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Policy Impact for Nonindustrial Private Forest Landowners

- The Case of Deregulating Private Forest Accounts

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Abstract

An ongoing investigation initiated by the government of Sweden is examining the tax structure for private entities and persons who are owners or partners in trading companies. It investigates whether current tax structure is too complex, and if there is a need to simplify the current tax structure. Nonindustrial private forest landowners own 52 % of the forestland areas in Sweden (Nilsson, 2015, p. 92), and they are often running their business as private entities. It becomes interesting to examine which sanctions the revised tax structure could have on private entities that have forests revenue as part of the total revenue. The study examines the financial effects that the revised tax system would have compared to the current tax system through a future simulation. The study finds that the proposed changes in the investigation will have a negative effect on the total profit for nonindustrial private forest landowners. They would contribute with further tax funds to the government through the proposed changes, but also that the revised tax system might have negative effects for the overall short-term supply on Swedish wood products.

Sammanfattning

En pågående utredning initierad av Regeringskansliet utreder skatteregler för enskilda näringsidkare och fysiska personer som är ägare eller delägare i handelsbolag. Utredningen undersöker huruvida avsättningsmöjligheterna är för komplexa, och om det nuvarande skattesystem bör förenklas. Privata skogsägare äger tillsammans 52 % av den totala skogsarealen i Sverige (Nilsson, 2015, p. 92), och den vanligaste företagsformen för dessa är enskild firma. Vilket har gett intresset till att undersöka vilka påföljder det reviderade skattesystemet kan få för enskilda firmor som har skog som en del av intäkten. Studien försöker därför genom en framtidssimulation jämföra nuvarande skattesystem med det reviderande skattesystemet för att identifiera finansiella effekter. Studien visar slutsatser som menar att nuvarande skattesystem har bättre planeringsmöjligheter att skjuta upp beskattningen på resultatet till följande år, och kan även få konsekvenser på utbudet av skogsprodukter eftersom det blir mindre lönsamt att avverka skog.

Glossary

Allocation fund – deposition possibility for private entities in Sweden, allows postponing taxation of 30 % of the result before taxes.
Capital base – the base for calculating the maximum possible depositions for expansion fund and interest allocations.
Cumulative distribution curve – curve that provides possible future scenarios, showing less and more likely outcomes.
Depositions – several possibilities to postpone taxation or distribute the result more even
Expansion fund – deposition possibility based on a capital base, allow a private entity to bring result for a tax rate of 22 %.
Interest allocation – deposition possibility that is based on a capital base, which allows a private entity to move funds between income of business and income of capital.
NIPF landowner – Nonindustrial Private Forest landowner, who possess forestland as private property, and operates the business as a private entity.
Result before taxes – revenues subtracted with costs, interests and depositions.
Total profit – The amount of funds that determine the final result after taxes, including untaxed assets.

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1 INTRODUCTION

Sweden is a country endowed with large natural resources, where the forest represents one of them. The total area of land in Sweden is 40.8 million hectares, where 28.1 million hectares are forestland areas, including idle land and mires (Nilsson, 2015, p. 53). Coniferous forests cover the main part of the forestland in Sweden, which contains different types of spruces and pines (Andersson, 2013). These types of trees have long lifecycles, usually about 70-120 years, before there is a final product, such as roundwood, wood pulp or biofuel (Andersson, 2013).

Historically the forest industry has played a major part in the Swedish economy (Kleinschmit *et al.*, 2011), where the sawing industry employed a great amount of people in the 19th and 20th century by producing saw timber and wood pulp (Bertholdson *et al.,* 2014; www, Skogssverige, n.d.). Currently the forest industry employs 175 000 people including subcontractors, and Sweden is now the third largest exporter in the world of paper, wood pulp, and sawn wood (www, Skogsindustrierna, 2016).

The forestland in Sweden can be divided into three major ownership categories, where the largest category is nonindustrial private forest (**NIPF**) landowners, whom together own 52 % of the productive forestland (Nilsson, 2015, p. 92). Incorporated companies own 24 % and others, such as the state of Sweden and the Swedish church, own the remaining 24 % (Nilsson, 2015, p. 92). In Sweden, there are different taxation regulations depending on whether it is an incorporated company or a private entity, and NIPF landowners tend to run their business as a private entity (Nilsson, 2015). Currently a debate questions taxation policies for private entities in Sweden.

1.1 Problem background

The ongoing debate concerning whether current depositions possibilities are too complex for the private entities, including several deposition possibilities with different regulations (Aronsson, 2014; Norrskog, n.d; Lepikko, 2016). This concern has led to a public investigation conducted by the Swedish government - *Simplified taxation regulation for private entities* (**SOU 2014:68**). The investigation has examined how the current legislations can be simplified, as private entities are assumed to have incentives to make the declaration as simple as possible to prevent unnecessary administrative costs (SOU 2014:68). In the current legislation, a private entity has the deposition possibilities of allocation fund, expansion fund, forest and forest damage account, and authorship account (SOU 2014:68). The investigation suggests, removing the current deposition possibilities and replacing them with a *business fund*. However, there are different opinions about the impact of this reform. More specifically, it is questioned what financial effects the tax reform will have for the private entities (Aronsson, 2014; Norrskog, n.d; Lepikko, 2016). NIPF landowners are the only private entities that can use forest account and forest damage account as a deposition (SFS 1999:1229, ch.21), which are arguments to study the financial effects of the proposed changes in the tax structure for NIPF landowners.

NIPF landowners commonly use forest account as a planning tool, having an impact on when to harvest and when to reforest (Aronsson, 2014; Norrskog, n.d; Lepikko, 2016). The uncertainty about whether the current tax privilege that forest accounts allows shall remain or not may reflect in the wood market. These are arguments to see what the effects would be if forest account where

to be deregulated from a micro perspective and how the deregulation may affect the overall supply of wood products.

Sweden is the third largest exporter of certain wood products in the world (www, Skogsindustrierna, 2016), but statistics show that Swedish exports and production of wood products has been changing lately, as illustrated in Figures 1 and 2. The figures show the development of export and production of forest products in Sweden, such as paper, wood pulp, and roundwood. What the charts reveal is that the export value on Swedish wood and the general production has been stagnating. There could be several reasons explaining the observed stagnation, however several studies show that when market conditions are uncertain, NIPF landowners tend to postpone deforestation (Brazee & Newman, 1999; Aronsson, 1990, Amacher *et al.*, 2003; Amacher, 1997).

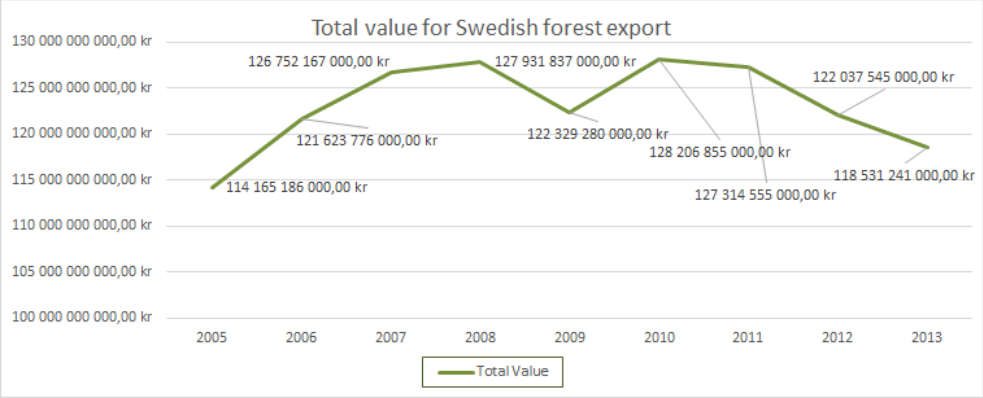

Figure 1 Value of Swedish forest export (Skogsstyrelsen 2014 p.297-320, own processing)

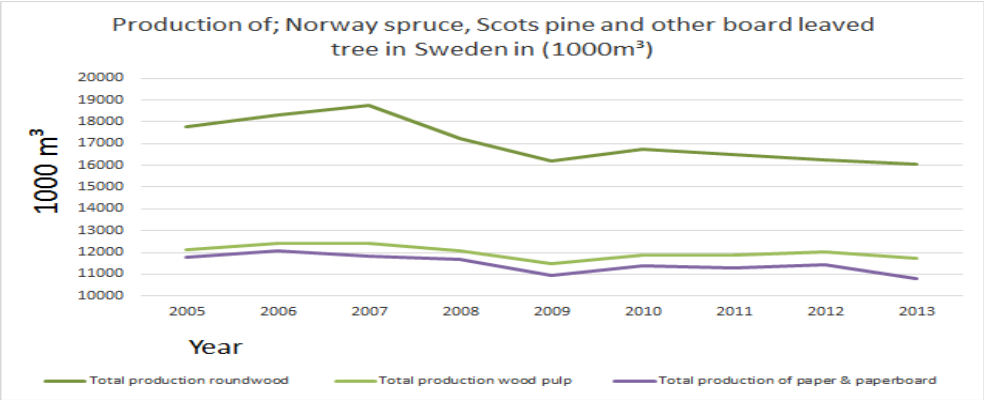

Figure 2 Production of different tree types in Sweden (Skogsstyrelsen, 2014 p. 205-215, own processing)

In order to influence NIPF landowner's management and strategic decisions, governments can use various policy instruments (Fortney, *et al*., 2011; Bertholdsson *et al*., 2014; Hibbard *et al.*, 2013). These policy instruments vary in their goals. It could both be financial instruments to facilitate the NIPF landowners' enterprise (Bertholdsson *et al.*, 2014) and instruments addressing environmental concerns (www, Skogsstyrelsen a, n.d.). One of the most frequently used policy

instruments for forest owners are tax incentive programs (Fortney, *et al*., 2011; Hibbard *et al*., 2013).

Forest account and forest damage accounts are a type of deposition possibilities, which allows forest owners to postpone the taxation of the result before taxes (Aronsson, 2014; Lepikko, 2016; Bertholdsson *et al.,* 2014). There are long periods in the forest industry, as it takes 70-120 years to produce the final product, there can be large revenues from the forest some years while the costs are high the next year. Therefore, the forest account will help to spread the forest-based revenue over a longer period. A NIPF landowner can set aside 40-60 % of the harvest revenue to a forest account (SFS 1999:1229 ch.21 §26). Although, if the forest must be harvested due to natural disasters, such as storms or a specific plant disease, then the NIPF landowner can use the forest damage account, which allows for postponing taxation on up to 80 % of the revenue from the harvest for a longer period of time (SFS 1999:1229 ch.21 §26). This study will examine the impact of SOU 2014:68 on NIPF landowners by simulating future prices on wood, keeping into account its historical volatility and applying it on a possible future scenario.

From an empirical perspective, the thesis examines what effects governmental policies can have on NIPF landowners in Sweden, and will provide tangible results for how the new potential governmental policy would affect the NIPF landowners. Further, the thesis also contributes in the academic discourse on forest policy analysis and policy theory. Amacher *et al.,* (2003) are arguing that much more can be done in literature that has a focus on links between government interventions and NIPF landowner's behavior. Governmental policies force NIPF landowners to enter into different agreements and consequences are that the market may be affected in an undesirable way (Amacher *et al.,* 2003). This drives interest toward the examination of how the potential new governmental policy can affect NIPF landowners.

1.2 Problem

Policy interventions are commonly used in order to influence NIPF landowners, where tax incentive programs especially have effects on NIPF landowner's decision-making (Fortney, *et al*., 2011; Hibbard *et al*., 2013). The problem to examine is the effects a new tax structure may have on NIPF landowners in Sweden, to see how different policy interventions will affect NIPF landowners. Further, there is also an ongoing discussion whether there is enough connection between science and practice, or if the attempts to connect them should be given up (Krott, 2012). The study is in the sense trying to fill a gap, showing how something that is constructed theoretically will work in practice with future simulations.

The stagnation in the production of wood products and export of forest products in Sweden open up for a need for a study that investigates influencing factors. Previous studies show that in uncertain market situations NIPF landowners tend to postpone the harvest of wood and it has been argued that increasing progressivity of tax systems has caused a stagnation of the supply of wood. (Brazee & Newman, 1999; Aronssson, 1990; Amacher *et al*., 2003; Amacher, 1997). If the SOU 2014:68 will increase the progressivity of the tax, the stagnation in the industry may continue.

1.3 Aim and research question

This thesis aims to examine governmental policy effects on NIPF landowners in Sweden, by analyzing the ongoing investigation that suggests revising the tax structure for private entities in Sweden. The aim will be addressed by answering the following research question:

> What will be the financial effects be for nonindustrial private forest landowners if forest accounts were to be revised according to the proposal provided within the investigation SOU 2014:68?

1.4 Delimitations

This study will look into the possible effects of SOU 2014:68 on Swedish NIPF landowners, and the reader is assumed to have basic knowledge about Swedish taxation. The conduction of the study will be done through simulated numerical future scenarios on three different NIPF landowners. Concerning the NIPF landowners, it is necessary to state some assumptions in order to conduct the simulation. These assumptions regard for instance price and production of roundwood, cost structure, depositions and result before taxes. It is also assumed in the study that the NIPF landowners only sell roundwood as felling rights, as it is the most common way for NIPF landowners to trade their forest (Skogsbarometern, 2014). These assumptions are affecting the outcome of the study, as assumptions can cause a distorted result.

The NIPF landowners in the study are assumed not to use *interest allocations*. Interest allocations is as a way to transfer funds from income of business to income of capital, which has a fixed tax rate of 30 % (SFS 1999:1229, ch.65, §7, see section 1.5 and 4.2.3 for further information). The investigation SOU 2014:68 only suggest minor changes for the regulations concerning interest allocations, which motivate the decision not to compare different scenarios where NIPF landowners deposit funds to interest allocations. Neither has the forest damage account been investigated, as it assumed that the simulation will not have any natural disasters. Further on, there will be no statements concerning if it is optimal for the NIPF landowner to harvest during the assumed years in the simulation, nor any statement on optimal quantity as the thesis will only look at the financial consequences for deregulating forest account. Since the study only investigates three different NIPF landowners, it is not possible to make general conclusions for the industry. However, the study tries to reflect over the characteristics of the industry in a sufficient way. A study involving further NIPF landowners would increase the robustness of the results.

1.5 An overview of current tax legislation for private entities

The actual tax burden may depend on several things, for instance, the type of income, its magnitude, and underlying legal entity, i.e., a private person or an incorporated company. The income can be of three types – income of labor, income of business and income of capital (SFS 1999:1229). The taxation of the types of income are all different, income of labor has a progressive tax rate (SFS 1999:1229, ch.65, §3), income of capital has a fixed tax rate of 30 % (SFS 1999:1229, ch.65, §7), and the taxation of income of business depends on the company form. An incorporated company faces a 22 % tax rate (SFS 1999:1229, ch.65, §10) and the same progressive tax rate as for income of labor is affecting the private entity (SFS 1999:1229, ch.65, §3).

The thesis will look into the affects for private entities, caused by SOU 2014:68, and therefore the progressive tax rate will play a major role in the study. The progressive tax rate has three different levels, where the percentage increases in correlation with the income/result before taxes. Table 1 shows the different levels of progressive tax rate.

