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Authors(s)
Hogan, Vincent (Vincent Peter)

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Expanssionary Fiscal Contractions?

Vincent Hogan*

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Abstract

We examine the usefulness of the Expansionary Fiscal Contraction hypothesis in explaining the performance of the Irish and Danish economies. We find some evidence in favour of a weak version of the EFC hypothesis: If the budget deficit is reduced in response to a fiscal crisis, consumption does seem to increase. However this increase is not enough to offset the direct effect of a reduction in the deficit on output—fiscal contractions are not literally expansionary.

*Department of Economics, University College Dublin, Dublin 4, Ireland. vincent.hogan@ucd.ie. I am grateful to Karl Whelan of the Board of Governors of the Federal Reserve for many key insights. All remaining errors are mine.
1 Introduction

The requirements for large fiscal adjustments has become one of the most important themes in macroeconomic debates worldwide. The past two decades have seen an unprecedented peace-time increase in public debt ratios and the IMF (1996) has stressed the need for fiscal consolidation in a wide range of industrial countries. In Europe, discussions surrounding EMU have concentrated largely on the Maastricht budgetary requirements. In the US, there is much discussion of balancing the federal budget and tackling entitlement programs. Given this background, it is a good time to explore the hypothesis put forward by Giavazzi and Pagano (1990) that large fiscal contractions can potentially be expansionary.

Several different, although related, theories have been advanced to explain how fiscal contractions may be expansionary. The first, which Giavazzi and Pagano (henceforth, GP) call the “German view” of fiscal policy, after Fels and Froelich (1986), suggests that reductions in government spending can be expansionary due to their effects on private sector expectations concerning taxation. If forward-looking consumers and investors anticipate long-run tax reductions because of cuts in expenditure, then they may increase expenditure now and so offset the demand-side effects of fiscal contraction. Blanchard (1990) proposed an extension to the basic EFC hypothesis: if tax increases unexpectedly stabilize debt now and thus avoid a later, more painful, stabilization involving larger increases then the change in expectations could prove expansionary. Blanchard’s model implies that such an outcome is most likely to be seen when economies are “close to the edge” with high debt-GDP ratios.

As support for the first expansionary fiscal contraction (EFC) theory, GP (1990) present the experiences of Ireland and Denmark, both of which combined severe fiscal contraction with strong output performance. However, a common feature of these expansionary fiscal contractions was a large devaluation prior to the adjustment implying that it was possible that the expansions were really due to increases in net exports. Furthermore, in a further refinement of the EFC hypothesis, Alesina and Perotti (1995, 1997) study a wide range of fiscal adjustment experiences and find that the adjustment programs most likely to succeed in stabilizing debt levels are those which cut expenditure. They indicate that such programs succeed not because they reduce deficits by more but rather because they lead to higher growth.

Most the theories of EFC concentrate on explaining why consumption might increase in response to a fiscal contraction. This need not imply that output is actually rising. So for example, following a cut in government
consumption, private consumption may rise due to some EFC mechanism. But it is quite possible, indeed likely, that this consumption effect is not large enough to offset the direct effect of the cut in government consumption so that output falls.

The principal econometric evidence that has been put forward has taken the form of consumption (or savings) function analyses. GP (1990) suggest that the Irish and Danish stabilization were associated with large residuals from estimated consumption and investment functions. GP (2000) perform a multi-country analysis of consumption and indicate that if fiscal actions are large and persistent then fiscal policy will have non-Keynesian effects on consumption.

This paper explores the empirical basis for EFC theories by focusing on the experiences of Ireland and Denmark – the two countries whose economic performance during the 1980s lead to the formulation of EFC hypothesis. We review the Irish and Danish evidence in the light of the more recent experience. We focus on two specific countries in contrast to most of the recent literature which has tended to focus on pooled cross country and panel data analysis. We believe our approach has the potential to capture important country specific effects which will be missed in panel data models.

Section two takes a first look at the Irish and Danish data. We assess whether it is plausible to attribute the output performance during these episodes to non-Keynesian effects of fiscal policy or whether other factors offset traditional Keynesian effects. Section three takes a more formal approach by estimating country specific savings function and testing several different versions of the EFC hypothesis. Section four concludes.

