Government Expenditures Effect on Economic Growth

The Case of Sweden 1960–2001

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2003:130 SHU • ISSN: 1404 – 5508 • ISRN: LTU - SHU - EX - - 03/130 - - SE
This thesis investigates how expenditures of the central government of Sweden have affected economic growth during a period with significant increases in central government expenditures throughout the western part of the world. The expenditures of the central government are divided into three main areas, consumption, investments and transfers. Rate of economic growth is regressed against the central government variables together with private investment, private consumption and interest rates. All the estimated coefficients had their expected signs and three of them were statistically significant on at least a five percent significance level. Results suggest that according to growth theory the government of Sweden spend too much and might inhibit economic growth.
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Chapter 1
INTRODUCTION

1.1 Background
The role and size of government expenditures arouses a great deal of controversy in macroeconomics. While countries have moved towards economic freedom and open markets (Gwartney, Holcombe & Lawson, 1998), government expenditures have increased more and more. Between the years 1960 and 1996 the size of government expenditures increased in all 23 OECD countries that have been members during this period. Sweden is one of these countries and also one where the government expenditures have increased in size the most (OECD, 1997). Some empirical findings suggest that government expenditure beyond a certain limit of its core functions would have an adverse impact on economic growth (Dar & AmirKhalkhali, 2002; Gallaway & Vedder, 1998). Changes in government expenditure and the growth rate of GDP in the case of Sweden are shown in figure 1.1. The figure shows that the trend in government expenditure and the growth rate in GDP tend to move in opposite directions. The negative correlation suggests that larger government expenditures could have a negative effect on economic growth. This could be a problem because economic growth can, for instance, increase the living standards of a country’s citizens (Norberg, 2001). If the growth in the economy is greater than population growth, a GDP per capita increase, living standards will on the average normally reach higher levels (Eklund, 2000). Then, if the negative correlation is a fact, a larger government should not be desirable from the viewpoint of economic growth and prosperity. If government expenditure inhibits economic growth, then, does the Swedish government spend too much beyond its core functions?
1.2 Purpose
The purpose of this thesis is to investigate if there is a significant negative relationship between the size of central government consumption, investments and transfers and the growth rate in national output in Sweden.

1.3 Method
Estimation of how government expenditure affects economic growth will be carried out with a standard macroeconomic model which is based on endogenous growth. Private and government investments and consumption are together with interest rates and transfers regressed in an attempt to estimate their impact on the economic growth rate in Sweden.

1.4 Scope
This study will look at the Swedish central government expenditures divided into three areas; consumption, investments and transfers. Only the central government will be examined and used as a proxy for the whole public sector. The study is limited to the period 1960 to 2001 since this period is characterized by a substantial growth in the central government of Sweden (SCB 2001).
1.5 Earlier Studies
There have been several studies on the impact of government size on economic growth. Some recent studies find a negative relationship between the two. (Barro, 1991; Gwartney, Lawson, and Holcombe, 1998). These studies look at spending beyond certain core functions and conclude that growth will be retarded if government spending is too high. A study carried out by Landau (1983) looks at the effect of government consumption on economic growth in ninety-six countries and finds a negative relationship between government spending and growth in national output. When investigating the effect of the government on economic growth in Saudi Arabia, Al-Yousif (2000) uses two different models and reaches contradicting results. However, he finds the model with positive relationship between government size and economic growth more applicable and therefore concludes that government size could have a positive effect on economic growth. Fölster and Henrekson (2000) find a robust negative relationship between government expenditure and growth. Their study is carried out in rich countries between the years 1970-1995. Their estimated coefficients suggest that a 10 percentage increase in government expenditure is associated with a decrease of 0.7-0.8 percentage points in growth rate.

1.6 Outline
Chapter two describes the economic functions of the government. It discusses core and beyond core government functions. An introduction to the expenditures and their growth in the Swedish government is also given. The third chapter briefly discusses two different growth theories, neo-classical and endogenous growth. The determinants used for the model in this thesis are also justified. In the fourth chapter the model that is used in this study is presented and data material for the model is also discussed. Chapter five presents the regression results, their significance and other statistic variables. It also contains a discussion concerning the results.
Chapter 2
GOVERNMENT IN THE ECONOMY

2.1 Government Core functions
Gwartney, Lawson and Holcombe (1998) refer to a selection of government functions as core functions. These are functions that can improve economic efficiency and thereby improve economic growth. Regardless of the debate concerning the activities that make up the core functions, there are two broad categories that emerge in most of the research made in this area (see e.g. Gwartney, Lawson and Holcombe, 1998; Lin, 1994; Al-Yousif, 2000). These two are the protective functions and the provision of a limited set of collective goods. The protective functions include establishment of rule of law and private property rights which can protect people from plunder. The involvement in producing goods for collective consumption includes goods such as defense, roads, education and public affairs. Goods, that otherwise would not be provided at all or provided in scarce quantity (Gallaway and Vedder, 1998). Together, the provision of these goods and the protection of private property will promote economic growth (Burda and Wyplosz, 2001).

