The Effects of Social Spending on Economic Activity: Empirical Evidence from a Panel of OECD Countries

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Abstract

The aim of this paper is to assess the short term effects of social spending on economic activity. Using a panel of OECD countries from 1980 to 2005, the results show that social spending has expansionary effects on GDP. In particular, we find that an increase of 1% of social spending increases GDP by about 0.1 percentage point, which, given the share of social spending to GDP, corresponds to a multiplier of about 0.6. The effect is similar to the one of total government spending, and it is larger in periods of severe downturns. Among spending subcategories, social spending in Health and Unemployment benefits have the greatest effects. Social spending also positively affects private consumption while it has negligible effects on investment. The empirical results are economically and statistically significant, and robust.

Keywords: Fiscal Policy, Social Spending, Economic Activity.
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1. Introduction

The recent revival of interest in fiscal policy issues has revived interest among researchers in verifying and understanding the linkages between fiscal policies and economic activity. Over the past two decades, a substantial amount of empirical research has been directed towards estimating the effect of fiscal policy on output and the existence of *crowding-out* (negative) versus *crowding-in* (positive) effects on private consumption and investment. While most of this research has focused on aggregate spending, several empirical studies have tried to identify the components of public expenditure that have the largest effects on economic activity. Among these components of public expenditure, social spending has been almost ignored by this stream of the literature[1]. In contrast, previous works have analyzed social spending in the context of income inequality and poverty reduction (OECD 2005, OECD 2008), and most recently in the context of automatic stabilizers (Darby and Melitz, 2008; Furceri, 2010).

From a theoretical point of view there are several channels through which social spending is likely to affect output in the short term. First, an increase in social spending will increase demand by rising public consumption. Second, since a number of social policies target low-income individuals and credit constrained agents, an increase in social spending is likely to affect positively private consumption. Third, some measures of social spending, such as active labour market polices, may affect output by increasing employment. Fourth, social spending in health may affect investment by rising human capital and, to the extent that private and public investments in the health sector are complementary, by providing medical capital goods. Fifth, an increase in social spending may be also associated with distortionary policy actions (such as early retirement incentives and invalidity benefits) which may have negative effects on output (via reduced labour force participation) both in the short and in the medium term.

[1]See Arjona et al. (2002) for a review of works on the effect of social spending on economic growth.

The aim of this paper is to fill the existing gap in the literature and to provide estimates of the short term impact of social spending on economic activity.

From a technical point of view, a common problem in previous studies that assessed the impact of government spending on economic activity in a panel framework is the identification of exogenous shocks. To address this issue, we estimate for each country a fiscal policy reaction function and use the residuals of this regression as exogenous social spending shocks[2]. These exogenous shocks are then used as independent variables in a dynamic growth panel equation.

We also estimate the impact of government spending in nine different social policy areas: i) Old age, ii) Survivors, iii) Incapacity related, iv) Health, v) Family, vi) Active labor market programme, vii) Unemployment benefits, viii) Housing, and ix) Other policy areas.

The results suggest that social spending has a significant short term effect on output. In particular, we found that an increase of 1% of social spending increases GDP by about 0.1 percentage point after one year, which, given the share of social spending to GDP, corresponds to a multiplier of about 0.6. The multiplier is only slightly larger than the one obtained using the same empirical approach for total government spending. While, one could expect a significant higher multiplier for social spending, the results suggest no significant difference. The reason is to be found in the large heterogeneity in the components of social spending and their effects on output. In particular, among the nine different policies are considered only Health, Unemployment benefits and Survivors have a statistically significant effect.

[2] A similar approach has been used by Fatás and Mihov (2003, 2006) to assess the effect of the volatility of fiscal policy shock on long-term growth, by Afonso et al. (2010) to assess the determinants of discretionary spending and revenue volatility, and more recently by Corsetti and Mueller (2010) to examine the effects of government spending on output during periods of crises.

We also find that the effect of social spending on output is larger in periods of severe downturns, while is similar between countries with low and high debt-to-GDP ratios, and between countries with large and small levels of trade openness.

Finally, we also test the existence of crowding-out (negative) versus crowding-in (positive) effects on consumption and investment. The results suggest that while social spending has a positive and significant impact on consumption, it has negligible and insignificant effects on private investment.

The rest of the paper is organized as follows. The next section presents the data and descriptive statistics regarding social spending in the OECD countries. Section three discusses the empirical methodology used to assess the impact of social spending on economic activity. Finally, the last section concludes with the main summary.

2. Data

Data are taken from the OECD databases. Data for income variables are retrieved from the OECD National Accounts dataset while data for social spending are taken from the OECD Social and Welfare statistics. The availability of social spending variables shortens the estimation period from 1980 to 2005 (See Annex 1 for data availability).

Total social spending contributes to a significant share of government expenditure and of GDP. On average, about 46 percent (21) of total government spending (GDP) is represented by social spending (Table 1).

Among the different policy areas in which social spending is allocated, Old Age and Health are by far the largest components of social expenditure. In particular, on average, Old Age and Health represent respectively the 14.5 and 12.5 percent of total government spending. Interestingly, the third largest category is Incapacity Related spending, while spending in

Unemployment benefits, Active Labor Market Programme and Housing are much smaller. Family related spending has also a significant share.

Total social spending differs considerably among countries (Figure 1). In particular, while in some countries (such as Austria, Belgium, Denmark, Finland, France, Germany, Italy, and Sweden) social spending is systematically above the average (about 21 percent of GDP), in other countries (such as Australia, Canada, Korea, Ireland, Iceland, Mexico and the United States) it is systematically below.

In contrast, there are no large differences across countries over time. In fact, for most of the countries in the sample (exceptions are represented by the Netherlands, New Zealand and the Slovak Republic) social spending (as share of GDP) shows an upward trend.

3. Empirical Methodology

To assess the impact of public spending and revenue on output a standard approach (initiated by Romer and Romer, 1989) is to estimate a dynamic growth equation and derive impulse response functions from the estimated coefficients. Analogously, a way to estimate the impact of social spending and its subcategories on output is to estimate a dynamic growth equation of the following form:

$$\Delta y_{it} = a_i + b_t + \sum_{j=0}^{3} \delta_j \Delta s_{i,t-j} + \boldsymbol{\gamma' X_{it}} + \varepsilon_{it} \quad (1)$$

and to derive the corresponding impulse response functions from the estimated δ_j. Where *y* is the log of output, *s* is the log of total social spending (or its sub-categories), a_i country-fixed effects and b_t time-fixed effects. *X* is a vector of control variables which can affect growth in the short term, such as the log of openness, population growth and investment as share of GDP.

