BUDGET AND EMPLOYMENT EFFECTS OF A CHANGE IN THE PAYROLL TAX

For the manufacturing sector

Bachelor thesis

Authors: Niklas Syk 820611-5910

Anders Östberg 800731-6931

Tutor: Lars Pettersson

Charlotta Mellander

Jönköping   2006-02-08

Bachelor Thesis in Economics

Title:	Budget and employment effects of a change in the payroll tax, for the manufacturing sector
Authors:	Niklas Syk
	Anders Östberg
Tutors:	Lars Pettersson
	Charlotta Mellander
Date:	2006-02-08
Keywords:	Payroll tax

Abstract

This thesis is examining the effects of a decrease in the payroll tax and the responding effect on the state budget. The emphasis is on the change in the number of employments for the manufacturing sector as a result of a decrease in the payroll tax. In order to analyze the effect a decrease in payroll tax has on employment, the elasticity of labor demand has been calculated. The result of this regression is significant, and therefore it can be concluded that a change in the payroll tax will have an effect on employment in the manufacturing sector. Since elasticity of labor demand is inelastic, the change in payroll tax will have a small impact on employment. The results of various surveys conducted in other countries are consistent with the findings of this thesis.

Kandidatuppsats inom Nationalekonomi

Titel: Effekterna av en ändring i arbetsgivaravgiften på sysselsättning och statsbudgeten, för tillverkningsindustrin

Författare: Niklas Syk

Anders Östberg

Handledare: Lars Pettersson

Charlotta Melander

Datum: 2006-02-08

Nyckelord: Arbetsgivaravgift

Sammanfattning

Den här uppsatsen ämnar att undersöka effekterna av en sänkning i arbetsgivaravgiften i Sverige och dess påverkan på statsbudgeten. Tyngdpunkten är lagd på förändringen av antal sysselsatta i tillverkningsindustrin en sänkning av arbetsgivaravgiften innebär. För att analysera effekten arbetsgivaravgiften har på sysselsättningsnivån och elasticiteten av efterfrågan på arbete har räknats ut. Resultatet från regressionen är signifikant vilket betyder att arbetsgivaravgiften har en inverkan på sysselsättningen för tillverkningssektorn. På grund av att efterfrågan på arbete är oelastisk kommer en sänkning av arbetsgivaravgiften ha en liten inverkan på sysselsättningsnivån. Resultatet från uppsatsen stämmer överens med resultat från liknande studier gjorda i andra länder.

Table of Contents

Figures

Tables

Appendixes

1 Introduction

The payroll tax is paid by the employer to cover for certain benefits received by the employee. Its main objective is to pay for health insurance and old-age pension. The payroll tax has over the last years been questioned because of its potential growth halting effects. Politicians and particularly individuals from the private sector; have stressed the fact that the tax increases variable costs for the employer and therefore reduces any growth potential in employment. A recent review of the Swedish economy conducted by NUTEK has found that 71% of small businesses in Sweden consider the payroll tax as the number one obstacle for growth. This view is strengthened by the fact that sole businesses (companies with only one employee) grow faster in Sweden than companies with more than one employee (NUTEK, 2006). However, there are few empirical findings for such a view; the payroll tax does in fact have an insignificant effect on employment. According to research made on the Finnish labor market (Korkeamäki & Uusitalo, 2006) and on the German labor market (Bauer & Riphahn, 1998), a decrease in the payroll tax will have a very small effect on employment.

There have been experiments whereby the payroll tax in Sweden was reduced. During 1994 all employers, except government authorities, had their payroll tax decreased for new employments by 15%, this is called "Generella anställningsstödet" (GAS). The prerequisite for employment was that they should be within 6 months and at least 17 hours a week. GAS cost the government approximately 1.8 billion SEK for loss in payroll tax revenues. The outcome of GAS was not as positive as expected and an evaluation concluded that it lead to approximately 100 000 gross employments (Johansson, S. Lundberg, P. J, Zetterberg, 1999). Companies that were going to employ workers even without the decrease in the payroll tax made the experiment unsuccessful. As Sweden experienced with GAS, a decrease in the payroll tax for the entire market (except to government authorities), will make it complicated to avoid an efficiency loss.

As a result of the election of the new government in Sweden 2006, new tax and employment policies can be expected. The intention is to decrease the payroll tax for certain segments of the labor market. An important feature of the new policy is "the startup jobs", this means that the payroll tax will be reduced for long-term unemployed individuals and youths, under a period of five years. The "startup jobs" are only targeting the private sector (Budgetpropositionen, 2007). It is therefore of particular interest to examine whether a reduction of the payroll tax will have a significantly positive effect on employment. To be able to make a relevant analysis of the relationship between a decrease in the payroll tax and the number of new employments, some segments of the labor market needs to be excluded. The manufacturing sector is the segment where the payroll tax will have the largest impact due to the possible substitution effect between capital and labor. Since experiments have been made with decreasing the payroll tax without any significant impact on employment, this thesis will use the most payroll tax sensitive sector of the labor market. The emphasis is therefore on the manufacturing sector.

1.1 Problem

Currently there is a debate regarding the possible negative effects on employment of the payroll tax. With the new government the possibility of a decrease in the payroll tax has been suggested. It is therefore of particular interest to investigate whether the payroll tax has a significant effect on employment or not. A decrease of the payroll tax will result in less government revenues, which means that the benefits that the payroll tax is financing must be collected through other means. If a decrease of the payroll tax will increase employment, the decrease could be financed through the new employments created. The question is then; will the number of new employments be large enough to finance such a reduction of the payroll tax?

The payroll tax was first introduced to Sweden in 1960 and it held by then only a few percent of the pre-tax salary. From 1980 to 2006 the amount of the tax has been on a steady level of approximately 30% with a peak in the early 1990s. The payroll tax is paid on top of the salary by the employer; it provides insurance if the employee becomes injured or sick during work. It further contributes to unemployment benefits and to retirement benefits for the employee (Svenskt Näringsliv 2006). A list of the different components of the payroll tax and their percentage for 2006 follows:

Table 1.1 Payroll tax in Sweden

Payroll tax in Sweden 2006

	Percentage of annual salary	Percentage of the payroll tax
Statutory old-age pension	10.21	31.62
Statutory survivor's pension	1.70	5.27
Statutory health insurance	8.64	26.76
Statutory occupational injury insurance	0.68	2.11
Parental benefits	2.20	6.82
Labor-market contribution	4.45	13.79
Payroll contribution	4.40	13.63
Summary	32.28	100

Source: Svenskt Näringsliv 2006

As mentioned, the payroll tax has had a steady development over the last decade. As the graph shows, the major increases took place during the 1970s and the 1980s, where it went from a relatively low level of approximately 10% to a level of 35% in 1985.

Figure 1.1 Development of the payroll tax
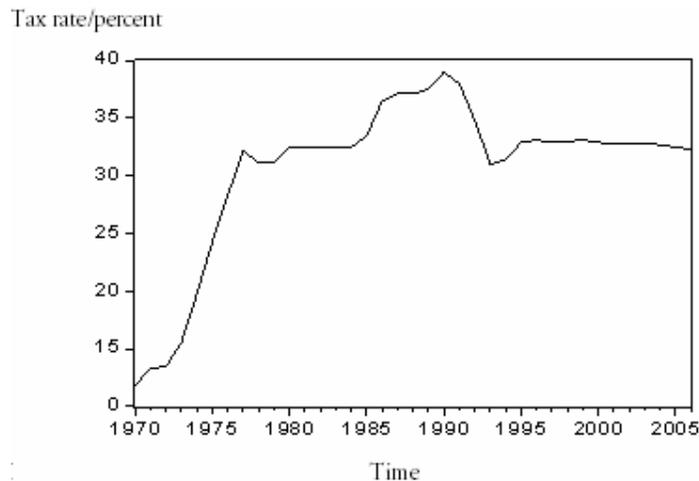
Source: http://www.expowera.com/mentor/foretaget/personal_skatter.htm

1.2   Purpose

The purpose of this thesis is to examine if a reduction in the payroll tax will have a significant effect on the number of employments in the manufacturing sector. How will a reduction of the payroll tax effect government revenues with respect to the number of new employments.

1.3   Research questions

1. Is the relationship between a change in the payroll tax and the number of employments in the manufacturing sector statistical significant?

2. How many new employments in the manufacturing sector will be created due to a decrease in the payroll tax?

3. Will the effect on the government budget be positive or negative due to the decrease in the payroll tax?

1.4   Method and limitations

This thesis is limited to analyzing the relationship between a decrease in the payroll tax and the effect on employment for the manufacturing sector. Regressions have also been made on the aggregate labor market and on the service sector. The results from the regressions on the aggregate market and the service sector will be briefly presented in this section; they are also available in the appendix.

The result from the regression using data from both private and public sector employments was insignificant, but analyzing the relation between the two variables graphically shows a

positive relation. That would suggest that increasing the payroll tax would increase employment. However, previous studies show that this relation is a correlation-relationship rather than a causal-relationship. To avoid the problem, the public sector was excluded. Companies in the public sector are not as sensitive to changes in costs such as the payroll tax. The number of employees in public sector companies is more or less based on political decisions rather than purely profit-maximizing motives. Privately owned businesses on the other hand are much more dependent on profit-maximizing decisions. The result of the regression can be seen in Appendix 2.