2.2 Beyond core functions
The above reasoning shows that some government spending will always be desirable in order to promote economic growth and obtain a stable society. However, government activity can also have a negative effect on economic productivity, as they grow more and more the law of diminishing returns begins operating (Gallaway and Vedder, 1998). This suggests that an expansion much beyond the core functions will have a negative impact on the economy and there are several reasons, discussed below, to believe this is true.

First, the higher taxes or the further borrowing that is required to finance growing government expenditures will have a negative effect on economic growth. Incentives for households to invest, take risks and to find jobs decreases as the government takes more and more of their earnings. Borrowing can also have a negative effect on private
investment since the government receives funds that could otherwise have been invested in the private sector. There is also a possibility that these will raise taxes because the government now has higher interest payments (Gallaway and Vedder, 1998).

Second, a large government sector increases the potential profits from rent-seeking activities; this might lead to a movement of resources into more unproductive use (Fölster and Henrekson, 1997). Rent-seeking occurs when people try to obtain income by having the government transfers to themselves rather than providing goods and services to others. They benefit the recipient but are a drain on the economy as a whole and economic growth suffers.

Third, continuous expansions of the government will move expenditure into less and less productive activities. Eventually the government becomes too large and will carry out more activities for which it is not suited. When this happens negative returns will set in which might retard economic growth. This is likely the result when governments become involved in the provision of private goods. Goods like food and housing fall into this category. There is no reason to expect that governments will either allocate or provide such goods more efficiently than the market sector (Gallaway and Vedder, 1998).

Fourth, the market process is more dynamic than the political process. Alertness is rewarding in a competitive system and will also impose swift punishment on those who make bad decisions. The public sector also adjusts much slower than the private sector. The time for moving out of bad investments, adjust to changing circumstances, new information and improved technologies is a lengthier process for governments. Economic growth is to a large degree a discovery process and this makes a slower responding government a major shortcoming as related to economic growth. A central element of economic growth is when entrepreneurs discover new technologies, improved production technologies and previously overlooked opportunities. This makes them able to combine resources into goods and services that are more highly valued. As entrepreneurs discover new and improved technologies, better methods of production, and opportunities that were previously overlooked, they are able to combine resources into goods and services that are more highly valued. (Gwartney, Lawson and Holcombe, 1998)
The core and “beyond core” functions suggest an inverted U-relationship between the size of government and economic growth rate. Figure 2.1, The Armey curve, displays the relationship between economic growth rate and government size. The output-enhancing functions dominate when there is a small government, in other words there is a positive relationship between growth rate and size of government up to a certain point. At point X, however, further increase of government size reduces the economic growth rate. Expansion beyond this point will more likely contribute to economic decline rather than growth and the relationship becomes negative (Gallaway and Vedder, 1998).

It is important to note that small governments that fail to provide a legal system, a stable monetary regime and other core functions efficiently will most likely not promote economic growth. Therefore a small government does not by itself promote economic growth.

2.3 Government expenditures in Sweden
The three main parts, besides interest payments, of the central government expenditures in Sweden are transfers, consumption and investments. Transfers are the reallocation of resources from the public sector to other sectors in the society, e.g. pension systems, unemployment benefits and business subsidies. Government consumption is for
instance, salaries paid to government employees and the purchase of goods and services. Investments are concerned with acquiring and constructing long term assets such as buildings, roads and machinery. Interest payments are mainly interest on the government debt, but also interest subsidies for student loans. Government revenues are made up of income taxes, interest revenues, indirect taxes and other sources. Figure 2.2 shows central government expenditures in Sweden by economic category for the year 2001. Interest payments are paid interest on the government debt (ESV, 2003). Transfers accounted for 67 percent of the central governments expenditures in year 2001. This means that 67 percent of government expenditures did not contribute to GDP since transfers are merely the re-allocation of funds.

