



Linnæus University

Sweden

Bachelor Thesis

Capital taxation and investment behaviour

*A study of how the introduction of ISK taxation in
Sweden has affected households' investments*



Author: Kajsa Rudal
Supervisor: Spencer Bastani
Examiner: Dominique Anxo
Term: VT18
Subject: Economics
Level: Bachelor
Course code: 2NA11E



Linnæus University
Sweden



Abstract

The aim with this essay is to research how changes in marginal taxation of capital, changes households' investment behaviour. To be able to do so, the introduction of investment savings accounts, or ISK, in Sweden will be studied. This since the ISK can be considered a tax-subsidised investment form, and as such could provide insight of how the households change their investment patterns when their marginal tax of capital is reduced. To be able to assess whether this was in fact the case, the method difference-in-difference will be used. Due to many similarities in tax systems, Denmark is chosen as a reference group, to the treatment group Sweden. The result from the two difference-in-differences shows that the ISK taxation had increased the total value of the households' stock ownership, but that no significant change in the number of private stock owners could be observed.

Key words

Marginal capital taxation, ISK,

Acknowledgments

I would like to thank my supervisor Spencer Bastani, my examiner Dominique Anxo and my opponent Jacob Elander for their valuable input.



Table of contents

1	Introduction	1
2	Theoretical framework	3
2.1	<i>The individuals' allocation choice</i>	3
2.2	<i>The individuals' allocation choice given preferential taxation on capital gains</i>	5
3	Background	9
3.1	<i>Why Investment Saving Accounts (Investeringsparkonto, ISK)?</i>	9
3.2	<i>Is the ISK a tax-subsidised investment form?</i>	10
3.3	<i>Institutional conditions</i>	14
3.3.1	Sweden	15
3.3.2	Denmark	16
3.4	<i>Effective marginal tax rate in Sweden & Denmark</i>	17
4	Empirical analysis	18
4.1	<i>The usage of a difference in difference method</i>	18
5	Result	19
6	Discussion	23
7	Conclusion	25
8	Reference list	26

Appendices

Appendix 1 – ISK taxation example

Appendix 2 – Re-arrangement of expression 2.5

Appendix 3 – Re-arrangement of expression 2.4



1 Introduction

The question of how marginal capital tax changes affect investment behaviour is an important subject, with serious policy implications. The topic of marginal capital taxation is often in the limelight in heated economical discussions between right- and left-wing politicians. Despite this and its relevance for policy makers, the subject has in relation to its relevance been quite unresearched. For this reason, this study aims to investigate how changes in the recent introduction of Investment Savings Accounts, *ISK*, has affected the investment behaviour in Sweden. In contrast to most previous studies conducted on the subject a difference-in-difference method will be used, opposed to the earlier cross-section studies. Denmark will due to its similar tax structure be used as a control group.

As mentioned, several cross-section studies have been conducted on how different marginal tax rates affect assets allocation (Alan et al., 2010, page 813). These generally find that households' probability of holding certain assets rather than the amount invested in different assets seem to be stronger correlated to changes in marginal tax rate. This implies that investors take greater care in deciding in where to allocate assets rather than how much they should invest in these assets (Poterba, 2002, page 37). This is also what King and Leape find in their study based on cross-section survey data for American households in 1978, suggesting that the distortions caused by capital tax seem to affect investment allocation more significantly than the share of net wealth invested (King and Leape, 1998, page 189).

In a cross-section study from 1990 Agell and Edin show that Swedish households increase their leverage when tax rates are introduced on nominal interest income, suggesting substitution between bank savings and risky-assets (Agell and Edin, 1990, page 62). Similarly, in a study of French households'



reaction to capital taxation between the period of 2001 to 2013, Schalck finds spill over effects as taxes are levied on specific assets. Lower taxes on stocks have consequently not only positive effects on amounts invested in stocks, it would also have a negative effect on the amount invested in other financial assets (Schalck, 2017, page 134). Agell and Edin also find similar income distributional effects of capital taxation as Feldstein (Feldstein, 1976, page 648). High-income earners seem to hold larger portions of their wealth in capital stock than low-income earners given preferential tax (Agell and Edin, 1990, page 62). Alessie, Hochguertel and van Soest find in their study of panel-data in the Netherlands a correlation between high income and stock ownership, but no such relation for the probability of owning mutual funds. Further they find that preferential tax incentives seem to affect mutual funds to a higher degree than stocks (Alessie, Hochguertel and van Soest, 2004, page 795).

Alan, Atalay, Crossley and Jeon use the differences in taxation for married couples in USA and Canada, joint versus individual taxation, as an exogenous variation in marginal tax rate. They consequently compare different couples with the same incomes portfolios but with different marginal tax rates, to analyse households' portfolio allocations given tax rates. They find only significant differences in allocation given changes in tax rates for the top half of the income distribution, when they include the whole sample or the bottom half, the coefficient cannot be ruled out to be zero. Compared to the previous studies on cross-section data conducted by Poterba, King and Leape, among others, the result they find of changes in marginal tax rates for high income households are much smaller. Suggesting that changes in marginal tax rates only have limited distortionary effects. (Alan et al., 2010)



2 Theoretical framework

In this section Atkinson and Stiglitz's basic portfolio model, presented in *Lectures on Public Economics*, will be used to illustrate the different mechanism of capital taxation.

2.1 The individuals' allocation choice

The individuals' investment choice can be simplified to two choices. The first choice concerns which type of asset to hold, safe risk free assets which gives a certain rate of return, r , or risky assets which rate of return, x , in the coming period is uncertain. The second choice is in which proportion of the total investment, A_0 , to hold the safe asset, $(1-a)$, and the risky asset, a . The individual will try to maximize expected utility from the end of the coming period, by adapting his/her investment choice. The proportion to hold in risky assets, a , will thus be given by the following maximisation, where E is the expectation operator;

$$\max_a E[U(A)] = \int U\{A_0[1 + ax + (1 - a)r]\}df \quad (1.1)$$

and the utility function U is concave, i.e. $U' > 0, U'' < 0$, which is consistent with the individual being risk-averse. Given the constraint that a cannot be negative, meaning that the individual cannot issue own risky securities, the first-order condition of the expected utility maximization becomes as follows;

$$\frac{\partial}{\partial a} E(U) = E[U' \cdot (x - r)] = 0 \quad (1.2)$$

The expression will have a corner solution $a = 0$ if the expected rate of return of the safe asset is higher than that of the risky. We will thus continue with the assumption that $\bar{x} > r$. Given a simplification of the possible outcome of x , we can reduce the possible outcomes to two "states of the world", which allows graphical representation of the individuals portfolio possibilities:



State 1: Risky assets yields more than the safe asset, $x_1 > r$

State 2: Risky assets yields less than the safe asset, $x_2 < r$

Where State 1 has the probability p_1 of occurring and State 2, p_2 , and $p_1 + p_2 = 1$. The expected return in this case will be as follows:

$$E(U) = p_1 U\{[(1+r) + (x_1 - r)a]A_0\} + p_2 U\{[(1+r) + (x_2 - r)a]A_0\} \quad (1.3)$$

Figure 1 graphically illustrates the possible outcomes of the individual's allocation, given the two-state model. The horizontal axis depicts the individual's wealth in state 1, i.e. when the risky asset yields more than the safe asset, and the vertical axis shows the individual's wealth in state 2, when the risky asset yields less than the safe asset. Since the safe asset has the same rate of return in both states of the world, it is represented in the picture by a 45° line. Point S on the 45° line shows the value of the individual's assets if all is located to the safe asset, $a = 0$. Point T on the other hand shows the value of the portfolio had the individual placed all investments in risky assets, as is the case when $a = 1$. Due to the different yields of the risky assets, $x_1 > r > x_2$, the wealth will vary between state 1 and 2, as is depicted in figure 1. In state 1 the wealth in point T will be $A_0(1 + x_1)$ meanwhile that of state 2 will take the value of $A_0(1 + x_2)$. The line ST shows all possible portfolio allocation, given that no borrowing is allowed, i.e. when $0 \leq a \leq 1$.

