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# BRIEFING PAPER #5

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## Tax revenue resulting in a loss

Jacob Lundberg

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#### SUMMARY

- On January 1st 2016, the marginal rate of tax in Sweden was raised. This applies in cases where monthly salary is SEK 50,000 or higher. It means that the marginal tax rate for some 400,000 people working in Sweden – e.g. doctors, engineers, accountants/auditors, and others in high income brackets – was increased by three percentage points. The highest Swedish marginal tax rate is now 60 per cent, which is highest in the world.
- According to the government, the tax increase will generate SEK 2.7 billion in revenue to the public treasury. But that calculation is static. It does not take into consideration the body of research showing that comparable tax increases have encouraged people to work less and engage in more tax planning.
- Even with conservative predictions about changes in human behaviour when the marginal tax rate goes up, this briefing paper will show that the increase will actually result in a loss for the public treasury. For example, when considering the behavioural effects that economics professors Thomas Piketty and Emmanuel Saez deem reasonable, the government's reforms are underfinanced by approximately SEK 5 billion per year.
- That amount is equivalent to the sum total for all of the government's reforms regarding infrastructure, schools, migration and integration in the budget proposal for 2016.
- The discrepancy results from the fact that, for reasons of prudence, the budget is calculated statically. This was appropriate when the tax cuts were the norm. It meant that future tax revenue would not be overestimated, and actual outcome could thus only be more positive than anticipated. But now the effect is the opposite: we have an increased risk of an unbalanced budget because changes in human behaviour because of the tax hike hasn't been taken into consideration by the government.

## INTRODUCTION

To finance their reforms, the government raised the marginal tax rate when, beginning in 2016, the earned income tax credit is phased out for monthly salary above SEK 50,000. At SEK 123,000, the earned income tax credit is entirely phased out. It means that the marginal tax rate for some 400,000 people working in Sweden – e.g. doctors, engineers, accountants/auditors and others in high income brackets – will be increased by three percentage points to 60 per cent (see figure 1). With an average municipal tax rate of 32 per cent and state income tax (including austerity tax) of 25 per cent, Sweden now has the highest marginal tax rate, 60 per cent, in the world. The last time that the marginal tax rate reached this level was in 1990, prior to the major tax reform. At the time, finance minister Kjell-Olof Feldt and Trade union leader Stig Malm called the tax system “rotten and perverse”. Sweden now has a higher marginal tax rate than the Dutch Caribbean island, Aruba, which previously taxed its well-paid residents at the highest rate in the world (KPMG, 2015).

To correctly understand the level of the marginal tax rate, it is also necessary to take into consideration payroll tax, VAT and excise duties on such things as alcohol, electricity, and gasoline. Payroll tax does, of course, provide corresponding benefits in the form of social insurance (higher income results in higher sick pay, etc), but for annual income in excess of SEK 450,000, which is the ceiling for parental insurance, higher income does not bring any additional benefits and the payroll tax is a pure tax. Under current rules, the effective marginal tax rate is 75 per cent for high earners. After the phase-out it rises to 77 per cent (see calculation in appendix).

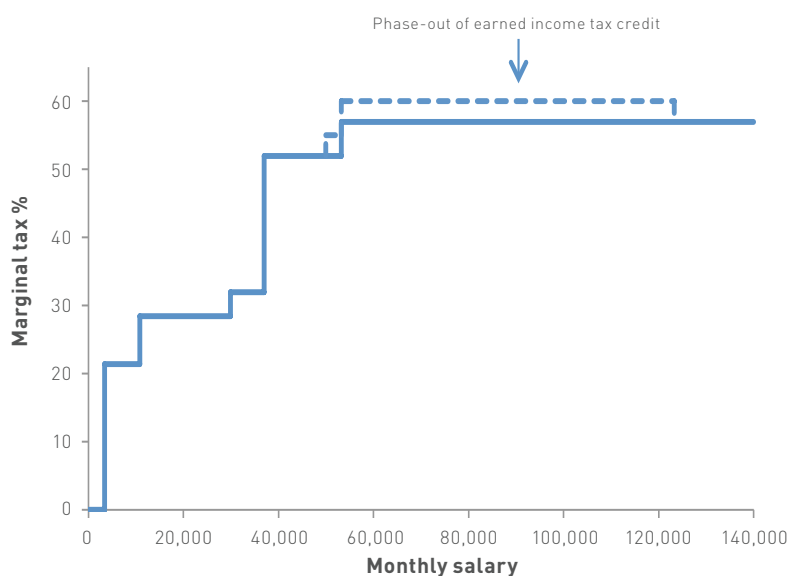
Decades of economics research show that if you raise income tax, people will reduce their working time, put in less effort on the job and engage in more tax planning. When the government calculated the expected increase in revenue of SEK 2.7 billion from the earned income tax credit's phase out, it failed to take changes in behaviour into consideration because revenue and expenses in the budget are calculated statically.