2.4 The growth of the Central Government in Sweden

The size of the central government as a part of the Swedish economy has increased significantly throughout the last decades. The growth in central government expenditures is to a large extent due to increased income redistribution (SCB, 2001), rather than an increase in the core functions of the government as defined by Gwartney, Lawson and Holcombe (1998). Figure 2.3 displays how total central government expenditures and the three different main categories, transfers, investments and

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1 Other sources are for instance subsidies from the European Union and revenues from sales of government property.
consumption, have changed over the last four decades. The curves for total expenditure and transfer payments are highly correlated which gives further evidence that most of the changes in total government expenditure is due to increases in transfers. In SCB (2001) it is stated that the expansion during the post-war period is due to the social reforms that are supposed to secure a material well-being for all citizens. According to Gwartney, Lawson and Holcombe (1998) such an expansion is likely to reduce economic growth. In 1960 total central government expenditures was 13 billion SEK or 19 percent of GDP. Of these 13 billion, transfers accounted for 45 percent, government consumption for 25 percent and investments 4.5 percent. In 2001 expenditures had grown to 33 percent (722 billion SEK) of the national output. Transfers were 67 percent, consumption 20 percent and investments as low as 1.1 percent of total expenditures.

![Graph of Central Government Expenditure, Total and by Economic Categories as a share of GDP 1967 – 2001](image)

Figure 2.3: Central Government Expenditure, Total and by Economic Categories as a share of GDP 1967 – 2001

Source: Sweden Statistics, 2003
Henrekson (1992) examines several demand and supply variables that can help explain the growth of the government size in Sweden. He finds that the supply variables tend to be more important to explain the growth in government consumption expenditure, while demand variables are more important for explaining growth in transfers. The most important conclusion in his analysis, according to himself, is that the growth of the public sector in Sweden is a complicated process that can not be explained only by a simple economic model. In comparison with other OECD countries Sweden had only slightly higher expenditures in the government sector in 1960. The two following decades these expenditures rose sharply and by 1980 Sweden had government expenditures 20 percentage points higher than the OECD average and it has stayed on about the same level up until now. Henrekson’s own judgment of the significant growth in the government sector during the post war period is to a large extent due to Keynesian ideas. The great depression during the 1930s made people doubt the liberal market economy’s ability to guarantee a growing prosperity. The Keynesian theory recommended a more active role by the government in the economy which Sweden followed and therefore the Swedish government grew dramatically.

Demand variables are for instance number of people employed, number of workers in unions and urban population. Supply variables are for instance share of total employment that are employed in the public sector, relative price between public production and the total production and governing political party.
This chapter introduces two different models of economic growth, a simple version of Solow’s Neo-classical theory and an endogenous growth model. The last part of the chapter deals with the determinants which are used later in the thesis. These determinants are based on the endogenous growth theory.

3.1 Neo-classical Theory of Growth
Most ideas concerning economic growth starts from the aggregate production function where factors of production determine the national output. According to the Neo-classical theories growth comes about in three ways if holding land fixed.

- Increase in the labor supply
- Increase in the capital stock
- Increase in productivity

Increasing labor supply generates a larger output. Real output rises if more people take part in a country’s production, i.e. through immigration, or if people who are not a part of the labor force begin working. Capital increase can be divided into two parts, increases in physical and human capital. Physical capital increase output because it enhances the productivity of labor and provides valuable services directly. A productivity increase can for instance take place when investments in equipment like computers and machinery, and this can for example reduce labor hours. Human capital promotes economic growth because people with skills are more productive than those without them. Investments in human capital are made through e.g. university studies and on-the-job training. Productivity increases explain the increase in output that can not be explained by the input increases (labor and capital). This is called the productivity of an input and can be affected by a number of factors. The most important factor is technological change which affects the productivity in two stages. First the
advance in knowledge called inventions. Second the use of that knowledge which if it leads to a more efficient production is called innovation (Burda and Wyplosz, 2001).

3.2 Endogenous growth

Endogenous growth theory highlights the fact that if productivity is to increase, the labor force must continuously be provided with more resources. Resources in this case include physical capital, human capital and knowledge capital (technology). Therefore, growth is driven by accumulation of the factors of production while accumulation in turn is the result of investment in the private sector. This implies that the only way a government can affect economic growth, at least in the long run, is via its impact on investments in capital, education and research and development. Reduction of growth in these models occurs when public expenditures deter investments by creating tax wedges beyond necessary to finance their investments or taking away the incentives to save and accumulate capital (Fölster and Henrekson, 1997). The main implications of endogenous growth theory can easily be summarized in a simple figure. In figure 3.1 the curve labeled G for growth shows the rate of output growth.

