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STRUCTURAL SLUMPS AND FISCAL POLICY

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The long swings of economic activity measured by the unemployment rate are characterized by fluctuations in gross capital formation. A structural boom is caused by expectations about future productivity growth and the profitability of capital and a slump by the disappointment of these expectations (see Phelps, 1994). The European golden age of the 1950s and the 1960s was, to take an example, characterized by high investment rates while the decades of high unemployment in the 1970s, 1980s and in some countries also the 1990s had much lower investment rates; the current slump has investment and employment falling; and a recovery from this slump will see both an investment and an employment recover. The relationship between investment and unemployment becomes stronger in periods preceding and following financial crises.

The objective of this short paper is to discuss and analyze to what extent fiscal policy can be used to affect the real economy that is subject to large swings in activity driven by changes in the expected profitability of capital and investment fluctuations. The financial turbulence of recent years has put great strains on the finances of governments in the developed countries. Very large deficits have emerged in the United States, Japan and the U.K. as well as in many of the European countries. These follow in the footsteps of the banking problems of recent years and the accompanying slumps in the real economies of many countries.

1. Budget deficits around the world

The financial crisis of 2007-2009 has created a serious fiscal sustainability problem in many countries. The latest downgrades of US and Japanese government debt have highlighted the difficulties faced by fiscal authorities in a large number of developed countries. Table 1 below shows the budget balance for a group of selected countries. In 2011 only Norway is expected to have a budget surplus. The largest budget deficits in 2011 are projected in the U.K. and the U.S. Large budget deficits are also predicted in Greece, Poland, Japan, Spain and France.

The most pertinent question to ask in this situation is to what extent a fiscal expansion can boost the economy and also if a fiscal consolidation should be expected to aggravate the slump. In this paper we will examine OECD data and measure the effectiveness of fiscal policy using a panel data set in order to explicitly test to what extent the effectiveness depends on the level of public debt.

In order to assess the level of the debt crisis it is useful to look at both public and private debt and to what extent public debt is owed to one's own citizens or to foreign entities. Table 1 shows general government and external imbalances in selected countries in 2010. The first column has a measure of total non-financial sector debt, which is the sum of public debt, household debt and (non-financial) business debt. The following four columns show the debt and deficits of the general government; gross debt, net debt, the budget balance and the cyclically-adjusted primary balance. The next four columns show the external indebtedness; the current account balance, the primary current account, the net investment position and gross external debt.

Since private debt has a tendency to become public debt during financial crises, one may start by taking a look at column (1). Japan comes out as the most indebted country, followed by Portugal, the U.K., the U.S., Ireland, Greece, Italy and France, the U.S. being distinguished by its high level of household debt. However, the countries differ in the extent to which the debt is owed to their own citizens or foreigners. Japan, being the most indebted country, has the smallest external debt, or only 41% of GDP. The same applies to Italy, which while having high levels of debt does not have high levels of external debt.¹ In contrast, the countries that are currently facing the most acute crises in Europe; Greece, Ireland, Portugal and Spain, have both high levels of domestic indebtedness as shown in column (1) as well as high levels of external debt, shown in column (9) and a very negative net investment position shown in column (8). To make matters more difficult, Greece, Ireland, Portugal and Spain have large current account deficits, both when interest payments are included as well as when they are excluded. The rapidly growing economies of China and India have much lower levels of debt, which in China is concentrated in the non-financial business sector. The stock of household debt is very small in both countries.

Turning to the public sector, Japan has the highest levels of gross and net public debt, followed by Greece, Italy and Belgium. The budget deficits are very large in Japan, the U.K. and the U.S. while in the Euro zone it is Ireland that tops the leagues – mainly because of fiscal outlays due to the restructuring of its banking system but also due to an operational deficit – and then Spain, France, Greece and Portugal.

¹ Countries with a large banking sector, such as Ireland and the U.K., have very high levels of gross external debt.

Table 1. General government and external imbalances in various countries in 2010 (% of GDP)

	Domestic indebtedness: Total non-financial debt*	General government imbalances				External imbalances			
		Gross debt	Net debt	Budget balance	Cyclically adj. prim. balance	Current account	Primary current account	Net intern. investment position	Gross external debt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Belgium	210	100	91	-4.8	0.2	0.3	-0.7	45	304
France	230	84	74	-8.0	-4.1	-1.9	-3.2	-12	196
Germany	205	75	59	-4.5	-1.0	4.9	3.5	38	154
Greece	250	130	110	-7.9	-1.5	-11.2	-7.1	-87	178
Ireland	260	94	55	-17.7	-5.1	-3.0	14.5	-102	1072
Italy	240	118	99	-5.1	0.7	-3.2	-1.3	-20	120
Portugal	310	83	79	-7.3	-3.0	-10.0	-5.6	-113	235
Spain	260	63	54	-9.3	-5.7	-5.5	-2.6	-96	173
U.K.	290	77	69	-10.2	-5.4	-1.1	-3.8	-22	429
Canada	209**	81.7	32.2	-4.9	-2.9	-2.8		-7	70
Japan	370	225	121	-9.6	-5.2	2.8	0.2	57	41
U.S	280	93	66	-11.1	-6.5	-2.7	-3.5	-19	98
China	140**	19.1	--	-2.9	-2.7	4.7	--	17	7***
India	118**	75.1	--	-9.6	-3.7	-3.1	--	-5	21

Source: World Economics and Financial Surveys. Fiscal Exit: From Strategy to Implementation, International Monetary Fund, IMF IFS, and World Economic Outlook, October 2010. *This is the sum of household, non-financial corporations and government debt. ** 2008 numbers taken from Bank of America: <http://www.gfmag.com/tools/global-database/economic-data/10403-total-debt-to-gdp.html#axzz1LBATEjBb>. *** *China Daily*, 24. April, 2009 http://www.chinadaily.com.cn/business/2009-04/24/content_7714027.htm.

Note, however, that the cyclically-adjusted primary deficit is smaller in most of the Euro zone countries than in Japan, the U.K. and the U.S. which shows that the three latter countries are engaged in a fiscal expansion while the Euro zone countries have deficits caused mainly by the slump of their real economies and falling tax revenues. Large CDS spreads have made fiscal expansions in many European economies impossible to carry out.²

Of the large developing countries, China has a modest fiscal deficit but a low level of public debt, very little external debt and very large external surpluses. India's public sector deficit largely reflects higher interest payments on its larger stock of public debt, there is a modest current account deficit and very little external debt.

2. Previous studies

The study of the effectiveness of fiscal policy has generated a much smaller literature than the one on the effectiveness of monetary policy. These fall into several classes. There are papers that study policy episodes of fiscal consolidations in order to measure the macroeconomic impact of large reductions in the budget deficit. There is also a literature that uses vector auto regressions to study the dynamic effects of discretionary fiscal policy on macroeconomic variables, such as Blanchard and Perotti (1999). Finally, there is the real business cycle approach that focuses on the moments of macroeconomic variables generated in RBC models with a variety of shocks.³

2.1 Case studies

What makes the study of the effectiveness of fiscal policy particularly interesting in the current economic environment is the possibility of an *expansionary contraction* offsetting the traditional Keynesian effects. On top of the Keynesian contractionary effects, lower interest rates that may accompany the fiscal contraction may increase aggregate demand and a reduction in the size of the public sector will make room for the private sector by releasing workers and lowering wages. There is also the possibility that consumers and businesses will begin to anticipate lower taxes in the future because of lower levels of public debt. Giavazzi and Pagano (1990) describe two examples of such expansionary contractions in Denmark and Ireland in the 1980s.

² The public debt crises that is currently underway has seen CDS spreads on ten-year government debt go from just over 2% for Greece at the beginning of 2010 to exceed 9%; similarly Irish government debt go from roughly 1.5% to exceed 5% and Portuguese debt go from around 75 basis points to exceed 3%.

³ See Galí (1999) on the limitations of the RBC approach.

Denmark was one of the countries hit by higher world real interest rates in 1982 because of its high level of public debt. While a fiscal stimulus had previously failed to boost the economy, the ensuing fiscal contraction was followed by an economic recovery. The turnaround in fiscal policy between 1982 and 1986 involved a combination of higher taxes and lower government consumption and investment, which reduced the full-employment primary budget deficit by around 10% of GDP and the debt-GDP ratio started declining.

One possible reason for this unexpected turn of events was that the fiscal contraction was preceded by devaluations of the currency versus the German mark. Moreover, long-term interest rates fell sharply and asset prices started to increase. Growth was driven both by rising private consumption as well as a booming investment demand.

At the beginning of the 1980s Ireland's public finances were in even worse shape than those of Denmark. The primary full-employment budget deficit was 8.4 and total national debt was 87% while the current account deficit was in excess of 10% of GDP. In 1987 a new government began to reign in the fiscal deficit and reduced the full-employment primary deficit by 7% of GP and growth resumed and the debt-GDP ratio started to decline. The fiscal consolidation mostly took the form of lower government consumption and investment rather than higher taxes. The exchange rate was devalued which improved the competitiveness of industry. An investment boom followed.

An example of a contractionary expansion is found by Giavazzi and Pagano (1995) in Sweden. They find that during a fiscal expansion that took place in these years investment fell and consumption turned out to be much lower than expected, apparently reflecting a large downward revision of permanent disposable income triggered by the fiscal expansion.

2.2 Econometric studies

Blanchard and Perotti (2002) developed a structural Vector Autoregression methodology to study the effects of fiscal policy on macroeconomic variables. They find that government spending shocks have a positive effect on output but a negative effect on investment as do Mountford and Uhlig (2002). In contrast, Blanchard and Perotti (2002), Fatas and Mihov (2001) and Gali, Lopes-Salido and Valles (2003) find a positive effect of government spending shocks on consumption using US data while Mountford and Uhlig (2002) and Burnside, Eichenbaum and Fisher (2003) find almost no effect.

Perotti (2004) extends applies the VAR methodology to the study of five large economies and finds that the effect of fiscal policy on GDP tends to be small with government spending multipliers lower than one common; the effects of increases in government spending and tax cuts have become smaller over time and tend to be negative in the post-1980 period. Finally, he finds that fiscal expansions tend to lower private investment for the group of five large economies as did the papers using U.S. data.