Equation (1) can also be modified to correct for possible autocorrelation as:

$$\Delta y_{it} = a_i + b_t + \sum_{j=1}^{3} \beta_j \Delta y_{i,t-j} + \sum_{j=0}^{3} \delta_j \Delta s_{i,t-j} + \boldsymbol{\gamma' X_{it}} + \varepsilon_{it} \quad (2)$$

However, a standard problem with equation (1) and (2) is that the OLS estimates of δ_j can be biased due to reverse causality, or endogeneity, as an increase in the GDP may affect social spending via automatic stabilizers or by inducing policy makers to set a contractionary stance. Reverse causation takes the form of:

$$\Delta s_{it} = \theta \Delta y_{it} + \epsilon_{it} \tag{3}$$

As suggested by a growing literature in health and labor economics[3], several categories of social spending may respond to the economic cycle and work as automatic stabilizers. For example, pension related spending may increase during downturns since firms may provide incentives to workers to early retirement; health spending may increase during recessions due to the fact that a higher number of people are usually found to report illness[4]. The cyclicality of social spending has been thoroughly analyzed by Darby and Melitz (2008), which, estimating *fiscal reaction functions* for nine categories of social spending find that several components of social spending (such as Unemployment benefits, Health, Retirement and Incapacity related spending) are counter-cyclical.

Based on this evidence it is likely that $\theta < 0$. Assuming positive values for δ_j, equation (2) and (3) produce opposite signs in the correlation of social spending and growth which implies that the simple OLS estimate of δ_j are likely to be biased downward. In other words, the OLS estimates of equation (1) may suggest concluding the absence of any significant effect of social spending on output even if theoretically the effect is present and positive. To deal with this endogeneity issue we try to identify government spending shocks by estimating a policy rule for social spending. A similar approach has been used by Fatás and Mihov (2003,2006) to assess the

[3] See, for example, Black et al. (2002); Boone and van Ours (2002) Autor and Duggan (2003); Beatty et al. (2000); Coile and Levine (2006); Holmulund (2004); Johansson et al. (2006); Ruhm (2006); Ruhm and Black (2002); and TapiaGranados (2005).

[4] At the same time, health spending may increase during booms since as the pace of work is greater, there may be more work accidents, especially in dangerous industries.

effect of the volatility of fiscal policy shocks on long-term growth, by Afonso et al. (2010) to assess the determinants of spending volatility, and more recently by Corsetti and Mueller (2010) to examine the effects of government spending on output during periods of crises. In particular, the approach we consider is to estimate for each country the following fiscal reaction function:

$$\Delta s_t = a \quad + Trend_t + \sum_{j=1}^{2} \alpha_j \Delta s_{t-j} + \sum_{j=0}^{2} \theta_j \Delta y_{t-j} + \boldsymbol{\varphi' Z_t} + \epsilon_t \tag{4}$$

where Z is a set of control variables including the initial level of the debt-to-GDP ratio, election dummies and the initial level of the ratio of total social spending to GDP. The residuals of the regression obtained for each country, $\widehat{\epsilon_t}$, are then used in the second-step to estimate the short term impact of social spending on output:

$$\Delta y_{it} = a_i + b_t + \sum_{j=1}^{3} \beta_j \Delta y_{i,t-j} + \sum_{j=0}^{3} \delta_j \hat{\epsilon}_{i,t-j} + \boldsymbol{\gamma' X_{it}} + \varepsilon_{it} \tag{5}$$

To address the fact that social spending shocks are estimates (unobserved), we make use of the *sandwich* estimator of the estimated covariance matrix of the second-step (Hardin, 2002), which has also the advantage to correct for heteroskedasticity.[5]

Finally, in order to assess whether social spending produces short term crowding-out versus crowding-in effects we re-estimate equation (5) for consumption growth (Δc):

$$\Delta c_{it} = a_i + b_t + \sum_{j=1}^{3} \beta_j \Delta c_{i,t-j} + \sum_{j=0}^{3} \delta_j \hat{\epsilon}_{i,t-j} + \boldsymbol{\gamma' X_{it}} + \varepsilon_{it} \tag{6}$$

and investment growth (Δi):

$$\Delta i_{it} = a_i + b_t + \sum_{j=1}^{3} \beta_j \Delta i_{i,t-j} + \sum_{j=0}^{3} \delta_j \hat{\epsilon}_{i,t-j} + \boldsymbol{\gamma' X_{it}} + \varepsilon_{it} \tag{7}$$

[5] As pointed out by Murphy and Topel (1985) in their seminal paper, a problem in using unobserved (estimated) regressors is that inferential analysis based on unadjusted standard errors fails to account for the fact that imputed regressors are measured with sampling errors. As a consequence, hypothesis tests based on the estimated covariance matrix of the second-step estimator are biased, even in large sample. In addition, since the regressors are estimated separately for each country it is likely that the error term of the second-step regression may be heteroskedastic.

4. Results

4.1 *Social Spending on Economic Activity*

We start our empirical analysis by estimating the effect of an increase in social spending on output as described in equation (1). The results of the estimation are reported in the first column of Table 2[6]. Looking at the results it seems that social spending has no effect on output. This finding is confirmed also when the lagged values of the GDP growth rate are included in the analysis (column 2). However, as discussed in the previous section, the reverse causation between growth and social spending produces a downward bias in the estimates which brings the effect toward zero. Indeed, once we control for this, by using as independent variable the estimated social spending shocks in equation (4)[7], the effect of social spending turns out to be positive and statistically significant (third and fourth column of Table 2, and Figure 2)[8]. Given that in equation (4) we control for the trend in social spending, the results also imply that while an exogenous shock has a significant impact a steady increase in social spending will not increase economic activity.[9]

In particular, a 1% increase in social spending increases output by 0.12 percent in the short term and by about 0.25 after three years. Given that we control in equation (4) for the initial level of the debt-to-GDP ratio, the increase in social spending has to be interpreted as social spending shock which leaves the debt-to-GDP ratio unchanged.

[6] The coefficients of the controls variables included in the estimation are statistically significant and with the expected signs.

[7] The results of the first stage estimation suggest that in general social spending is counter-cyclical in most of the countries. Countries with higher public debt and with a higher initial level of the ratio of total social spending to GDP are characterized by a lower social spending growth. The results are available from the authors upon request.

[8] The number of observations is significantly reduced due to the short series of the debt-to-GDP ratio for several countries. This also determines an unbalanced panel. To check for robustness of the results we have also replicated the estimates including only those countries for which the debt series goes back until 1980. The results are extremely robust both in terms of magnitude of the coefficients and the total effect.

[9] We would like to thank an anonymous referee for suggesting this interpretation.

The estimated effect is unaffected by the inclusion of the lagged value of GDP growth. In terms of multiplier effects, the estimates imply that an increase of social spending of 1 percent of GDP increases output by 0.57 percentage point[10].

Given the absence of previous empirical studies focusing on social spending we do not have a benchmark of comparison for our estimates. For this purpose, we replicate our analysis using total government spending. The results obtained using the latter are similar to those obtained using social spending (Table 3). In particular, the results in the third and fourth column of Table 3 suggest that a 1% increase in total government spending increases output by about 0.22 percent after one year, which corresponds to a short term multiplier of about 0.51.

Overall, the results are in line with the range of short term multipliers' estimates of total government spending presented in previous empirical studies. In particular, they are consistent with estimates from structural vector autoregressive (SVAR) models, from large multinational macro models (Henry et al., 2008) and from DSGE models (Coenen et al., 2010).

