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Lower payroll taxes for young workers

- Was the introduction of the payroll tax reductions for young employees an effective way to lower youth unemployment?

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Abstract

This thesis studies the effects on the unemployment rate and average income due to the payroll tax cuts for young workers in Sweden. The method that has been used is a difference-in-difference approach with two different control groups. The unemployment rate for Swedish individuals at age 15-24 has been matched towards individuals at the same age in Finland and Denmark. The data behind the estimations is picked from the database of Eurostat. The results indicate an increase in the unemployment rate, contrary to the expectations from the theoretical framework in the subject. One possible explanation for a lack of increase in employment due to a targeted tax cut is shifting, meaning that the lowered cost for firms is shifted onto the employees' wages. However, no significant results on the wage effect were found, so no such conclusion can be made. The explanation could lay in modeling problems, a growing labor force or the supply of labor (which may choose other alternatives than employment). By the results of this report, the main conclusion is that the payroll tax reductions did not reduce the high unemployment rate among young individuals in Sweden.

Content

1 Introduction

Rising unemployment has for several years been a problem in Sweden, which have caused an increased need of labor market policies to counteract the negative evolution. A high unemployment rate is a big problem for the society, causing a decrease in government income, making the unemployment rate an important field of research. In Sweden, especially the unemployment among young individuals is very high relative to the unemployment rate among rest of the labor force. It is known that the youth unemployment is exposed to cyclicality and young individuals tend to delay their entry to the labor market to a greater extent. Also, from the employers' aspect, the adolescents have a lower productivity than the older. The mentioned factors may explain the high unemployment rates among young individuals. To counteract the problems with high unemployment evolution, the Swedish government imposed a payroll tax cut for young employees in accordance with proposition 2006/07:84: ”*Reduction in payroll taxes for employees over 18 but not yet 25 years old”* and 2008/09:7:*”Further reductions in payroll taxes for young employees”*. The main ideas behind the propositions was to decrease youth unemployment rate by simplifying the labor market entering and increase young individuals' attractiveness for the employers.
The purpose of this thesis is to examine whether the reductions in payroll taxes due to the proposition 2006/07:84 and the extended proposition 2008/09:7 resulted in a positive employment effect for young workers. Further, I am going to investigate how average wages has been affected. All for examine whether the reductions were an effective way to lower the unemployment rate for the young individuals in the country. This to answer the research question of this study, which is the following:
“Was the payroll tax reductions for young employees in Sweden in 2007 and 2009 an effective way to decrease the unemployment rate for young individuals?”

The thesis continues as follows: Section 2 presents a brief summary of the Swedish labor market history and an account for the Swedish payroll tax, the propositions behind the tax reductions, and the Swedish wage formation model. Section 3 summarizes some previous research in the field of tax reductions. Section 4 contains the theoretical framework. Section 5 presents the data used. Section 6 describes the methodological approach. Section 7 presents, and section 8 discusses, the regression results. Section 9 consists of a short summary of this study and finally a conclusion is presented.

2 Background

In this section of the report, a brief summary of the Swedish labor market the past decades are being presented, focusing on the history of the unemployment. This is followed by a description of the Swedish pay roll tax system and the two propositions behind the tax reductions. Finally, since also the wage effect is being analyzed in this report, this section ends with an explanation of the Swedish wage formation model.

2.1 The Swedish labor market 1990-2015

According to SCB (2016), the Swedish economy has the recent decades been characterized by cyclical fluctuations, back and forth between recessions and booms several times. When the 1990s entered, after several years of good economic climate, the high employment rates were changed towards high numbers of unemployment. Between 1990 and 1993, the number of employed decreased by around half a million individuals. At the same time, the number of individuals in the labor force increased by almost 100 000. This made the employment rate soar, and at the time it exceeded 8 percent. Also, the youth employment was affected, which reached its peak in 1997 (when it was as high as 22 percent). The decrease in the employment rate brought severe cuts in the public sector due to the lowering in tax revenues from decrease in employment. Also for the total population, the unemployment rate reached its peak in 1997 (over 10 percent) (SCB, 2016). After 1997, till the beginning of the 2000th century, the situation on the labor market improved. The unemployment rate decreased by nearly five percentage points. Also the youth unemployment decreased with the same ratio at the same time (Eurostat, 2016). The evolution of the youth unemployment is shown in figure 1 below.

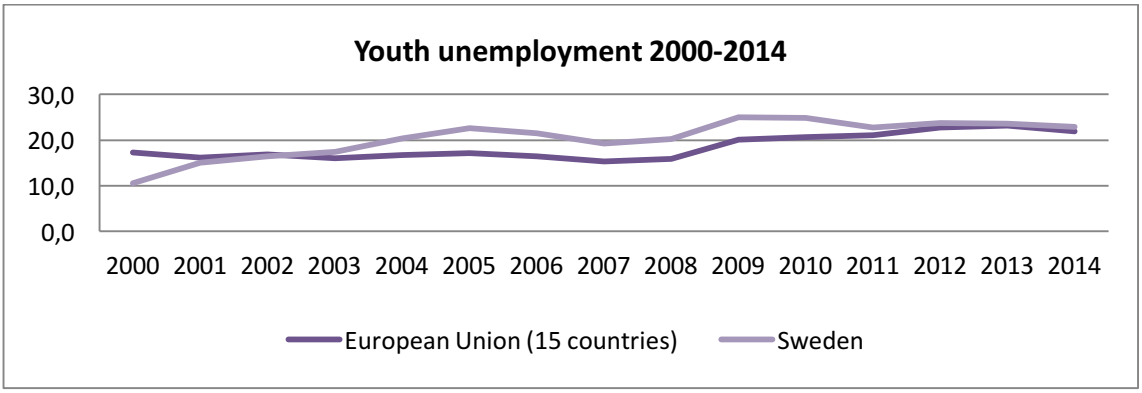

Figure 1 – Evolution of youth unemployment 2000-2014 (Eurostat, 2016).

As seen in the figure, the youth unemployment was in the early stage of the 2000th century lower than the level for the EU-15[1] countries.
But, after the year of 2003, it rose above the EU-15 level. The rise can partly be explained by a modification in the statistical reporting conducted in 2005, in the purpose to suit the EU standard. The modification extended the concept of unemployed to include individuals who are going to work within three months, provided that they have the possibility of working during the reference week or begin within 14 days after the end of the reference week. Thus, the youth unemployment shifted upwards, now over the level of the EU-15 countries, since students who are working only during the summer is now seen as unemployed (SCB, 2005).
In all, for the time period 1990-2015, the unemployment rate for young individuals in Sweden has been around two to three times higher than for the total labor force (Eurostat, 2016).

2.2 Swedish payroll tax

According to Skatteverket, the payroll tax is in Sweden one part of the social fees, and is paid by the employer as a proportion of the employee's gross wage. The tax consists of seven compulsory fees so as pension, health insurances, parental charges and other social benefits, to finance a part of the Swedish welfare services. The payroll tax was introduced in Sweden in 1960, when it constituted of only a few percent of the employees' gross wage. During the 1960s and the 1970s the tax was raised gradually, and since the end of the 1970s it has been relatively stable around 30 percent. After the elections in 2006, the new Swedish government introduced two reforms that implied a big change in the payroll tax rules. Today, the full payroll tax is 31.42 percent and is paid for employees in the ages between 26 and 65. The two reforms, introduced in 2007 and 2009 separately, reduced the tax considerably for young workers. After another change in the government composition after the 2014 election, a new arrangement was made, which implies that from 1st June 2016, full payroll taxes (31.42 percent) is once again mandatory on all workers' wage (2016).

[1] EU-15 is the number of member countries in the European Union prior to the addition of ten new countries in 2004. To EU-15 counts the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom (OECD, 2007).

