<td>Sales growth</td>
<td>1.06</td>
<td>0.939010</td>
</tr>
<tr>
<td>Transport</td>
<td>1.06</td>
<td>0.947586</td>
</tr>
<tr>
<td>Healthcare</td>
<td>1.04</td>
<td>0.964341</td>
</tr>
</tbody>
</table>

Mean VIF 1.15

Before carrying out the statistical analysis for the manufacturing companies the VIF values were checked. The VIF values were around one for every variable which meant multicollinearity could be determined to not be a problem for the analysis.

Table 5. VIF test for model only including manufacturing companies

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating margin</td>
<td>1.13</td>
<td>0.888192</td>
</tr>
<tr>
<td>Total assets</td>
<td>1.12</td>
<td>0.892878</td>
</tr>
<tr>
<td>Appropriations/Kt-1</td>
<td>1.01</td>
<td>0.990919</td>
</tr>
<tr>
<td>Re/Kt-1</td>
<td>1.01</td>
<td>0.993302</td>
</tr>
<tr>
<td>Sales growth</td>
<td>1.00</td>
<td>0.997370</td>
</tr>
</tbody>
</table>

Mean VIF 1.05
5.3 Normality assumption

Before carrying out the regression analysis a test for normality was also carried out in order to control that residuals were normally distributed. The normality assumption is important for the results to be useful. In order to see if the residuals were normally distributed a histogram over the residuals was produced in STATA, see figure 10. In order for the residuals to be more normally distributed the variable data was winsorized at 1 percent level as discussed earlier.

![Figure 10. Histogram over the residuals](image)

As can be seen residuals are concentrated around zero and seem to roughly follow a normal distribution. Therefore, we assumed the residuals to be normally distributed.

The residuals were not normally distributed for the sample of manufacturing companies and therefore the data was winsorized in this sample as well at 1 percent level, which solved the problem.

5.4 Testing for Heteroscedasticity

As mentioned in the practical method, there is a risk that statistical tests are affected by heteroscedasticity. Thereby a Breusch-Pagan / Cook-Weisberg test was made to control if the independent variables had constant variance. The p-value from the test was p<0.001 which means the null hypothesis is rejected and there could be heteroscedasticity in the sample. Because of the problems of heteroscedasticity, a robust regression was made to deal with this.
Problems with heteroscedasticity was also present in the sample of manufacturing firms. Therefore, a robust regression was made for this sample as well.

### 5.5 Variable Correlations

To test the correlation between the variables in the model, a correlation analysis was performed which is presented in table 8. It is desirable to obtain high correlation values between the dependent variable and the independent variables, while the correlation between the independent variables should be low. The independent variable which showed the strongest correlation with investments was Retained earnings as expected. This value was 0.282, while the weakest correlation was with total assets and amounted to 0.001. Since the research hypothesis was that there is a correlation between investments and appropriations, a strong correlation value between these variables is desirable, which was -0.252.

According to Kennedy (1998, p. 187), the correlation between independent variables should not exceed 0.8 or 0.9, which indicates multicollinearity exists in the model. As table 8 shows, the correlation between the independent variables is generally low with the highest value of -0.429, between manufacturing and trading companies. Overall, the correlation between the independent variables is less than 0.1, which is relatively low and indicates multicollinearity does not exist in the model.

---

**Table 6. Heteroscedasticity test**

<table>
<thead>
<tr>
<th>Breusch-Pagan / Cook-Weisberg test for heteroskedasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ho:</strong> Constant variance</td>
</tr>
<tr>
<td><strong>Variables:</strong> Re/Rt-1 Appropriations/Rt-1 Operating margin Sales growth Total assets Data/media Construction/Engineering consultancy Leisure Services/economics/administration Healthcare Energy/drain Transport Manufacturing Trading companies</td>
</tr>
<tr>
<td>chi2(14) 2419.17</td>
</tr>
<tr>
<td>Prob &gt; chi2 0.000</td>
</tr>
</tbody>
</table>
Table 7. Variable correlation table

![Variable correlation table]

5.6 Regression results for the general model

In Table 9 the results from the regression analysis can be seen. The model as a whole has an R-square value of 0.1914 which means 19.14 percent of the variations in investments can be explained by the model. Furthermore, the F-statistic has a p-value of <0.001 which means at least one of the coefficients’ in the model is significant, that is different from zero. When evaluating the model, it is also of interest to look at the coefficient of each variable and its t-value and p-value in order to determine if the coefficient is significant. In this study a significance level of 5% is applied. This means only coefficients with a p-value of less than 0.05 are significant.