The portfolio chosen is marked with a P in figure 1, and is the point where the possible allocation line tangents the individual's indifference curve. The proportion of the total investment allocated to risky assets, a , is thus equal to the ratio of the distance of SP to ST. (Atkinson, A.B., Stiglitz, J.E., 2015, pages 80-83)

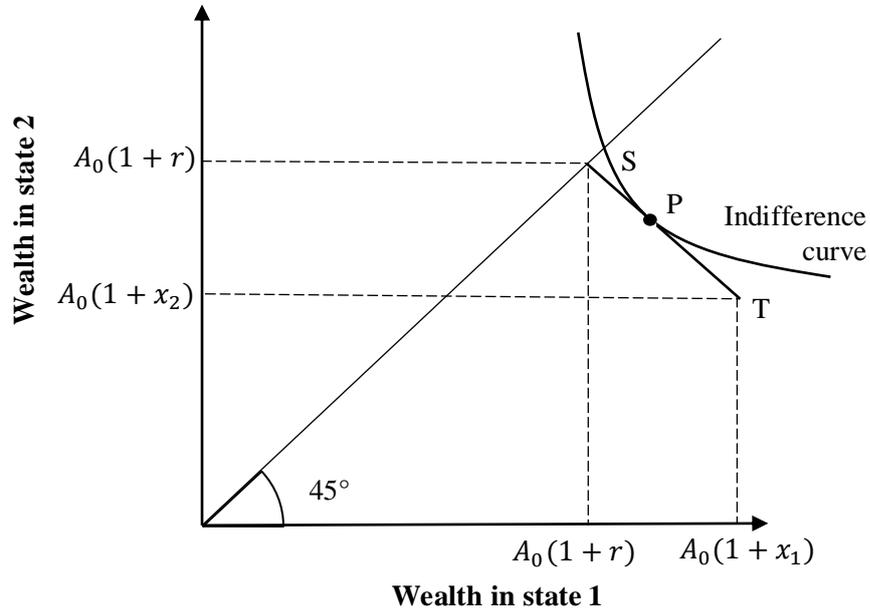


Figure 1 The possible portfolio outcomes given the two states of the world

2.2 The individuals' allocation choice given preferential taxation on capital gains

As will be demonstrated in detail under the section “Example of ISK taxation” in the appendix, assets held in an ISK account is subjected to lower taxation than assets taxed under conventional taxation. The example will also demonstrate the regressivity of the tax, as higher yields has a lower effective tax rate than normal yields. Consequently, assets with expected high yields would have experienced effective tax reliefs compared to assets with lower expected yields such as safe assets. To examine how tax reliefs on capital gains in general affect investment decisions of the individual, an extended version of the model presented above will be used.

In this extended model the investor most not only chose between allocating between safe and risky assets, but also whether or not to place the assets in an account subjected to conventional taxation or to place the assets in an ISK. We will start by introducing a tax on a conventional savings account. The income



tax, at a tax rate of t_i , will consequently be levied on the return of both the safe and risky asset, changing the previous maximisation to the following expression:

$$\max_a E[U(A)] = \int U\{A_0[1 + \langle ax + (1 - a)r \rangle(1 - t_i)]\}df \quad (2.1)$$

Which gives the following first order condition with respect to a :

$$\frac{\partial}{\partial a} E(U) = (1 - t_i)E[U' \cdot (x - r)] = 0 \quad (2.2)$$

Differentiating the above expression with respect to t_i , the following rather complicated second order condition is reached.

$$E \left\{ U''(x - r) \cdot \left[(x - r)(1 - t_i) \frac{\partial a}{\partial t_i} - (a(x - r) + r) \right] \right\} = 0 \quad (2.3)$$

This can in turn be rearranged to the following expression:

$$\left[(1 - t_i) \frac{\partial a}{\partial t_i} \right] E[-U''(x - r)^2] = aE[-U''(x - r)^2] - rE[U''(x - r)] \quad (2.4)$$

To interpret we need to know that $E[-U''(x - r)^2]$ is strictly positive, which follows on the assumption that the utility function is concave, $U'' > 0$, and $x \neq r$. Further we need how the wealth elasticity of the risky asset changes sign depending on the sign of $E[U''(x - r)]$. To explore this, we set the demand for the risky asset to be $Z = aA_0$, and differentiate 2.2 with respect to A_0 :

$$E[U''(x - r)]\{[1 + r(1 - t_i)] + (1 - t_i)(x - r)\} \frac{\partial Z}{\partial A_0} = 0 \quad (2.5)$$

Re-arranging¹ expression 2.5:

$$\frac{\partial Z}{\partial A_0} \cdot \frac{A_0}{Z} = \frac{E[U''(x-r)]}{E[-U''(x-r)^2]} \frac{(1+r(1-t_i))}{a(1-t_i)} \quad (2.6)$$

¹ See appendix 2 for re-arrangement



It can be seen that the wealth elasticity of the risky asset depends on the sign of $E[U''(x - r)]$, as the denominator, $E[-U''(x - r)^2]$, is strictly positive. Consequently, the wealth elasticity of the risky asset has the same sign as $E[U''(x - r)]$. Knowing this we can re-arrange² expression 2.4 to show the how private risk-taking is affected by income taxation:

$$\left[(1 - t_i) \frac{\partial a}{\partial t_i} - a \right] = \frac{-rE[U''(x-r)]}{E[-U''(x-r)^2]} \quad (2.7)$$

Which shows that given $r > 0$, private risk-taking will decrease in the case of income taxation if the wealth elasticity of demand for risky assets is positive. Which can be translated to mean that when an income tax is introduced, private risk-taking is decreased in the normal case where the wealth elasticity of the demand for risky asset is positive.

In the previously introduced two state world, this would render the following expected return:

$$E(U) = p_1 U\{[1 + \langle ax_1 + (1 - a)r \rangle (1 - t_i)] A_0\} + p_2 U\{[1 + \langle ax_2 + (1 - a)r \rangle (1 - t_i)] A_0\} \quad (2.8)$$

In the case of the ISK tax will not be levied on the actual returns, but instead the normal returns which are based on the expected return for the safe asset, \bar{r} . Consequently, the tax will be $t_i \bar{r} A_0$ regardless of the proportion invested in risky assets, a . This in turn will change the look of the original maximisation to the following expression:

$$\max_a E[U(A)] = \int U\{A_0[1 + \langle ax + (1 - a)r \rangle - t_i \bar{r}]\} df \quad (3.1)$$

If one re-arranges expression 2.4, it becomes apparent that the ISK taxation has the form of wealth taxation. As $\bar{r} t_i$ is a constant that could be renamed

² See appendix 3 for re-arrangement



t_w , the following simplification: $\bar{r}t_i = t_w$ can be made, which gives the following expression:

$$\max_a E[U(A)] = \int U\{A_0(1 - t_w)[1 + (ax + (1 - a)r)]\}df \quad (3.2)$$

The first order condition will consequently be the following:

$$\frac{\partial}{\partial a} E(U) = (1 - t_w)E[U' \cdot (x - r)] = 0 \quad (3.3)$$

As the term $(1 - t_w)$ can be cancelled out however, the first order condition will look the same as the original one, see expression 1.2. This does not however mean that a is left unchanged by the ISK taxation, as U' depends on t_w . As the ISK taxation reduces the initial wealth, A_0 , it has the same effect as an inward shift in the budget constraint, compared to the case with no taxation. This means that the introduction of a wealth tax either decreases or leaves the proportion of risky assets the same, no matter what the wealth elasticity of demand for risky assets are.