2.2.1 Proposition 2006/07:84

In the proposition 2006/07:84 *"reduction in payroll taxes for employees over 18 but not yet 25 years old",* a reduction in payroll taxes for young workers, as of the beginning of the year is at least 18 but not yet 25 years old, is proposed. In the proposition it was suggested that the fees, except the pension fees, would be halved, which corresponds to a reduction around 11 percentage points for individuals included in the target group. Arguments for the tax cut was including the cyclicality of the youth unemployment combined with the delayed entering of the labor market, and the fact that the adolescents have a lower productivity than the rest of the labor force. The idea behind the proposition was therefore to make it easier for young individuals to enter the labor market and increase their attractiveness and thereby increase youth employment. The proposition was adapted by the government the 15th of march 2007, came into force the 1st of July 2007 (Regeringens Proposition 2006/07:84, 2007).

2.2.2 Proposition 2008/09:7

The new proposition 2008/09:7 "*Further reductions in payroll taxes for young employees",* was modified relative the old one in two ways. First, the affected age range was extended to include individuals under 18 and up to those who at the start of the year had not yet turned 26 years of age. Second, the payroll reduction was increased. The new fees were proposed to be only a fourth of the original fees (except the pension fees which still remained constant), leaving the current payroll tax for workers under 26 years of age at 15.52 percent. The purpose of the extended reduction was, once again, to up the attractiveness of young workers by making it easier for them to enter the labor market, and therefore create a sustainable higher employment rate. (Regeringens proposition 2008/09:7, 2009).

2.3 Wage formation

The Swedish wage formation model, according to Medlingsinstitutet (2012), involves an interplay between legislation and collective agreements. It differs a lot from the wage formation in other countries across the world. The legislation establishes the framework, but is semidisposive in large parts, so that the parities of the labor market can sign agreements with other content. Around 70 percent of all employees in Sweden are organized in unions, and up to 90 percent of all workers are employed by firms

connected to unions. An employer bound to the collective agreement must apply the agreement on all their employees, even if the employees are not a member of the union. A basic protection for employees is legislated, but large deviations can be done via collective agreements. In Sweden, there is no minimum wage legislation. Minimum wages are negotiated between the social partners and laid down in collective agreements.

Further, according to Konjunkturinstitutet (2015), the collectively agreed minimum wages in Sweden are relatively high compared to international standards. The agreements differentiate wages based on factors as age, experience and skill levels, which implies that younger workers are more likely to obtain wages bound by the minimum wage. Further, unemployment is higher among low educated workers (which young employees often tend to be). So by adjusting minimum wages, the employment could probably be boosted in groups with low levels of education and/or low levels of relevant experience.

3 Literature review

A large part of the literature that examines the effects of payroll tax cuts is concerning general tax reductions.
Gruber (1995) was early on examining the question of the effects of a payroll tax, providing new evidence by looking at Chile before and after a privatization of its social security system. Due to the reform, the Chilean firms faced a large reduction in the payroll tax burden, when it fell from 30 percent to only 5 percent in the course of six years. Gruber is using data from a survey of manufacturing plants in Chile, which contains data on total wages and payroll taxes paid at thousands of plants in each year. Gruber does find strong evidence of that the incidence of payroll taxation was fully passed on wages and that there was no effect on the employment. He does however state that the method used has some potential weaknesses, thus e.g. some of the variation in firm-specific tax rates may be spurious.

Evidence of that a tax reduction will lead to higher employment has however been found. An example of an article of this kind is written by Anderson and Meyer (2000), whom examines the effect of unemployment insurance (UI) payroll tax on wages and employment in Washington, US. The authors are making a comparison of wages and UI program and labor market outcomes before and after a change in the UI taxes, which they say provide good evidence on tax incidence and the effects of experience rating. They use individual level administrative earnings data to examine the incidence. Their findings show that labor earnings always fall with higher taxes. It is also shown that the market-level tax is largely passed on to the worker in the form of lower earnings. However, firms can shift very little of the firm-level tax, which implies that the experience-rated system might lead to a substantial reallocation of labor across firms. Further, it is suggested that the experience rating may both reduce UI claims and stabilizes employment. Both these factors leads to higher employment.

Regarding reductions targeted towards groups that may be sensitive to labor market rigidities, there is one major article, written by Kramarz and Philippon (2001). Kramarz and Philippon is examining the employment effects of a reduction in payroll taxes in France, for, mostly young, workers on or close to the minimum wage. Their findings show evidence for that increases in wage costs is associated with higher unemployment. Using a Difference-in-Difference approach, comparing years of increasing and

decreasing minimum cost, gives them estimates which implies that a 1 percent increase of the cost leads to a 1.5 percent increase in the probability of transitioning from employment to unemployment for the treated group. However, transitions the other way around, from unemployment to employment are not so clear. Their results show that tax subsidies have a small and insignificant impact on entry.

Concerning the targeted reductions in Sweden, considering the proposition 2006/07:84; "*Reduction in payroll taxes for employees over 18 but not jet 25 years old"*, and the extension, proposition 2008/09:7; "*Further reductions in payroll taxes for young employees"*, there is two major studies. One, performed by Egebark and Kaunitz (2014), and the other, performed by Skedinger (2014).

Egebark and Kaunitz (2014) examines the effects on employment and wages in Sweden due to the reductions in payroll taxes for young workers. To estimate the effects, the authors are using two different types of Difference-in-Difference approaches. They mean that by using these two different approaches, they should obtain a more robust overall picture. If the estimates obtained from the two different methods are similar, their results can be considered credible.

By comparing estimates within the group that were subject to the payroll reductions, with the estimates within another group that were not subject to the reductions, the authors can draw a conclusion about the effects on the employment rates. They choose to make two evaluations, using both 25-year-olds, and the whole target group (19-15-year-olds) as control groups. Concerning the treatment group, the authors is considering it preferable to keep the age interval close to the cutoff, so therefore 26-year-olds (later extended also to 27-year-olds) are used as control group. Egebark and Kaunitzs results shows a small statistically significant positive effect on the employment rate. For the comparison between 25 and 26-year-olds the size of employment increased 1.3 percent in 2007 and 0.8 percent in 2008, which they considered to be a relatively modest increase. The results for the whole target group, 19-25-year-olds, shows an increase in employment higher than for only 25-year-olds: 2.7 percent in 2007 and 1.4 percent in 2008. All results show a smaller increase in 2008 than in 2007, which they explain by the fact that the treatment effect for one year could persist to the next year. Therefore, using 26-year-olds could bias the 2008 estimate downwards, which in turn made the authors extend the comparison with 26-year-olds vs. 27-year-olds. The results from this estimation, for both methods, shows a positive effect on the employment rate by

roughly 1.3 percent both in 2007 and in 2008. For the extended 2009 reduction, the estimates show no further boost in the employment.
Egebark and Kaunitz does also look at wages, and they find evidence for a small increase in the wages. They do however conclude that the shifting does not by itself explain the modest effects on the employment.
The authors find the cost of the payroll tax reductions to be more than four times higher than the hiring cost of new employees, which makes the authors draw the conclusion that the reductions were largely unsuccessful.

Skedinger (2014) is examining the effects of the payroll tax reductions by looking at the retail industry. Although only analyzing one industry, I find his research important in the subject because of the high number of young workers in the retail industry, and, at the same time, the share of labor cost is relatively high contra the total costs.
Also Skedinger is using the Difference-in-Difference approach, comparing the subjected group, 19-25-year-olds, with a not subjected group, which he chooses as 27-29-year-olds. As a contribution to the previous research in the subject by e.g. Egebark and Kaunitz, he is dividing the workers into blue- and white-collar workers to see how the effect may differ depending on the status of the worker. For examining the effect on firms' profits, there is no suitable control group available, why a different approach is used. He is therefore using a linear specification, exploiting the variation in treatment intensity across firms.
Estimates of entry into the industry, exit from the industry, hours worked and log of hourly wages are obtained. For blue-collar workers, in short-run (2007), the probability of entering the industry increased by 1.7 percentage points in the treated group relative the control group. In long-run (2004-2011), entry increased by 1.5 percentage points. The probability of exit is also small, estimated to 0.2 percentage points in the short run. A rough estimate of the short-run increase in net employment is therefore 1.5 percent, while zero percent in the long-run. The short-run effect for 2007 indicates no effect at all on hours worked. Skedinger does find some evidence of increasing wages, but small effects. In the short-run the effect is found close to zero, while in long-run it is estimated around 0.5 percent.
The results for white-collar worker are even more modest. The author finds no discernible positive effect at all on net employment, not even in short-run. After the reduction in 2007, hours worked by the white-collar workers increased, but he finds no

further effect due to the extended reduction in 2009. The 2004-2009 estimates for white-collar workers, compared to estimates for the previous period, show a reduction in both probability of entry, and hours worked. Skedinger says that the extended payroll tax reduction in 2009 may have counteract the decline of labor market prospects for young workers due to the financial crisis that hit the world economy in this period, but it did not eliminate it. His conclusion is that, for workers given the minimum wage, the estimated effects of the payroll tax reduction suggest larger than previous research, but still modest, effects on the probability of entry the industry.
Regarding firm's profits, Skedinger is one of the first to examine the effect on firm performance from the payroll tax cuts. He finds evidence that for a firm with a larger share of young workers before the reform, the payroll tax contributions get smaller in relation to the wage bill after the reform. He also finds that firms profit margins are always positive, evidence of increasing profits following the payroll tax reform is found.

