

Taxation of labor income

A choice between efficiency and inequality?

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Abstract

This thesis applies a model for optimal top taxation rate on all Scandinavian countries. The starting point is a theory by Saez, Piketty and Stantcheva limiting the possible change in behavior of taxpayers into three channels; labor supply, tax avoidance and compensation bargaining. I show that optimal top taxation rate depends on these three key elasticities and how they affect the tax system. The elasticities are derived from the literature and labor income taxation in the Scandinavian context is the focus of the article. The findings of this thesis is that compensation bargaining happens in the Scandinavian countries, and that it can be adjusted with higher top taxes, applied at a higher level of income than today. This can be done without any larger dead weight losses through labor supply or tax avoidance. I suggest an income tax schedule with smaller and less salient jumps to remove compensation bargaining as an inefficient behavior without creating incentives to increase tax avoidance.

Key words: labor taxation, labor supply, tax avoidance, compensation bargaining, optimal taxation, elasticities

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1 Introduction

Optimal taxation is a constant discussion in the society. This is because of its implications for individuals and the communities or nations. Efficient labor taxation has been studied by economist for a long time with many different outcomes. Traditionally, lower taxes have been associated with higher economic growth and less dead weight loss. Later literature suggests a possible opposite effect. Optimal taxation is a puzzle due to every individual and country having different preferences and influencing variables, as well as the impact it has on the society as a whole.

When discussing taxation, Scandinavia¹ excel from other countries. The three Scandinavian countries have in the last century had high marginal taxes compared to most other countries. When using Scandinavia as the research object, the effects of high labor taxation should be conspicuous.

Saez, Piketty and Statcheva (2014)² presents a model to find the optimal top labor income taxation. This optimal level depends on three channels of which top tax payers can react through; labor supply, tax avoidance and compensation bargaining. It is the elasticity of these three channels that are determining of the optimal top taxation rate. The goal of this thesis is to find the most efficient marginal tax level for top earners. This lead to two research questions:

- Is compensation bargaining an inefficiency problem in the Scandinavian countries? If so, how can we reduce it?
- What is the optimal top marginal taxation rate for the Scandinavian countries?

The first conclusion I reach is that labor supply and tax avoidance is very inelastic in the Scandinavian countries. Changes in income taxation levels will have small effect on the individuals' behavior on hours worked or taxes avoided. Compensation bargaining on the other hand is found to be present in the Scandinavian countries. It is difficult to say at what degree. If not an inefficiency issue today, it might become one as the data show that the top 1% is highly prone to react to changes in top marginal tax rate through bargaining higher compensation.

Finally, I suggest a tax schedule with smaller and less salient jumps than Sweden and Denmark has today to reduce compensation bargaining without creating incentives to tax avoid for the top tax payers in the tax system.

¹ To be clear: Norway, Sweden and Denmark.

² Further on referred to as SPS.

Some level of inequality is usually a good thing for economic efficiency. It creates incentives to innovate, be creative, take education and work hard (Aghion, Akcigit, Bergeaud, Blundell, & Hemous, 2015).

Today there are in most cases value judgements lying behind taxation policy. A few economists have stated that economists only can contribute in a small degree giving advice on taxation policy because they believe a tax system must be based on the values of the people and not first and foremost economic efficiency (Hansen, 1999).

The scope of this thesis is labor compensation and mainly labor income taxation. This means leaving out capital income and other types of wealth. It is a weakness in this thesis, leaving out a possible source of income for high-income earners. Including capital would be a potential extension to include a broader part of the tax system in the thesis, but also using capital as a control variable for the behavioral changes that might occur when taxes are changed. Even do, this thesis is consistent with SPS' model, and will not include capital.

This thesis will try to give a recommendation on how tax systems in Scandinavia should be designed when addressing the issues of this paper. The goal is to look at the most efficient way of organizing the economy, more specific how to tax labor income.

When this is said, not only the traditional economic aspect will be taken into consideration. Social utility and allocations based on this is as relevant. This can be confused with a political point of view, but shall be seen as an economic measure for the optimal organization of the society and economy. When looking at Scandinavia in a global perspective income inequality is very low. Even so, income inequality has increased in these countries too and SPS have found a potential economic incentive that could explain the development.

The disposition of this thesis will be as follow: First, a short presentation of classical optimal taxation theory and their assumptions. Second, an introduction to the model and results of Saez, Piketty and Stantcheva. Third, the tax schedules in the Scandinavian countries will be briefly explained. Fourth, the data and results for the Scandinavian countries is presented. Here the different possible scenarios of changes in labor income tax will be discussed with use of previous literature. Fifth, descriptive data and a correlation measure will be presented, before a chapter discussing other possible channels and explanations not included in the theory. A short chapter where the top marginal tax rate results are presented will follow. Finally, a discussion and a policy recommendation is followed by some suggestions for further research.

2 Background

2.1 Classical Optimal Taxation Theory

Classical literature describes two effects on labor supply behavior when income levels change due to adjustments in tax and/or salary. In the example of increased income taxes, the worker will receive a lower salary if not changing its behavior. One possible behavioral change is the income effect, where the worker will increase its number of hours worked to receive the same salary as before the tax change. The other is the substitution effect. When taxes rise, the hourly wage that the individual receive will decrease, making leisure relatively cheaper than before. The worker will therefore choose more leisure. In the example of taxation, these effects pull in opposite directions, making the reaction to the tax change smaller in total (Rosen & Gayer, 2008).

The theories on efficient taxation agree that changes in behavior due to taxation is economic inefficient (Hansen, 1999). A change in behavior happens when the individual's elasticity is not zero. From this, one could claim that an efficient tax system is a system where people's behavior is not changed.

The optimal tax from an economic perspective is a lump-sum tax because this tax would not create an excess burden. Lump-sum tax might be the optimal option, but in realistic terms not possible to pursue. Literature on taxation present many reasons for this, where social fairness, welfare and the individual's utility being based on others well-being as a few of the main reasons. Research³ also advocates that what is inelastic should be taxed heavily with the aim of reducing welfare losses, where lump sum tax would not affect behavior in any way and therefore be the most economically efficient (Rosen & Gayer, 2008).

Another key point in the classical optimal taxation theory is the assumption that the worker will respond to whatever incentives the tax system provides. This means that the worker will respond fully rational and according to their elasticity. The discourse⁴ within optimal labor taxation theory has been based on the assumption that labor supply is approximately perfectly elastic. With this assumption follows

³ For an overview, see Rosen and Gayer (2008), chapters 16 and 18.

⁴ See for example Papp and Takats (2008) for an overview.

many consequences. When labor supply is perfectly elastic, taxing labor income will change the worker's behavior in a large degree. When adding the assumption of a perfect competitive labor market, taxing labor will create large efficiency costs. Given that labor supply is elastic, taxing the rich to redistribute to the poor will reduce the incentives to work for both the rich and the poor, creating a double negative effect (Rosen & Gayer, 2008).