Table 1 Progressive tax rate limits (SFS 1999:1229 ch.65, §3; www, Skatteverket n.d a; own processing)

Tax thresholds for income	Description	Tax rate
< 430 200 SEK	Taxed with municipally tax rate	32 % (average tax rate may differ between the different municipalities in Sweden)
430 200 – 625 800 SEK	A governmental tax rate of 20 % is added on the municipally tax rate	52 %
> 625 800 SEK	A governmental tax rate of 25 % is added on the municipally tax rate	57 %

Within the current tax regulation, there are several deposition possibilities for private entities, such as allocation funds, expansion funds, interest allocations, forest and forest damage accounts, and authorship account. These are all different possibilities for a company to distribute result before taxes to following years. Some of the depositions are based on a *capital base*, which determines the maximum allowed deposition. The capital base varies depending on which deposition that is used. Table 2 show a simplified summary of the deposition possibilities, section 4.2 presents a more profound description. The thesis will not investigate the authorship account.

Table 2 Summary of current deposition possibilities (SFS 1999:1229, own processing)

Deposition possibility	Description
Allocation fund	30 % of the result can be deposit into an allocation fund. The fund allows funds to be untaxed up to six years. The sixth year the fund must be brought up for taxation. (SFS 1999:1229 ch.30)
Expansion fund	It is an opportunity for a private entity to tax a part of their result with 22 %. The maximum deposition is 128.21 % of the company's capital base, which has to be accounted each year. The deposition has no time limit, but the total summation of depositions can never exceed 128.21 % of capital base. When funds are withdrawal, the tax of 22% is subtracted to actual tax rate (SFS 1999:1229 ch.34)
Interest allocation positive	The private entity can move capital from income of business to income of capital, and then be taxed with a 30 % tax rate. The

	deposition depends on the capital base, which has to be positive. There is no time limit. (SFS 1999:1229 ch.33)
Interest allocation negative	If the capital base is negative, the company has to move capital from income of capital to income of business, and tax it with a progressive tax rate. (SFS 1999:1229 ch.33)

When harvesting forest, NIPF landowners have the opportunity to deposit a part of the revenue into a forest account. If natural disasters, such as a storm or a fire, force the NIPF landowners to harvest their forest, the forest damage account provides greater deposition possibilities than the forest account. The forest account has a time limit of ten years, and the forest damage account of twenty years (SFS 1999:1229, ch.21, §36). The deposition is depending on what type of forest product the NIPF landowner has sold (SFS 1999:1229, ch.21 §25-26), shown in table 3.

Table 3 Forest and forest damage account (SFS 1999:1229 ch.21, own processing)

Product	Forest account	Forest damage account
Felling rights	60 % of the earnings	80 % of the earnings
Shipping timber	40 % of the earnings	50 % of the earnings
Extraction of forest products	40 % of the earnings	50 % of the earnings

1.6 SOU 2014:68

All of the mentioned deposition possibilities have been considered by the governmental investigation *Simplified taxation regulation for private entities* (SOU 2014:68), where the investigation looks into the current tax structure in order to simplify it. SOU 2014:68 suggests that an alternative would be to replace current deposition possibilities with one deposition, called the business fund (SOU 2014:68, p. 122). This business fund would allow a deposition of 40 % of the company's result before taxes, as long as it does not exceed the company's capital base. It will not have a time limit, similar to the expansion fund.

1.7 Possible tax effects with business fund

In order to illustrate the differences between the current legislation and the proposed changes in SOU 2014:68, table 4 show the effects for a NIPF landowner. In this example, the NIPF landowner only use a forest accounts for depositions in the current legislation, in order to simplify it. Assume that the NIPF landowner has a revenue of 100 from disforestation, and 100 from another income source, for instance agriculture. The NIPF landowner has fixed cost of 40 and a variable of 20 % of the total revenue, in this case (100+100)*0.2=40. The costs are equally divided between the forest based income and the other income source.

As Table 4 show, there are greater deposition possibilities with current legislation since the deposition for forest account is based on the revenue from harvesting (SFS 1999:1229, ch.21, §25-26), and the business fund is based on result before taxes (SOU 2014:68). The table illustrates that the NIPF landowner will bring up a higher result before taxes and will

consequently be taxed more. However, no tax thresholds is considered in the example and opens up interest to further examination of SOU 2014:68.

Table 4 Example current legislation vs SOU 2014:68 (own processing)

	Forest account		Business fund	
Revenue from forest		100,00		100,00
Revenue from other income source	100,00		100,00	
Fixed costs forest		20,00		20,00
Fixed costs forest other income source	20,00		20,00	
Variable costs		20,00		20,00
Variable costs	20,00		20,00	
Result befor depositions	60,00	60,00	60,00	60,00
Deposition forest account @ 60 %		60,00		
Deposition business fund @ 40 %			24,00	24,00
Balance depositions		60,00		48,00
Result	60,00	-	36,00	36,00
NPV @0,95 %		59,44		71,32
Tax @ 32 %		19,20		23,04

2 THEORETICAL PERSPECTIVE

This chapter includes an overview of the theoretical framework and literature that the study will use. It will give an overview of the theories in order to understand the analysis provided.

2.1 Policy theory

Hoogerwerf (1990) define policy theory as a theory that helps to analyze a certain content within an existing or non-existing policy. It involves the designers, the decision makers, and the process of implementing the policy (Hoogerwerf, 1990). Policy theory explain the content and the idea that are explicitly or implicitly found in a written or oral policy (Hoogerwerf, 1990).

2.1.1 Policy theory in the forest sector

The literature on forest policy and forest economics has historically been focusing on the most important factors that determine the NIPF landowner's behavior for what may concern the decision to harvest and reforest, and the relative timing (Amacher *et al*., 2003; Binkley, 1981; Hyberg & Holthausen 1989; Amacher, 1997). An ongoing concern is about how the government should interfere with the forest market (Amacher, 1997, Boyd & Hyde, 1989, Krott, 2012). In the past three decades, taxation in the forestry sector has been one of the most studied areas within the fields of forest policy and forest economics. Forest taxation has focused on how to set tax rates to forest growth and harvest policies, to reach long-term targets, in terms of profits and environmentally sustainable production (Amacher, 1997). Amacher (1997) contributes to this discourse, highlighting that taxation in the forest sector can be a quite complex issue, and that governments face three types of constraints when designing tax policies for the forest industry.

Amacher (1997) studies "*how the forest taxation literature has progressed towards incorporating them into formal models of policy design*" (p.105), which would help to motivate ideas for future research. A general finding is that most governments face three types of constraints that prevent optimal implementation of a first best taxation system. First, governments are constrained in the sense that governments often have targets on how much revenues a certain industry should bring in through taxes, which limits possibilities to change tax structures if targets should be met (Amacher, 1997, p.105). Second, governments can be constrained in the sense that forest taxation are distorted to begin with, for example, the taxation does not relate to all forest activities in practice. There are few policies targeting standing forests, and virtually no tax that directly targets non-timber benefits, which implies that any tax system is potentially distortional to forest management decisions (Amacher, 1997, p.106).

The third constraint on government tax policies arises as governments rarely implement or change tax-policies in isolation, rather there are pre-existing distortions that make the reform in existing policies or the choice between new ones difficult. In this case, introducing new taxes along with their additional distortions may result in a less efficient tax structure than the one currently in place. "*In fact neutrality of a specific tax may no longer be desirable. The second feature of the forest policy environment is the many governments involved in policy design. Often, different levels of governments control different forest taxes*" (Amacher, 1997 p.106). However, governments' main concern is about their own targets, which may result in coordination failure and the impossibility to ensure forest taxes in practice. Instead, different sections in the government compete for revenue collections from tax and may behave in a way to maximize profit (Amacher, 1997).

This strategic behavior from the different sections in the government may result in inefficient levels of public goods provided from forests and excess burdens that are higher than when governments coordinate perfectly. The constraints and competition of tax revenue has remained unstudied in forestry policy (Amacher 1997). Also most of the previous work does not seek to recommend the best normative tax system for meeting a government's revenue and facing the different constraints (Amacher, 1997). In line with Amacher, (1997), Boyd and Hyde (1989) shows an empirical analysis on how public regulation can distort optimal market conditions.

2.1.2 Policy effects on supply and demand

Boyd and Hyde (1989) explain how public regulations have an impact on social welfare, where forestry sector intervention is used to show the effects of governmental interference and how it can distort optimal market conditions (Boyd & Hyde, 1989). In their study, they show that governmental regulations interfere with market conditions. Regulations in the market will be well suited when it aims to redistribute income to the less well off in society or increase price stability for a good (Boyd & Hyde, 1989). Forest sector intervention brings up the point on regulating supply and demand.

Neoclassical economic theory means that supply and demand are self-regulated. Given that, producers and buyers make decisions in order to maximize their profit or utility, have access to the same information and that the buyers have rational preferences between outcomes that can be associated with values. (Veblen, 1963; Rubinfeld & Pindyck, 2012). For normal goods, the theory posits that if the firm lowers the price it will reach a higher demand, and if the firms increase the price it will reach a lower demand (Arrow, 1967; Nicholson, 2012). Firms will operate in a manner so that they produce an optimal amount of output, given output and input prices. By definition, this optimal amount is such that the corresponding marginal revenue (MR) equals the marginal cost of production (MC). Assuming perfect competition, if price or costs change firms will no longer produce at optimum, and will change their output or price in order to make MR=MC (Rubinfeld & Pindyck, 2012). Despite this, governments tend to regulate markets, for example if a government want to prioritize the production of a certain good, it can pay subsidies to R&D or give tax reliefs on the good with the intention to decrease its price (Martin & Scott, 2000). Also, if governments want to decrease the use of certain good that, for instance, can be of harm to the population, governments can add extra taxes with the intention to make the good more expensive (Rubinfeld & Pindyck, 2012).

Boyd and Hyde (1989) apply the neoclassical economic theory on the forest sector, stating that governments should not distort markets as it hinders optimal market incentives. They highlight the lack of empirical studies and call for further studies focusing on the identification of better policies for the forest industry (Boyd & Hyde, 1989). Krott (2012) contributes to the discourse on policy interventions, arguing that there is a need for further integration between science and reality when designing policy tools. Krott (2012) argues that scientific knowledge will most likely be distant from reality. However, through a scientific process, knowledge gets increasingly closer to reality, but there is a great need for better information as a source for solving problems and gaining power (Krott, 2012). Better information concerning forest politics would provide a greater understanding of the consequences of specific policy issues and regulations (Krott, 2012). The information would be useful in the process of designing new policies and regulations. It is suggested that the separation between science and practice has to be given up, and instead either

integrate scientific arguments in a political discourse, or identify active boundaries between the two realms that are mainly strategically designed (Krott, 2012). Suggested is an idea of merging science and reality when designing new policies, or reforming existing market interventions or policy instruments for markets (Krott, 2012).

2.2 Microeconomic theory

To analyze firms or peoples choices, microeconomic theory can be used to provide scenarios about how the firm or individual will spend the resources available in order to maximize utility (Nicholson, 2002). Utility is highly subjective and depends on individual preferences. Measuring actual utility level is usually hard, in order to make statements based on utility considerations, it is common to use assumptions about the utility, and seek for either quantifiable variables, which will increase or decrease utility. One variable that usually increases the utility is profit (Nicholson, 2002).

2.2.1 Microeconomic theory in the forest sector

Earlier studies on NIPF landowners involves assumptions on the NIPF behavior about the timing of harvest and reforestation (see Rodríguez-Vicentea & Pérez, 2010; Alig *et al.*, 1990; Fortney *et al.,* 2011). NIPF landowners are in these studies assumed to act according to profit maximizing behavior (Aronsson, 1990; Fortney *et al.,* 2011). However, in addition to profit, recent studies show that other factors affect NIPF landowners' decisions on how to manage the forest. These include the opportunity of providing non-timber goods and services, leaving the forest as bequests to the next generation, or simply wait until the price level is adequate (Conway *et al.,* 2003; Bolkesjø & Baardsen, 2001). In addition, a great amount of NIPF landowners has an alternative occupation as main income source, which can make them spend less time on forest management (Rodríguez-Vicentea & Pérez, 2010). Absenteeism and forest intentions work as destabilizers for the economic sustainability in forest markets. Making forest management and NIPF landowners' decisions hard to predict and leaving further room for studies (Rodríguez-Vicentea & Pérez, 2010; Bolkesjø & Baardsen, 2001).

2.2.2 The Aronsson's model

Aronsson, (1990) provides a model about how NIPF landowners behave when the tax structure is progressive and how the progressivity of the tax will affect the overall supply of forest products in Sweden. In the model NIPF landowners gain utility from consumption, which means that all funds that is left after subtracting costs, deposition, savings and taxes from the revenue are assumed consumption. This has a positive effect on the utility of the NIPF landowners (Aronsson, 1990). Future harvest depends on the volume harvested today and on the initial forest value (Aronsson, 1990). The model posits potential outcomes for the supply of roundwood in Sweden, and how the progressive tax rate affect NIPF landowner's decisions to disforest. Aronsson (1990) find that if progressivity increases marginally it will affect the decision not to disforest substantially.

2.2.3 Conway *et al.*'s model

A study similar to the one in Aronsson (1990) can be found in Conway *et al.,* (2003). Conway *et al.,* (2003) imply that there is a lack of studies on how non-timber services affect the utility of

NIPF landowners. That not all NIPF landowners use the forest for maximizing profit from disforestation. Instead, NIPF landowners can gain equal amount of utility by leaving forest as bequest or use it for non-timber services.

By including other variables such as hunting or leaving forestland as bequest, Conway *et al.,* (2003) is examining the utility of the forest owner. With the variables taken into consideration, the study is estimating how to maximize the NIPF landowner's utility and explain the behavior of NIPF landowners. The conclusions from the study is that the NIPF landowners are in fact not only possessing forest for harvesting it. NIPF landowners also gain utility from letting forest be a bequest for next generation or letting the forest grow in order to increase the property value (Conway *et al.,* 2003).

Until now, we have presented studies that are supposed to illustrate that multiple variables effect NIPF landowners' management of their forest. To address our aim, we want to compare different scenarios. One scenario that will show how the future profits for the NIPF landowners will be, if they still have the possibility to deposit funds to forest account, expansion fund and allocation fund. The other scenario is when the NIPF landowner only has the business fund as deposition possibility. In order to compare the two different scenarios a new model has been set-up.