As I mentioned in the beginning of this review, I find both Swedish articles interesting and relevant. Both studies are using a Difference-in-Difference approach with young workers who were subjects to the reforms as their treatment group, and slightly older workers who were not subjects to the reform as control group. The results of both studies do suggest a small increase in employment due to the reductions in payroll taxes for the young workers, but with some distinction. The Difference-in-Difference method is a good method to use with this type of research because it eliminates bias that could occur due to cyclical trend differentials. However, it is important to remember the importance of the choice of control group. Both studies do only show, as I mentioned when analyzing the method used by Egebark and Kaunitz (2013), the relative effect between the treated and the control group, not the absolute effect. Also, as discussed in the articles, the treated group, younger workers, may be more cyclical sensitive than the controlled group, which may bias the estimate. Egebark and Kaunitz analyzes the cost of the reforms, which Skedinger does not. But instead, Skedinger do analyze how the cuts affect the firms' profit, which Egebark and Kaunitz does not, so there are some advantages and disadvantages with both articles. Egebark and Kaunitz have a couple of suggestions why the employers do not increase their hiring as much as they could, but they do not present any research in this area. Here, Skedingers article complements well, thus he finds an increase in the firms' profits.

Other large empirical studies performed in the Nordic countries are written by Bennmarker et al. (2009), Korkeamäki and Uusitalo (2009) and Korkeamäki (2011). None of these three studies do find evidence for that the employment should have increased due to a payroll tax cut.
I have found only one other study, except for Skedinger (2014), examining how payroll taxes affects firms' profits, which is the one written by Korkeamäki (2011). Korkeamäki finds, contrary to Skedinger, insignificant effects on profits. This he is considering ambiguous because of the small effects on both employment and wage reported in the study.

My conclusion is that the research in this area is far from complete. What I would like to accomplish by this report is to perform a research on how the targeted reductions in payroll taxes in Sweden 2007 and 2009 affected the employment for young worker in absolute terms, using a Different-in-Different approach, using a country with a labor market similar to the Swedish labor market. In this way, I could avoid the problem with measuring the relative effect of the reductions. If the results show a small or no increase in employment, in line with the previous research presented in this review, I am going to extend my research by looking on how the reforms has affected workers wage.

4 Theoretical framework

According to economic theory, the labor market, simplified, consists of two leading parties: employers and employees. The labor supply is given by the total number of hours an employee is willing to offer at various wage levels, which is affected by the worker's preferences. The labor demand is given by the total amount of hours an employer demands at various wage levels. Also the government is involved, which can, via regulations, help set the ground rules that guide exchanges in the labor market. The price respective the cost for the trade is the wage. A sudden increase in the labor force would press the wages down, while a reduced labor force would push the wages up. A new higher or lower equilibrium will occur. In the long run, the labor market will remain in equilibrium where there is no unemployment (Borjas, 2013).

4.1 Labor market equilibrium

The labor market is in its equilibrium state when hours supplied by employees equals hours demanded by employers. In figure 2, the equilibrium is illustrated in a graph, showing the intersection of labor supply curve (S) and labor demand curve (D), which generates the competitive wage w^* and employment E^*. Another wage level than w^* would create upward or downward pressure on the wage because there would be too many jobs in relation to available workers or vice versa. At the competitive wage level, each firm hires workers up to the point where the value of marginal product of labor equals the competitive wage. The equilibrium state implies that all individuals searching for a job at the specific wage level is being hired, so there is no unemployment. Triangle *P* gives the producer surplus, and the triangle *Q* gives the worker surplus. A competitive market, with no regulations, maximizes the gains from trade which is illustrated as the areas $P + Q$ (Borjas, 2013).

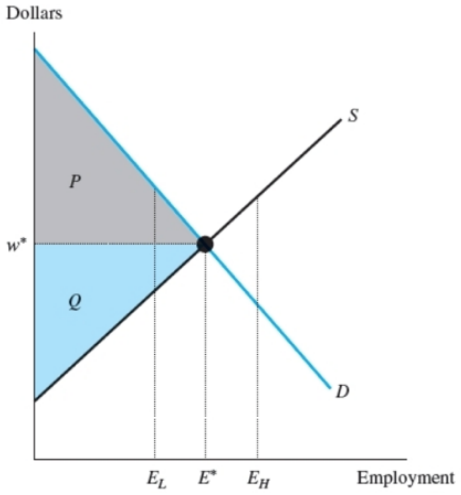

Figure 2 – Labor market equilibrium (Borjas, 2013).

4.2 The payroll tax incidence

In Sweden, the legislated incidence of the payroll taxes is formally assessed upon employers, meaning that the employer is accounting for the payment. When a payroll tax is assessed on the employer, the cost of hiring will extend to not only to include the wage, but also the tax. Firms need to take this into account when hiring. Therefore, the labor demand curve will shift down (from D_0 to D_1) and the wage employers are willing to pay will be reduced by the tax rate in order to cover for the extra cost, down to $w_0 - t$. The introduction of a payroll tax moves the labor market to a new equilibrium, where the number of employees falls from E_0 to E_1 and the wage received by employees declines to w_1. The total cost of hiring for the employers rises to $w_1 + 1$. Worth noticing is that, even though the legislation clearly states that the employer must pay the payroll tax, the labor market shifts part of the tax to the employee since also the employees received wage declines. The economic burden will be shared between the employers and the employees. The effect on employment and wage level is dependent upon the change in the distribution of the received income, which in turn is dependent upon the elasticities of labor demand and labor supply, and the wage formation process (Borjas, 2013). However, if the wage received by employees falls by exactly the amount of the tax, it is the workers who bear the whole burden. Many economists believe that at least in short run this is the case, since they have found the elasticity of labor supply to be close to zero (Rosen & Gayer, 2014).

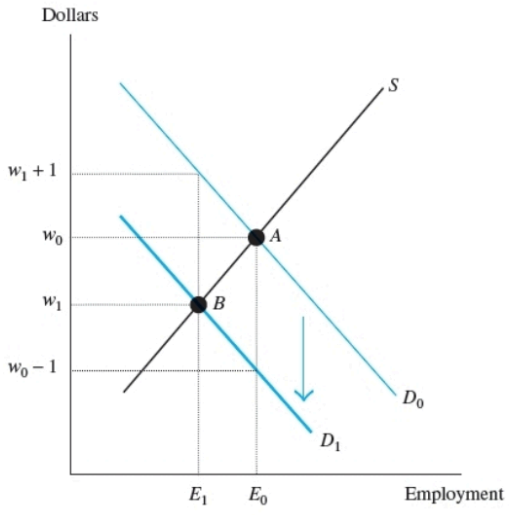

Figure 4 – The impact of a payroll tax assessed on firms (Borjas, 2013).

The payroll tax in Sweden is in the form of a proportion of the wage, but is here illustrated as a unit tax for simplicity. If illustrated as a proportion, the labor demand curve would pivot instead of shifting, the analysis is otherwise the same.