The earned income tax credit was introduced in 2007 and, since then, it has been expanded four times (for a technical explanation, see appendix). The aim of the reform was to make participation in the workforce more profitable. Additionally, marginal tax rates were lowered on earned income for people in low- and middle-income brackets. During the eight years that the center-right Alliance ruled, the marginal tax rate for people in high-

income brackets was never lowered. It has remained at 57 per cent ever since the austerity tax was introduced. Earned income tax credit is not unique to Sweden, either.

Since the 1990s, many countries have introduced different versions of an earned income tax credit. This, because it has been shown to be an effective way of getting more low-income earners into the workforce, as well as influencing how much they work. In many such countries there is also a gradual reduction in the credit with higher incomes. The Alliance government decided against a reduction because it would have increased the marginal tax rate in a country that already had one of the highest such rates in the world.

Figure 1. Marginal tax rate 2016 (not including pension contribution) with phase-out of the earned income tax credit shown as a dotted line. Source: Own calculations



## BEHAVIOURAL EFFECTS

Reforms are reported in the national budget statically, without considering changes in behaviour. In the debate, this is referred to as disregard for dynamic effects. In most instances, there are good reasons for disregarding dynamic effects. For example, there can be uncertainty about behavioural changes from different types of reforms. With a dynamic calculation, there's a risk that the national budget will run at a deficit when a tax cut is implemented. This can happen when calculations are too optimistic, with an expectation of more jobs and higher tax revenue as a result of the reforms.

But, with tax hikes, the effect of disregarding dynamic effects is the opposite. For this reason, as discussed by Flood (2015), behaviour effects should be taken

into consideration so that government revenue is not overestimated when there is a tax hike. This is particularly important when government finances are tight, i.e. when there are no margins in the budget for miscalculation.

The amount of revenue generated from a tax hike depends on how people change their behaviour as a result.

In the research, behavioural changes are measured via tax base elasticity. High elasticity means that salary earners are sensitive to changes in taxation, and that they are very likely to alter their behaviour with certain types of reforms. Examples of this are increasing or decreasing hours worked, switching jobs, or starting a company to enable more tax-planning options.

Elasticities have been estimated in a large number of studies. Sørensen (2010) uses elasticity of 0.2, based on Swedish studies, with a note that this should still be regarded as a conservative assessment. Based on the tax reforms during the 1980s, Blomquist & Selin (2010) arrive at elasticity of 0.2–0.25 for men, and much higher elasticity for women. Based on the major tax reform of 1990–1991, Gelber (2014) arrives at elasticity between 0.2 and 0.4 for married men.

Elasticity of 0.3 is often used in international literature (e.g. Hendren, 2014) as a reasonable estimate of the mainstream for this area of research. Piketty & Saez (2012) state that most estimates of elasticity are within the range of 0.1 and 0.4. They conclude that 0.25 is “a realistic mid-range estimate” of elasticity. In a controversial study by Diamond & Saez (2011), elasticity of 0.25 is used. Chetty (2012) claims that elasticity of 0.33 is the level used in several key studies. Hendren (2014) uses 0.5 as an estimate of the upper limit for elasticity.