3. The effect of deficits on consumption and investment

In this section data from 19 OECD countries are used to study the relationship between fiscal variables, private consumption and private investment.⁴ We start by taking the general government deficit from 1960-2010 for each of the 19 countries D_{it} and regress it on current and lagged values of the growth of real GDP and use the residual F as a measure of the cyclically-adjusted budget deficit;

$$F_{it} = D_{it} - \hat{D}_{it} \quad (1)$$

where \hat{D}_{it} is the predicted deficit from the equation;

$$D_{it} = \alpha_{0i} + \sum_{j=0}^4 \alpha_{ji} g_{it-j} + \varepsilon_{it} \quad (2)$$

and g is the rate of growth of real GDP.

In Figure 1 the first difference of the cross-country average of F for each year in the sample is plotted against the first difference of private consumption as a ratio to GDP and private investment as a ratio to GDP. According to the Keynesian effect, one should observe a positive relationship in both panels: a greater budget deficit should go with increased consumption and investment. Such a relationship is visible in the left-hand panel – in spite of some outliers – indicating that a higher deficit may cause increased consumption; the relationship in the right-hand panel is closer to being downward-sloping, indicating that a higher deficit may cause a fall of investment. However, these relationships are very weak. Thus the figures in Appendix B show the plots for each of the 19 countries for both changes in investment and consumption do not reveal any clear relationship between these variables and changes in the cyclically-adjusted

⁴ The countries are: Australia, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the U.K. and the U.S.

budget deficit. There are many observations where a fall in the deficit coincides with both rising investment and consumption and when an increase of the deficit coincides with a fall of investment and consumption.

Tables 2-5 have the estimation results for the following equation

$$\Delta C_{it} = \beta_{i0} + \beta_{i1} \Delta F_{it} + \beta_{i2} \Delta F_{it} B_{it} + \beta_{i3} B_{it} + \varepsilon_{it} \quad (2)$$

$$\Delta I_{it} = \gamma_{i0} + \gamma_{i1} \Delta F_{it} + \gamma_{i2} \Delta F_{it} B_{it} + \gamma_{i3} B_{it} + \varepsilon_{it} \quad (3)$$

where C denotes the consumption-GDP ratio and I the investment-GDP ratio, F is the cyclically-adjusted fiscal deficit and B denotes government liabilities as a proportion to GDP. In column (1) we show the results when all observations are included; column (2) has the results when only those observations are included where the ratio of government liabilities to GDP exceeds 10%; then when they exceed 20%; then 30% and finally 40%.

The coefficient estimates indicate that the positive effect of the fiscal deficit on consumption is declining in the size of the government debt. Government liabilities are also included and have a statistically insignificant coefficient as well as an interaction term. In Table 3 there is the effect of the fiscal deficit on private investment. In contrast to the effect on private consumption, the fiscal deficit tends to lower investment in accordance with the pattern in Figure 1. This is consistent with the earlier results of Alesina et al. (2002). However, in contrast to Table 2, repeating the estimation for higher levels of debt does not generate significantly different results.

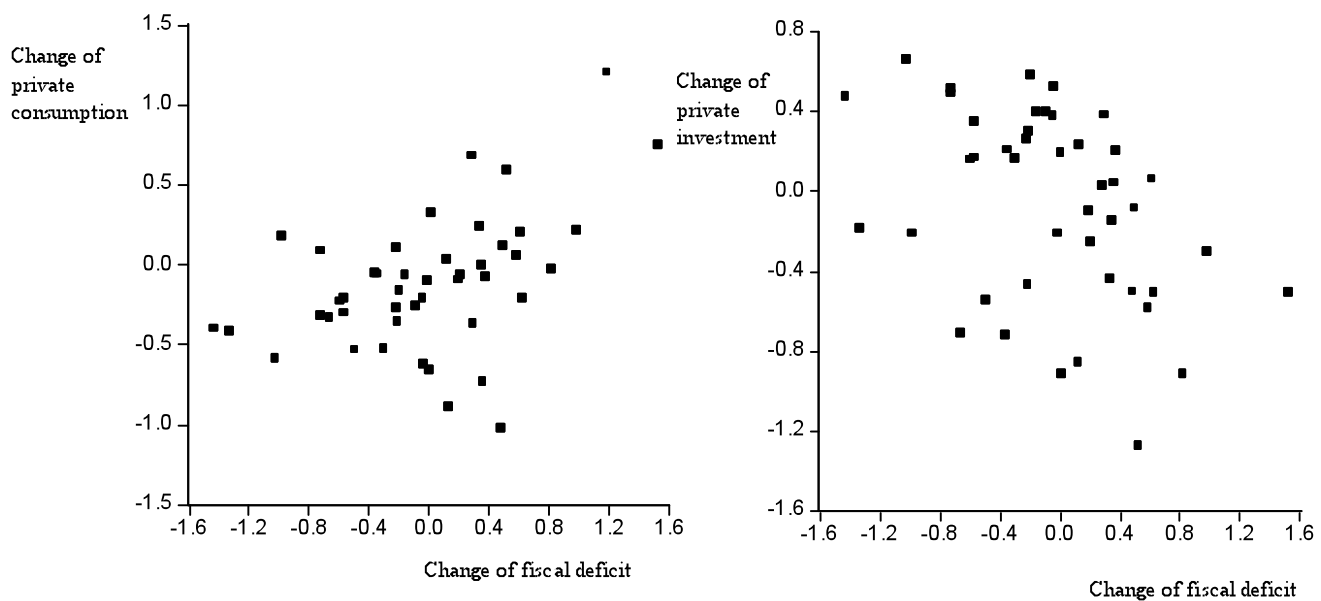
In Table 4 we explore whether the expansionary effect of the fiscal deficit on private consumption depends on its size. In the first column we estimate the equation using all observations while in the second column we only include observations where the increase in the deficit exceeds 10% of GDP and so forth. In the bottom panel we show results for decreases in the deficit, first a 10% decrease and so on. The results suggest that the effect of a fiscal stimulus on consumption – increase in the deficit – is increasing in the size of the stimulus and decreasing in the level of public debt.⁵ Thus inflating an indebted country using fiscal stimulus is less effective than inflating a less indebted country. The results in the bottom panel also suggest that

⁵ Giavazzi and Pagano (1995) study the relationship between private consumption and fiscal policy changes in a cross section of 19 OECD countries. They find that both fiscal contractions and expansions can have non-Keynesian effects if they are sufficiently large and persistent.

the contractionary effect of a decrease in the deficit is increasing in the size of the deficit reduction but decreasing in the level of public indebtedness.⁶

In Table 5 we show the results for private investment. A fiscal stimulus lowers investment. A fiscal contraction can increase investment when the level of government debt is high – in excess of about 70% of GDP – but reduces investment when it is low.

Figure 1. Consumption, investment and the fiscal deficit



⁶ In Appendix B we show the relationship between changes in the cyclically-adjusted deficit and changes in the ratio of private consumption to GDP for each of the nineteen countries. Clearly, the relationship is weak for most of the countries and a fiscal contraction sometimes goes together with an increase of private consumption.

Table 2. Fiscal policy and consumption, varying the stock of public liabilities

	All obs.	Gov.liab>0.10	Gov.liab>0.20	Gov.liab>0.30	Gov.liab>0.40
Constant	0.110 (0.71)	0.101 (0.64)	0.004 (0.03)	0.0005 (0.00)	-0.045 (0.28)
Deficit	0.139 (2.68)	0.149 (2.93)	0.096 (2.37)	0.061 (1.35)	0.026 (0.59)
Deficit*gov. Liab.	-0.001 (1.28)	-0.001 (1.49)	-0.0002 (0.47)	0.0001 (0.23)	0.001 (0.92)
Gov. Liab.	-0.002 (1.06)	-0.002 (1.00)	-0.001 (0.38)	-0.001 (0.42)	-0.0002 (0.10)
Obs.	576	573	545	511	454
R-squared	0.10	0.10	0.09	0.09	0.11

Table 3. Fiscal policy and investment, varying the stock of public liabilities

	All obs.	Gov.liab>0.10	Gov.liab>0.20	Gov.liab>0.30	Gov.liab>0.40
Constant	-0.535 (3.27)	-0.520 (3.20)	-0.655 (3.65)	-0.562 (2.84)	-0.520 (2.50)
Deficit	-0.139 (2.31)	-0.161 (2.68)	-0.140 (2.39)	-0.062 (0.96)	-0.129 (1.94)
Deficit*gov. Liab.	0.001 (1.78)	0.002 (2.15)	0.001 (1.95)	0.0003 (0.56)	0.001 (1.58)
Gov. Liab.	0.008 (3.48)	0.007 (3.45)	0.009 (3.89)	0.008 (3.18)	0.007 (2.73)
Obs.	564	562	535	502	445
R-squared	0.07	0.07	0.08	0.06	0.06

Countries included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Spain, Sweden, the U.K. and the U.S. Estimation method: Ordinary least squares, White cross-section standard errors and covariance. t-ratios in parentheses.