4.3 Deadweight loss

In the equilibrium state in a competitive labor market, in the absence of a payroll tax, the total gains of trade are maximized. When the payroll tax is introduced by the government, regardless whether imposed on workers or on firms, the payroll tax increases the cost of hiring which reduce total employment. Therefore, the after-tax equilibrium is inefficient due to the fact that number of employed is lower than the number that maximizes the total gains. The introduction of a payroll tax reduces employment from E_0 to E_1, decreasing both producer surplus which is given by the smaller triangle P^*, worker surplus which is given by the smaller triangle Q^*. The tax revenues that the government receives are given by the rectangle T, see figure 4. The deadweight loss of the tax is illustrated by the triangle *DL,* and measures the value of gains forgone because of the introduction of the tax. The deadweight loss arises because the tax prevents some workers who are willing to work from being hired by employers who were willing to hire them before the introduction of the payroll tax.
When introducing a reduction in the payroll tax, the demand curve will, as shown in the next section, take a shift back up towards its original position. Thus, the size of the dead weight loss on the labor market will be smaller due to a reduction in the payroll tax (Borjas, 2013).

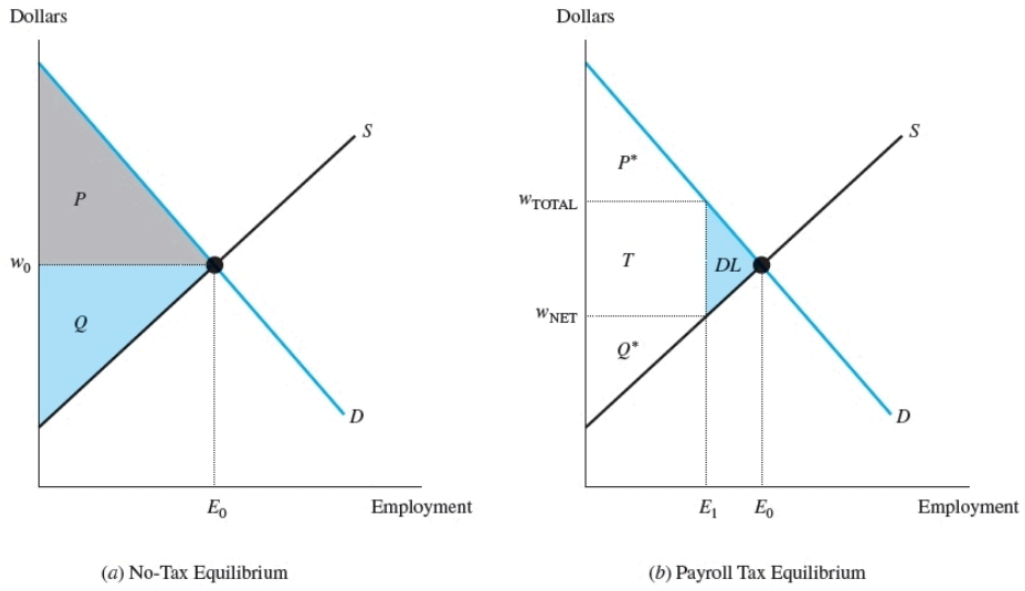

Figure 5 – Deadweight loss of a payroll tax (Borjas, 2013).

4.4 Unemployment effect of reduced payroll taxes

The unemployment effect of reduced payroll taxes is assumed to differ depending on the time horizon used. Both short run and long run unemployment effects is being analyzed in this report.

Due to collective agreements, wages are fixed at short run. Wages are therefore independent of the level of employment. In figure 6, an extreme case where the labor supply is perfectly elastic, is being illustrated. Contrary to the effects when imposing a payroll tax, the cost of hiring reduces which implies an increased demand of workers due to higher willingness to hire. This will make the labor demand curve shift from D_1 to D_2, and the employment increases therefore to E_2. In short run, the hiring costs decreases by the tax reduction, but the reduction is not reflected in the wages received by workers (Rosen & Gayer, 2014). The situation is graphically illustrated in figure 5.

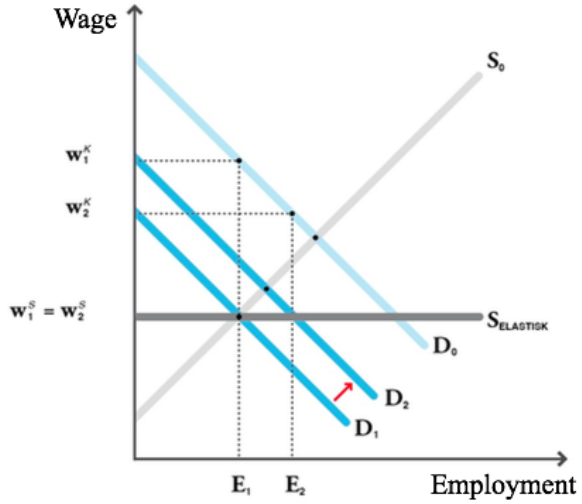

Figure 6 – Employment effect of reduced payroll taxes when perfectly elastic supply (Borjas, 2013).

In the long run, the collective agreements can be renegotiated and the wages are therefore partly flexible. This will place the workers in a better bargaining position due to the improved position on the labor market. The long run employment effect will be especially dependent on the elasticities of the labor demand and supply. A less wage rate sensitivity among the workers will therefore give a smaller employment effect due to a tax reduction. To obtain a positive employment effect, neither the demand or supply of labor can be perfectly inelastic.

In figure 7, another extreme case, where the labor supply is perfectly inelastic, is being illustrated. This implies that the supply is independent of the wage rate level. In this case, the payroll tax reductions are fully passed onto the workers, who will receive a wage increase corresponding the tax cut, to w_3^S. The cost of hiring for employers will remain as at the absence of the tax. At the new, higher, wage level, it will not be profitable for employers to extend their hiring, so in long term there will be no effect on the employment rate, but the workers will receive a higher wage. Similarly, the effect on cost for hiring and therefore employment rate will be low if the labor demand is very elastic (Rosen & Gayer, 2014). The situation is graphically illustrated in figure 6.

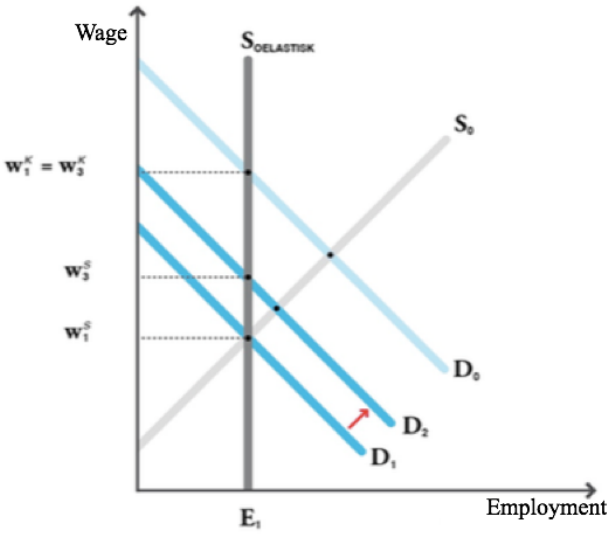

Figure 7 – Employment effect of reduced payroll taxes when perfectly elastic demand (Borjas, 2013).

5 Data

The data for both the unemployment and the wage analysis is taken from the database of Eurostat, which is the leading provider of high quality statistics for Europe. The data is a part of the EU Labour Force Survey (EU-LFS), a survey providing quarterly and annual data on labor participation and individuals outside the labor force. To monitor the quality of the survey, there is a specific reporting structure including several reports, for instance an annual quality report and a report to the Council and the Parliament. Another important element in assuring the quality of the survey is the regulations on how it is organized. The definitions of employment and unemployment used in the survey closely follows the International Labour Organizations guidelines, so the definitions are the same in all countries which makes the data comparable (Eurostat, 2016).

