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Master Essay II

The Swedish EITC and its effect on the employment rate

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Abstract

The thesis evaluates the Swedish EITC and its effect on the employment rate. The Swedish EITC was introduced in 2007 to encourage more people to enter the labor market. This will be evaluated with a difference-in-difference method. The fact that the tax rate in the municipality is an important part of the formula for the EITC will be used to form groups depending of the size of the tax rate. A municipality with a higher tax rate would experience a higher increase in the employment rate than those with a lower tax rate.

It will be shown that there is a difference between groups with different tax rates. However, when controlling for long-term time trend, this effect is eliminated. This shows the difficulties of examining the Swedish EITC.

1. Introduction

In 2006 the party coalition “Alliansen” won the election in Sweden under the banner that it should be more profitable to work in Sweden. In 2007 the Swedish government lived up to this promise by lowering the income tax on labor. The way they decided to do this was to increase the basic deduction with a part called “jobbskatteavdraget”. This reduction of the income tax is commonly known as an Earned Income Tax Credit, EITC. The main idea with this reform was to encourage people to work. With the EITC in Sweden the middle income earner will get a tax credit of about 1,700 SEK a month. At most, it is possible to get a tax credit of 2,100 SEK a month (Edmarker et.al. 2012:2, pp.3-4).

According to standard labor economics theory, a reform like this will affect the working decision through an income effect and a substitution effect. If leisure and consumption are normal goods, the substitution effect makes leisure more expensive when wages increase. The income effect works in the opposite direction by making the worker afford more leisure when her wage increases (Bosworth et.al. 1996, p. 29).

Theoretically, even if the total EITC effect can go both ways, EITC is seen as a redistribution method with less distortion than other welfare programs aiming to help the working poor (Eissa and Liebman, 1996, p.606.).

EITC programs exist in many other countries, e.g. in the US and the UK. However, in both these countries the EITC is only targeting certain groups of taxpayers, whereas in Sweden the EITC is targeting the whole working population (Edmarker, et.al. 2012:1, p4).

The EITC program in the US aims at getting low-income families with children into the labor force. This EITC program is estimated to be the single most important program when it comes to lifting children out of poverty (Eissa,2006, pp.73-74).

In the UK there exists a similar EITC program called Working Family Tax Credit, WFTC, which aims to encourage low-income families to get into the labor force. Studies in the UK have found the WFTC increases the labor force with between 29,000 and 59,000 individuals (Blundell et.al. 2005, pp. 1-2).

Thus, there are studies showing that the EITC affects certain groups well. However, when given to a whole working population the research on EITC is so far limited. There has been a study made on the Swedish EITC that examines the period 2004-2008.

However the conclusion was that it is too hard to evaluate the effect due to the difficulty of eliminating underlying trends (Edmarker et.al. 2012:2, p. 16).

To examine whether the EITC in Sweden has increased the employment rate, a version of a difference-in-difference method will be performed, this time with a longer time span. The EITC is calculated based on the tax level in the municipality that the taxpayer lives in, and when the tax is higher the EITC will result in a larger tax reduction. The fact that the tax rate differs between municipalities will be used to create a sort of control and treatment group. By doing this it will be possible to isolate the effect of the EITC on the employment rate. Thus, if the EITC has had an effect, a municipality with a higher tax rate should have experienced a higher increase in the employment rate compared with a municipality with a lower rate.

The data that will be used is aggregated data over the employment for each municipality over the period 1993-2012. The dataset will be reduced to cover individuals between 20-64, because the EITC is larger for individuals above the age of 65.

It will be shown that the municipalities in the group with a higher tax rate had experienced a higher increase in the employment rate of approximately 0.7 percentage points than the municipalities in the other groups. In a municipality with 10,000 inhabitants this would correspond to 70 new working opportunities that could be explained by the EITC. However, when controlling for unobserved time trends, this change will no longer be significant.

The conclusion will be that the variation is too small to get a significant result. However, it is not possible to reject the fact that the EITC has affected the employment rate.

2. Earned income tax credit

Recently, the trend in OECD countries has been to lower income taxes (Owens, 2005, p.4). One type of deduction, that tries to stimulate people to work more, is the Earned Income Tax Credit (EITC). This method has been tried (in addition to in Sweden), in the US and the UK (Edmarker et.al. 2012:1, p.10).

In many countries the EITC has been used to redistribute resources to groups outside the working force. For example, tax credits have been a common method to redistribute resources in the US and the UK (Blundell, 2005, p.426).

In the US the EITC is targeting low-income families with children. The idea with the EITC program in the US was to encourage people in low-income families to leave the social security program and instead enter the labor market. To be qualified for the EITC, the person's earned income must be below a certain threshold and the person must have an underage child (Eissa & Hoynes, 2004, pp.75-79).