Another consequence when assuming a perfect competitive labor market and perfect elasticity is that a high marginal tax relative to the average tax level will reduce economic efficiency (Rosen & Gayer, 2008). This is because the relative high marginal tax will change the individuals labor supply. With low labor supply wages are pushed upwards which also can be inefficient (Hansen, 1999). Traditional studies have reached the conclusions that short-run labor supply is inelastic but labor supply is perfect elastic in the long run. This has been challenged in newer literature (Goolsbee, 1997; Rosen & Gayer, 2008).

Within economic theory, bunching at kink points is a different aspect of changed behavior due to taxation. In Scandinavia, bunching at kink point can be an additional issue to take into consideration due to their tax schedule designs. Kink points is where the budget line changes, in example where the marginal tax rate jumps from a percentage to another. What has been theoretically discussed and empirically proven, is that individuals bunch around kink points, thus where the budget line changes (Saez, 2012). Due to bunching, one would be able to observe that individuals would stop working (or start tax avoid) when the marginal tax rate jumps to a higher rate. Some research that have been made on bunching in tax schedules suggest that the jump in the marginal tax rate must be a substantial and salient one for bunching to happen (Chetty, Looney, & Kroft, 2009). Bunching create local distortions within a tax system, being an efficiency problem in itself.

Optimal taxation theory focus on the elasticities of the taxed good. This thesis will focus on elasticities of labor supply, tax avoidance and compensation bargaining and their effect on economic efficiency within tax schedules.

2.2 Saez, Piketty and Stantcheva's Model for an Optimal Top Taxation Rate

Saez et.al. (2014) observe that an increase in income inequality and an income concentration at the top 1% over the last decades has happened. Their paper tries to explain why this has happened and in what way it is inefficient. SPS develops a model on how to reach an optimal income tax based on economic theory and data. They show that the response on labor taxation depend on three fundamental

elasticities, introduced stepwise: the elasticity of labor supply, tax avoidance and compensation bargaining.

SPS begin by analyzing the role of labor supply elasticity. According to classic literature on labor supply and taxation, employees will change their supply of labor when taxes changes. Their labor supply elasticity is therefore assumed well above zero (thus an elastic labor supply). SPS questions this assumption and argues that labor supply is close to inelastic, which makes labor income efficient to tax. The definition of labor supply that SPS use is a broad definition include hours worked, intensity of work and career choices. They also assume away income effects, due to tractability, simplicity and the assumption that the effect would be small.

This leaves substitution effect as the change in behavior of the individual. The substitution effect should have the largest effect amongst top earners because leisure is relatively more expensive for this group, giving a higher change in payed tax if taxes were to change. When assuming labor supply is inelastic, workers will not change their labor supply when changing the tax levels. A high tax rate on labor will not create an excess burden and therefore be economic efficient.

Saez et.al. (2014) start with the standard model of supply-side response⁵. The standard model of supply-side response is SPS's model for the elasticity of labor supply (e_1). They present a formula for the aggregated elasticity of income in the top tax bracket with respect to the net-of-tax rate. The formula is the standard elasticity for real economic responses for labor supply effects, where τ is the marginal tax rate and z is taxable earnings.

$$e_1 = \frac{1 - \tau}{z} \frac{dz}{d(1 - \tau)}$$

However, previous literature (Papp & Takats, 2008) suggest that when increasing (marginal) tax rates there would be more tax avoidance. This is due to higher taxation making it more profitable to do so because of the relative price of punishment of tax avoidance. SPS defines tax avoidance as “changes in reported income due to changes in the form of compensation but not in the total level of compensation” (Saez, Piketty, & Stantcheva, 2014, p. 235). An example in the Scandinavian countries could be changing the compensation from labor income to i.e. stock options due to the tax on capital being lower than the tax on labor income. When adding tax avoidance (e_2) to the formula, the fraction of behavioral response of taxable earnings (z) to the derivative of the marginal tax rate (τ) is added to the elasticity, and we get:

$$e_2 = \frac{1 - \tau}{z} \frac{dx}{d(\tau - t)}$$

⁵ For the mathematical background of the models see Saez et.al. (2014) page 234-245.

Where x is sheltered income and t is the uniform and constant marginal tax rate for the sheltered income, which is lower than τ .

SPS further argues that changing the individuals underlying preference is difficult, but changing the tax system to avoid opportunities is realistic. SPS' model sees tax avoidance and evasion as a legal problem that would be reduced when covering the legal loopholes in taxation laws. The degree of tax avoidance due to increased taxes depends on the tax system design and the possibilities the tax system offers (Saez et al., 2014).

As for the last channel, SPS argues that top earners through the compensation bargaining channel have an inefficient economic effect, and that this is where the big inefficiency problem lies. When the marginal tax rate is low, the incentive to negotiate higher compensation is larger. This due to the cost of the negotiation becomes relatively lower when the marginal tax rate is low. These changes in relative price is larger the higher the wage. Or from the worker's perspective – they can keep a larger part of the increase wage in their own pocket. As SPS writes "(...)executives can be overpaid if they are entrenched and use their power to influence compensation committees" (Saez et al., 2014, p. 238). When negotiating a higher compensation, the income increase will be bigger when the tax rate is low and vice versa. SPS also believes that this rent seeking opportunity has a skewed distribution in the population, making it more profitable and executable for high income earners. From this we can assume that compensation bargaining is a larger problem in the top 1% income share relative to the rest of the population. To calculate the bargaining elasticity, the formula uses the real labor supply elasticity model and the derivative of b which is the bargained earnings. e_3 is therefore the elasticity of the individual's compensation bargaining if taxes change.

$$e_3 = \frac{1 - \tau}{z} \frac{db}{d(1 - \tau)}$$

Compensation bargaining is inefficient in three ways. First, when the incentives to negotiate higher compensation is big, the worker is paid more without increasing their actual productivity; thus the pay does not equal their marginal economic product. Second, the ones able to negotiate their compensation is normally top earners, creating a larger income gap. This has shown to have negative effects on economic growth⁶. As the article states; "[b]argaining is a wasteful effort that shifts resources without any real productivity effect" (Saez et al., 2014, p. 243). Third, it is reasonable to believe that economic power leads to actual power (Hansen, 1999). When using their power to affect taxes follows even lower marginal tax rates for high income takers. This again leads to more compensation bargaining. Governments would therefore want to discourage this type of behavior.

⁶ The possible effect of economic growth will be discussed in chapter 3.4.2 in this thesis.

Combining the elasticity formula, SPS show that the total elasticity for taxable income e is the sum of these three elasticities; $e = e_1 + e_2 + e_3$. The optimal marginal tax rate for the top income bracket will therefore be:

$$\tau^* = \frac{1 + \tau \cdot a \cdot e_2 + a \cdot e_3}{1 + a \cdot e}$$

Where $a = z/(z - \bar{z}) > 1$, thus a equals the quota between taxable earnings and taxable earnings minus average earnings. The level of a must be higher than 1 to have an income to be taxed with the top marginal tax rate. The top marginal tax rate will therefore apply for all income levels above average earnings.

If tax avoidance (e_2) is removed by the government as it is considered by SPS as a legal problem, thus given $\tau^* = t^*$, we have that $e = e_1 + e_3$. The formula then become:

$$\tau^* = \frac{1 + a \cdot e_3}{1 + a \cdot e}$$

This is the optimal marginal taxation rate for the top bracket income earners, dependent of the three elasticities.