Table 4. Fiscal policy and consumption, varying the size of the fiscal policy shock

	All obs.	Δ deficit>0.10	Δ deficit>0.20	Δ deficit>0.30	Δ deficit>0.40	Δ deficit>0.50	Δ deficit>0.60	Δ deficit>0.70	Δ deficit>0.8
Constant	0.110 (0.706)	-0.383 (1.70)	-0.473 (2.09)	-0.551 (2.29)	-0.717 (2.70)	-0.820 (2.96)	-0.903 (3.07)	-0.923 (3.44)	-1.025 (3.84)
Deficit	0.139 (2.684)	0.377 (3.09)	0.420 (3.48)	0.465 (3.75)	0.528 (4.23)	0.575 (4.44)	0.619 (4.61)	0.656 (5.43)	0.693 (6.09)
Deficit*gov. Liab.	-0.001 (1.281)	-0.003 (1.88)	-0.004 (2.07)	-0.004 (2.22)	-0.004 (2.54)	-0.004 (2.65)	-0.005 (2.86)	-0.005 (3.23)	-0.006 (3.57)
Gov. Liab.	-0.002 (1.057)	0.003 (0.95)	0.004 (1.26)	0.005 (1.21)	0.005 (1.35)	0.001 (1.55)	0.007 (1.75)	0.006 (1.67)	0.007 (1.83)
Obs.	576	254	240	222	201	192	180	166	156
R-squared	0.10	0.16	0.18	0.21	0.22	0.23	0.27	0.32	0.36

	Δ deficit<-0.10	Δ deficit<-0.20	Δ deficit<-0.30	Δ deficit<-0.40	Δ deficit<-0.50	Δ deficit<-0.60	Δ deficit<-0.70	Δ deficit<-0.80	Δ deficit<-0.9
Constant	0.311 (1.27)	0.317 (1.25)	0.405 (1.40)	0.443 (1.52)	0.461 (1.47)	0.563 (1.79)	0.713 (2.28)	0.683 (1.85)	0.631 (1.58)
Deficit	0.136 (1.24)	0.127 (1.15)	0.163 (1.28)	0.172 (1.30)	0.161 (1.13)	0.185 (1.30)	0.239 (1.77)	0.250 (1.62)	0.249 (1.51)
Deficit*gov. Liab.	-0.001 (1.17)	-0.001 (1.18)	-0.002 (1.31)	-0.002 (1.47)	-0.002 (1.37)	-0.002 (1.58)	-0.003 (2.04)	-0.003 (1.88)	-0.003 (1.71)
Gov. Liab.	-0.006 (1.99)	-0.007 (2.02)	-0.008 (2.10)	-0.009 (2.39)	-0.009 (2.47)	-0.011 (2.80)	-0.013 (3.18)	-0.012 (2.74)	-0.011 (2.30)
Obs.	289	271	252	237	224	212	191	168	155
R-squared	0.15	0.14	0.18	0.19	0.19	0.22	0.23	0.21	0.18

Countries included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Spain, Sweden, the U.K. and the U.S. Estimation method: Ordinary least squares, White cross-section standard errors and covariance. t-ratios in parentheses.

Table 5. Fiscal policy and investment, varying the size of the fiscal policy shock

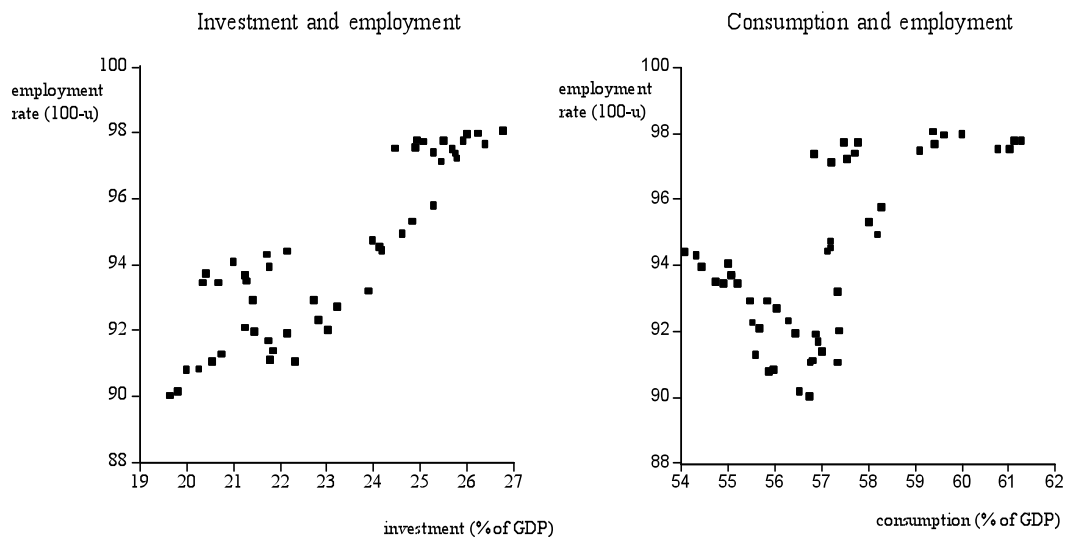
	$\Delta\text{deficit}>0.10$	$\Delta\text{deficit}>0.20$	$\Delta\text{deficit}>0.30$	$\Delta\text{deficit}>0.40$	$\Delta\text{deficit}>0.50$	$\Delta\text{deficit}>0.60$	$\Delta\text{deficit}>0.70$	$\Delta\text{deficit}>0.80$
Constant	-0.031 (0.12)	0.042 (0.17)	0.010 (0.03)	-0.094 (0.267)	-0.062 (0.168)	-0.255 (0.68)	-0.212 (0.56)	-0.036 (0.10)
Deficit	-0.369 (2.89)	-0.388 (2.91)	-0.385 (2.67)	-0.361 (2.249)	-0.387 (2.304)	-0.298 (1.82)	-0.326 (1.93)	-0.382 (2.30)
Deficit*gov. Liab.	0.003 (1.74)	0.004 (1.96)	0.003 (1.63)	0.004 (1.506)	0.004 (1.509)	0.003 (1.19)	0.003 (1.18)	0.004 (1.52)
Gov. Liab.	0.002 (0.50)	0.001 (0.19)	0.002 (0.43)	0.003 (0.517)	0.002 (0.446)	0.004 (0.74)	0.004 (0.79)	0.002 (0.35)
Obs.	246	233	215	194	186	174	160	151
R-squared	0.12	0.12	0.14	0.16	0.16	0.16	0.17	0.18

	$\Delta\text{deficit}<-0.10$	$\Delta\text{deficit}<-0.20$	$\Delta\text{deficit}<-0.30$	$\Delta\text{deficit}<-0.40$	$\Delta\text{deficit}<-0.50$	$\Delta\text{deficit}<-0.60$	$\Delta\text{deficit}<-0.70$	$\Delta\text{deficit}<-0.80$
Constant	-0.243 (1.04)	-0.080 (0.35)	-0.110 (0.45)	-0.209 (0.80)	-0.167 (0.57)	-0.022 (0.08)	-0.025 (0.07)	-0.102 (0.25)
Deficit	0.150 (1.33)	0.204 (1.86)	0.173 (1.52)	0.148 (1.30)	0.162 (1.32)	0.202 (1.64)	0.198 (1.40)	0.178 (1.19)
Deficit*gov. Liab.	-0.002 (1.70)	-0.003 (2.34)	-0.003 (1.99)	-0.002 (1.63)	-0.002 (1.74)	-0.003 (2.10)	-0.003 (1.72)	-0.002 (1.30)
Gov. Liab.	0.004 (1.09)	0.002 (0.48)	0.002 (0.67)	0.004 (1.09)	0.003 (0.75)	0.001 (0.31)	0.001 (0.30)	0.003 (0.63)
Obs.	287	269	250	235	222	210	189	166
R-squared	0.14	0.16	0.15	0.15	0.16	0.19	0.18	0.21

Countries included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Spain, Sweden, the U.K. and the U.S. Estimation method: Ordinary least squares, White cross-section standard errors and covariance. T-ratios in parentheses.

Unemployment rates in the OECD show long swings, which dominate shorter business cycle movements.⁷ Unemployment rates in the 19 OECD countries appear to be very persistent series showing infrequent changes in mean unemployment. Of the two variables; private consumption and investment, it is the latter which is more closely correlated with changes in the rate of employment ($100-u$). Figure 2 shows the average cross-country employment rate in the sample plotted against average investment and private consumption, both defined as a ratio to GDP.

Figure 2. Investment, consumption and employment ($100-u$)



Note the clear upward-sloping relationship between employment and investment. The relationship between employment and private consumption is much weaker in comparison. To further explore this relationship we estimate equations linking share prices (normalized by labor productivity) to the fiscal deficit, world real interest rates and real oil prices: investment to these same variables and then employment to private consumption and investment using instrumental variables;

$$\Delta(1-u_{it}) = \eta_i + \eta_1 \Delta C_{it} + \eta_2 \Delta I_{it} + \varepsilon_{it} \quad (3)$$

and report the results in Table 6 below.

⁷ See Gylfi Zoega (2010) "The Financial Crisis: Joblessness and Investmentlessness," *Capitalism and Society*: Vol. 5: Iss. 2, Article 3.

Table 6. Employment and investment

Dependent variable	Share prices	Investment*	Employment rate*(
Constant	-0.45 (0.31)	-0.11 (1.60)	-0.01 (0.11)
Fiscal deficit	-1.37 (3.25)	-0.06 (2.76)	
World real rate of interest	-2.02 (1.87)	-0.23 (5.14)	
Real price of oil	-0.21 (1.09)	0.00 (0.03)	
Investment			0.76* (2.44)
Private consumption			-0.29 (0.59)
Observations	667	669	618
R-squared	0.07	0.09	0.30

* The regressors are lagged one year in the investment equation. ** Instrumental variables estimation with White cross-section standard errors & covariance. Instruments: ΔF , Δq , Δr^* , $\Delta poil$, where r^* denotes the world real rate of interest, q is the level of share prices normalised by productivity and $poil$ is the world real price of oil.

The results show that fiscal deficits have an adverse effect on the stock market and investment and investment is then positively related to employment. Share prices and investment also depend negatively on world real interest rates. The results show that employment is positively associated with investment while the relationship with private consumption is not statistically significant from zero. A 10% increase of investment – from 20% to 30% of GDP – can be expected to raise the employment rate by above 7%.⁸

4. Employment, private and public saving

⁸ The empirical relationship between investment and employment is consistent with models of the long swings of employment. Phelps (1994) built three models linking unemployment to different asset prices where there is real wage rigidity due to efficiency wage reasons. There is the customer-market model first formulated by Phelps and Winter (1970) extended to a general equilibrium framework where changes in the shadow price of customers lead firms to change their mark-up of price over marginal cost and hence also their demand wage. In Phelps's turnover-training model, an increase in the shadow price of trained workers makes firms decide to train more workers, and this lowers unemployment in steady state. Finally, in a two sector model of a labor-intensive capital goods sector and a capital-intensive consumer goods sector, an increase in the shadow price of capital will make firms increase wages which will also lower unemployment.

In order to further explore the relationship between fiscal policy and employment we define three periods based on the business cycle; the first from 1986 to 1993; the second from 1993 to 2000; and the third from 2000 to 2007, and find average value for budget deficits, public debt, private saving and household and business debt for each of the 19 countries in the sample.