2 A First Look at the Data

2.1 The Irish Case

The recent performance of the Irish economy is illustrated in Figure 1. Broadly speaking the performance in the up the late 1980s was exceptionally bad while performance throughout the 1990s was exceptionally good. The turning point came in 1987, by this time the course of fiscal policy had become unsustainable and the Irish public finances were in very serious trouble. The debt-GDP ratio was nearly 120%, the budget deficit equalled 10.8% of GDP. Growth was negative and the unemployment rate stood at 17%.

1The data for Figure 1 are from the IMF’s International Financial Statistics CD-ROM with the exception of the unemployment data which come from the OECD Economic Outlook diskettes
The election of a new government in early 1987 saw a shift in macroeconomic policy. A sharp fiscal contraction was introduced aimed at restoring stability to the public finances. A national wage agreement delivered wage moderation was agreed and exchange rate policy, after an intra-EMS devaluation in 1986, was aimed towards maintaining stability within the EMS. As Figure 1 shows, the Irish fiscal contraction featured substantial cuts in public expenditure. By 1989, public expenditure was more than 10 percentage points below its 1986 level as a share of GDP. Indeed, by 1989, these expenditure cuts had translated into a decline in the tax share of GDP despite the large reduction in the deficit.

This period also saw stability relative to the DM which lead to a gradual decline in the differential between Irish and German interest rates (although the reduction in real interest rates was smaller). Furthermore, despite the large fiscal contraction, sustained growth resumed in 1987 for the first time since the late 1970s and both the debt-GDP ratio and the unemployment rate began to decline rapidly. By 1990, it was clear that the fiscal crisis had been averted and the Irish economy was experiencing unprecedented rates of economic growth.

The fact that the extreme fiscal contraction of this period was accompanied by an impressive growth performance provides some evidence that the fiscal contraction was the cause of the economic expansion, although GP also give the competitive effects of the 1986 EMS devaluation some role in their explanation. Furthermore, the fact that this stabilization was achieved by expenditure cuts rather than by increases in taxation is consistent with Alesina and Perotti (1996,1997).

The Irish experience appears at first glance to conform well to the first EFC theory outlined above: the reductions in the expected tax burden associated with the fiscal adjustment may have produced a positive response from consumers and investors thus leading to strong economic growth. However, a closer inspection of the data reveals that the evidence is not so clear. Table 1 breaks down the growth in GDP into its expenditure components, consumption (C), investment (I), government consumption expenditure (G), exports (X) and imports (M). It also shows the contribution of each of these components to overall growth in GDP (the numbers on the right-hand side of the table add together to give growth in GDP). Thus table 1 describes exactly where the sources of growth in the components of GDP came from during the period around the 1987 stabilization.

The year 1987 was the first year of the stabilization program and also the first year of the resumption of strong growth. Growth in Real GDP of 4.56% was made up of negative contributions of 0.2% from investment and 1.01% from government spending on goods and services; private consump-
tion expenditures contributed 2.1% but growth in imports took 2.95% away. Thus, domestic expenditure on domestic goods and services actually declined (contributing negative 2.06% to growth) - the classic Keynesian outcome!

The data quickly reveal that the impressive growth in GDP was largely driven by the performance of exports, which grew by 12.86%. Because of the extreme openness of the Irish economy - in 1986 the sum of imports and exports equalled 124% of GDP - this contributed a massive 6.24% to the figure for GDP growth: had exports remained flat during 1987, there seems to be little doubt that the Irish economy would have been in severe recession. Subsequent years also tell the same story. Strong export growth continued to stimulate the economy during 1988 and 1989. Investment remained flat until 1989 and consumption growth was moderate given the overall growth rate. Table 1 tells us that the picture of a domestic demand-driven boom in Ireland is not the full story.

What caused the strong export performance? Undoubtedly one reason was the fast growth in the UK. GP have focused on the role of exchange rate policies in influencing competitiveness, noting “it is remarkable that in both our cases of ‘expansionary contractions’ the shift in fiscal and exchange rate policy were preceded by a sizeable devaluation”. In fact the nominal effective exchange did not depreciate by much during this period. However the real effective exchange rate measured by unit labour costs declined substantially. This was due to sizeable gains in productivity and also the fact that wages were restrained both by a national wage agreement and exceptionally high unemployment. Thus, as the last panel of Figure 1 shows, the level of competitiveness improved dramatically throughout the 1980s.