The conclusion of the model is that the top tax rate can be “higher than commonly assumed” (Saez et al., 2014, p. 233). The quantitative evidence presented is based on US data and partly international data. There is evidence for compensation bargaining in the SPS research. The most important one being the almost perfect negative correlation between marginal tax rate and pre-tax income for top 1% income earners, when controlling for economic growth, time trends, and country fixed effects. What SPS interprets of this result is that when the marginal tax rate is low, the economic incentives for compensation bargaining is higher, and the individuals act accordingly. This effect will be much higher for high income takers. The top 1 % income share will therefore increase when there is a low top marginal tax rate and decrease when the top marginal tax rate is high. Changes in relative CEO pay when marginal tax rates changes are also presented, giving support for this theory. (Saez et al., 2014).

2.3 Tax Schedules in Scandinavia

In an international perspective, the Scandinavian countries have high top marginal tax rates on labor income. At what level of income the top tax rate begins is different among the countries, as well as the maximum marginal tax rate. Sweden has a top marginal tax rate at 57%, Denmark 55% and Norway has a top marginal

tax rate at 47%. As of taxes on capital the three countries differ. Denmark has the highest tax on capital at 42%, while Norway as the lowest at 25% (Skatteetaten, 2012; Skatteministeriet, n.d.). Sweden has a tax rate on capital of 30% (ESAO, n.d.).

The Swedish tax schedule for income taxation has two rather big jumps in marginal tax rate. The two big jumps are the jump from local government tax to state tax and the jump from state tax to the increased state tax (“värnskatten”). In the Swedish tax schedule, bunching by self-employed has been detected (Bastani & Selin, 2014) as well as bunching of wealth (Seim, 2013). With the highest jump in marginal tax rate being at a yearly income of 645 000 SEK, the top income earners have no incentives to bunch due to their yearly income being much higher. Self-employed can be compared to CEO’s and other employments behavioral- and opportunity wise, with the possibility to change the way of receiving compensation. With jumps in marginal tax rate at higher income levels, bunching by CEO’s and others with similar positions could be expected.

The Danish tax schedule is very similar to the Swedish one, with a few big jumps in marginal tax rate. In Denmark, the threshold for reaching the top marginal tax rate is significantly lower than the two other countries, leaving out bunching even for many self-employed. The Norwegian tax schedule for income taxation has more but smaller jumps in the marginal tax rate. The largest jump being at circa 10%, where Denmark and Sweden have their biggest jumps at around 20%. As for bunching, Nybakk (2015), shows that there were not possible to prove any significant bunching in the Norwegian tax schedule.

3 Scandinavian Case

This chapter will investigate the three channels separately using literature to provide an estimate of the elasticities for Scandinavia. To be able to apply the model by Saez, Piketty and Stantcheva, the elasticities for labor supply, tax avoidance and compensation bargaining are needed and will be presented individually in this chapter.

3.1 Labor Supply

There are many factors that can affect labor supply. Every country has different social system and benefits, tax systems and employment regulations that might affect the supply of labor. The Scandinavian countries are very similar in a worldwide perspective. The social system and benefits are very alike, with free schooling, unemployment insurance and free health care. When comparing the European countries and the US, Bargain, Orsini and Peichl (2014) show that tax-benefit system, demography and wage per hour level does not affect labor supply significantly. They reach the conclusion that the differences between countries are in fact differences in workload preferences. I will further on in this thesis assume that the labor supply elasticities of the Scandinavian countries can be assumed to be the same, thus, the three populations have similar workload preferences. Because there is a limited amount of research made solely on labor supply elasticities in Denmark, Sweden and Norway, I will supplement my discussion with research from other countries to estimate the concrete labor supply elasticity.

When looking at labor supply elasticities in research, the research on US data is normally divided in (married) male and female labor supply elasticities. Empirical evidence has showed that women are more sensitive to changes in income levels and more often stays at home or reduces their workload. This might be changing, especially in the Scandinavian countries where equality and economical independence have been increasing the last decades.

Newer research using US data has reached the conclusion that since the 1980, the female labor supply elasticity and labor participation respond substantially less to changes in tax policy (Bishop, Heim, & Mihaly, 2009). Assuming that female labor supply elasticity is moving towards the male elasticity would seem reasonable. Looking at data for the female labor participation rate for the US and the Scandinavian countries, the trend Bishop et.al (2009) finds for the US

would be applicable for Norway, Sweden and Denmark. If anything, the trend would be stronger in the Scandinavian countries due to the labor participation rate amongst females are higher in all three Scandinavian countries compared to the US (Key Indicators of the Labour Market database, 2016).

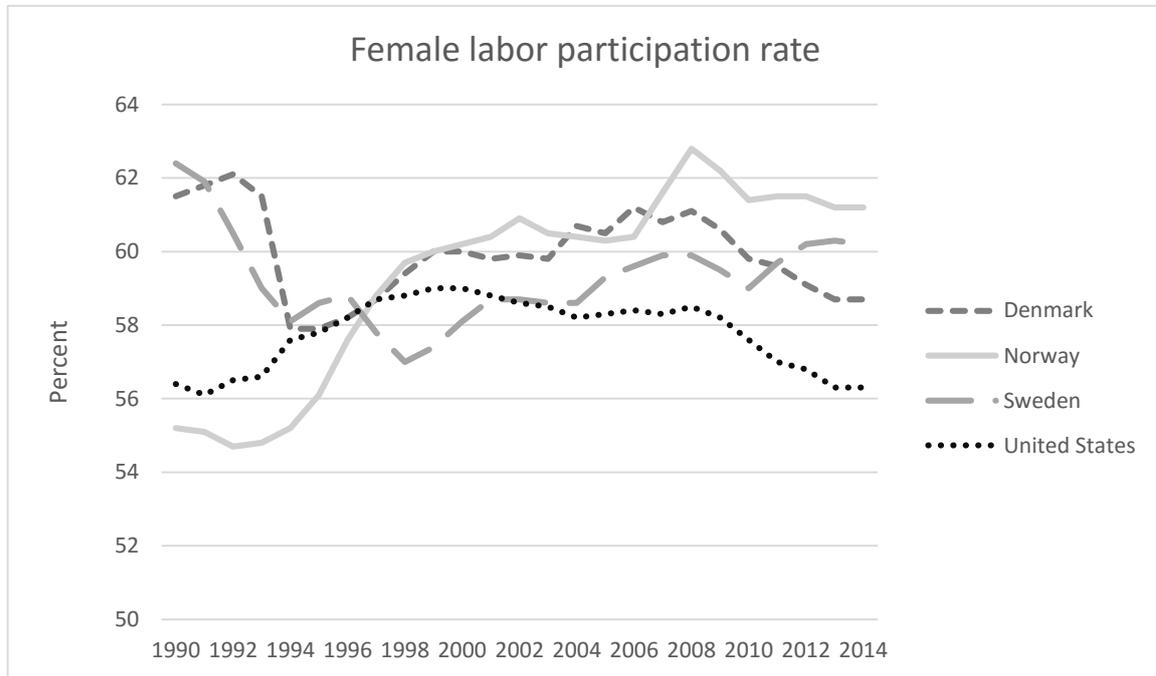


Table 3-1. Female labor participation rate

There have been several attempts at calculating the labor supply elasticities in Sweden, many of them using data from the 1980's or earlier. Aronsson and Walker (1997) gathers the results from these studies and finds that the labor supply elasticities calculated are very alike and not very affected by changes in tax policy⁷ (Thomas Aronsson & James R. Walker, 1997). Blomquist and Hansson-Brusewitz (1990) finds that married Swedish males has a labor supply elasticity with respect to income between 0.02 and 0.08 while for married females the elasticity is calculated to be between 0.03 and 0.243 depending on calculation method. The female labor supply elasticity width is very large, and due to the choices of calculation methods of the different elasticities it would be reasonable to assume the true value is closer to 0.03 than 0.243 (Blomquist & Hansson-Brusewitz, 1990). The lowest calculated elasticities for women and the elasticities for men is close to a perfect inelastic labor supply.