In the two-state-world previously introduced it would give the following expected outcome:

$$E(U) = p_1 U\{(1 + r) + (x_1 - r)a\}A_0(1 - t_w) + p_2 U\{(1 + r) + (x_2 - r)a\}A_0(1 - t_w) \quad (3.4)$$

Meanwhile it has been established that an increase in both the conventional income taxation³ and the ISK taxation, affects the proportion of risky assets negatively, the empirical question tries to compare the relative effects of the different tax schemes on the proportion of risky assets. Relevant for the question is how the size of the wealth tax t_w compared to that of the income tax t_i , which by construction of the ISK taxation depends on the government

³ Given the normal case where the wealth elasticity of the demand for risky assets is positive.



borrowing rate, that is the safe asset, \bar{r} . As \bar{r} is set in November each year, the ISK tax is adjusted to the market yearly. The difference between the conventional and ISK taxation's expected returns can be observed in the taxation of the risky assets, given the assumption that $\bar{r} = r$.

$$E(U)_{Conventional} = p_1 U\{(1 - t_i)ax_1A_0\} + p_2 U\{(1 - t_i)ax_2A_0\}$$

$$E(U)_{ISK} = p_1 U\{(ax_1 - t_i ra)A_0\} + p_2 U\{(ax_2 - t_i ra)A_0\}$$

The tax scheme chosen will be the one which generates the highest expected return. (Atkinson, A.B., Stiglitz, J.E., 2015, pages 85-89)

3 Background

3.1 Why Investment Saving Accounts (Investeringssparkonto, ISK)?

Capital taxation in the form of Investment Saving Accounts, in Swedish Investeringssparkonto, and from now on in short ISK, was introduced the first of January 2012 in Sweden. The goal stated for the law, specified in the promemoria, was to simplify financial savings by making the tax return form easier to fill in. The background for the proposed simplification was systematic faults in many tax reports concerning trade in stocks, leading to private persons paying either too much or too little capital tax. Overall the treasury department, Finansdepartementet, estimated that the variation in effective tax payment for capital, due to the faulty declarations, was large, and thus constituted a problem. Further the previous existing capital taxation on stock sales, the still existing alternative to ISK, requires that each disinvestment needs to be reported for taxation. It is possible that these requirements would lead to lock-in-effects, as shareholders would avoid selling stocks with underlying profit as these would be taxable. In extension this could lead to reduced competition in the market for financial instruments, as the lock-in-effect would reduce movement on financial markets. Thus, a second objective of the enactment of ISK was to prevent lock-in-effects. (Finansdepartementet, 2010, page 39)



To achieve the objectives a flat-rate tax scheme on financial instruments was enacted as an alternative to pre-existing taxation. Like its alternative, the ISK has a tax rate of 30% but the tax is based on imputed income, the *flat-rate revenue*, rather than actual income. The flat rate revenue is the product of the *capital base* times a multiplier, where the capital base is estimated to be the sum of all depositions over the year together with the value on the account in the beginning of each quarter, divided by four (Skatteverket, n.d.).

$$\text{Capital base} = \frac{\text{sum of depositions} + \text{value in each quarter}}{4}$$

The multiplier has changed since the year of introduction, when it was set to be equal to the government borrowing rate from the previous year (Proposition, 2011/12:1). As the government borrowing rate dropped in 2016, the multiplier was changed to be equal to the government borrowing rate plus 0.75 percentage points, with a minimum of 1.25 percent. After the first of January 2018 additional changes was made, the added percentage points were increased to 1 from the previous 0.75, in effect increasing the tax of ISK.

For private persons none of these calculations are needed as the flat-rate revenue is already reported in the tax return forms, thus simplifying the financial declaration process. The introduction of ISK enables investors to switch between different funds over the year without evoking extra taxes, thus making it cheaper for investors to trim their portfolios. (Skatteverket, n.d.) This change prevents the risk for lock-in-effects. Which in consequence would increase the movement and competition in the financial sector. (Finansdepartementet, 2010, page 40)

3.2 Is the ISK a tax-subsidised investment form?

In the promemoria investigating the consequences of ISK, the suggested level of the flat-rate was that of the government borrowing rate plus 0.75 percentage point (Finansdepartementet, 2010, page 90), as introduced in 2016 and not just the government borrowing rate that was in fact introduced in 2012. Since the



suggested accounts in the promemoria most likely would contain stocks either directly or indirectly via ownership in investment funds, the average return on ISK would be higher than the return on long term government bonds. The treasury department thus motivates the added 0.75 percentage points on the flat-rate to calculate the flat-rate revenue, to tax the excess return of stocks compared with long term government bond⁴. (Finansdepartementet, 2010, page 91). Given the government's calculations the effective tax rate would be 22,2% if in an ISK, compared to 28,7% with the conventional tax system, a decrease in tax with about 6 percentage points. In effect the introduction of ISK would entail tax reliefs on certain capital gains.⁵

The main of opinion of the industry was that the flat-rate used to calculate the flat-rate revenue was set to high⁶, and that the added 0.75 percentage points should be removed, as it would disfavour investors with high risk-aversion. This is also what is suggested in the budget proposal and later enacted. The calculated effective tax would thus be even lower than the previous suggested tax, from approximately 22% to 19%, resulting in a tax relief of almost 10% compared to the conventional capital income taxation. (Proposition, 2011/12:1 pages 343-345)

⁴ In the estimations behind the legislative proposal the average return on ISK would be 7.6%, meanwhile the future government borrowing rate is assumed to increase to 4.9% based on the treasury department's estimations on the year of 2012 to 2014 and an increased repo rate. (Finansdepartementet, 2010, pages 126-128)

⁵ An outcome which was not specified as an objective for the enactment, but which nonetheless is encouraged by the exchequer "as Swedish households' long-term savings should be promoted" (Finansdepartementet, 2010, page 91, the author's own translation).

⁶ The promemoria was referred to various instances in the Swedish business world such as the Swedish bank organisation and "Aktiespararna" and their responses were collected and commented on in the budget proposal for 2011 from the right-wing coalition ruled government.



In a new legislative proposal in 2015 the new Social Democratic lead government proposed an increase in the flat-rate by adding 0.75 percentage points, as was suggested in the original promemoria from 2012. (Finansdepartementet, 2015, pages 9-13) This was later increased to 1 percentage points in January 2018, a decision which sparked critique from the business world, as the government once again went against the industry's recommendations. This increase would thus give an effective tax of 23% on ISK using the same methods as previously. The ISK would consequently still entail tax reliefs compared to the conventional capital income taxation. According to the government's investigation, this increase would not however lead to any redistributions of investments away from the ISK since it would still benefit from tax reliefs, they predict however that the overall savings in ISK might be slightly reduced⁷. (Finansdepartementet, 2016, pages 8-11)