The second regression was made with the service sector. In the service sector the main input to the production process is labor. The special skills of the laborers are the actual product, and one worker can only be substituted by another. When increasing the cost of labor by raising the payroll tax, one might believe that the service sector would decrease their number of employees. This is not the case. Labor is the only income of these companies, and decreasing the number of employees will decrease the output. A reduction in labor within the service sector will occur only if the increase in the payroll tax makes the marginal cost of labor higher than the marginal return of labor. The result of the regression was insignificant and therefore excluded. The result of the regression with the service sector can be seen in Appendix 3.

This could be compared to the manufacturing sector. Companies are using labor and capital in production. If the cost of labor increases with a higher payroll tax, the companies have the possibility to substitute the labor to capital. This will make the manufacturing sector more sensitive to changes in the payroll tax than other sectors. All calculations and results presented in the empirical work are therefore based on the manufacturing sector. In the regression data on annual employment in the manufacturing sector and the payroll tax level is used. The time span of our survey is between the years 1971 and 1990. The motive behind using employment data only up to 1990 is because of the recession of the early 1990s and minimal change in the payroll tax from 1995 up until 2006.

1.5 Outline

As an introduction of the subject a number of previous studies on the relationship between employment and the payroll tax will be presented. Results from previous studies on payroll taxes and employment will be analyzed and presented. This is followed by theories of the effects of taxation. The concept of economic freedom and the importance of well defined and working market structures are presented. Furthermore, the connection between taxation and economic growth is analyzed. With the Laffer-curve the optimal level of taxation is analyzed, and at what point the level of taxation actually might decrease tax revenues for the government. The relationship between the output of a company, the number of new employments, and the cost of labor is examined in the section regarding companies' revenues and costs. The theory section is continuing with graphs describing the cost burden of a change in the payroll tax. To fully understand the effects of the payroll tax, an econometrical analysis has been done, to calculate the change in the number of employments to a reduction in the payroll tax. The analysis includes graphs and statistics on the relationships, and various calculations dealing with elasticity and changes in employment.

2 Previous studies on payroll taxes and employment.

In different countries experiments have been made with decreasing the payroll tax. This section will present the results from such experiments. The structure of the tax system and other aspects of the market vary between countries to a large degree. Making a strict comparison of the results will therefore be difficult. A general summary of the result will however be presented in a separate part of this section.

2.1 Germany

In 1998 Thomas Bauer and Regina T. Riphahn conducted a study testing to what degree the incidence of payroll taxes had effects on employment in Germany. Of particular was the relationship between social insurance contributions and the growing problem of unemployment. In Germany the social security contribution is paid both by the employer and the employee. The contribution is paid on top of the wage earned by the employee. The percentage of the contribution varies with the amount of the salary but the employer and the employee pays the same amount. The contributions are generally lower in eastern Germany (K. Nyquist, G. Rabe, P. Sundgren, 2002)

In the study they used industry level data from 1977 to 1994 and estimated a system of five interdependent, dynamic factor demand equations. Annual data from 32 different industries were used to estimate five interdependent factor demand equations. The inputs that were used in the production function were energy along with capital and labor measures. Energy was included as an input in the production function since it has an impact on the manufacturing process. The importance of energy for manufacturing is reinforced by the large increase in price since the early 1970s. The findings from the study were that factor prices have significant effects on factor demands. The separation of energy and capacity utilization factors was also important for the study of factor demands. The study found that the impact of payroll taxes, such as social contribution rates, on employment is minimal.

The empirical model contained of five dynamic interrelated factor demand equations for manufacturing industries. The equations were used to determine the long-run elasticity of labor demand and to estimate the short run effects of a change in the payroll tax. The study came to the conclusion that measures of factor demand such as the number of employees and the capital stock responded stronger to changes in factor costs than to changes in the amount of hours worked and the capacity utilization rate. In the study, changes in payroll taxation were used to simulate the different effects on labor demand; the result was that a change in payroll taxation did not have a significant effect on labor demand. As an example a two percentage decrease of the social security contribution in 1977 would only have decreased unemployment with 0.8% after 18 years. Even if the contributions to social insurances were reduced to zero and revenues were raised based on the taxation of the capital stock, employment would only increase with 9.5% over 18 years. According to the researchers their results were inline with findings from similar studies (T. Bauer & R.T Riphahn 1998).

2.2 Finland

A study made by Ossi Korkeamäki and Roope Uusitalo from 2006 evaluated the effects of an experiment in northern Finland. Payroll taxes were decreased from between 6% to 3% over a period of three years (January 1st 2003 to December 2005), in a few selected parts of Finland where unemployment was high. In Finland the social security contributions is paid both by the employee and the employer. The contributions are based on taxed income and on the pre-tax wage. For the employer the amount of the wage paid to the employee, make-up the foundation for the tax. For the employer the contributions add up to 25% of the wage (K. Nyquist, G. Rabe, P. Sundgren, 2002).

The effects were estimated through comparing employments and wages in companies in the target region with employments and wages in similar companies outside the target region. The area outside the target area was called the control region. Before the experiment employer contributions to the National Pension Scheme and to the National Health Insurance varied between 2.95% and 6% of the total wage bill, depending on the capital intensity and the size of the firm. The companies in the control region were during three years relieved from paying these social insurance contributions. All firms in the target region, both private employers and state-owned firms were qualified for the tax exception. However, municipal employers were not included in the experiment. The majority of the companies who applied for the tax exemption were very small, the median company had only four employees and only ten percent had more than twenty employees. The main industries were business services, retail trade, hotels and restaurants and construction. The maximum annual tax reduction was set to 30,000 euros per company. To finance the experiment National Health Insurance contributions were raised with 0.014% for companies outside the target area.

In the survey, firm level data on wages and employments were used. Changes in employments in the target area were compared with changes outside the target area. The unemployment rate in the target region and in the control region was on a similar level before the experiment began in 2003. The unemployment rate in the target region was in 2002 23.56% and in the control region 21.17%.

It is reasonable to expect that a payroll tax cut will have a different impact on companies; companies paying a lower salary may for example be more sensitive to lower wage costs if the price elasticity of low-skilled workers is higher than for high-skilled workers. The size of a company will also be important for the effect of the payroll tax cut, it is reasonable to believe that companies that paid more than the maximum amount of 30,000 euros would be less sensitive to the tax reduction. For these companies the tax cut will act as a lump-sum reduction in taxes and therefore have no marginal effects on employment. This problem was solved through dividing the sample of companies into quartiles defined after average wage; the effects were then calculated separately in each quartile.

The conclusions from the study were that approximately half of the 4.1% decrease in payroll taxes was offset by faster wage growth in the target region. The remaining two percent of the tax cut had no significant effect on employment. The researchers believe that the insignificance was mainly due to the small sample size. According to point estimations the tax cut increased employment with 0.8% demonstrating that labor demand elasticity should be around 0.4%. The researchers further believed that targeting the tax cut in narrowly defined regions and the short time of the tax reduction, will limit the extent to which the results of the tax reduction can be permanently implemented in the whole country. The experiment was financed through raising payroll taxes in the rest of the

country. If the payroll tax would be decreased on a national level it would have to be financed through increasing other taxes. The researchers also stress the possible substitution effects of a regional experiment; companies could for example re-allocate labor from the rest of the country to the target region.

The purpose of having target regions was to boost employment in those areas. An experiment with target regions will however create difficulties in applying the results from the study on a national level. One further problem is that wage increases are decided on a national level through negotiations between labor unions and employer organizations. A nation wide reduction of payroll taxes will have an impact on these negotiations. A regional tax cut on the other hand will only affect a smaller share of employers with less impact on the national bargaining. Furthermore, a temporary tax cut will also have a smaller effect on employment than permanent reduction has (Korkeamäki & Uusitalo, 2006).

2.3   Chile

A study made on the Chilean market reinforces the conclusions from the Finnish and the German studies. In 1995 Jonathan Gruber examined an experiment of privatization of the social security system. The new policy meant a decrease in average payroll taxes from 30% to 5%, over a period of six years starting in 1981. Previously the social security programs in Chile had been financed through a high payroll tax. After 1981 most social insurance programs where shifted from the employer payroll taxes to general revenues. As a result average payroll taxes decreased to 8.5% for manufacturing industries by 1982.

The data used were tax and wage information from a sample of manufacturing companies, the time period was from 1979 to 1986. The conclusions were that the decrease in payroll taxes did not have a significant effect on employment or labor market efficiency. It seemed to be the case that the tax reduction was fully passed onto workers in the form of higher wages. Looking at the results from the study it might be tempting to say that financing employee benefits through payroll taxes does not have any significant efficiency costs. However, there are some particular circumstances of the Chilean economy of the 1980s that limit such conclusions. Foremost, the level of inflation will affect the effect of taxation and secondly if wages are rigid they will react more flexibly to tax cuts than to an increase. However, the findings of the study are similar to other surveys from less inflationary environments (Gruber, 1995).