The reasons for labor supply being close to inelastic could be many. Research has suggested that fixed work hours can be a large determinant, give that there are few job where the worker himself can adjust the hours solely on preferences and changes in income and taxation. It is reasonable to assume a big effect on the labor supply elasticity given that firms require fixed hours of work (Chetty,

⁷ Schematic presentation of the included studies can be found in Aronsson and Walker (1997) page 240.

Friedman, Olsen, & Pistaferri, 2011). A competitive labor market might contribute as well as future prospect like raise in wage or promotions.

Bargain et.al. (2014) shows in their research that selected European countries and the US has quite similar labor supply elasticities. The labor elasticities they find is very low, close to zero, for almost all countries. They find that the labor supply elasticities for married men in both Sweden and Denmark is less than 0.01, and the results are quite the same for married women, all elasticities with a significance level of 95% (Bargain et al., 2014). Norway is not included in the dataset. A labor supply demand elasticity of less than 0.01 is an inelastic elasticity where labor supply is close to perfect inelastic. When economic factors change, and is very close to being perfect inelastic changes 0.01 percent when taxes changes by 1 %. These are not unexpected result and there can be several underlying effects contributing. The labor supply elasticity will further on not be divided in male and female elasticities due to their similarity.

First, institutional reasons for inelastic labor supply can be affecting the Scandinavian labor supply, one of them being the presence of union. Chetty et.al. (2011) includes unions as an affecting factor on labor supply. They present a model where unions will bargain until the worker's hours per week meets the preferences of as many workers as possible. In that way, most employees work approximately as many hours as they prefer and the firm requires and offers only jobs that holds this set of hours. This can contribute to a more inelastic labor supply.

Second, estimating a labor supply elasticity for the top 1% income share is necessary. Intuitively, given that those in the top 1% income share usually has high standing and time limited jobs, it would be difficult for the worker to reduce hours worked. A CEO is expected to work as many hour as the job demand and it is not very likely to have that type of job with strong preference of working fewer hours or dependent on the changes in tax levels. Assuming that the firm requires fixed number of work hours is thus reasonable in these levels of income. Therefore, assuming that the top 1 % income share would have a lower elasticity than average would be reasonable. (Saez, Slemrod, & Giertz, 2012)

To conclude, the labor supply elasticity in the Scandinavian countries is very low, not far from perfect inelastic. Significant changes in labor supply when changing the marginal tax rate seems very unlikely when the labor supply elasticity is this close to zero. When focusing on high income earners, it would be reasonable to believe they are to some degree less elastic than the general population. A raise in taxes on high income takers would therefore not create large excess burdens and be an efficiency problem based on labor supply.

3.2 Tax Avoidance

Tax avoidance is described by Saez et.al (2014) as changes in how the compensation is received without a change in the total level of compensation. Given that the elasticity for tax avoidance is elastic, people will start to or increase their tax avoidance when taxes increase. The purpose of tax avoidance is to pay less taxes on the same income. Tax avoidance is potential to occur when taxes rise, due to the relative price of punishment becoming cheaper, making the potential cost of tax avoidance lower relative to paying the taxes. If the elasticity is closer to inelastic, individuals will not change their behavior if taxes were to change. Previous literature has assumed that individuals are perfectly rational and informed, reaching the conclusion that higher taxes will lead to higher tax avoidance. There must be differentiated between legal and illegal tax avoidance. Legal tax avoidance is not considered a problem and is only contributing to the effectiveness of the tax system as long as the tax system is complete.

In a randomized tax audit study from Denmark, Kleven et.al (2010) finds that when removing the 5% self-reported incomes, tax avoidance rate is very small, only 0.3% of the included individual was in some way tax avoiding (Kleven, Knudsen, et al., 2010). The results points toward Danes being very inelastic in tax avoidance when taxes change, only small effect are observed when the marginal tax rate is increased. The study could not distinguish if the tax avoidance that existed was due to lack of knowledge by the tax payer or tax avoidance on purpose.

There are several reasons for this. First, the risk of detection is found to have a strong effect on tax avoidance. This can be explained by the rational behavior of individuals, being sensitive for the level and possibility of being detected and punished.

Second, what differs Scandinavia from the US is the third-party reporting system of taxable income. In all three Scandinavian countries it is the firm and not the individual that reports the income to the tax authority, leaving less room for tax avoidance (Kleven, Kreiner, & Saez, 2009). Strict regulations of employees and the board of larger firms is also a part of the explanation presented by Kleven et.al (2009). Smaller firms and therefore closer relationship between wage setters and wage receiver will create more possibilities for unethical decisions, resulting in increased tax avoidance.

Third, the tax avoidance response is also found to be somewhat enhanced close to large kinks in marginal tax rate. Less salient jumps in marginal tax rate is therefore suggested to remove it as an incentive to tax avoid (Chetty et al., 2009; Kleven et al., 2009).

Fourth, the reason for Scandinavia to possibly be less elastic when it comes to tax avoidance and changes in tax levels is the social aspect (Saez et al., 2014). Social norms might affect in larger degree in smaller countries built on social democratic values where the society is considered a social cooperation. This is a variable difficult to measure and study, but should be mentioned, as Saez et.al (2014) and Kleven et.al. (2009) does.

The elasticity for the whole population does not necessary reflect the elasticity of the highest income takers. Top earners should have more power to affect the timing and way of receiving compensation, which leads Goolsbee (1997) to conclude that top earners should have the largest changes in tax avoidance when taxes change. If so, top earners should have the highest elasticity in tax avoidance. Goolsbee (1997) uses US data on several thousand corporate executives to investigate what happens when they are being taxed. He finds that in the short run, many will tax plan to avoid higher taxes, but that this is not feasible in the long run which means that the long run elasticity is low.

Goolsbee (1997) further show that there is a small increase in the US in non-taxable income when the marginal tax rate increases. This is mainly due to tax planning made in advance of the tax adjustment to minimize the tax burden. This is only possible to do in the short run, and as Goolsbee writes: “When the dust settles, however, the total reduction in taxable income may be modest and the dead weight loss of progressivity not nearly as large as claimed by existing literature” (Goolsbee, 1997, p. 28). He concludes that an increased marginal tax rate in the US for top earners have more or less insignificant effects, and the effects observed is temporary (Goolsbee, 1997). The long term elasticity found in the study is 0.07 which leads to the conclusion that when taxes change, the high income takers will increase their tax avoidance minimally. Top earners in the US does not tax avoid much more when taxes increase, and is therefore rather inelastic according to Goolsbee (1997).