## HOW MUCH DOES THE TAX HIKE COST?

Table 1. Public financial impact of the earned income tax credit phase-out with different values for tax base elasticity. Source: Own calculations (see details in appendix, prop 2015/16:1.<sup>1</sup>)

Elasticity	Revenue increase incl. VAT effects (SEK billions)	Revenue increase excl. VAT effects (SEK billions)	Government assessment (SEK billions)
0 (static)	2.0	2.6	2.7
0.1 (low)	0.0	0.8	
0.2 (conservative)	-2.0	-0.9	
0.3 (average)	-4.0	-2.7	
0.5 (high)	-8.0	-6.2	

<sup>1</sup> The figures in the table were calculated using a simple, transparent method used by Sørensen (2010) in a report for ESO (group of experts conducting studies in public finance). The method is presented in an appendix.

Table 1 shows what the higher marginal tax rate would generate in revenue for different tax base elasticities. Tax base elasticity is a measure of the percentage decrease in taxed income (tax base) when net salary is reduced by 1 per cent due to a tax hike.

With zero elasticity, i.e. a static assessment, the revenue increase from phase-out of the earned income tax is assessed at SEK 2.6 billion. That is in line with the government’s estimate of SEK 2.7 billion.

A tax hike would also lead to lower VAT revenue, at least over time. In view of that, the revenue increase would be SEK 2 billion instead of SEK 2.6 billion. But there is a balancing factor, since the funds would be directed at other measures that generate VAT revenue for a corresponding amount. SEK 2.7 billion is, accordingly, a reasonable assessment of the static revenue increase.

With elasticity higher than zero, i.e. taking into consideration changes in human behaviour, all revenue disappears already at a low, 0.1, level of elasticity. In that scenario, neither is any VAT revenue generated from other measures given that the budget must be balanced over time. When there is an increase in marginal tax rate, it is thus most reasonable to assume “revenue increase incl VAT effects” when assessing the long-term impact on government finances.

As mentioned in the section above, the most reasonable assessment of tax base elasticity falls within the range of 0.2–0.3. This is based on Swedish and international studies. Claiming that phase-out of the earned income tax credit will not result in any revenue flow to the government, which, for example is the conclusion of Ericson & Flood (2014), is thus a very conservative expectation that very likely underestimates behavioural changes.<sup>2</sup>

<sup>2</sup> Ericson, Flood & Wahlberg (2009) claim that the average elasticities in their model are 0.05 for single men and 0.1 for cohabiting men (most people in high-income brackets are men). This indicates that Ericson & Flood (2014) underestimate changes in behaviour among taxpayers. Furthermore, they also only consider changes in hours worked, and thus disregard new studies taking into account changes in average hourly earnings, usage of deductions, etc., which can result from changes in taxation.

If we use the level that Piketty & Saez regard as mainstream for this area of research – elasticity of 0.25 – we can expect a decrease in revenue of around SEK 3 billion, which means that the budget is underfinanced by SEK 5 billion. At the most, using the highest level of elasticity proposed by researchers, we can expect that the tax hike will reduce government revenue by SEK 8 billion.<sup>3</sup>

## CONCLUSIONS

The government is counting on the assumption that a phase-out of the earned income tax credit will generate SEK 2.7 billion in revenue to its treasury. But, they are disregarding the likelihood of salary earners working less, and other behavioural changes. For reasons of prudence, dynamic effects on the national budget from tax cuts are disregarded.

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For tax hikes, however, prudence dictates that dynamic effects should be taken into consideration. Otherwise, there is a risk that revenue from a tax hike will be overestimated, and that the government will be tempted to approve a higher level of expenditure than it can afford. Over time, this will have a negative impact on government finances.

This compilation shows that all of this holds true with regard to the phase-out of the earned income tax credit. If assessments (from prior research) of changes in the behaviour of taxpayers are used, the conclusion is that the tax hike will drain the treasury of SEK 2-4 billion. Applying the level that Piketty & Saez regard as mainstream for this area of research, the conclusion is that the government's reforms are underfinanced by around SEK 5 billion.