2.4   Colombia

A study made by Adriana Kugler and Maurice Kugler on the Colombian market examined the effects on employment and wages of a payroll tax increase. A social security reform in 1993 increased payroll taxes (for pensions and healthcare) by approximately 10.5% between 1994 and 1996. In contrast to previously mentioned studies, the effects of an increase in payroll taxes were considered. It is interesting to compare a payroll tax reduction to an increase, since the effects of payroll taxes may be asymmetric. If wages are flexible upwards but rigid downwards, the effects of a tax cut could fully pass onto wages, but an increase in taxes would not result in lower wages. Minimum wages indicates that wages can only decrease to a certain point. Results from previous studies show that payroll taxes should have an insignificant effect on employment, if changes in payroll taxes are fully passed on to workers in form of higher wages (or lower wages if the payroll tax is increased). This is likely to happen if workers valuate the benefits financed through payroll taxes equal to the costs. Since payroll taxes were also used to finance other benefits in Colombia the link

between worker benefits and payroll taxes were not as close as in Chile. For example training and family allowances for low-income families are financed through payroll taxes. Due to this payroll taxes are less likely to pass onto wages in Colombia.

The weaker tax benefit linkage and the existence of minimum wages is the reason why the increase in payroll taxes, did not shift onto wages as in other countries. The real minimum wage has been stable over the last few years which in combination with increased payroll taxes reduce the possibility of companies transferring their costs of taxation to workers. In Colombia only 20% of the taxation costs were passed onto workers through lower wages, which would explain why the increase of the payroll tax had negative effects on employment. Results from the study showed that a 10% increase in payroll taxes reduced employment with approximately 4.2% to 4.9%. Furthermore, the increase in payroll taxes had a larger negative effect for workers in the production sector than for workers in other sectors, because of the minimum wages in the production sector (A. Kugler & M. Kugler, 2001).

2.5   Summary of results form previous studies

Looking at the results from the studies made on Germany, Finland, Chile and Colombia it is clear that the payroll tax does not have a significant influence on employment. In the German study different paths of labor demand under different scenarios of payroll tax developments, were analyzed. The findings were that employment is not sensitive to a decrease in payroll taxes. As an example; a two percent decrease of the social security contribution in 1977 would only have decreased unemployment with 0.8% after 18 years. In Finland and Chile the payroll tax was reduced and most of the reduction resulted in higher wages. In Colombia where the payroll tax was increased, an effect on employment was observed. However, the effect was negative and the 10 % increase in payroll taxes resulted in a 4 % increase in unemployment. The reason why there was only a small negative effect on wages in Colombia is that wages are rigid due to binding minimum wages. Increasing the payroll tax can therefore have negative effects on employment. The increase also had a larger negative effect on production workers than for non-production workers. In Colombia there was no clear linkage between the payroll tax and worker benefits.

Linkage between payroll taxes and the benefits they finance is important for labor supply and demand. An increase in payroll taxes will reduce labor demand due to higher labor costs but at the same time it raises labor supply because of the higher benefits. If wages are not rigid and workers value the benefits received equal to the costs, then the effects on employment can be neutral. If wages are rigid and the revenues from the payroll tax finances other benefits, only a portion of the payroll tax will be shifted to worker's wages and employment would be affected negatively by payroll taxes. Therefore, the effect of the payroll tax will depend on the characteristics of labor supply and demand, and on the structure of the labor market. This is why an increase or a decrease of payroll taxes might have different effects in different countries (Kugler, A. & Kugler, M., 2001).

3 Macro economics effects of the payroll tax.

3.1 Economic Freedom and Taxation

Economic research tells us that an important factor for economic growth is the level of economic freedom in a country (Berggren, 2002). Economic freedom is a measurement defined through a number of characteristics typical for a market economy; this is summarized into an index called the Economic freedom index (EFI). The index is a calculation of 37 components, categorized in seven subgroups resulting in an index for the years 1970, 1975, 1980, 1985, 1990, 1995 and 2000. The subgroups are:

1) Size of Government: Consumption, transfers, and subsidies

2) Structure of the economy and use of markets

3) Monetary policy and price stability

4) Freedom to use alternative currencies

5) Legal structure and property rights

6) International exchange: Freedom to trade with foreigners

7) Freedom of exchange in capital and financial markets

   (J. Gwartney, R. Lawson, D. Samida, 2000 p.7).

Each component as well as the index is measured with a number from zero (no economic freedom) to ten (full economic freedom). The components for each subgroup are added up and calculated into a weighted average. In the economic freedom report of 2000 Sweden is on a 19th place with an EFI of 7.4. To get some perspective Sweden's index can be compared to the United Kingdom which has an EFI of 8.4, the US with an EFI of 8.5 or the Democratic republic of Congo with an EFI of 3.2. Since 1970 Sweden has had a 37% increase in economic freedom, which means that in a number of areas important steps have been taken towards more competitive markets (Berggren, 2002: 3). In taxation many improvements have been made. For example, marginal taxes on income have been decreased (Hansson, 2006). The payroll tax is however one area where economic freedom has not developed in the same positive direction. The payroll tax was introduced in Sweden in 1960 and has since then increased dramatically reaching a peak in the late 1980s with 40%. The tax has since the mid 1990s been stable around a level of 32 percent. (http://www.svensktnaringsliv.se/index.asp?pn=1166115).

Economic freedom is an important factor for growth; it can be proved by both theoretical and empirical grounds. The incitements that economic actors (entrepreneurs, innovators, financers, industrialists etc.) face will influence the actions they will take. The incitements are in turn influenced by the institutions of the market (taxation, property rights etc.); these can either be effective or ineffective. If the institutions stimulate actions that lead to the production of goods and services valuable for society, they contribute to growth. Institutions that guarantee economic freedom enable increasing returns on productive investments. This is accomplished through low taxation, autonomous legislation and property rights. Sweden's lack of economic growth over the last decades can, according to research, be explained through the lack of positive incitements for entrepreneurs. The payroll tax together with other forms of taxation has had a clear negative effect on the

profitability of owning and running a business. The lack of profitability may be the explanation for the low number of new small to medium sized businesses, and also the low level of growth during the last decades (G. Du Rietz & D. Johansson, 2005).

On empirical grounds the Indian economist Jagdish Bhagwati has presented evidence for the relationship between economic freedom and growth. Bhagwati claims that countries which have conducted market oriented policies with openness to trade and investments; has had a strong growth in wealth over time. In contrast, inward looking countries have developed in the opposite direction (J. Bhagwati, 1999).

Economic growth has a high priority on the political agenda in most countries. The economic growth in Sweden has over the last decades been relatively low compared to other OECD-countries (Henrekson, 2000 p. 3). With that in mind it is important to consider the underlying factors of growth. Neo-classical growth theory explains economic growth as dependent on the factors of production: capital, labor, land, (human capital) and technology. The importance of the factors of production is widely accepted. A central question is however, in what economic and political environment these factors of production can develop? The political and economic debate has over the last years focused more on this issue. Recent critique of the neoclassical growth theory has pointed out that the economic and political environment is also important for growth. Therefore, an analysis of the institutions that influence incentives for the economic actors is important. Economic freedom therefore plays an important role in characterizing the institutional structure and the central parts of economic policy. This is why less government interventions will lead to a more flexible private sector and hence a higher growth rate of the economy. Payroll taxes can be seen as an intervention by the government in the market (less economic freedom) and therefore harmful for the economic growth of a country. Small and medium sized companies have over the last decades come to play an increasingly important role for economic growth. Interventions in the market such as the payroll tax may therefore disturb the growth potential of the economy (Berggren, 2002).

3.2   Taxes and Growth

Institutions and economic mechanisms affect the level of growth in a country. There are a number of growth models in economic theory. Endogenous growth theory is the most recent and has been of particular interest for recent research. In endogenous theory human capital accumulation and its externalities are seen as the driving force behind what is called the steady state of growth (P. Todaro, S. Smith, 2006). In the endogenous theory human capital is accumulated in the same way as physical capital. The economy therefore needs to invest a certain amount of resources to accumulate physical capital, the growth rate of a country then corresponds with the growth level of physical capital. Therefore will the economic policies influence the growth rate of the economy. Any policy that influence saving decisions or the allocation of consumption and investment of individuals will affect the growth rate of a country (J. Kiander, J. Kilponen, J. Vilmunen, 2000).

When the government intervenes in the market through taxation and regulations, they affect the level of economic freedom in the country. The purpose of the payroll tax is to pay for sick leave, social securities, pensions and other benefits for the employed individual. The result of the payroll tax on the demand side of labor is that it makes the costs for the employer higher, which means that it will be more expensive to hire labor; demand for labor will consequently decrease (Katz 2006). On the supply side, a tax wedge between wages paid and received can lead into equilibrium unemployment, if wages are not allowed

to adjust. If taxes on labor influence unemployment they could also have an impact on the growth rate of a country. A higher level of equilibrium unemployment will yield a higher capital-labor ratio and consequently a less productive capital stock. Therefore will the lower level of returns from capital lead to lower savings and thus lower growth rate per capita output. Any factor that will cause a higher equilibrium unemployment level such as payroll taxes will also lead to a lower equilibrium growth rate of per capita output (Kiander et al 2000)

The correlation between high taxes and economic growth has been debated in the field of economics over the past decades. In developed high-income countries the correlation between low economic growth and high taxes has been supported by recent research; however is the relation not so significant in developing low-income countries. It is important to point out that economic research cannot provide us with definite answers regarding how high or low taxes should be to maximize wealth. Research can work as a guideline of different approaches to taxation, and the consequences of those choices. Individuals who support high taxes often question the correlation between high growth and low taxes. It is argued that taxes does not effect growth in a negative way since high government expenditures have an equally positive effect, that would out weigh the negative effects of the high taxes. Further the security a large system of benefits gives would encourage individual risk taking and therefore boost economic growth. In Sweden the high tax level has been defended based on this argument (Katz, 2006).

