Budget Consolidations in the Aftermath of a Financial Crisis: Lessons from the Swedish Budget Consolidation 1994–1997.

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Abstract

The Expansionary Fiscal Contraction (EFC) hypothesis predicts that a major fiscal consolidation leads to an economic expansion under certain circumstances. We test this hypothesis, and the implied non–linear responses of the economy to large and small changes in fiscal policy using data from the Swedish budget consolidation 1994–1997 that was implemented after the banking crisis in the early 1990's. We use a structural VAR/event study methodology following Blanchard and Perotti (2002) that explicitly allows us to distinguish between normally marginal changes in fiscal policy and comprehensive fiscal reforms. We find that "marginal changes" in fiscal policy (expenditure and tax changes) have the expected Keynesian effects on output and consumption. However, we find no evidence supporting the existence of reverse effects of fiscal policy during the budget consolidation. The budget consolidation had no other effects than those effects fiscal policy has during normal times. This result is somewhat surprising since the Swedish budget consolidation is often regarded as both comprehensive and successful. One reason for this result may be that households did not expect permanently lower taxes in the future and did not revise their expectations about future disposable income. Another explanation, although related, may be that households expected the budget consolidation to restore government outlays to the pre–crisis level and believed that tax increases where permanent.

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1 Introduction

The financial crisis has led to a fiscal crisis in many countries. Large budget deficits and slow economic growth has led to increasing debt ratios not only in EU but also many other countries.[1] Most EU countries (24 out of 27 in 2010) also have budget deficits exceeding the 3 percent reference value stipulated by the Stability and Growth Pact. In some countries, for example in Greece and Ireland, the fiscal crisis has developed into a full–fledged sovereign debt crisis. Without doubt many countries now, as the acute effects of the crisis subside, have to consider a phasing out of rescue packages and recovery policies and turn their efforts to restoring long–run sustainable public finances.

There is a fear among policymakers as well as economists that extensive budget consolidations will lead to further declines in economic activity counteracting the efforts to bring public finances in balance. Traditional economic theory suggest that a budget consolidation will have a contractionary effect on the economy leading to lower economic growth and higher unemployment. However, economic theory also suggest that extensive budget consolidations may have expansionary or reverse effects under certain circumstances. This non–Keynesian prediction is often called 'Expansionary Fiscal Contractions' (EFC) (Giavazzi och Pagano (1990)).[2]

There are, in principle, two channels through which budget consolidations can have expansionary effects, either through expectations effects or through supply side effects induced by fiscal policy. The first channel is based on the argument that a credible and is expected to lead to permanently lower government expenditures and taxes, households revise their expectations about future disposable income and therefore also permanent income. As a result, private consumption increases. If the change in private demand is larger than the reduction in government demand, output will increase. If debt ratios are high and growing households are more likely to expect a future consolidation as they know that debt cannot continue to increase indefinitely (Bertola and Drazen (1993) and Sutherland (1997)). Perotti (1999) also studies the relation between high debt ratios and the existence

[1] High debt ratios are associated with lower economic growth as shown by Reinhart and Rogoff (2010b). When debt ratios exceed 90 percent, the median growth rate falls by roughly 1 percent and the average growth rate by 1.7 percent. The macroeconomic development prior to and after major crises are studied by Reinhart and Reinhart (2010) whereas Reinhart and Rogoff (2010a) document links between banking crises and sovereign crises.

[2] Such expansionary effects are not only supported in non–Keynesian models but also in new–Keynesian models with sticky prices (Canzoneri, Cumby and Diba (2003) and Linnemann and Schabert (2003)). In these models the argument is that cuts in government expenditures lead to increased private wealth and therefore increasing private consumption. This holds if the elasticity of substitution between public and private goods is high. In the opposite case when the elasticity of substitution is low, the effects of fiscal policy switches sign and the traditional effects are restored, see Linnemann and Schabert (2004).

of reverse effects of fiscal policy. He shows within a three period model with liquidity constrained households that cuts in government expenditures are more likely to give expansionary effects than tax increases.[3] A high share of liquidity constrained agents reduces the likelyhood of expansionary effects. The second channel is based on the relationship between fiscal policy and real wages, a labor–market channel. If a contractionary fiscal policy lead to less upward pressure on private sector wages then there will be a positive effect of profits and investment as shown by Alesina, Ardagna, Perotti and Schiantarelli (2002).

Empirical support of the EFC hypothesis include Alesina and Perotti (1995), Perotti (1999), Giavazzi, Jappelli and Pagano (2000), Höppner and Wesche (2000), Giudice, Turrini and in't Veld (2003), Rzońca and Ciżkowicz (2005) and Afonso (2006) for example. There are also a few papers rejecting EFC effects, for example van Aarle and Garretsen (2003) who focus on EU–countries and are using the same method as Giavazzi och Pagano and Hjelm (2002) who is using panel data regressions. Andersen and Risager (1990,1991) and Andersen (1994) focus on the Danish fiscal consolidation and reject EFC effects. It is noteworthy that most of these empirical studies consider a cross–section of countries either employing cross–section or panel data regressions. There are very few event studies.

The purpose of this paper is to conduct an empirical test of the EFC hypothesis with focus on non–linear effects of fiscal policy during the Swedish budget consolidation 1994–1997. This episode is interesting to study for several reasons. First, the budget consolidation was substantial and covered public sector spending, income taxes as well as value added taxes and other features. The total effect of the program over the three year period was estimated to 125.5 billion SEK (around 7.5 percent of GDP). The program consisted of both reductions of government expenditures and income reinforcing measures. Spending cuts accounted for about half of the total program. Second, the budget consolidation was preceded by a banking crisis in early 1990's. The Swedish banking crisis is considered by Reinhart and Rogoff (2008) to be one of the most severe during the postwar period leading to large declines in economic activity over a long period. The costs of rescuing the banking sector after the crisis was substantial, around 6 percent of GDP. Third, the budget consolidation was also considered as successful as it managed to turn a budget deficit of -8.8 percent of GDP to a surplus of 3.7 percent during a three year period.