In the model the control variable which is significant in relation to investments is retained earnings with a p-value of 0.001. Aside from this also the dummy control variables for leisure- and healthcare companies are significant with p-values below 0.05. Both the coefficients for leisure- and healthcare companies were negative which indicates companies in these industries invest less. The coefficient for manufacturing firms is positive and have a p-value of 0.004 which indicates that a positive relationship exists.
between investments and manufacturing firms. This means that these firms invest more than companies in other industries. The intercept is also significant at the 5 percent significance level. However, sales growth, operating margin nor total assets showed no significant relationship with investments at a 5 percent significance level. Both sales growth and operating margin even show a weak but insignificant negative relationship with investments. What this means is that as operating margin and sales growth increases investments decreases, which would be contradictory to what could be expected. However, these relationships were not significant.

The independent variable investigated in this study is the appropriations. What is tested is if taken appropriations stimulates investments. This implies a negative relationship between appropriations and investments is predicted, meaning the coefficient for appropriations should be negative. It should be a negative relationship since appropriations are shown on the income statement as a cost when they are taken to shield income from taxation which leads to increased liquidity and can contribute to increased investments. When appropriations are positive they are an income. Resources previously shielded from taxation which are taken back to taxation effectively decreasing internal resources. The hypothesis implies the coefficient for appropriations is negative which means when appropriations are negative the result is an increase in investments.

The regression shows that the variable for appropriations has the negative coefficient -1,35. The t-value of the coefficient was -3,1 and the coefficient had a p-value of 0,002. This means the coefficient for appropriations is significant at a 5 percent significance level. According to this model 1 Swedish crown taken as an appropriation would result in 1,35 Swedish crowns being spent on investments.

The results indicate that there is a negative relationship between appropriations and investments which were significant at a 5 percent significance level. Therefore, the results are in line with hypothesis (H1). This means if appropriations are taken lowering the year-end result the total amount spent on investment increases.

Table 8. Regression results for general model

| Variable                              | Coef. | Std. Err. | t-value | P>|t| | [95% Conf. Interval] |
|---------------------------------------|-------|-----------|---------|-----|----------------------|
| Re/Kt-1                               | 0,8981759 | 0,2709301 | 3,32   | 0,001 | 0,3665456 - 1,429806 |
| Appropriations/Kt-1                   | -1,347979 | 0,4312529 | -3,13   | 0,002 | -2,194201 - 0,5017566 |
| Operating margin                      | -0,0019498 | 0,0011045 | -1,77   | 0,078 | -0,004117 - 0,0002174 |
| Sales growth                          | -0,0000334 | 0,0002444 | -0,14   | 0,891 | -0,000513 - 0,0004461 |
| Total assets                          | 1,576-10 | 1,826-10 | 0,86   | 0,388 | -2,206-10 - 5,156-10 |
| Data/media                            | 0,0382311 | 0,0189948 | 2,01   | 0,044 | 0,0009588 - 0,0755034 |
| Construction/Engineering consultancy  | 0,0401999 | 0,0229337 | 1,75   | 0,08  | -0,0048015 - 0,0852013 |
| Leisure                               | -0,1454279 | 0,0448007 | -3,25   | 0,001 | -0,2333376 - 0,0575181 |
| Services/economics/administration     | 0,0121125 | 0,0231593 | 0,52   | 0,601 | -0,0333316 - 0,0575565 |
| Healthcare                            | -0,035749 | 0,0275492 | -1,22   | 0,223 | -0,0876332 - 0,0004833 |
| Energy/drain                          | 0,0555183 | 0,0346698 | 1,6    | 0,11  | -0,0125123 - 0,1235488 |
| Transport                             | -0,010253 | 0,0146824 | -0,75   | 0,485 | -0,0390633 - 0,0185574 |
| Manufacturing                         | 0,0586336 | 0,0203562 | 2,88   | 0,004 | 0,0186898 - 0,0987775 |
| Constant                              | 0,037403 | 0,0122898 | 3,04   | 0,002 | 0,0132874 - 0,0615186 |