4 Theoretical framework

4.1 Taxation in equilibrium

Figure 4.1 GDP and Federal Spending
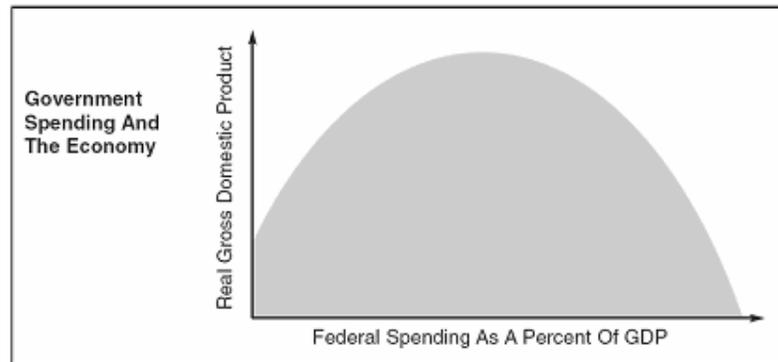

Vedder and Gallaway (1998)

This model is a simple illustration of how a high tax burden can harm a country's economic development. The peak of the shaded area is where a country's economic freedom and government intervention are perfectly balanced. Left of the peak is when a country's government does not intervene in the work of necessary public authorities such as the police force or the fire department. There are some markets which need to be regulated by the government to decrease the country's dead weight loss (DWL). One such market could be a country's infrastructure. If all roads were privately owned many resources would be wasted. This would be the case if, for example, two roads were built next to each other, owned by separate companies, and there was only a demand or need for one road. Markets like this would be more efficient with a government monopoly building all the roads, ensuring no wasted resources.

In comparison, if a country is on the right side of the peak, the government intervenes too much in the economy. Less money is earned because of government regulations. High payroll taxes are a good example of this. If a company has the ability to employ an extra worker but has to hold back because the payroll tax is greater than the profit the worker would yield, then the company will choose not to employ more workers. Thus, the country will loose revenues since it will not take advantage of the developing firms' future increases in profits.

4.1.1 The Laffer curve

This section is describing a simplified elasticity calculation that can be used to examine how tax revenue changes when the tax rate changes.

Figure 4.2 The Laffer curve
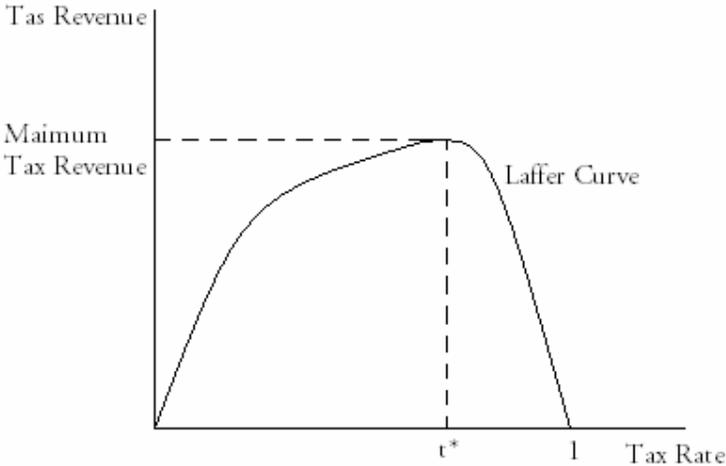
Varian (2003)

This graph is comparing the tax rate to the tax revenue. With a tax rate of zero, no taxes will be paid. If the tax rate is 1 the tax is so high that no one is willing to demand or supply the good, so the tax revenue is also zero. The curve that shows the relation between tax rate and tax revenue is called the Laffer curve.

When the tax rate is high enough, an increase in the tax rate will end up reducing the collected revenues. The reduction in the supply of a good due to increased tax rate can be so large that tax revenue decreases; this is called the Laffer effect.

The question is how high the tax rate has to be for the Laffer effect to occur.

Figure 4.3
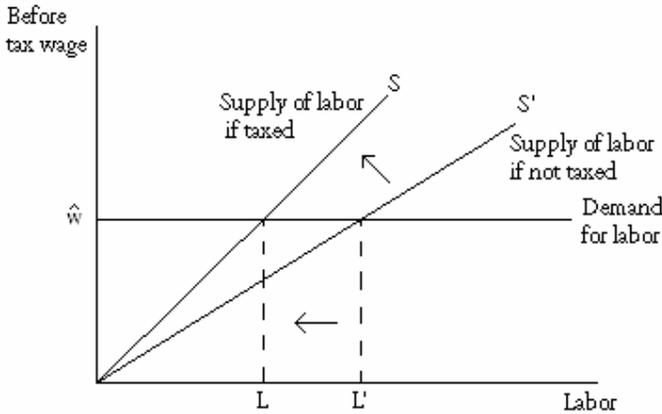
Varian (2003)

To explain this question, Varian (2003) has used a simplified model of the labor market, figure 4.3. Suppose that a firm will demand zero workers if the wage rate is higher than a specific amount $\hat{w}$, and that the firm will have an infinite demand in workers at $\hat{w}$. This means that the demand curve is flat at $\hat{w}$. If a tax on labor is introduced at the rate t, then the worker gets $w = (1-t)\hat{w}$. The supply curve will tilt to the left and the amount of labor will decrease. Tax revenue is given by the formula:

$$T = t\hat{w}S(w) \tag{5.4}$$

where S(w) is the labor supply. To see the change in tax revenue as the tax rate changes, the formula has to differentiate with respect to t:

$$dT/dt = [-t*dS(w)/dw*\hat{w} + S(w)]\,\hat{w} \tag{5.5}$$

The Laffer effect occurs as revenues decline when t increases. This means that when the equation is negative, there is a Laffer effect. To be able to experience this, the amount of labor has to significantly decrease when taxes increase, which means supply of labor has to be elastic. The next equations explain which values of elasticity will make this equation negative.

$$-t*dS(w)/dw*\hat{w} + S(w) < 0 \tag{5.6}$$

Transposing yields:

$$-t*dS(w)/dw*\hat{w} > S(w) \tag{5.7}$$

Dividing both sides by tS(w) gives:

$$dS/dw*\hat{w}/S(w) > 1/t \tag{5.8}$$

Multiplying both sides by (1-t) and using the fact that $w = (1-t)\hat{w}$ gives:

$$dS/dw*w/S > 1-t/t \tag{5.9}$$

The left hand side of this equation is the elasticity of labor supply. The Laffer effect can only occur if the elasticity of labor supply is greater than (1-t)/t.

It is not very likely that the Laffer effect will occur. If the elasticity of labor supply is at 0.2 (which is the highest value ever found), then the tax rate has to be around 84%. Only then will the Laffer effect take place. According to Varian, the United States is unlikely to experience this, but countries like Sweden with higher tax rates provide evidence that the Laffer phenomenon may have occurred (Varian 2003). In Sweden the marginal tax on income reached 87% in the mid 1970s. With a marginal tax of that dimension, the incentive to work was small and the cost of the society was high. Including taxes on wealth and/or income on capital, the marginal tax could exceed 100%. The tax rate decreased in the 1980s and in the early 1990s, and has now, for the highest incomes, reached approximately 55% (Hansson, 2006). With a marginal tax of 87%, it can be expected that Sweden experienced a Laffer effect.

4.2   Payroll Tax, Wages and Employment.

Payroll taxes can lead to lower deadweight losses than other types of taxation. The cost of a payroll tax can be financed by the employees, the employers, or a mix of both (A. Kugler & M. Kugler, 2001). This section describes two extremes in which the complete cost burden is either on the employees or on the employers. It also describes a more realistic view, where the two components are sharing the costs. The graphs illustrate simple supply and demand models of the labor market, which demonstrate the potential effects of a payroll tax. The horizontal axis represents the level of employment and the vertical axis represents the wage level. If a reduction in taxes leads to higher wages that offset the cost of the tax cut, there will be no effect on employment. As mentioned earlier, when the amount of workers increases and the productivity is constant, the marginal revenue product of workers decreases. The demand for labor curve is also describing the marginal revenue product.