The bottom line is this: the government is implementing a tax hike for a group that it feels is earning too much, even though it will lower tax revenue for everyone. And, Sweden will once again top the list of countries in the world with the highest marginal tax rates.

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*3 It should be noted that decreases in tax revenues due to behavioural changes depend on the type of behavioral changes. If the tax hike leads to fewer hours worked or lower productivity the state will receive no alternative income. If, however, the tax hikes for instance increase tax planning, then revenues from capital income taxes will partly compensate for the tax loss. Unfortunately there is not enough research to determine how each tax base is affected. Under reasonable assumptions however, the finding that tax revenues will decrease due to the tax hike is robust.*

## REFERENCES

Bastani, Spencer & Selin, Håkan (2014), "Bunching and non-bunching at kink points of the Swedish tax schedule" *Journal of Public Economics*, vol 109.

Blomquist, Sören & Selin, Håkan (2010), "Hourly wage rate and taxable labor income responsiveness to changes in marginal tax rates" *Journal of Public Economics*, vol 94.

Chetty, Raj (2012), Bounds on elasticities with optimization frictions : a synthesis of micro and macro evidence on labor supply, *Econometrica*, 80 (3).

Diamond, Peter & Saez, Emmanuel (2011), The case for a progressive tax : from basic research to policy recommendations, *Journal of Economic Perspectives*, 25 (4).

Du Rietz, Gunnar, Johansson, Dan & Stenkula, Mikael (2013), *Swedish labor income taxation (1862–2013)*, Rochester, NY, Social Science Research Network (IFN Working Paper 977) (uppdaterad september 2015).

Ericson, Peter & Flood, Lennart (2014), *Höjda eller sänkta marginalskatter för mer resurser till skolan?* Stockholm: Svenskt Näringsliv, läst 2015-11-23, <[http://www.svensktnaringsliv.se/material/rapporter/hojda-eller-sankta-marginalskatter-for-mer-resurser-till-skolan\\_585927.html](http://www.svensktnaringsliv.se/material/rapporter/hojda-eller-sankta-marginalskatter-for-mer-resurser-till-skolan_585927.html)>.

Ericson, Peter, Flood, Lennart & Wahlberg, Roger (2009), *SWEtaxben : a Swedish tax/benefit micro simulation model and an evaluation of a Swedish tax reform* Göteborg: Handelshögskolan vid Göteborgs universitet (IZA Discussion Paper 4 106).

Finansdepartementet (2014), *Beräkningskonventioner 2015*. Stockholm: Regeringskansliet

Flood, Lennart (2015), "Skatter räknas, räkna med skatter", *Ekonomisk debatt*, vol 43 (5).

Gelber, Alexander M (2014), "Taxation and the earnings of husbands and wives : evidence from Sweden", *Review of Economics and Statistics*, vol 96 (2).

Hendren, Nathaniel (2014), *The inequality deflator : interpersonal comparisons without a social welfare function* Cambridge, MA, National Bureau of Economic Research (NBER Working Paper 20 351).

KPMG (2015), "Individual income tax rates table" Stockholm: KPMG läst 2015-11-23, <<https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/individual-income-tax-rates-table.html>>.

Piketty, Thomas & Saez, Emmanuel (2012), *Optimal labor income taxation* Cambridge, MA, National Bureau of Economic Research (NBER Working Paper 18 521).

Proposition 2015/16:1, *Budgetpropositionen för 2016*.

Riksrevisionen (2009), *Jobbskatteavdraget*. RiR 2009:20.

Sørensen, Peter Birch (2010), *Swedish tax policy : recent trends and future challenges* (Rapport till Expertgruppen för studier i offentlig ekonomi 2010:4). Stockholm: ESO-gruppen, Läst 2015-11-23, <[http://www.econ.ku.dk/pbs/Dokumentfiler/Comments \(English\)/Swedish%2520tax%2520policy.PBS.pdf](http://www.econ.ku.dk/pbs/Dokumentfiler/Comments (English)/Swedish%2520tax%2520policy.PBS.pdf)>.