There is a related literature focusing on the preconditions of successful budget consolidations but they do not in general consider banking crises. Barrios, Langedijk and Pench (2010), for example, study whether there is a link between banking crises resolutions and budget consolidations using a cross–section of countries. However, they do not discuss the existence of expansionary effects of fiscal policy only what distinguishes a successful from

[3] Afonso (2001) also analyzes a model with liquidity constrained agents but in a two period framework.

an unsuccessful budget consolidation.

We will apply the approach suggested by Blanchard and Perotti (2002). Their approach combines traditional time series analysis with an event study.[4] Within our empirical model we distinguish between the effects of fiscal policy during normal times with those during non–normal times, i.e., during a major budget consolidation. We extend the Blanchard and Perotti model by also including unemployment allowing us to also consider the dynamic relations between fiscal policy and the rate of unemployment.

The paper is structured in the following way. In section 2 we describe the particulars of the Swedish banking crisis in the early 1990's and the subsequent budget consolidation. The statistical model including the identification of structural shocks is discussed in section 3. Section 4 contains the empirical analysis. Finally, the main conclusions and lessons for countries implementing budget consolidations in the aftermath of the crisis are given in section 5.

2 The Swedish budget consolidation 1994–98

The Swedish banking crisis in early 1990's followed a similar pattern as most financial crises.[5] Deregulation (removal of formal bank regulations and capital controls) lead to rapid credit expansion with sustained increases in asset prices and real estate prices. After a period of price increases and the decoupling of prices from fundamentals the bubble burst leading to dramatic falls in both asset prices and real estate prices in turn leading to disruption of these markets. Sharp increases in non–performing loans and credit losses in the financial sector lead to widespread bankruptcies. The banking crisis also coincides with the ERM crisis in the summer of 1992 which spilled over to the Swedish currency. The measures taken to defend the fixed exchange rate were, in retrospect, extreme. After a period of successive increases in the overnight interest rate the Riksbank increased the rate to 500 percent on September 16. The speculative pressure gradually disappeared and the overnight interest rate was lowered but in November speculation resumed an on November 19 the Riksbank had to abandon the fixed exchange rate and the krona depreciated immediately by 9 percent. Over the next 12 month period the krona depreciated by 20 percent.

Contributing to the crisis was the fact that Swedish households despite regulations were more indebted than in many other countries. For example, in 1980 the household sector debt amounted to 67 percent of disposable income. New lending from financial institutions

[4]This approach has been used in other studies of fiscal policy, for example Perotti (2002), Afonso and Claeys (2008) and Bergman and Hutchison (2010).

[5]See Englund (1999) for an analysis of the causes and consequences of the Swedish banking crisis.

were around 20 percent per year during the first half of the 1980's. During the latter half of the 1980's new lending increased by 73 percent in real terms. Competition among banks, mortgage institutions and finance companies increased which lead to higher risk–taking. It is notable that the extra risk–taking was a deliberate choice taken in order to gain market shares. Lending in foreign currencies also increased from 27 percent of total bank lending in 1985 to 47.5 percent in 1990. Lending to corporations increased faster than lending to households during the 1980s, first household lending increased as a result of the deregulation and lending to corporations followed with a 2–3 year lag. Englund (1999) argues that other major shocks in addition to the deregulation contributed to the asset and real estate price bubbles for example high inflation, expansionary economic policy and low post–tax real interest rates. Lax supervision, inexperience and lax risk analysis followed after the deregulation which also contributed.

The crisis came gradually. During the end of 1989 real estate stock price index started to fall compared to the general index and by the end of 1990 it had fallen by 52 percent since the peak in August 1989. Credit losses and non–performing loans increased gradually leading to a fall in bank stock price index. During the same period the after–tax real interest rate jumped from -1 percent in 1989 to +5 percent in 1991. In addition, the marginal tax on capital income and interest deductions were reduced from 50 percent to a flat 30 percent tax rate in 1991. In September 1990 one finance company Nyckeln ("the Key") went bankrupt as it could not renew funding. Other finance companies were affected as well as they had to resort to bank lending and in a few days the money market dried up. A number of other finance companies also went bankrupt over the coming months and the crisis spread to the banking sector. Credit losses increased and over the period 1990–93 the accumulated losses in the banking sector was 17 percent of total lending. At the same time the real estate market also dried up leading to sharp price falls and further problems in the banking sector. Bank lending related to real estate accounted for around 10–15 percent of all lending but between 40 and 50 percent of all losses. For example, the bank Gota went bankrupt in September 1992 and was taken over by the state and merged with Nordbanken (also owned by the state) increased lending by 102 percent over the period 1985–88 and credit losses accounted for over 37 percent of total lending. Only one bank, Handelsbanken went through the crisis without any government support. Other banks either had to rely on government support or new capital from the owners.

The deep recession that followed in the aftermath of the banking crisis together with costs related to the attempts to rescue the banking sector lead to sharp increases in government deficits and debt. Over the period 1989 until mid 1992 the budget deficit as a percentage of GDP fell from a surplus of 3.3 percent in the fourth quarter of 1989 to a deficit of 11.4 percent in the second quarter of 1993. Over the same period government

debt as a percentage of GDP increased from 45 percent to over 76 percent. The banking crisis resulted in a government debt crisis. Reinhart and Rogoff (2008) identifies the Swedish banking crisis as one of the five most catastrophic episodes in the postwar period with major declines in economic performance over a long period.[6] The costs of rescuing the banking sector after the crisis was around 6 percent of GDP.