The tax reform that took place in the UK was called the Working Families Tax Credit, WFTC. The WFTC was similar to the one in the US in the way that it was targeting low-income families with children. However, in the UK reform a minimum number of hours of work a week was also required. To be entitled the WFTC, you must work at least 16 hours. So therefore there is an incentive to work more for those who worked less than 16 hours a week. However, the opposite incentive exists for those working more than 16 hours a week, because they now only have to work 16 hours to be entitled to the WFTC (Blundell & Shepard, 2011, p.8).

In the US case, it can be shown that the EITC does affect the labor supply. However, it can also be shown that it only affects the extensive margin, but not the intensive margin, in other words, it affects the decision to start working but not the number of hours worked (Eissa & Hoynes, 2004 pp.106-107).

In the UK, it was found that the hours worked increased by the WFTC reform. The attractiveness of working more than 16 hours increased and did not go below these 16 hours for those economically entitled to the program. Thus, for them working more than 16 hours a week, there was an income effect pulling them away from work to at least 16 hours a week, but a substitution effect pulling them towards work (Blundell and Shepard, 2011, p.9).

The Swedish EITC was introduced in 2007 and has been implemented in 5 different steps, 2007, 2008, 2009, 2010 and 2012. The main purpose of the reform has been to encourage more people to enter the labor market, instead of increasing the number of hours worked. Therefore the main task of the Swedish EITC is to stimulate the extensive margin rather than the intensive margin (Edmarker, et.al. 2012, p.3).

There has been some criticism against the Swedish EITC, e.g. the weak transparency in the design and that the reform is relatively unknown. In a survey made

in 2009 only 40 percent of the Swedish population aged 15-74 answered that they knew about the EITC reform. Among the unemployed, for whom the reform is designed, 29 percent answered that they knew about the EITC reform (SOU, 2011, p.323).

In Sweden, everyone pays a tax on their income from labor to the municipality. The average income tax in 2014 was 31.86 %. Above a certain threshold there is also a central government income tax; this threshold was 420,800 SEK in 2014. There is also a basic deduction on income from work that depends on the size of the income (Edmarker et.al. 2012:1, p.5).

In contrast to other countries, everyone who is employed in Sweden is entitled to the EITC and does not have to apply.

The formula for how the EITC is calculated differs, depending on earned labor income. This is depending on the labor incomes share of the price base called “prisbasbelopp”. This is recalculated every year and for 2014 it is 44,400 SEK. The EITC is calculated by subtracting the basic deductions from this earned income from work, and then it is multiplied by the tax rate of the municipality. However, there are some thresholds generating different formulas to manipulate the earned labor income part depending on the labor income as a share of the price base (SFS 1999:1229. 2014. Chapter 67).

This will be shown in Table 1.

Table 1

Labor income as share of the price base	EITC
$x < 0,91$	$(inc - BD) * t$
$0,91 < x < 2,94$	$((0,91PB + 0,332 * inc) - BD) * t$
$2,94 < x < 8,08$	$((1,584PB + 0,111 * inc) - BD) * t$
$x > 8,08$	$(2,155 * PB - BD) * t$

Here inc is the earned labor income, BD is the basic deduction, PB is the price base and t is the municipality tax rate. (SFS 1999:1229, chapter 67).

An example of different EITC combined with different labor incomes is shown in Table 2 below.

Tabel 2

Yearly labor income	EITC
19,000 – 40,000	70-6,889
40,405 – 130,536	11,163 – 15,788
130,537 – 358,752	16,131 – 30,949
≥358,753	26,340

In SEK and with an average tax of 31.86 %.

As can be seen above, there is a big variation in the EITC, depending on the size of the labor income. However, there is an upper limit at a yearly labor income above 358,753 SEK where the EITC no longer increases. The examples in Table 2 above are calculated with the average tax rate of 31.86 %. This means that the EITC will vary between municipalities, meaning that a taxpayer living in a high tax municipality will get a higher EITC than a taxpayer living in a low tax municipality. The municipality with the highest tax in Sweden is Dorotea (in the northern part of Sweden) with an income tax of 34.7 %, and the municipality with the lowest tax rate is Vellinge (in the southern part of Sweden) with a tax rate of 29.19 %. For a part time worker who earns 100,000 SEK a year, the EITC in these two municipalities are 15,134 and 12,731, respectively. This is a difference of 2,403 Swedish kronor on a yearly basis.