5.1 Data for analyzing the unemployment rate

The used data contains monthly information about the average unemployment rate of individuals at the age 15-24 in the three countries during the time period of 2002 till 2014 (Eurostat, 2016). The unemployment rate is defined as the share unemployed in the total number of individuals in the labor force. Unemployed is a person who did not work during the reference week but actively been searching for a job the last four weeks. Also individuals who is starting a job within three months, given that they could work during the reference week or start within 14 days after the end of the reference week is subjected. Further, the labor force consists of the employed and the unemployed. Individuals who is not in the labor force is those who is neither employed or unemployed, e.g. students, senior citizens and chronically ill (SCB, 2016). The arguments behind using the unemployment rate as outcome variable is to cover only those individuals who wants to work.

Further, the data of the EU Labour Force Survey is reported in predetermined age ranges, which may cause problems. The first reduction is concerning individuals at age 18-25, but the age interval of the data used is 15-25. Individuals who is not subjects to the fist reduction will therefore also be in the sample, which may bias the estimate. Also while identifying the effects of the 2009 years extended reductions problems may occur. The reform is extending the the upper age limit for individuals subjected to the reduction from the earlier limit 25 year-olds to now include 26 year-olds. Age specific

data can be specially ordered from Eurostat, but due to financial limitations in this study, such data is not available for me, thus the age interval 15-25 is being used. This may bias the estimates concerning the second reduction.

5.2 Data for analyzing average wages

Ideally for the sake of the study would be to use data containing information about average hourly wages in different sectors, but due to limitations in availability, data over annual average income from work is being used.

Again, the data is reported in predetermined age ranges, but here forcing me to use data over yearly average income for individuals at the age 25 or less (Eurostat, 2016). However, this will not have a significant impact on the results thus I assume a very small share of individuals under 15 years do have an income from work. The same problem as for the analysis for the unemployment rate will occur while identifying the effects of the 2009 reductions, which may bias the result.

Another problem with this dataset might be to accomplish significant results. As mentioned, no better data than annual average income is found. Since the data is annual, I will at most have 33 observations in the wage analysis, making the probability of finding significant results very small.

6 Methodological framework

Turning our attention to quantifying the reform effects on the employment rate, previous research on the Swedish payroll reductions has compared the affected group with a slightly older, not affected, group, were the estimates has shown the relative effects on the employment rates. By using young workers in the two Nordic countries Finland and Norway as control groups to control for common trends and seasonal factors, I will obtain a comparison in absolute terms. Further, the control groups will be close to homogenous to the Swedish young workers and I will therefore obtain an estimate close to the true value. Thus, I am using a difference-in-difference approach to identify the effects from the reductions in the payroll tax. Using the computer software Stata, I will run the regressions shown in section 5.2.1 and 5.3.1 for the different time periods presented in section 5.2 and 5.3. By doing so, I will obtain the difference-in-difference estimator and thereby be able to identify the effects on the unemployment rate and average wages for young individuals in Sweden.

6.1 Difference-in-difference

Difference-in-difference estimation consists of identifying the effects of a treatment. A comparison between the outcomes before and after the treatment is drawn for the affected group, which further is compared with this difference in an unaffected group. The great advantages of using a difference-in-difference approach are the simplicity as well as its ability to circumvent many of the endogeneity problems that may arise when making comparisons between heterogeneous individuals (Bertrand et al., 2004).
A control group is used to exclude changes in exogenous variables during the period of measure, since the changes are assumed to be identical for either groups. Therefore, the estimation is eliminating parts of the distortions between the treatment and control group that may be caused by permanent differences across the groups. An additional assumption for the difference-in-difference approach compared to the regular OLS estimation is parallel trend assumption. This assumption says that $\lambda_{t2} - \lambda_{t1}$[2] are the same in the treatment group as well as the control group, implying that the outcome for either group is equal affected by trends (Stock & Watson, 2012).

[2] λ_{t1} is the outcome in a time period before the treatment and λ_{t1} is the outcome in a time period after the treatment so that $\lambda_{t2} - \lambda_{t1}$ is the difference in outcome after relative before the treatment. The outcome is in my case the unemployment rate or the average wage.

6.2 Choice of comparison group

When using a difference-in-difference approach, homogeneity across treatment and control groups contribute in making the estimation more precise (Stock & Watson, 2012). The choice of using individuals from the Nordic countries Norway and Finland is based on the similarities in the three countries labor markets. The similarities lay for example in the wage setting models, tax systems, labor market participation and education level. Another factor contributing to the choice is similarity in unemployment rate evolution. First also Denmark was included as a control group, but since too many differences were found, Denmark was left out.

6.3 Estimation of the unemployment effect

To estimate the effects on the unemployment rate for young individuals a difference-in-difference approach with one treatment group and two control groups is being used. The treatment group, consistent of individuals at the age of 15-24 years who is in the Swedish labor force, is the one subjected to the reductions. To obtain an estimation in absolute terms, a comparison between with individuals at the same ages, in labor forces in countries with a labor market similar to the Swedish one, is being held.
The employment effect of the reforms is being estimated for three different time periods, the first one from January 2002 till July 2008 (one year after the implementation of the first reform), the second period from January 2002 till December 2009 (one year after the implementation of the second reform), and lastly one period, examining the long run effect, from January 2002 till the end of 2014. By using this specific time periods, the effects on short respectively long term can be analyzed.

The difference in the change in the unemployment rate for the country groups are compared and an estimate of its impact is obtained by taking the "double the difference" for the treatment and control group. This generates a difference-differences –estimation:

$$\hat{\delta}_1 = \left(\hat{y}_{cg}^{t+x} - \hat{y}_{tg}^{t+x}\right) - \left(\hat{y}_{cg}^{t} - \hat{y}_{tg}^{t}\right)$$

Where $\hat{\delta}_1$ is the DiD estimate, describing the unemployment effect. $\hat{y}_x^t$ is the unemployment rate in time t for each group, where cg is indicator for control group and tg is indicator for treatment group. t stands for a time period before treatment and t + x stands for a time period after the treatment. The same model for estimation will be used for all time periods. If the obtained value of $\hat{\delta}_1$ is positive, there is evidence for a

positive effect on the unemployment rate, interpreting an increase in the unemployment rate for young workers during the observed time period. The expected value of $\hat{\delta}_1$ is therefore negative.

6.3.1 Empirical approach

The regression used for obtaining the difference-in-difference estimator is the following:

$$y^t = \beta_0^t + \beta_1^t D^{tr} + \beta_2^t D^{post} + \delta_1^t (D^{tr} \times D^{post})$$

where y^t is the unemployment rate, D^{tr} is a dummy variable for the treatment group (one for treatment group and zero for control group), and D^{post} is a dummy variable for post treatment (one for post treatment and zero for pre treatment). Further, β_0^t is a constant, β_1^t is an estimator for the group dummy and β_2^t is an estimator for the post dummy. Lastly, δ_1^t is the estimator for the treatment effect, obtained by interacting the dummies for group possession and pre/post treatment.

Using the computer software Stata, I will run the regression for the different time periods. By doing so, I will obtain the difference-in-difference estimator and thereby be able to identify the effects on the unemployment rate in Sweden.

6.3.2 Substitution and scale effect

Another implication of the assumption of parallel trends is that the control group cannot be affected by the treatment. If, however such spillovers exist, a measure of the relative effect is obtained rather than the absolute effect. In previous literature concerning the reductions in payroll taxes in Sweden, where a comparison among different age groups in the country, the results may have been influenced by the substitution and scale effect due to the spillover. The substitution effect arises when individuals among the treatment group and the control group have very similar abilities. They can therefore be seen as perfect substitutes, which make them interchangeable. Thus, as labor cost of the treatment group gets cheaper in relation to the control group, the working opportunity transfers from the control group to the treatment group and a substitution effect arises. The substitution effect may therefor overestimate the result when comparing with another age group within the country. The scale effect tends to work in the opposite direction. The reductions in the payroll tax, cuts the firms' cost, allowing them to expand output. This, in turn, requires firms to hire more workers, who may be

individuals in the control group. Theoretically the scale effect may have a negative impact on the difference in difference estimator, leading to a distorted result (Egebark & Kaunitz, 2013).
To evade the problems of spillovers, this study is making the comparison between the employment rates of young workers in different countries, rather than between different age groups within Sweden. But, also between countries the relative cost of labor will increase in the control groups due to the payroll tax cut. However, it seems ambiguous to believe that job opportunities would widely been transferred from the control countries Norway and Finland to Sweden, thus if absence of a substitution effect, I consider it negligible. Neither the scale effect is considered to affect the results in this study.