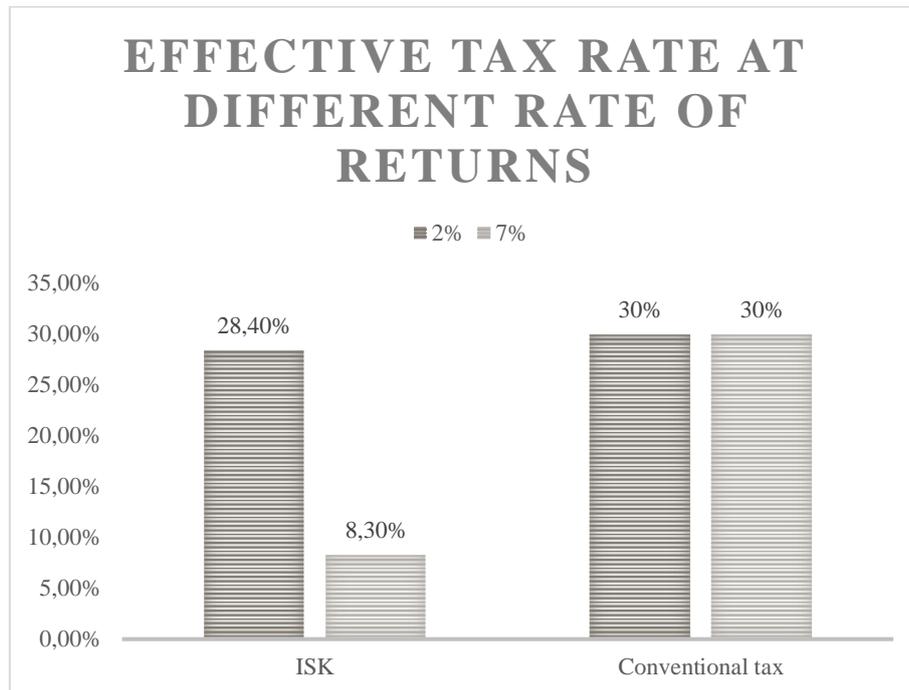
In his article “Inte självklart att ISK är skattegynnade” (Investment Saving Accounts do not necessarily have preferential tax), Jacob Lundberg argues that it's not only the effective tax rate that is of interest regarding capital income tax, but also the question of risk, and who bears it (Lundberg, J., 2017). In the case of conventional capital gains taxation, the government takes some of the risk of investments as it takes 30% of capital gains and losses. Savings subjected to conventional capital income taxation bears less risk, as losses are partially shared with the government. This is however not the case with ISK and as such owners of ISK bears the full risk of investments. Further as the tax scheme for ISK are constructed on the flat-rate revenue, no consideration in

⁷ Distributional effects motivated the government's increase of the flat-rate. As ISK are mostly owned by individuals in the upper part of the income distribution, the government argued that the lower tax on ISK mostly benefited high income earners. Further the government made the point that men compared to women have higher capital base and as such, the increase in the flat-rate would reduce gender inequality in savings.



the taxation is taken to actual revenues. Consequently, owners of ISK need to pay tax regardless of any revenues, making it possible for individuals to pay tax despite making a loss. Lundberg uses the *Capital Asset Pricing Model* (CAPM), to show how the government with a flat-rate equal to that of the government borrowing rate can allocate between risky and secure investments, by reinvesting parts of the tax revenue gained on ISK on the stock market. Using the increased tax revenues caused by increases in the flat-rate of ISK, the government would be able to reach higher revenue from risky assets than in the case of conventional capital income taxation. Thus, using the additional percentage points in the flat-rate to improve its financial position at the expense of individual investors. (Lundberg, J., 2017).

As the ISK tax scheme is based on flat-rate taxation, normal return rather than excess return is taxed. (Waldenström, D, Bastani, S. and Hansson, Å., 2018, page 131) Apart from the theoretical implications of how taxes should be formed to give right incentives, it also means that the ISK tax scheme is regressive (Bastani, S., Hansson, Å. and Waldenström, D., 2018, page 164). This is illustrated in graph 1, based on the example presented in the appendix.



Graph 1 Visual illustration of the different tax rates calculated in the example presented in the appendix

As can be observed from graph 1, unlike traditionally taxed assets, assets in an ISK are subjected to different tax rates depending on revenue. Thus, the taxation in the case of low revenues, 2%, is about 30% meanwhile for higher revenues, 7%, the tax drops to about 10%, making the tax scheme regressive. Risky assets which generally yields higher expected returns than safe assets, are thus favourably taxed with the new ISK taxation.

3.3 Institutional conditions

Both Sweden and Denmark have traditionally had a high tax pressure, as is common in the Nordic countries who all have had social democratic welfare regimes over the last century. As social security has been high, so has the need for full-employment been as to finance the public spending. Both countries consequently have high progressivity in their tax system, and high redistributive goals and generous individual benefits. The result of this has



been a high level of de-commodification of the labour force in both countries and a society in which the individual is not dependent on family or church.

3.3.1 Sweden

In 1990-1991 a massive reconstruction of the Swedish tax system was conducted, with the aim of reducing distortions caused by the previous system as well as making capital taxation more uniform. To achieve this many deductions and exemptions were removed, the number of tax brackets were decreased and many taxes were lowered (Konjunkturinstitutet, 2005). Further new capital taxation was legislated, a 30% proportional tax on capital, in this essay referred to as conventional capital taxation (Skatteverket, 2013, pages 5). The aim of this new capital taxation was to comply with the *neutrality principle* which states that the taxation system should tax different capital income neutral (Konjunkturinstitutet, 2005).

Sweden has a dual income taxation system, separating labour and capital income. Labour income is taxed proportionally, but higher marginal tax rates are levied on individuals who has an income over a certain level. Individuals who earn less than 19 247 Swedish kronor the year 2018, though this vary from year to year, do not need to pay any income tax. Individuals who earn more than that need to pay the municipality tax, *kommunalskat*, on the income over 19 247 they have earned. How high the county tax is varying between each municipality, but for which the average of 2018 was 32,12% (Skatteverket, 2018¹). Individuals who earn more than 468 700 Swedish kronor are subjected to state income tax of 20% on their earnings above the bracket. An additional income bracket for income over 675 700 exists, for which the marginal tax is 25%. (Skatteverket, 2018²)

Pensions in Sweden consist of the general pension, occupational pension and private savings. The general pensions are state organised and based on income.



18,5% of all pensionable income are deducted each year, for which 16 percent goes to the income pension meanwhile the rest, 2,5%, goes to the premium pension. Those who have a low pension are entitled to a guarantee pension (Pensionsmyndigheten, n.d.). On average Swedish pensioners receive about 60% of their last salary in pension (Min pension, 2018). The corporate income tax in Sweden is 22%. Owners of limited companies tax labour income as such, and eventual income from dividends as such. (Verksam.se, 2018) The tax rate of capital income is 30%. VAT is payed on goods and services at 25% in Sweden in most cases, but goods has lower VAT.

3.3.2 Denmark

Just like Sweden, Denmark also has a dual income taxation system, which applies a marginal state tax to high income earners. The municipality tax varies between different municipalities, but the average of these was 24,9% for 2018. People who earn more than DKK 498 900 in 2018, will be subjected to the *topskat*, a state income tax, at 15 (Skat³, 2018). Apart from these taxes on income a special type of labour market tax exists on 8%, church taxes etc. On average the effective tax rate for the average citizen in Denmark was 45,7%.

Like in Sweden, pensions in Denmark consist of different parts. All Danish citizens who've lived in Denmark between the age of 15 to 65 receive the basic pension, which is around 6000 DKK a month. The basic pension is however reduced if the recipient earnings exceed 301 200 DKK yearly. A means tested supplementary pension is paid to the poorest and maxes out at about 6000 DKK. Apart from the state financed basic and supplementary pensions, ATP and occupational pensions exist. (OECD, 2015, pages 240-243)

Capital gains are taxed progressively in Denmark. Share gains below the progression threshold of DKK 52,900 are taxed by 27%, any surplus is taxed at 42% in 2018. For couples, the progression threshold is the double, that is DKK 105,800. Both dividend and profit on sales are calculated as *share gains* (Skat¹, 2018). To calculate profit on sales, *the average method* is used. Profit



is defined as the difference between the selling price and the average purchase price for the shares. The average purchase price in turn is calculated with the purchase price of all shares in each company before sale (Skat², 2018). Losses on sales are subtracted from the share proceeds given that the shares are traded on a regulated market. If the losses are greater than the share gains, the outbound capital is subtracted from an eventual partner's share gains. If, despite this, there is a loss remaining, this can be used in the next year of income. (Skat¹, 2018).

Year	Progressions limit	Tax
2018	52 900	27/42
2017	51 700	27/42
2016	50 600	27/42
2015	49 900	27/42
2014	49 200	27/42
2013	48 300	27/42
2012	48 300	28/42
2011	48 300	28/42
2010	48 300	28/42
2009	48 300/106 100	28/43/45
2008	46 700/102 600	28/43/45

Table 1. Progressions limits for 2008-2018.