It would appear then that Ireland’s fiscal contraction was lucky enough to come during a period in which its largest export market experienced very strong growth, the establishment of credibility by joining the EMS reduced real interest rates and output was well below potential levels depressing wages. One can also note that, since the fiscal adjustment, growth in Ireland has averaged over 5% a year, well above the OECD average. This suggests that the supply-side conditions for rapid growth were in place, something which may not be true in other countries currently contemplating budgetary

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2 In 1987 the UK economy grew at 4.76% while in 1988 it grew at 4.98%, rates far above its post-1973 average of 1.62%.
3 The reason for this was that the substantial devaluation of punt within the EMS during 1986 was offset by the depreciation of Sterling against the DM.
4 Though such measures are obviously fairly speculative, OECD Economic Outlook estimates the gap between actual and potential Irish GDP in 1986 to be 5.2% of GDP. For comparison purposes, the US output gap was 5.5% during the severe 1982 recession. Such a depressed state of the economy would likely have encouraged competitiveness.
adjustment.

2.2 The Danish Case

Figure 2 illustrates the recent performance of the Danish economy.\(^5\) A brief summary of the facts concerning the Danish fiscal contraction is as follows. In 1982, Denmark’s debt-GDP ratio was 65% and rising rapidly with a budget deficit equal to 8% of GDP. A series of upward revisions of the public sector deficit had lead to uncertainty in financial markets concerning the sustainability of the Danish public finances. The inflation rate had been reduced by less than in other EC countries and Danish exchange rate policy had involved a number of devaluations during the previous years. Long-term interest rates stood at 22% and the credit rating on Danish foreign debt had been downgraded.

The election in October 1982 of a Conservative coalition lead to a turnaround in macroeconomic policy. The program had much in common with its Irish counterpart. There were three elements (OECD, 1984). Firstly, the new government set out to reduce the budget deficit. Secondly, the currency was roughly fixed to the DM within the EMS and exchange controls were removed. Thirdly, an incomes policy was introduced in an attempt to tackle inflation and help competitiveness. The fiscal imbalance was tackled gradually: the deficit was reduced to 6.7% of GDP during 1983 and had moved into surplus by 1986. However, unlike the Irish experience, tax increases were the principal tool in this fiscal stabilization: tax rates were raised and the tax base broadened. The result was a permanent upward movement in the tax share of GDP as shown in the first panel of figure 2. There was restraint in public expenditure, leading to a decline in its share of GDP. However, despite the fiscal contraction the economy’s growth was relatively strong: growth averaged 3.6% between 1983 and 1986, fueled by strong domestic demand.

GP (1990) argue that consumption increased despite the increase in taxes because of a fall in interest rates. They also show that consumption was higher than predicted during the years after the stabilization. However, this consumption residual was small and even if it was completely due to fiscal contraction, it would have had a far smaller effect on domestic demand than the direct effect of deficit reduction.

Like the Irish case, export growth was strong during the stabilization despite moderate European growth during this period. Unlike the Irish case

\(^5\)The data for Figure 2 are from the IMF’s International Financial Statistics CD-ROM with the exception of the unemployment data which come from the OECD Economic Outlook diskettes.
there was indeed a large devaluation in the effective exchange rate during the years prior to the adjustment. Curiously, however, when account is taken of productivity, this translated into a real appreciation over the period of the stabilization.

Table 2 (which replicates the calculations of Table 1 using the corresponding Danish data) shows, there is evidence that domestic demand played a larger role in the Danish expansion than it did in Ireland. For example in 1983, strong consumption growth contributed 1.3% to GDP growth. This coupled, with near flat government consumption and a small rise in investment and relatively slow import growth, overall domestic expenditure contributed 1.12% to growth.

The reduction in real interest rates during this period also seems to have played an important part in strengthening domestic demand during this period. It also appears that the reduction in real interest rates was largely due to shifts in exchange rate policy.

Thus, the Danish experience does not necessarily tell us that the fiscal contraction was expansionary in the sense of the EFC hypothesis i.e. that private individuals increased current consumption in anticipation of lower future taxes. Instead it seems that fiscal stabilization combined with a credible monetary policy reduced interest rates which boosted consumption and investment in a standard Keynesian fashion.