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## APPENDIX

### HOW WE CALCULATED TABLE 1

The information required for calculating table 1 includes the tax rates before and after the tax hike (57 and 60 per cent, respectively), the average income of persons affected by the change (SEK 790,000) and a measure of tax base elasticity. Elasticity is the only component where there is uncertainty as to its value.

With SEK 100 earned by a person in a high-income bracket, the amount they retain is lowered from SEK 43 to SEK 40, which corresponds to a decrease of 7 per cent. Tax base elasticity is the relationship between the percentage change in taxed income (tax base) and the percentage change in net salary. With an elasticity of 0.2, taxed income would shrink by an average of 1.4 per cent (7 per cent  $\times$  0.2), or SEK 11,000 due to the taxpayer's changes in behaviour, e.g. working less overtime hours, engaging in more tax planning, etc.

Such a decline in income results in lower revenue from income tax equal to SEK 6,300 (57 per cent of SEK 11,000), lower payroll tax of SEK 3,500 (31 per cent of SEK 11,000) and lower VAT of SEK 1,200 (25 per cent of the decrease in salary after tax). The tax loss per person is thus just under SEK 11,000. Multiplying that amount by the number of individuals in the interval (360,000), we arrive at a tax loss of SEK 4 billion.

Since the static revenue increase is just SEK 2 billion, the total impact on government finances is a loss of SEK 2 billion with elasticity of 0.2. The dynamic effects in the form of behavioural changes are thus significantly larger than the static effect of the tax hike.

The calculations disregard income effects, i.e. lower income resulting from a tax hike would make salary earners willing to work more in order to compensate. But research has shown that the income effects are typically quite small. The extensive margin, i.e. risk that salary earners exit the labour market entirely, is also disregarded. But such effects are likely low for people in a high income bracket.

Migration is yet another disregarded, but potentially important effect. High taxes may discourage highly qualified individuals from working in Sweden. Over the long-term, however, the probably most important aspect is educational and career choice. This is the risk of fewer individuals choosing an education and career which, over time, will yield high income. Because such effects can take decades to observe, little research is available in the area.

One unanswered question is whether salary earners react less to small and difficult-to-understand tax hikes. The Swedish National Audit Office (2009) has stated that knowledge of the earned income tax credit is low, and that it has a complicated design. Nevertheless, the way in which it will be phased out is relatively easy to understand, and the group affected by it has a high level of education. Furthermore, one may speculate about whether the short-term reaction to a tax hike is greater than would be the case for a tax cut (this is called "loss aversion").

Estimated elasticity is often lower when small tax changes are being evaluated. This is explained by optimization frictions, i.e. when a taxpayer is not motivated to change behaviour over the short term because the change in taxation is so small (Chetty, 2012). But it is unlikely that the change in taxation would have no effect over the long term. Taxpayers react to changes in their net salary. They will eventually come to understand the tax system's new design and adapt their behaviour accordingly.

A related study has been conducted by Bastani & Selin (2014). They conclude that salary earners do not bunch at the cut-off point for state income tax, as the theory predicts. Optimization frictions could explain why, (along with the fact that controlling one's income with exactness can be difficult) particularly when the cut-off point for state income tax changes each year.

Accordingly, the conclusion is that it can take a number of years for the lower revenues depicted in table 1 to materialise, particularly if VAT effects are also considered. Nevertheless, the government is counting on SEK 2.7 billion in higher revenue in 2016 and each subsequent year until 2019.

### EFFECTIVE MARGINAL TAX

To evaluate phase-out of the earned income tax credit, it is necessary to first calculate the effective marginal tax rate, including payroll tax and consumption taxes. At present, the highest marginal tax rate is 57 per cent and payroll tax is 31.42 per cent. According to Du Rietz, Johansson & Stenkula (2013), the average consumption tax (which includes energy taxes, various VAT, etc) is 25 per cent. Effective marginal tax is thus:

$$\tau_1 = \frac{0.57 + 0.3142 + 0.25(1 - 0.57)}{1 + 0.3142} = 75.46\%$$

After year-end, the marginal tax rate increases to 60 per cent and the effective marginal tax becomes:

$$\tau_2 = \frac{0.6 + 0.3142 + 0.25(1 - 0.6)}{1 + 0.3142} = 77.17\%$$

We want to include payroll tax in the calculation, which requires that we divide all tax rates by 1.31. This is because we express the tax as a percentage of the employer's cost (salary plus payroll tax). We comply with the norm in research literature by using the Greek letter, tau, to represent the tax rate.