3. Theory and earlier research

3.1. Theory

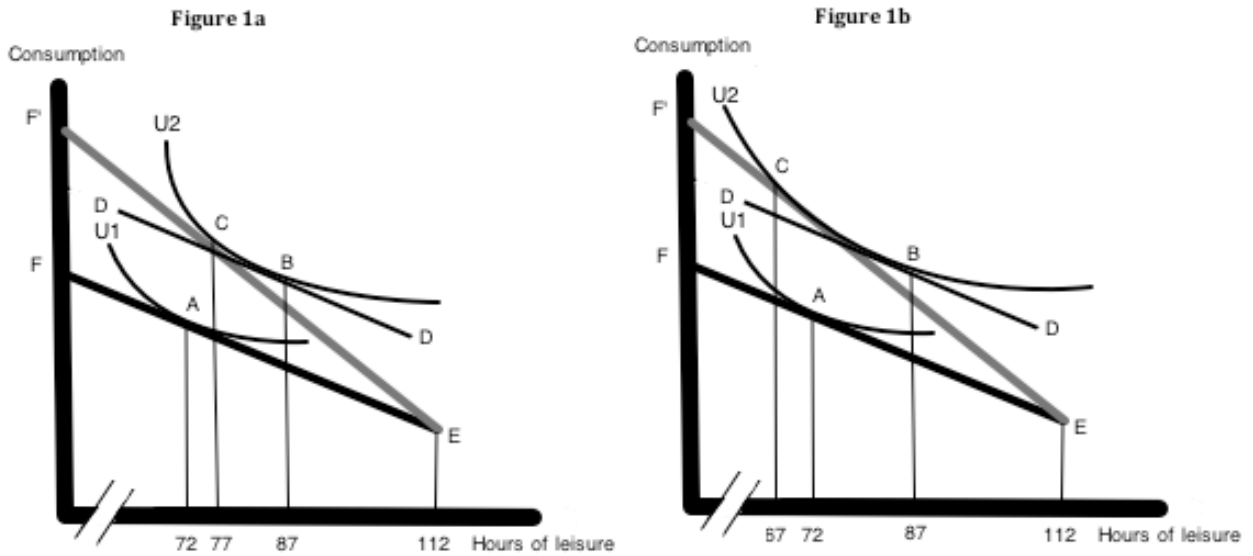
When the wage increases, like in the event of an EITC, there are two mechanisms affecting the worker: the substitution effect and the income effect. The substitution effect implies that the worker will work more after the wage increases because leisure will be more expensive relative to consumption. However, the income effect implies that due to the wage increase the worker can work less to maintain the same level of utility. The income effect and the substitution effect work in opposite directions and it is not obvious which effect dominates in the case of an EITC (Bosworth et.al. 1996. pp.27-28).

However, this effect is only true if leisure is a normal good, i.e. that we demand more of it if we get richer. It is reasonable to assume that leisure is a normal good and therefore the theorem above will hold. The implication of leisure (and goods) being a

normal good is that we will have indifference curves that are getting better when going to the north-east (Borjas, 2010, p.37).

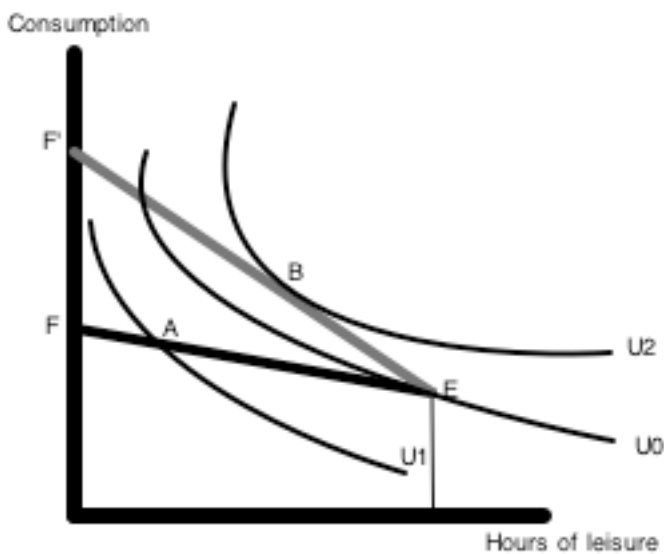
The process of the income and substitution effect is shown in Figure 1. On the axes we have consumption and hours of leisure. If we assume that we sleep 8 hours a night, the hours left for leisure are in total 112 a week. The budget constraint is the line between points E and F. The indifference curve determines how many hours to work, in this case 40 hours a week in point A, which leaves 72 hours for leisure. When the EITC is introduced, the slope of the budget constraint is getting steeper and is now going from E to F', however, the total hours available for leisure is still the same. The DD line is representing the income effect, i.e. the increased wealth due to the higher wage achieved by the EITC. The income effect will move the working decision to point B, reducing the time at work by 15 hours. However, because of the increased wages, leisure is now more expensive relative to consumption, leading to the result that the substitution effect moves the working decision along the indifference curve to point C. What will happen with the hours worked due to the EITC depends on which effect dominates. In Figure 1a, the income effect dominates, which results in the substitution effect reducing the working decision to a point less than 40 hours a week. In Figure 1b the substitution effect is dominating which leads to more hours worked after the introduction of the EITC. Which one of these two effects dominates depends on the earned income. The higher the income is, the more expensive leisure gets in relation to consumption. In other words, the higher the income is the greater the possibility that the substitution effect dominates (Borjas, 2010, pp.38-39).