In columns (1)-(5) fixed-effect regression results are reported using pooled cross-section time-series data when using the raw measures of saving and deficits while in columns (6)-(10) the cyclically-adjusted measures are used as defined by equation (2) above. In columns (11) and (12) the estimation in columns (9) and (10) is repeated by adding time effects. Columns (1) and (6) have investment, private saving and government deficits. In columns (2) and (7) one allows for an interaction between saving and private sector debt and deficits and central government debt. Columns (3) and (8) add government consumption and columns (4) and (9) net foreign assets interacted with private saving. A non-linear interaction between private saving and private debt and public deficits and public debt is allowed in columns (5) and (10). Fixed time effects are included in columns (11) and (12) where the regressions of columns (9) and (10) are repeated.

As in Table 6, investment turns out to be the most important explanatory variable. The investment variable alone explains over 80% of the variation of employment in the sample. Private sector saving tends to be positively correlated with employment but its coefficient is often insignificant. Public deficits turn out to be expansionary for employment but their effect is decreasing in the stock of central government debt. Government consumption has a coefficient which is always insignificantly different from zero. Net foreign assets are negatively correlated with employment. The attempt in columns (5) and (10) to capture a non-linear effect of private saving and public deficits only generates a weak non-linear effect of public deficits.

The results imply that employment is increasing in investment; that public deficits are expansionary but that their effect is decreasing in the level of public debt; that changes in government consumption do not affect employment beyond the effect of changes in the deficit; that private sector debt is positively associated with employment and net foreign assets negatively associated with employment.

Table 7. Private and public saving and employment

	Cyclically unadjusted					Cyclically adjusted						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	76.41* (56.48)	71.75* (30.11)	70.78* (12.82)	69.56* (24.77)	81.45* (14.24)	74.60* (62.09)	66.64* (20.87)	66.70* (22.00)	70.84* (12.46)	68.31* (21.11)	74.47 (7.95)	67.86* (60.17)
Investment	0.96* (17.67)	0.71* (3.88)	0.70* (4.10)	0.63* (6.06)	0.51* (3.33)	0.84* (13.59)	0.75* (4.39)	0.75* (4.34)	0.60* (2.92)	0.71* (3.85)	0.39 (1.48)	0.80* (9.28)
Private saving	-0.17* (3.67)	0.07 (0.29)	0.07 (0.33)	0.41 (1.12)	-0.32 (0.76)	0.26 (1.16)	0.72* (2.03)	0.81* (1.91)	1.34* (3.00)	1.35 (1.45)	1.53* (2.40)	1.23 (1.08)
Gov. deficits	-0.50* (5.57)	-0.34 (1.58)	-0.34 (1.42)	-0.11* (2.10)	0.01 (0.03)	-0.01 (0.04)	0.95* (3.03)	1.00* (2.71)	1.26* (2.67)	1.10* (2.76)	1.13 (1.26)	1.18* (2.04)
Private saving *private sector debt		-0.001 (0.69)	-0.001 (0.67)	-0.003 (1.42)	0.004 (0.96)		-0.0002 (0.20)	-0.001 (0.45)	-0.004 (1.76)	-0.01 (0.70)	-0.01* (4.04)	-0.01 (0.54)
Deficit*central gov. debt		0.002 (0.64)	0.002 (0.67)	0.002 (0.40)	-0.00* (1.97)		-0.007* (3.38)	-0.01* (3.29)	-0.01* (2.53)	-0.01* (2.38)	-0.01 (0.92)	-0.01* (2.19)
Private sector debt		0.06 (1.71)	0.06 (1.54)	0.11* (3.81)	0.05 (1.15)		0.05* (4.49)	0.05* (4.10)	0.068 (5.29)	0.05* (3.53)	0.07* (3.03)	0.04* (3.34)
Central gov. debt		0.002 (0.04)	0.00 (0.00)	-0.03 (0.50)	-0.06 (1.32)		0.05* (2.74)	0.05 (2.57)	0.02 (0.44)	0.04* (2.22)	0.02 (0.23)	0.04* (2.15)
Government consumption			0.06 (0.14)	-0.14 (0.70)	-0.04 (0.11)			0.12 (0.87)	0.17 (0.58)	0.16 (1.13)	-0.15 (0.31)	0.20 (0.53)
Private sector sav.*net for. Assets				-0.005* (2.59)					-0.001 (0.05)		-0.003 (0.10)	
Net foreign assets				0.08 (1.78)					-0.06* (2.54)		-0.06* (3.69)	
Private saving*private sector debt squared					-0.00002* (1.97)					0.00 (0.65)		0.00 (0.54)
Deficits*central gov. debt squared					0.0001* (4.84)					0.0001* (2.18)		0.0001 (1.86)
	Fixed country effects					Fixed country effects					Fixed country and time effects	
Observations	57	42	42	34	42	57	42	42	34	42	34	42
R-squared	0.91	0.96	0.96	0.98	0.96	0.91	0.97	0.97	0.99	0.97	0.99	0.97

Estimation method: Ordinary least squares, fixed effects, White cross-section standard errors and covariance. t-ratios in parentheses.

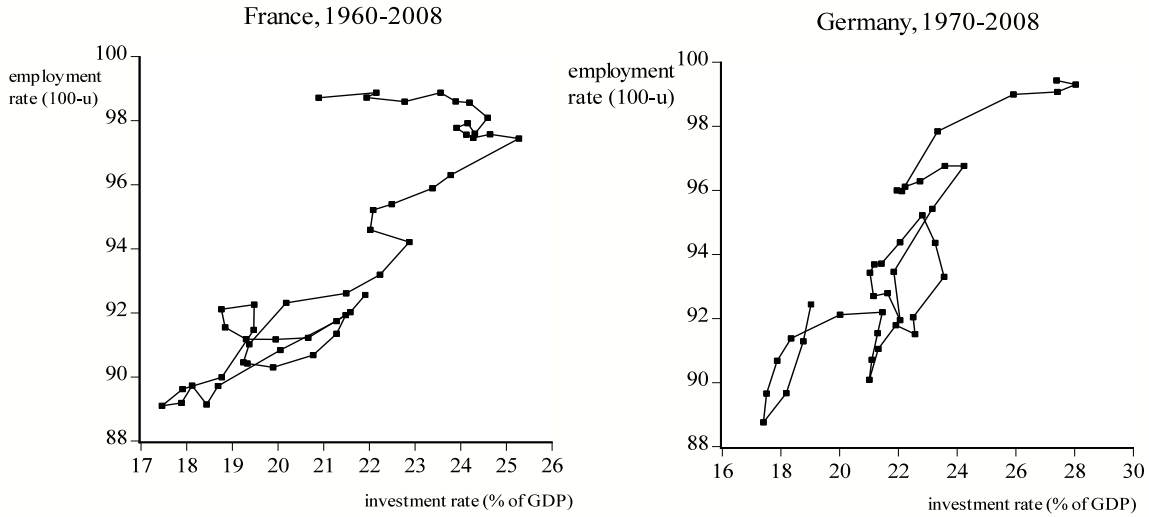
The relationship between investment and employment is more robust than the one between the cyclically-adjusted deficit and employment. Moreover, the numerical values of the coefficients imply that changes in investment are more potent at explaining employment fluctuations. For example, between 2008 and 2009 the fiscal expansion that took place in the U.S. took increased the cyclically-adjusted deficit by 1.7% of GDP. With a central government debt level of 53% of GDP, the employment should have risen by 0.92% of the labour force as a result. In comparison, investment fell by 3.6% of GDP since its peak in the fourth quarter of 2007 which should have reduced the employment rate by 2.7%.

5. Structural booms and slumps

The empirical analysis has shown a weak impact of fiscal policy on employment but a stronger association between investment and employment. In fact, the long swings of economic activity as measured by the employment rate are characterized by fluctuations in gross capital formation. Such a structural boom can be caused by expectations about future productivity growth and the profitability of capital and a slump by the disappointment of these expectations. The European golden age of the 1950 and the 1960 was, to take an example, characterized by high investment rates while the decades of high unemployment in the 1970s, 1980s and in some countries also the 1990s had much lower investment rates; the current slump has investment and employment falling; and a recovery from this slump will see both an investment and an employment boom.⁹ See Figure 4 below.

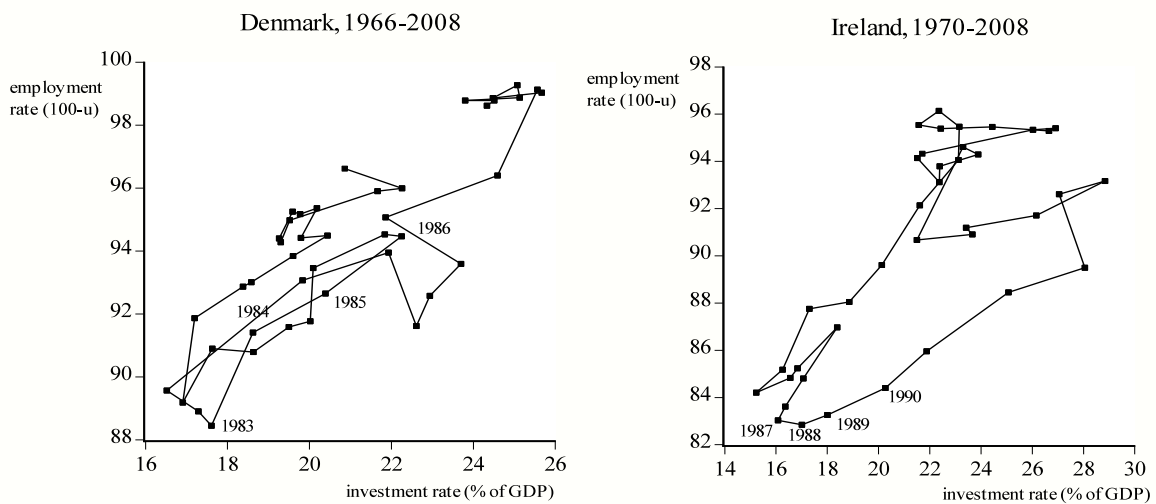
⁹ Smith and Zoega (2006, 2008) use principal components analysis to compare global changes in employment and investment and find that the two variables are closely related and mirror the movement of the world real rate of interest. Taken together, the results suggest that the long swings of unemployment may reflect changes in the investment outlook – expected profits and interest rates.

Figure 4. Investment and employment in France and Germany



The two episodes of an expansionary fiscal contraction in Denmark and Ireland discussed above can be viewed in this light. Figure 5 shows the relationship between investment and the employment rate in these two countries. Note that rise of both investment and employment from 1983-1986 in Denmark and 1987-1993 in Ireland.