The Swedish budget consolidation was substantial. The cyclically–adjusted primary balance rose by 10.7 percent of GDP over five years, with cuts to primary current expenditure accounting for about 80 percent of the improvement. Table 2 summarizes the total effects of the budget consolidation program The table shows the total effect in 1998 when the consolidation program had ended. On the expenditure side, transfers to households were cut by 34.6 billions which accounted for 48 percent of total expenditure reductions. On the income side, increased social contributions and other income accounted for the main part of the income reinforcing measures. The total effect was estimated to be 125.5 billion SEK which was around 7.5 percent of GDP. Note also that the value added tax of food was reduced as part of the program.

Table 2 reports some macroeconomic key figures for the Swedish economy before, during and after the budget consolidation. According to the table, the reductions of government expenditures was substantial. Total outlays as a percentage of GDP fell from 68.3 percent in the quarter just preceding the implementation of the budget consolidation to 58.7 percent in the first quarter of 1998 when the consolidation period ended. Government revenues as a percentage of GDP, on the other hand, did not change much even though taxes were raised. It is also notable that revenues increased over time after the budget consolidation to almost 62 percent of GDP in the first quarter of 2000. As expected, the budget deficit improved substantially and went from a deficit to a surplus regardless of what measure we use.

The macroeconomic development is also interesting to study. Average growth in output and in private consumption were negative during the period preceding the budget consolidation. Note, however, that economic growth already had started to increase during the last quarters before the consolidation was implemented. For example, GDP growth was over 4 percent on an annual basis in the third quarter of 1994, see Table 2. Output growth fell during the consolidation and increased somewhat in the period after. Unemployment was relatively high during the consolidation but started to fall in the beginning of 1998. Three years after the consolidation, unemployment was almost halved. Our interpretation is that the budget consolidation managed to break the increases in government outlays and reduce budget deficits. This constituted a structural break. We view the Swedish budget consolidation as a specific and atypical event and hypothesize that the links be-

[6]The other four banking crises are Spain in 1977, Norway in 1987, Finland in 1991 and Japan in 1992.

Table 1: The Swedish budget consolidation program, total effect in 1998 in billions of SEK.

Reductions of government outlays	
Transfers to households	34.6
Reduced subsidies	8.1
Reduced government consumption	6.8
Other	21.7
Total reductions	71.2
Increases in government revenue	
Social contributions	23.7
Capital tax	7.5
Tax on high income earners (värnskatt)	4.2
Production taxes	6.1
Other	27.5
Total increases	69.0
Budget weakening effects	
Reduced value added tax on food	-7.6
Other	-7.1
Total budget weakening	-14.7
Total program	125.5

Note: Budget Proposition 2000/01:100 Bilaga 5 (Budget Law 2000/01:100 Appendix 5).

tween changes in government expenditures (and taxation) are different during this period. Household expectations about future disposable income and public finances may have been adjusted to the new situation which in turn may affect permanent income and therefore also private consumption.

Table 2: Macroeconomic key figures before, during and after the budget consolidation 1994:4 to 1997:4.

	Before	During	After
Government outlays as a percentage of GDP	67.5	63.3	58.5
Government revenue as a percentage of GDP	60.3	58.9	60.6
Budget deficit as a percentage of GDP	-7.2	-4.4	2.1
Primary balance as a percentage of GDP	-7.7	-2.9	3.3
GDP growth	-0.5	2.9	4.2
Consumption growth	-0.7	1.8	4.0
Unemployment	8.0	11.3	8.5
	1994:3	1998:1	2000:4
Government outlays as a percentage of GDP	68.2	58.7	58.1
Government revenue as a percentage of GDP	59.4	59.3	61.8
Budget deficit as a percentage of GDP	-8.8	0.6	3.7
Primary balance as a percentage of GDP	-7.9	2.1	4.5
GDP growth	4.2	3.5	3.2
Consumption growth	1.5	2.5	3.1
Unemployment	11.1	10.3	6.3

Note: All numbers are in percent. Before denotes the period 1991:1–1994:3, during 1994:4–1997:4 and after 1998:1–2000:4.

3 Data and method

The data set contains quarterly observations of real GDP, private consumption, government consumption, direct taxes and unemployment. All variables are in real terms and we take the natural logarithm on all variables except unemployment which is in percentages. The sample starts in the first quarter in 1971 and ends in the fourth quarter in 2008. The reason for not also using data covering also the last two years is that we are concerned that the current financial crisis will impact the empirical results. The data has been downloaded from OECD.

The empirical approach we will use allow us to distinguish between the effects fiscal policy has during 'normal times' and those effects that can be associated with major budget consolidations ('non–normal times'). In order to identify these effects we make use of the

approach suggested by Blanchard and Perotti (2002). Their approach is to model the interrelationship between the variables using a vector autoregressive system (VAR–model) and then analyze the effects of a major change in fiscal policy which could be either expenses related to wars as in Blanchard and Perotti or the effects of a major fiscal consolidation as in our paper. Bergman and Hutchison (2010) also applies a similar identification scheme in their case study of the Danish budget consolidation during the 1980's. Our approach allows us to analyze the effects of fiscal policy (changes in government consumption and taxes) during normal times and by modeling the budget consolidation using a dummy variable (as has been suggested by Blanchard and Perotti (2002)) we distinguish between these effects during normal times to those during a major budget consolidation.

Our approach combines a case study aiming at studying how a major budget consolidation affects output, private consumption and unemployment with the analyzes of fiscal policy effects during normal times. A major budget consolidation should be viewed as a special circumstance and handled separately from the dynamic responses of fiscal policy in the normal case. To measure the effects of a major budget consolidation we let a dummy variable represent the effects of fiscal policy during non–normal times. The dummy variable is equal to one during the consolidation period staring in the fourth quarter of 1994 until the fourth quarter of 1998, otherwise it is equal to zero. The exact dating of the budget consolidation period is of course arbitrary but the results presented below are relatively unaffected to minor changes in the periodicity. The dummy variable will then measure the effects on output, private consumption and unemployment separately from those effects that fiscal policy has during normal times. By computing the dynamic effects from the dummy variable on for example GDP, we can test whether the effects of a budget consolidation is different from the effects during normal times. In this regard, our approach allow us to test for reverse effects from fiscal policies during non–normal times.