Figure 3.1:  Endogenous growth: Determination of Economic Growth and Technological progress
Source:  Gylfason, 1998

3 Unless stated chapter 3.2 refers to Gylfason, (1998)
There are three key variables that contribute to economic growth: the saving rate, efficiency, and depreciation. The curve labeled T for technological progress shows the key property of the endogenous-growth model. Technological progress follows the growth rate in GDP per capita. This is done through learning by doing and technological change will therefore increase when economic growth increases. Point B in the graph shows the rate of population growth. At point A where T and G intersect is the long run equilibrium value of the rate of economic growth and technological progress. At that point economic growth equals the distance between the points O and C along the vertical axis. This growth can be divided into two parts: the distance OB is due to population growth while BC is due to technological progress. If the saving rate raises the curve G will shift up to G’. The equilibrium point will move from A to D where both economic and technological growth is faster than at point A. In figure 3.1 population growth is held constant and this means that economic growth, as defined by output per capita, occurs because more capital is accumulated and because technological progress accelerates through the learning process. A drawback of this model is that it does not say anything about how fast movements happen. Figure 3.1 can also be used to show what happens in the case of an efficiency increase. An efficiency increase is when output increases with existing stock of capital. More and better education is an example of an efficiency increase, this will like savings increase shift the G curve upwards to G’. This is because saving and efficiency interact. A given level of saving translates increased efficiency into more growth and a given level of efficiency likewise translates increased saving into more growth. The two, savings and efficiency, have the same effect on economic growth and technological progress. Gross investment can never be a negative number, however, if the wearing down of existing capital exceeds gross investments, net investments will be negative. Therefore depreciation of capital will make the capital stock decline and, hence, economic growth will become negative. In figure 3.1 a movement from G’ to G will take place if the capital stock depreciates more than gross investment. The equilibrium point moves from D to A. Economic growth and technological progress slows down. The slowdown in technological progress takes place because it follows economic growth.

In the case of an increase in population growth shown in Figure 3.2 the T curve shifts upwards to T’. This is because with more population growth, a given rate of growth is consistent with less technological progress than before. Rate of population growth
increases from OH to OI while economic growth remains unchanged since the G curve is not affected (moves only with changes in savings rate, depreciation and efficiency). However, the rate of growth of output per capita decreases from HJ to IJ.

![Diagram](image)

Figure 3.2: Endogenous Growth: An Increase in Population Growth Reduces Technological Progress, but Leaves Economic Growth Unchanged

Source: Gylfason, 1998

### 3.3 Determinants of economic growth

In order to analyze how government expenditure could affect economic growth a number of major variables have been taken into consideration. These variables, gross investments, private consumption, government consumption, government investment, interest rates and government transfers are discussed in the following paragraphs.

#### 3.3.1 Gross investments

Firms purchases of new buildings, equipment, machinery and inventories are referred to as investments. They all add to the capital stock (Burda and Wyplosz, 1997). Investments play six macroeconomic roles according to Piana (2001):

1. It contributes to current demand for capital goods.
2. It increases the production base and hence, future production capacity
3. It modernizes the production process and improves cost effectiveness
4. It leads to higher productivity
5. It allows for the production of new and improved products
6. It incorporates innovations and quality standards

Cumulated investments increase the capital stock and gives rise to increased production in the future. Investments also have a direct positive effect on GDP from the domestic expenditure side and will raise GDP with the same amount, ceteris paribus (Piana, 2001).

3.3.2 Private Consumption
Consumption is a component of GDP and the direct effect of a consumption increase that GDP will raise with the same amount, ceteris paribus. A further increase in consumption will also be followed by the rise in GDP since it is a determinant of consumption and there will be a positive feedback loop between consumption and GDP (Piana, 2001)