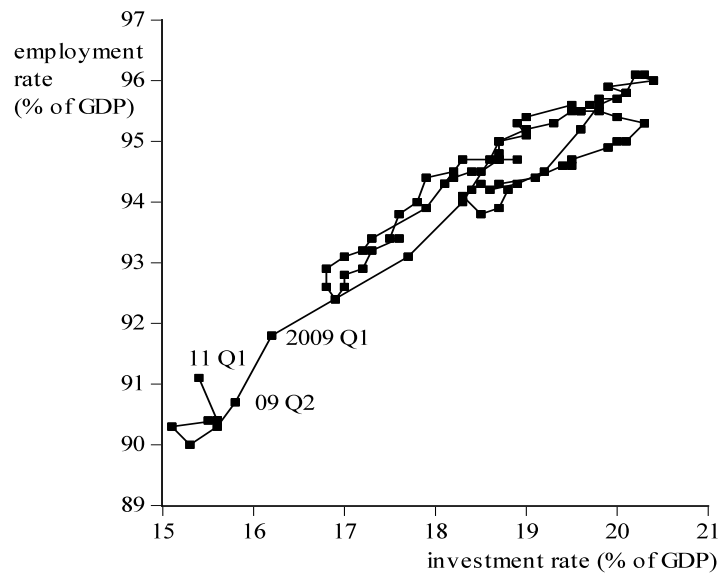
Figure 5. Expansionary contractions in Denmark and Ireland



The relationship between investment and unemployment becomes stronger in periods preceding and following financial crises. Financial crises follow a pattern that consists of changes

in asset prices, investment and employment. A noteworthy feature is the “jobless recoveries” that often follow such crises.¹⁰ Asset prices rise during the economic boom that precedes a financial crisis and then decline in its aftermath. The rising asset prices spur investment which generates employment growth and high real wages. The figure below shows the employment rate and investment for the United States using quarterly data for the last two decades. Note the strong positive relationship between investment and employment. The recent elevation of unemployment coincides with the fall of investment to very low levels.¹¹

Figure 6. Investment and employment the U.S.



6. Conclusions

We have found that employment has a positive association with investment and that investment is weakly and negatively related to fiscal deficits. The long swings of economic activity are caused by changes in the investment outlook, not by changes in the fiscal stance. Moreover, it is not

¹⁰ This was the case in Finland and Sweden in the aftermath of their financial crises in the early 1990s where the behavior of employment mirrored that of investment.

¹¹ Recently released data on the U.S. economy do not generate much optimism. Housing investment slowed in the last quarter of 2010. However, business investment in equipment and software showed signs of life, growing at a 13% pace, which was the strongest since early 2006 and added 0.8 percentage points to growth. This was offset by about a half by a decline in business investment in structures. In the first quarter of 2011 there is a slowdown in growth due to a fall in net exports and government spending.

clear if and then when a fiscal expansion can raise investment and contribute to employment growth. There are examples of fiscal contractions stimulating investment and employment – such as in Denmark and Ireland in the 1980s – and fiscal expansions that reduce investment and employment – such as in Sweden in the early 1990s.

The most important determinant of unemployment is expectations about future profits and interest rates. This implies that the level of unemployment depends on economic performance in a wider sense: productivity, expected productivity growth, innovations, entrepreneurship and the functioning of global capital markets, see Phelps (2006, 2007). Fiscal policy may be of best uses in targeting investment through accelerated depreciation tax deductions as proposed by the current U.S. administration or an investment tax credit scheme. There is also the option of using targeted schemes that promote bank lending which make the government take on some of the credit risk. Such schemes may attack the root of the current problems which lie in low levels of credit creation and investment.

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Appendix A

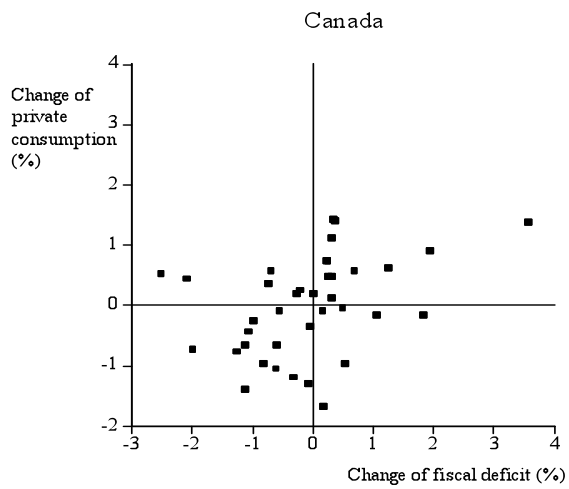
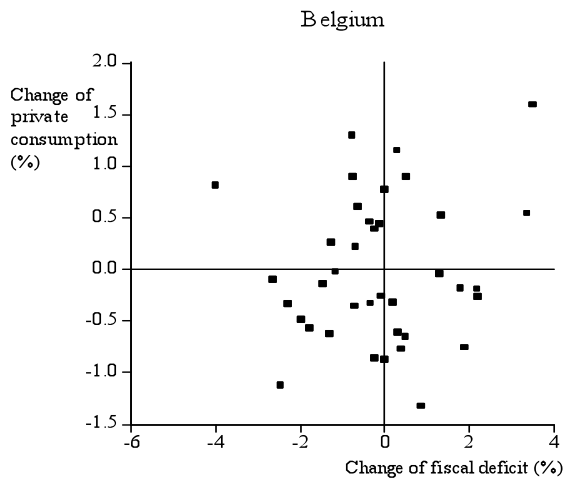
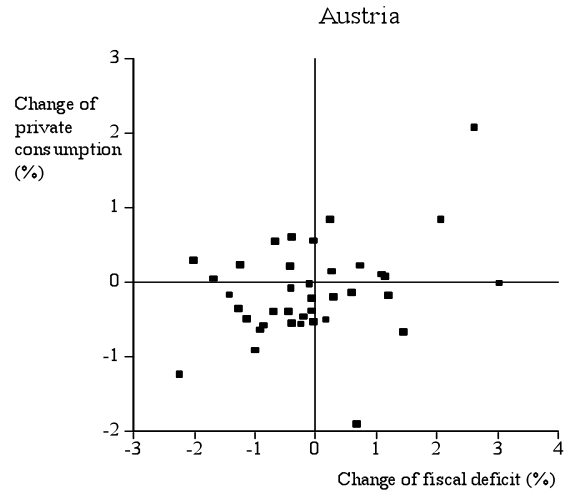
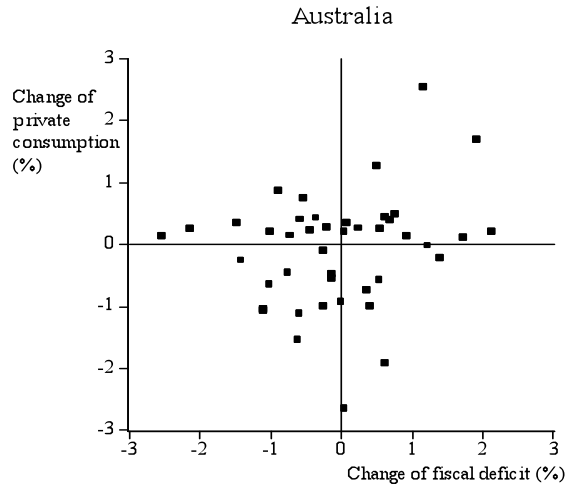
Projected budget- and current-account balances in 2011

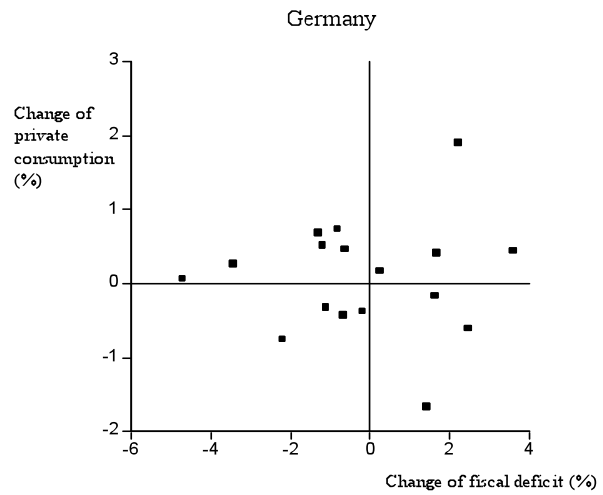
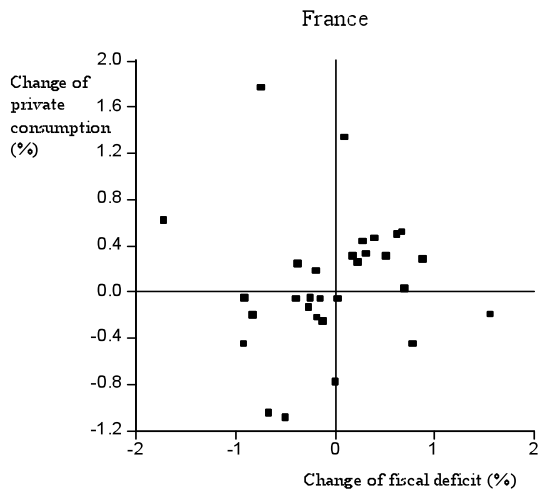
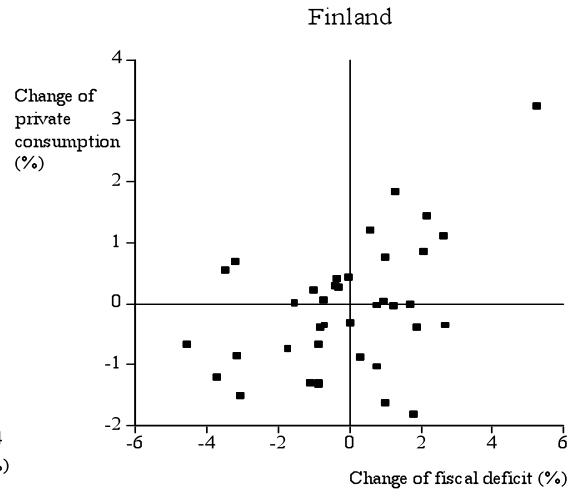
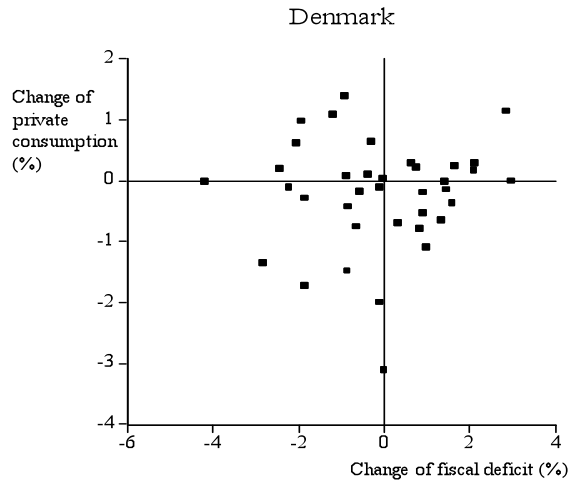
Budget balance				Current account balance			
Surplus countries		Deficit countries		Surplus countries		Deficit countries	
Norway	9.4	Germany	-0.5	Norway	12.9	Hungary	-1.0
		Switzerland	-0.5	Switzerland	10.9	U.K.	-1.7
		Sweden	-0.8	Sweden	6.3	France	-1.8
		S. Korea	-1.6	Netherlands	5.9	Canada	-2.5
		China	-1.7	Germany	4.9	India	-2.7
		Australia	-2.0	China	4.1	Czech Rep.	-2.7
		Canada	-2.1	Japan	3.3	Poland	-2.8
		Brazil	-2.5	Denmark	3.8	Greece	-2.9
		Hungary	-3.1	Austria	2.6	Brazil	-2.9
		Austria	-3.7	S. Korea	2.0	Australia	-3.0
		Italy	-4.3	Belgium	1.2	Italy	-3.0
		Netherlands	-4.3	Ireland	0.2*	U.S.	-3.4
		Belgium	-4.4			Spain	-3.8
		Czech Rep.	-4.6				
		Denmark	-4.8				
		India	-5.0				
		France	-6.4				
		Spain	-6.7				
		Japan	-7.9				
		Poland	-7.5				
		Greece	-8.1				
		U.S.	-8.8				
		U.K.	-9.0				
		Ireland	-9.4				