The VAR model contains five variables: GDP, private consumption, government expenditures, direct taxes and unemployment. We also include the output gap in G7–countries in order to condition our results on the world business cycle and its effects on the Swedish economy.

The starting point of our analysis is to assume that the five variables can be modeled as the following structural vector moving average model (VMA model):

$$\Delta x_t = \delta + R(L)\, \upsilon_t \tag{1}$$

where $x_t = \left[\begin{array}{ccccc} T_t & G_t & Y_t & C_t & U_t \end{array} \right]'$, and where L is the lag operator. The structural shocks $\upsilon_t = \left[\begin{array}{ccccc} \psi_T & \psi_G & \psi_Y & \psi_C & \psi_U \end{array} \right]'$ satisfies the conditions that $\mathrm{E}[\upsilon_t] = 0$, and that $\mathrm{E}[\upsilon_t \upsilon_t']$ is diagonal, ψ_i is the structural shock to taxes, government consumption, GDP, private

consumption and unemployment.[7] The parameters in the lag polynomial $R(L)$ can be computed from the reduced form VMA–model

$$\Delta x_t = \delta + C(L)\varepsilon_t \tag{2}$$

where $C(L) = I_5 + \sum_{j=1}^{\infty} C_j L^j$, and the five–dimensional vector of residuals ε_t is assumed to be white noise, i.e., $\mathrm{E}[\varepsilon_t] = 0$ and $\mathrm{E}[\varepsilon_t \varepsilon_t'] = \Sigma$ is a non–singular covariance matrix. The basic problem is now how to recover the structural shocks in υ_t in (1). As is standard, the structural shocks are linear combinations of the reduced form residualsε_t in (2). In other words, let the matrix F represent these linear relations such that $\upsilon_t = F^{-1}\varepsilon_t$.

The identification we use is a version of the one suggested by Blanchard and Perotti (2002). Assume that the relationship between the reduced form residuals and the structural shocks is of the following form:

$$\begin{aligned}
\varepsilon_t^T &= a_1 \varepsilon_t^Y + a_2 \psi_t^G + \psi_t^T \\
\varepsilon_t^G &= b_1 \varepsilon_t^Y + b_2 \psi_t^T + \psi_t^G \\
\varepsilon_t^Y &= c_1 \varepsilon_t^T + c_2 \varepsilon_t^G + c_3 \varepsilon_t^p + \psi_t^Y \\
\varepsilon_t^C &= d_1 \varepsilon_t^T + d_2 \varepsilon_t^G + d_3 \varepsilon_t^p + \psi_t^C \\
\varepsilon_t^p &= e_1 \varepsilon_t^Y + \psi_t^p
\end{aligned} \tag{3}$$

where a, b, c, d and e are parameters to be estimated. The first two relations in (3) implies that unexpected changes to taxes (in period t) are caused by unexpected changes in GDP and structural shocks to government expenditures and taxes, while unexpected changes to government expenditures are caused by unexpected changes in GDP and structural shocks to taxes and government consumption. The following two equations states that there is a contemporaneous relationship between unexpected changes in GDP (and in private consumption) and unexpected changes in taxes and government consumption in addition to own structural shocks. The last equation shows that structural shocks to unemployment interact with unexpected changes in GDP. We assume that; (i) there are no contemporaneous links between shocks in unemployment and government consumption and taxes, and (ii) that shocks to private consumption do not affect unemployment contemporaneously.

To estimate the parameters linking reduced form residuals to structural shocks we follow the procedure outlined by Blanchard and Perotti with two exceptions. First, the parameter a_1 is the output elasticity of taxes is constructed by Blanchard and Perotti using disaggregated data on taxes. Instead of following this approach we decide to set this parameter to 1.3 which corresponds to a 0.6 units increase in taxes when GDP increases

[7]Note that the VMA model is derived from a structural VAR model with finite lags such that the lag structure is infinite in the VMA representation.

by one unit. Second, the parameter b_1 measuring the output elasticity of government expenditures is set to -0.2 which is in the range of what Giorno, Richardson, Roseveare and van den Noord (1995), Girouard and André (2005) and Flodén (2009) estimate for Sweden. Blanchard and Perotti assume that this parameter is zero for the US economy as they cannot find any relationship between government consumption and GDP.[8]

The relationship between unexpected changes in taxes and government expenditures is represented by the parameters a_2 and b_2 and allows for possible linkages between these two variables, government expenditures may react to changes in taxes or vice versa. As pointed out by Blanchard and Perotti, there is no convincing way to separately identify these parameters. One solution is to compare two cases, when $a_2 \neq 0$ and $b_2 = 0$ or when $a_2 = 0$, $b_2 \neq 0$. We follow this suggestion.

At last, the parameter e_1 is the contemporaneous effect from shocks to GDP on unemployment whereas ψ_t^p is the structural shock to unemployment. Our identification implies that we allow for a contemporaneous response in unemployment when GDP changes and that shocks to unemployment affects both GDP and private consumption contemporaneously.

Blanchard and Perotti suggest a two–step procedure to estimate the parameters in the matrix F and the impulse response functions. The first step is to estimate the parameters in F from a VAR model where all parameters in the lag polynomial are quarter specific. This implies that the lagged reaction is allowed to vary depending on the variable in a specific quarter. The reason for using this seasonal response of taxes when GDP changes (or the response of government expenditures when GDP changes) is that it is reasonable to assume that the seasonal pattern could be strong enough to affect these responses significantly. Some taxes, for example excise taxes and value added taxes are collected with a lag and it is reasonable to condition estimated impulse responses on these potential seasonal or lagged effects.