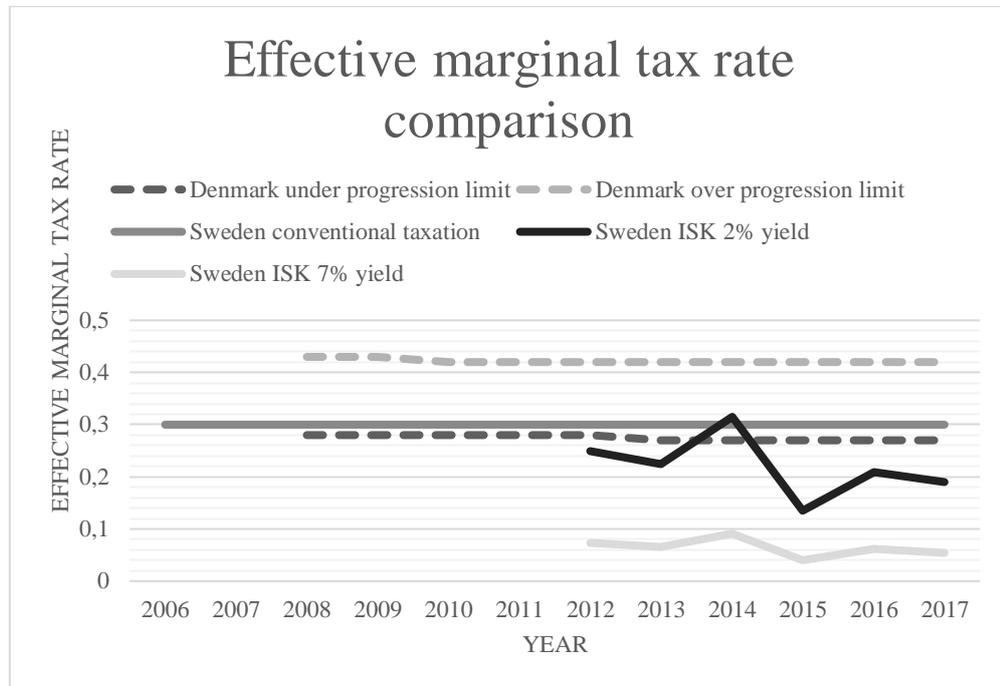
Source: (Skatteministeriet², 2018)

3.4 Effective marginal tax rate in Sweden & Denmark

To summarise the above table and provide better visual representation of how capital taxation in the both countries has differed over time, graph 2 is given. The graph shows the effective marginal tax rate for Denmark when the capital gains are either under or over the progression limit, as presented in table 1. For Sweden in the form of conventional taxation as well as for ISK. Two separate



yields have been represented in the graph as the effective marginal taxation for ISK varies with yield.



Graph 2. Effective marginal tax rate comparison between different investments in Sweden and Denmark.

Source: (Skatteministeriet², 2018) and own calculations.

4 Empirical analysis

4.1 The usage of a difference in difference method

To be able to assess the effect ISK has had on households' stock market behaviour, and in consequence also the effect marginal taxation has on households' stock market behaviour, two variables will be investigated. First the total value of the households' stock market ownership will be compared between Sweden and Denmark. This will be done to investigate whether the introduction of ISK has actually increased the value of stock market ownership as was partially the goal with ISK. Secondly the number of private stock



owners will be compared. This is to determine whether an eventual increase in the total value of households' stock ownership derives from either an increase in the number of private stock owners, that is new stock investors, or due to increased investments from individuals who already own stock, or a combination of the two. Thus, the possible increase in total value of households' stock ownership can be contributed to increases along the extensive marginal or the intensive marginal. Either increase could consequently be derived back to the introduction of ISK taxation, and a change from conventional taxation to ISK taxation. Further it would suggest that the ISK taxation has increased investors proportion of risky assets, a .

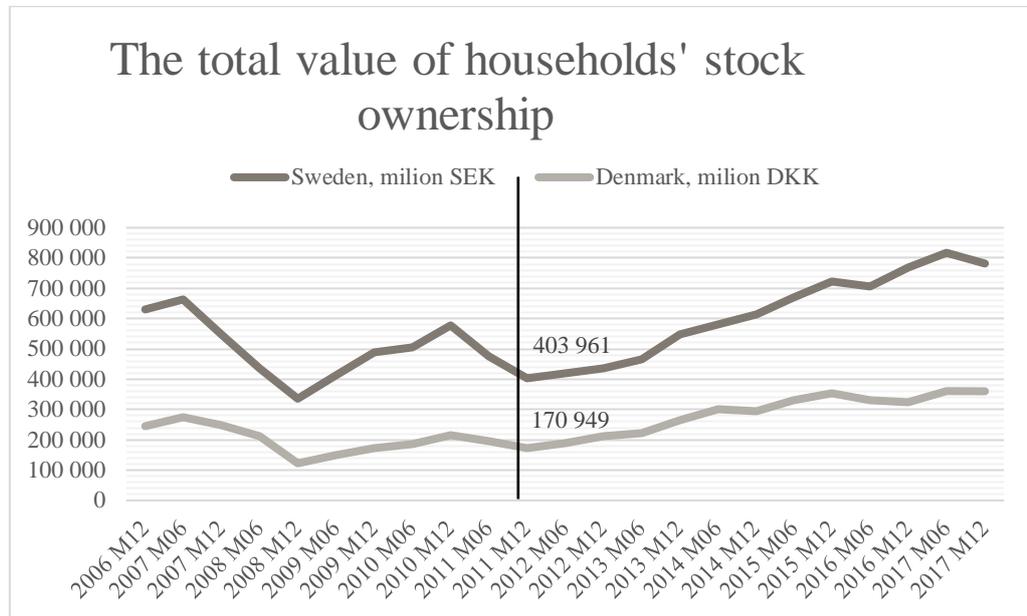
To effectively use the difference in difference method, it is of paramount concern that the reference group and the treatment group, in this case Denmark and Sweden, are as similar as possible apart from the treatment.

5 Result

Graph 3 shows the total value of households' stock ownership for both Sweden and Denmark over the period of 2006 to 2017. The blue line shows the value of Swedish households' assets in shares expressed in million Swedish kronor, meanwhile the grey line shows the same for Denmark but expressed in million Danish kronor. The vertical black line marks when ISK was introduced in Sweden. Thus, the left of the vertical black line shows the period before the treatment, meanwhile the right of the line shows the development of the total value of households' stock ownership after the introduction of ISK. As can be observed from graph, the two countries have different levels of total value of households' stock ownership. They do however have very similar trends in the period before 2011, and consequently it would seem reasonable to use this variable for a difference-in-difference analysis. The graph shows that meanwhile both countries' total value seems to fluctuate together, Sweden



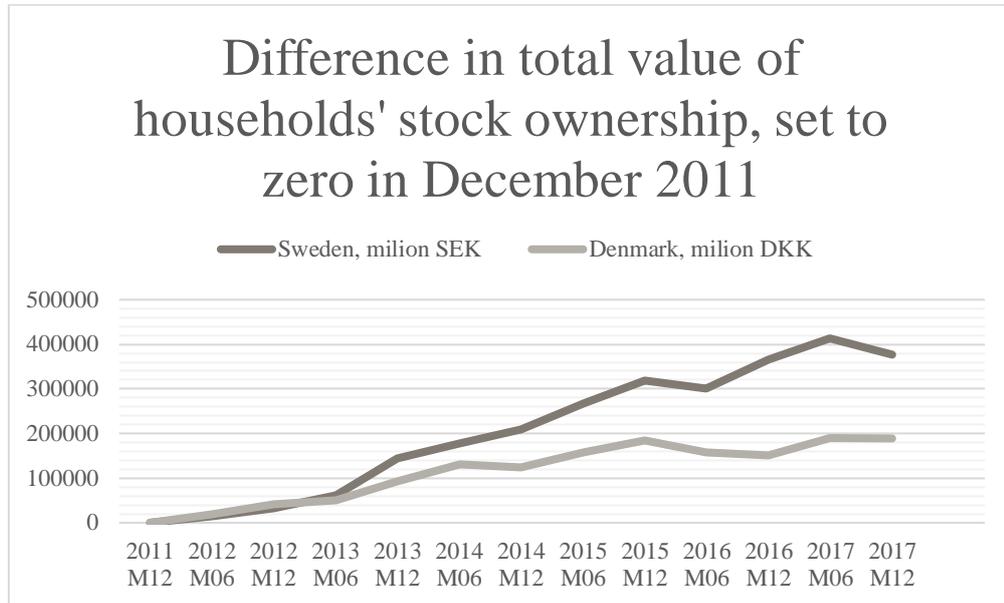
seems to have a steeper trend compared to Denmark in the period after the introduction of ISK taxation.