4.1.1 Asymmetric Effects

The effect of social spending on economic activity may also differ between different phases of economic cycles (Perotti, 1999, 2004). In fact, during downturns the share of agents that are liquidity constrained tends to increase, reducing therefore the contraction in aggregate private consumption due to Ricardian motives, and therefore magnifying the effect of spending shocks. To examine the existence of this asymmetric effect we estimate the following equation:

$$\Delta y_{it} = a_i + b_t + \sum_{j=1}^{3} \beta_j \Delta y_{i,t-j} + \sum_{j=0}^{3} \delta_j \hat{\epsilon}_{i,t-j} 0^{+} + \sum_{j=0}^{3} \delta_j \hat{\epsilon}_{i,t-j} 0^{-} + \boldsymbol{\gamma' X_{it}} + \varepsilon_{it} \qquad (8)$$

where 0^{+} (0^{-}) is a dummy variable that takes the value equal to 1 when the output gap[11] is greater (lower) than zero, and zero otherwise. The first column of Table 4 summarizes the results and

[10]The multiplier effect is computed by multiplying the estimated elasticity by the inverse of the share of social spending to GDP: 0.12*(Y/S) =0.12*4.76=0.57.

shows that the effect of social spending on output does not vary according to different phases of the economic cycle. However, while the effect is similar during upturns and downturns, it may still vary between periods of normal times and severe downturns. Indeed, it is possible to argue that asymmetries in the effect of fiscal policy may arise only during severe shocks, in which the share of agents that are liquidity constrained increases more markedly. To test for this hypothesis we re-estimate equation 6, assuming 0^+ (0^-) to take the value equal to 1 when the GDP growth rate is greater (lower) than -1%, and zero otherwise. The results reported in the second column of Table 3 indicate the presence of asymmetric effects and suggest that social spending has larger effects during severe downturns (mostly after 2 and 3 years of the initial social spending sock).[12]

Another source of asymmetry can arise from the level of public debt (Blanchard, 1990, Sutherlands, 1995). In particular, if the debt-to-GDP ratio is high agents can expect future consolidation measures and therefore reduce current consumption in response to an increase in government spending. To test for this hypothesis we re-estimate equation (6) by constructing 0^+ (0^-) as a dummy variable that takes the value equal to 1 when the debt-to-GDP ratio is above (below) 60% and zero otherwise. The results are reported in the third column of Table 4 and suggest that the effect of social spending on output is not statistically different between countries with high and low public debt.

Finally, another source of asymmetry that we test is related to trade openness. In fact, form a theoretical point of view is possible to expect that the effectiveness of a spending shock is larger in more closed economies. To test this hypothesis we classify the countries in the sample in two groups based on their level of trade openness. In particular, 0^+ (0^-) takes the value equal to 1

[11] Data for output gap are taken from the OECD Economic Outlook database, where potential output is derived from a production function approach (Beffy *et al.*, 2006).

[12] The results are robust to different threshold levels (-2%, -3%, -4%) and are available from the authors upon request.

when the share of exports and imports over GDP is greater (lower) than 75%[13], and zero otherwise. The last column of Table 4 summarizes the results and show that the effect of government spending is not statistically different between relatively more closed and open economies.

4.2 *Categories of Social Spending*

In this section we investigate which component of social spending contributes more to the positive effect on output. To this purpose, for each of the categories of social spending presented in Section 2 we construct a measure of exogenous shocks. This measure is then used to estimate equation (6). Given the robustness of the results to the inclusion of past values of the GDP growth rates in the specification, we report the results for the regression without the lags of the dependent variable. This has the advantage to avoid endogeneity problems due to the inclusion of the lagged dependent variable in a panel framework[14]. The results for each of the sub-categories of social spending are presented in Table 5. Looking at the result we can notice that the categories for which there is a significant effect on output are Health and Unemployment benefits, and to a lesser extent Survivors (Figure 3). In particular, Health has a significant impact up to three years after the initial shock. However, while in terms of elasticities Health spending is the most efficient one, in terms of multipliers effect Unemployment benefits is the social spending category that produces the largest effect on output. In particular, the short term multipliers associated to

[13] This number corresponds to the average of openness in our sample. As an additional test we have also estimated a specification in which openness enters as an interaction term with social spending growth in equation (5). The results still point to the absence of asymmetric effects.

[14] The results are still robust to the inclusion of the lags of GDP growth.

Health and Unemployment benefits are 0.9 and 2.1, respectively. In other words, an increase of 1 percent of GDP in Health (Unemployment benefits) spending increases output by 0.9 (2.1)[15].

These results confirm and complement the evidence of Darby and Melitz (2008) and Furceri (2010) which suggest that Health and Unemployment benefits are those categories of social spending which provide more insurance against idiosyncratic shocks.

4.3 Crowding in versus Crowding-out Effects?

From a theoretical point of view there is no consensus on the effect of spending shocks on consumption and investment. The standard Real Business Cycle (RBC) model predicts a decline in private consumption in response to a rise in government spending (Aiyagari et al., 1990; Baxter and King, 1993; Christiano and Eichenbaum, 1992; and Fatás and Mihov, 2001), while the standard IS-LM model predicts that consumption should rise in response to a positive government spending shock (Blanchard, 2003). Similarly to consumption, the two theories also predict different outcomes for investment. The standard RBC model claims that an increase of government consumption will have a positive effect on investment while the standard IS-LM model predicts that investment should decline in response to a positive government spending shock. From an empirical point of view the evidence is also non-conclusive[16].

To test whether social spending has crowding-in or crowding-out effects on consumption and investment we estimate equation (6) and (7). Starting with consumption, the results are displayed in the second column of Table 6 and in Figure 4B. Looking both at the table and the figure, it is apparent that social spending has a positive short term impact on consumption. In particular, a 1% increase in total spending increases private consumption by 0.35 percent in the

[15] The multiplier effects are computed by multiplying the estimated elasticity by the inverse of the share of Health and Unemployment benefits over GDP.
[16] See Furceri and Sousa (2009) for a review of the empirical works on this issue.

three years after the initial spending shock. Among the categories of social spending, Health, Unemployment benefits and Survivors are those that have statistically significant effects (Table 7 and Figure 5) and among these three categories, Unemployment benefits are those associated with the largest multiplier. This is consistent with the idea that Unemployment benefits are targeted measures to liquidity constrained agents, for which the increase in consumption is expected to be the largest.

In contrast, the effect of social spending (considered as a whole) on investment is not statistically significant (Table 6 and Figure 4C). Among its sub-categories, the only component that produces a strong statistically significant effect is Health spending (Table 8 and Figure 6). This result is in line with Wang, (2005) which find that health spending has positive short term effects on private investment. Unemployment benefits and Survivors are also found to affect investment but only at a significance level of 10%. Despite the significant effect of these three categories, the fact that total social spending is not statistically significant seems to be driven by the large negative effect of Old Age which accounts for a large part of total spending.

5. Conclusions

This paper analyzes the short term impact of social spending on economic activity for a panel of OECD countries from 1980 to 2005. To this purpose we use a two-step approach. In the first step we construct a measure of exogenous social spending shock, by regressing for each country a policy rule in which the growth rate of social spending is regressed against its lagged values, the current and past growth rate of GDP, the initial level of debt, the share of social spending over GDP and election dummies. The residuals of this regression are then considered as exogenous social spending shocks. In the second step, we assess the effect of these shocks on economic activity.