2.3 The model set-up

Our model results from the combination of some elements presented in both Aronsson (1990) and Conway *et al.,* (2003). It must be stressed that in our model, consistently with the focus in our study, we do not seek equilibriums or try to optimize the utility of the considered NIPF landowners. The study is comparing two different scenarios and investigates 1) the different results from possible future scenarios from the studied NIPF landowner's accountings in qualitative discussion, 2) what impact, the given results from the studied NIPF landowners' accountings, might have for the supply of roundwood. The study uses the model to quantify the profit accruing to the NIPF landowners.

$$TP = \sum_{i=1}^{\infty} C_{i,} + D_{fi,} + D_{ai,} + D_{ei,} - T$$

Equation 1 Forest account model, (own processing)

$$C_i = (P * Q) - (VC_1 + FC) + (M - VC_2) - D_{fi,} - D_{ai,} - D_{ei,}$$

Equation 2 Forest account model (own processing)

The C_i is the revenue subtracted with costs and depositions. D_{fi} ,D_{ai},D_{ei} represent the different depositions possibilities. Assume NIPF landowner gain profit from 1) The results after depositions (C_i) 2) The funds available in the different depositions accounts (D_{fi}+D_{ai}+ D_{ei}). What will decrease the profit is T, which is the tax paid on the result after the different depositions are made. The NIPF landowners will maximize the deposition possibilities until he/she reaches a result that is satisfied (see method chapter 3.3 to see result assumptions). The NIPF landowner will make the depositions in the following order.

$$if\ C_i = (P * Q) - (VC_1 + FC) + (M - VC_2) > 0$$
$$then\ D_{fi} = y_1(P * Q)$$
$$if\ C_i = (P * Q) - (VC_1 + FC) + (M - VC_2) - D_{fi} > 0$$

$$then\ D_{ai} = y_2(C_i + D_{fi})$$
$$and\ if\ C_i = (P * Q) - (VC_1 + FC) + (M - VC_2) - D_{fi} - D_{ai} > 0$$
$$then\ D_{ei} = y_3(EG)$$
Equation 3 Deposition order for forest account (own processing)

The tax on income is, according to SFS 1999:1229, based on the result after depositions and is calculated using the following equation:

$$T = \sum_{i=1}^{3} t_i + t_2 + t_3$$
Equation 4 Tax model (SFS 1999:1229 ch21 §21) (own processing)

We take into consideration the following different thresholds in order to levy the proper tax rates

$$if\ C_i \leq 430200\ then\ t_1 = c_i * r_1$$
$$if\ c_1\ is \geq 430200\ but \leq 625800\ then\ t_2 = ((c_i - 430200) * r_2)$$
$$if\ c_i \geq 625800\ then\ t_3 = C_i - 625800 * r_3$$
Equation 5 Tax thresholds (own processing)

With some adjustments, it is possible to use the same model when calculating the other scenario, which is the case where the only possible deposition is the business fund. D_{bi} is the new deposition possibility and T is the tax paid based on C_i. The study still assumes that NIPF landowner gain profit from the funds available from the deposition.

$$TP = \sum_{i=1}^{\infty} (C_i + D_{bi}) - T$$
$$where\ C_i = (P * Q) - (VC_1 + FC) + (M - VC_2) - D_{bi}$$
$$if\ C_i = (P * Q) - (VC_1 + FC) + (M - VC_2) > 0$$
$$then\ D_{bi} = y_4((P * Q) - (VC_1 + FC) + (M - VC_2))$$
Equation 6 Business fund model (own processing)

$Variable\ list:$
$i = Period$
$P = Stumpage\ price$
$Q = Quantity\ disforest$
$VC_1 = Variable\ cost\ for\ forest$
$FC = Fixed\ costs$
$M = Income\ from\ other\ source$
$VC_2 = Variable\ cost\ for\ other\ income$
$D_f = Deposition\ to\ forest\ account$
$D_a = Deposition\ to\ allocation\ fund$
$D_e = Deposition\ to\ expansion\ fund$
$y_1 = rate\ which\ determines\ max\ deposition\ forest\ account$

$r = Interest\ rate\ for\ forest\ account$
$y_2 = rate\ which\ determines\ max\ dceposition\ allocation\ fund$
$y_3 = rate\ which\ detmines\ \max\ deposition\ to\ expansion\ fund$
$y_4 = rate\ which\ determines\ \max\ deposition\ to\ business\ fund$

$$EG = Capital\ base\ for\ expansion\ fund$$

$t_1 = Municipal\ tax$
$t_2 = Govermental\ tax\ 1$
$t_3 = Govermental\ tax\ 2$
$r_1 = municpal\ tax\ rate\ @\ 32\%$
$r_2 = Govermental\ tax\ rate\ @\ 52\%$
$r_3 = Govermental\ tax\ rate\ @\ 57\%$

2.4 Net Present Value

For the results to be more precise, all the future profits have been discounted using Net Present Value (**NPV)**. The difference between the discounted cash flow generated by an investment project and investment cost initially paid for undertaking it gives the NPV (Brealey & Myers, 2003). When budgeting an investments or projects profitability the NPV can help evaluate a project by comparing other investment opportunities (Brealey & Myers, 2003). In this study, the NPV is total profit before taxation for each company. The formula used for the calculation of the NPV is the following:

$$NPV = -I + \sum_{t=1}^{\infty} \frac{CF}{(1+r)^t}$$

Equation 7 Net present value, own processing (Brealey & Myers, 2003)

Where:
I – the cost for the initial investment
CF – Stream of future cash flow generated by the investment
t – Time
r – Discount rate

2.5 Decisions connected with risk

When analyzing a decision to be made *ex ante,* there are reasons to formulate probabilities about the risk involved with the decisions and investigate the different outcomes that might actually materialize (Hardaker *et al.,* 2015; Brealey *et al.,* 2011). What is determining the risk is the result of many factors, and is highly dependent on the context. When considering the context, think for instance of comparing the purchase of a governmental bond with investing in the stock of a pharmaceutical company. A governmental bond is often a safe investment connected with low risk, but also low profits (Brealey *et al.,* 2011). A share in a start-up pharmaceutical company is instead often associated with high risk, but can pay out high dividends if the company is successful (Brealey *et al.,* 2011).

What the example is supposed to show is the connection of different investments with different kinds of risk. If an investor were to buy stocks or bonds with his/hers capital he/she is most likely to investigate worst and best case scenarios of the investment to do so one can use what is called Monte Carlo simulation.

2.6 Monte Carlo simulation

Monte Carlo simulation **(MCS)** is a tool used in risk analysis, where models are built to calculate potential outcomes based on uncertain variables (Hardaker *et al.,* 2015). The simulation can provide an estimation of the future and provide a potential outcome based on probability distributions, thus, estimate what results are more or less likely to occur (Hardaker *et al.,* 2015). MCS use multiple random numbers, with series of computational algorithms, to compute possible outcomes based on repeated random sampling (Hardaker *et al.,* 2015).

Iterations are different outcomes, each iteration is a sampling that represents an estimation of stochastic elements that could occur (Hardaker *et al.* 2015). With enough iterations, it is possible to create a more stable probability distribution. The simulation can be set up in order to make it possible to see if an investment is profitable or not, or examine different settings if things were to change in the market (Hardaker *et al.* 2015).

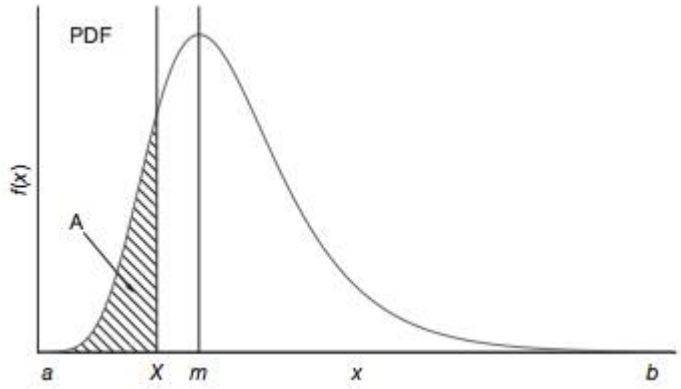

Figure 3 Probability density function (PDF) (Hardaker et al., 2015)

Figure 3 show a probability density function (PDF). A probability density function is usually shaped like a bell, with a central peak indicating most likely value of the uncertain quantity, and with the low probabilities in the "tales" on each side of the peak (Hardaker *et al.* 2015). In the figure it is shown a PDF with the uncertain quantity of *X*, denoted by *f(X)*, with a minimum value of *a,* and a maximum value of *b*, and mode at *m* (Hardaker *et al.* 2015). Every PDF has the property that the area under the whole curve is equal to one. The shaded area (*A*) shows the probability of values between *a* and *X* (Hardaker *et al.* 2015). There are some problems associated with the PDF in decision analysis, in particular, it can be challenging to make sure that the area below the curve is actually equal to one, which is a rule that probability requires. Therefore, it is common to use a cumulative distribution function (CDF) (Hardaker *et al.* 2015).

The CDF is the function that gives probabilities of a certain scenario (Hardaker *et al.* 2015). By repeatedly selecting different values between zero and one, the sample is generating different scenarios, where scenarios in the middle has high probability (Hardaker *et al.,* 2015). What is explained is for a single variate sample for x are more likely to be drawn in areas with higher probabilities of occurrence. With enough iterations, in this case different x, MCS will recreate probability distributions (Hardaker *et al.,* 2015). In the function a single variable is used, however it is almost the same as if several of uncertain iterations are simulated, the difference is that in the multi-iterations case, it is necessary to account for the co-dependency (Hardaker *et al.,* 2015). Figure 4 shows the inverse CDF, where the most likely results are shown where the graph

is the steepest while the most unlikely where it fades out, similar to the tales in the PDF (Hardaker *et al.* 2015).

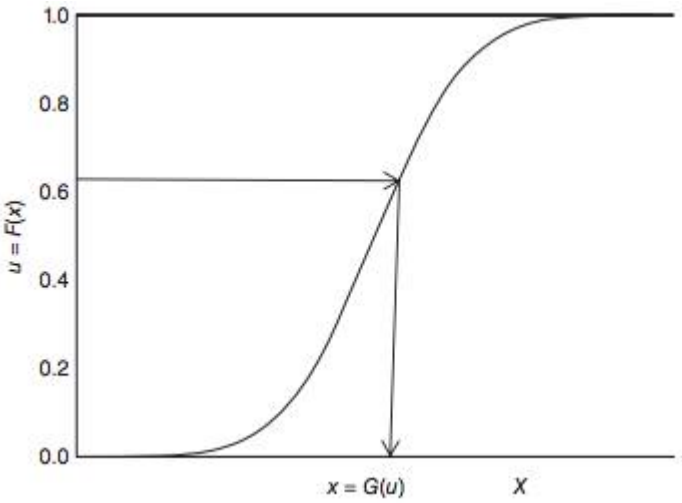

Figure 4 Inverse cumulative distribution function (Hardaker et al., 2015)

2.6.1 @RISK

@Risk is a software used as an add-in in Microsoft excel which computes MCS by adding relevant data into it. By fitting distribution to the observed time series and generating a number of extra observations the program presents future possible outcomes (www, @Risk, 2016). The risk analysis performed by the program is consistent with the assumptions and provides the probability of how likely they will occur. @Risk is a valuable tool for decisions under uncertainty (www, @Risk, 2016).

3 METHOD

This chapter will provide an overview of the conduction of the thesis, the used methods and the procedure followed for the simulations used in order to achieve the results.

3.1 Mixed method

The conduction of the thesis bases on a merge between quantitative and qualitative research methods. This type of research approach has arguments either for and against, debating whether it is suitable or not to combine the two approaches (Bryman & Bell, 2011, Bryman, 2014). For instance, research argues that the two methods are paradigms of each other, as they are built on different epistemological theses (Bryman & Bell, 2011). However, recent studies in social research methods shows that the mixed methods are becoming a more common approach and that the two epistemological theses can benefit from mixing them (Bryman, 2014).

The quantitative research approach has a penchant for natural science, where concrete numbers and figures are the basis of the analysis (Bryman & Bell, 2011). A quantitative research method is built on the ability to measure, it is described as a reliable tool or a yardstick to observe and measure differences (Bryman & Bell, 2011). It also provides a "*more precise estimate of the degree of relationship between concepts*", giving the tools to examine certain factors more thoroughly (Bryman & Bell, 2011, p. 154). A quantitative research approach attaches a great importance on the ability to prove a certain point, for instance by the possibility to measure it. It also has a deductive approach towards theory, where the theory is commonly set before the results are actually realized (Bryman & Bell, 2011).

A qualitative research approach differs from the quantitative method since the qualitative approach puts a higher value on words instead of numbers (Bryman & Bell, 2011). The approach has an inductive view on the relation between theory and research, where the theory often is generated from the collected data (Bryman & Bell, 2011). It has an interpretive epistemological position, where it focus on examining the interpretation of the social environment, and further on has an ontological position where it states that *social properties are outcomes of the interactions between individuals* (Bryman & Bell, 2011, p. 386).

When using a combination of these two approaches the qualitative method can be seen as a support to the quantitative approach. In fact, through its less structured approach it can help bring up ideas to examine further on in the research process (Bryman & Bell, 2011). The qualitative approach can also be of assistance in the study. With its knowledge about different social contexts, the analysis can in fact be broader than the one based only on the analysis of numerical data (Bryman & Bell, 2011). The mixture between the methods are called mixed method, and is often used when research questions are designed in a way so that they partially will give a concrete result, but also how the result will function in a less concrete contexts (Bryman, 2014).

In this thesis, numerical data has a vital part of the empirics, which motivates a quantitative approach. On the other hand, the theory has emerged through research process, which implies a qualitative approach. In addition, the qualitative approach allows analyzing the results in a broader context (Bryman, 2014). This allows drawing possible conclusion instead of definite conclusions, although definite conclusion has more robustness, possible conclusion opens up for

further studies which suits well when contributing to policy theory, which often lacks empirical studies (Amacher *et al.,* 2003; Krott, 2012; Hoogerwerf, 1990).

3.2 Selection of empirical data

In order to conduct the study, three different NIPF landowner's accountings were collected as empirical data. These different companies are of different sizes and characteristics, but all with the common denominator that they own forest. The companies will remain anonymous through the thesis and will be referred to as C1, C2 and C3.

As soon as the focus of the study was identified, LRF Konsult was contacted in order to collect empirical data. LRF Konsult was informed with what the study was supposed to investigate, and that it was desirable to have different companies that reflected the market adequate. Due to secrecy, LRF Konsult did the selection of companies on their own, as the companies wanted to remain anonymous. The decision to ask LRF Konsult for help to collect data is because it is the largest advisory company within Sweden, with a special focus in the agriculture and forest sector (www, LRF Konsult a, n.d.; www, LRF Konsult b, n.d.). This study has not been conducted as a report for LRF Konsult.

The NIPF landowners were chosen in order to represent the industry fair. One has high turnover with a small amount, less than 10 %, based on forestry, another has high turnover with significant amount, greater than 50 %, comes from deforestation, and the final one that has low turnover solely originated from the forest. The differences between the companies will represent the actual market, where NIPF landowners tend to run their business differently (Bertholdsson *et al*., 2014).

3.2.1 General assumptions for NIPF landowners

The received data for the simulation were at some points inadequate, due to the lack of information concerning product, price, and volume. Therefore, some assumptions have been made in order to make the simulation possible. The provided data included accountings for each company where it was possible to deduce the most important financial information, most importantly to see in what extent the company was influenced by their forest. Although, it was not possible to interpret from what type of forest product the forest revenue was linked. Therefore one general assumption is that all the forest-based revenue is linked to the product roundwood, sold as felling rights, as felling rights is the most common way for NIPF landowners to trade their forest (Skogsbarometern, 2014). This assumption is necessary in order to use the right price and quantity in the simulations.

3.2.2 Price and production information

To make the analysis possible, information about price and production development of forest products were collected, mainly from Skogsstyrelsen, for the years 1995-2015. Since the received data from LRF Konsult did not contain any information about prices and volumes, these statistics have been used in order to create equal conditions where the companies are all facing the same price and production development in the simulations. The reason for using the timeline of 1995-2015 was to have a broad span, both including natural disasters and a financial crisis, but also to have a long period with a stable market (www, Skogsstyrelsen, d, n.d.; Pendery, 2009).

The gathered data is collected from the most recent statistical book from Skogsstyrelsen. Skogsstyrelsen is an authority which: "*are responsible for the Swedish forest policy brought out and put into practice by those who own and manage the forest"* (www, Skogsstyrelsen, n.d c).

Being a governmental institution engaged in gathering data for the Swedish forest industry, the data provided can be trusted and used.

3.3 Fabrication of the simulations with data

Based on the received data and assumptions possible future scenarios for the NIPF landowners have been simulated using Monte Carlo simulation in the add-in program @Risk for Microsoft Excel.