3.3.3 Government Consumption and Investments
Government consumption is also a component of the GDP. Everything else held fixed government consumption will increase GDP since it contributes to current demand. It will also have the same positive feedback loop on GDP as private consumption itself has because it increases GDP which is a determinant of total consumption. However, there is also a negative effect since increased public expenditure needs to be financed. Financing public expenditure is done through taxes or by borrowing. Increased taxes will lower disposable income for households and private consumption may fall accordingly. Public expenditure can also have a crowding-out effect on private investments. This is because resources that could have been invested in the private sector, for instance, goes to the government sector instead. Public expenditure might also have a positive effect on interest rates, which in turn can decrease investments. When it comes to public investments these are devoted to roads, railways, buildings like schools and hospitals. As discussed in chapter 2 government investments are expenditure on the core functions and therefore they are expected to have a positive effect on the economy (Piana, 2001)
3.3.4 Interest rates

Interest rates have an impact on GDP growth since it affects several parts of the economy. Among others an increase in the interest rate would yield the following:

- A fall in profitability of firms, due to higher interest payments
- A fall in private investments
- A fall in consumption

Large increases in the interest rate could through other variables have a negative effect on the GDP (Piana, 2001)

3.3.5 Government Transfers

Transfers do not, like government investments and consumption, contribute to GDP since it is merely a redistribution of finances. It does however create higher taxes in the society. This in combination with its negative effects should have a negative impact on economic growth. The ratio between transfers and GDP is therefore only a way of measuring the size of transfers as a share of total government expenditure
4.1 The model

Growth theory suggests that growth is driven by accumulation. Therefore, gross investments will be included in the model. Since this study is trying to estimate the effect of government variables on economic growth, private and government investments are separated. Also government and private consumption will be two different variables. Government transfers and interest rates are added to form the function. Equation 1 displays the function for economic growth and is expressed as:

\[ \Delta Y = F(I, R, C, G, H, T) \]  

Dependent variable is the growth rate in real GDP, denoted \( \Delta Y \). Table 4.1 summarizes all the independent variables and their expected signs in the regression.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Source</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I) Private investments</td>
<td>SCB, 2003</td>
<td>+</td>
</tr>
<tr>
<td>(R) Interest rates</td>
<td>SCB, 2003</td>
<td>-</td>
</tr>
<tr>
<td>(C) Private consumption</td>
<td>SCB, 2003</td>
<td>+</td>
</tr>
<tr>
<td>(G) Government consumption</td>
<td>SCB, 2003</td>
<td>+/-</td>
</tr>
<tr>
<td>(H) Government investments</td>
<td>SCB, 2003</td>
<td>+</td>
</tr>
<tr>
<td>(T) Government transfers</td>
<td>SCB, 2003</td>
<td>-</td>
</tr>
</tbody>
</table>

Private and government investments are expected to have positive signs since both build to the capital stock. Private consumption is also expected to have positive sign because of the multiplier effects of increased consumption. Although government consumption adds to the GDP, the sign is undecided since higher taxes could have a negative effect on private consumption. Interest rates and transfers are both expected to have negative
signs. Interest rates because of its negative effects on investments and transfers because its disturbing effects on the markets through higher taxes.

Ordinary least square regression is used to estimate the coefficients of the variables in equation 1. Equation 2 displays the growth regression and is formulated as:

\[ \Delta Y = \alpha + \beta_1I + \beta_2R + \beta_3C + \beta_4G + \beta_5H + \beta_6T \]  

(2)

The constant is denoted \( \alpha \) while \( \beta_n \) are the coefficients of the different variables. The estimates obtained for each coefficient shows how much a one unit increase in each individual variable will affect the growth rate in national output. A convenient way would be to take the logarithm of the variables before running the regression. In this case each coefficient would be respective variable’s elasticity. However this is not possible since the Swedish economy has experienced years with negative growth rates and negative interest rates and taking the logarithm of these would not be defined.

Other variables often included in growth regressions are the increase in labor supply, technological change and productivity. Labor growth in Sweden has very closely followed population growth during the period this study is carried out and is therefore ignored (World Bank, 2000). According to endogenous growth theory, technological progress follows economic growth and therefore technological progress will not be included (Gylfason, 1998). While this is a short run study, productivity is a long run variable and therefore left out (Piana, 2001)

4.2 Data Material

The data is drawn from SCB (2003) for the period 1960-2001. Real interest rates are obtained by subtracting the annual inflation rate from three months treasury bills. Investments are like GDP growth measured in their annual growth rate. All the other independent variables are measured as their share of the GDP for each year. Since these are percentage values current prices are used.
4.3 Autocorrelation

Autocorrelation is common when using time series data in regressions. It occurs when the residuals does not form a random trend around the regression line. Positive autocorrelation which is the common one for time series is when the trend of the residuals is formed systematically above or below the line.