The results suggest that social spending has a significant short term effect on output, especially during downturns. In particular, we found that an increase of 1% of social spending increases GDP by about 0.1 percentage point after one year, which, given the share of social spending to GDP, corresponds to a multiplier of about 0.6. Given the absence of previous empirical studies focusing on social spending we do not have a benchmark of comparison for our estimates. For this purpose, we replicated our analysis using total government spending. The results obtained using the latter suggest that a 1% increase in total government spending increases output by about 0.22 percent after one year, which corresponds to a short term multiplier of about 0.51. While, one could expect a significant higher multiplier for social spending, the results suggest no significant difference. The reason is to be found in the large heterogeneity in the components of social spending and their effects on output.

Social spending is classified in nine policy areas: i) Old age, ii) Survivors, iii) Incapacity related, iv) Health, v) Family, vi) Active labor market programme, vii) Unemployment benefits, viii) Housing, and ix) Other policy areas. Among these categories, only social spending devoted to Health, Unemployment and Survivors have a statistically significant effect on economic activity.

Finally, we also test the existence of crowding-out versus crowding-in effects on consumption and investment. The results suggest that while social spending has a positive and significant impact on consumption (mostly determined by Health and Unemployment benefits spending), it has a negligible and insignificant impact on private investment (with spending devoted to Health being the only category with a significant and positive effect).

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Table1.Average Social Spending Shares

	% of Total Expenditure	% of GDP
Total	45.5	21.0
Old Age	14.5	6.8
Survivors	1.4	0.8
Incapacity Related	5.6	2.8
Health	12.5	5.5
Family	4.9	0.7
Active Labor Market Programme	1.5	0.7
Unemployment	2.7	1.3
Housing	0.9	0.4
Other Policy Areas	1.4	0.6

Table 2.The Effects of Social Spending on Ouptut

	Endogenous Shock[a]		*Exogenous Shock*[b]	
$Growth_{t-1}$	-	0.207	-	0.290
		(4.37)***		(1.75)*
$Growth_{t-2}$	-	-0.105	-	-0.132
		(-2.27)**		(-2.33)**
$Growth_{t-3}$	-	-0.020	-	-0.080
		(-0.48)		(-1.20)
Log $Openness_t$	0.785	0.822	3.953	3.288
	(2.15)**	(3.82)***	(3.27)***	(2.81)***
$(Investment/GDP)_{t-1}$	0.245	0.238	0.181	0.144
	(4.93)***	(4.86)***	(2.94)***	(1.91)*
Population $Growth_t$	-1.517	-58.150	-44.365	-43.554
	(-0.21)	(-2.19)**	(-1.12)	(-1.15)
Social $Spending_t$	0.040	0.056	0.122	0.120
	(0.86)	(2.74)***	(2.01)**	(2.11)**
Social $Spending_{t-1}$	-0.011	-0.290	0.031	0.013
	(-0.38)	(-1.42)	(0.54)	(0.24)
Social $Spending_{t-2}$	-0.012	-0.001	-0.012	-0.01
	(-0.48)	(-0.03)	(-0.19)	(-0.20)
Social $Spending_{t-3}$	-0.009	-0.006	0.100	0.107
	(-0.37)	(-0.34)	(1.50)	(1.70)*
Total Effect	0.008	0.020	0.241	0.264
	(0.04)	(0.77)	(2.36)**	(2.34)**
N	548	545	345	345
R^2	0.42	0.45	0.53	0.58

[a] Growth rate of government social spending.
[b] Computed as residual of equation (4).
***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

Table 3.The Effects of Social Spending vs Total Government Spending

	Social Spending[a]		*Total Government Spending*[a]	
$Growth_{t-1}$	-	0.290	-	0.401
		(1.75)*		(3.34)***
$Growth_{t-2}$	-	-0.132	-	-0.122
		(-2.33)**		(-1.89)*
$Growth_{t-3}$	-	-0.080	-	-0.019
		(-1.20)		(-0.33)
Log $Openness_t$	3.953	3.288	1.788	1.076
	(3.27)***	(2.81)***	(1.83)*	(1.14)
$(Investment/GDP)_{t-1}$	0.181	0.144	0.188	0.104
	(2.94)***	(1.91)*	(3.25)***	(1.76)*
Population $Growth_t$	-44.365	-43.554	-36.459	-41.488
	(-1.12)	(-1.15)	(-1.01)	(-1.34)
$Spending_t$	0.122	0.120	0.222	0.220
	(2.01)**	(2.11)**	(2.63)***	(2.77)***
$Spending_{t-1}$	0.031	0.013	0.170	0.096
	(0.54)	(0.24)	(1.88)*	(0.24)
$Spending_{t-2}$	-0.012	-0.01	-0.079	-0.112
	(-0.19)	(-0.20)	(-1.02)	(-1.44)
$Spending_{t-3}$	0.100	0.107	0.044	0.115
	(1.50)	(1.70)*	(0.66)	(1.74)*
Total Effect	0.241	0.264	0.356	0.319
	(2.36)**	(2.34)**	(2.22)**	(2.07)**
N	345	345	428	428
R^2	0.53	0.58	0.52	0.58

[a] Computed as residual of equation (4).

***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

Table 4.Asymmetrci Effects over the Cycle

	Cycle	*Normal Times*[a] *vs. Severe Downturns*[b]	*Debt*	*Openness*
Social Spending$_t0^+$	0.083	0.094	0.052	0.123
	(0.99)	(1.62)*	(0.65)	(1.65)*
Social Spending$_{t-1}0^+$	0.114	0.069	0.076	0.125
	(1.22)	(1.11)	(0.88)	(1.49)
Social Spending$_{t-2}0^+$	0.008	-0.054	0.081	-0.039
	(0.07)	(-0.81)	(1.01)	(-0.54)
Social Spending$_{t-3}0^+$	0.054	0.082	0.020	-0.001
	(0.47)	(1.21)	(0.22)	(-0.02)
Total Effect0^+	0.259	0.191	0.229	0.208
	(1.44)	(1.86)*	(1.67)*	(1.53)
Social Spending$_t0^-$	0.107	0.304	0.152	0.068
	(1.24)	(0.72)	(1.76)*	(0.82)
Social Spending$_{t-1}0^-$	0.014	0.069	0.028	-0.005
	(0.17)	(1.11)	(0.32)	(-0.07)
Social Spending$_{t-2}0^-$	-0.021	1.008	-0.120	0.009
	(-0.29)	(3.75)***	(-1.26)	(0.09)
Social Spending$_{t-3}0^-$	0.124	0.786	0.200	0.174
	(1.57)	(4.70)***	(2.19)	(1.87)*
Total Effect	0.224	2.167	0.260	0.246
	(1.64)*	(2.50)**	(1.84)*	(2.34)**
Difference in total effect(P-value)	0.89	0.02**	0.87	0.84
N	548	545	345	345
R^2	0.42	0.45	0.53	0.58

Note: Control variables included but not reported.

[a] Defined as periods in which the growth rate of GDP >-1%.

[b] Defined as periods in which the growth rate of GDP <-1%.