Graph 3 The total value of households' stock ownership for Sweden and Denmark between 2006-2017

Source: SCB (2017) and Danmarks Nationalbank (2017)

This is better visualised in graph 4. In graph 4 both countries' total value of households' stock ownership is set to zero in December 2011, that is the last month before the treatment ISK was introduced in Sweden. Consequently graph 4 only visualises the differences in trends between the two countries rather than in level as in graph 3. The result is that a clear difference in trends can be spotted. The total value of Swedish households' stock ownership has grown faster than Denmark's, suggesting that the introduction of ISK has in fact increased the total value of households' stock ownership.



Graph 4 Difference in total value of households' stock ownership, set to zero in December 2011.

Source: SCB (2017) and Danmarks Nationalbank (2017)

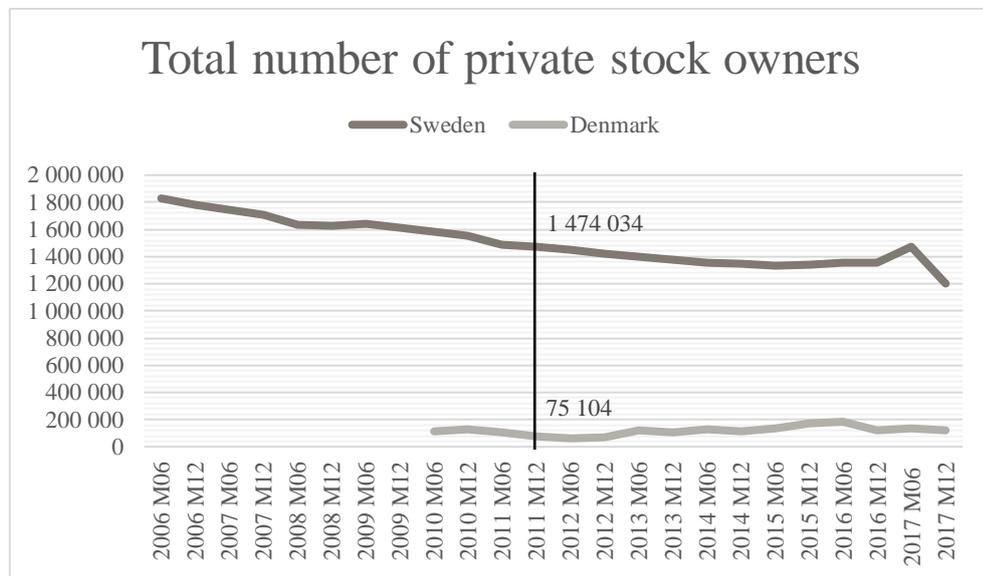
Graph 5 displays the development of number of private stock owners in Sweden and Denmark over the whole examined period, 2006-2017. As in graph 3, the bold vertical black line marks out the introduction of ISK in Sweden. Consequently, the left-hand side in the graph shows the period before the treatment, meanwhile the right-hand side shows the development after the treatment was introduced in Sweden.

From this graph it could also seem like the countries share similar trends in the period before the introduction of ISK taxation, but due to the lack of data for Denmark during 2006 to 2010, no definitive answer concerning the existence of common trends can be given. Despite this, the variable will be used to conduct a difference-in-difference analysis, but the result of said analysis will be treated carefully.

The graph shows small fluctuations and rather horizontal trends for both countries, though the trend for Sweden seem to be slightly downwards sloping,



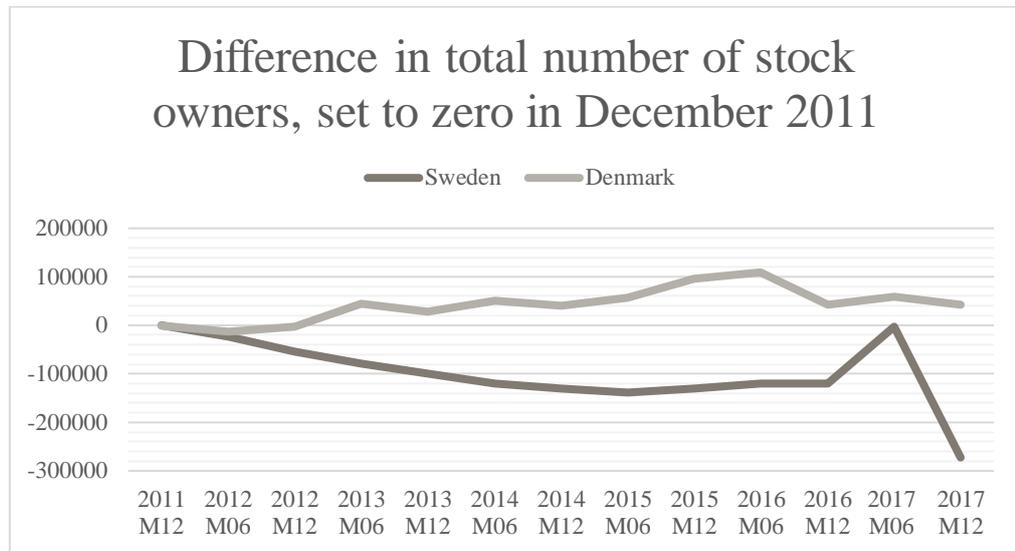
with a peak in June 2017 which was then set of in December the same year. Denmark on the other hand has increased their number of private stock owners during 2012 to 2016, and then slightly decreased the numbers again after 2016. After the introduction of ISK in January 2012, no clear break in the negative trend of the number of private stock owners can be identified in Sweden, and Denmark to the contrary increase the number of private stock ownership. Despite the limited amount of data for Denmark during the relevant period, this would suggest that the introduction of ISK has had very limited, if any effect at all on the number of private stock owners in Sweden.



Graph 5 The total number of private stock owners for Sweden and Denmark between 2006-2017.

Source: SCB (2017) and VP securities (2017)

Graph 6 illustrates the differences between Sweden and Denmark after December 2011, with the differences in levels removed. Thus, graph 6 shows the development of the number of private stock owners with the number set to zero in December 2011. In this graph the negative trend for Sweden is more clearly shown, as well as the positive trend for Denmark.



Graph 6 Difference in total number of private stock owners, set to zero in December 2011.

Source: SCB (2017) and VP securities (2017)

6 Discussion

The result from the difference-in-difference performed on the total value of households' stock ownership shows that the introduction of ISK, that is a reduction of marginal taxation of capital gains, has led to an increase in the value households' hold in stocks. The second difference-in-difference is weaker due to lack of data which limits the possibility to draw any major conclusions. Despite this the result of the second difference-in-difference would suggest that the introduction of ISK taxation seem to have had a limited effect on the number of private stock owners. The result, though weak, would thus indicate that the introduction of ISK taxation has mainly lead to an increase in investments in the stock market from people who already had investments in the stock market.