One way of eliminating autocorrelation is by identifying the factors responsible for the autocorrelation and extend the regression accordingly. The Cochrane-Orcutt method does this with an iterative process with 5 different steps. First, the original equation is regressed. Second, residuals are being calculated. Third, $e_t$ regressed against $e_{t-1}$ to estimate the correlation between the two ($\rho$). The fourth step is put the actual value of the correlation ($\rho$) to the original equation. Step five re-calculates the residuals and the process starts over at step three until the autocorrelation is eliminated (Dougherty, 1992)
Chapter 5
EMPIRICAL FINDINGS

5.1 Results
The results obtained from the estimation of equation 2 are summarized in table 5.1. Dependent variable is the real growth rate in GDP measured in percentage points. The table gives an overview of the sign and size of each coefficient and their statistical significance. All numbers are rounded up to two decimal points.

Table 5.1: OLS-Regressions for the growth effect of the determinants of economic growth

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficient ($\beta$)</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.04</td>
<td>0.47</td>
</tr>
<tr>
<td>Private Investment</td>
<td>0.69*</td>
<td>6.58</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>-0.16**</td>
<td>-2.49</td>
</tr>
<tr>
<td>Private Consumption</td>
<td>0.08</td>
<td>0.52</td>
</tr>
<tr>
<td>Government Consumption</td>
<td>-0.3</td>
<td>-1.22</td>
</tr>
<tr>
<td>Government Investments</td>
<td>0.14</td>
<td>1.09</td>
</tr>
<tr>
<td>Transfers</td>
<td>-0.21*</td>
<td>-2.87</td>
</tr>
</tbody>
</table>

Durbin Watson 1.81 F-statistic 18.76 $R^2$ 0.77

* and ** indicates statistical significance at the 1% and 5% level respectively

A Durbin-Watson statistic below 2 indicates the possibility for positive autocorrelation which is very common in studies using time series data (Dougherty, 1992). By comparing the value obtained from the regression with the upper and lower limits from the appropriate table and concluding that the value is higher than the upper limit for the critical value of the Durbin-Watson statistic the null hypothesis of no autocorrelation can not be rejected at a five percent significance level.

The aim of this regression is to explain the behavior of the dependent variable $\Delta Y$ by changes in the explanatory variables. The Goodness to fit, $R^2$, has a value of 0.77 which implies that 77 percent of the variation in the dependent variable can be explained by
the model’s independent variables. By comparing the F-statistic with a critical value obtained from an F-distribution table it is possible to investigate whether the value of $R^2$ reflects a true relationship or if it has arisen as a matter of chance (Dougherty, 1992). The F-statistic from table 5.1 has a value of 18.76 and the critical value from the F-distribution table is 3.3. If the F-statistic is higher than the critical value the null hypothesis$^4$ can be rejected. Therefore, the suggestion that the $R^2$ value has arisen by chance is rejected concluding that there is a true relationship.

The coefficients all have their expected signs as displayed in table 4.1. To verify statistical significance for each independent variable t-tests are carried out. In order to reject the null hypothesis that $\beta$ is equal to zero the t-statistic for each variable has to lie outside a critical t value obtained from a t distribution table. The critical values in this case are 2.042 and 2.750 for the five and one percent significance level respectively. By comparing the t-statistics in table 5.1 with the critical values these values shows that the interest rate and transfers are both significant at the five percent level while private investments are significant at the one percent level. The other variables have too low t-statistics to be significant and anything better than the 30 percent level.

5.2 Alternative regression

As an alternative regression the three independent variables for government size, consumption, investments and transfers were placed into one single variable. The government variable in this regression is measured as total government expenditure as shares of GDP while the other explanatory variables were measured the same way as in the original regression. A Durbin-Watson statistic of 1.67 gives no reason to reject the null hypothesis of no autocorrelation. The goodness to fit had a value of 0.70 so the model was able to explain 70 percent of the variation in the GDP change. The F-statistic had a value high over the critical F-value so the goodness to fit is assumed to not have arisen by chance. The t-value for the government variable was 2.36 and hence a statistically significant negative relationship on economic growth at the five percent significance level.