***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

Table 5. The Effects of Social Spending Categories on Output (Elasticities-%)

	HE	UN	AC	OA	SU	IN	FA	HO	OT
Social Spending$_t$	0.050 (1.75)*	0.028 (3.42)***	0.002 (0.24)	-0.019 (-0.55)	0.012 (0.80)	-0.011 (-0.48)	0.008 (0.71)	-0.001 (-0.18)	0.004 (0.66)
Social Spending$_{t-1}$	0.075 (2.28)**	0.006 (0.73)	-0.007 (-0.47)	0.067 (1.20)	0.016 (1.83)*	0.023 (1.06)	-0.010 (-0.86)	-0.004 (-0.60)	0.008 (1.56)
Social Spending$_{t-2}$	0.035 (1.00)	0.015 (1.80)*	-0.001 (-0.28)	-0.004 (-0.09)	0.009 (0.82)	0.017 (0.81)	-0.003 (-0.26)	-0.010 (-1.61)	0.004 (1.00)
Social Spending$_{t-3}$	0.073 (2.10)**	0.010 (1.19)	-0.004 (-0.28)	-0.042 (-0.68)	0.013 (1.40)	-0.003 (-0.16)	-0.017 (-1.01)	-0.003 (-0.30)	-0.007 (-1.12)
Total Effect	0.233 (2.65)***	0.059 (3.04)***	-0.009 (-0.25)	0.002 (0.01)	0.049 (2.29)**	0.025 (0.52)	-0.022 (-0.69)	-0.018 (-0.94)	0.006 (0.65)
N	360	351	322	352	352	352	354	275	330
R^2	0.54	0.59	0.58	0.54	0.53	0.53	0.53	0.63	0.54

Note: Note: Control variables included but not reported.
HE=Health; UN=Unemployment benefits; AC=Active labor market programmes; OA=Old age; SU=Survivors; IN=Incapacity related; HO=housing; OT=Others.
***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

Table 6.The Effects of Social Spending on Ouptut, Consumption and Investment (%)

	GDP	*Consumption*	*Investment*
Log Openness$_t$	3.953	4.554	11.837
	(3.27)***	(2.63)***	(2.59)***
(Investment/GDP)$_{t-1}$	0.181	0.306	1.129
	(2.94)***	(3.36)***	(4.70)***
Population Growth$_t$	-44.365	-55.882	-322.383
	(-1.12)	(-0.98)	(-2.05)***
Social Spending$_t$	0.122	0.166	0.141
	(2.01)**	(2.08)**	(0.57)
Social Spending$_{t-1}$	-0.31	0.007	-0.110
	(0.54)	(1.26)	(-0.47)
Social Spending$_{t-2}$	-0.012	-0.002	0.105
	(-0.19)	(-0.03)	(0.42)
Social Spending$_{t-3}$	0.100	0.076	0.047
	(1.50)	(1.05)*	(0.21)
Total Effect	0.241	0.346	0.183
	(2.36)**	(2.60)***	(0.49)
N	345	345	345
R^2	0.53	0.39	0.45

***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

Table 7. The Effects of Social Spending Categories on Consumption (Elasticities-%)

	HE	UN	AC	OA	SU	IN	FA	HO	OT
Social	0.074	0.030	0.021	-0.046	0.034	-0.033	0.019	0.008	0.007
$Spending_t$	(1.37)	(2.75)**	(1.54)	(-0.90)	(1.88)*	(-1.05)	(1.33)	(0.98)	(1.04)
Social	0.095	0.029	-0.003	0.117	0.031	-0.003	0.014	-0.016	0.010
$Spending_{t-1}$	(1.70)*	(2.31)**	(-0.15)	(1.52)	(2.38)**	(-0.10)	(0.98)	(-1.78)*	(1.45)
Social	0.009	0.012	0.012	0.003	-0.017	-0.011	0.014	-0.002	-0.004
$Spending_{t-2}$	(0.16)	(1.17)	(0.63)	(0.04)	(-1.21)	(-0.38)	(1.07)	(-0.16)	(-0.71)
Social	0.08	0.013	-0.027	-0.121	0.021	-0.005	-0.023	-0.001	-0.006
$Spending_{t-3}$	(0.15)	(1.23)	(-1.11)	(-1.38)	(1.37)	(-0.18)	(-1.06)	(-0.06)	(-0.79)
Total	0.186	0.078	0.002	-0.048	0.069	-0.052	0.024	-0.010	0.007
Effect	(1.37)*	(3.07)***	(0.03)	(-0.33)	(1.96)**	(-0.79)	(0.61)	(-0.42)	(0.37)
N	360	351	322	352	352	352	354	275	330
R^2	0.39	0.47	0.47	0.42	0.40	0.38	0.39	0.51	0.38

Note: Note: Control variables included but not reported.
HE=Health; UN=Unemployment benefits; AC=Active labor market programmes; OA=Old age; SU=Survivors; IN=Incapacity related; HO=housing; OT=Others.
***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

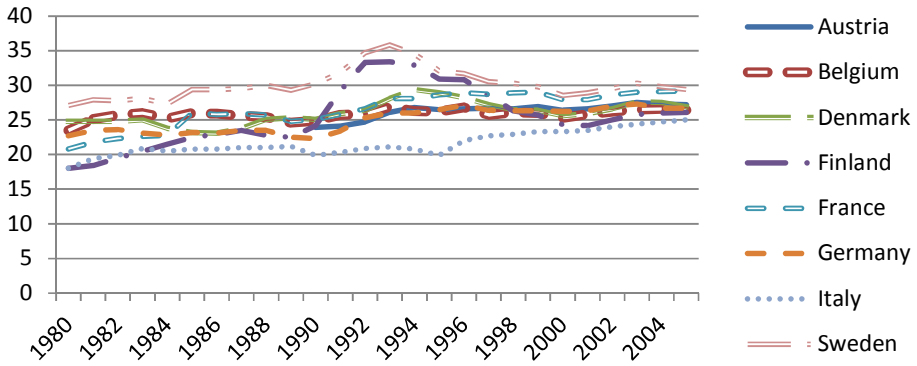
Table 8. The Effects of Social Spending Categories on Investment (Elasticities-%)

	HE	UN	AC	OA	SU	IN	FA	HO	OT
Social	0.121	0.078	0.018	-0.134	0.048	-0.100	-0.01	0.049	-0.000
$Spending_t$	(1.05)	(2.35)**	(0.38)	(-1.04)	(1.15)	(-1.16)	(-0.35)	(1.27)	(-0.02)
Social	0.190	0.002	-0.046	0.113	0.067	0.031	0.19	0.011	0.007
$Spending_{t-1}$	(1.60)	(0.05)	(-0.93)	(0.72)	(2.06)**	(0.37)	(0.48)	(0.90)	(0.42)
Social	0.172	0.042	0.045	-0.016	0.010	0.029	-0.011	-0.031	0.008
$Spending_{t-2}$	(1.43)	(1.37)	(1.17)	(-0.12)	(0.20)	(0.36)	(-0.26)	(-1.18)	(0.54)
Social	0.142	0.021	0.017	-0.111	0.010	-0.013	-0.011	0.040	-0.028
$Spending_{t-3}$	(1.10)	(0.65)	(0.31)	(-0.62)	(0.30)	(-0.15)	(-0.21)	(1.20	(-1.56)
Total	0.626	0.143	0.033	-0.149	0.135	-0.053	-0.016	0.081	0.007
Effect	(2.22)**	(1.91)*	(0.28)	(-0.51)	(1.69)*	(-0.30)	(-0.17)	(1.01)	(0.28)
N	360	351	322	352	352	352	354	275	330
R^2	0.46	0.49	0.47	0.46	0.46	0.45	0.45	0.54	0.46