In the second step, we use the estimated parameters and thus the estimated F matrix to identify the VMA system. We again estimate the VAR model but this time without allowing for seasonality and the F matrix is then used to identify the structural shocks. We can only identify the structural shocks to government expenditures and taxes. For this reason it is not possible to analyze the effects from, say, structural shocks to unemployment on taxes. This is a limitation of the approach. Also, the dynamic effects of the dummy variable representing the budget consolidation are independent on the particular identification scheme. Regardless of how we identify the VAR model, the impulse responses to a budget consolidation (the dummy variable) are the same.

[8]The results and conclusions drawn are not affected by these two assumptions. Changes in the values of a_1 and b_1 do not affect the results.

In the following section we analyze the dynamic effects of GDP, private consumption and unemployment to restrictive fiscal policy and to the budget consolidation during the 1990's. Finally, we examine how important the dummy variable is by computing historical decompositions, i.e., we compute forecasts of GDP and private consumption using our model and the estimated structural shocks. These calculations will give a picture of how important the budget consolidation was for explaining the developments of GDP and private consumption during the consolidation period.

4 Empirical analysis

4.1 Model specification

The first step in our empirical analysis is to set up and specify the empirical model. The model outlined above contain no cointegration relation but there are no requirements otherwise on the statistical properties of the data. We start by testing for unit roots and cointegration. The results from these tests suggest that all variables, possibly with the exception of private consumption contain unit roots, see Table 3. We reject the null for private consumption at the five percent level when allowing for a quadratic trend. Assuming that all variables contain unit roots we then test for cointegration using the Engle–Granger two step method. There is no strong empirical evidence suggesting cointegration. Regardless of our assumption about the deterministic components, we cannot reject the null that there is a unit root in the residuals from the first stage regression implying that we cannot reject the null that there is no cointegration relationship between the series.[9] Since the unit root and cointegration tests do not strongly suggest that there is a cointegration relationship in the model we assume in the following that the variables contain a unit root but that they are not cointegrated.[10]

Our assumption about unit roots also has consequences for the interpretation of the impulse response functions. The model is estimated in first differences implying that all structural shocks have permanent effects on the variables. In a stationary VAR, the long–run effects on the variables are always equal to zero. This may not be the case when assuming non–stationarity where the long–run effects are not necessarily equal to zero. The consequence is that we cannot give an economic interpretation of the long–run

[9]We have also used the Johansen method to test for cointegration. These tests suggest that there might be one cointegration vector present in our VAR model. Further testing reveals that we cannot reject the null that there is a cointegration relation between GDP and private consumption. This implies that these two variables seem to contain a common stochastic trend.

[10]We have also estimated the model under the assumption that all variables are stationary around a quadratic trend but results and conclusions are unaffected.

effects. This holds regardless of whether we assume stationarity or not. At the same time it is important to note that there is no restriction imposed on the model restricting the dynamic responses. The short–term responses are not restricted at all. Neither the size or the direction are restricted implying that these can be given an economic interpretation. The definition of short–run versus long–run is of course arbitrary and unfortunately there is nothing in the model that we can use as a guideline. Normally, we define medium–term as the duration of a business cycle, i.e., five to ten years. We follow this convention.

Table 3: Test for unit roots and cointegration.

Variable	τ_τ	τ_γ
Direct taxes	0.521	0.577
Government consumption	0.867	0.430
GDP	0.382	0.502
Private consumption	0.100	0.033
Unemployment	0.078	0.171
Engle–Granger cointegration test	0.749	0.828

Anm: τ_τ denote an ADF–test with constant and linear trend while τ_γ denotes a test with constant and a quadratic trend. All ADF–tests are based on an automatic lag length selection using a maximum of 12 lags. Engle–Granger two–step method is used to test for cointegration. Only asymptotic p–values are reported in the table.

4.2 Effects of fiscal policy during normal times

The results we show below are based on a VAR–model with 4 lags where we include the dummy variable representing the Swedish budget consolidation. We also include the output gap for the G7–countries as an exogenous variable to capture the influence of the world business cycle on the Swedish economy. This implies that the effects of fiscal policy and the budget consolidation are conditioned on the influences from the world business cycle. The lag length of the exogenous variable is the same as for the endogenous variables.

In Figure 1 we show impulse responses of GDP, private consumption and unemployment to a structural positive shock to taxes (direct taxes are raised by one percentage points) and a negative shock to government consumption (government consumption is reduced by one percentage point).[11] In other words, we study how restrictive fiscal policy affects the

[11]In Appendix A we show how taxes and government consumption respond to these structural shocks.

economy. Dashed lines in the figure shows confidence intervals computed using a bootstrap method with 1000 trials.

We find in Figures 1(a) and 1(c) showing the effects from a tax shock that the effects on GDP and private consumption are in line with standard theory. Raised taxes lead to a fall in output and in private consumption even though the size of the effect is smaller on private consumption. These impulse responses are consistent with traditional Keynesian theory.

Figures 1(b) and 1(d) show how GDP and private consumption respond to a reduction of government expenditures. As is evident from the graphs we find only a short–run negative effect on GDP. After approximately one year, the effect ceases to be significant. This suggest that it is more efficient to use tax changes than changes in government expenditures if the aim is to obtain large and significant output effects. As expected we find that the impulse responses of private consumption match those that we find for GDP. Reductions of government consumption only have short–run negative effects. The conclusion is that restrictive fiscal policy (either raised taxes or reduced government consumption) has the conventional restrictive effects on the economy during normal times. We also find that the tax effects are larger than the effects emanating from changes in government consumption.

The last to graphs in Figure 1, figures 1(e) and 1(f), show how unemployment reacts to changes in taxes and government expenditures. The graphs suggest that higher taxes tend to increase unemployment. It is surprising that the effect is relatively large and significant in particular compared to those effects we estimate when there is a shock to government expenditures. The effect on unemployment after a shock to government expenditures is very short–lived. After one year, the effect is statistically insignificant.

Altogether these results suggest that fiscal policy has the expected and conventional effects on output and private consumption. Tax changes has large short–term effects on output, private consumption and unemployment whereas changes in government expenditures only have small short–run effects.