3.3.1 Price and production

Through the collected price information the changes in price for roundwood was calculated for each year between 1995 and 2015. Further, the standard deviation was calculated, using following formula:

$$Variance = the\ expected\ value\ of\ (r_m - A_m)^2$$
$$where\ r_m = is\ actual\ value\ \ and\ A_m = median\ value$$
$$standard\ deviation\ is\ \sigma = \sqrt{of\ variance}$$

Equation 8 Standard deviation (Brealey et al., 2014, p.167)

The standard deviation (**s.d.**) represent the span where the price and volume can fluctuate, using a triangular distribution in the software @Risk. The triangular distributions allows setting the most likely outcome (mean), maximum outcome and minimum outcome. Using MCS, the most and least possible outcomes can be obtained (Hardaker *et al.,* 2015). Thus, a mean outcome can be derived from the simulations. It is from the mean that the study has obtained the future results. From the mean result for each of the companies, the possible deposition and tax has been calculated. Showing how the investigation SOU 2014:68 will affect the NIPF landowners. All companies have been examined over a twelve-year time-period. However, the years vary as the collected accountings where not consistent in the years. With one scenario that accounts for current depositions and one with the new deposition possibility.

The accountings only contained information on the revenue from the disforestation and did not include the price that was paid to the NIPF landowner, nor what type of wood it was. A general assumption will be that the forest based revenue is felling rights sold to the current market price. To obtain the volume, the revenue from the received accountings was divided with the current market price from data from Skogsstyrelsen (2014). The same method was also used for the price simulations, observing how the total production volume fluctuates during the years 1995-2015, calculating change, variance, and standard deviation. The NIPF landowners are assumed to operate in a similar way as before, thus they are not allowed any flexibility, which may make the result distorted.

3.3.2 Cost assumptions

To simulate the results, certain assumptions are made about the cost structure for the NIPF landowners. All the costs and financial posts are divided into variable and fixed costs, where the fixed cost remained static and was discounted with risk free rate. The fixed costs have been determined by summation of the following posts: salaries, depreciations and interests. The remaining costs were treated as variable. This was conducted as if even when revenue is 0 SEK, the fixed costs would remain, where the other costs are more directly related to the turnover. The variable costs depends on the revenue, which implies the higher the revenue, the greater the costs. It must be stressed that the study does not allow any flexibility for the NIPF landowners,

which can make the results distorted. If flexibility would be allowed in the cost structure, it is most likely that the results would differ.

3.3.3 Result assumption

The result for a private entity is taxed as the NIPF landowner's annual salary. An assumption was made that those who have their company as the main occupation wants a salary to live off. In the statistics of salaries, a farmer with forest and farmland earns an average of 276 000 SEK annually (www, SCB, 2016). Due to this, the part of the results that exceeds 276 000 SEK will be available for deposition in to forest accounts or other depositions possibilities. First, a maximum deposition to forest account will be made, and thereafter, if the result still exceeds 276 000 SEK, other depositions possibilities will be used. Also, if the result is below 276 000 SEK the owner is assumed to withdraw funds in order to bring the result up to 276 000 SEK. For the company who does not have their business as their major occupation, the desired result is set equal to 0 SEK in the simulation. This is due to the assumption that they have another income source outside the company to live off. Depositions and withdrawals are then done under the same conditions as for the companies with a desired result of 276 000 SEK.

3.4 Monte Carlo Simulation and @RISK

The received data were collected in Microsoft Office Excel, where each NIPF landowner accountings were compiled in order to get an insight in the business. To simulate the effect of forest taxation, revenues and cost were separated into two main groups – forest based income source and other income source.

3.4.1 Costs

The factor that determines the variable costs has been calculated, first by adding all the costs and financial posts together which is referred to as total costs. Second, the fixed costs have been subtracted with the total costs so that what remains are the variable costs. Third, the revenue from the financial statements has been considered in order for a factor to be derived.

$$TC - FC = VC \rightarrow \frac{R}{VC} = \propto$$

Equation 9 Cost function

Where:
TC= total cost
FC=fixed cost
VC= variable costs
R= total revenue
$\propto$= variable cost factor

A new variable cost-factor for each financial statement has been determinate in order to be used for the simulations.

3.4.2 Revenue and price

If prices should fluctuate without being dependent on the revenue the result would be hard to analyze. Following illustration represents a result with cost independency where the average price fluctuations has been accounted as well as the price. As the graph shows in figure 5, for the company there is a great uncertainty in the future. With a probability of a negative NPV of 19.9

% and a positive of 80.1 %, with any number between - 5 817 799 SEK and 28 443 107 SEK. What it is supposed to illustrate is that due to the high fluctuating and that certain assumptions is needed to make the simulations about future scenarios more realistic. Therefore, costs will depend on revenue at a fixed rate.

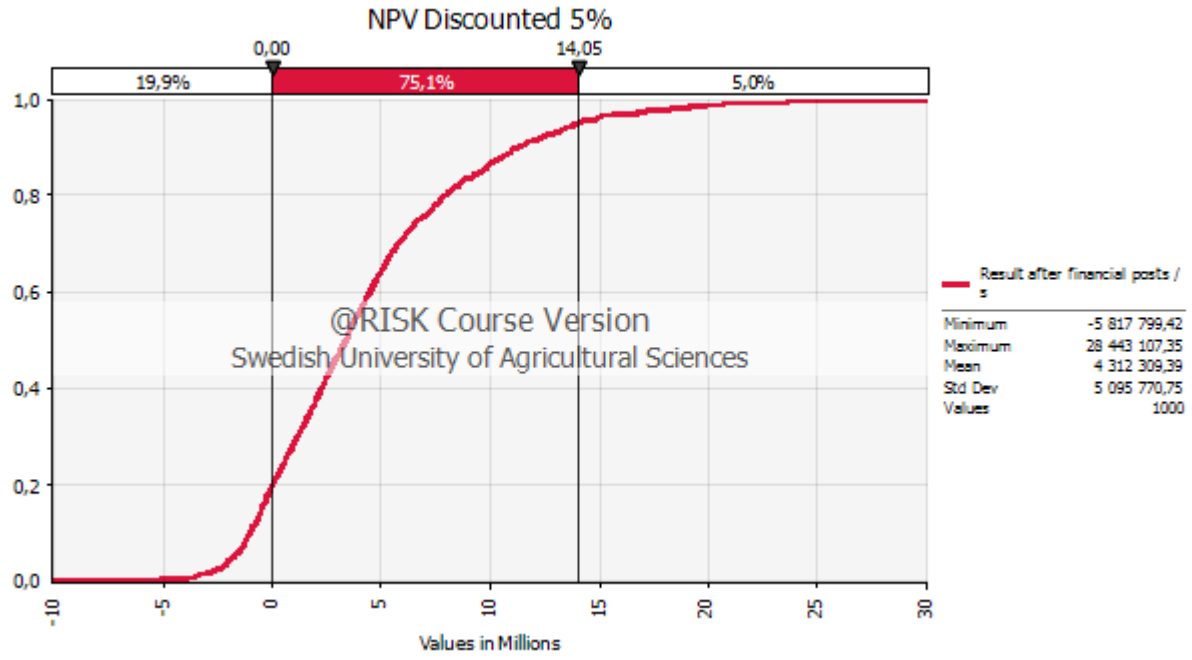

Figure 5 Cumulative distribution curve (@RISK)

3.5 Discounting

The revenue received through the simulations has considered the inflation. The used inflation is 2 %, which is the inflation goal by the Central Bank of Sweden (www, Riksbanken, 2016). This is done in order to present a more precise result, where future price changes are taken into account. The risk free rate is the same rate used for i) the calculation of the interests accruing on the forest account and ii) the calculation of the net present values. The rate 0.95 % for forest account is an average rate from different banks in Sweden, which have forest account as a product. The banks considered were Danske Bank, Handelsbanken, Landshypotek and Swedbank. (www, Handelsbanken n.d.; www, Swedbank n.d.; www, Landshypotek n.d.; www, Danske Bank, n.d.).

$$(0{,}0075 + 0{,}009 + 0{,}0105 + 0{,}01)/4 = 0{,}0095$$

Equation 10 Calculation of discount rate

4 EMPIRICAL BACKGROUND

The following chapter will provide information about the current tax regulation for private entities, the proposed changes in the regulation and some background information about the investigated entities.

4.1 Income taxation in Sweden

In Sweden, there are different tax regulations depending on whether you run a private entity, incorporated company, or a part of a trading company. There are also different categories of income - income of labor, income of business and income of capital. These different types of income have different tax rates. Income of labor is taxed by a progressive tax rate that depends on how high the income is (SFS 1999:1229, ch.65, §3). Income of business has different tax rates depending on the company form, whether it is an incorporated company or a private entity. Incorporated companies have a tax rate of 22 % (SFS 1999:1229, ch.65, §10) and a private entity has a progressive tax rate (SFS 1999:1229, ch.65, §3). Income of capital is taxed with 30 % (SFS 1999:1229, ch.65, §7).

The progressive taxation of income of labor is depending on how high an individual's income is for one year. This implies that the more you earn, the higher the tax rate will be. To enforce this, there are several levels of tax rates, where the individual first pay taxes to the municipality (SFS 1999:1229, ch.65 §3, www, Skatteverket, 2016, a). The municipal tax rate can differ with some percentage points depending on the geographic locations in Sweden, due to different political leaders in the municipality, but is approximately 32 % (www, Skatteverket, 2016, a). When an individual's total income exceeds 430 200 SEK there will be a governmental tax of 20 % added on top of the municipal tax, and when exceeding 625 800 SEK a tax rate of 25 % will be added (SFS 1999:1229, ch.65 §5, www, Skatteverket, 2016, b).

For example, if a person earn 1 000 000 SEK per year, the income will be split in three different tax rates. 430 200 SEK will be taxed with the municipal tax rate, approximately 32 %. The income above 430 200 SEK and below 625 800 SEK (195 600 SEK) will be taxed with 32 %, with additionally 20 % (52 %), and the final part above 625 800 SEK will be taxed with 32 %, added with 25 % (57 %) (SFS 1999:1229, ch.65 §5, www, Skatteverket, 2016, b).

Table 5 Tax example (own processing)

	1 000 000,00 kr	
	Amount	Tax
32%	430200	137664
52%	195600	101296
57%	375 000,00 kr	213750
Total tax	1000000	452710

4.2 Current tax regulation for private entities

The current regulation for taxation of private entities is stated in the Income Tax Act (SFS 1999:1229). Current legislation states that the owner of a private entity cannot bring up a salary for him/her as a cost during the year within the business, thus the earnings are the result of the private entity (SFS 1999:1229, ch.65, §3). It is also stated that a private entity is not an independent taxable unit, the income is instead taxed at the individual level, that is to say the owner and in some cases the owner's spouse or partner (SKV 295, 2016). Due to this, the result of a private entity is therefore taxed with a progressive tax rate, as for an individual with income of labor.

Further, on, there are several different deposition possibilities for private entities in order to postpone the payment of taxes, such as allocation funds, expansion funds, interest depositions, forest and forest damage accounts, and authorship account. These deposition possibilities are all defined by specific regulations and calculated in various ways.

4.2.1 Allocation fund

A private entity has the possibility to allocate up to 30 % of their result before taxes to an allocation fund (SFS 1999:1229, ch.30, §6), and has the opportunity to postpone the taxation up to six years after the allocation has been made (SFS 1999:1229, ch.30, §7). If the result is negative in the company one year, it has the possibility to withdrawal a part of the allocation fund in order to even out the result (SKV 295). The deposition does not need to be placed into a bank account; instead, it is available for usage in the company's assets (SKV 295).

4.2.2 Expansion fund

An expansion fund is a deposition possibility for private entities to place a part of their capital in a fund that will be taxed with 22 % (SFS 1999:1229, ch.65, §8). The expansion fund was implemented in order to make the conditions between a private entity and an incorporated company similar, since the expansion fund is taxed with the same tax rate as an incorporated company - 22 % (SFS 1999:1229, ch.65, §8).

Table 6 Example expansion fund (SKV 295, own processing)

Example max deposition	
Income:	100 000
Max deposition	128 210
Tax (22% x 128 210)	-28 210
Remaining deposition	100 000

The highest possible deposition to an expansion fund is 128,21 % of the company's capital base, which can be described as the difference between assets and liabilities (SFS 1999:1229, ch.34, §6), and it can also not be higher than the adjusted profit (SFS 1999:1229, ch.34, §4). The deposition limit of 128.21 % of the capital base implies that the remaining deposition after tax payment will be the same as the income, see the example in table 6.

The expansion fund does not have a time limit, in comparison with other deposition possibilities, although there are some circumstances that will require a return of the capital from the fund. Each year a capital base has to be calculated, and if the existing means in the fund exceeds the capital base, then no further depositions can be made (SFS 1999:1229, ch.34). If the business is terminated or liquidated, the capital has to been brought back (SFS 1999:1229, ch.34, §16).

4.2.3 Interest allocations

Interest allocation can both be positive and negative, and is a tool that allows the company to move capital between two types of income - income of business and income of capital (SFS 1999:1229, ch.33, §2). To estimate to what extent allocations can be made the capital base has to be calculated (SFS 1999:1229, ch.33, §8).

If the capital base is positive, the company has the opportunity to make a positive interest allocation, thus move capital from income of business to income of capital (SFS 1999:1229, ch.33, §2) and pay a lower tax rate of 30 % (SFS 1999:1229, ch.65, §8). In order to estimate the extent of the allocation the capital base is multiplied with the government-borrowing rate enumerated with 6 % (SFS 1999:1229, ch.33, §3), the achieved number is the highest possible allocation. A positive interest allocation is voluntary (SFS 1999:1229, ch.33, §6).

Table 7 Example positive interest allocation (SKV 295, own processing)

Example positive interest allocation	
Capital base	1 000 000
Income of business	300 000
Possible allocation (1 000 000 x 6.90 %)	69 000
Income of business (300 000-69 000)	231 000
Income of capital	69000

The case can also be the other way around when there is a negative capital base. When this occurs, the company has to move capital from income of capital to taxation in income of business (SFS 1999:1229, ch.33, §2). To estimate the allocation the negative capital base is multiplied with the government borrowing rate enumerated with 1 % (SFS 1999:1229, ch.33, §3).

Table 8 Example negative interest allocation (SKV 295, own processing)

Example negative interest allocation	
Capital base	- 1 000 000
Income of business	300 000
Income of capital	100 000
Possible allocation (1 000 000 x 1,90 %)	19 000
Income of business (300 000 + 19 000)	319 000
Income of capital (100 000 – 19 000)	81 000

4.2.4 Forest accounts and forest damage accounts

Forest accounts and forest damage accounts are deposition possibilities for NIPF landowners, which allow them to postpone taxation of a part of their income from deforestation by making depositions into a credit institution (SFS 1999:1229, ch.21, §21). The NIPF landowner may only make one deposition to a forest account for each year (SFS 1999:1229, ch.21, §32), and the deposition may not cause a deficit within the company (SFS 1999:1229, ch.21, §30). The deposition has to be at least 5 000 SEK for a forest account, and 50 000 SEK for a forest damage account (SFS 1999:1229, ch.21, §31).

A withdrawal from a forest account can be implemented at the earliest four months after deposition, with a lowest amount of 1 000 SEK (SFS 1999:1229, ch.21, §36). The deposition has to be withdrawn after a maximum of ten years for forest accounts, and twenty years for forest damage accounts (SFS 1999:1229, ch.21, §36). Withdrawals from the accounts should be brought up for taxation the current year the withdrawals are made (SFS 1999:1229, ch.21 §37).