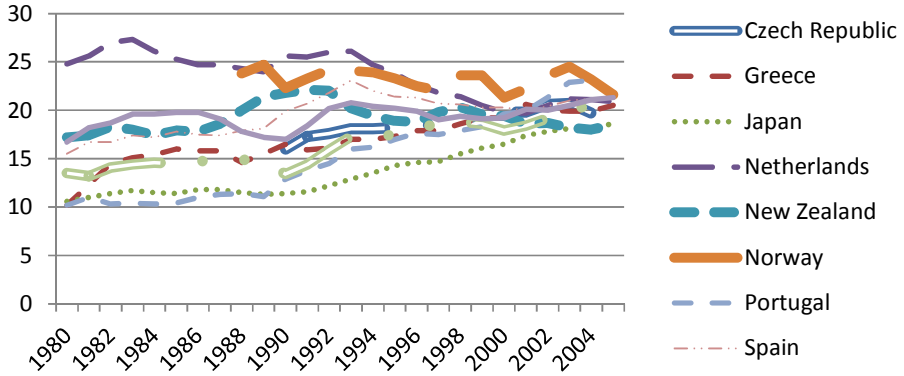
Note: Note: Control variables included but not reported.
HE=Health; UN=Unemployment benefits; AC=Active labor market programmes; OA=Old age; SU=Survivors; IN=Incapacity related; HO=housing; OT=Others.
***, **, *denotes significance at 1%, 5%, 10% respectively. T-statistics in parenthesis (Robust standard errors).

Figure 1. Total Social Spending over time (% GDP)

High-social spending share countries



Average-social spending share countries



Low-social spending share countries

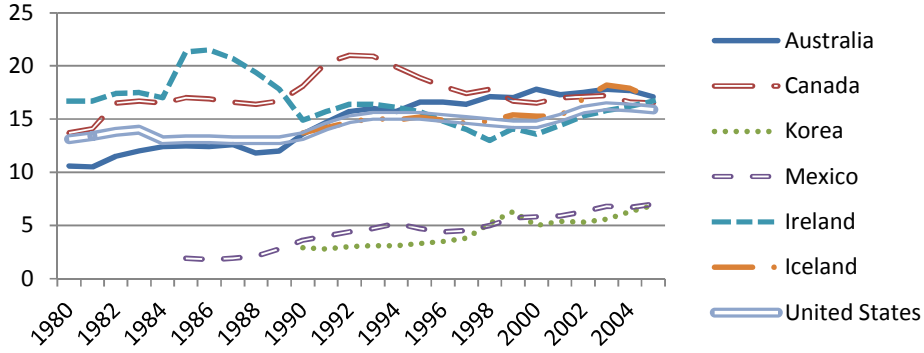
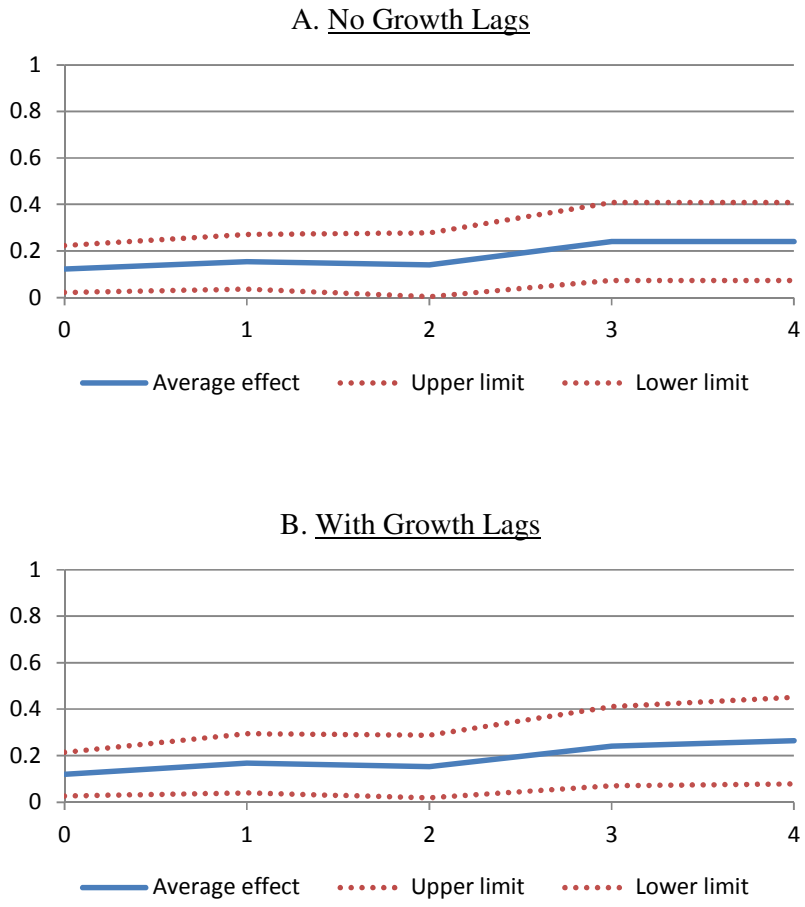
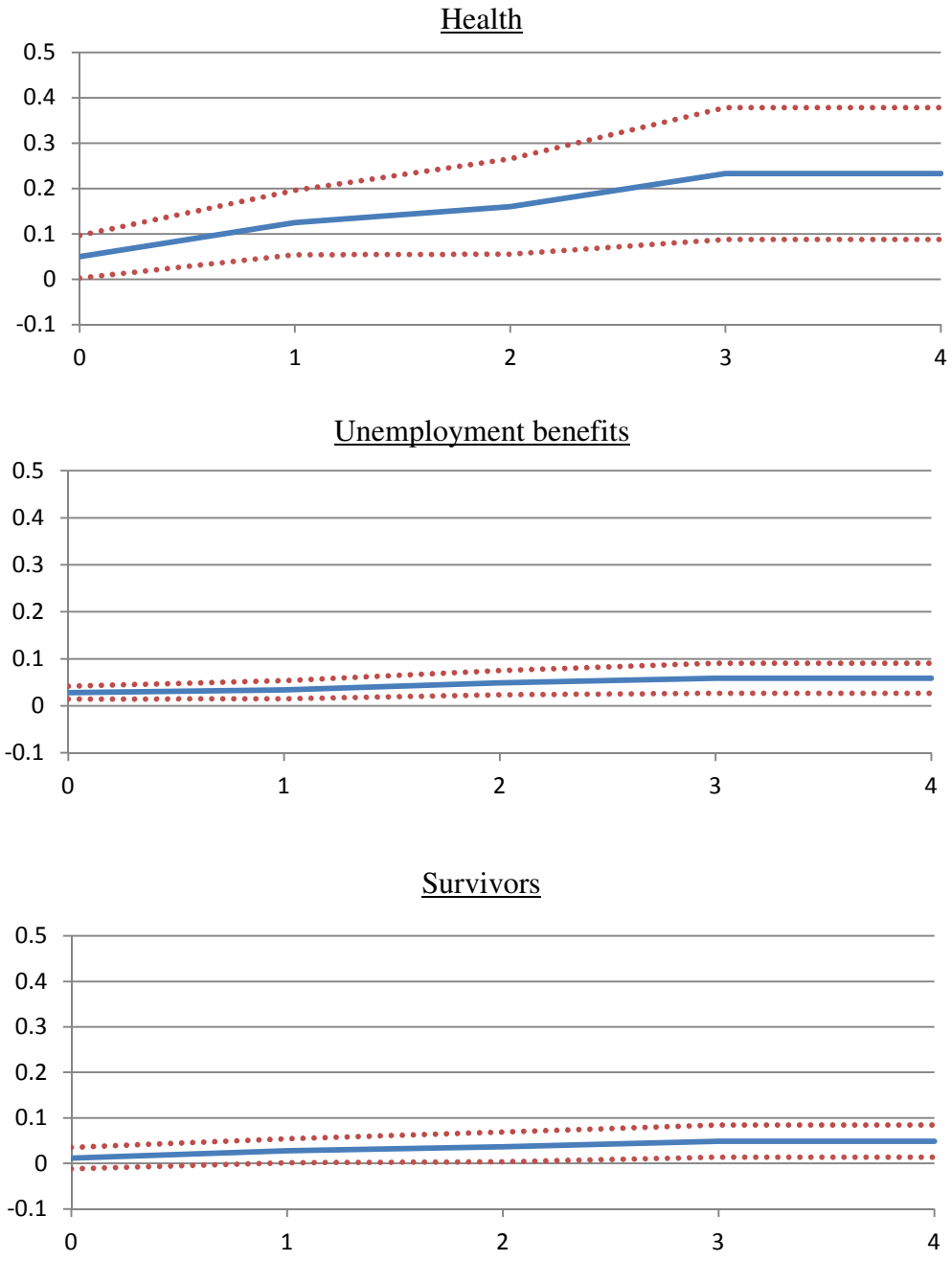