Figure 4.4 Cost burden of the payroll tax
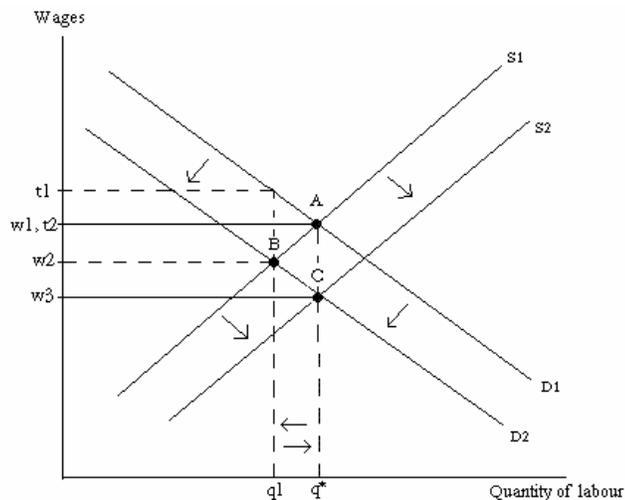
This model describes the effect of flexible wages in relation to the workers who value the benefits financed through payroll taxes as much as the reduction in wages enforced by their employers. When a payroll tax is introduced the cost of employees will increase, and the demand for workers will shift from D1 to D2. The number of employees will decrease to q1 at point B. In this example the value of the payroll tax benefits equals the value of the wage. At point B the benefit of the payroll tax (t1) is larger than the decrease in wage. The employees are therefore willing to work for a lower wage, and the supply curve shift from S1 to S2. At point C the benefit of the payroll tax offset the lower wage and both the employers and employees will be indifferent to the change. At point C the benefit from the payroll tax (t2) equals the pretax wage (w1). The payroll tax will fully shift from the cost of employers to the employees; a shift from A to C. In this situation there is no dead weight loss and no efficiency loss. (A. Kugler & M. Kugler, 2001).

This situation can only occur when wages are perfectly flexible, and when the benefit of the payroll tax exactly offsets the change in wage. Due to decreased economic freedom and a variation in people's economic condition, this is highly illusory, but it is a good way of describing the economic theory.

Due to unions and minimum wages, perfectly flexible wages are not possible in most countries. This scenario is described in Figure 4.5.

Figure 4.5 Fixed wages
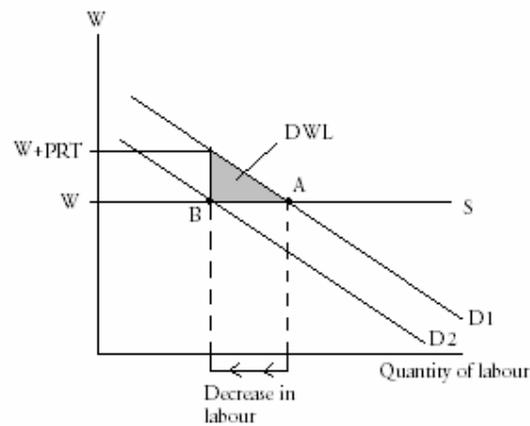
This model describes the effects of a fixed wage. If a payroll tax is introduced, with fixed wages, the whole cost of the tax will be paid by the employer. This will increase the cost of labor by the same amount as the payroll tax. The supply curve is illustrating the supply of workers when the wages are fixed. By increasing the payroll tax within fixed wages, the quantity demand for employees will decrease from A to B. The gray area is the "Dead Weight Loss" (DWL), which is the amount forgone by the society through the introduction of the payroll tax. The company has the ability to employ more workers, but due to the increased cost of labor it is too expensive. The loss for the government will be equal to the loss in taxable income and reduced consumption of goods and services.

If the payroll tax revenue partly finances benefits not directly accrued by employees, only a part of the payroll tax would be shifted to workers' wages and employment would be effected.

Figure 4.6 Incidence of the payroll on labor supply and demand
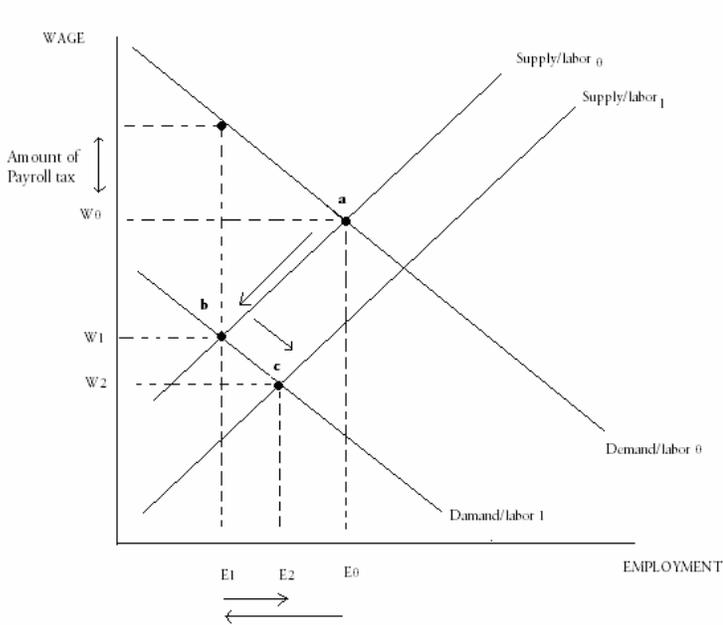
The equilibrium in this situation is achieved at point (a), where no payroll tax is assumed. The employment level is at E_0 and wage level at W_0. When a payroll tax is introduced the cost of labor will increase for the firm and therefore decrease the demand for labor to D_1^L. The effect on wages will be a reduction to W_1 and the effect on total employment will be a decrease to E_1 (point b). The effect of this lack of employment will depend on the elasticity of labor demand and supply. Since the revenues from the payroll tax are used to finance benefit programs for workers, the supply of labor will not decrease by the full amount of E_0 to E_1. Since the tax is giving workers benefits, they are willing to work more for a given wage, shifting labor supply outwards to S_1^L. The result is that employment will move from E_1 to E_2, while the wage falls further to W_2 (point c). Workers will accept a lower wage since they value the benefits they receive from the payroll tax. This leads to less unemployment than would the pure effect of the tax (E_0 to E_1).

The efficiency loss or dead weight loss for the economy also depends on the elasticity of labor demand and supply, on the extent to which benefits are restricted to workers, and on the tax/benefit linkages. The payroll tax will give workers some benefits; however, if they value these benefits less than the decrease in the wage, the supply shift will not fully cover the unemployment effect of the payroll tax (Gruber, 1995).

17

5 Empirical Work

5.1 Regression

In this section a regression is made, comparing the relation between the payroll tax to the number of employees in the manufacturing sector. The aim for the regression is to find the effect of a change in the payroll tax on the number of employees in the manufacturing sector.

5.1.1 Data

Changes in the payroll tax are usually small. To be able to make a relevant analysis of changes, the regression has to be calculated with time series data. Because of the small changes over time, the data is annual and the years from 1971 to 1990 are the length of the time series. The calculation of the change in employment is made by using the aggregate number of employees in the manufacturing sector in Sweden for each year. With the use of time series data and the annual change in payroll tax and employees, the aim with the regression is to find a relation between the two. The regression is using the manufacturing sector as the independent variable and the payroll tax as the dependent variable. The data is collected from Statistics Sweden.

5.1.2 Hypothesis

In this section, we are investigating whether or not the relation between changes in the payroll tax and changes in the number of employment in the manufacturing sector is statistically significant.

$$Y_t = \alpha + \beta * X_t + e_t \tag{5.1}$$

In this linear equation, Y is the dependent variable, X is the independent variable, e is the error term, and α, β are constants. The probability that the change in the independent variable will describe the total change in the dependent variable is small; an error term is therefore included to capture the changes that are not due to the independent variable. Thus, the independent variable is the payroll tax over the same time period.

The equation can be changed to:

$$E_t = \alpha + \beta * T_t + e_t \tag{5.2}$$

E = Number of employees in the manufacturing sector

T = Payroll tax

e = random error term

α and β = constants

5.1.3 Expected sign

Payroll tax is included in the cost of labor that employers are facing. Labor is a variable cost because it increases as the production increases (in labor intensive firms). The marginal cost will rise when labor cost increases, which will make the demand for labor fall. In manufacturing industries, labor and capital are substitutes. This means that if the price of

labor increases, companies will substitute the relatively more expensive input labor for the relatively cheaper input capital. This is why the relation between payroll tax and the number of employees will be negative. This means that when the payroll tax increases, the number of employees will fall. The equation will then be:

$$E_t = \alpha - \beta * T_t + E_{t-1} + e_t \qquad (5.3)$$

E_{t-1} is a lagged variable of the dependent variable (E_t), this is included to correct for autocorrelation. Using time series data, regressions have often problems with residuals that are correlating with there own lagged variables. This will have the result that the ordinary least square is not efficient among linear estimators, which means the regression will not be BLUE (Best Linear Unbiased Estimator) (Sjölander, 2006).

5.1.4   Null hypothesis

The first part of analyzing a regression is to find out whether or not the exogenous variable is statistically significant. When an independent variable is statistically significant, a change in the independent variable will bring a change in the dependent variable with 95% significance. Two probabilities will be tested H_0 and H_1:

H_0: $\beta = 0$ (payroll tax has no significant effect on employment)

H_1: $\beta \neq 0$ (payroll tax has a significant effect on employment).

5.1.5   Elasticity

The constant β is the slope of the linear relation, and is used to calculate the elasticity of the variables. The elasticity measures the impact of a change in the independent variable in relation to the dependent variable. If the elasticity is 0.1, then a 10% increase in the payroll tax will bring a 1% increase in employment. The relationship between an independent and dependent variable could be elastic or inelastic. When the relation is elastic, a change in the independent variable will bring a greater change in the dependent variable. When the relationship is inelastic, a change in the independent variable will bring a smaller change in the dependent variable.