6.4 Estimation of wage effects

A factor determining the unemployment effect is how much the tax reductions is shifted onto workers in form of higher wages. It is possible that, in the long run, the wages adjust to counteract the effect of a change in payroll taxes. In an extreme case, where the tax cut is fully shifted, the payroll tax cut can be completely canceled out by an increase in wages. This scenario would result in unchanged net labor cost for employers, and therefore no effects on the unemployment (Egebark & Kaunitz, 2013). Using this knowledge, I can examine whether relative wage increase could explain (the lack of) changes in unemployment rate.
However, according to economic theory, wages are fixed in collective agreements in short run. In this report I will study the immediate effect on wages, which will cause an underestimation of the long run equilibrium outcome of the reductions in payroll taxes if wages adjust in the longer run due to the fixed wages. Therefore, I will also, as in the estimation of the effects on the unemployment rate, use a long run time horizon. By again using the time period of January 2004 till December 2014, the probability of capturing the true wage difference-in-difference estimator is increased. However, long run is a vague concept, making it hard to decide if the long run time period in reality is to consider long run.

The wage effect will be estimated somehow similar to the estimation of the employment effect. A difference in difference approach, using Swedish young workers as treatment group and Finish and Norwegian young workers as control groups, will be used.

Average wages in the time period of the years 2004 to 2006 is being compared to average wages in the period of the year 2008. The same comparison is being held to the average wages in the period of the year 2009. Also, as mentioned before, in a try to measure the long run effect, the comparison is also being held with the average wages in the time period of the years 2004 to 2006 against the average wages in the period 2009 to 2014.

Similar the estimation of the employment effect, the difference in the change in wages for the country groups are compared and an estimate of its impact is obtained by taking the "double the difference" for the treatment and control group. This generates a difference-difference estimation similar to the estimation of employment effects:

$$\hat{\delta}_1 = \left(\widehat{w}_{cg}^{t+x} - \widehat{w}_{tg}^{t+x}\right) - \left(w_{cg}^{t} - \widehat{w}_{tg}^{t}\right)$$

Where $\hat{\delta}_1$ is the DiD estimate, describing the effect on wages. $\widehat{w}_x^t$ is the average wage in time t for each group, cg is indicator for control group and tg is indicator for treatment group. t stands for a time period before treatment and t + x stands for a time period after the treatment. Also for the wage analyze, the same model for estimation will be used for all time periods.

If obtained value of $\hat{\delta}_1$ is positive, there is evidence for a positive effect on the average wages, interpreting the reduction in payroll taxes has increased the average wages for young workers in Sweden during the measured time period.

6.4.1 Empirical approach

The same regression as for the unemployment analysis is used for obtaining the difference-in-difference estimator for average wages:

$$y^t = \beta_0^t + \beta_1^t D^{tr} + \beta_2^t D^{post} + \delta_1^t (D^{tr} \times D^{post})$$

What differs is that here y^t is the average wage. Again, D^{tr} is a dummy variable for the treatment group (one for treatment group and zero for control group), and D^{post} is a dummy variable for post treatment (one for post treatment and zero for pre treatment). Further, β_0^t is a constant, β_1^t is an estimator for the group dummy and β_2^t is an estimator for the post dummy. Lastly, δ_1^t is the estimator for the treatment effect, obtained by interacting the dummies for group possession and pre/post treatment.

7 Results

Below the results from performed regressions is being presented, the effect on the unemployment rate and the effects on average wages separately.

7.1 Treatment effects on the unemployment rate

To verify the assumption of parallel trends, I have plotted the monthly average unemployment rates for individuals at age 15-24 for Sweden, Finland and Norway in a chart. By examining the evolution of the unemployment rate for the treatment group as well as the two control groups, one can verify this assumption. Thus if the unemployment rate for the three groups has evaluated similarly, well presentable control groups are chosen in this concern. Figure 7 is graphically illustrating the evolution of unemployment rates. The black vertical lines are illustrating the implementation of the payroll reductions.

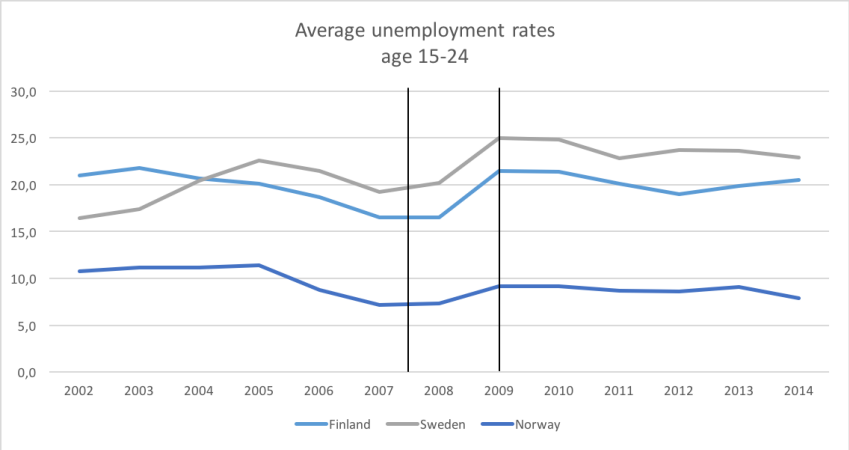

Figure 7 – Evolution of Swedish, Finnish and Norwegian unemployment rate for individuals at age 15-24 during years 2002 – 2014 (Eurostat, 2016).

As seen, the evolution of the unemployment rate for young workers has, during the whole time period analyzed, been very similar across the three countries. This legitimizes the critical assumption of parallel trends, implying that the unemployment rate would have been similar for the control group and the treatment group in the absence of treatment, making the control groups well presentable.

Comparing the evolution of the unemployment rates between the Swedish and the Finnish group, it is shown from figure 7 to progressed similarly after both the first and the second reform. The expected value of the difference-in-difference estimate will therefore be close to zero, implying no or merely a small effect on the unemployment rate. However, relative the Norwegian group, a slightly larger increase in the unemployment rate for the Swedish group is shown. The expected value of the difference-in-difference estimate is therefore positive, implying an expected increase in

the unemployment rate among the Swedish group. After the second reform, the unemployment rate evaluates similar for the Swedish and the Norwegian group. Around the second reform and in the long run, again the unemployment rate is shown to be progressed similarly.

In table 1 below, the main findings from testing the unemployment effect is being presented. The outcome variable is monthly average unemployment rate. The treatment effects are relative to the reference time period January 2002 – June 2007.
From the left, row headers are showing the estimated time period. DiD 2008 and the related numbers in the first row represents the one-year effect of the first reform[3]. DiD 2009 and the related numbers in the second row represents the one-year effect of the second reform[4]. Finally, DiD 2014 and thereby row three represents the long run effect[5]. The first column is showing the results from comparing the unemployment rate for the Swedish and the Finnish group. The difference-in-difference estimator shows a statistically significant, yet small, positive effect on the unemployment rate, in all three time periods. The rise in the unemployment rate relative the Finnish group, in the short run, is around 3.9 percentage point for the first reduction, and about 3.7 percentage point for the second reduction. In the long run, the unemployment rate has increased around 3.9 percentage points relative the Finnish group. When instead using the Norwegian group, the increase is in total larger. However, the short run effect of the fist reduction is smaller, an increase around 3.4 percentage points. The short run effect of the second reduction is an increase around 4.7 percentage points while the long run effect is around 5.3 percentage points. Finally, I have combined the Finnish and the Norwegian group to compare against the Swedish group. The results of this comparison is considered as a median, and is therefore used as the main focus of the unemployment rate analysis. In the short run, for the first reduction the unemployment rate is increased around 3.6 percentage points, and for the second reduction an increase around 4.5 percentage points. In the long run, the difference-in-difference estimator show an increase in the unemployment rate by 4.6 percentage points.
More detailed regression results from the unemployment rate analysis are found in Appendix A.