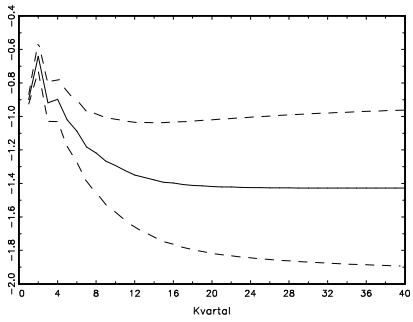
4.3 Effects of a major fiscal consolidation

Let us now investigate if the budget consolidation had any significant effects on the Swedish economy, i.e., if the effects of fiscal policy is different during non–normal times. As explained above, we let a dummy variable represent the budget consolidation, the dummy variable is equal to unity 1994:4–1997:4 and zero otherwise.[12] The dummy variable then

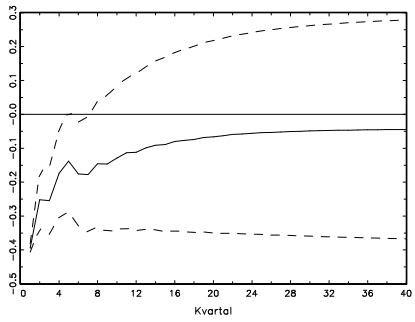
[12] An alternative approach is to allow all parameters in the VAR model to change during the consolidation period. Since we only have very few observations we cannot estimate the model and therefore we have chosen to use the dummy variable approach instead.

Figure 1: Impulse respons of GDP (Y), private consumption (C) and unemployment (U) to restrictive fiscal policy (raised taxes (T) and reduced government expenditures (G)) under "normal" times.

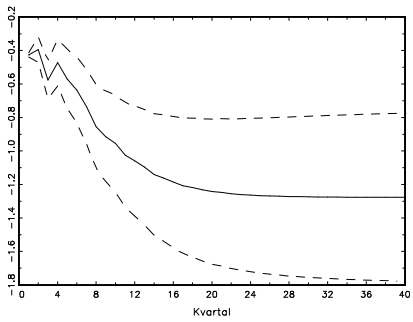
(a) Effect on Y from T



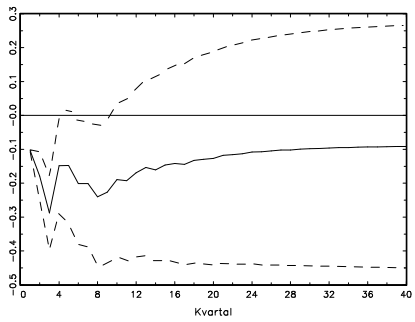
(b) Effect on Y from G



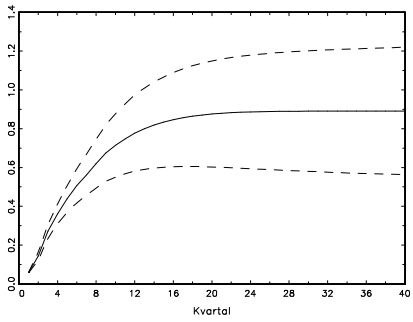
(c) Effect on C from T



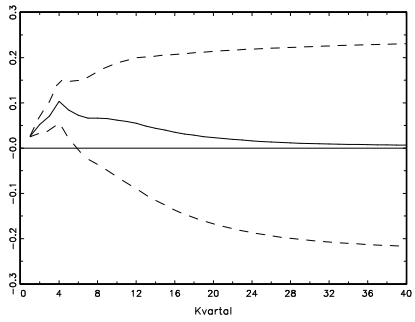
(d) Effect on C from G



(e) Effect on U from T



(f) Effect on U from G



Note: Dashed lines shows confidence intervals computed using a bootstrap method with 1000 trials.

measures the effects of the budget consolidation on the variables in the model. Figure 2 shows how GDP, private consumption and unemployment responded to the budget consolidation. Confidence bands are constructed in the same way as above using bootstraps

with 1000 trials.

The dynamic effects on the three variables represent the implied response of these variables to the budget consolidation. They allow us therefore to compare and distinguish between those effects that fiscal policy has during normal times and those effects emanating from the budget consolidation. Note also that the impulse responses in Figure 1 and those from the dummy variable in Figure 2 are fundamentally different. The impulse responses shown in Figure 1 reports how the three variables react to a standardized structural shock. These are compared to the effects of the budget consolidation, i.e., the effects of a unit shock to the dummy variable. It is not possible to transform the impulse responses in Figure 1 so that a direct comparison of the sizes of the effects can be compared. Therefore we only compare the sign and shapes of the impulse responses reported in Figure 1 with those we find in Figure 2. It is also worth noting that the long–run effects of a unit shock to the dummy variable is different from zero. The reason for this is that we estimate the model in first differences but measures the effects on the level. Therefore it is not possible to give an economic interpretation of the long–run effects

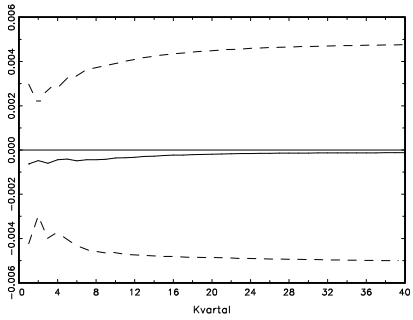
We find in the upper two graphs that the budget consolidation had a negative impact on GDP and private consumption. However, these negative effects are not statistically significant at conventional levels. The interpretation is that the budget consolidation had no significant effect on the macroeconomic development except those that we report in Figure 1. The same conclusion holds for unemployment, the point estimates are positive indicating higher unemployment during the consolidation period but the impulse responses are not statistically significant. Our conclusion, based on this empirical evidence is that we cannot identify any specific effects of the Swedish budget consolidation. Thus, there are no empirical results supporting the hypothesis of reverse effects of fiscal policy during bad times.