5.1.6   Hypothesis testing

Dependent Variable: Manufacturing sector

Sample (adjusted): 1972-1990

Included observations: 19 after adjustment

Table 5.1 Regression

Variable	Coefficient	Std. Error	t-Statistic	Probability
Payroll tax	-2.029278	0.845494	-2.400108	0.0289

R-squared = 0.853729

The outcome of the hypothesis testing shows that the null hypothesis – that the payroll tax has no significant effect on the number of employees – can be rejected. This is seen by the

low p-value of 0.0289, which is less than 0.05 and therefore statistically significant. A change in the payroll tax will have an effect on the number of employees. Since the coefficient of the independent variable is negative, then a change in the payroll tax will have a negative effect on the number of employees. If the payroll tax increases, the number of employees will decrease. The R-squared of approximately 0.85 indicates that 85 percent of the change in employment can be explained through a change in the payroll tax. A graphical presentation of the relationship is shown in appendix 6.

The elasticity of the number of workers is calculated by:

$$\text{Elasticity} = \beta * (X/Y) \tag{5.4}$$

Sjölander Pär (2006)

X = 32.5% (Payroll tax 2005)

Y = 685.6 (Number of workers in the manufacturing sector 2005, in thousands)

β = -2.03 (coefficient)

$$-2.03*32.5/685.6 = -0.0962295$$

If the payroll tax decreases by 1%, the number of employees will increase by 0.0962295%.

5.1.7   Regression outcome

Since the outcome of the regression was statistically significant, a number of conclusions can be drawn for employment in the manufacturing sector:

- A change in the payroll tax will have an impact on employment.
- The relationship between payroll tax and employment is inelastic, which indicates that a 1% change in the payroll tax will lead to a 0.0962295% change in employment
- Their relationship is negative since increased payroll taxes leads to decreased employment
- The result agrees with previous studies since a decrease in the payroll tax leads to a small change in employment

5.2   Decreased payroll tax benefits offset by a greater number of employees.

Excluding the part of the payroll tax that is not directly transferred back to the employee (Labor-market contribution and Payroll contribution), the tax can be considered as a wage; the concern is who controls the money. For the individual to enjoy the same benefits as before, their wage must be increased by the same amount as the payroll tax is reduced. Reducing only the payroll tax without increasing the wage is the same thing as reducing the wage, because the wage has to pay for the diminishing benefits that result from a lower payroll tax.

The fact that the wage has to pay for the entire reduction in the payroll tax is a simplified theory. The wage has to offset the amount of the tax when the labor market supply is totally inelastic. This means that a reduction in the payroll tax has no impact on the number

of employments. The reduction in the payroll tax could also be partly financed by other reductions. By reducing the labor cost – accomplished by decreasing the payroll tax – the demand for labor will increase.

We will now discuss a labor market where supply is totally elastic. This means that labor demand is in charge of the number of workers in the market. By maintaining constant wages, the change in the payroll tax has to be financed by a greater number of workers. How many new workers must be employed if the payroll tax decreases from 32.5 to 28.5% of the pre tax salary, with no reductions in the aggregated payroll tax benefits? How elastic will the relationship have to be in order to finance a reduction of the payroll tax? These two questions will be answered in the following section. The model we are using is simplified; that is, we are only examining the change in the number of employees with fixed wages. We do not take into account the benefits an increased workforce has on the economy in terms of increased consumption, etc. The model we are using is:

$$\mathbf{L * W * t = T} \qquad (5.5)$$

- L = Number of workers in the manufacturing sector

- W = Average annual pre tax wage

- t = Payroll tax in percentage of the pre tax wage

- T = Payroll tax

Average annual pre tax wage:	240,000 SEK (20.000 * 12)
Number of workers:	685,600
Payroll tax in percentage of the pre tax wage:	32.5%

Source: Statistics Sweden 2006 [1]

The amount of payroll tax paid in 2005:

$$685,600*240,000*0.325 = \mathbf{53,476,800,000}$$

How many additional workers must be employed by reducing the payroll tax to 28.5 %?

Here t_2 is equal to the new payroll tax.

$$(L+X)*W*t_2 = T \qquad (5.6)$$

$$(685,600+X)*240,000*0.285 = 53,476,800,000$$

$$685,600+X = 781,825$$

$$X = 781,825 - 685,600 = \mathbf{96,225}$$

---

[1] Source: www.scb.se

Given that public expenditures are unchanged, the labor force needs to be increased by approximately 96,000 to offset the reduction of the payroll tax. The payroll tax could have a positive result if it brings a great change in the number of employees. As previous experiments show, there are no similar strong relations between lower payroll tax and increased number of employees.

The result of equation 5.6 is extreme and serves as a reminder that this cannot be implemented in the real world. The number of workers would be much less if all tax benefits that come with a greater labor force were taken into account. The additional worker variable (X) is exogenous, which means that we take the availability and costs of workers for granted. In real life unemployed workers are expensive for a country. When new workers enter the market, there will be less tax money paying for unemployment costs; this amount has to be calculated into the equation.

Average cost of unemployed data: The average cost of one unemployed worker is 8,400 SEK per month.[2]

The number of employees needed to keep the same aggregate tax amount will be shown by adding the value of the annual cost of one unemployed worker (C) times the extra number of employments (X):

Average annual cost of one unemployed worker: $C = 8,400*12 = 100,800$

$$X*C+(L+X)*W*t_2 = T \qquad\qquad (5.7)$$

$$X*100,800 + (685,600+X)*240,000*0.285 = 53,476,800,000$$

$$X = \textbf{38,899}$$

The number of employed people has decreased from approximately 96,000 to almost 38,900. The later is a more realistic number, but there are still some factors which are excluded in the model. We do not consider the benefits the society gets by having a larger workforce, which would decrease the number of additional workers even further.

38,900 is an unlikely number if the change occurs over one year. According to previous experiments, the number of employments is not that sensitive to changes in the payroll tax. This means that if the full shift of the payroll tax were introduced, the cost would be much higher than the benefits. Instead, the decrease should be interpreted gradually over years so the market would have time to adjust. With small changes, the losses would be minimized and, in the long-run, the number of employees would increase. Ultimately, the decrease would be offset by a larger work force.

As shown in the equation, a 4% reduction of the payroll tax will create 38,900 jobs. The elasticity of the number of employees is found by calculating the amount of X with a 1% decrease in the payroll tax. Dividing the result with the number of employees gives the elasticity:

---

[2] http://www.helagotland.se/GEN_Forum_Messages.asp?ForumThreadID=5064&ForumID=17

$$X*100{,}800 + (685{,}600+X)*240{,}000*0.32175 = 53{,}476{,}800{,}000$$

$$X = 3{,}004$$

3,004 / 685,600 = 0.0044

Elasticity = $100*0.0044$ **= 0.44**

This means that the relation between the payroll tax and the number of employed would have an elasticity of 0.44. Therefore, if the payroll tax decreases by 1%, the number of employees should increase by 0.44%.

Using the elasticity of the calculated value in the regression, the change in the number of employees would not be as high as in the experiment. Calculating the outcome of the number of employees by using the elasticity calculated in the regression the number of employees would change to:

E = elasticity (0.0962295)

Δt = Percentage change in the payroll tax (4/32.5 = 12.3%)

$$\mathbf{L+X = L*(1+E)^{\Delta t}} \tag{5.8}$$

$$685{,}600*(1+0.000962295)^{12.3} = 693{,}759$$

$$693{,}759 - 685{,}600 = \mathbf{8{,}159}$$

According to the elasticity calculated from the regression, a decrease from 32.5 to 28.5% in the payroll tax will increase the number of workers by 8,159. This result can be used to calculate the loss of the government revenue with a reduction in the payroll tax. The same circumstances as in the equation (5.7) are assumed. Putting the change in labor into the equation (5.7*) will give us the government revenue of the aggregated annual payroll tax.

$$X*C+(L+X)*W*t_2 = T \tag{5.7*}$$

$$8{,}159*100{,}800+(685{,}600+8{,}159)*240{,}000*28.5 = \mathbf{47{,}453{,}224{,}559}$$

$$53{,}476{,}800{,}000- 47{,}453{,}224{,}559= \mathbf{6{,}023{,}575{,}441}$$

A decrease in the payroll tax by 4% will create 8,159 new jobs over a year. The reduction in the aggregated payroll tax revenue will be approximately 6 billion SEK. The reduction is due to employers paying a 4% lower payroll tax for all employees. In order to finance the reduction, an increase in employment of 38,900 new workers would be needed. According to our calculations, the elasticity of labor demand is not high enough to finance a reduction in the payroll tax. In the short run, the loss of government revenue will make it impossible

to finance a tax reduction given that the social benefits are unchanged. In this model we are not considering government revenues that would be generated from consumption of the previously unemployed individuals.

6 Analysis

The result from our empirical work is that relationship between the payroll tax and the number of employments is significant for the manufacturing sector. That could be compared with employment in the aggregated market (private and public sector) where the relationship is not significant. The reason why the relationship is not significant for the aggregate market has to do with the characteristics of the public sector. Employment in the public sector was expanded in Sweden from the 1970s up to the early 1990s. The expansion was closely related to the high tax revenues, partly collected through the high payroll taxes. Employment in the public sector later decreased, when tax reductions were made during the 1990s. The relationship between payroll taxes and employment in the aggregate labor market has therefore shown a positive relationship. This is not a reasonable outcome compared with results from previous studies and economic theory.