Figure 1



However, the ambiguous effect of the EITC only applies if the person is already working. If she is not working at the moment when the EITC is introduced, there will not be any income effect. The decision to start working is in this case determined by the reservation wage. This process is shown in Figure 2. When not working, there is no point on the line EF that will give her a higher utility than she already has in point E. However, after the introduction of the EITC, it may be possible to reach a higher indifference curve by entering the labor market (Borjas, 2010, pp.40-42).

Figure 2



The EITC is only granted to labor income, which implies that work participation will be encouraged. This is because the EITC will change the slope of the budget constraints by making it steeper. Those who did not work before the EITC will not experience any change in their welfare, and those who did work before will still prefer to work. However, when it is more profitable to work, some who did not work before may now enter the labor market (Eissa & Hoynes, 2006, pp. 87-88).

Because the main idea with the introduction of the EITC in Sweden is to get more people to enter the labor market, the desired effect is the one shown in Figure 2. The reservation wage is given by the slope of the budget constraint. A steep budget constraint increases the possibility that a person feels that it pays off to work. Because the EITC has been increased in five steps, the possibility of reaching inhabitants outside the labor market has increased (Borjas, 2010, p.41).

The EITC may make it more attractive to have a job by compensating for a lower wage. The wage paid by the employer is the same as before, leading to a decreased wage demand from the employee. When the wage demand decreases, it is likely that the employer opens up for more vacancies relative to the job searchers. This will not only lead to a lower unemployment rate but also to a shorter search process for those who become unemployed. In this case the EITC will not only induce people to start working; it will also work as a work creator (Kolm & Tonin, 2011, p.80).

3.2 Earlier research

The Swedish earned income tax credit has recently been evaluated with a difference-in-difference method by Edmark et.al. (2012). However, this research was made on individual data between the years 2004–2008. The authors come to the conclusion that it is not possible to evaluate the Swedish earned income tax credit because they cannot ensure that they have controlled for all underlying trends.

The authors conclude that the problem that they face in Sweden is that the EITC is affecting all workers the same way. Therefore they do not have any control group and cannot control if the EITC had any effect. To adjust for this the authors performed a difference-in-difference method with the assumption that the EITC would affect a worker in a low tax municipality differently than a worker in a high tax municipality (Edmark et.al. 2012:1, pp.3-5).

Their result shows that there is an effect of the EITC on employment. However, the authors also performed a placebo test, by changing the period to 2004-2006 and act as if the EITC was introduced in 2005. When performing the same regression, the estimate shows the same pattern (Edmark et.al. 2012:1, pp.26-28). With a placebo test showing a similar result as the authors main regression, they came to the conclusion that they have not been able to control for all underlying trends and that the variation between individuals are too small (Edmark et.al. 2012:1, p.33).

The EITC in the US that is targeting low-income families has been evaluated several times by Nada Eissa and cowriters. In a paper by Eissa et.al. (2006), the authors have been looking at the behavioral response to taxes. They conclude that the labor supply does respond to EITC. However, they also conclude that this response is concentrated to the extensive margin rather than the intensive margin. In other words, the authors find that the EITC affects the decision to start working rather than the hours worked (Eissa et.al. 2006, p.107).

Blundell et.al. (2005) have done research on the similar tax credit program targeting low-income families in the UK called WFTC. They used a difference-in-difference method to examine if the labor supply has increased among single mothers due to the WFTC. They also tried the same set-up for couples with children. They concluded that the labor participation among single mothers had increased with 60,000 new working opportunities due to the WFTC. However, they could not see any significant effect when looking at mothers who lived in a relationship (Blundell et.al. 2005, pp.26-27).