Another way to illustrate the (un)importance of the budget consolidation and therefore also potential differences between normal and non–normal times is to compute forecasts of GDP and private consumption based on our model and the estimated structural shocks. Our VAR model allows us to refine the effects of each structural shock including the dummy variable representing the budget consolidation, i.e., we can compute forecasts for, for example, GDP under the assumption that only one structural shock affects the variable. This historical decomposition allows us to compare and evaluate the importance of the budget consolidation in relation to the structural shocks affecting the economy during the consolidation period.

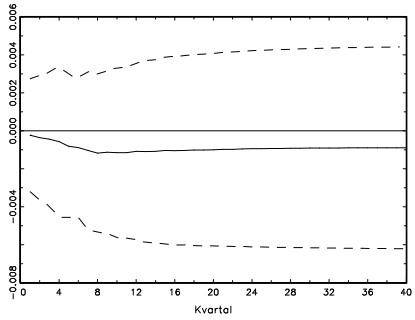
Figure 3 shows forecasts of GDP and private consumption when using all available information up to the third quarter of 1993. From this point on we use our model to compute forecasts of these two variables conditional on actual values of the exogenous

Figure 2: Impulse responses of GDP (Y), private consumption (C) and unemployment (U) to the Swedish budget consolidation 1994:4–1997:4.

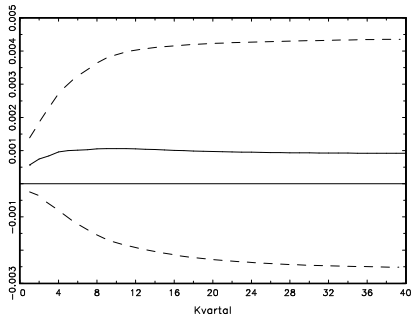
(a) Effect on Y



(b) Effect on C



(c) Effect on U



Note: Dashed lines shows confidence intervals computed using a bootstrap method with 1000 trials.

variable, i.e., the output gap for G7–countries. We compute these forecasts until the fourth quarter of 2000. The solid line shows actual GDP and private consumption, respectively. The long dashed curve shows forecasts when using the VAR model including the dummy variable are shown (base projection including dummy) but excluding the accumulated effects of the structural shocks. The forecasts without the dummy variable are shown using the dotted curve.

In the graph on the left hand side, Figure 3(a), we show the forecasts of GDP. The graph clearly shows that the base projection including the dummy variable does a poor job forecasting the actual behavior of GDP. We also note that the dummy variable is relatively important, the growth rate of GDP implied by the base projection when also including the dummy variable is close to the actual growth rate. On the other hand, our results also show that the base projection together with structural shocks to government consumption produce forecasts very similar and close to those forecasts we find when using the base

projection plus the dummy. The dummy variable and structural shocks to government consumption seem to be equally important when forecasting actual GDP. These results can be compared to forecasts using the base projection and structural shocks to taxes during the consolidation period. As is evident in Figure 3(a), the forecasts using the base projection and structural shocks to taxes do a good job in tracking actual GDP. Tax shocks seem to be very important when explaining actual behavior of GDP. This result is also consistent with the impulse responses shown in Figure 1 above. In Table 2 we showed that government outlays as a share of GDP fell during the consolidation period whereas government revenue as a share of GDP was almost constant. Tax shocks should then be more important than shocks to government consumption which is illustrated in Figure 1. The other three shocks that we have in the system only have marginal importance for GDP.

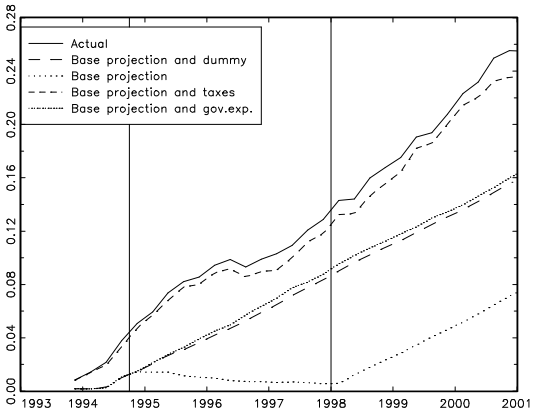
The historical decompositions of private consumption shown in Figur 3(b) are fully consistent with the results for GDP. The dummy variable representing the budget consolidation only has marginal influence comparable to the effects of structural shocks to government consumption. Tax shocks are very important. When adding only tax shocks to the base projection, the model tends to overvalue the development of actual private consumption. Disregarding all other structural shocks during the period, private consumption should have been higher during the consolidation period. At the same time we note that Figure 3(b) shows that the development of private consumption is underrated during the latter part of the consolidation period. Negative shocks to government consumption counteract the positive effects from structural tax shocks but together these two structural shocks explain the main part of actual consumption during the consolidation period. The other three shocks are relatively unimportant.

5 Conclusions

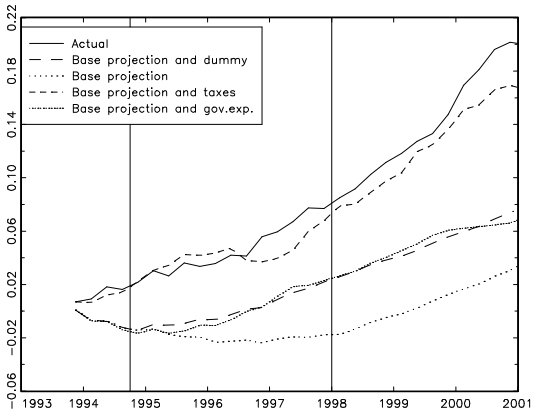
This paper examines the macroeconomic effects of the Swedish budget consolidation that was implemented 1994–1997. In particular, we focus on the hypothesis that a major budget consolidation can have reverse effects, i.e., we test the expansionary fiscal contraction hypothesis. We find no empirical support for this hypothesis. Contractionary fiscal policy has the standard contractionary effects on GDP and private consumption and we find no specific macroeconomic effects of the Swedish budget consolidation. Our results are surprising given earlier cross–country studies and the few event studies that exist in the literature. Furthermore, it is surprising that a major budget consolidation where the total range of measures account for around 7.5 percent of GDP did not have any distinguishable effects other than the standard ones. The very large budget deficits turned during a very

Figure 3: Historical decomposition of GDP and private consumption during and after the budget consolidation.