Number of obs: 1057
F(5, 289): 0
Prob > F: 0.1914
R-squared: 0.1914
Root MSE: 0.1914
5.7 Regression results for manufacturing companies

In table 10 the result of the robust regression analysis can be seen. The model as a whole has an R-square of 0,7165, this means 71,65 percent of the variation in investments can be explained by the model. The p-value for the F-statistic is <0,001 which means at least one of the coefficients’ in the model is significant, different from zero. To evaluate the variables in the model as with the test of general model a significance level of 5 percent was applied. The control variable retained earnings proved to be significant with a t-value 7,59 and a p-value of <0,001. The other control variables operating margin, sales growth and total assets were not significant with p-values for each variable well above the significance level of 0,05. The variable investigated the appropriations for manufacturing companies. What is tested is if taken appropriations stimulates investments in manufacturing companies to a greater extent than the other companies. Exactly as in the general model there is an assumed negative relationship between appropriations and investments.

The regression shows the variable for appropriations has the negative coefficient -16,33. The t-value of the coefficient was -1,35 and the coefficient had a p-value of 0,179. This implies the coefficient is not significant at a 5 percent significance level. The results from the test indicates a negative relationship between appropriations and investments, however this relationship is not significant. Therefore, the results are not in line with hypothesis (H2). Appropriations taken lowering the year-end result for manufacturing firms cannot be said to increase the total amount spent on investment increases.

Table 9. Regression results for manufacturing companies

|                  | Coef.  | Std. Err. | t-value | P>|t| | [95% Conf. Interval] |
|------------------|--------|-----------|---------|-----|---------------------|
| Re/Kt-1          | 0,5926825 | 0,0781167 | 7,59   | 0   | 0,4389326 - 0,7464323 |
| Appropriations/Kt-1 | -16,3301 | 12,1118 | -1,35 | 0,179 | -4,016 867 - 7,508 462 |
| Operating margin | -0,0259661 | 0,0210018 | -1,24 | 0,217 | -0,067302 - 0,0153697 |
| Sales growth     | -0,0015026 | 0,0070461 | -0,21 | 0,831 | -0,0153707 - 0,0123655 |
| Total assets     | -4,25E-10 | 1,23E-09 | -0,35 | 0,73  | -2,84E-09 - 1,99E-09  |
| Constant         | 0,5777931  | 0,360376  | 1,6    | 0,11 | -0,1315012 - 1,287 087 |

Number of obs    | 295   |
F(5, 289)        | 13,75 |
Prob > F         | 0     |
R-squared        | 0,7165|
Root MSE         | 4,861 |
6 Analysis and Discussion

6.1 The relationship between appropriations and investment

The study provides empirical evidence indicating that there is a relationship between appropriations and investments in firms. However, from the study conclusions of cause and effect cannot really be drawn as there could be lurking variables. Nonetheless the result is in line with previous research performed on accelerated depreciation, which have shown that accelerated depreciations have a relationship with investments (Ackermann et al., 2016; Polzin et al., 2018; House & Shapiro, 2008). However as has been argued earlier by Hanna & Christoffer, (2010) the effect could be minimal. As both accelerated depreciation and tax allocation reserves are incorporated into the appropriations it is not possible to determine the effectiveness of each policy for the relationship with investments. Wielhouwer & Wiersma, (2017) investigated accelerated depreciation policies included in Dutch GAAP. The policies implemented in the Netherlands allows for companies to freely choose the tempo of depreciation of assets which allows them to depreciate the assets with amounts which fit the company’s current needs. The study show that this type of policy may stimulate investments. As tax allocation reserves allows for the possibility of early reversal if needed. It can therefore be argued that tax allocation reserves give more flexibility then accelerated depreciation. This would in turn lead to suggest in accordance with Wielhouwer & Wiersma, (2017) that tax allocation reserves may be to a large extent the explanation of the relationship with investments.