Depositions to forest accounts are regulated depending on what type of product the forest owner has sold. Depositions into a forest account can be done as follows (SFS 1999:1229, ch.21 §25):

- Felling rights - 60 % of the income
- Shipping timber - 40 % of the income
- Extractions of forest products - 40 % of the income

Depositions into a forest damage account can be done as follows (SFS 1999:1229, ch.21 §26):

- Felling rights - 80 % of the income
- Shipping timber - 50 % of the income
- Extractions of forest products - 50 % of the income

4.3 SOU 2014:68 – Simplified taxation regulation for private entities

The SOU 2014:68 investigation was initiated by the Swedish government in 2012, with the aim to evaluate and simplify current tax regulation for private entities. The reason for which this investigation was initiated was the desire to achieve a neutralization of the corporate tax frame for private companies, regardless whether it is a corporation or a private entity (SOU 2014:68, p. 71). Today, there are some differences depending on the type of business undertaken. For instance, there are different possibilities to make depositions, where a private entity has some advantages upon a corporation (SOU 2014:68).

Within the current regulation for private entities, there are five different possibilities to do allocations - allocation fund, expansion fund, the forestry and forest damage account, and the authorship account (SOU 2014:68, p. 117). These depositions have different legislations, stating how they should be done in a certain order and be withdrawn for taxation in various timeframes. The investigation points out that this system is unnecessary complicated for the private entity, and therefore a simplification may be needed (SOU 2014:68).

SOU 2014:68 highlights a certain complex issue with the current legislation, the fact that some of the different deposition possibilities are depending on each other. A deposition for an allocation fund is to be done after the interest allocation, and a deposition to the expansion fund is to be done after both of them (SOU 2014:68). In the investigation, they argue that some of these deposition possibilities are not fully utilized, and the main argument for this is lack of knowledge.

To deal with these variances between the different types of business, the investigation presents a proposal for changes in the tax legislation. Their proposal is to remove the current deposition possibilities, and replace it with one deposition possibility - a business fund (SOU 2014:68, p. 122). In the business fund, only earnings within the company should be used as a base for depositions, similar to the praxis of current expansion fund (SOU 2014:68, p.23). It is also suggested that this business fund should not have a timeframe for when the depositions should be withdrawn for taxation, instead they propose there should be compulsory tax rate on the capital placed in the business fund (SOU 2014:68), which could be compared with the legislation for allocation funds for incorporated companies (SFS 1999:1229 ch.30, §6a).

The business fund should have similar rules as the expansion fund, where the possible deposition is calculated for each year, where the capital base states how big the total deposition can be (SOU 2014:68). The investigation propose that the business fund should have its base in the company's profit, initial with the dispensable income (SOU 2014:68, p.144.). It is suggested that 40 % of the dispensable income should be available for deposition to the business fund (SOU 2014:68, p.125) This will, according to the investigation, simplify the paper work for private entities, and the conditions between corporate businesses and private entities should be more alike (SOU 2014:68, p.125.*)*.

In the current legislation, a capital base is used to calculate several depositions. Although, different methods to calculate the capital base are used depending on what deposition it concerns. This is unnecessary confusing according to the investigation, since the different capital bases are quite similar to each other, but still contains some differences (SOU 2014:68, p.128). Due to this, it is suggested in the investigation that there should be one joint capital base for the remaining business fund and interest allocation (SOU 2014:68, p.128).

4.4 The studied private entities

Three different private entities were selected for this study, all with different characteristics, but with the common denominator – they all fall within the category of NIPF landowners. It was desirable to have different characteristics of the companies, in order to provide a broader view of the consequences of SOU 2014:68 in the future.

The only information received for this study is their accounting and the fact that they own forest, otherwise there is little to say, except what can be read from the accountings. In the accountings, it is possible to see two companies are larger than the third in their turnover, where the third has a significant smaller turnover. In addition, it is possible to see that one of the two bigger companies has a greater impact from the forest than the other. This is because half of the company's revenue can be attributable to the forest.

4.4.1 Company one

Company one (C1) has an average turnover of 3 023 383 SEK, where the forest makes up for 6 % of the revenue. C1 harvest three out of six years, which implies that the turn over connected to forest varies over the years. What distinguish C1 is that their main income source is not their forest, instead they have another main income source for which no information has been provided about. In addition, it is a very profitable company delivering a positive result every year. The size of the company implies that the owner has it as his/her main occupation.

4.4.2 Company two

Company two (C2) has a turnover, on average: 4 199 598 SEK and 52 % of the revenue is from disforestation. C2 harvest each year in the provided information, and it is shown that forest plays a crucial part for the company. The profitability of C2 is not stable, it shifts from a negative result of a couple hundred thousand to a positive result of several hundred thousand. Even considering the volatile result of the company, the size still implies that the owner has it as their main occupation.

4.4.3 Company three

Company three (C3) only has revenues attributable to forest, thus 100 % of the revenue is from disforestation. However, the company has much lower turnover than previous companies, with

an average of 95 769 SEK. In addition, it seems like they are implementing large reforestations through the received years, which consequently lowers the result, and some years below zero. C3 is also not assumed to have the company as their main income source, due to the size.

5 RESULT AND ANALYSIS

Following chapter will present the received results from the Monte Carlo simulations, combined with an analysis that illuminates the results from the theoretical framework. The simulations will described as possible outcomes for C1, C2 and C3 and show differences from current tax legislation and the proposed changes in SOU 2014:68.

5.1 Summation of the results

In table 9, the results for all the companies and the different future scenarios are presented. The C is representing the result before taxes for the simulated time-period. Since there will be less possibilities to make depositions the value of C will increase. This will in turn affect the amount of paid taxes, T. D stands for the balance of untaxed assets at the end of the simulated time-period, and the total profit, TP, is the summation of the results after depositions and taxes for the simulated time-period.

Table 9 Summary of the results from the simulation, (own processing)

	Company 1	**Comapny 2**	**Company 3**
C	**C_5-C_{12}**	**C_5-C_{12}**	**C_5-C_{12}**
Current legislation	2 727 177,06	2 037 949,91	28 610,25
SOU 2014:68	4 485 534,07	2 443 025,39	215 802,80
	64%	20%	654%
D	**D_5-D_{12}**	**D_5-D_{12}**	**D_5-D_{12}**
Current legislation	3 933 786,54	959 285,65	218 635,26
SOU 2014:68	1 179 100,00	358 100,00	-
	-70%	-63%	-100%
T	**T_5-T_{12}**	**T_5-T_{12}**	**T_5-T_{12}**
Current legislation	1 487 258,38	618 267,81	9 847,90
SOU 2014:68	2 003 340,34	834 334,20	110 774,66
	35%	35%	1025%
Total profit	**TP_5-TP_{12}**	**TP_5-TP_{12}**	**TP_5-TP_{12}**
Current legislation	5 173 705,21	2 378 967,75	237 397,62
SOU 2014:68	3 661 293,73	1 966 791,19	105 028,14
	-29%	-17%	-56%

5.2 Company one

For C1 accountings was received from 2010-2014, and the simulations were done for the upcoming seven years. By the received accountings, it can be inferred that C1 has their main income based in another income source than the forest, as the forest-based revenue consists of only 6 % of the total revenue in the company. C1 is assumed to harvest three out of five years, which will be years with higher forest based revenues. The mean result for C1 in the simulation is 6 175 708.82 SEK, with a s.d. of 482 472.58 SEK. As C1 only shows positive results in the

received accountings, C1 can be seen as a stabile company, with even results throughout the years. The minimum result is 4 379 275.94 SEK and the maximum result is 7 911 876.49 SEK. In the cumulative distribution curve in figure 6 it can be inferred that 90 % of the possible future results before taxation will be between 5 383 000 and 6 961 000 SEK.

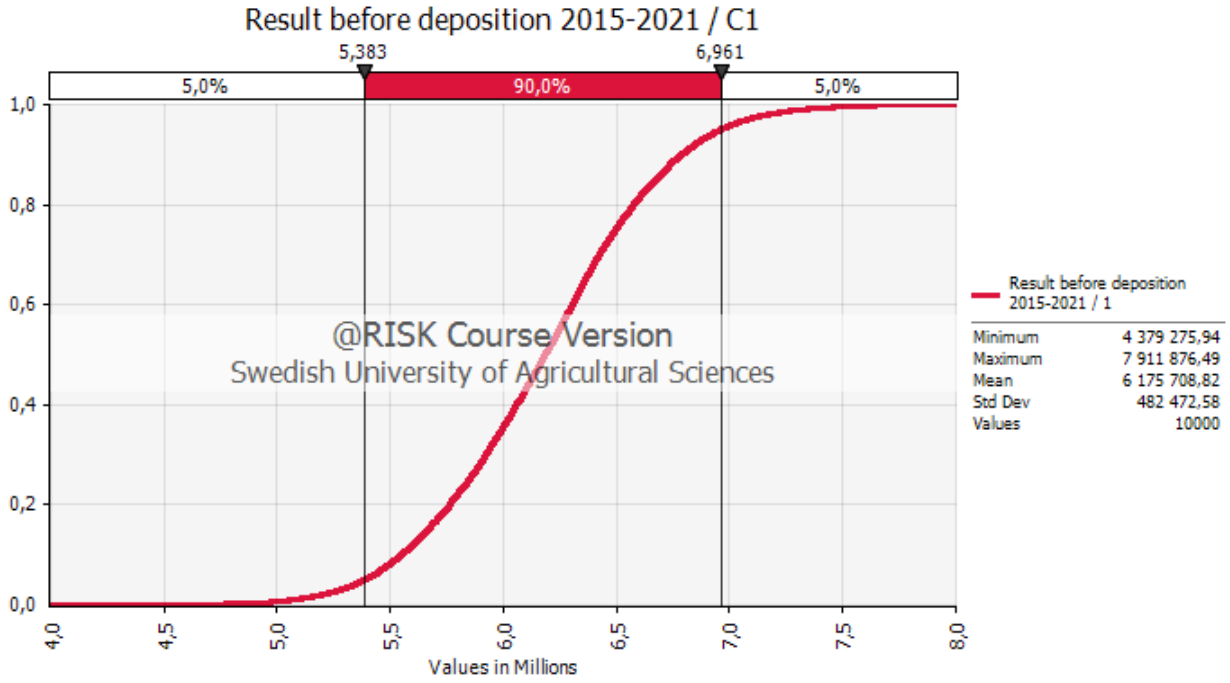

Figure 6 Cumulative distribution curve for C1 (own processing)

C1 is a profitable company that presents positive results each year and use several deposition possibilities in order to lower the result before taxes, as seen in Appendix 1. The effects of the proposed changes by SOU 2014:68 is shown in Appendix 2. For the simulated time-period they present a result before taxes and after depositions, C, of 2 727 177.06 SEK, compared to the C with the proposed changes that is 4 485 534.07 SEK, which is an increase of 64 %. This is resulting in a higher tax burden, from 1 487 258.38 SEK to 2 003 340.34 SEK. As a larger amount of money is used for tax payments the total profit for the simulated time period is decreasing with 29 %, and differs between 5 173 705,21 SEK to 3 661 293,73 SEK, leaving less assets left within the company.

C1 has the goal to obtain an even result of 276 000 SEK before taxes, as the NIPF landowners is assumed to have the company as its main occupation. This is not possible even with the current legislation, since the company makes high positive results each year. C1 does not have any years with a negative result, so there are no reasons to withdrawal untaxed assets in order to even out results. However, the company has fluctuations over the years and with the current system C1 has more possibilities to distribute its income. The untaxed assets, D, differs between current legislation and SOU 2014:68. D will decrease with 70 %, which is mainly due to the deregulation of all the deposition possibilities, not only the forest account.

Even if it is not possible to bring the result down to 276 000 SEK with the current legislation, the result is still kept low in order to avoid a progressive tax rate. C1 still exceeds governmental tax

thresholds in some years, but with the proposed changes in SOU 2014:68 the company will exceed the governmental tax thresholds in each year except one. This is the main cause of the increased tax burden, as the company is facing a tax rate of 57 % in four of the simulated years. This is a concern, as Aronsson (1990) argues that the overall supply of roundwood will shift negatively as the progressivity of the tax rate increases. Aronsson (1990) argues that NIPF landowners will receive utility from consumption, meaning that the result after subtracting costs, depositions, savings and taxes is available for consumption. Therefore, when C1 is facing a greater progressivity it is reasonable to argue that the company's incentives to harvest their forest will decrease.

Since the forest does not play a crucial part for the company's economy, a possible outcome of the deregulation of the forest account could be that the NIPF landowner evaluate alternative usage for the forest, such as non-timber activities (Conway *et al.,* 2003; Bolkesjø & Baardsen, 2001). As the NIPF landowners are assumed to act according to profit maximization behavior (Aronsson, 1990; Fortney *et al.,* 2011), it can be argued that when conditions are deteriorated it will not be interesting for the NIPF landowner to obtain their harvest of forest.

5.3 Company two

For C2 accountings were received for 2012-2015, and the future simulation was conducted through @RISK for the eight upcoming years. In C2, the forest-based revenue has a significant impact on the company, where it represent for 52 % of the turnover. In the accountings it is shown that the forest-based revenue is even over years, which implies that harvesting takes place each year. It has therefore been assumed in the simulation that C2 will harvest in all of the simulated years. In the simulations the result before depositions and taxes oscillates between –71 359 SEK and 848 022 SEK, which implies that C2 is a company with volatile results. C2 is assumed to have their business as its main occupation, and the depositions will therefore be done in order to receive a result before taxes of 276 000 SEK. The simulation for C2 with current legislation is shown in Appendix 3, including all possible depositions. As there is a large forest based revenue, the possible deposition to the forest account is enough to bring the result down to 276 000 SEK, and therefore no other depositions are used.

In figure 7 the cumulative distribution curve show possible future outcome for C2 and sums up the results with a mean scenario of 2 751 373 SEK. As mentioned, C2 is described as a company with volatile results, which can be inferred from figure 7, where it shows that 90 % of the possible future results will be between –4 830 000 SEK and 10 940 000 SEK. The minimum result for the simulated time-period is –13 145 398.69 SEK while the maximum is 23 003 719.40 SEK.

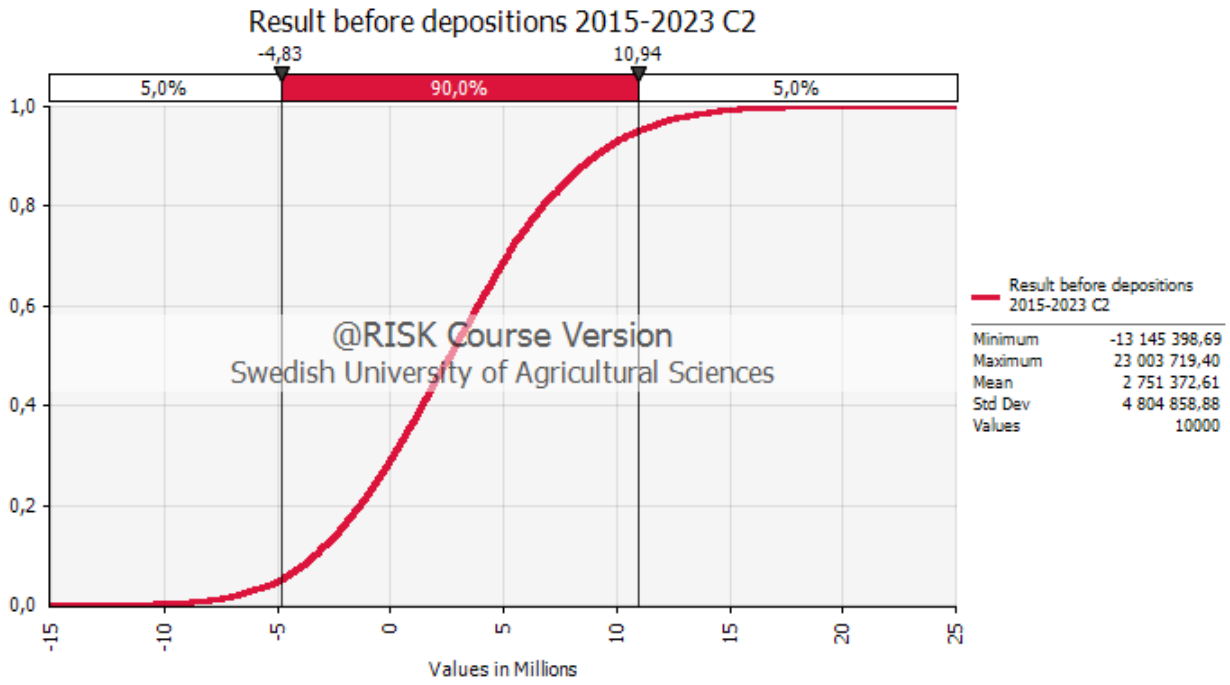

Figure 7 Cumulative distribution curve for C2 (own processing)

The depositions to the forest account are used fully for C2 in the simulation with current legislation, which gives a result before taxes, C, of 2 037 949.91 SEK. For the same period, 618 267.81 SEK has been paid in taxes. The balance for the untaxed assets in the final year is 959 285.65 SEK, by adding C with D, reduced by T a total value of 2 378 967-75 SEK is obtained, which is equivalent to the total profit, TP.