4. Empirical method and Data

4.1 Empirical method

To examine if the EITC affects the employment rate in Sweden, a difference-in-difference method will be used. In an ordinary difference-in-difference regression, one treatment group is run against a control group. In the Swedish EITC case, there exists no control group because all workers are affected (treated) by the EITC. The EITC is calculated

using the tax rate for the municipalities, and because municipalities have different tax rates the EITC varies between municipalities. If the EITC is affecting the employment rate, it will be possible to see a difference between municipalities with a high tax rate and those with a low tax rate.

In the case of a natural experiment, such as a policy change like the introduction of the EITC, the difference-in-difference is a frequently used method in economic research. A policy change can be used as a natural experiment if the treatment or the size and time of implication differ between groups (Verbeek, 2012, p.381).

To perform the difference-in-difference model, aggregate municipality data is used in a fixed effect panel data model. In this way it will be possible to separate a variation in one of the municipalities or a group of municipalities, from the others. The panel data regression will be run as a fixed effect model. This method will add an individual specific intercept that is fixed over time. Thereby the fixed effect will capture all unobserved individual variations over time. When the sample is not random, which it is not in this case when it contains all the municipalities in Sweden, it is appropriate to use a fixed effect model. Thus, the fixed effect model is the most appropriate for this analysis (Verbeek, 2012, pp.373-374).

With the difference-in-difference approach the model can be written as:

$$emp_{it} = \alpha_i + \mu_t + \delta_1 g2_{it} + \delta_3 g3_{it} + \beta_1 inc_{it-1} + \beta_2 educ_{it} + \varepsilon_{it} \quad (1)$$

Where the dummy variable $g2=1$ if the municipality has a tax rate above 31 % and below 33 % for the years 2007-2012, and 0 otherwise. The last dummy variable $g3=1$ if the tax rate is greater than or equal to 33 % for the years 2007-2012, and 0 otherwise. The variable inc is the log average income for each municipality. It is likely that the effect of the income will be delayed due to the fact that it take some time for people to change their behavior, therefore this variable will be lagged by one year. The variable $educ$ is the number of inhabitants with higher education in the municipality. The intercept variable α_i , is the municipality intercept that is constant over time and different between municipalities. The variable μ_t is the time specific fixed effect, and it will be assumed to be the same for all individuals (Verbeek, 2012, p.380).

The ε_{it} is the error term that is independent and identically distributed. For the model to hold it is important that the error term ε_{it} is uncorrelated over individuals

and time and that all the correlation between them is captured by α_i . However, the efficiency of the model is affected by the presence of autocorrelation in the error term. This problem will be considered by using a variant of the Newey-West robust standard errors called cluster robust covariance matrix (Verbeek, 2012, 390).

The difference-in-difference method works as the name indicates by taking the difference in two stages. First it takes the difference in time before and after the treatment was introduced. This difference takes care of the unobserved individual fixed effects that are constant over time. The second difference is between the treated and the untreated group (Angrist and Pischke, 2009, pp.228-229).

To avoid multicollinearity one of the groups will be eliminated from the set. In the regression that has been performed, Group 1 will be eliminated. However, this will not change the inference of the result, because the difference between groups with different tax rates will still be possible (Verbeek, 2012, p.44).

Even if the difference-in-difference approach will eliminate unobserved variation not caused by the EITC, we cannot exclude the possibility that there exists an underlying long-term time trend. This time trend may affect the employment rate and covariates with the EITC in a way that is hard to control for (Edmarker et.al. 2012:1 p.33).

To control if the difference-in-difference method has been successful in eliminating all unobservable variations, a placebo test will be performed. This will be performed in the same way as described above, however we will now pretend that the EITC period was between 2000 and 2006. If our method has been successful, the placebo test should not generate any significant result (Edmarker et.al. 2012:1, p.17).

However, the possibility that there exists an underlying trend, as suggested by Edmarker et.al. 2012, a specific time trend for each municipality will be added. If the EITC alone has been affecting the employment rate, an effect will be visible even after controlling for this time trends.

4.2 Data

The data contains aggregated data over individuals ages 20 to 64 in each municipality. This limitation has been made because it is more likely that persons after 20 have started their working carrier. The regulations of the EITC become more favorable after

the age of 64, and therefore individuals at the age of 65 and above have been eliminated from the data set.

Total employment will be divided with the population to get the employment rate, which will be used as the dependent variable and regressed upon the tax rate. In some regression the average income and the number of inhabitants with higher education will be added as control variables.

The data has been collected for all 290 municipalities in Sweden from 1993 to 2012. However, during this period, some municipalities lack data for various reasons. Some municipalities have been divided into two municipalities and others have changed region affiliation. The municipalities lacking data have been deleted from the data set. These municipalities are Nykvarn, Södertälje, Knivsta, Heby, Bollebygd and Lekeberg. After removing these six municipalities, the data set will include 284 municipalities. The data has been downloaded from Statistics Sweden, SCB. A list over the municipalities and their tax rate for 2012 will be found in the Appendix.