Using the results of Goolsbee (1997) as the elasticity measure for Scandinavia could seem reasonable. The biggest difference in US and Scandinavian tax law for income is the Scandinavian requirement to tax of what is in the US is called nontaxable compensation. This could be covered phone bills, cars, holidays and other benefits. With this in mind, it is likely that the elasticity for the Scandinavian countries is bias toward even more inelasticity than the US results. Another factor to have in mind is that the marginal tax rate for the top income takers in all three Scandinavian countries is higher than in the US. This could give the output of the relative price of tax avoiding in Scandinavia is lower, and the results that Goolsbee finds only applicable to Scandinavia taking into consideration that the elasticity could be bias towards somewhat higher. Taking all these arguments into account, Chetty et.al (2011) finds little tax avoidance generally in Denmark, leading to the conclusion that it is likely that the tax avoidance elasticity in Scandinavia is somewhat lower than in the US.

The research and theoretical work on tax avoidance suggest that for high-income earners, there is only a short run effect on tax avoidance when adjusting the tax levels for top earners. Tax avoidance elasticity can be assumed to be close to zero in Scandinavia. This is due to the cost of punishment, third party reporting, social norms and few avoidance possibilities in the tax system. Having a tax system without bunching or other economic incentives to tax avoid, the elasticity can be approximated to zero.

3.3 Compensation Bargaining

According to the Saez et.al (2014) model, compensation bargaining (or rent seeking) is an inefficiency problem due to wages increasing without marginal productivity increasing. The cost of bargaining higher compensation for the worker is lower when the marginal tax rate is lower. This is because the worker then receives relatively more of the bargained compensation themselves, which again increases the incentive to bargain higher compensation. The effect is larger the higher income the individual have.

SPS assume that the whole increase in income inequality is because of the possibility the top share has to bargain higher compensation, creating a larger gap in economic and political power. Aghion et.al (2015) finds that parts of the increase in income inequality is based on innovation. They find that the increase in top 1% income share is based on more income in the economy in total. The lower income levels in not decreased, but the top has increased (Aghion et al., 2015).

Based on the model of SPS, rent seeking in Scandinavia should be less of a problem due to the high marginal tax rate in all three countries compared to the US. Even so, marginal taxes have changed over time and is not at the highest level historically. Tendencies of compensation bargaining should therefore be possible to observe. At the same time, the income level at which top marginal tax rate is reached is far below the income levels of the top percent and this might be an enhancing factor on rent seeking. The Scandinavian countries could therefore be experiencing compensation bargaining as an inefficiency problem.

The data presented by SPS is consistent with rent seeking being an inefficiency problem. The strongest and clearest evidence presented is the highly negative correlation between pre-tax income share for top 1% and the top marginal tax rate. Further, changes in the level of CEO-compensation and its correlation with marginal tax rates is presented. The results show a relation between high CEO-compensation levels and low top marginal tax rates. Further, SPS leaves out labor supply and tax avoidance as explanatory factors of the increased income inequality, and assuming their model is correct compensation bargaining is the inefficiency

problem, and can be solved with higher taxes without individual's changing their behavior.

Panel A. Average CEO compensation

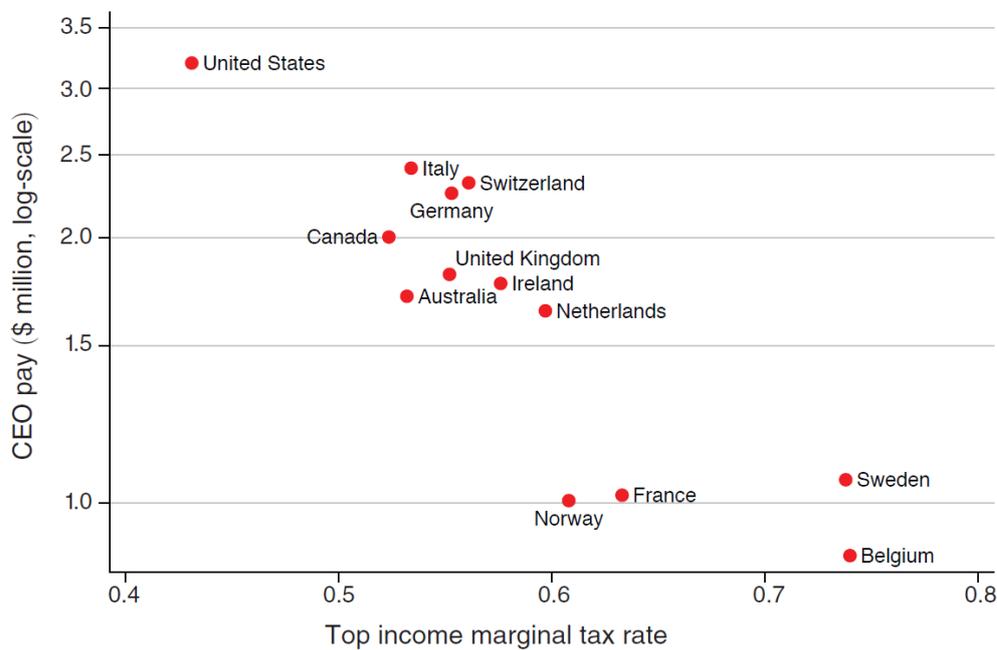


Table 3-2. CEO-compensation and top income marginal tax rate

3.3.1 Empirical Evidence of Compensation Bargaining

The top taxation wedge data used is collected from respective countries tax agency. The top 1% income share data is collected from The World Wealth and Income Database (Alvaredo, Atkinson, Piketty, Saez, & Zucman, 2016). Due to limitations presented as changes in tax systems, other historical disturbances and data quality, the data used differs between the countries. For Norway the years 1960-2010 is used. For Sweden the timeframe is 1950-2012, while for Denmark the years included is 1980-2009. Having the possibility to include as many years as possible for all countries is optimal. There has been rather large changes in the top marginal tax rate throughout the years included for all three countries even if they differ in number of observations, this is a wide enough time frame to investigate changes in pre-tax income and variance in marginal tax rate with a degree of certainty.

The main evidence on compensation bargaining presented by Saez, Piketty and Stantcheva is the clear negative correlation between pre-tax top 1% income share and the top marginal tax rate in the US. The descriptive statistics for Norway, Sweden and Denmark seem to be giving the same results. The descriptive results can be interpreted as compensation bargaining being an effect of lower top marginal

taxes. Lowering top marginal taxes incentivizes rent seeking in the top income share, creating inefficiency in the economy.