[3] Time period July 2007 – July 2008 relative to period January 2002 – June 2007.
[4] Time period July 2007 – December 2009 relative to period January 2002 – June 2007.
[5] Time period July 2007 – December 2014 relative to period January 2002 – June 2007.

	SWEDEN VS. FINLAND	R^2	SWEDEN VS. NORWAY	R^2	SWEDEN VS. FINLAND & NORWAY	R^2
DiD 2008	3,917***	0,204	3,364***	0,852	3,640**	0,259
	(0,917)		(0,920)		(1,673)	
DiD 2009	3,664***	0,138	4,730***	0,858	4,532***	0,295
	(0,718)		(0,693)		(1,218)	
DiD 2014	3,922***	0,337	5,297***	0,915	4,610***	0,358
	(0,475)		(0,438)		(0,925)	

*Note: *** p<0.01, ** p<0.05, * p<0.1*

Table 1 – Regression results for unemployment analysis (my own results).

7.2 Treatment effects on average wages

To test if the assumption of parallel trends holds for the wages analysis, I have now plotted the yearly average income from work for individuals at age 16 – 24 for Sweden, Finland and Norway in a chart. Again, if the annual income for the three groups has evaluated similarly, well presentable control groups are chosen. Figure 8 is graphically illustrating the evolution of average annual income. The black vertical lines are illustrating the implementation of the payroll reductions.

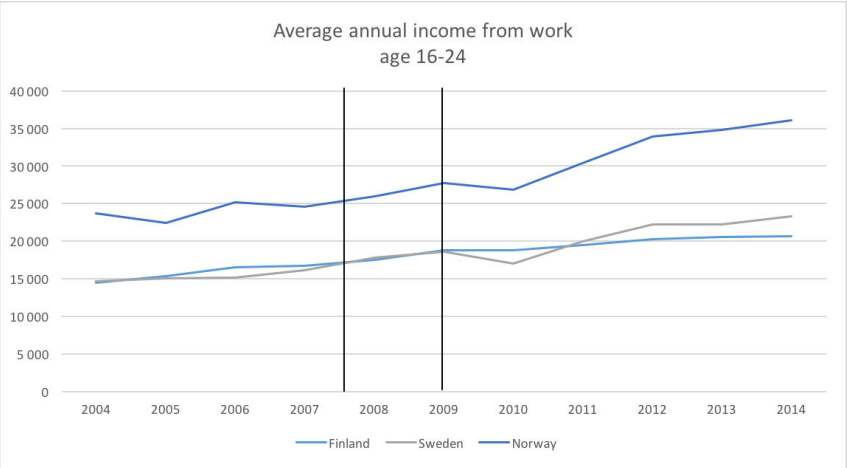

Figure 8 – Evolution of Swedish, Finnish and Norwegian average annual income from work for individuals at age 16 – 24 during years 2204 – 2014 (Eurostat, 2016).

From the chart one can conclude that the average income among the Norwegian group is significant higher than for the other two countries. Before the first reduction, it is seen that the average income among the Swedish group develops in a lower speed than among the other countries. However, the evolution among the Norwegian group is very

similar to the evolution among the Swedish group, both during and after the payroll tax reductions. The level of the average income among the Finish group is, contrariwise the Norwegian, very similar to the Swedish level. The evolution does however differ slightly from the Swedish and Norwegian, thus the line is quite straight.
From figure 8 one can conclude the estimated wage effect to be high at the time around the first reduction, and then even out a bit relative to the other two groups in the long run.

The main findings from testing the wage effect is being presented in table 2 below. The outcome variable is annual average income from work. The treatment effects are relative to the reference time period 2004 – 2006. The row headers are representing the same time periods as in the unemployment rate analysis.
As predicted from the chart, the effect seems to be larger around the first reduction. The difference-in-difference estimator shows a real increase in annual income with 1 579 Euro per year for the Swedish group. One year after the second reduction, the increase is shown to be 1 328 Euro per year. In the long run, the difference-in-difference estimator show an increase in the average income by 810 Euro per year.

	SWEDEN VS. FINLAND & NORWAY	**R^2**
DiD 2008	1579 (4,536)	0,393
DiD 2009	1328 (4,001)	0,393
DiD 2014	810 (4,288)	0,323

*Note: *** p<0.01, ** p<0.05, * p<0.1*

Table 2 – Regression results for wage analysis (my own results).

However, the most important thing to have in mind is the insignificance of the results. As predicted, none of the three difference-in-difference estimators is statistically significant, causing problem to draw any conclusion about the actual effect.
More detailed regression results from the unemployment rate analysis are found in Appendix B.

8 Discussion

According to economic theory, a payroll tax cut will, in short term, have a positive effect on the employment rate and therefore a negative effect on the unemployment rate. In the short run, wages do not adjust because they are bound in collective agreements over time. This is causing the firms' costs to decrease and will therefore, according to theory, also decrease the unemployment rate for the group in concern. Contrary to theory and previous research in the subject of reduced pay roll taxes, the results from the estimations performed in this study do not show a negative effect on the unemployment rate, but rather a positive effect. Previous research, presented in the literature review, is examining the effects across different age groups within Sweden. This differ from the examination in this study where the same age group but from different countries has been used, which makes the results from previous research non-comparable. However, it does seem unreasonable to assume that the reductions would lead to an increased unemployment rate, indicating that the model used is not an optimal choice due to several facts like that exogenous effects may have affected the treatment and control group differently, or that the chosen data is biasing the results.

Since the unemployment rate for adolescents is much more sensitive to economic conditions than the unemployment for the rest of the labor force, the fluctuations in youth unemployment rate caused by the economic conditions may be bigger and therefore bias the results. In 2008, a large financial crisis caused a bad economic condition in several European countries, among these Sweden. Another explanation for the increased youth unemployment rate found in Sweden could be due to that the crisis affected the three analyzed countries differently. For example, the economic situation in Norway is highly correlated with the oil prices. The 2008 financial crisis was mainly not about the oil, but rather the housing market. The economic condition in Norway may therefore not have been as affected as the condition in Sweden. Such differences may have distorted the results of this study. The critical assumption of parallel trends among the analyzed countries does not entirely hold, implying that exogenous factors may have been captured which in turn may have affected the results, making the difference in difference estimators positive. If the assumption had completely hold, the value of the estimator would be equal to, or lower than, zero.

A lack of decrease in the unemployment rate due to a reduction in taxes as the payroll tax cut can to some degree be explained by increased wages. Therefore, has this study also included a wage analysis, comparing the annual average income from work for the concerned age group in the three countries. Unfortunately, annual income was the best measure found, giving me only 33 observations at the most. As predicted, such small number of observations was not enough to obtain statistically significant results. The non-significant results imply a great uncertainty. There is not enough evidence conclude that there actually is an effect on wages due to the payroll tax cut. However, the non-significance does not imply that there is certainly no effect. In the chart where the annual average income for the three groups has been plotted, it is shown a small increase in the average income for the Swedish group compared to the two other groups pooled together. The estimations are however not enough to conclude that the increase is the payroll tax cut effect shifted onto workers.

The discussion that follows is divided into three parts, one for each time period analyzed.

8.1 Year 2008

The difference-in-difference estimator for the short run analysis of the effect on the unemployment rate from the first reform show a positive significant effect off 3,64 percentage points when comparing all three countries, implying an increase in the unemployment rate for young individuals in Sweden. The increase is larger when comparing Sweden with only Finland, 3,92 percentage points, and smaller when comparing with only Norway, 3,36 percentage points. The increase implies that a cut in firm costs would result in a higher unemployment rate, which itself may not be likely to assume. I can clearly conclude that the assumption of parallel trends does not entirely hold. From the estimation on the effects on average yearly wages, a non-significant positive value of the difference-in-difference estimator is shown. There has been an increase in income among the Swedish group relative the other two groups combined, but there is not enough evidence found to conclude that the increase is due to the payroll tax cut. If so is the case, the increased wages could be a part of the explanation why the unemployment rate has increased.