The previous empirical results can be summarised to predict that changes in marginal taxation of capital will have a greater impact of where to place assets, rather than in which quantities. The result of this study however may seem to



show the opposite, as no clear change in number of private stock owners was observed as a result of the introduction of ISK taxation. It is nevertheless not the case. As the study has measured the total value and number of private stock owners, the study has not managed to measure the immediate allocation decision of investors. That is whether investors already in the stock market have changed their allocation of assets. Instead the study has managed to capture an increase of total amount invested in the stock market, in line with previous empirical studies. But also, and maybe more importantly, that the change in marginal capital taxation as the result of the introduction of ISK, seems to have had almost no effect in attracting new investors to the stock market. Consequently, it would seem that the introduction of ISK taxation has been beneficial solely to those who already held assets in the stock market.

Meanwhile the study does not claim to investigate how changes in capital taxation affects different groups in the income distribution, age and sex, it is reasonable to assume that the ISK taxation has had similar outcome as previous empirical studies would suggest. That is that changes in capital taxation mostly affect those in the upper part of the income distribution (Alan et al., 2010). The fact that the introduction of ISK taxation has had an undistinguished effect in attracting new investors to the stock market, would point to that the change in taxes has had an uneven effect among the income distribution, as stock ownership in Sweden is positively correlated with higher income. Further, as the ownership of stocks in Sweden are not only uneven regarding the owners' income, but also in sex and age, it could be assumed that men and people of a higher age have benefited the most from the ISK taxation (SCB, 2017).

The question of perfect information is relevant in this matter. It is reasonable to assume that persons who already own stocks would be inclined to keep oneself well informed of changes in the taxation framework, as it directly would affect them. In this case the assumption of perfect information would



be a plausible simplification. The simplification hides however the true effect of tax reliefs on investment behaviour given perfect information and will thus most probably underestimate the effect.

For people who do not already own stocks however, the assumption of perfect information would most likely be faulty. Despite numerous news articles which put the introduction of ISK taxation in the limelight and the heated discussions on editorial pages the changes in the flat rate has rendered in Sweden, it is reasonable to assume that the information about the ISK introduction and its tax implications has only reached the parts of the Swedish population that already have an interest in the subject. Therefore the limited effect of the introduction of ISK taxation seems to have had on people who do not already own stock can be at least partially contributed to lack of information.

7 Conclusion

The aim with this essay has been to research how changes in marginal taxation of capital changes households' investment behaviour. To be able to do so, the introduction of investment savings accounts, or ISK, in Sweden has been studied. This since the ISK can be considered a tax-subsidised investment form, and as such could provide insight of how the households change their investment patterns when their marginal tax of capital is reduced. To be able to assess whether this was in fact the case, the method difference-in-difference was chosen. Due to many similarities in tax systems Denmark was chosen as a reference group, to the treatment group Sweden. The result from the two difference-in-differences showed that the ISK taxation had increased the total value of the households' stock ownership, but that no significant change in the number of private stock owners could be observed. The findings suggest that people who already own stocks have increased their assets in stock, meanwhile few new investors have been attracted by the introduction of ISK taxation.



8 Reference list

Agell, J., Edin, P-A., 1990. Marginal Taxes and the Assets Portfolios of Swedish Households. *Scandinavian Journal of Economics*. 92(1), pp 47-64.

Alan, S., Atalay, K, Crossley, T. F. & Jeon S-H., 2010. New evidence on taxes and portfolio choice. *Journal of Public Economics*. 94 (2010), pp. 813–823

Alessie, R., Hochguertel, S. & van Soest, A., 2004. Ownership of Stock and Mutual Funds: A Panel Data Analysis. *Review of Economics and Statistics*. 86(3), pp. 783-796.

Atkinson, A.B., Stiglitz, J.E., 2015. *Lectures on Public Economics*. 2nd edition. Princeton: Princeton University Press

Bastani, S., Hansson, Å. & Waldenström, D., 2018. *Kapitalbeskattningens förutsättningar 2018 - Konjunkturrådets rapport*. Stockholm: SNS Förlag.

Danmarks Nationalbank. 2017. Securities. Available at:
<http://nationalbanken.statbank.dk/statbank5a/default.asp?w=1843> [Accessed 29 April 2018]

Euroclear, 2017. *Aktieägandet i Sverige 2017*. [pdf] Available at:
https://www.euroclear.com/dam/ESw/Brochures/Documents_in_Swedish/Aktieagandet_i_Sverige_2017.pdf [Accessed 25 Mars 2018]

Feldstein, M., 1976. Personal Taxation and Portfolio Composition: An Econometric Analysis. *Econometrica*. 44(4), pp. 631-650.



Finansdepartementet, 2010. *Schablonbeskattat investeringssparkonto och ändrad beskattning av kapitalförsäkring*. Promemoria. Stockholm, Sweden. Available at: <http://www.regeringen.se/rapporter/2010/12/schablonbeskattat-investeringsparkonto-och-andrad-beskattning-av-kapitalforsakring/> [Accessed 21 Mars 2018]

Finansdepartementet, 2015. *Vissa kapitalbeskattningsfrågor inför budgetpropositionen för 2016*. Lagrådsremiss. Stockholm, Sweden. Available at: <http://www.regeringen.se/49b73e/contentassets/083da4900b4e42959661f130d9aea3b0/lagratsremiss-vissa-kapitalbeskattningsfragor-infor-budgetpropositionen-....pdf> [Accessed 21 Mars 2018]

Finansdepartementet, 2016. *Höjd beskattning av sparande på investeringssparkonto och i kapitalförsäkring* Promemoria. Stockholm, Sweden. Available at: <https://www.regeringen.se/4a63be/contentassets/090c63f00d714e4e902fa684661a3bf1/hojd-beskattning-av-sparande-pa-investeringsparkonto-och-i-kapitalforsakring.pdf> [Accessed 22 Mars 2018]

Johansson, D., Larsson, H-P., Norrman, E., Sanandaji, T., Stenkula, M., Malm, A., 2014. *Företagsskattkommittén och entreprenörskapet - en kommentar till företagsskattkommitténs arbete med utgångspunkt i effekterna på entreprenörskapet i Sverige* [pdf] Available at: http://entreprenorskapsforum.se/wp-content/uploads/2014/06/Skatterapport_slutv.pdf [Accessed 24 Mars 2018]



King, M. A., Leape, J. I., 1998. Wealth and portfolio composition: Theory and evidence. *Journal of Public Economics*. 69(2), pp. 155-193.

Konjunkturinstitutet, 2005. Fördjupning i Konjunkturläget augusti 2005 – Principer bakom 1991 års skattereform. [pdf] Available at:
<https://www.konj.se/download/18.130dc716150d75fadf73cd4/1446726849727/Principer-bakom-1991-ars-skattereform.pdf> [Accessed 18 April 2018]

Lundberg, J., 2017. Inte självklart att ISK är skattegynnad. *Ekonomisk debatt*, 45(8), page 63-65.

Min pension, 2018. Så blir pensionen för 1960-talister. Available at:
<https://blogg.minpension.se/2018/04/19/sa-blir-pensionen-for-1960-talister>
[Accessed 19 April 2018]

OECD, 2015. Pensions at a Glance 2015. [pdf] Available at:
https://read.oecd-ilibrary.org/social-issues-migration-health/pensions-at-a-glance-2015_pension_glance-2015-en#page245 [Accessed 15 May 2018]

Pensionsmyndigheten, n.d. Förstå din pension. Available at:
<https://www.pensionsmyndigheten.se/forsta-din-pension.category.sa-fungerar-pensionen.tag.pensionsmyndigheten%3Aforsta-din-pension+sa-fungerar-pensionen+allman-pension-fran-staten#pm-category-filter-last-card>
[Accessed 19 April 2018]

Poterba, J. M., 2002. Taxation and Portfolio Structure: Issues and Implications. NBER Working Paper No. 8223.