The remaining municipalities have been divided into three different groups depending on their tax rate in year 2012. Municipalities with a tax rate below or equal to 31 % will be in Group 1, municipalities with a tax rate above 31 % and below 33 % will be in group 2, and those with a tax rate above or equal to 33 % will be in Group 3. The distribution can be shown below in Table 3.

Table 3.

Tax rate	Observations
$t \leq 31 \%$	42
$31 \% < t < 33 \%$	102
$t \geq 33 \%$	82

t = tax rate

5. Analysis

The result from performed regressions is shown in Table 4. In Model 1 we can see that Group 3 has experienced a higher increase in the employment rate than Group 2 after the introduction of the EITC. This result is consistent with economic theory that states that people will enter the labor market when the wage increases. Since the EITC is

calculated with the tax rate, leading to the conclusion that a higher tax rate will result in a higher EITC, it is consistent with the empirical model that Group 3 has experienced a higher increase in the employment rate than Group 2. Group 3 has experienced an increase of 1.2 percent; meanwhile Group 2 has experienced an increase of 0.5 percent. Both these changes are significant at a one percent significant level. This means that the difference in 0.7 percentage points can be explained by the introduction of the EITC. In a municipality with 10,000 inhabitants, this will correspond to 70 new job opportunities that could be derived from the introduction of the EITC.

In Model 2 and Model 3 the control variables *income* and *education* have been added. This does not change the effect of Group 2 and Group 3 that are still significant at a one percent significant level and with a difference between the two groups of 0.7 percentage points. However, the income variable is never significant and the education variable is significant at a one percent significant level, but with a diminishing small effect.

In Model 4, Model 5 and Model 6, the same regressions are run again, but now controlling for the municipality specific time trends. When doing this, the effect of the groups on the employment rate is eliminated. In Model 4 and Model 6 none of the group variables are significant. In Model 5 Group 2 is significant on a ten percent significance level but with a negative sign. The education variable still shows a diminishing small significant effect, but now only on a ten percent significant level. However, the income variable is now significant at the one percent significant level.

Table 4.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Group 2	0.0049***	0.0052***	0.0057***	-0.0014	-0.0014*	-0.0014
Group 3	0.0115***	0.0122***	0.0128***	0.0011	0.0012	0.0013
Income		0.0253	0.0249		0.0427***	0.0418***
Education			0.000***			0.000*
N	5680	5679	5679	5680	5679	5679
R ²	0.6408	0.6429	0.6451	0.8882	0.8914	0.8918

Significance level: ***=1% **=5% *=10%

When controlling for the time trend the effect goes away. This suggests that there exists an underlying time trend affecting the employment rate in a positive way.

The same regressions were tried using only year 2012 as the time for the EITC. This was tried because this is the year when all the raises in the EITC had been executed. The result remained almost the same as above; the only difference was that the

difference in effect between Group 2 and Group 3 decreased by 0.2 percentage points in Model 1 to Model 3. In Model 4 to Model 6 the effect is eliminated when controlling for the time trends.

To further investigate if there exist not observable underlying time trends, a placebo test has been executed. In these regressions the EITC period will be pretended to exist between 2000 and 2006. When performing this placebo test, it was not possible to find a significant difference between Group 2 and Group 3. The result for the placebo test is shown in Table 5.

Table 5.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Group 2	-0.0004	-0.0004	-0.0004	-0.0004	-0.0003	-0.0003
Group 3	0.0028**	0.0029**	0.0029**	0.0014	0.0015	0.0015
Income		0.0141	0.0133		0.0427***	0.0417***
Education			0.000			0.000*
N	5680	5679	5679	5680	5679	5679
R ²	0.6286	0.6294	0.6303	0.8880	0.8911	0.8915

Significance level: ***=1% **=5% *=10%

However, even if it is not possible to see any effect of the EITC on the Swedish employment rate in this study, it is not possible to eliminate the possibility that there exists an effect. The variations in the tax rate are small and that makes it harder to get a legible result with this model.

This study is restricted to only evaluate the extensive margin of the labor market. Thus it does not tell us anything about the intensive margin, i.e. hours worked. According to theory the income and substitution effect will work in opposite direction, the former making people decreasing their working participation and the later making them increase the same. Even if hours worked were not the main target for the government when introducing the EITC, it may affect the extensive margin as well. If people work more after the introduction of the EITC due to the influence of the substitution effect, then there might be a risk that fewer new jobs are created because people work more. If on the other hand, the income effect is dominating, then more job opportunities could be created due to people working less than before. Therefore it could be an idea to study the intensive margin as well in the Swedish case. However, if there have been any change in hours spent on the labor market that leads to creating or reducing new working opportunities, this will have been shown when looking at the extensive margin as well.