Figure 2. The Effects of an Exogenous Social Spending Shock on Output (%)



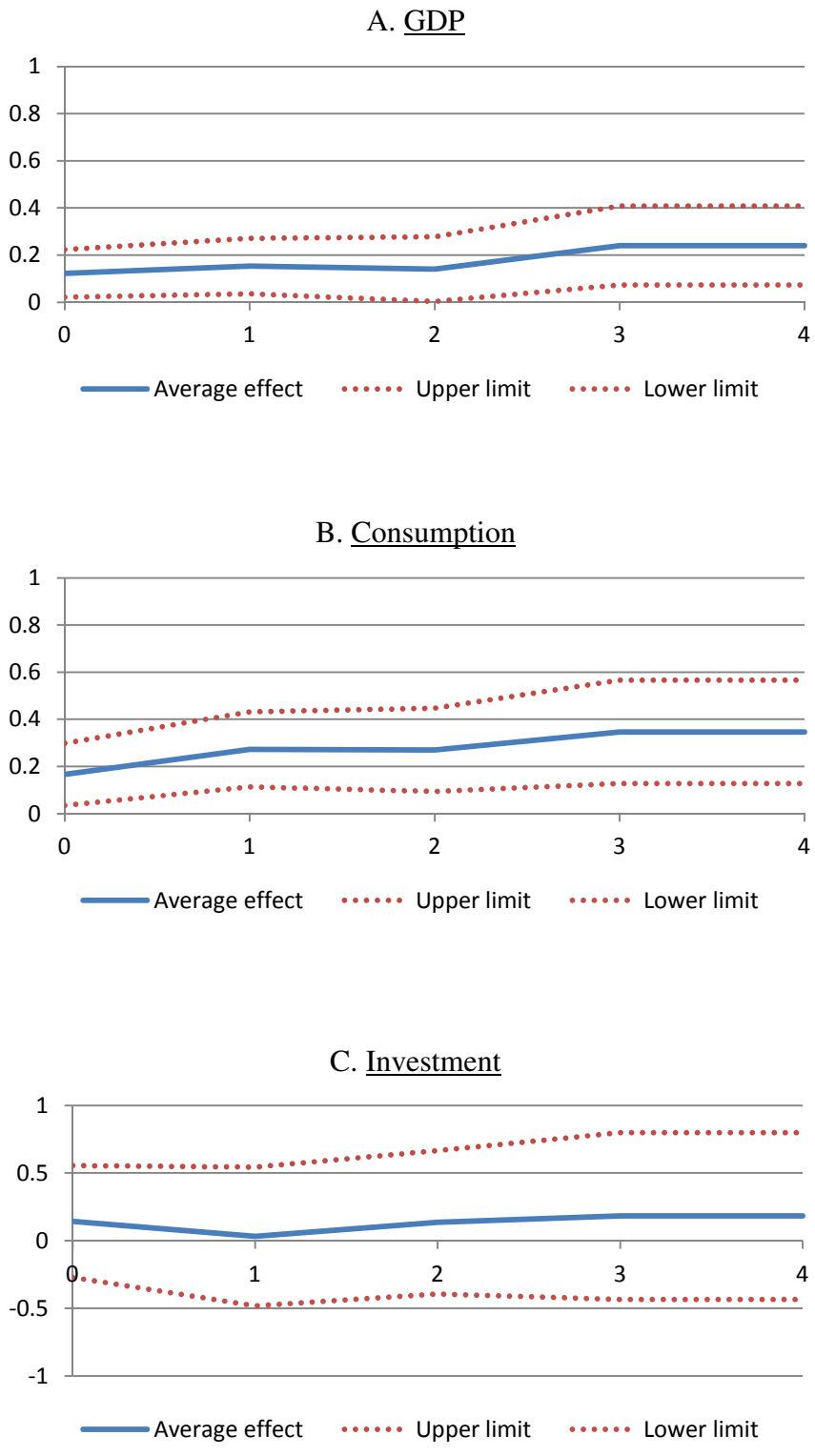
Note: Years after the shock in horizontal axes. 90% confidence bands.