According to Wielhouwer & Wiersma, (2017) the use of the depreciation policy led to higher investments in assets which qualify for the policy compared to other assets. Koowattanatianchai et al., (2017) in a historical overview of accelerated depreciation concludes that these programs are not always working as intended. They argue companies could misuse the policy only in order to take advantage of the tax benefit which leads to inefficient investments. Therefore, it is of interest whether the effect of increase in investments is connected with accelerated depreciation or tax allocation reserve. Since the tax allocation reserve does not require a specific asset to depreciate this implies firms are more free to choose investment type. This in turn could be argued leading to better investments. A higher degree of freedom would imply more investments to be made and thereby it might be the case that tax allocation reserve represents larger part of the relationship between appropriations and investments.

The study is also in line with the work of Eklund (2010) which showed the importance of retained earnings as a determinant of investments. This study like Eklund (2010) show a positive significant relationship between retained earnings and investments. It could be argued that appropriations have a similar function as retained earnings, since it is about internal funds. Appropriations could be said to have this effect because they improve cash flow. According to pecking order theory internal funds is an important type of financing for investments (Myers, & Majluf, 1984). While both retained earnings and appropriations is about the internal resources, the increase in appropriations is stipulated to increase funds retained in the firm. However, it also decreases the retained earnings as it lowers the after tax income by decreasing book profit, which might be a potential problem in this study.

The results from the second model about manufacturing firms are in line with Eklund (2010) when it comes to the significant relationship between retained earnings and
investments. The model even has a higher R-squared which means it has a higher level of explanation of investments. However, the hypotheses that there is a closer relationship between appropriations and investments for manufacturing companies proved to be false, because a significant relationship could not be proved. However, the coefficient for appropriations for manufacturing companies is much higher than for the general results.

The sub sample of manufacturing firms could not prove a significant relationship between appropriations and investments. Given the assumptions are true that manufacturing companies invest a lot in equipment and have good possibilities utilising accelerated depreciation. The results of this sub sample therefore puts the general results a bit into question. However, there might be other important factors playing a major role here.

Eklund (2010) calls for investigations into Scandinavian institutional specificities which might explain the high dependence on retained earnings and suggests the tax system might distort capital allocation. This study could be argued to show the importance of this dimension as using these tools to get around taxes which provides better possibilities for investments. It could with looking at the results from Eklund (2010) with especially high dependence of internal funds might be suggested that untaxed reserves are especially useful in the Swedish context. Therefore, it could be argued the relationship between appropriations and investments might be significant in a Scandinavian context, but not elsewhere. This would mean that if the same policies existed in other countries and if this study was performed in those countries the results might have been different.

Much of this study has discussed the deferral of tax as a mean of funding investment. However, as always in regression analysis there is a risk the relationship might be accidentally caused by lurking variables. Sundsvik (2016) showed in his study of the change in the Swedish corporate tax rate that companies tried to utilize earnings management to lower the firm income with the purpose to pay taxes in the future at a lower tax rate. This implies there are multiple reasons for deferring taxes and it is hard to determine if the use of appropriations actually stimulate investments. It could be argued that appropriations are rather utilized for tax arbitrage or increasing firm value by the time value of money. By this logic it might be suggested that tax allocation reserves are too lightly treated as they do not require firm to buy an asset in order to utilize them as do accelerated depreciation.

It could be argued the economic business cycle affects the level of investment in society as lower interest rates make it cheaper to invest and higher rates makes it more expensive. The last years Sweden has had low interest rates. In 2018 the rate was at negative 0,5 percent (Sveriges Riksbank, 2018). Since then the interest has increased and as of April 2019 the rate is at negative 0,25 (Sveriges Riksbank, 2019). The rates at which companies borrow at would probably be lower as well. Although companies do not borrow at the official bank rate it can be interesting noticing the time value of deferring tax payments will be affected (Koowattanatianchai et al., 2017, p 117). The lower interest rates which are seen in Sweden would imply discount rates would being lower, effectively decreasing the effect from time value of money. Thereby the benefit of deferral of tax payments would be smaller in times of low interests. However, this will also imply that the positive cash flows will be discounted with a lower rate.

The current low interest rates would imply the policies investigated would be less effective and not stimulate investment as much. However as can be seen from the general
results of the study there is a relationship between appropriations and investments. It could be argued the relationship might be stronger in times of higher interest rates. Thereby it could be of interest to study the relationship in times of higher interest rates.