(a) GDP



(b) Private consumption



short time period to surpluses. In the public debate it has always been argued that the consolidation was extremely successful. Judging from the apparent structural change in the government expenditures, it is fair to say that the consolidation was successful. At the same time it is important to remember that taxes were raised and that government revenue as a share was held almost constant during a period when GDP growth was low, actually lower than in the last quarters preceding the budget consolidation.

One possible reason for our failure to find reverse effects could be that taxes were not affected significantly. The main effect of the budget consolidation was to cut government spending. It is possible that households did not expect lower future taxes even though expenditures had been reduced permanently. If that was the case, permanent income remained fairly constant and therefore also private consumption. It is also noteworthy that government revenue as a share of GDP increased after the consolidation period even though output growth increased. An interesting question is if Swedish households expected this or not. One new tax was introduced as part of the consolidation program, the so called extra tax on high income earners ("värnskatten"), with the mutual understanding among politicians that this tax should be removed as son as the consolidation was finished.[13] This tax still exists. This also illustrates that temporary fiscal policy measures tend to become permanent. One possible interpretation is that households expected that this extra tax as well as other tax increases would remain even after the consolidation. Moreover,

[13]The extra tax on high income was introduced in 1995 and removed in 1999. At the same time a new extra tax was introduced on high income earners.

households may have viewed the reductions of government outlays as temporary and that outlays would return to its pre–crisis level after the consolidation. In such a case, they would not revise their expectations about future disposable income. Alternatively, if most households are liquidity constrained then a budget consolidation should have the standard contractionary effects. The actual development of government outlays and revenue during the last 10 years support this interpretation, both government outlays and revenues as shares of GDP are around 50 percent, i.e., on levels comparable to those in the pre–crisis period.

Another possible explanation to our failure of finding reverse effects may be that the economy already had started to recover when the newly elected government decided to implement the consolidation. Looking more closely at the macroeconomic development the year before the consolidation was implemented we note that economic growth had increased and that the budget deficit as well as the primary balance had improved significantly. As soon as the consolidation had been implemented, output growth fell and unemployment increased. Furthermore, the government had already started implementing a more restrictive fiscal policy. It may be that the actual consolidation was not properly composed, too extensive and not well–timed. These questions are left for future research.

What are the lessons for the current situation in many EU countries? From theory and empirical work we know that fiscal policy may have reversed effects under certain circumstances. However, the literature have not found compelling evidence suggesting particular compositions of fiscal policy measures that trigger these reverse effects. For example, it is typically the case that successful budget consolidations also include tax increases. If these tax increases are only temporary, theory would tell us that permanent income may not be significantly affected. If they are permanent, as in the Swedish case, households would respond by reducing private consumption and there will be no reverse effects. One reason why governments also raise taxes during budget consolidations may be that they need to balance expenditure cuts with raised taxes in order to get acceptance from the voters (and coalition partners). The empirical finding that higher taxes are found to be a significant factor explaining successful budget consolidations may be a coincidence and should therefore not be used as a policy recommendation. Experience and empirical evidence have shown that credible budget consolidations where government outlays are cut may have reverse effects but government should not expect and count on such effects. It is likely that the consolidations in Greece and in Ireland will have contractionary effects. Whether the long–run effects will be positive remains to be seen in the future.

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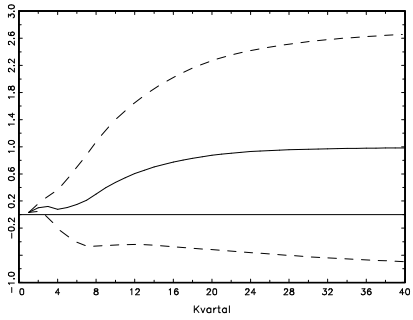
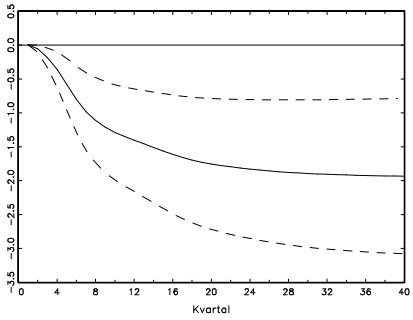
Appendix A: Impulse responses of taxes and government consumption to restrictive fiscal policy.

Figure C.1: Impulse responses of taxes (T) and government consumption (G) to a positive shock to taxes (T) and negative shocks to government consumption (G).

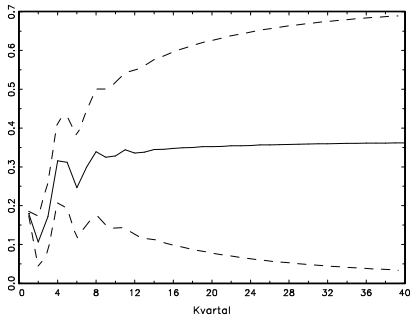
(a) Effect of T from T



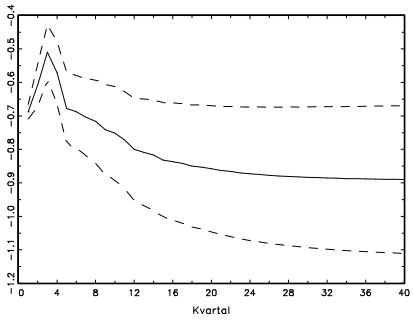
(b) Effect of T from G



(c) Effect of G from T



(d) Effect of G from G



Note: Dashed lines indicate confidence intervals constructed using boot straps with 1000 trials.