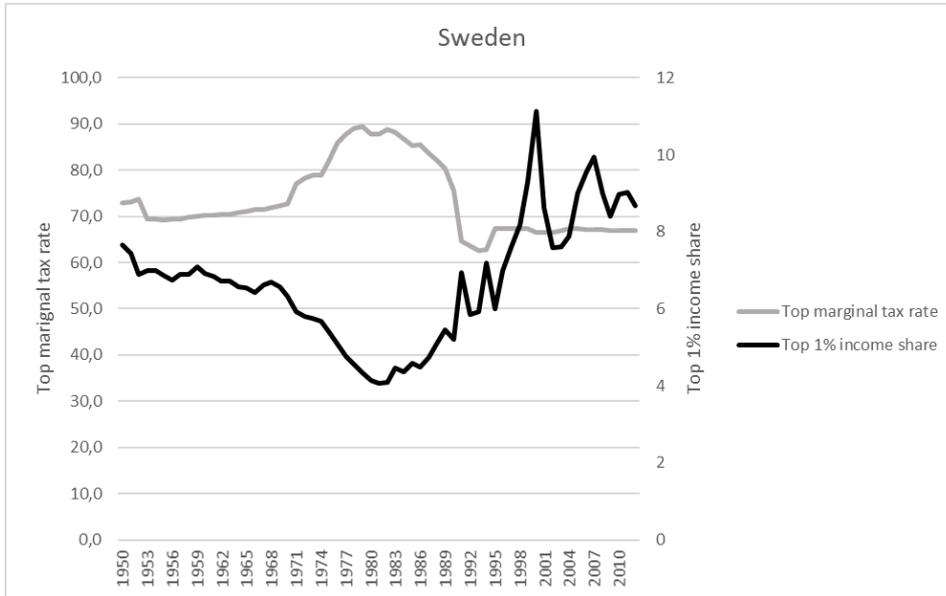


Table 3-3. Sweden - top marginal tax rate and top 1% income share

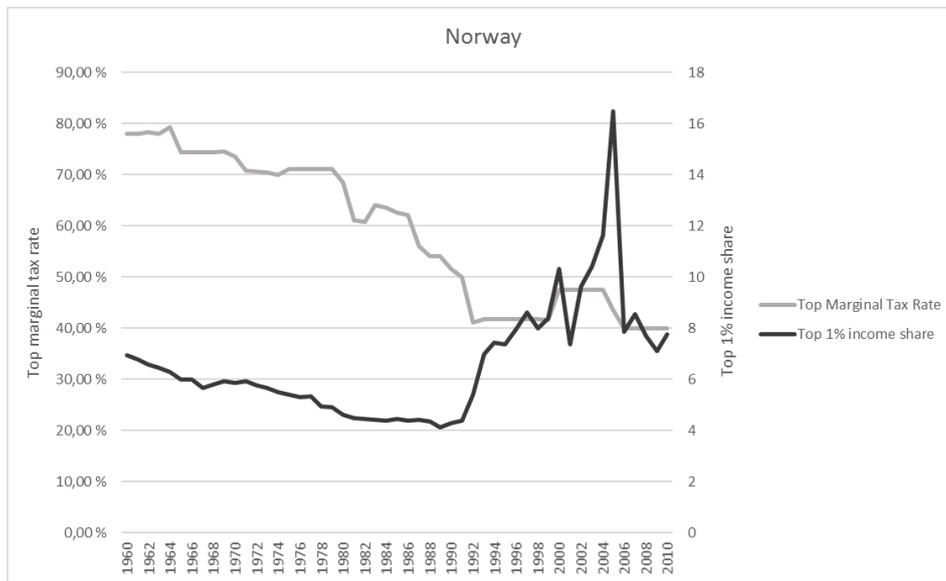


Table 3-4. Norway - top marginal tax rate and top 1% income share

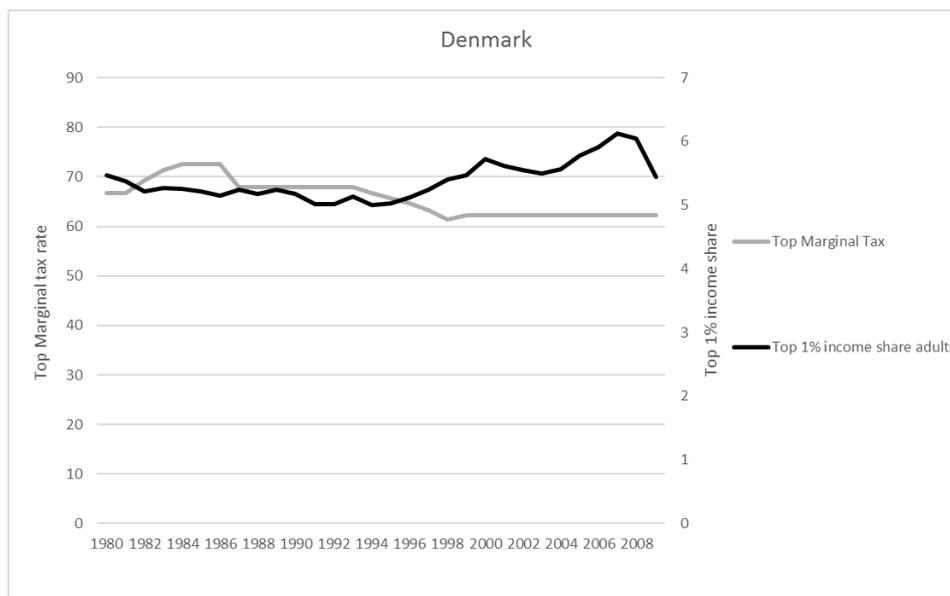


Table 3-5. Denmark - top marginal tax rate and top 1% income share

In the descriptive graphs, disturbances are also very easy to observe. For Norway and Sweden, reforms in tax schedules and different financial disturbances can be observed in the large jumps in the top 1% income share. Denmark has not gone through as large changes in the tax schedule affecting the top 1% income share and has therefore no large peaks and sudden changes in their top 1% income share.

The correlation tested is the correlation between the top marginal tax rate and the top 1% income share. The correlation can take the values of -1 to +1, where -1 is perfect negatively correlated while +1 means perfect correlated data. A coefficient of 0 means there is no correlation (Dougherty, 2011). I also test the period before 1995 and the period after to control for the large disturbances observed in Norway and Sweden's descriptive data.

	Norway		Sweden		Denmark	
Year from	1960		1950		1980	
Year to	2010		2012		2009	
Years	Number of observations	Correlation	Number of observations	Correlation	Number of observations	Correlation
<- 1995	36	0.1381	46	(-)0.8697	15	0.1257
1995 ->	16	0.4165	18	(-)0.3652	15	(-)0.6337
All years	51	(-)0.4777	63	(-)0.8040	29	(-)0.6467

Table 3-6. Correlation measures for the Scandinavian countries

The correlations in table 3.6 suggest as SPS finds for the US, a relative high correlation between the top marginal tax rate level and the top 1% income share for Denmark and Sweden. The correlation is quite strong and consistent with the result of SPS. What benefits these results is that the data is time-series with the last data within recent years. For Norway, there does not seem to be the same correlation. On the descriptive table it is possible to observe negative trends for both variable, not being consistent with SPS' model of compensation bargaining. In further

research it would be useful to test this correlation controlling for changes in tax schedules, taxes on capital, financial interruptions and other factors likely to affect the results.