6.2 The Influence of the Control Variables

Control variables were included in order to increase the regression model's degree of explanation and since several factors may have an impact on investment decisions. Adam & Goyal (2008) argues investment opportunities cannot be observed by outsiders and hence researchers have to rely on proxy variables in order to gain an insight into what affects investments. As can be seen in table 9, only Retained earnings of the control variables turned out to have a positive significant relationship with investments at a 5% significance level. However, this is not unexpected since Eklund (2010) has shown that Swedish companies are heavily dependent on retained earnings to invest. The dummy variables leisure and healthcare also proved to have a significant negative relationship with investments. This might mean companies within this industry invest less than others. Reasons for this could be that companies in these industries primarily make money on their services and hence do not need to invest much in capital. The dummy variable for manufacturing firms showed as expected a positive significant relationship with investment and the reason for this might be that these firms have large assets and thereby need to invest a lot. This was also the reason why the second hypothesis was stated.

Furthermore, neither operating margin, change in net sales, total assets nor any of the remaining dummy variables showed a significant relationship with investments. The fact that the operating margin was not significant does not correspond to what Alam & Stafford (1985) concluded, profitability being an important factor for investments. This might be because operating margin was the only proxy variable for profitability. If more proxy variables had been included for profitability, the result might be different.

Change in net sales was not significant, despite the fact that change in net sales measures exactly what was intended to be measured. This does not match with previous research (Eklund, 2010). The reason for this may be that the companies in this study consisted of large and mature companies. If the study was performed on companies within an early stage of the life cycle, this variable might have shown a connection with investments. Therefore, it is conceivable that a hypothetical repetition of this study with a larger sample of big companies would not show a positive relationship either.

Total assets did not show any relationship with investments, which is not in line with earlier research by Fishman & Rob (1999), who showed larger companies tend to invest more in R&D, which is part of the investment business. However, this study did not take into account R&D investments due to manual data collection being needed. This may be an explanation why no connection could be shown between investments and total assets. Total assets in this study was a proxy variable to measure the size of the company. If more variables were included, such as net sales, which also describes the size of the company, another result might have been obtained. The fact that the companies are well-established and mature can also here be a reason why the connection could not be proved, since they may have reached a breakpoint where investments are not needed to any great extent.
7 Conclusion

7.1 Summary

This study tried to investigate the relationship between appropriations taken and investments made by the largest non-listed firms in Sweden. The taken approach to investigate this was by conducting a quantitative study. The reason for conducting this study was to evaluate if the policy could help companies make investments and evaluating if the policy is effective. Company data consists of information from a 5-year period, between 2013-2017. Investments were measured through taking the negative cash flows from the cash flow statement. The appropriations were found and taken from the income statement for each company.

In order to answer the research question of the study secondary data was collected from the database Business retriever. The database includes information on all companies in Sweden giving access to the data needed. This was for conducting a statistical analysis using the statistics software STATA. In the end 215 firms and five year of data was analysed using statistical analysis.

A literature search was carefully conducted to get the underlying theory for the study. Articles from the areas of accounting and finance were reviewed in order for building the hypothesis of the study. The control variables and research design was taken from previous peer reviewed work in order to improve validity (Eklund, 2010; Gugler et al., 2004). Furthermore, we assumed manufacturing companies would have special use of appropriations based on the data, showing these companies had high levels of capital.

The hypotheses of the study were the following

\[ H1 \text{ As appropriations are taken lowering the year-end result the total amount spent on investment increases} \]

\[ H2 \text{ A model using only manufacturing companies have a higher degree of explanation} \]

The first hypothesis was tested by conducting a regression analysis. In order for the model to be normally distributed the variables were divided by last year’s total assets as Eklund (2010). The data was furthermore winsorized at a 1 percent level in order to deal with the remaining problems of non-normality. The model was further made robust dealing with heteroscedastic residuals. The results showed a negative significant relationship between appropriations and investments made by firms. This is in line with some previous research on the relationship between investments and accelerated depreciation, a component of appropriations (Ackermann et al., 2016; Polzin et al., 2018; House & Shapiro, 2008). Therefore, the results are in line with the hypothesis (H1).

The seconded hypothesis was tested using a regression analysis were the same control variables were included. Thereby the control variables for the different industries were removed. The results yielded from the regression were not significant. Therefore, it could
not be proved that there is a relationship between appropriations and investments for manufacturing companies.