## STATIC REVENUE INCREASE

In order to calculate the static revenue increase, we only need to know that the 360,000 individuals who will incur a higher marginal tax rate have an average income of SEK 790,000 and they will lose 3 per cent of the portion of their income that exceeds SEK 600,000. Additionally, there are 20,000 individuals for whom earned income tax credit of SEK 26,000 will entirely disappear. The static revenue increase is thus SEK 2.6 billion.

The mathematical calculation is as follows:

$$\Delta R_S = 0,03 \times (790,000 - 600,000) \times 360,000 + 26,000 \times 20,000 = 2,600,000,000$$

$\Delta$  is "change in" and  $R$  is revenue. All amounts have been rounded off.

All income is eventually consumed and when taxpayers incur lower income of SEK 2.6 billion it will, over time, lower the revenue flow to the government from VAT and excise duties by 25 per cent of that amount (since, as already stated, 25 per cent of consumption fees is tax). The static revenue increase, having considered this, is thus SEK 2 billion.

## DYNAMIC REVENUE CHANGE

Revenue change resulting from changes in the behaviour of taxpayers is as follows (assuming elasticity of 0.2):

$$\Delta R_D = \frac{\tau_1 - \tau_2}{1 - \tau_1} \epsilon \tau_2 Z_1 N = \frac{0.75 - 0.77}{1 - 0.75} \times 0.2 \times 0.75 \times (1.31 \times 790,000) \times 360,000 = -4,000,000,000$$

where (Greek letter, epsilon) is tax base elasticity,  $Z_1$  is average income (including payroll tax) for those affected by the tax change and  $N$  is the number of taxpayers affected.

This is the formula explained intuitively in the section, "How much does the tax hike cost?" The formula is taken from Sørensen (2010), page 227. The amount is negative when there is a tax hike and vice versa for a tax cut.

The change in net revenue is:

$$\Delta R = 0.75 \times \Delta R_S + \Delta R_D$$

This expression is used to calculate the second column of table 1.

The calculations here have been made using data from Statistics Sweden's LINDA database for 2012, which has then been indexed for the growth in salaries and number of persons employed. The LINDA database contains taxation and other information from public records for a random selection of 3.35 per cent of the population.

## EARNED INCOME TAX CREDIT

The earned income tax credit can be regarded as an extra basic deduction that only applies to wage earnings (not benefits, such as sick pay, unemployment, etc.). From a purely legal perspective, the earned income tax credit is a tax reduction equal to the municipal tax rate multiplied by the distance between the red and blue lines in figure 2. A person with SEK 360,000 or more in annual income will not incur the tax on the first SEK 13,000 of earnings, thanks to the basic deduction. The earned income tax credit exempts another SEK 82,000. With an average municipal tax rate of 32 per cent, this person obtains a tax reduction of SEK 26,000 per year (SEK 82,000  $\times$  0.32) or SEK 2,200 per month. That is the highest possible earned income tax credit, because this is when it is fully phased in and the basic deduction is at its lowest level.

The earned income tax credit is phased in at two different rates and it therefore lowers the marginal tax rate for people in low and middle income brackets, see figure 1. The earned income tax credit will now be phased out by 3 per cent with an annual income starting at SEK 600,000. Thus, the credit is entirely phased out when income reaches SEK 1,480,000 (600,000 + 26,000/0.03) using the average municipal tax rate. Just as with phase-in, a phase-out means that the marginal tax rate increases in that interval.

Figure 2. The earned income tax credit (with the proposed phase-out depicted as dotted line) and basic deduction for 2016, based on annual income. Source: Chapter 63 Section 3 and Chapter 67 Section 7 of the Swedish Income Tax Act, prop 2015/16:1.