Proposition, 2011/12:1. *Budgetpropositionen för 2012 Förslag till statens budget för 2012, finansplan och skattefrågor (Regeringens proposition)*

Available at:

<http://www.regeringen.se/49bb1b/contentassets/bd4a4f4b45d44059a23b7b0646c1cdfc/forslag-till-statens-budget-for-2012-finansplan-och-skattefragor-kapitel-1-6> [Accessed 21 Mars 2018]

Schalck, C., 2017. Tax measures and household financial behaviour: Evidence from France. *The Quarterly Review of Economics and Finance*. 66(November), pp. 127-135.

Skat¹, 2018. Når du køber og sælger aktier og værdipapirer. Available at: http://skat.dk/skat.aspx?oid=2234844&ik_navn=transport [Accessed 20 April 2018]

Skat², 2018. Gevinst og tab opgøres efter gennemsnitsmetoden. Available at: <http://skat.dk/skat.aspx?oId=2244476> [Accessed 20 April 2018]

Skat³, 2018. Satser. Available at: http://skat.dk/skat.aspx?oid=2035568&ik_navn=footer [Accessed 20 April 2018]

Skatteministeriet¹, 2018. Kommuneskatter - gennemsnitsprocenter 2007-2018. Available at: <http://www.skm.dk/skattetal/satser/kommunal-beskatning/kommuneskatter-gennemsnitsprocenter-2007-2018> [Accessed 20 April 2018]

Skatteministeriet², 2018. Skatteberegning. Available at: <http://www.skm.dk/skattetal/beregning/skatteberegning?p=3> [Accessed 20 April 2018]



Skatteverket, 2013. *Tax Statistical Yearbook of Sweden 2013*. [pdf] Available at: <https://www.skatteverket.se/download/18.15532c7b1442f256baef0a3/1397485808066/15216.pdf> [Accessed 18 April 2018]

Skatteverket, 2017. *Fysiska personers kapitalinkomster*. [online] Available at: <https://www.skatteverket.se/omoss/varverksamhet/statistikochhistorik/skattpakapital/fysiskapersonerskapitalinkomster.4.3152d9ac158968eb8fd2940.html#Kopia3avInnehall> [Accessed 23 Mars 2018]

Skatteverket, 2018¹. Så beskattas din lön. Available at: <https://www.skatteverket.se/privat/skatter/arbeteochinkomst/sabeskattasdinlon.4.54a3d27615036ac09f316ce.html> [Accessed 18 April 2018]

Skatteverket, 2018². Belopp och procent – inkomstår 2018. Available at: <https://www.skatteverket.se/privat/skatter/beloppochprocent/2018.4.4a4d586616058d860bcf48.html#h-Brytpunkt> [Accessed 18 April 2018]

Skatteverket, n.d. *Investeringssparkonto*. [online] Available at: <https://www.skatteverket.se/privat/skatter/vardepapper/investeringssparkontoisk.4.5fc8c94513259a4ba1d800037851.html> [Accessed 21 Mars 2018]

SCB, 2017. Aktieförmögenheten minskade. Available at: <https://www.scb.se/hitta-statistik/statistik-efter-amne/finansmarknad/aktieagarstatistik/aktieagarstatistik/pong/statistiknyhet/aktieagarstatistiken/> [Accessed 29 April 2018]

Verksamt.se, 2018. Skatter och avgifter. Available at: <https://www.verksamt.se/starta/skatter-och-avgifter> [Accessed 20 April 2018]



VP Securities, 2017. vp. INDIKATOR. Available at: <https://www.vp.dk/da-DK/About-VP/Facts-and-figures/vp-indikator> [Accessed 29 April 2018]



Appendix 1- ISK taxation example

The purpose with this example is to illustrate firstly how the ISK is a tax-subsidised investment form, and secondly its progressive proportions. Suppose an individual has savings of 10 000 Swedish kronor but no additional monthly savings. The option the individual has concerns whether to invest these in assets with conventional taxation or to open an ISK account, and in which type of asset to invest. Assume that there are two types of assets. A safe asset with a rate of return of 2% and a risky asset which yields 7%. Given that the individual invests all in one asset type and taxation model, four different investment strategies exist; ISK and safe assets, ISK and risky assets, conventional taxation and safe asset and lastly conventional taxation and risky assets. In this example the government borrowing rate is set to 0,5%, making the multiplier 1,5% with the new rules starting in January 2018.

a.) ISK and safe asset

Quarter 1: 10 050

Quarter 2: 10 100

Quarter 3: 10 150

Quarter 4: 10 200

Capital base:

$$(10\,000 + 10\,050 + 10\,100 + 10\,150 + 10\,200)/4 =$$

$$50\,500/4 = 12\,625$$

$$\text{Flat-rate revenue: } 1,5\% \cdot 12\,625 = 189,375$$

$$\text{Tax: } 30\% \cdot 189,375 = 56,81$$

$$\text{Marginal tax rate: } 56,81/200 = 28,4\%$$

b.) ISK and risky asset

Quarter 1: 10 175

Quarter 2: 10 350



Quarter 3: 10 525

Quarter 4: 10 700

Capital base:

$$(10\,000 + 10\,175 + 10\,350 + 10\,525 + 10\,700)/4 =$$

$$51\,750/4 = 12\,937,5$$

$$\text{Flat-rate revenue: } 1,5\% \cdot 12\,937,5 = 192,77$$

$$\text{Tax: } 30\% \cdot 192,77 = 57,83$$

$$\text{Marginal tax rate: } 57,83/700 = 8,3\%$$

c.) Conventional taxation and safe asset

Revenue: 200

$$\text{Tax: } 30\% \cdot 200 = 60$$

$$\text{Marginal tax rate: } 60/200 = 30\%$$

d.) Conventional taxation and risky asset

Revenue: 700

$$\text{Tax: } 30\% \cdot 700 = 210$$

$$\text{Marginal tax rate: } 210/700 = 30\%$$



Appendix 2 – Re-arrangement of expression 2.5

Re-arranging expression 2.5 to expression 2.6:

$$E[U''(x-r)]\{[1+r(1-t_i)]+(1-t_i)(x-r)\}\frac{\partial Z}{\partial A_0}=0 \quad (2.5)$$

$$E[-U''(x-r)](1-t_i)(x-r)\frac{\partial Z}{\partial A_0}=E[U''(x-r)](1+r(1-t_i))$$

$$E[-U''(x-r)^2](1-t_i)\frac{\partial Z}{\partial A_0}=E[U''(x-r)](1+r(1-t_i))$$

$$\frac{\partial Z}{\partial A_0}=\frac{E[U''(x-r)]}{E[-U''(x-r)^2]}\frac{(1+r(1-t_i))}{(1-t_i)}$$

$$\frac{\partial Z}{\partial A_0}\cdot\frac{A_0}{Z}=\frac{A_0}{aA_0}\frac{E[U''(x-r)]}{E[-U''(x-r)^2]}\frac{(1+r(1-t_i))}{(1-t_i)}$$

$$\frac{\partial Z}{\partial A_0}\cdot\frac{A_0}{Z}=\frac{E[U''(x-r)]}{E[-U''(x-r)^2]}\frac{(1+r(1-t_i))}{a(1-t_i)} \quad (2.6)$$



Appendix 3 – Re-arrangement of expression 2.4

Re-arranging expression 2.4 to expression 2.7

$$\left[(1 - t_i) \frac{\partial a}{\partial t_i} \right] E[-U''(x - r)^2] = aE[-U''(x - r)^2] - rE[U''(x - r)] \quad (2.4)$$

$$\left[(1 - t_i) \frac{\partial a}{\partial t_i} \right] = \frac{aE[-U''(x - r)^2] - rE[U''(x - r)]}{E[-U''(x - r)^2]}$$

$$\left[(1 - t_i) \frac{\partial a}{\partial t_i} \right] = a - \frac{rE[U''(x - r)]}{E[-U''(x - r)^2]}$$

$$\left[(1 - t_i) \frac{\partial a}{\partial t_i} - a \right] = \frac{-rE[U''(x - r)]}{E[-U''(x - r)^2]} \quad (2.7)$$