The research questions were formulated the following way

\[ RQ1: \text{Does an increase in use of untaxed reserves stimulate an increase in the investments made by firms?} \]

\[ RQ2: \text{Is this effect more pronounced for manufacturing firms?} \]

In this study there is empirical support that a relationship might exist between an increase in untaxed reserves and an increase in investments made by firms. This is however not the case for manufacturing companies.

7.2 Contribution

Few studies have been conducted in this area of research, most studies have only focused on accelerated depreciation. This study looked at the Swedish GAAP and the possibilities of appropriations and the link to investment.

This study can be seen as a starting point for future research in the area of appropriations. Investments could be said favouring growth and job creation and therefore it is of interest to study factors which promote investments. Investigating how accounting standards can encourage investments would be of use. This study shed some light on how standards could be implemented improving the accounting for appropriations to favour investment.

The study also tries to put focus on the value and use of appropriations. Understanding the value and use of this accounting tool. Since no similar study has been conducted on Swedish companies, this study can serve as a guide for further research. We believe that research is needed in this area for several reasons. For example, companies can take part of the results and gain insight into how accounting methods can affect the company. But also standard setters and law-makers need research as a basis to make correct decisions when revising in the regulations.

7.3 Limitations

As with most research in the area there are limitations, this is the case with this study as well. One problem is that the study uses a relatively small sample because it investigates a rather small population. Second, the study only uses five reporting years which does not yield many observations. The variable for investment is also estimated without taking into account some of what a firm might see as an investment but the accounting system not. This was however a conscious choice to use only what could be drawn from the cash flow statement. The data collection for the variable for investment also entitled some manual work which increases the risk of input errors and thereby lowering the reliability. Much of the model was based on Eklund (2010). However, Eklund (2010) used Tobin's Q to incorporate the expectations of unobserved investment opportunities in the future.
As this study investigated private non-listed companies the variable Tobin’s Q could not be used. The study should therefore be seen with caution since it investigates private companies as opposed to previous work. Not being able to adjust for these expectations might pose a problem.

7.4 Further Research

As previous research has shown, it is not only capital and the expected rate of return which affects investments, since psychological factors also have an effect (Sawers, 2005). Therefore, suggestions of future research are qualitative interviews where researchers try to understand the underlying factors for managers and organizations’ choice of investments and how managers reason about appropriations and whether these affecting decision-making in the business.

As this study has some limitations regarding the sample, it could be interesting to conduct a study with a broader sample. Future studies could include smaller firms and more years of data. It could also be of interest to conduct a similar study and try to include investments in research and development to see if appropriations have a relationship with these investments.

In further research it would be of interest to study the components of appropriations to see which part has the greatest impact on investments. As mentioned in the discussion the rule of tax allocations reserves could be interesting to investigate as it opposed to accelerated depreciation do not require an asset in order to be executed.

7.5 Societal effects

Companies are an important part of the society as they contribute to tax revenues, work opportunities, etc., but in order for them to be competitive in the long term perspective, investments must be made. An important part of business research is therefore to study factors which influence investments.

The societal effects from the study could for example be that the importance of appropriations could be overestimated. This might lead to policy which is not thought through. Even though this study shows a relationship between appropriations and investments it is not necessarily the case that a cause and effect relationship exist. Furthermore, future research might disprove the results. This can be a general problem interpreting the result of research from one source and drawing wide conclusions.

If investments increase because of the policies investigated, it is not necessarily the case that these lead to investments of higher quality, meaning good allocations of capital. As a result of these types of studies, policies could be implemented which are not effective and only leads to tax savings for firms which are not useful for society as a whole. As resources would be taken from the common and allocated to the few without real benefits for the society. The results of research in this area needs to be presented with caution, not drawing to extensive conclusions. Since the risk of misinterpretations could lead to bad policy is always a risk.