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$^4$ The null hypothesis here is being that the explanatory variables has no relationship with the growth rate in real GDP.
5.3 Discussion

Regarding government spending the results, in broad terms, support both the Keynesian and monetarist views of government expenditure. On the one hand the results demonstrate that government expenditure positively affects real GDP through investments. On the other hand it shows how government consumption and in particular transfers leads to significant crowding out effects. In the original regression a one unit increase in transfers corresponds to a 0.21 percent decrease in the economic growth rate. A one unit increase in the investment rate would, with its positive relationship, lead to a 0.69 percent increase in the economic growth rate. The last statistically significant variable, interest rates, suggests that a one unit increase would lower the rate of economic growth with 0.16 percent. Unfortunately these units can not be specified and give the exact answers on what the units are measured in since the relationships are not linear. Nevertheless, it does tell us if the relationship is positive or negative and if it is significant or not. Government consumption is probably the theoretically most disputed variable. A part of the GDP as it is, government consumption does have a positive effect on GDP when it increases. On the other hand, if the increase in government expenditure is interpreted as a fall in disposable income for households it also has a negative effect. In the first regression the negative effect seems to be stronger than the positive effect and hence the relationship between government consumption and economic growth is negative although not significant at more than the 30 percent significance level. Another explanation of why government consumption would have a negative effect on economic growth could be that investments are crowded out through an interest rate increase due to higher government spending. By using the arguments of Gwartney, Lawson, and Holcome (1998) the results for government consumption would suggest that too much are spent beyond the core functions and therefore it retards rather than contribute to economic growth. The evidence is stronger for transfers. Here there seem to be little doubt, both theoretically and empirically that there is a negative relationship. The results for transfers are not surprising since it is merely the re-distribution of money. It could be argued that a more even distribution of income would have a positive effect on aggregated private consumption. However, the linear relationship between transfers and private consumption is strongly negative\(^5\). Government investments is the only

\(^5\) The correlation which measures the direction and strength of a linear relationship between two quantitative variables had a value of -0.74 between transfers and private consumption.
government variable with a positive relationship on economic growth in this regression. Like government consumption it was not statistically significant. Still, the sign lies accordingly with theory and the results suggest that higher government investments could increase economic growth. Both regressions imply that the Swedish government is larger than what is optimal for a higher growth rate. If the inverted U-relationship is assumed, Sweden would be on the falling portion of the Armey curve. Perhaps Sweden have chosen to trade-off economic growth for security in form of a large distributive government sector? If economic growth would be the primary goal the results further suggests that transfers and government consumption could be reduced in order to free capital for both private and government investments and maybe private consumption.

With a goodness to fit of 77 percent there is no doubt that explanatory variables of significance have been excluded. Of course this model does not explain the whole story for the economic growth in Sweden during the last four decades. Several events throughout history have had its effects on the economic growth in the world and in Sweden. Some points in history are in particular worth considering. One of these was the significant price increases in oil and raw materials the first half of 1970. The price increases lead to increased costs and a demand reduction. The effect of this was lower utilization of capital, decreasing investment and hence, a fall in production. A similar scenario took place 1979-1980 with a second considerable increase in oil prices. The fall in economic growth could also be due to changing conditions for economic growth. Economists argue that a fall in growth conditions took place during the 1970s and 1980s. This because of the build up since the Second World War ended and technological development slowed down (Eklund, 2000). The major economic crisis in Sweden in the late 1980s can not be left out of the discussion which could have had a major impact of the following years when Sweden experienced a negative growth rate in real GDP.
Chapter 6
CONCLUSIONS

The purpose of this thesis was to investigate whether there was a significant relationship between government expenditures in three main areas and economic growth in Sweden between the years of 1960 and 2001. This has been a period substantial growth in the central government sector mostly due to social reforms and increased income redistribution. Earlier studies have not been able to reach agreement about the government expenditures affect economic growth. However, there seem to be some consensus that neither too little nor too much government expenditure is desirable.

The model used in this study included the government variables and other determinants of economic growth. The regression that was carried out in an attempt to estimate each variable’s effect on economic growth gave a goodness to fit of 77 percent, which is a relatively high value. However, it has to be highlighted that not everything is explain by this model.

Each individual variable had their expected values when regressed. Although the signs lied accordingly to theory not all of them had a statistically significant relationship. Three of the variables, private investments, interest rates and transfers showed a statistically significant relationship on at least the five percent significance level. In an alternative regression with the government variables consolidated into one single variable the results showed similar results with private investments being positive and government expenditure on the whole to be negative in relation to economic growth.

The results do, in all, suggest that the Swedish government spend too much beyond its core functions and that this could retard economic growth.
REFERENCES