The manufacturing sector is dependent on the two inputs capital and labor. If the relative price of one input increases, a company could substitute the relatively more expensive input for the other. The payroll tax will increase the price of labor that employers are facing; when the payroll tax increases it is reasonable to assume that a substitution effect between labor and capital will be present. During the 1970s and the 1980s the payroll tax was increased in Sweden, from a relatively low level of approximately 12% in 1970 to 32% in 1990. During the same period employment in the manufacturing sector decreased. To distinguish a significant relationship in the regression, data from 1970 to 1990 was used. The outcome from the regression was significant and showed that the relationship between employment and the payroll tax is negative.

A positive employment effect can therefore be distinguished from a decrease in the payroll tax. The relationship for the manufacturing sector is inelastic with an elasticity of -0.0962295, indicating that a 1% decrease of the payroll tax will lead to a 0, 0962295% increase in employment. The empirical work illustrates an estimation of how many new employments would be needed in the short run to finance a 4% decrease of the payroll tax, holding the level of benefits constant. The current elasticity of labor demand at -0,0962295% will only create 8,159 new employments. To finance a 4% decrease (32, 5% to 28, 5%) would demand approximately 38,900 new employments, holding the level of benefits constant. In the estimations any positive effects of people being employed (such as the consumption of goods and services) were not considered.

The Swedish example shows us that the payroll tax will have an effect on the number of employments but not large enough to finance the loss in tax revenues. According to our calculations the government will make a loss of approximately 6 billion SEK, from the decrease in the payroll tax. Further will according to the findings from previous studies, a potential effect of a payroll tax decrease be an increase of the wage level. Since the level of the payroll tax has been stable in Sweden for over a decade, it is difficult to predict the outcome of a decrease of the payroll tax. However, it is reasonable to believe that the outcome in Sweden would not be different to the outcome in other countries. Therefore, the result of a decrease would not lead to any significant change in employment and the effect would pass on to the existing workforce in the form of higher wages.

The structure of the Swedish labor market will also affect the possible outcomes, since Sweden has strong labor unions which collectively decide the development of wages, a decrease can be expected to fully pass on to wages. We further believe that an increase of

the payroll tax would have similar effects to what was seen in Colombia. Due to the minimum wage in Colombia the increased cost of labor could not pass on to wages as in the case of a decrease in payroll taxes. Even though Sweden does not have minimum wages the strong unionization of the labor market would mean that an increase in the payroll tax would have negative effects on employment.

In order for a decrease of the payroll tax to have any larger effect on employment the decrease would have to be permanent and significantly large. A time limited decrease will according to previous studies have its limitations. The reason why we believe that the long-run effects of a decrease of the payroll tax could be positive has to do with uncertainty. If companies believe that a decrease will be permanent they will feel more secure to hire more workers on a long-term basis.

The short run effect of a decrease in the payroll tax will result in a government tax deficit due to the loss in tax revenues. One reason for the loss in revenues can be explained by uncertainty among companies. Since the structure of the Swedish labor market also makes it difficult and costly to fire workers, only a smaller effect in employment will be seen. To avoid the negative short run effects the government should decrease the payroll tax annually with a few percent over a longer time-period. Companies will then experience the tax reduction as permanent and therefore feel more secure to invest in more workers.

The outcomes of a tax reduction will also reach different results depending on what structural system the country has (as in Chile and Colombia). If there is a clear linkage between the amount paid and the benefits received, as in Sweden where the payroll tax is used to finance a large system of benefits, then a reduction will be complicated to make without at the same time restructuring the system of benefits. If Sweden should consider any larger reductions of the payroll tax it is reasonable that our benefit system at the same time should involve more individual financing, through individual insurance solutions. However, the public opinion regarding private insurance solutions is to put it lightly, not positive. Increasing the work force is therefore more complicated than just decreasing the payroll tax. With the current structure of the Swedish economy, decreasing the payroll tax will not have a significant effect on employment.

7 Conclusion

In this thesis we have dealt with three research questions. With the support of our findings from the empirical work these questions have been answered. The first question was if the relationship between a change in the payroll tax and number of employments in the manufacturing sector is significant? With the result from our regression we have come to the conclusion that the relationship is significant for the manufacturing sector, indicated by the t-statistic (-2.4) and the p-value (0,028).

The second question was; how many new employments in manufacturing sector will be created due to a decrease in the payroll tax? The answer is that 8,159 employments in the manufacturing sector will be created due to a 4% decrease in the payroll tax.

The third question was if the effect on the government budget be positive or negative due to the decrease in the payroll tax? We came to the conclusion that the decrease in the payroll tax would lead to a short run loss in government revenues of approximately 6 billion SEK. This result is only taking into account the tax revenues collected from the new employments and the loss of revenues due to the decrease in the tax level, the level of benefits is assumed to be constant. The number of new employments in short run will in other words not be sufficient to cover for the decrease in government tax revenues.

A reduction of the payroll tax will according to the calculations in the short run lead to a government deficit, since the number of new employments will not be enough to cover the loss in tax revenues. This does not mean that a decrease of the payroll tax not should be considered. The decrease in the payroll tax will lead to an increase in employment but also to a budget deficit for the government. Our suggestion for further studies is therefore an analysis of a simultaneous change of economic policy and a decrease in the payroll tax.

8 References

Berggren Niclas (2003). Ekonomisk frihet, tillväxt och jämlikhet, Ekonomisk Debatt, årg 31, nr 3 47.

Du Rietz Gunnar & Johansson Dan (2005). Skatterna, företagandet och tillväxten, No 20, Ratio Working Papers, The Ratio Institute.

Gallaway E. Lowell (1998). Government Size and Economic Growth,p. 2, Ohio University.

Gruber Jonathan (1995). The Incidence of Payroll Taxation – Evidence from Chile. Working Paper No. 5053, National Bureua of Economic Research.

Gwartney James & Lawson Robert (2000). Economic Freedom of the World, 2000 Annual Report. Florida State University Capital University with Dexter Samida The Fraser Institute.

Hansson Åsa (2006). Svensk skattepolitik: Från Pomperipossa via århundradets skattereform till värnskattens utdragna avskaffande. Underlagsrapport framtagen åt ratio-institutet. Nationalekonomiska instutitionen, Lunds universitet.

Henrekson Magnus (2000). Swedish Economic Growth and Scholarly Objectivity - An objective sociologist vs. subjective economists, or the other way around?

Johansson S. Lundborg P. och J. Zetterberg (1999). Massarbetslöshetens karaktär och vägarna till full sysselsättning, FIEF, Stockholm

Jones Charles I. (2002). Introduction to Economic Growth (2nd edition), p. 22-23, University of California at Berkeley: W. W. Norton & Company

Katz Jesper (2006). Häftig skatt eller sexig tillväxt – Skatternas påverkan på tillväxten, Timbro

Kiander Jaakko, Kilponen Juha, Vilmunen Jouko (2000). Taxes, Growth and Unemployments in The OECD Countries – Does Collective Bargaining Matter? Government Institute for Economic Research Helsinki

Korkeamäki Ossi & Uusitalo Roope (2006). Employment effects of payroll-tax cut – evidence from a regional tax exemption experiment, Working paper 2006:10

Nyquist Kerstin, Rabe Gunnar, Sundgren Peter (2002). Skatter i EU m.fl. stater, Svenskt Näringsliv

Riphahn Regina T. & Thomas Bauer (1998). Employment Effects of Payroll Taxes - An Empirical Test for Germany, Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor.

Sjölander Pär (2006). Lab Compendium Econometrics 1, Jönköping International Business School.

Todaro Michael P. & Smith Stephen C. (2006). Economic Development, ninth edition. p. 141-145, Pearson Addison Wesley.

Varian Hal R. (2002) Intermediate Microeconomics, a modern approach, sixth edition, p.284-286, New York, W. W. Norton & Company, Inc.

Vedder Richard (1998) Government Size and Economic Growth, p. 2, Ohio University

Verket för Näringslivsutveckling, NUTEK Årsbok 2006

Internet sources

Barnes, L. (2006, Januari 28). *Bra med 200,000 nya offentliga jobb.* Retrieved 2006-11-05, from http://www.helagotland.se/GEN_Forum_Messages.asp?ForumThreadID=5064&ForumID=17

http://www.svensktnaringsliv.se/index.asp?pn=1166115

Borg, A. (2006, Oktober 16). *Budgetpropositionen för 2007.* Retrieved 2006-12-01, from http://www.riksdagen.se/webbnav/index.aspx?nid=37&dok_id=GU031D23&rm=2006/07&bet=1D23

Bhagwati, J. (1999). *Economic Freedom: Prosperity and Social Progress.* Retrieved 2006-12-01, from http://www.columbia.edu/~jb38/freedom_tokyo.pdf (2003-03-27).