Since companies have a responsibility in society, they are also expected to take responsibility for environmental issues and sustainability. This can be done in many
different ways such as sustainable production, which is often more expensive and hence requires more investments. If appropriations contribute to more investments it could also lead to an increase in sustainable investments, which is a positive effect for society in the long run. In addition, Koowattanatianchai et al., (2017) discusses that several countries allow for increased speed of accelerated depreciation when investing in environmentally friendly assets and machines. For example, the Netherlands allows high degree of freedom when choosing depreciation rates for environmentally friendly equipment, where up to 75 percent can be depreciated already in the first year. Furthermore, Koowattanatianchai et al., (2017) discuss that there are some theoretical studies showing accelerated depreciations can promote green investments. KPMG, 2013 notes that several nations use tax relief to facilitate the sustainability work for the companies. For example, accelerated depreciation is used to encourage the purchase of energy-saving equipment. However, this implies someone has to decide if a certain type of investment is environmentally friendly. If policies are not constantly updated this might promote obsolete technology as development is rapid. This could lead to inefficient investments as companies would follow depreciation policy rather than technological development. Another societal effect could be the requirement to print five hard copies of this thesis (USBE, 2018). This requirement is set by the ISO 14001 certified business school (USBE, n.d.), creating CO2 emissions which cause environmental harm.

7.6 Truth Criteria

According to Collis & Hussey (2014, p. 52), there are two important criteria in quantitative research which should be met for the study to be considered credible. These are reliability and validity and will be discussed in the following sections.

7.6.1 Reliability

The criterion for reliability refers to the fact that the study must be carried out carefully. Therefore, a study with high reliability should have a high replicability, which means a study in a hypothetical repetition should give the same or at least similar results (Bryman & Bell, 2017, p. 181). In this study, quantitative variables have been studied which means a replication of the study would give exactly the same results and hence the study meets a high reliability. Things which could affect replicability are whether Business Retriever, from where data was collected, is a unreliable source. If for example, repeated data collection would produce other companies or other information about the companies, the replicability would be poor. On the other hand, we consider that this is not a problem, since when repeating the retrieval of data at a later date, exactly the same companies could be identified. A clear description of how the data is collected is also of great importance for having high reliability. The sample selection chapter shows step by step how the observed companies have been gathered, which makes it easy for other researchers to replicate the study. Also the fact that Business Retriever is a source given access from Umeå University must be considered reliable.

However, it is possible to discuss this concept further. In this study, the 215 largest non-listed companies in Sweden were selected because it required manual work to collect the data. If a similar study was conducted by other authors on other companies, it is unclear whether the study would receive similar results, because of the relatively few number of observations that have been analysed. Therefore, whether the outcome of this study can be generalized on other companies of smaller size or in other regions is limited.
7.6.2 Validity

The concept of validity is about the relevance of the study which means how well a study measures what is intended to be measured (Bryman & Bell, 2017, p. 176). This is an important criterion to fulfil because this aims at whether the study’s results can be considered reliable. At present, it is common for social science research of quantitative design to be carried out with the help of qualitative variables, such as, for example, questionnaires where respondents can interpret the questions and self-assess their answers. In these studies, abstract concepts might sometimes need to be operationalized in order to be measurable. In these situations, there is a risk that one does not measure what is meant to be measured. Both the validity and the reliability can be ruptured as, for example, questions in a questionnaire study may have different meanings depending on the individual's own interpretation. In this study it was investigated whether there was a connection between appropriations and investments in cash flow, which must be regarded as high validity and reliability because the variables were of quantitative form and predefined concepts from accounting standards were used operationalization needed. However, the model used in the analysis and choice of statistical tools in the study was based on previous peer reviewed work which improves validity (Eklund, 2010; Gugler et al., 2004).

7.7 Generalizability

According to Collis & Hussey, (2014, p. 54) one purpose of studies of positivist paradigm is to be able to generalize the result from the sample on the population. To do this, a randomized selection must be made (Collis & Hussey, 2014 p. 133). The larger the sample size, the better the study will represent the population. However, the selection in this study must be regarded as a non-probability sample and therefore the result cannot be generalized on the population. This study would be more interesting if it had been carried out based on a larger and randomized selection, but due to manual handling it was not possible. Apart from the theory advocating randomized selection as a requirement for generalization of data, it does not imply the results are uninteresting. Generalization can be done if how the sample was produced is taken into account. Therefore, this study can be generalized with caution on larger Swedish companies as these are the ones that were studied.
References list


Myers, & Majluf. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221. [https://doi.org/10.1016/0304-405X(84)90023-0](https://doi.org/10.1016/0304-405X(84)90023-0)


Appendix 1. Control for regression assumptions of Subsample

Figure 11 Histogram over the residuals for the regression analysis of manufacturing firms

Table 10. Test for Heteroscedasticity for manufacturing firms

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables:Re/Kt-1 Appropriations/Kt-1 Operating margin Sales growth Total assets
chi2(5) 2022.77
Prob > chi2 0.000

Test for Heteroscedasticity showing non constant variance which lead to running a robust regression.
Table 11. Correlation table for the variables for manufacturing firms.