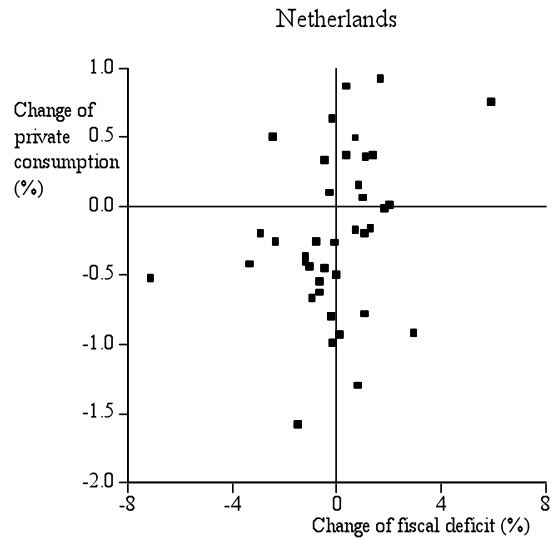
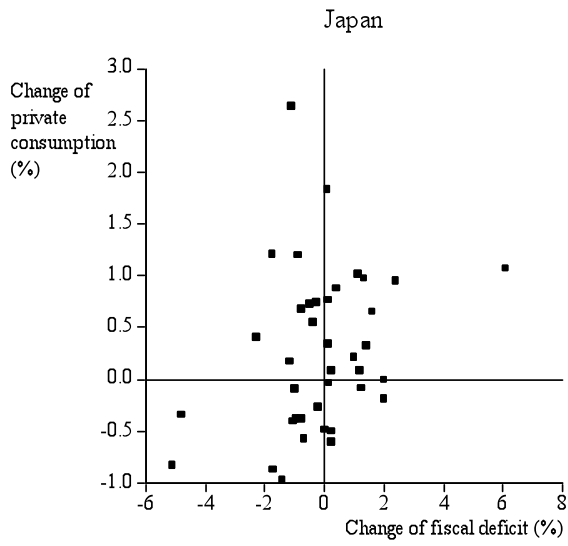
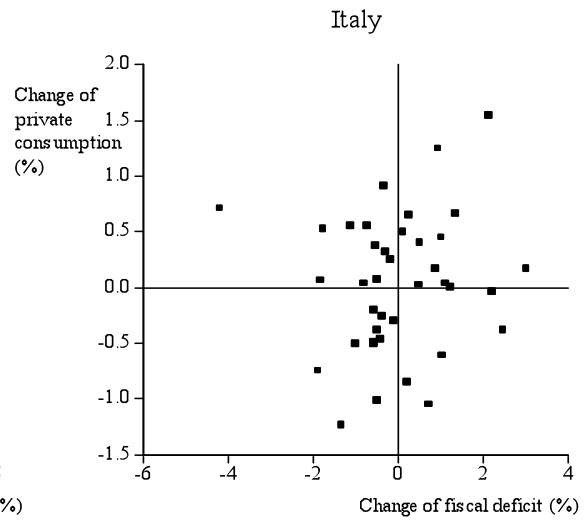
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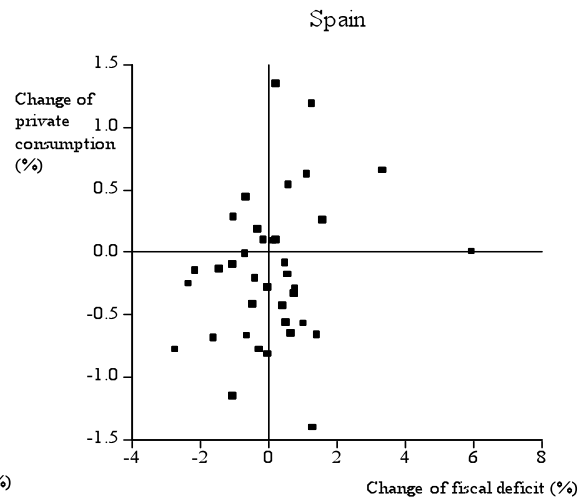
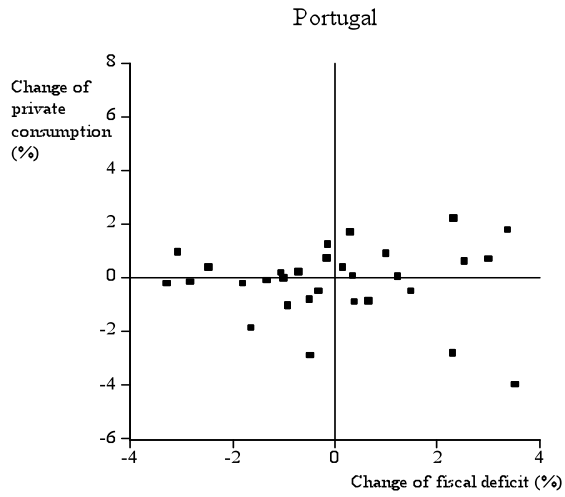
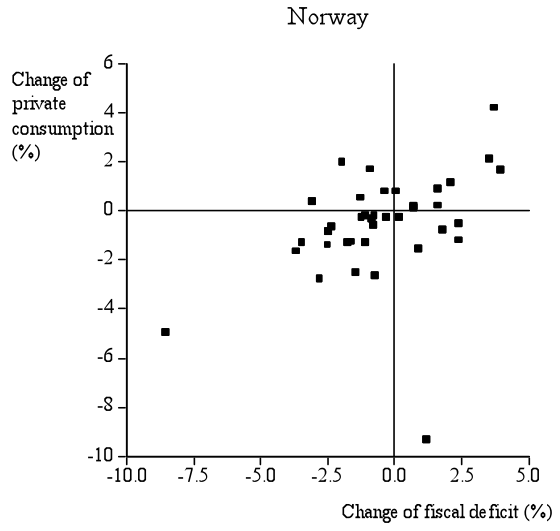
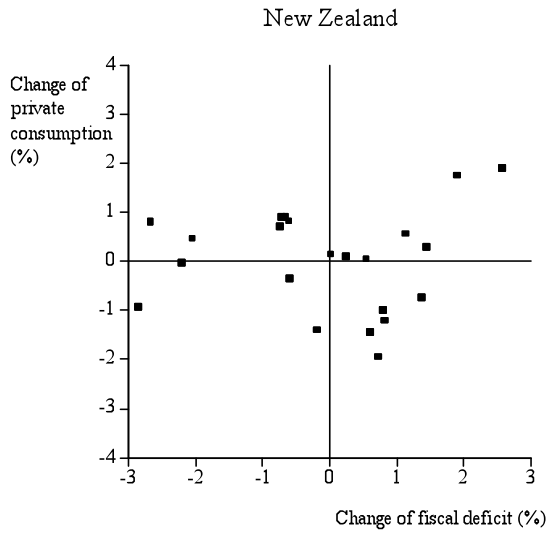
Appendix B