2.3 Summary

What emerges from looking closer at the examples EFC originally given by GP is that in each of these cases there are several factors which may have offset the effects of fiscal policy to produce apparently non-Keynesian outcomes – only one of those factors being the EFC mechanism. The high rate of economic growth accompanying the Irish stabilization was largely driven by strong export performance which in turn was driven by wage restraint and productivity gains. Contrary to what we might expect during an EFC episode, Irish domestic demand was relatively flat and failed to exhibit non-Keynesian properties. The Danish stabilization, on the other hand, did feature strong domestic demand but it is difficult to unravel the separate effects of fiscal and monetary policy during this period of falling real interest rates.

Furthermore, despite the much-quoted statement that both Irish and Danish stabilizations were preceded by large devaluations (see for instance Alesina and Perotti (1995), IMF (1996, pg. 60)), the real effective exchange rate actually appreciated over the course of the Danish adjustment.
So on the basis of a first look at the data the evidence for the EFC hypothesis is actually quite week. There were clearly other factors at work also and they were probably more important than the EFC mechanism. However, just because it was not the dominant factor, does not imply that the EFC was absent. In order to assess this we now turn to more formal econometric evidence.

3 Econometric Evidence

3.1 Fiscal Policy and Savings

In this section we estimate a specification close to that of GP(2000), but apply it separately to Irish and Danish data rather than to a cross section of OECD countries. We do this because it is of interest to see whether Ireland and Denmark, the two countries that sparked interest in EFC, still support the hypothesis in its more recent formulations. More importantly a country specific study has an advantage in that it allows for coefficients to differ across countries. Pooling data across countries may be inappropriate because of institutional differences across countries not captured by fixed effects. There is no reason to expect that the effect of fiscal policy on savings should be the same or even similar in different countries. Furthermore, this issue is of particular importance when investigating the EFC hypothesis, precisely because EFC are events that we suspect only in unusual times in certain countries. The “average” coefficients estimated from pooled data sets will hide differences between countries with and without EFC. Of course estimating the relationship separately for different countries has an obvious cost: the consequent loss of degrees of freedom, may prevent us from identifying an EFC effect if it is small.

We follow Giavazzi and Pagano (1996,2000) and estimate national savings and consumption regressions interacting the fiscal variables with various other variables that capture the potential for non-linear effects. We allow for possibly non-linear effects of fiscal policy. For example, Blanchard (1990) suggests that the EFC will be more likely to operate in times of fiscal crisis defined as when the debt-GDP ratio reaches some critical level. The literature also suggests\(^6\) that successful adjustments were more likely to concentrate on expenditure cuts and less likely to increase tax rates. In addition expenditure-cutting adjustments have also be found to lead to a slight acceleration of growth after the adjustment in contrast to the decline in growth.

\(^6\)See Alesina and Perotti (1996), Perrotti (1997) for example.
seen for other adjustments. For this reason we include taxes government consumption and transfers as separate variables in some of the regressions.

Before proceeding, we briefly review what the various theories predict will be the effect of fiscal policy on savings. Broadly speaking the effects of taxes (T), transfers (TR) and government consumption (G) on savings (S) will depend on the planning horizon of households and their expectations. In a fully specified model of infinitely lived agents (or dynastic household with bequests) fiscal policy will have no effect on national savings i.e. $S_G = S_T = S_{TR} = 0$, where the subscript indicates the partial derivative. Any change in the government’s surplus will simply crowd out the savings of private agents who know that increases in the surplus today facilitate decreases in the surplus at some point in the future. This is the well known case of Ricardian Equivalence.

In finite horizon models (e.g. Over-Lapping Generation models without bequests) an increase in taxation will reduce the life time income of the current generation leading to a reduction in private savings and consumption. But because private agents pay some of the taxes via a reduction in consumption, the increase in government savings exceeds the reduction in private savings. Therefore national savings will rise ($S_G < 0$, $S_T > 0$, $S_{TR} = -S_T < 0$).