Appendix 1

Regression: Manufacturing sector

Dependent Variable: Manufacturing sector
Method: Least Squares
Date: 12/15/06   Time: 15:22
Sample (adjusted): 1972 1990
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Payroll tax	-2.029278	0.845494	-2.400108	0.0289
C	291.0167	134.2805	2.167231	0.0457
Manufact.sec.(-1)	0.776185	0.114068	6.804595	0.0000

R-squared	0.853729	Mean dependent var	1039.789
Adjusted R-squared	0.835445	S.D. dependent var	55.02381
S.E. of regression	22.32062	Akaike info criterion	9.192838
Sum squared resid	7971.361	Schwarz criterion	9.341960
Log likelihood	-84.33196	F-statistic	46.69295
Durbin-Watson stat	1.220472	Prob(F-statistic)	0.000000

Appendix 2

Regression: Total market

Dependent Variable: Total market
Method: Least Squares
Date: 12/17/06   Time: 14:14
Sample (adjusted): 1971 2005
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Payroll tax	4.469498	2.861159	1.562129	0.1281
C	799.2070	346.1129	2.309094	0.0275
Total market (-1)	0.774792	0.099702	7.771119	0.0000
R-squared	0.862000	Mean dependent var		4122.371
Adjusted R-squared	0.853375	S.D. dependent var		176.3453
S.E. of regression	67.52558	Akaike info criterion		11.34471
Sum squared resid	145910.5	Schwarz criterion		11.47802
Log likelihood	-195.5324	F-statistic		99.94176
Durbin-Watson stat	0.688361	Prob(F-statistic)		0.000000

The payroll tax has no statistical significance on the number of employments in the total market. This outcome could have some different reasons. The change in the payroll tax are too small in the short run, a small decrease in the payroll tax is not enough to employ workers.

There are different reasons why a company chooses to employ workers. If a company has no desire to employ, a small reduction in the payroll tax will only have a small impact on the cost of labor. This will not be enough for the employer to change plans and employ just due to a slightly decrease in the costs. The outcome of a change in the payroll tax is also due to who is facing the cost. A reduction of the payroll tax with fixed wages will reduce the employees' social security benefits, and the revenue of the reduced labor cost will be captured by the companies.

Appendix 3

Regression: Service sector

Dependent Variable: SERVICE
Method: Least Squares
Date: 12/18/06   Time: 18:07
Sample (adjusted): 1979 2006
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Payroll tax	20.25293	23.09798	0.876827	0.3889
C	-742.3987	921.4766	-0.805662	0.4280
SERVICE(-1)	1.018003	0.020061	50.74642	0.0000

R-squared	0.990493	Mean dependent var	20453.46
Adjusted R-squared	0.989733	S.D. dependent var	2576.454
S.E. of regression	261.0637	Akaike info criterion	14.06836
Sum squared resid	1703856.	Schwarz criterion	14.21110
Log likelihood	-193.9571	F-statistic	1302.378
Durbin-Watson stat	1.265274	Prob(F-statistic)	0.000000

t-statistic = 0.876 < 2.00

The relation between the payroll tax and the number of workers in the service sector is not statistical significant.
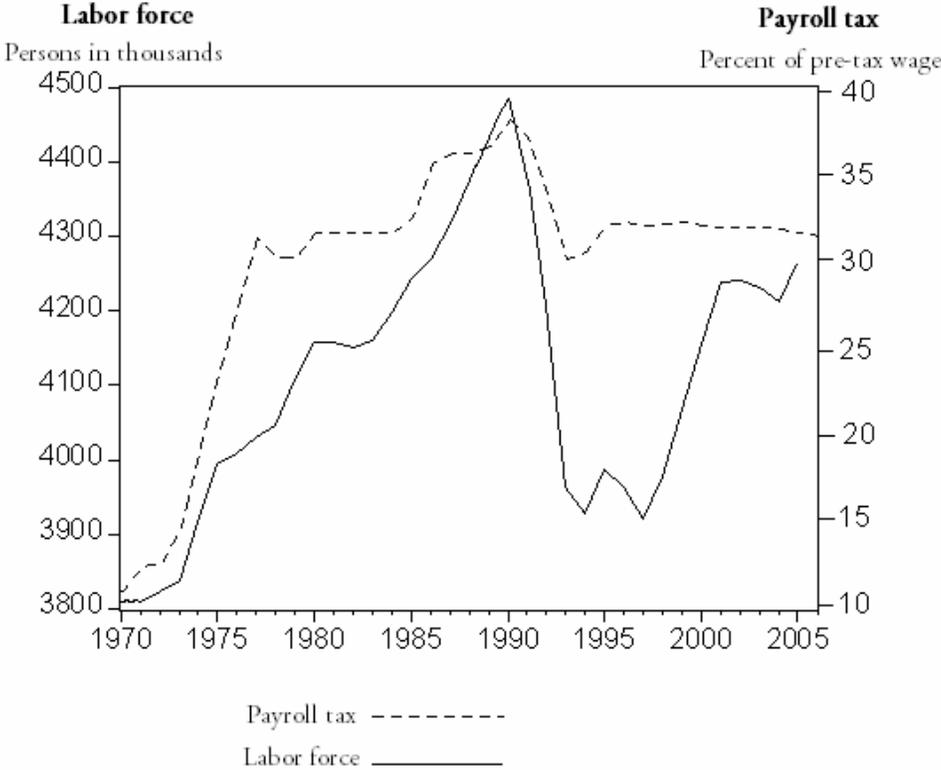
Appendix 4

Labor force private sector and the payroll tax

Payroll tax — Percent of pre-tax wage

Labor force private sector — Persons in thousands

Payroll tax – – – – – –
Labor force _____

Appendix 5

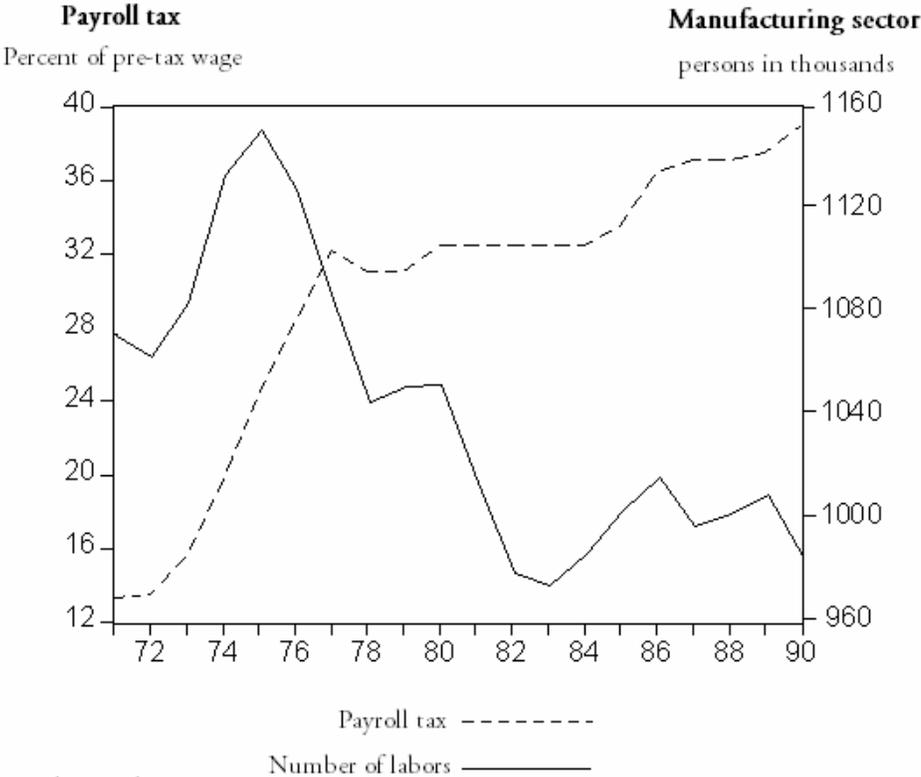Aggregate labor force and the payroll tax

Data: www.scb.se and www.ekonomifakta.se

According to our analysis, the relation between the payroll tax and the number of employees should be negative. If the payroll tax goes down, the cost of labor decreases and the demand for labor increases. This is not the case for Sweden, where the relation is more positive than negative, as shown in the graph. When the payroll tax has increased, the number of employed people has increased as well. We know that the relation cannot be positive because the demand for labor decreases when the cost of labor increases. The reason for the positive relationship between aggregate employment and increases in the payroll tax is the expansion of the public sector.

During the years of the large increases in the payroll tax, employment in the public sector was also expanded. Since the tax revenues were used by the government to expand various services, it is not strange to see a relationship between the increase in taxes and employment. This observation is strengthened by the fact that employment decreased at the same time as taxes were decreased during the early 1990s. Since less tax revenues reduce the possibilities of running expansionary public policies, it is natural to see that such employments would decrease when tax revenues are decreased. With this in mind, it is reasonable to leave out the public sector from the analysis. Concentrating purely on the manufacturing sector employment makes it possible to analyze the pure effect which payroll tax has on employment. Total market regression can be seen in Appendix 2.

Appendix 6

Labor force manufacturing sector and the payroll tax

Payroll tax
Percent of pre-tax wage

Manufacturing sector
persons in thousands

Payroll tax – – – – – – –
Number of labors ————————

Data: www.scb.se and www.ekonomifakta.se

The graph shows the development of the payroll tax and employment in the manufacturing sector. In the graph, a large decrease in employment can be seen throughout the 1970s and during most of the 1980s. In the regression, we decided to use data only up to 1990, since the payroll tax was largely increased during this period and employment decreased significantly during the same period. This was done to isolate any potential dependent relationship between the two variables. When considering only this time period, a negative relationship could be observed.