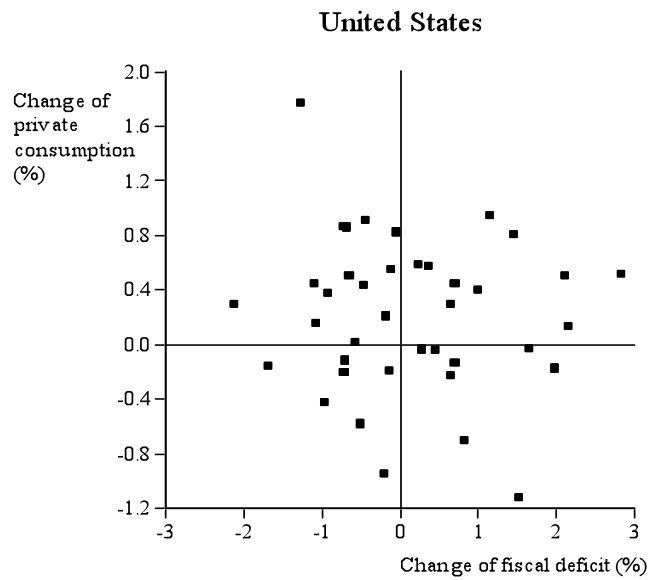
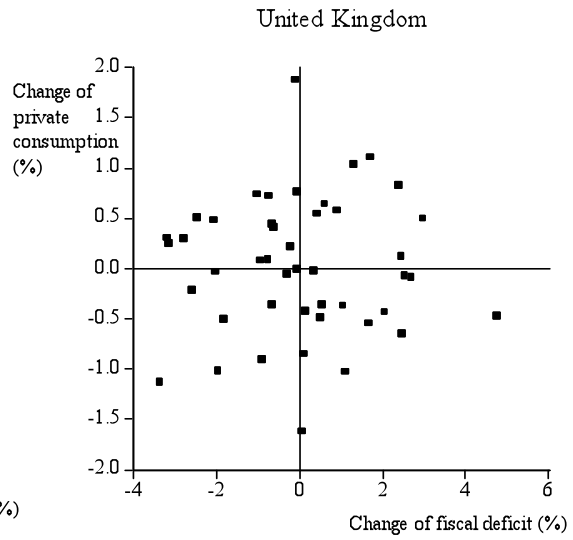
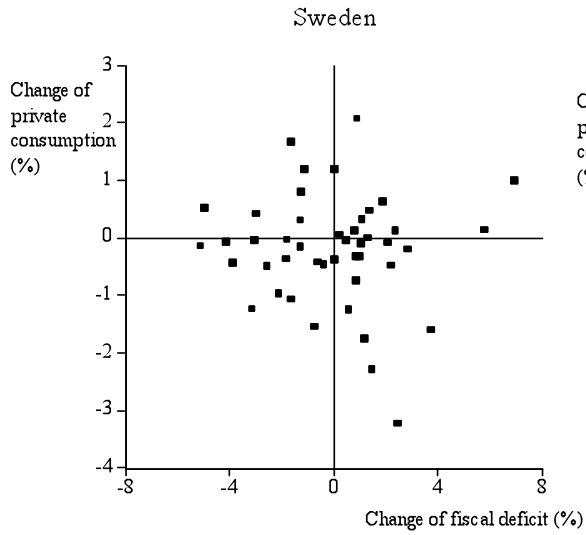
Private consumption and cyclically-adjusted budget surpluses



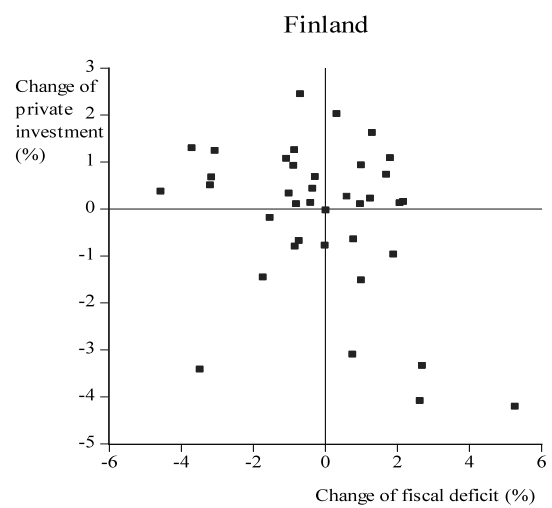
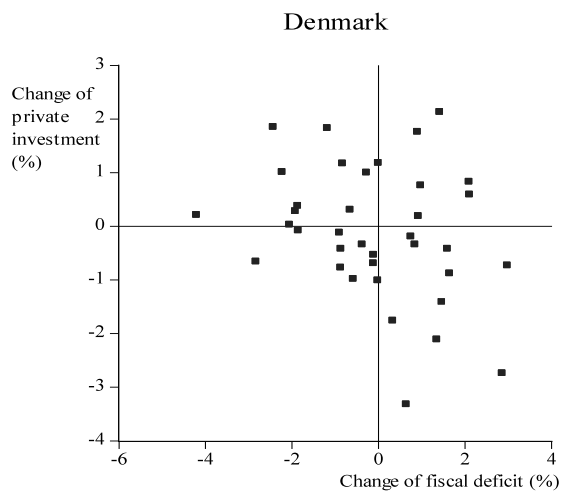
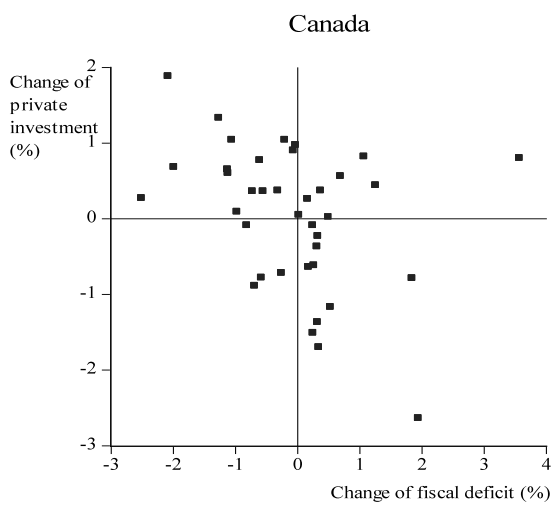
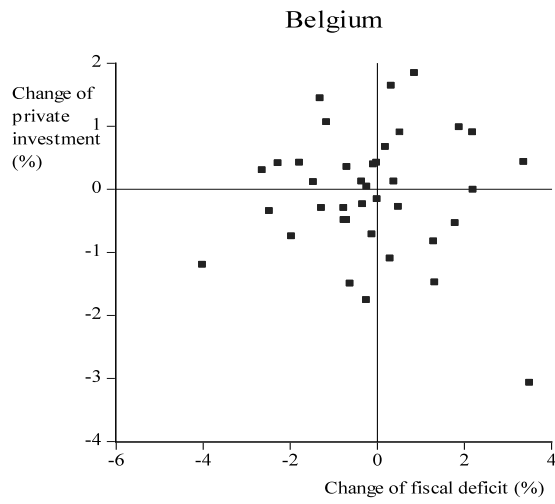
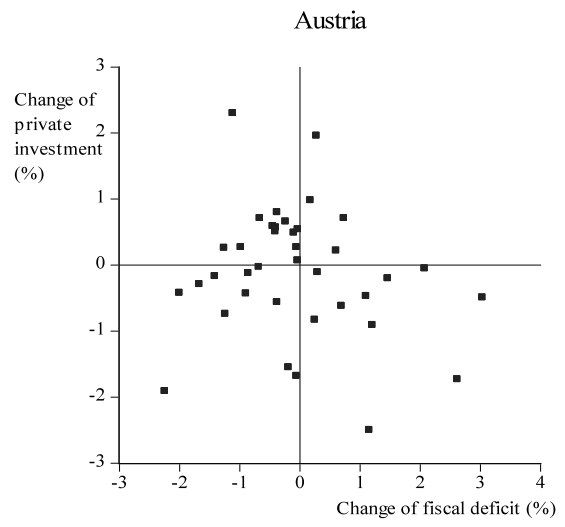
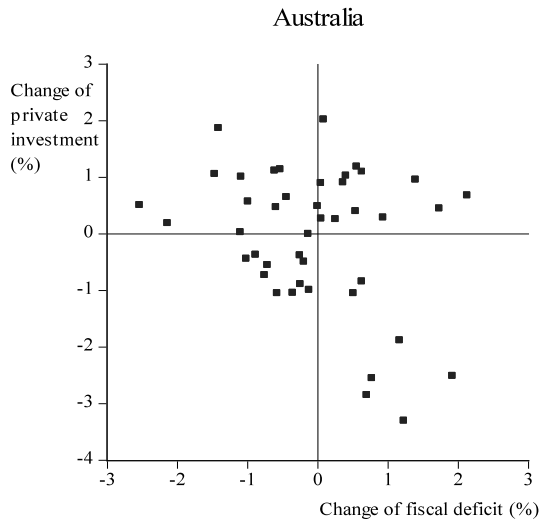