Figure 3.The Effect of Social Spending Categories on Output (Elasticities-%)



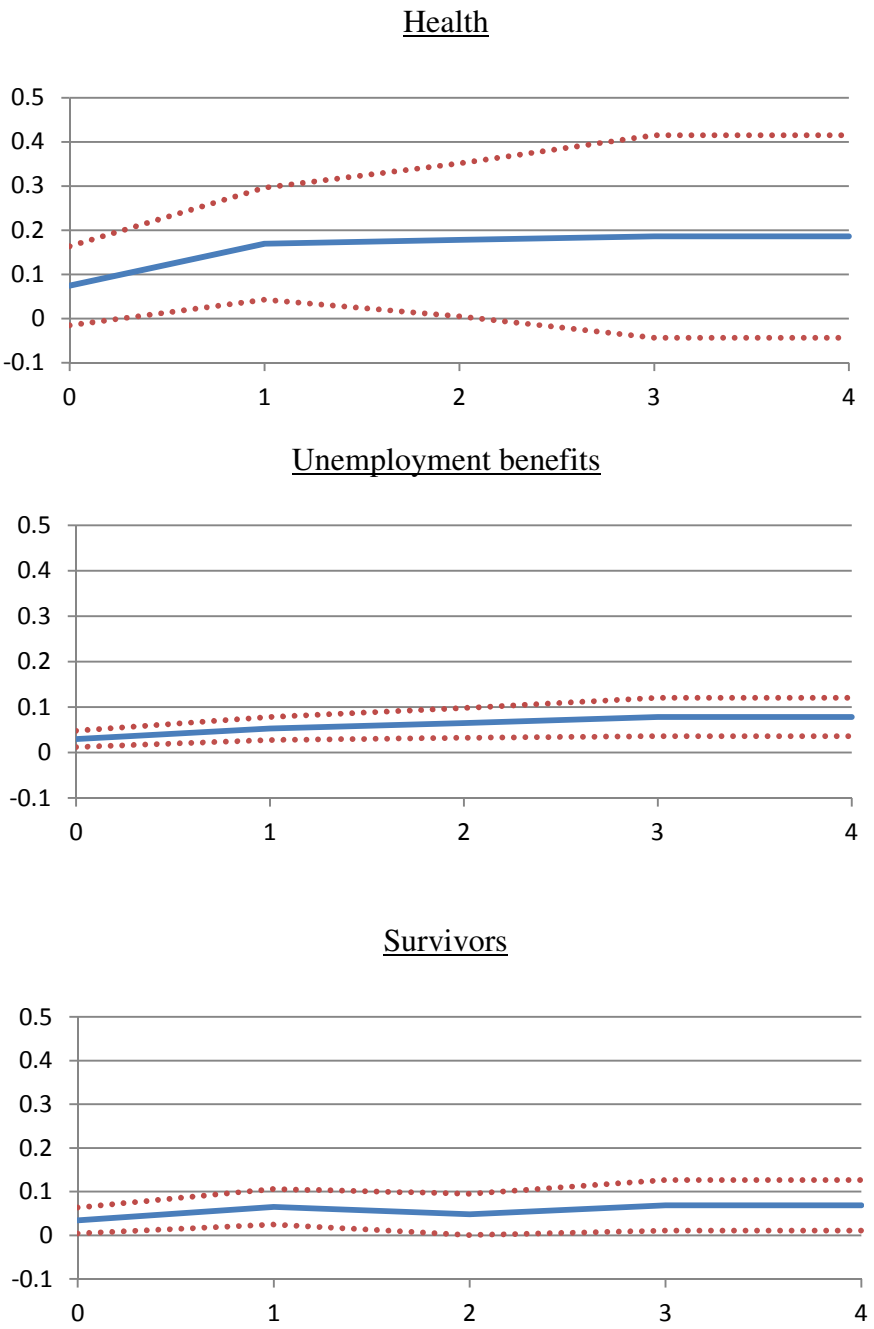
Note: Years after the shock in horizontal axes. Solid lines=average response. Dotted lines=90% confidence bands.

Figure 4. The Effects of Exogenous Social Spending Shocks on Activity (%)



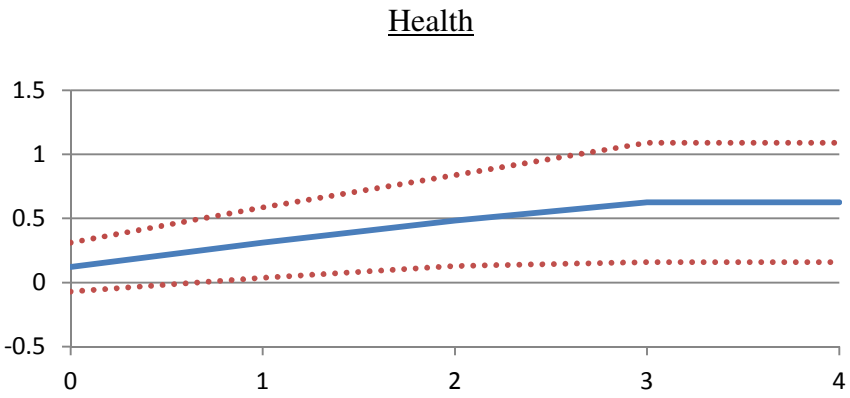
Note: Years after the shock in horizontal axes.90% confidence bands.

Figure 5.The Effect of Social Spending Categories on Consumption (Elasticities-%)



Note: Years after the shock in horizontal axes. Solid lines=average response. Dotted lines=90% confidence bands.

Figure 6.The Effect of Social Spending Categories on Investment (Elasticities-%)



Note: Years after the shock in horizontal axes. Solid lines=average response. Dotted lines=90% confidence bands.

ANNEX

Data for social spending are taken from the OECD Social Expenditure Database. The database includes internationally comparable statistics on public and (mandatory and voluntary) private social expenditure at programme level. The main social policy areas covered are: Old age, Survivors, Incapacity-related benefits, Health, Family, Active labour market programmes, Unemployment, Housing, and Other social policy areas. The database is updated periodically, every two years and covers several OECD countries from 1980 to 2005. The table below reports for each country and for each social policy area the first year for which data are available.

Table A1-Data Availability

	TOT	OLD	SUR	INC	HEA	FAM	ACT	UNE	HOU	OTH
AUS	1980	1980	1980	1980	1980	1980	1985	1980	1980	1980
AUT	1980	1980	1980	1980	1980	1980	1985	1980	1980	1980
BEL	1980	1980	1980	1980	1980	1988	1985	1988	-	1988
CAN	1980	1980	1980	1980	1980	1995	1995	1995	1995	1995
CZE	1990	1990	1990	1990	1990	1990	1991	1991	1994	1990
DNK	1980	1980	1980	1980	1980	1980	1980	1980	1980	1983
DEU	1980	1980	1980	1980	1980	1980	1985	1980	1980	1980
FIN	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
FRA	1980	1980	1980	1980	1980	1980	1985	1985	1980	1989
GRE	1980	1980	1980	1980	1980	1980	1985	1980	1980	1980
ICE	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990
IRL	1980	1980	1980	1980	1980	1980	1985	1985	1980	1980
ITA	1980	1980	1980	1980	1980	1980	1990	1980	1980	1990
JAP	1980	1980	1980	1980	1980	1980	1990	1980	-	1990
KOR	1990	1990	1990	1990	1990	1990	1990	1997	-	1990
MEX	1985	1985	1985	1985	1985	1989	1985	-	1985	1985
NLD	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
NZL	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
NOR	1980	1980	1980	1980	1980	1980	1985	1980	1980	1980
SVK	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995
SWE	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
GBR	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
USA	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980

Note: In the table is reported the first year where the data is available. (-) means missing.
TOT=Total social spending; OLD=Old Age; SUR=survivors; INC=Incapacity Related; HEA=Health; FAM=Family; ACT=Active Labor Market; UNE=Unemployment; HOU=Housing; OTH=Other Policy Areas; DNI=Domestic National Income.