If C2 would face the proposed changes from SOU 2014:68 it would involve changed deposition possibilities, where the business fund would allow less deposition possibilities. In C2 the deposition possibility is pending between 0 and 339 200 SEK, because it is accounted on the result, and not the revenue, see Appendix 4. Although C2 has great fluctuations in the revenue, they can still bring up 276 000 as a result to be taxed for the majority of the years and have positive balance in their untaxed funds. With the proposed changes, C2 will be affected negatively in terms of planning, as C2 will have less funds to be distributed in years with low revenue or high costs. The TP for C2 will decrease with 17 %, from 2 378 967.75 SEK to 1 966 791.19 SEK, leaving the company with less funds to distribute.

C2 has a much more uncertain future than C1 and can therefore be assumed to have greater need to plan the revenue. As mentioned, the current tax structure allows for larger deposition possibilities, which in this case is equivalent to better planning possibilities. When considering strategic decisions, risk is a great factor that determines the decision (Brealey *et al.,* 2011; Hardaker *et al.,* 2015), in this case the decision regarding harvesting. The CDC show a great uncertainty, which is associated with high risk. In order to reduce the risk for C2 forest account and depositions possibilities are helpful tools. When substituted to the business fund the ability to plan decreases, and the risk of less profitable results from harvest increases. This may result in relocated time to a less volatile income source, and may change the forest management.

In the case with the current legislation C2 is able to keep an even result around 276 000 SEK each year, but when facing the proposed changes through SOU 2014:68 the company will increase their revenue for some of the years. C2 will also be facing the effect of the progressive tax rate, as the company exceeds the limit for progressive tax rate in one year. Even if C2 only reaches the first governmental tax threshold, the company will still with a 52 % tax rate for a part of the result. As mentioned for C1, the same outcome and argument is valid for C2 regarding tax progressivity.

5.4 Company three

The accountings for 2010-2013 were received for C3, and the simulation has been done for the upcoming eight years. C3 is the company with the lowest revenue in the study. It only has forest-based revenue. Due to this, C3 is assumed to have the firm as an ancillary business, and receiving a salary from a job outside the company. As it is assumed that owner already have an income, depositions are done in order to bring the result down to 0 SEK to avoid tax thresholds.

The forest activities in C3 differs over the years, where harvesting occurs in one year, reforestration in another, and the remaining years are seen as middle years with low activity in the forest. Due to this, the study have simulated harvest years, planting years and middle years in order to present a reliable future scenario. For example, the years 2014 and 2018 are seen as harvest years with high revenue from forest, while 2016 and 2020 are years with reforestration, where the costs are significantly higher. Figure 8 show the CDC for C3, where it can be inferred that the maximum value for C is 364 3658 SEK, minimum value is –372 171 SEK, and with a mean value of 26 837 SEK. The s.d. for C3 is 99 676.49 SEK, which is at the same level as for C1 and C2, seen to their possible outcomes.

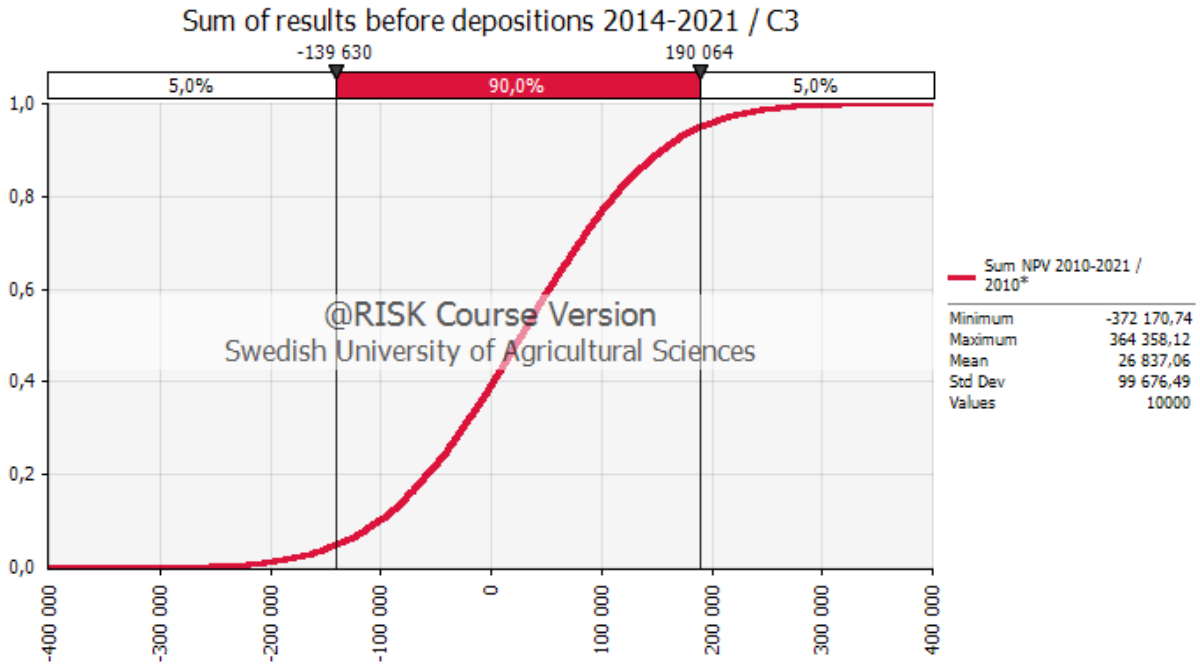

Figure 8 Cumulative distribution curve for C3 (own processing)

With the current legislation, C3 has the possibility to set the result to 0 SEK almost every year when applying depositions to forest account and allocation fund. With the business fund the case will somewhat change. With current legislation C3 will present a C of 28 610.25 SEK, but with the business fund it will be 215 802.80 SEK. This increase in C will lead to an increase in T, where it shifts from 9 847.90 SEK to 110 774.66 SEK. This is the largest percentage increase in T, with 1025 %, and can be explained by the fact that C3 has the opportunity to report a result close to 0 SEK with the current legislation, and will therefore have a low tax burden.

The balance in D with the current legislation is 218 635.26 SEK, which is used to even out the result during planting years. Although, when facing the business fund there will not be enough means in order to do this, and the balance of D will be 0 SEK. The TP of C3 will decrease with 56 % from 237 397.62 SEK to 105 028.14 SEK, which also is the largest percentage decrease of the TP in this study. It should be stressed that the received results for C3 are extreme because C3 has a desirable result of 0 SEK. Therefore, the percentage change is higher than with the other companies in the study.

C3 is an example where the proposed changes comes with a price. Krott (2010) argues for the importance of bringing together science and reality when forming new policies. For C3 it can be questioned if it is realistic to enforce a new tax structure that would increase the tax burden with over 1000 %, without stressing that the reform will have a significant impact on the industry.

5.5 Forest management

Neoclassical theory suggests that firms make rational decisions, based on how to maximize their profit (Rubinfeld & Pindyck, 2012). This, combined with studies showing that NIPF landowners have diverse interests how to manage the forest (Conway *et al.,* 2003; Bolkesjø & Baardsen, 2001), could have a negative impact on the willingness to manage the forest for production of wood products. SOU 2014:68 will, according to this study, have negative effect on the planning possibilities for NIPF landowners. A possible consequence is that some NIPF landowners in Sweden will redistribute their time, focus on other income sources, as the forest will no longer profitable enough to use for production of wood, as Conway *et al.,* (2003) finds that NIPF landowners that has another occupation tend to spend less time on forest management.

5.6 Policy theory analysis

Policy theory helps to understand the role of governmental interference with the market, specifically how to target tax on forest growth and harvest to reach long-term profits with a sustainable production from an environmental perspective (Amacher, 1997; Krott, 2012; Fortney *et al.,* 2011). Boyd and Hyde (1989) argue for how governmental interventions can hinder optimal market conditions, with the exceptions if the policy aims to redistribute fund for welfare purposes or is used to correct market failures. The thesis can confirm that the studied NIPF landowners would add to more tax funds to the government with the business fund, which would contribute to additional funds for the welfare systems in Sweden.

Although, the welfare system might seem to benefit from the reformed tax structures, this may not be the case. As mentioned the production of wood products in Sweden has lately been stagnating. They could be better of letting their forest grow, in order to increase the property value or leaving it to next coming generation as bequest, similar to Conway *et al.,* (2003) findings on NIPF landowner's behavior. If stagnation in the industry already can be observed,

and on top this harvesting wood becomes even less profitable a possible consequence is continued stagnation and possible short-term deficit of wood, which would result in less tax revenue and less economic growth.

Amacher (1997) states that governments face constraints when designing tax policies for the forest industry, and one of the constraints is that policies are rarely changed in isolation for a certain industry or a product. The isolation benefit can be seen as tool to even out difference between certain sectors. Swedish NIPF landowners are benefiting from an isolation benefit through the forest account. By allowing NIPF landowners distribute their income over several years when harvesting their forest gives the NIPF landowner an isolation benefit compared to other sectors. With the proposed changes in SOU 2014:68 this isolation benefit will be deregulated, and the forest industry with unique characteristics will be seen as any other industry. From Amacher (1997) perspective forest accounts can be seen as a way to hinder market distortion by changing tax policies in isolation, the deregulation of forest accounts can be seen as a step in the wrong direction when designing optimal tax policies.

5.7 Incorporation of practical issues in new policies

Previous studies show that when designing new policies there are often a lack of knowledge of the reality, that the policies are often based on theoretical frameworks with assumptions that does not reflect the real world properly (Krott, 2012). SOU 2014:68 purposes to regulate the current tax structure for all private entities, without stressing how the changes will affect specific sectors, such as the forest sector. NIPF landowners are forced to adapt to the changes, as they cannot change the structure of the firm, due to Swedish legislation concerning ownership of estates (see SFS 1979: 230). Therefore, it can be reasonable to argue that more information and knowledge about the actual impact for the NIPF landowners should be incorporated when designing the new tax structure suggested in SOU 2014:68. In line with this, Krott (2012) argues that better information concerning forest politics would provide a greater overview of the actual consequences that specific policies and regulations will have on the NIPF landowners.

6 DISCUSSION

SOU 2014:68 has the aim to evaluate and simplify current tax regulation for private entities (SOU 2014:68, p.3). When the results of the investigation were presented in 2014, they introduced the proposed change – to replace current legislation with a new type of deposition, the business fund. Instead of having five different deposition possibilities, all with different rules, the investigation suggest that private entities should only have one deposition in order to make it less complicated. According to the study, SOU 2014:68 will have a negative effect on the planning possibilities for NIPF landowners, as the forest account has historically been used as a tool to even out the result over a longer period. Nevertheless, we must stress that the results from this study should be read with caution, as the study only has been looking at three different NIPF landowners. If the study had been conducted on another set of data, for example private entities without forest as an income source, the difference between current tax structure and the business fund would have been less, as forest account only is a deposition possibility for NIPF landowners.

For companies that are facing different results over the years, having high revenues during harvesting years and high costs during planting years, the forest account provides a planning tool to control the result of the company in a greater extent. It can be questioned if the investigation has taken the complexity of the sector into account when formulating the proposed changes. It can seem reasonable to have the forest account as a planning tool, as it can take 70-120 years to produce a final product from the forest (Fortney *et al*., 2010).

Even if it is assumed that one deposition possibility will be easier to handle than five, the study shows that the companies will have less means left in the business as the taxes increases. A possible consequence of SOU 2014:68 is that some NIPF landowners will redistribute their time to focus on another income sources, as the forest will no longer be as profitable to use for production of wood. This could lead to less well-managed forests, and a decrease in the supply of Swedish forest products. Instead, the likeliness that forests will be used for other purposes increases, such as non-timber activities or leaving it as a bequest for the next generation.

What can be questioned is if this a matter of communication, SOU 2014:68 aims to simplify the tax declaration process for private entities without having any emphasis on gaining more tax income. From our results it can be interpreted that NIPF landowners will be taxed more, and consequently contribute to a higher tax income for the government. If the investigation would have been clear that the purpose was to further extend welfare funds in Sweden, the logic of the changes would be clearer.

6.1 Further research

Much of what has been studied in policy theory becomes evident in this study. For instance, when designing new policies it can be vital to create or keep isolation policies in order to increase production of a certain output. For the future, it can be of interest to study how these isolating factors should be taken into account when designing governmental policies in the forest sector. In addition, the study has only compared different results and provides potential outcomes, but does not find equilibriums between tax paid by NIPF landowners and funds for a government to provide welfare. Future studies could try to find equilibriums where the tax motivates NIPF landowners enough to keep the supply of wood steady, and is taxed fairly if compared to similar industries.

7 CONCLUSION

The aim of this study was to examine how a potential reform in the tax structure, following the investigation SOU 2014:68, may affect NIPF landowners. Once analyzed three different types of NIPF landowners, we observe that these companies may be affected negatively by a reform. In contrast, the government may collect higher tax revenue, which can be used for welfare-enhancing activities. Nevertheless, it is also clear that lower profits may deter any incentive by NIPF landowners in terms of business expansion.

There is a risk that the overall supply of forest products in Sweden may decrease if NIPF landowners would face the new tax program, as their total profit will decrease. If it becomes less profitable to harvest the forest, it can be argued that other uses, such as using the forest for non-timber services or leaving it as a bequest for the next generation, may become more attractive. The study argues that there is a lack of understanding how governmental policies will affect companies in practice. Thus, the need to merge theory and practice within the forest sector is still a relevant challenge.