It could be of interest to evaluate whether it is optimal to introduce the EITC to the whole population. The effect on those who already have jobs could be negative if the income effect is dominating. In that case it would be better to have some kind of threshold etcetera for when to be granted EITC. However, the upside of including the whole working population is that, as discussed above, the decreased working hours that could apply if the income effect dominates could create new job opportunities.

6. Conclusion

In 2007 Sweden decided to lower the tax for those who work. This was made through an EITC. The reason to do this was to encourage more people to enter the labor market. To get more people to leave unemployment and get a work, the reservation wage must be such that it will be possible to increase the utility by entering the labor market. For those outside the labor market it is only the slope of the budget constraint that changes, thus it is for this group only a matter of a substitution effect that will bring them into work.

EITC programs have been used in many other countries before, but then only for a specific group, for example underprivileged families. In those cases the EITC has proved to work rather well when it comes to the extensive margin, i.e. to get people to enter the labor market. However, there exists a limited number of studies on how well the EITC works when applied to the whole population.

To examine this, a difference-in-difference method will be performed. The fact that the tax rate in the municipality is an important part of the EITC formula, this will be used to form groups of high tax municipalities and low tax municipalities. A higher tax rate will also generate a higher EITC,

It can be shown that those municipalities with a higher tax rate have experienced a higher increase in the employment rate than those with a lower tax rate. This result may imply that the EITC does get more people to enter the labor market.

However, when controlling for time trends, this effect is no longer provable. There seems to exist a long-term time trend affecting the employment rate. Even though this result implies that the EITC has not generated any new working opportunities, it is not possible to reject the possibility that it has. The small variation in the tax rate between the municipalities makes it hard to get a consistent result.

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Data collected from Statistics Sweden, SCB.

Appendix

Swedish municipalities in alphabetic order, with tax rate expressed in percent.