<table>
<thead>
<tr>
<th></th>
<th>IKt-1</th>
<th>Re/Kt-1</th>
<th>Appropriations/Kt-1</th>
<th>Operating margin</th>
<th>Sales growth</th>
<th>Total assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>IKt-1</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re/Kt-1</td>
<td>0.8257</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriations/Kt-1</td>
<td>-0.2185</td>
<td>-0.0422</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating margin</td>
<td>-0.0648</td>
<td>-0.0549</td>
<td>-0.0651</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales growth</td>
<td>-0.0339</td>
<td>-0.0266</td>
<td>0.0436</td>
<td>0.0092</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Total assets</td>
<td>-0.0536</td>
<td>-0.0490</td>
<td>0.0084</td>
<td>0.3246</td>
<td>0.0046</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Correlation table for the variables for manufacturing firms, where no problems of multicollinearity seem to exist. However, correlations exist between independent variables appropriations and retained earnings and the dependent variable investment.

Appendix 2. Descriptive statistics for Subsample

Table 12. Descriptive statistics of variables in the second model

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>IKt-1</td>
</tr>
<tr>
<td>Re/Kt-1</td>
</tr>
<tr>
<td>Appropriations/Kt-1</td>
</tr>
<tr>
<td>Operating margin</td>
</tr>
<tr>
<td>Sales growth</td>
</tr>
<tr>
<td>Total assets</td>
</tr>
</tbody>
</table>


Appendix 3. STATA do-file for the general model

Data import

ssc install winsor2

winsor2 IKt1, cuts(1 99)
winsor2 REKt1, cuts(1 99)
winsor2 Bokkt1, cuts(1 99)
winsor2 Rörelsemarginal, cuts(1 99)
winsor2 Förändringavomsättning, cuts(1 99)
winsor2 Balansomslutning, cuts(1 99)

*Descriptive statistics

summarize IKt1_w REKt1_w Bokkt1_w Rörelsemarginal_w 
Förändringavomsättning_w Balansomslutning_w Datamedia Byggteknikkonsult 
Tillverkandesverige Handel Fritid Tjänsterekonomiadmin Sjukvård Energiochavlopp 
Transport

regress IKt1_w REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w 
Balansomslutning_w Datamedia Byggteknikkonsult Tillverkandeföretag Handel Fritid 
Tjänsterekonomiadmin Sjukvård Energiochavlopp Transport 

estat vif

* homoscedacity
hettet REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w 
Balansomslutning_w Datamedia Byggteknikkonsult Tillverkandeföretag Handel Fritid 
Tjänsterekonomiadmin Sjukvård Energiochavlopp Transport 
predict IKt1f, xb
predict sl, residual
gen sls=sl^2
scatter sls IKt1f

regress IKt1_w REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w 
Balansomslutning_w Datamedia Byggteknikkonsult Fritid Tjänsterekonomiadmin 
Sjukvård Energiochavlopp Transport Tillverkandeföretag Handel,robust 
estat vif

predict resid, residuals
Appendix 4. STATA do-file for the model with manufacturing companies

Data import

winsor2 IKt1, cuts(1 99)
winsor2 REKt1, cuts(1 99)
winsor2 Bokkt1, cuts(1 99)
winsor2 Rörelsemarginal, cuts(1 99)
winsor2 Förändringavomsättning, cuts(1 99)
winsor2 Balansomslutning, cuts(1 99)

* Descriptive statistics

summarize IKt1_w REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w Balansomslutning_w

regress IKt1_w REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w Balansomslutning_w

estat vif

* homoscedacity
hetest REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w Balansomslutning_w
predict IKt1f, xb
predict sl, residual
gen sls=sl^2
scatter sls IKt1f

regress IKt1_w REKt1_w Bokkt1_w Rörelsemarginal_w Förändringavomsättning_w Balansomslutning_w,robust
estat vif

predict resid, residuals

histogram resid, kdensity normal
ssc install jb
jb resid