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APPENDIX

1.Company one – current legislation

COMPANY 1	2010	2011*	2012	2013*	2014*	2015	2016	2017*	2018*	2019	2020	2021*
Total revenue	3 080 887,88	3 300 991,64	2 701 447,63	3 010 204,69	3 117 730,97	2 812 561,38	2 925 797,02	3 124 415,97	3 301 408,42	2 834 466,58	2 812 635,30	2 965 662,56
Revenue from forest	58 167,00	205 408,40	23 797,40	426 719,00	568 492,80	45 668,27	40 550,20	301 350,10	367 952,36	37 846,67	43 745,15	349 418,57
Revenue other income source	3 022 720,88	3 095 583,24	2 677 650,23	2 583 485,69	2 549 238,17	2 711 744,85	2 827 878,25	2 761 802,81	2 868 722,56	2 741 042,13	2 713 740,44	2 558 093,74
Price	516,00	538,00	487,00	455,00	477,00	479,39	483,39	487,35	494,18	494,49	494,28	507,94
Quantity m3	112,73	381,80	48,87	937,84	1 191,81	95,26	83,89	618,34	744,57	76,54	88,50	687,91
3 023 382,96	178 522,95	0,06										
Total cost	- 2 319 382,90	- 2 604 934,13	- 2 288 377,70	- 1 671 039,02	- 1 928 096,71	- 2 076 281,88	- 2 141 587,60	- 2 108 332,09	- 2 171 093,05	- 2 076 978,54	- 2 056 781,92	- 1 971 729,93
Varible costs for other income source	- 1 845 710,28	- 2 132 840,09	- 1 828 079,99	- 1 199 992,16	- 1 414 109,22	- 1 627 876,08	- 1 697 591,63	- 1 657 926,16	- 1 722 110,71	- 1 645 463,41	- 1 629 074,05	- 1 535 638,44
Varible costs for forestry	- 5 500,00	- 8 327,20	- 895,20	- 15 967,60	- 63 190,80	- 1 851,38	- 1 643,89	- 12 216,65	- 14 916,69	- 1 534,29	- 1 773,42	- 14 165,33
Fixed cost	- 468 172,62	- 463 766,84	- 459 402,51	- 455 079,26	- 450 796,69	- 446 554,42	- 442 352,08	- 438 189,28	- 434 065,66	- 429 980,84	- 425 934,46	- 421 926,16
Result before deposition	**761 504,98**	**696 057,51**	**413 069,93**	**1 339 165,67**	**1 189 634,26**	**736 279,50**	**784 209,42**	**1 016 083,87**	**1 130 315,37**	**757 488,04**	**755 853,38**	**993 932,63**
Possible deposition forest account	34 900,20	123 245,04	14 278,44	256 031,40	341 095,68	27 400,96	24 330,12	180 810,06	220 771,42	22 708,00	26 247,09	209 651,14
Possible deposition allocation fund	228 451,49	208 817,25	123 920,98	401 749,70	356 890,28	220 883,85	235 262,83	304 825,16	339 094,61	227 246,41	226 756,01	298 179,79
Possible deposition expasion fund		1 631 921,59	1 122 240,05	953 203,03	932 133,62	1 256 125,03 kr	1 043 879,68	1 016 527,42	804 981,42	355 846,42	163 217,42	-
Tax at 22% rate for expansion fund						38 146,02	45 860,76	46 540,12	98 809,70	42 378,38	35 907,83	-
Depostion Forest account	-	- 120 000,00	-	- 250 000,00	- 339 000,00	- 27 400,00	- 24 300,00	- 180 800,00	- 220 700,00	- 22 700,00	- 26 200,00	- 209 600,00
Withdrawel from forest account												120 000,00
Deposition allocation fund	-	-	-	- 200 000,00	-	- 220 800,00	- 235 200,00	- 304 800,00	- 339 000,00	- 227 200,00	- 226 700,00	- 298 100,00
Withdrawal allocation fund									200 000,00		220 800,00	235 200,00
Deposition expansion fund						- 173 391,00	- 208 458,00	- 211 546,00	- 449 135,00	- 192 629,00	- 163 217,42	-
Withdrawal Expansion fund												
Change deprication machines	-	-	70 000,00	- 60 000,00	- 50 000,00							
Balance Forest account		120 000,00	120 000,00	370 000,00	709 000,00	736 400,00	767 695,80	955 788,91	1 185 568,90	1 219 531,81	1 257 317,36	1 358 861,88
Balance other deposition				200 000,00	200 000,00	420 800,00	656 000,00	960 800,00	1 099 800,00	1 327 000,00	1 332 900,00	1 395 800,00
Balance Expansion fund						135 244,98	162 597,24	374 143,24	823 278,24	1 015 907,24	1 179 124,66	1 179 124,66
Intrest forest account 0,95%						6 995,80	7 293,11	9 079,99	11 262,90	11 585,55	11 944,51	12 909,19
Result before taxes	**761 504,98**	**576 057,51**	**483 069,93**	**829 165,67**	**800 634,26**	**314 688,50**	**316 251,42**	**318 937,87**	**321 480,37**	**314 959,04**	**560 535,96**	**841 432,63**
NPV @ 0,95	754 338,76	565 266,43	469 559,94	798 391,71	763 664,41	297 332,88	295 997,62	295 702,85	295 255,19	286 543,69	505 165,78	751 179,05
Sum NPV 2015-2021	2 727 177,06											
Balance untaxed assets 2021	3 933 786,54											
Tax Paid	1 487 258,38											
Total profit	5 173 705,21											
*=year with disforest												
Inflation	2%											

Tax			Sum to be taxed 2015	Sum to be taxed 2016	Sum to be taxed 20	Sum to be taxed 2018	Sum to be taxed 2019	Sum to be taxed 2020	Sum to be taxed 2021
Municpal tax	32%	<= 430200	314 688,50	316 251,42	318 937,87	321 480,37	314 959,04	430 200,00	430 200,00
Govermental tax 1	20%	430 200,00	-	-				130 335,96	195 600,00
Govermental tax 2	5%	625800	-	-					215 632,63
Tax for expansion fund 22%	22%		173 391,00	208 458,00	211 546,00	449 135,00	192 629,00	163 217,42	-
		Tax paid	2015	2016	2017	2018	2019	2020	2021
		MT	100 700,32	101 200,45	102 060,12	102 873,72	100 786,89	179 371,51	137 664,00
		GT1	-		-			130 335,96	101 712,00
		GT2	-						122 910,60
		EFT	38 146,02	45 860,76	46 540,12	98 809,70	42 378,38	35 907,83	-
		Total Tax	138 846,34	147 061,21	148 600,24	201 683,42	143 165,27	345 615,30	362 286,60

	1	2	3	4	5	6	7	8	9	10	11	12
COMPANY 1	2010	2011*	2012	2013*	2014*	2015	2016	2017*	2018*	2019	2020	2021*
Total revenue	3 080 887,88	3 300 991,64	2 701 447,63	3 010 204,69	3 117 730,97	2 757 414,14	2 868 429,47	3 063 153,93	3 236 675,94	2 778 889,82	2 757 486,61	2 907 513,33
Revenue from forest	58 167,00	205 408,40	23 797,40	426 719,00	568 492,80	45 668,27	40 550,20	301 350,10	367 952,36	37 846,67	43 745,15	349 418,57
Revenue other income source	3 022 720,88	3 095 583,24	2 677 650,23	2 583 485,69	2 549 238,17	2 711 744,85	2 827 878,25	2 761 802,81	2 868 722,56	2 741 042,13	2 713 740,44	2 558 093,74
Price	516,00	538,00	487,00	455,00	477,00	479,39	483,39	487,35	494,18	494,49	494,28	507,94
Quantity m3	112,73	381,80	48,87	937,84	1 191,81	95,26	83,89	618,34	744,57	76,54	88,50	687,91
Total cost	- 2 319 382,90	- 2 604 934,13	- 2 288 377,70	- 1 671 039,02	- 1 928 096,71	- 2 076 281,88	- 2 141 587,60	- 2 108 332,09	- 2 171 093,05	- 2 076 978,54	- 2 056 781,92	- 1 971 729,93
Varible costs for other income source	- 1 845 710,28	- 2 132 840,09	- 1 828 079,99	- 1 199 992,16	- 1 414 109,22	- 1 627 876,08	- 1 697 591,63	- 1 657 926,16	- 1 722 110,71	- 1 645 463,41	- 1 629 074,05	- 1 535 638,44
Varible costs for forestry	- 5 500,00	- 8 327,20	- 895,20	- 15 967,60	- 63 190,80	- 1 851,38	- 1 643,89	- 12 216,65	- 14 916,69	- 1 534,29	- 1 773,42	- 14 165,33
Fixed cost	- 468 172,62	- 463 766,84	- 459 402,51	- 455 079,26	- 450 796,69	- 446 554,42	- 442 352,08	- 438 189,28	- 434 065,66	- 429 980,84	- 425 934,46	- 421 926,16
Result before deposition	**761 504,98**	**696 057,51**	**413 069,93**	**1 339 165,67**	**1 189 634,26**	**681 132,26**	**726 841,87**	**954 821,83**	**1 065 582,89**	**701 911,28**	**700 704,69**	**935 783,40**
Possible deposition forest account	34 900,20	123 245,04	14 278,44	256 031,40	341 095,68	27 400,96	24 330,12	180 810,06	220 771,42	22 708,00	26 247,09	209 651,14
Possible other deposition	228 451,49	208 817,25	123 920,98	401 749,70	356 890,28	204 339,68	218 052,56	286 446,55	319 674,87	210 573,39	210 211,41	280 735,02
Depostion Forest account	-	- 120 000,00	-	- 250 000,00	- 339 000,00							
Withdrawel from forest account												120 000,00
Other depositions (Periodiseringsfond)	-	-	-	- 200 000,00	-							
Withdrawel other depositions									200 000,00		-	-
Change deprication machines	-	-	70 000,00	- 60 000,00	- 50 000,00							
Balance Forest account		120 000,00	120 000,00	370 000,00	709 000,00	709 000,00	709 000,00	709 000,00	709 000,00	709 000,00	709 000,00	829 000,00
Balance other deposition				200 000,00	200 000,00	200 000,00	200 000,00	200 000,00	-	-	-	-
Possible deposition business fund						272 452,90	290 736,75	381 928,73	426 233,16	280 764,51	280 281,88	374 313,36
Max deposition business fund						1 256 125,03	906 671,76	616 024,66	234 124,66	24,66	24,66	24,66
Deposition business fund						- 272 400,00	- 290 700,00	- 381 900,00	- 234 100,00	-	-	-
Withdrawel business fund												
Balance business						272 400,00	563 100,00	945 000,00	1 179 100,00	1 179 100,00	1 179 100,00	1 179 100,00
Result before taxes	**761 504,98**	**576 057,51**	**483 069,93**	**829 165,67**	**800 634,26**	**408 732,26**	**436 141,87**	**572 921,83**	**1 031 482,89**	**701 911,28**	**700 704,69**	**1 055 783,40**
NPV @ 0,95	754 338,76	565 266,43	469 559,94	798 391,71	763 664,41	386 189,95	408 209,88	531 183,76	947 338,35	638 585,41	631 488,53	942 538,18

Sum NPV 2015-2021	4 485 534,07
Balance unpaid taxes	1 179 100,00
Tax Paid 2015-2021	2 003 340,34
Total profit	3 661 293,73
Inflation	2%

Tax		To be taxed	2015	2016	2017	2018	2019	2020	2021
Municpal tax	32%	<= 430200	408 732,26	430 200,00	430 200,00	430 200,00	430 200,00	430 200,00	430 200,00
Govermental tax 1	20%	430 200,00		5 941,87	142 721,83	195 600,00	195 600,00	195 600,00	195 600,00
Govermental tax 2	5%	625800				405 682,89	76 111,28	74 904,69	429 983,40
Tax for expansion fund 22%	22%								
		Tax paid	2015	2016	2017	2018	2019	2020	2021
		MT	130 794,32	137 664,00	137 664,00	137 664,00	137 664,00	137 664,00	137 664,00
		GT1	-	3 089,77	74 215,35	101 712,00	101 712,00	101 712,00	101 712,00
		GT2	-	-	-	231 239,25	43 383,43	42 695,67	245 090,54
		Total Tax	130 794,32	140 753,77	211 879,35	470 615,25	282 759,43	282 071,67	484 466,54

	1	2	3	4	5	6	7	8	9	10	11	12
COMPANY 2	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total revenue	4 270 127,00	3 535 091,00	4 352 841,22	4 640 332,54	4 381 367,90	4 226 473,86	4 026 123,06	3 498 493,65	4 100 345,29	3 394 472,14	3 481 928,23	3 759 164,35
Revenue from forest	2 160 484,00	1 402 038,00	2 198 676,50	2 925 497,20	2 311 154,32	2 179 358,51	1 966 214,78	1 503 730,95	2 081 536,45	1 337 766,88	1 344 850,88	1 620 998,74
Revenue other income source	2 109 643,00	2 133 053,00	2 154 164,72	1 714 835,34	1 984 304,40	1 964 243,31	1 980 964,69	1 926 164,79	1 938 409,91	1 990 146,98	2 068 804,24	2 064 456,50
Price	487,00	455,00	477,00	504,00	513,17	525,31	532,83	542,52	550,99	552,72	539,56	579,29
Quantity m3	4 436,31	3 081,40	4 609,38	5 804,56	4 503,72	4 148,74	3 690,12	2 771,77	3 777,79	2 420,34	2 492,47	2 798,27
Total cost	- 4 220 663,00	- 3 636 460,00	- 3 251 358,04	- 3 367 118,57	- 3 533 345,05	- 3 496 727,59	- 3 482 333,52	- 3 373 303,01	- 3 425 149,92	- 3 399 273,13	- 3 467 774,48	- 3 476 230,87
Varible costs for other income source	- 2 461 932,11	- 2 166 805,36	- 1 821 333,34	- 1 735 246,44	- 2 011 812,97	- 1 991 473,76	- 2 008 426,96	- 1 952 867,36	- 1 965 282,24	- 2 017 736,54	- 2 097 484,24	- 2 093 076,23
Varible costs for forestry	- 384 403,00	- 108 260,00	- 81 441,60	- 295 980,00	- 198 211,50	- 194 386,48	- 175 375,26	- 134 124,31	- 185 661,30	- 119 321,26	- 119 953,11	- 144 583,94
Fixed cost	- 1 374 327,89	- 1 361 394,64	- 1 348 583,10	- 1 335 892,13	- 1 323 320,58	- 1 310 867,34	- 1 298 531,30	- 1 286 311,34	- 1 274 206,38	- 1 262 215,33	- 1 250 337,13	- 1 238 570,71
Result after financial posts	**49 464,00**	**- 101 369,00**	**1 101 483,18**	**1 273 213,97**	**848 022,85**	**646 874,23**	**464 845,95**	**56 592,72**	**594 796,44**	**- 71 359,27**	**- 54 119,35**	**209 224,37**
					808 864,80	611 197,98	435 075,66	52 469,87	546 275,16	- 64 921,29	- 48 773,40	186 782,59
Possible deposition forest account	1 296 290,40	841 222,80	1 319 205,90	1 755 298,32	1 386 692,59	1 307 615,11	1 179 728,87	902 238,57	1 248 921,87	802 660,13	806 910,53	972 599,24
Possible deposition allocation fund	14 839,20		330 444,95	381 964,19	254 406,85	194 062,27	139 453,79	16 977,82	178 438,93			62 767,31
Depostion Forest account	-	-	- 400 000,00	- 997 200,00	- 1 386 600,00	- 1 307 600,00	- 1 179 700,00	- 902 200,00	- 1 248 900,00	- 802 600,00	- 806 900,00	- 972 500,00
Withdrawal from forest account	-	-	100 000,00	-	814 500,00	936 800,00	990 900,00	1 121 600,00	530 200,00	1 149 900,00	1 137 000,00	1 039 200,00
Deposition allocation fund	-	-	- 400 000,00	-								
Withdrawal allocation fund	-	-	-	-					400 000,00			
Balance forest account			300 000,00	-	572 100,00	948 334,95	1 146 144,13	937 632,50	1 665 240,01	1 333 759,79	1 016 330,51	959 285,65
Balance allocation fund			400 000,00	-	-	-	-	-	400 000,00	- 400 000,00		
Interest on forest account @0,95 %					5 434,95	9 009,18	10 888,37	8 907,51	15 819,78	12 670,72	9 655,14	9 113,21
Result before taxes	**49 464,00**	**- 101 369,00**	**401 483,18**	**276 013,97**	**275 922,85**	**276 074,23**	**276 045,95**	**275 992,72**	**276 096,44**	**275 940,73**	**275 980,65**	**275 924,37**
NPV @ 0,95%	**48 998,51**	**- 99 470,09**	**390 254,92**	**265 769,89**	**263 181,92**	**260 848,25**	**258 367,05**	**255 886,31**	**253 573,52**	**251 045,58**	**248 719,06**	**246 328,23**
NPV 2012-2023	**2 037 949,91**	**2 685 764,73**										
Balance untaxed assests 2023	959 285,65											
Total taxed paid	618 267,81											
Total profit	2 378 967,75											
Inflation	2%											