8.2 Year 2009

Also the estimator for the short run analysis over the effects on the unemployment rate from the second reduction show a positive significant result. The estimator when comparing all countries is for this time period 4,53 percentage points, an increase by 0,89 percentage points compared to the first reduction. Comparing only with the Norwegian group show a further increase by 1,37 percentage points, leaving the total increase in the unemployment rate at 4,73 percentage points after the two reductions. The result may be affected by problems in the data set used. Since age-specific data cannot be ordered for this study, the whole affected group is not analyzed for the second reform thus the age group is only covering the age of 14 till 25 year olds.
Another weakness with the analysis' on short run is the timing. The time span after the tax cuts may be to short for the unemployment rate to be affected by the reduction. This causes me to question whether it really is the treatment effect that has been captured rather than exogenous effects or not. If exogenous factors are what causing the change across treatment and control groups, there are weaknesses in my analysis. Again, the assumption of parallel trends does not fully hold, implying that this might be the case. Only in the case when comparing with the Finish group, the unemployment rate did not increase further. In fact, the unemployment rate decreased by 0,26 percentage points after the second reduction relative the first. The purpose of the second reduction is therefore fulfilled when looking only at the Swedish and the Finish group, which also is in line with theory.

8.3 Year 2014

In the long run, the estimators show a further increase for all three comparisons. For the comparison with all three countries, the long run effect is an increase in the unemployment rate by totally 4,61 percentage points. Comparing only with the Finish group, the long run effect is an increase by 3,92 percentage points and comparing only with the Norwegian group the same increase is around 5,3 percentage points. Whether the payroll tax reduction is passing on the wages or not is an important question since the effect on the unemployment rate could be neutralized by raised wages. The effect on wages are according to the difference-in-difference estimator also in the long run positive, but still non-significant.
Again, the most likely explanation to the positive effect on the unemployment effect lays in weaknesses in the model. So as not to distort the result, the treatment and control

group must be affected by other events similarly. As the other estimations, the assumption of parallel trends does not fully hold, implying that, again, exogenous factors are being captured in the model. Thus, by this study, a negative effect on the unemployment, and, in turn, a positive effect on the employment cannot be detected.

Since wages should be fixed in the short run, the from theory expected effects is at least a temporary decrease in the unemployment rate. However, the results from this study shows that both in long and short run, the effects were, contrary to theory, a rising unemployment rate. Unfortunately, the conducted wage analysis did not give any explanation for these results thus only non-significant results were found. So the question is why the unemployment rate rose.
One possible explanation to this question, beyond the modeling problems mentioned, could lay in the labor supply. Especially for young individuals there are many other alternatives than employment. For example, some of those who is actively applying for jobs might just feel satisfied by receiving unemployment benefits. These individuals are still included in the definition of unemployed. Another explanation could be a change in the size of the labor force. The outcome variable through out this report has been the unemployment share, defined as the share of unemployed in the number of individuals in the labor force. The reductions in payroll tax may for example increase the optimism among people. More individuals therefore get willing to work and starting to apply for jobs. If a smaller share of these individuals manage to get a job than those who does not, the unemployment rate increases. In the presence of such case, the payroll tax reductions may have led to an unchanged or actual a higher number of employed adolescents, but still an increase in the youth unemployment rate.

9 Conclusion

The purpose of this thesis has been to examine whether the reductions in payroll taxes due to the proposition 2006/07:84: ”*Reduction in payroll taxes for employees over 18 but not yet 25 years old”* and the extended proposition 2008/09:7: *”Further reductions in payroll taxes for young employees”* resulted in a decrease in youth unemployment. According to economic theory, a reduction in payroll taxes will lead to a decrease in unemployment in the short run. This because wages are bound in collective agreements in short term, so the lowered costs for firm cannot be shifted onto wages. However, in the long run, the effect is determined on whether/how big a portion of the reduction is being passed onto the wages. The unemployment effect could be neutralized by raised wages.

As a complement to previous research in the area, control groups of youth employees in the two Nordic countries Norway and Finland has been used. This in a try to eliminate the impact of the substitution effect and the scale effect. Contrary both economic theory and former research, the result of this thesis show a positive effect on unemployment and accordingly, no positive employment effect. The results are most likely captured other events happened during the analyzed time period, which may explain the result. The three countries may have been affected by exogenous factors differently. The results are therefore probably strongly affected by the 2008 financial crisis, which may have distorted the estimation and giving doubtful results. Thus, the difference in difference method may not be the most optimal method to use when evaluating reforms of this magnitude. Other possible explanation to the results may be the low elasticity of the labor supply or an increased willingness at young individuals to work.

The crucial question is whether the allocation of, in this case, a large amount of money is being effectively allocated. The main conclusion from this study is that, when comparing the unemployment rate among the treated (young employees in Sweden) with equal aged individuals in Finland and Norway, the proposition 2006/07:84 and the extended proposition 2008/09:7 did not result in a positive employment effect for young people. Thus, to answerer the research question, I do not find evidence enough to consider the two payroll reductions in Sweden in 2007 and 2009 as an effective method to reduce the unemployment among the Swedish young people.

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Appendix A

In Appendix A, all results from the regression analysis on the employment effect is being presented.

1. Regression result from comparing the Swedish and the Finnish group. Monthly data for the unemployment rate for individuals at age 15-24.

VARIABLES	DiD 2014	DiD 2008	DiD 2009
DPost	-0.610*	-4.038***	-1.419***
	(0.336)	(0.648)	(0.489)
DTr	-0.500	-0.500	-0.500
	(0.361)	(0.360)	(0.415)
Interaction	3.922***	3.917***	3.664***
	(0.475)	(0.917)	(0.718)
Constant	20.12***	20.12***	20.12***
	(0.255)	(0.254)	(0.293)
Observations	312	156	199
R-squared	0.337	0.204	0.138

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2. Regression result from comparing the Swedish and the Norwegian group. Monthly data for the unemployment rate for individuals at age 15-24.

VARIABLES	DiD 2014	DiD 2008	DiD 2009
DPost	-1.985***	-3.485***	-2.485***
	(0.310)	(0.650)	(0.490)
DTr	9.136***	9.136***	9.136***
	(0.333)	(0.361)	(0.387)
Interaction	5.297***	3.364***	4.730***
	(0.438)	(0.920)	(0.693)
Constant	10.48***	10.48***	10.48***
	(0.235)	(0.255)	(0.274)
Observations	312	156	192
R-squared	0.915	0.852	0.858

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3. Regression result from comparing the Swedish, the Norwegian and the Finnish group. Monthly data for the unemployment rate for individuals at age 15-24.

VARIABLES	DiD 2014	DiD 2008	DiD 2009
DTr	4.318***	4.318***	4.318***
	(0.702)	(0.656)	(0.681)
DPost	-1.297**	-3.761***	-2.286***
	(0.534)	(0.966)	(0.703)
Interaction	4.610***	3.640**	4.532***
	(0.925)	(1.673)	(1.218)
Constant	15.30***	15.30***	15.30***
	(0.405)	(0.379)	(0.393)
Observations	468	234	288
R-squared	0.358	0.259	0.295

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix B

In Appendix B, all results from the regression analysis on the wage effect is being presented.

1. Regression result from comparing the Swedish, the Norwegian and the Finnish group. Annual data for average income from work for individuals at age 15-24.

VARIABLES	DiD 2014	DiD 2008	DiD 2009
DTr	-6,427*	-6,427**	-6,427**
	(3,657)	(2,869)	(2,829)
DPost	3,994	445.6	1,098
	(2,476)	(2,619)	(2,310)
Interaction	809.8	1,579	1,328
	(4,288)	(4,536)	(4,001)
Constant	21,596***	21,596***	21,596***
	(2,111)	(1,656)	(1,633)
Observations	33	15	18
R-squared	0.323	0.393	0.393

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1