There is a third set of models (for convenience referred to as Expectations Models) which predict that fiscal policy can have perverse (perhaps even non-linear) effects on national savings. It is these models that provide the theoretical rationale for EFC hypothesis. For example if the current fiscal deficit is unsustainable, savings may be very high in anticipation of a looming financial crisis which would lead to a decline in real living standards. In this scenario any decrease in the deficit to an extent sufficient to assure private agents that a crisis has been averted, may cause them to reduce savings and increase consumption. If this reduction in private sector precautionary savings is large enough, it may dominate the increase in government savings from the fiscal consolidation and lead to a reduction in national savings ($S_G > 0$, $S_T < 0$, $S_{TR} > 0$). Thus the effect of fiscal policy on savings could reverse sign in times of financial crisis.

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7 National savings is defined as the excess of Gross National Income over the sum of private consumption and government consumption. For a comprehensive review of impact of fiscal policy on savings in different models, see Giavazzi and Pagano (2000).

8 $S$ is National Savings $S = S_{priv} + S_{pub} \equiv (Y - T - C) + (T - G) \equiv Y - C - G$

9 This is true to a first approximation, fiscal policy can still have an effect if taxes are distortionary.

10 The exact definition of financial crisis varies from model to model. For example, Blanchard (1990) thinks of a crisis occurring when Dbet-GDP reaches a critical level. Alesina
In these models we get the apparently perverse result that an increase in the government budget surplus can reduce national savings. Thus if we find evidence that sign of the effect of fiscal policy does reverse, then we will have evidence of the existence of mechanism for EFC.

However it is important to note that the presence of an EFC effect for consumption (or savings) does not necessarily imply that a fiscal contraction will lead to an expansion of output. In order for a fiscal consolidation to be expansionary in the sense of increasing output the effect on consumption (savings) must not only be positive (negative) but sufficiently large so as to dominate the direct effect of the contraction on GDP. To be clear, let $\theta$ be the direct effect of government consumption ($G$) on private consumption ($C$). Normally we would expect $\theta = 0$ i.e. once we control for income, government expenditure has no effect on private consumption. The effect of $G$ on National Savings, $S$, is given by $-(1 + \theta)$. In most estimated models where evidence of EFC is found (See GP 2000) the estimates of $\theta$ fall in the range $-1 < \theta < 0$ generating the perverse effect of $G$ on $C$ or $S$. However, the output multiplier has the same sign as $(1 + \theta)$ and so still has an orthodox positive sign albeit smaller in magnitude. In order to have a fiscal contraction that actually leads to an expansion in output we must have $\theta < -1$ or equivalently $S_G > 0$. It is worth noting that none of the coefficients estimated in GP1(1996,2000) are large enough to generate a negative multiplier. In fact the term “Expansionary Fiscal Contraction” seems to have come to refer to the effect on consumption rather than the net effect on output.

In the following subsections we estimate savings functions for Ireland and Denmark. Our specification nests the three sets of models discussed above and follows GP (2000). Our analysis differs from theirs in that we use data from International Financial Statistics CD ROM rather than OECD as the former is available for a longer period – and degrees of freedom are crucial in a country specific study. Table 3 reports the exact series used and the transformations of the data.

### 3.2 Ireland

Table 4 shows regressions of the national savings rate on its lag, the output gap the real interest rate, government consumption and taxes net of transfers and Perotti (1996) think of a crisis being singled out by large changes in the deficit.

11If $Y = C(Y,G) + I + G$ and $S = Y - C - G$ then $\frac{dY}{dG} = \frac{1+\theta}{1-C_Y} = \frac{-S_G}{1-C_Y}$

12For Ireland the full set of variables from the OECD database is available for the period 1977-97. For Denmark the OECD data begins in 1981. The IFS data is available from 1960. The data on Irish national debt is taken from the Irish Government’s National Treasury Management Agency Website: www.ntma.ie
and various interactions. The lagged savings rate is expected to capture the dynamics of the system. The output gap variable accounts for the effect of transitory changes in income on national saving. All the variables (except real interest rate) are scaled by potential GDP so as to be in units consistent with Giavazzi and Pagano (2000).\(^{13}\) Note that the variables are not in logs. The interaction terms capture the possibility that fiscal policy may have non-linear effects on savings.