Using CEO's as proxy for those in the top 1% income share, table 3.2 show that the Scandinavian countries had relatively high marginal tax rates, therefore lower shares of income concentrated in the top 1%. This also suggests that compensation bargaining is a smaller problem in Scandinavia than in for example the US. Even so, the correlation measure suggests that the individual's behavior is the same, leading to inefficiency. A possibility if data was available would be looking at the level of CEO compensation over time and their correlation with top marginal tax rate. This would give stronger implications of their relation over time.

With appropriate data, it would be valuable to perform a regression with top 1% income share as the dependent variable (Dougherty, 2011). In such a regression, control variables like financial stability, changes in tax schedules and tax level on capital would be included. Government spending, level of education, economic growth and intensity of work are other variables that could have an effect on the results and would have been optimal to include in such a regression. Using panel data with for example all OECD countries would also be a useful alternative studying this problem.

Further, performing a lagged regression would also test the possibility of a reversed causal relationship. With a theoretical approach as this thesis, causality is difficult to prove. A lagged regression would give greater support to the causality of the theory and the correlation measure, giving more strength to the suggestive evidence of the correlating top marginal tax rate and top 1% income share (Angrist & Pischke, 2009).

With the descriptive data and the correlation measure, claiming that a compensation bargaining elasticity is elastic in Sweden and Denmark is reasonable. The descriptive statistics gives the impression that the elasticity is near to unit elastic, while the correlation measure implies a somewhat lower elasticity.

To summarize, data suggest that compensation bargaining exists in Sweden and Denmark but not in Norway. CEO compensation data suggest it is a smaller problem in Scandinavia than the US, but if marginal tax rate changes, the high income earners are prone to rent seek.

3.4 Other Channels

This section discusses other potential channels that can affect the optimal tax rate. Further in this thesis they will not be included as the thesis result is calculated based on the SPS model. Even so, how other channels could affect the optimal top tax rate is presented below and how they can be valuable potential extensions.

3.4.1 Tax Migration and Tax Competition

One aspect that SPS theory does not discuss is the global context in which tax is set today. Tax migration and competition as considerations countries and regions have to make in their tax policy, creating a pressure towards lower taxes (Kleven, Landais, & Saez, 2010). This is on big weakness with model SPS present. The difficulties with tax migration when trying to study their impact and range is the shortage of appropriate data. Globalization is affecting the decision-making of both individuals and countries, creating more competition in taxation and more mobility for individuals and therefore also possibly increasing the elasticity for individuals to react to tax changes. Including tax competition and migration as a behavior changing channel for tax payers could increase the coverage level of the model. Tax competition and migration would also be more applicable if capital and corporate taxes was included.

Assuming that people have a high mobility and therefore increases the tax competition can be a discussed assumption. In the US, people are very mobile. There is no language or culture barriers and very few administration barriers. The situation could be different for the Scandinavian countries. The language barriers, cultural differences as well as the administrative work when moving to another country can be higher for Scandinavians. The EU has lowered these barriers within Europe, but language and culture can be large determinants for individual's mobility.

3.4.2 Taxation and Economic Growth

Within taxation theory and debate, the effect taxes have on economic growth has been to a large degree discussed. SPS finds no correlation between economic growth and change in top marginal tax rate using data from 1960-1964 and 2006-2010.

Panel A. Growth and change in top marginal tax rate

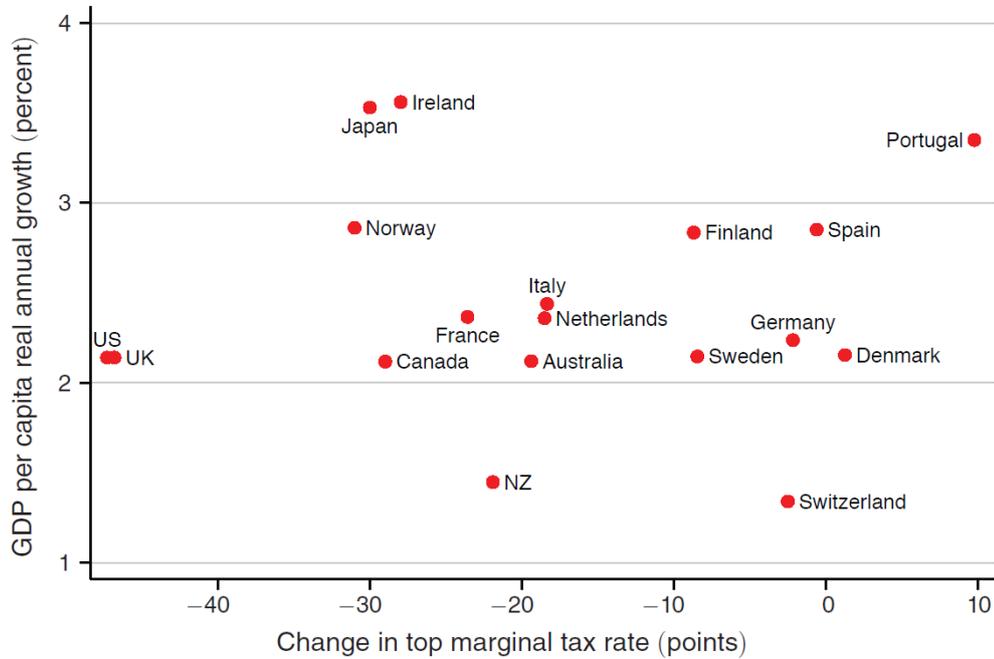


Table 3-7 GDP per capita (annual growth in percent) and change in top marginal tax rate (points) 1960-1964

Panel B. Growth (adjusted for initial 1960 GDP)

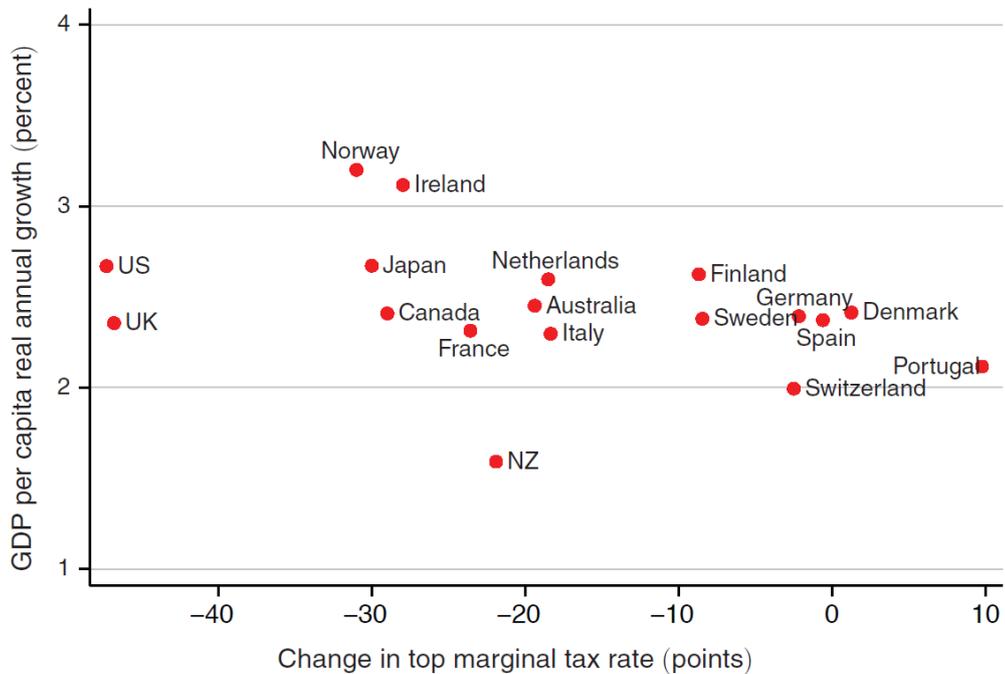


Table 3-8. GDP per capita (annual growth in percent) and change in top marginal tax rate (points) 2006-2010