Tax		Sum taxed	2015	2016	2017	2018	2019	2020	2021	2022	2023
Municpal tax	32%	<= 430200	276 013,97	275 922,85	276 074,23	276 045,95	275 992,72	276 096,44	275 940,73	275 980,65	275 924,37
Govermental tax 1	20%	430 200,00	-	-							
Govermental tax 2	5%	625800	-	-							
Tax for expansion fund 22%	22%			- 435 075,66	- 52 469,87	- 546 275,16	64 921,29	48 773,40	- 186 782,59	- 2 526 971,37	-
		Tax paid	2015	2016	2017	2018	2019	2020	2021	2022	2023
		MT	88 324,47	88 295,31	88 343,75	88 334,71	88 317,67	88 350,86	88 301,03	88 313,81	88 295,80
		GT1	-		-						
		GT2	-						-		
		EFT									
		Total Tax	88 324,47	88 295,31	88 343,75	88 334,71	88 317,67	88 350,86	88 301,03	88 313,81	88 295,80

	1	2	3	4	5	6	7	8	9	10	11	12
COMPANY 2	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total revenue	4 270 127,00	3 535 091,00	4 352 841,22	4 640 332,54	4 381 367,90	4 226 473,86	4 026 123,06	3 498 493,65	4 100 345,29	3 394 472,14	3 481 928,23	3 759 164,35
Revenue from forest	2 160 484,00	1 402 038,00	2 198 676,50	2 925 497,20	2 311 154,32	2 179 358,51	1 966 214,78	1 503 730,95	2 081 536,45	1 337 766,88	1 344 850,88	1 620 998,74
Revenue other income source	2 109 643,00	2 133 053,00	2 154 164,72	1 714 835,34	1 984 304,40	1 964 243,31	1 980 964,69	1 926 164,79	1 938 409,91	1 990 146,98	2 068 804,24	2 064 456,50
Price	487,00	455,00	477,00	504,00	513,17	525,31	532,83	542,52	550,99	552,72	539,56	579,29
Quantity m3	4 436,31	3 081,40	4 609,38	5 804,56	4 503,72	4 148,74	3 690,12	2 771,77	3 777,79	2 420,34	2 492,47	2 798,27
Total cost	- 4 220 663,00	- 3 636 460,00	- 3 251 358,04	- 3 367 118,57	- 3 533 345,05	- 3 496 727,59	- 3 482 333,52	- 3 373 303,01	- 3 425 149,92	- 3 399 273,13	- 3 467 774,48	- 3 476 230,87
Varible costs for other income source	- 2 461 932,11	- 2 166 805,36	- 1 821 333,34	- 1 735 246,44	- 2 011 812,97	- 1 991 473,76	- 2 008 426,96	- 1 952 867,36	- 1 965 282,24	- 2 017 736,54	- 2 097 484,24	- 2 093 076,23
Varible costs for forestry	- 384 403,00	- 108 260,00	- 81 441,60	- 295 980,00	- 198 211,50	- 194 386,48	- 175 375,26	- 134 124,31	- 185 661,30	- 119 321,26	- 119 953,11	- 144 583,94
Fixed cost	- 1 374 327,89	- 1 361 394,64	- 1 348 583,10	- 1 335 892,13	- 1 323 320,58	- 1 310 867,34	- 1 298 531,30	- 1 286 311,34	- 1 274 206,38	- 1 262 215,33	- 1 250 337,13	- 1 238 570,71
Result after financial posts	**49 464,00**	**- 101 369,00**	**1 101 483,18**	**1 273 213,97**	**848 022,85**	**646 874,23**	**464 845,95**	**56 592,72**	**594 796,44**	**- 71 359,27**	**- 54 119,35**	**209 224,37**
	49 464,00	- 101 369,00	1 101 483,18	1 273 213,97								
Possible deposition forest account	1 296 290,40	841 222,80	1 319 205,90	1 755 298,32	1 386 692,59	1 307 615,11	1 179 728,87	902 238,57	1 248 921,87	802 660,13	806 910,53	972 599,24
Possible ther deposition	14 839,20		330 444,95	381 964,19	254 406,85	194 062,27	139 453,79	16 977,82	178 438,93			62 767,31
Depostion Forest account	-	-	- 400 000,00									
Withdrawal from forest account	-	-	100 000,00	-				219 407,28		80 592,72		
Other dispositions (Periodiseringsfond)	-	-	- 400 000,00	-								
Withdrawal other depositions	-	-	-	-								
Balance forest account			300 000,00	300 000,00	300 000,00	300 000,00	300 000,00	80 592,72	80 592,72	-	-	-
Balance other depositions			400 000,00									
Possible deposition business fund					339 209,14	258 749,69	185 938,38	22 637,09	237 918,58			83 689,75
Max deposition Business					17 916 574,37	17 916 574,37	17 916 574,37	17 916 574,37	17 916 574,37	17 916 574,37	17 916 574,37	17 916 574,37
Deposition business fund					- 339 200,00	- 258 700,00	- 185 900,00		- 237 900,00			
Withdrawal business fund										266 700,00	330 100,00	66 800,00
Balance business fund					339 200,00	597 900,00	783 800,00	783 800,00	1 021 700,00	755 000,00	424 900,00	358 100,00
Result before taxes	**49 464,00**	**- 101 369,00**	**401 483,18**	**1 273 213,97**	**508 822,85**	**388 174,23**	**278 945,95**	**276 000,00**	**356 896,44**	**275 933,45**	**275 980,65**	**276 024,37**
NPV @ 0,95%	**48 998,51**	**- 99 470,09**	**390 254,92**	**1 225 959,44**	**485 327,60**	**366 765,74**	**261 081,32**	**255 893,06**	**327 782,16**	**251 038,96**	**248 719,06**	**246 417,50**

NPV 2015-2023	**2 443 025,39**
Balance untaxed assets 2023	358 100,00
Total tax 2016-2023	834 334,20
Total profit	1 966 791,19
Inflation	2%

Tax		To be taxed		2016	2017	2018	2019	2020	2021	2022	2023
Municpal tax	32%	<= 430200		430 200,00	388 174,23	278 945,95	276 000,00	356 896,44	275 933,45	275 980,65	276 024,37
Govermental tax 1	20%	430 200,00		78 622,85							
Govermental tax 2	5%	625800									
Tax for expansion fund 22%	22%										
		Tax paid		2016	2017	2018	2019	2020	2021	2022	2023
		MT		137 664,00	124 215,75	89 262,71	88 320,00	114 206,86	88 298,70	88 313,81	88 327,80
		GT1		15 724,57	-	-	-	-	-	-	-
		GT2									
		Total Tax		153 388,57	124 215,75	89 262,71	88 320,00	114 206,86	88 298,70	88 313,81	88 327,80

Company 3	2010*	2011	2012¤	2013	2014*	2015	2016¤	2017	2018*	2019	2020¤	2021
Total revenue	322 509,00	28 207,00	29 185,07	3 175,65	320 293,15	24 440,78	21 492,07	3 451,27	307 691,72	28 344,08	35 855,51	2 738,04
Revenue from forest	322 509,00	28 207,00	29 185,07	3 175,65	320 293,15	23 961,55	21 070,65	3 383,60	301 658,55	27 788,32	35 152,47	2 684,36
Revenue other income source						-	-	-	-	-	-	-
Price	516,00	538,00	487,00	455,00	489,39	491,64	498,68	495,35	496,80	503,00	504,80	490,98
Quantity m3	625,02	52,43	59,93	6,98	654,47	48,74	42,25	6,83	607,20	55,24	69,64	5,47
Total cost	- 31 540,66	- 25 878,06	- 228 875,80	- 88 376,91	- 30 823,21	- 23 842,97	- 169 154,91	- 92 512,87	- 29 365,76	- 24 542,55	- 271 167,90	- 76 021,80
Varible costs for forestry	- 14 983,70	- 9 476,91	- 212 629,00	- 72 283,00	- 14 880,75	- 8 050,54	- 153 511,09	- 77 016,28	- 14 014,99	- 9 336,24	- 256 104,70	- 61 100,35
Fixed cost	- 16 556,96	- 16 401,15	- 16 246,80	- 16 093,91	- 15 942,46	- 15 792,43	- 15 643,81	- 15 496,60	- 15 350,76	- 15 206,30	- 15 063,20	- 14 921,45
	95 769,18											
Result before deposition	**290 968,34**	**2 328,94**	**- 199 690,73**	**- 85 201,26**	**289 469,94**	**597,82**	**- 147 662,84**	**- 89 061,60**	**278 325,97**	**3 801,54**	**- 235 312,39**	**- 73 283,75**
Possible desposition forest account	193 505,40	16 924,20	17 511,04	1 905,39	192 175,89	14 376,93	12 642,39	2 030,16	180 995,13	16 672,99	21 091,48	1 610,61
Possible deposition alloction fund	87 290,50	698,68			86 840,98	179,35			83 497,79	1 140,46		
Depostion Forest account	- 198 436,00				- 192 100,00				- 180 900,00		- 21 000,00	
Withdrawal from forest account			68 809,00	20 637,00			60 900,00	90 000,00			173 000,00	74 000,00
Deposition allocation fund					- 86 800,00				- 83 400,00			
Withdrawal Allocation fund							86 800,00				83 400,00	
Balance Allocation fund					86 800,00	86 800,00	-	-	83 400,00	83 400,00	-	-
Balance forest account	287 913,00	287 913,00	219 104,00	198 467,00	390 567,00	394 277,39	337 123,02	250 325,69	433 603,78	437 723,02	289 881,39	218 635,26
Intrest forest account 0,95%					3 710,39	3 745,64	3 202,67	2 378,09	4 119,24	4 158,37	2 753,87	2 077,03
Result before taxes	**92 532,34**	**2 328,94**	**- 130 881,73**	**- 64 564,26**	**10 569,94**	**597,82**	**37,16**	**938,40**	**14 025,97**	**3 801,54**	**87,61**	**716,25**
NPV @ 0,95Result before taxes	**91 661,56**	**2 285,31**	**- 127 221,37**	**- 62 168,00**	**10 081,87**	**564,85**	**34,78**	**870,03**	**12 881,78**	**3 458,57**	**78,96**	**639,42**
Sum NPV 2010-2021	28 610,25											
Balance untaxed assests	218 635,26											
Total taxed paid	9 847,90											
Total profit	237 397,62											
Inflation	2%											

Tax		Sum taxed		2016	2017	2018	2019	2020	2021	2022	2023
Municpal tax	32%	<= 430200		10 569,94	597,82	37,16	938,40	14 025,97	3 801,54	87,61	716,25
Govermental tax 1	20%	430 200,00		-							
Govermental tax 2	5%	625800		-							
Tax for expansion fund 22%	22%			-	-	-	-	-	-	-	-
		Tax paid		2016	2017	2018	2019	2020	2021	2022	2023
		MT		3 382,38	191,30	11,89	300,29	4 488,31	1 216,49	28,04	229,20
		GT1			-						
		GT2							-		
		EFT									
		Total Tax		3 382,38	191,30	11,89	300,29	4 488,31	1 216,49	28,04	229,20

Company 3	2010*	2011	2012¤	2013	2014*	2015	2016¤	2017	2018*	2019	2020¤	2021
Total revenue	322 509,00	28 207,00	29 185,07	3 175,65	320 293,15	24 440,78	21 492,07	3 451,27	307 691,72	28 344,08	35 855,51	2 738,04
Revenue from forest	322 509,00	28 207,00	29 185,07	3 175,65	320 293,15	23 961,55	21 070,65	3 383,60	301 658,55	27 788,32	35 152,47	2 684,36
Revenue other income source						-	-	-	-	-	-	-
Price	516,00	538,00	487,00	455,00	489,39	491,64	498,68	495,35	496,80	503,00	504,80	490,98
Quantity m3	625,02	52,43	59,93	6,98	654,47	48,74	42,25	6,83	607,20	55,24	69,64	5,47
Total cost	- 31 540,66	- 25 878,06	- 228 875,80	- 88 376,91	- 30 823,21	- 23 842,97	- 169 154,91	- 92 512,87	- 29 365,76	- 24 542,55	- 271 167,90	- 76 021,80
Varible costs for forestry	- 14 983,70	- 9 476,91	- 212 629,00	- 72 283,00	- 14 880,75	- 8 050,54	- 153 511,09	- 77 016,28	- 14 014,99	- 9 336,24	- 256 104,70	- 61 100,35
Fixed cost	- 16 556,96	- 16 401,15	- 16 246,80	- 16 093,91	- 15 942,46	- 15 792,43	- 15 643,81	- 15 496,60	- 15 350,76	- 15 206,30	- 15 063,20	- 14 921,45
Result before deposition	**290 968,34**	**2 328,94**	**- 199 690,73**	**- 85 201,26**	**289 469,94**	**597,82**	**- 147 662,84**	**- 89 061,60**	**278 325,97**	**3 801,54**	**- 235 312,39**	**- 73 283,75**
Possible desposition forest account	193 505,40	16 924,20	17 511,04	1 905,39	192 175,89	14 376,93	12 642,39	2 030,16	180 995,13	16 672,99	21 091,48	1 610,61
Depostion Forest account	- 198 436,00											
Withdrawal from forest account			68 809,00	20 637,00			32 000,00	90 000,00			76 467,00	
Balance forest account	287 913,00	287 913,00	219 104,00	198 467,00	198 467,00	198 467,00	166 467,00	76 467,00	76 467,00	76 467,00	-	-
Possible deposition business fund					115 787,98	239,13			111 330,39	1 520,61		
Deposition business fund					- 115 700,00				- 111 300,00			
Withdrawal business fund							115 700,00				111 300,00	
Balance business fund					115 700,00	115 700,00	-	-	111 300,00	111 300,00	-	-
Result before taxes	**92 532,34**	**2 328,94**	**- 130 881,73**	**- 64 564,26**	**173 769,94**	**597,82**	**37,16**	**938,40**	**167 025,97**	**3 801,54**	**- 47 545,39**	**- 73 283,75**
NPV @ 0,95Result before taxes	**91 661,56**	**2 285,31**	**- 127 221,37**	**- 62 168,00**	**165 745,99**	**564,85**	**34,78**	**870,03**	**153 400,61**	**3 458,57**	**- 42 848,82**	**- 65 423,21**
Sum NPV 2010-2021	215 802,80											
Balance untaxed assets	-											
Total taxed paid	110 774,66											
Total profit	105 028,14											
Inflation	2%											

Tax		To be taxed		2016	2017	2018	2019	2020	2021	2022	2023
Municpal tax	32%	<= 430200		173 769,94	597,82	37,16	938,40	167 025,97	3 801,54		
Govermental tax 1	20%	430 200,00									
Govermental tax 2	5%	625800									
Tax for expansion fund 22%	22%										
		Tax paid		2016	2017	2018	2019	2020	2021	2022	2023
		MT		55 606,38	191,30	11,89	300,29	53 448,31	1 216,49	-	-
		GT1		-	-	-	-	-	-	-	-
		GT2									
		Total Tax		55 606,38	191,30	11,89	300,29	53 448,31	1 216,49	-	-