One problem with these estimates is that they do not account for potential endogeneity of the tax rate. While government consumption is likely to be exogenous the level of taxes and the level of transfers are likely to respond to the overall state of the economy via automatic stabilizers and also via deliberate changes in government policy in response to the economic situation. In order to overcome this problem we estimated the savings function instrumenting using lagged values of the variables and a measure of the cyclically adjusted fiscal surplus calculated by the OECD. The resulting point estimates were similar to those presented in table 4, but unfortunately none were significant. We feel that this lack of significance is mostly an artifact of the lack of observations.\(^{14}\) Furthermore Giavazzi and Pagano (1996) report that their estimates are not very robust to alternative sets of instruments. Therefore we do not report the results of the IV estimation.

The first column of table 4 reports the results of the basic regression without any interaction effects, estimated by OLS on the Irish data. The results are broadly consistent with Giavazzi and Pagano (2000). The estimate of the effect of the lagged savings rate confirms their result that the long run effect of savings determinants are approximately twice the short run effects. The estimate of the effect of the output gap is correctly signed, but insignificant. As we would expect temporary increases in GDP relative to potential GDP tend to raise both public and private savings. The point estimate of the effect of net taxes on national savings is very close to theirs (although here it is insignificant). However, the effect of government consumption expenditure is much less negative here (−0.34 against −0.73) and this difference is significant. This is interesting because a negative coefficient is what we would expect from an orthodox finite horizon model. So it appears that Ireland, while conforming to the finite horizon model, does so to a lesser extent than the rest of the OECD. This suggests that the expectations mechanism may operate in Ireland to a greater extent than it does in the OECD on aver-

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\(^{13}\)Potential GDP is defined as GDP passed through a Holdrick-Prescott Filter. Giavazzi and Pagano (2000) used the OECD’s potential output series, which is virtually indistinguishable from ours.

\(^{14}\)In particular the OECD’s measure of the cyclically adjust budget surplus is only available for 20 years.
age. Note that this result is obtained without explicitly isolating those crisis episodes where the expectations hypothesis would be expected to dominate.

There is a danger that a regression such as that in column one of Table 4 could be inconsistent due to the presence of unit roots in several of the variables. Giavazzi and Pagano (2000) maintain that the lagged savings term is sufficient to account for the dynamics of the system, while in their 1996 paper they include lags of the fiscal policy variables. Including lags here results in all coefficients being insignificant almost certainly because of the loss in degrees of freedom. Alternatively we estimate the equation with all variables replaced by their first differences. In the interest of brevity the results are not shown, but are not substantially different from the regression in level terms.\footnote{\textit{A first difference specification would lead to inconsistent estimates if there was a co-integrating relationship between the variables. A Johansen test does not allow us reject (at the 5\% significance level) the null that there is at least one co-integrating vector. An Error Correction Model produces coefficients on fiscal policy variables not significantly different from Table 4.}}

The other regressions in table 4 allow us to test the hypothesis that the relationship between savings and the fiscal policy variables is different in times of crisis. In the second column we examine the possibility that the effect of fiscal variables is different during periods of large adjustment.\footnote{\textit{We adopt a similar approach to Alesina and Perotti (1996) and define a large adjustment to be a change in the cyclically adjusted budget deficit greater than 1.5\% of GDP. For Ireland these adjustments occurred in 1984 and 1987-89.}} The first thing to note is that the coefficients on the interacting term are insignificant. However, this is not the end of the story. The inclusion of the interaction terms allows the effect of taxes in ordinary times to become positive, significant and close to that estimated by Giavazzi and Pagano (2000). This suggests that, in normal times, net taxes have an entirely orthodox “finite horizon” effect on savings. But outside of normal times the magnitude of this effect is reduced to some extent. Thus when we fail to distinguish between normal and crisis times, as in column one, we get an effect statistically indistinguishable from zero. We cannot get an accurate measure of the effect of large stabilizations directly because we do not have enough observations of crisis periods, but nonetheless we can verify its presence. Thus we have some evidence of non-linear effects of fiscal policy induced by the expectations. There is therefore some support from the Irish data for the EFC hypothesis. But note that there is no evidence to suggest that the output multipliers are negative i.e. $S_G$ is not positive.