The argument used is that high taxes leads to high tax revenue. This again leads to more government spending on for example education and infrastructure which again is proven to increase productivity of the population (Helms, 1985) (Rosen & Gayer, 2008). Even so, other researchers come to contradictory conclusions. The research on taxation and its effect is very divided. Some studies reach the conclusion that taxation is not a determining factor for economic growth. The findings suggest that the efficiency of the government and spending choices gives larger results (Karagianni, Pempetzoglou, & Saraidaris, 2015) (Tamai, 2015).

Because Saez et.al (2014) solely takes labor taxes into account this might give a skewed result. Looking at the whole tax system including taxes on capital and firms would give more strength to SPS conclusion of having high labor income taxes for the top income takers.

Further on I will assume away other potential channels that affect the optimal top tax rate in consistency with SPS.

3.5 Hypothetical Results for Optimal Top Taxation Rate

Combining all the result we end up with a table showing the elasticities of labor supply, tax avoidance and compensation bargaining. The elasticities are approximations for labor supply and tax avoidance as the respective chapters concluded. The elasticity of compensation bargaining differs among the three countries, I use 0 for Norway and 0,5 for Sweden and Denmark in this calculation. I use the hypothetical value of 0.02 for labor supply elasticity consistent will the result found earlier. For tax avoidance the value of 0.01 is used.

	Norway	Sweden	Denmark
e ₁	0,02	0,02	0,02
e ₂	0,01	0,01	0,01
e ₃	0	0,5	0,5

Table 3-9. Table of elasticities

Using these elasticities in the formula SPS derived in their model, we can test to calculate the optimal top marginal tax level for Norway, Sweden and Denmark.

$$\tau^* = \frac{1 + a \cdot e_3}{1 + a \cdot e}$$

Where a equal taxable earnings divided with taxable earnings minus average earnings, where a must be above 1. The average income in Sweden 2015 is 384 000

SEK, in Norway the average income is 426 100 and in Denmark it is 298 785 DKK.

If calculating the optimal top marginal taxation in Sweden for an income level at 1 000 000 kr, $a = 1,62337662$. Then we get through the model that the optimal top marginal taxation rate level should be 97 %. For Denmark the $a = 1,42609613$ and the optimal top taxation rate according to the model is 97.5 %. For Norway the optimal top marginal tax rate is 96.3 %. It is important to remember that these tax levels are marginal tax levels and therefore also reasonable if individuals are as inelastic as the estimated. Differences in the calculated results from what is expected can be explained either by underestimating the labor supply and tax avoidance elasticities, overestimating the compensation bargaining elasticity or that for the Scandinavian countries other channels (i.e. tax migration and competition) are important when trying to reach the optimal top tax rate. It is still valuable to show that the SPS model produces a top tax rate even if the results are not applicable in realistic tax system. With more correct estimates, the calculated tax rate would be more useful for tax policy.

4 Discussion

As this thesis has shown, labor supply in Scandinavia is inelastic, close to zero. Furthermore, it is shown that for high income earners, the elasticity would be even more inelastic due to their type of employment. The level of taxation will therefore not change labor supply significantly and more specifically not change the labor supply for high income earners. There are few studies made on labor supply over long periods of time, making it difficult to determine the very long term labor supply. Even so, it is to some degree reasonable to assume that the long term labor supply is more elastic than the short run elasticity affecting educational and career choices. Over a fairly long time, data has shown that labor supply is close to inelastic. Thus, top tax earners in Norway, Sweden and Denmark have an inelastic labor supply and will not react through changes in their supply of labor if the level of taxation changes and e_1 is approximated close to zero.

Tax avoidance of labor income is near to not existing in the Nordic countries. The group with the highest tax avoidance according to Chetty et.al (2011), self-employed are the most willing to tax avoid if taxes change or the tax system offers the possibility. Due to their ability to affect how to receive their compensation income earners in the top 1% income share can might have the same reaction pattern as self-employed. With an increased possibility to adjust the timing and way of receiving the compensation, it is reasonable to believe that top income earners have a higher degree of tax avoidance than the average. Even so, tax avoidance was show to be very low in Denmark. Applied on the whole of Scandinavia, the result is that tax avoidance is not a large occurring issue if marginal taxes were to rise. e_2 is therefore estimated to be very inelastic.

Compensation bargaining was the third estimated elasticity. Due to the lack of appropriate data, an accurate estimation was not possible to do. When looking at descriptive data and correlation measures of top marginal tax rate and the top 1% income share, it does seem to be elastic to some degree. This is somewhat speculative, but using the data available, e_3 gives an impression that the elasticity might be less than 1 (unit elastic) but more elastic than e_1 and e_2 .

By applying the model by Saez et.al (2014) on Scandinavia, compensation bargaining proves to be a potential source of inefficiency in the economies. If given the economic incentives of lower marginal tax rate, the top 1% income share will negotiate higher wages and create a productivity inefficiency and a skewed distribution of power. A high marginal tax rate will according to these results not create excess burden in the economy. The results would be more precise with data and the possibility to control for other variables. Due to the already relative high

marginal tax rate in the three Scandinavian countries, compensation bargaining might not be a large economic problem. Even so, given the opportunity rent seeking will most likely happen. What these results thus tells us it that when looking at labor income taxation there should not be a choice between efficiency and inequality. The optimal top marginal tax rate found for Sweden and Denmark is approximately 97 % while for Norway it is 96 %. The hypothetical result of the optimal top taxation rate shows that the model might have some weaknesses when applied to the Scandinavian countries and that estimating concrete elasticities can be rather challenging.

Given the conditions of inelastic labor supply and tax avoidance as income moving between the income shares in the top 1% income share, I find that the most efficient is higher taxation for the top 1% income share to avoid compensation bargaining. In Sweden and Denmark today, the tax systems incentivize to a certain degree tax avoidance for income levels close to the kink point in the marginal income tax schedule.

Based on the theory and research on bunching in tax schedules and my findings in this thesis, a smoother and more progressive tax schedule is my suggestion for income taxation in Scandinavia. Small and less salient jumps would contribute to reduce tax avoidance due to tax planning if taxes are raised to reduce compensation bargaining. These suggestions might have undesired effects outside the scope of this thesis, and when looking at the whole tax system of a country, the suggested policy might not be feasible

In further research using data to calculate the different elasticities and controlling for other variables would be useful. Including capital would be a valuable addition to include a different part of the income of the richest. In addition, it would be valuable to include tax competition and migration in the model, as an extension of the model by Saez et.al (2014).

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