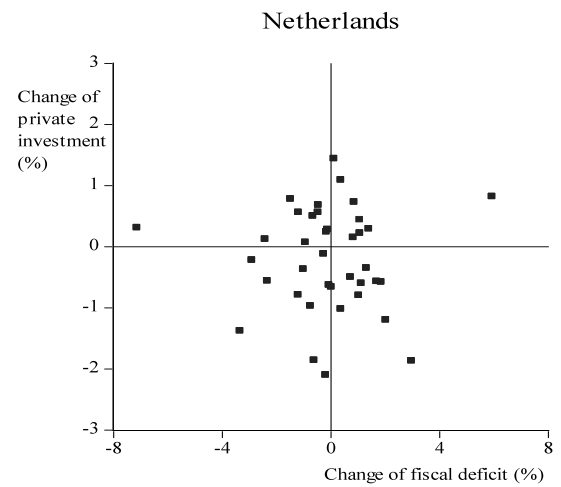
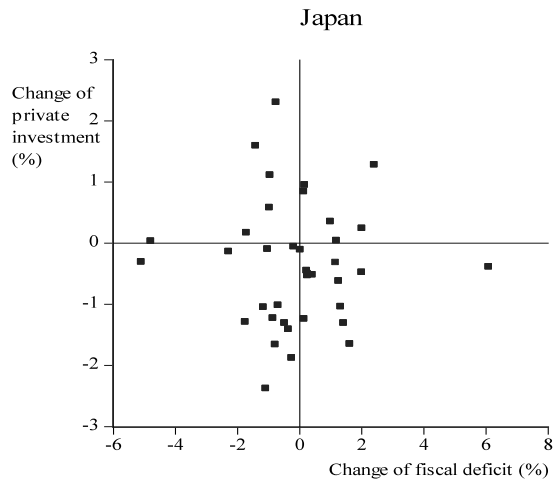
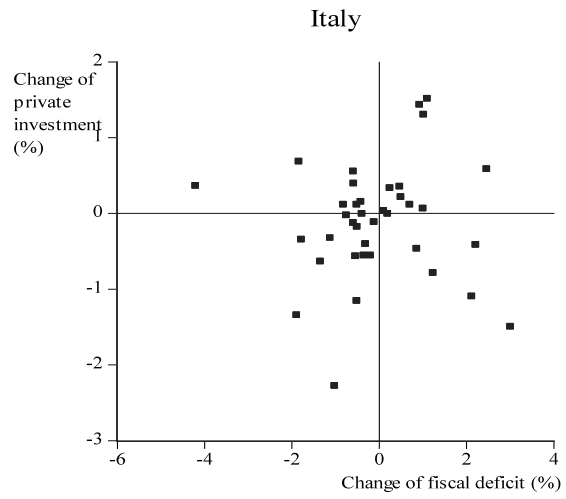
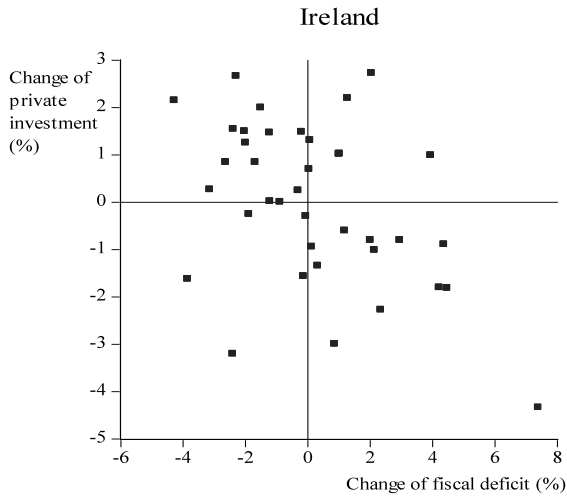
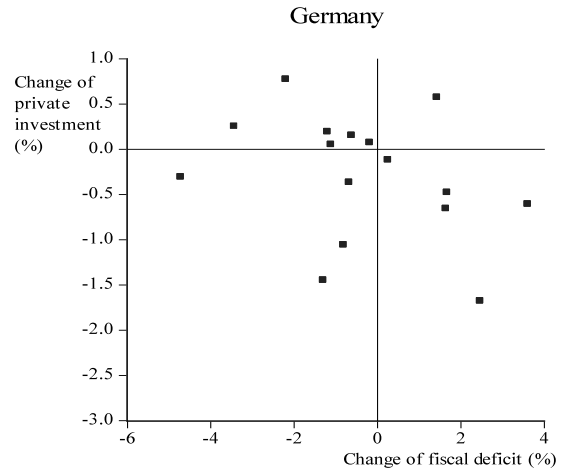
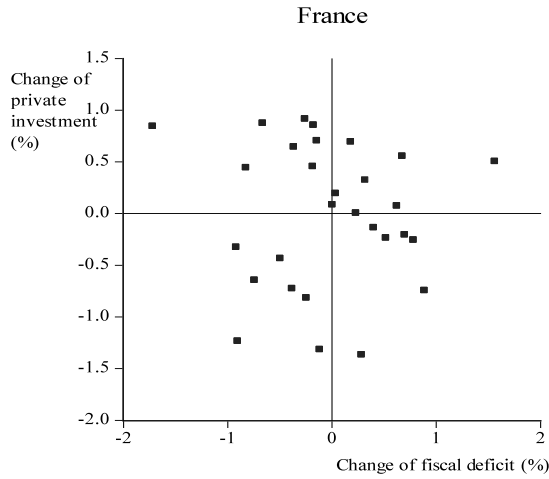


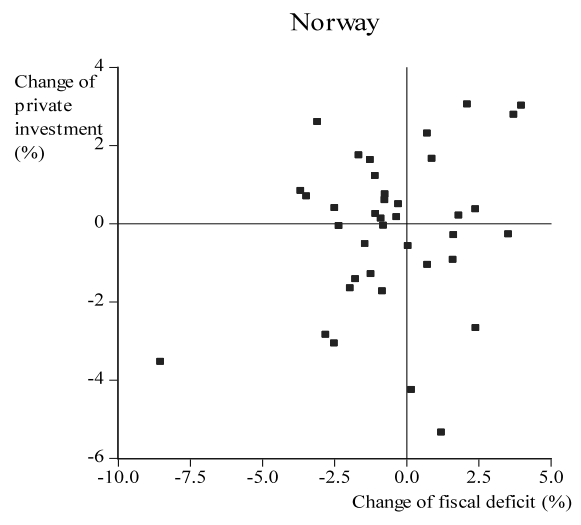
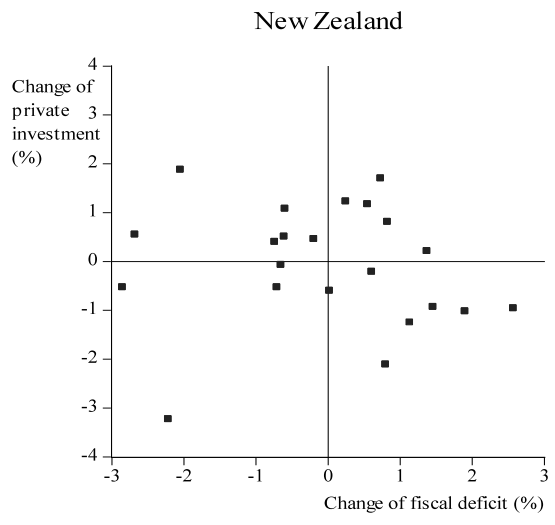


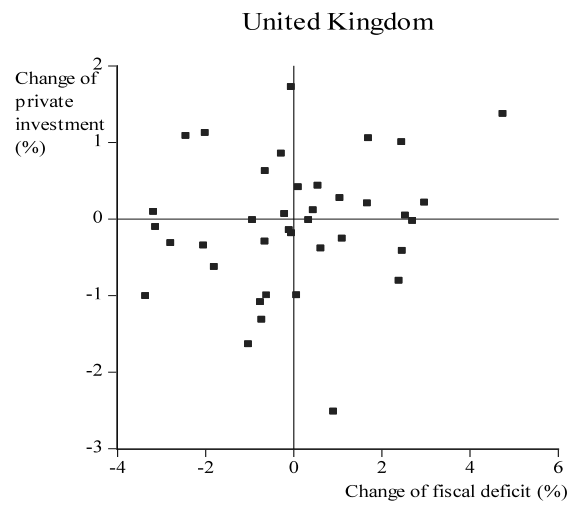
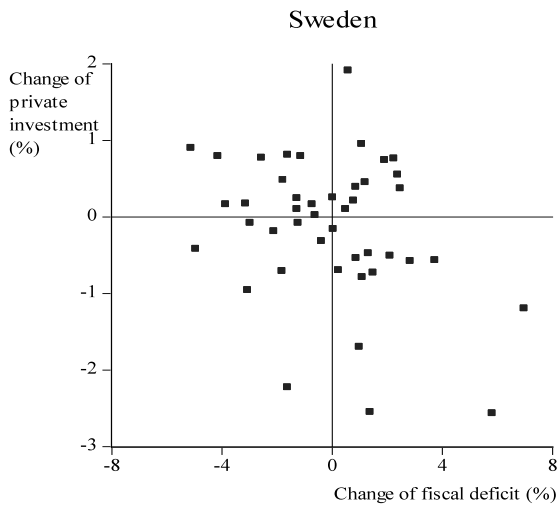
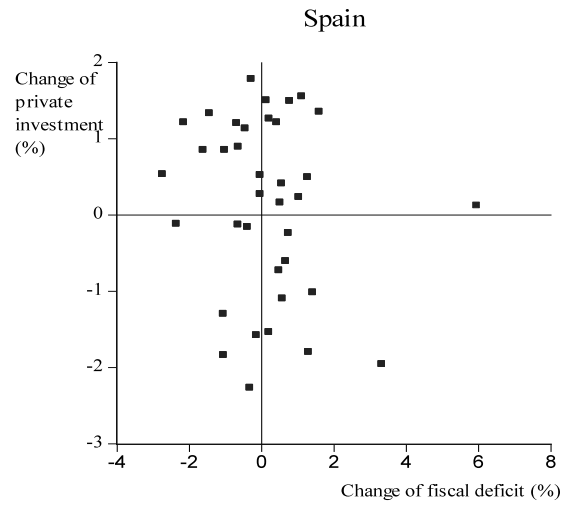
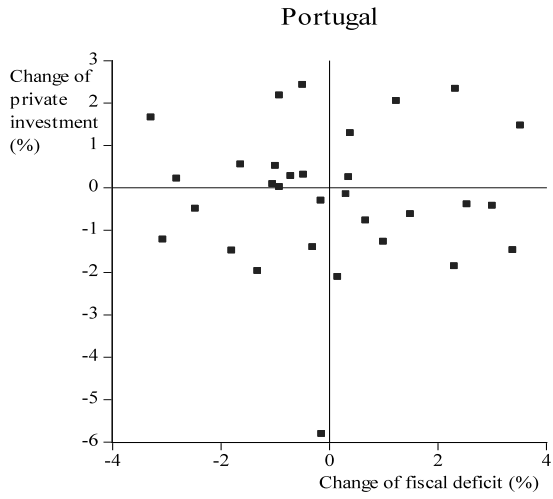


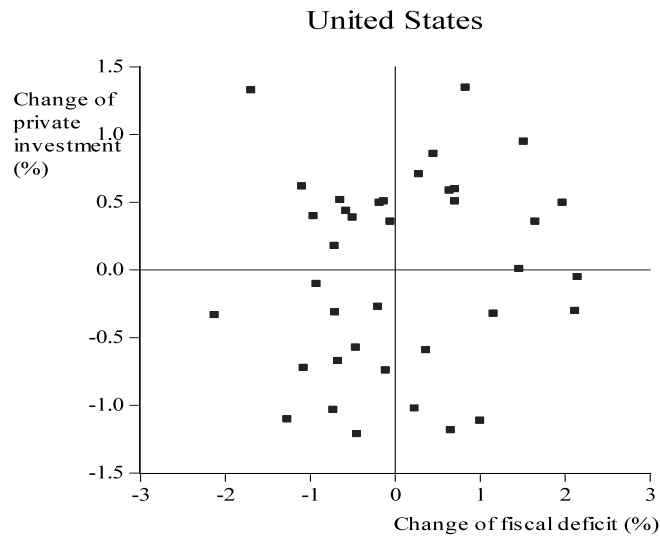
Private investment and cyclically-adjusted budget surpluses











Appendix C

The data and their sources

General government net borrowing or net lending (% of GDP): OECD

Gross fixed capital formation (% of GDP): OECD

Rate of Unemployment as % of Civilian Labor Force: OECD

Private consumption, households and non-profit institutions serving households: OECD

Government consumption: OECD

General government gross financial liabilities (% of GDP): OECD

Share prices, index: IMF