Ale	32.75	Götene	32.65	Lekeberg	32.48	Piteå	32.43	Trosa	31.43
Alingsås	32.24	Habo	32.33	Leksand	32.95	Ragunda	34.17	Tyresö	31.58
Alvesta	32.46	Hagfors	33.7	Lerum	31.53	Robertsfors	33.4	Täby	29.73
Aneby	32.9	Hallsberg	32.1	Lessebo	32.85	Ronneby	33.55	Töreboda	31.85
Arboga	32.24	Hallstahammar	32.19	Lidingö	30.72	Rättvik	32.95	Uddevalla	32.54
Arjeplog	33.68	Halmstad	30.85	Lidköping	31.74	Sala	32.69	Ulricehamn	31.93
Arvidsjaur	32.48	Hammarö	33.3	Lilla Edet	33.25	Salem	32	Umeå	33.1
Arvika	32.1	Haninge	31.88	Lindesberg	32.35	Sandviken	32.82	Upplands Väsby	31.28
Askersund	32.4	Haparanda	32.68	Linköping	30.25	Sigtuna	32.08	Upplands-Bro	31.68
Avesta	33.1	Heby	33.36	Ljungby	31.61	Simrishamn	30.9	Uppsala	31.7
Bengtsfors	33.3	Hedemora	33.3	Ljusdal	33.57	Sjöbo	30.81	Uppvidinge	32.65
Berg	33.47	Helsingborg	30.6	Ljusnarsberg	32.1	Skara	31.45	Vadstena	31.1
Bjurholm	33.4	Herrljunga	33.04	Lomma	29.63	Skellefteå	32.9	Vaggeryd	32
Bjuv	31.28	Hjo	32.45	Ludvika	33.2	Skinnskatteberg	32.89	Valdemarsvik	32
Boden	32.53	Hofors	34.32	Luleå	32.68	Skurup	30.41	Vallentuna	31.08
Bollebygd	32.47	Huddinge	32.05	Lund	31.23	Skövde	31.44	Vansbro	33.43
Bollnäs	32.07	Hudiksvall	32.82	Lycksele	33.35	Smedjebacken	33.59	Vara	32.15
Borgholm	32.45	Hultsfred	32.78	Lysekil	32.94	Sollefteå	34.08	Varberg	30.75
Borlänge	33.55	Hylte	31.87	Malmö	31.23	Sollentuna	30.3	Vaxholm	31.88
Borås	31.94	Håbo	32.2	Malung-Sälen	33.2	Solna	29.22	Vellinge	28.89
Botkyrka	32.23	Hällefors	33.1	Malå	33.65	Sorsele	33.4	Vetlanda	32.17
Boxholm	31.84	Härjedalen	33.42	Mariestad	32.14	Sotenäs	32.19	Vilhelmina	33.7
Bromölla	32.15	Härnösand	34.03	Mark	32.09	Staffanstorps	29.18	Vimmerby	32.73
Bräcke	33.92	Härryda	31.5	Markaryd	31.65	Stenungsund	32.52	Vindeln	33.4
Burlöv	30.48	Hässleholm	31	Mellerud	33.48	Stockholm	29.58	Vingåker	32.9
Båstad	30.62	Höganäs	30.12	Mjölby	31	Storfors	33.7	Vårgårda	32.09
Dals-Ed	34.09	Högsby	32.58	Mora	33.47	Storuman	33.4	Vänersborg	33.09
Danderyd	29.45	Hörby	30.87	Motala	31.25	Strängnäs	31.9	Vännäs	33.4
Degerfors	33.35	Höör	31.32	Mullsjö	32.65	Strömstad	32.79	Värmdö	32.23
Dorotea	33.4	Jokkmokk	32.63	Munkedal	33.21	Strömsund	33.67	Värnamo	31.75
Eda	33.45	Järfälla	30.73	Munkfors	33.7	Sundbyberg	31.13	Västervik	32.03
Ekerö	31.33	Jönköping	32.15	Mölnadal	31.14	Sundsvall	33.28	Västerås	30.74
Eksjö	32.57	Kalix	32.73	Mönsterås	32.28	Sunne	33	Växjö	31.31
Emmaboda	32.08	Kalmar	32.68	Mörbylånga	32.28	Surahammar	32.69	Ydre	31.75
Enköping	31.7	Karlsborg	31.95	Nacka	30.71	Svalöv	30.88	Ystad	30.5
Eskilstuna	32.35	Karlshamn	33.4	Nora	32.8	Svedala	30.63	Åmål	33.34
Eslöv	30.13	Karlskoga	33.05	Norberg	33.04	Svenljunga	32.15	Ånge	34.02
Essunga	32.45	Karlskrona	32.7	Nordanstig	33.57	Säffle	33.2	Åre	33.17
Fagersta	32.49	Karlstad	32.95	Nordmaling	33.55	Säter	33.45	Årjäng	33.15
Falkenberg	31.52	Katrineholm	32.35	Norrköping	31.3	Sävsjö	32.58	Åsele	33.4
Falköping	32.48	Kil	33.6	Norrtälje	32.22	Söderhamn	32.87	Åstorp	30.68
Falun	33.2	Kinda	31	Norsjö	33.65	Söderköping	31.2	Åtvidaberg	32
Filipstad	33.2	Kiruna	33.23	Nybro	32.7	Södertälje	32.23	Älmhult	31.25
Finspång	32.2	Klippan	30.4	Nykvarn	32.05	Sölvesborg	33.46	Älvdalen	33.45
Flen	32.5	Knivsta	31.77	Nyköping	31.65	Tanum	32.44	Älvkarleby	33.05
Forshaga	33.55	Kramfors	33.83	Nynäshamn	31.93	Tibro	31.59	Älvsbyn	32.63

Färgelanda	33.64	Kristianstad	31.25	Nässjö	32.45	Tidaholm	32.2	Ängelholm	29.43
Gagnef	33.38	Kristinehamn	33.65	Ockelbo	33.97	Tierp	31.85	Öckerö	31.64
Gislaved	32.65	Krokom	33.12	Olofström	33.35	Timrå	33.33	Ödeshög	31.65
Gnesta	32.35	Kumla	31.1	Orsa	33.55	Tingsryd	32.11	Örebro	31.9
Gnosjö	32.8	Kungsbacka	31.75	Orust	32.84	Tjörn	32.09	Örkelljunga	29.15
Gotland	33.1	Kungsör	32.41	Osby	32.15	Tomelilla	31	Örnsköldsvik	32.78
Grums	33.6	Kungälv	32.32	Oskarshamn	32.38	Torsby	33.7	Östersund	32.97
Grästorps	32.45	Kävlinge	28.9	Ovanåker	33.07	Torsås	32.3	Österåker	31
Gullspång	33.37	Köping	32.54	Oxelösund	32.45	Tranemo	31.45	Östhammar	32.55
Gällivare	32.73	Laholm	31	Pajala	32.88	Tranås	32.22	Östra Göinge	31.5
Gävle	32.72	Landskrona	30.63	Partille	30.84	Trelleborg	30.75	Överkalix	32.98
Göteborg	32	Laxå	33.23	Perstorp	30.95	Trollhättan	31.84	Övertorneå	31.93