The third column of table 4 examines the possibility that the effect of the fiscal policy varies with the level of debt. We might expect that at low
level of debt the orthodox finite horizon model may apply. But when debt reach crisis levels, the expectations model dominates, agents cast a wary eye on the future and respond to anything that may stabilize the situation with a reduction in (precautionary) savings. In order to examine this possibility, we interact the ratio of debt to potential GDP with the two fiscal policy variables.

The results are quite striking, indicating that the effect of fiscal policy is highly non linear. The interaction terms are significant as are the level terms. In order to clarify the effect of fiscal policy consider two scenarios: A low debt scenario (where debt is 25 percent of potential GDP) and high debt scenario (where debt is 85 percent of potential GDP). During periods of low debt, increases in net taxes lead to an increase in the savings rate of 
\[1.23 - 0.25 \times 2.1 = 0.71\] approximately as we would expect from the finite horizon model. During periods of high debt, however, increases in net taxes have a large negative effect on the savings rate. This is not what we would expect under the normal finite horizon model, but it is what we would expect to see during expansionary fiscal contractions driven by the expectations model. When it seems that a government is tackling the debt crisis by increasing taxes, private agents feel secure in increasing their consumption and reducing their savings.

The effect of government consumption expenditure is less clear cut. It is tempting to cite the positive coefficient on the level effect as evidence of a negative multiplier – but this would be true only when debt is zero. In the low debt scenario the net effect of an increase in government consumption is to reduce national savings by 
\[0.91 - 0.25 \times 4.1 = -0.12\] approximately what we would expect from a standard finite horizon model. In the high debt environment the effect of an increase in government consumption is much larger at 
\[0.91 - 0.85 \times 4.1 = -2.58\] This is a curious result. We might expected that an increase in government consumption during times of fiscal crisis would aggravate the crisis, inducing private agents to increase their precautionary savings (or at least reduce their savings by less than they would in ordinary times). Instead we find precisely the opposite.

The fact that we get a negative coefficient on government consumption during times of high debt coupled with the fact that the coefficient on government consumption in column 2 of table 4 was unaffected by the inclusion of interaction terms suggest that individuals focus on taxes when deciding

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17 The ratio of Debt to potential GDP in Ireland was 25 percent in 1979 and 85 percent in 1987. These dates can be regarded, respectively, as being the start of the down-turn, and the beginning of the up-turn in the economy.

18 Strictly speaking it is possible for private savings to rise and national savings to fall because of the reduction in the government’s surplus. But that doesn’t seem very likely.
on consumption plans. This is not entirely consistent with the a strict interpretation of EFC hypothesis. Government consumption is taken to imply future taxes, so individuals should react to large changes in it. This result, is however, consistent with the observations of Alesina and Perotti (1995,1997).

They noticed that the more successful stabilizations tended to be based on cuts in transfers (here included in “net taxes”). If this is true we would expect to see a greater effect from a big change in taxes rather than from a big change in government consumption.

In order to examine this issue further we separate net taxes into its two components: gross taxes and transfers. Thus government consumption and transfers together account for what non-economists would consider as government expenditure. Economic theory would suggest that agents should treat transfers as negative taxes and so the two variables should enter with coefficients of the same magnitude but opposite signs.

Column 4 of table 4 shows the results of a regression with the two components of net taxes separated and interacted with the level of debt and a dummy for large fiscal adjustment. Column 4 shows that for their level effects taxes and transfers are indistinguishable being of the same magnitude and of opposite signs – as expected. The coefficient on the transfer variable is also different from the coefficient on the government consumption variable indicating that agents react differently to the two types of government expenditure, as we would expect.19 The interactions with the “large adjustment” variable are insignificant with the exception of the gross tax variable. Thus during large adjustments, the effect of an increase in gross taxes on national savings is negative (0.96−1.34 = −0.38) and significant whereas it is positive during normal times (0.96). Again this provides some evidence for the EFC hypothesis - an increase in taxes shows that the crisis is being dealt with and leads to a reduction in precautionary savings.

We can also look at the effect of the fiscal variables during times of high vs. low debt. The results are similar to those of column three. Increases in government consumption cause savings to fall during times of low debt and, curiously, even more so during times of high debt. Again there is no evidence that the multiplier is negative for any historically observed level of debt. The effect of an increases in taxes is now no different in times of high debt than in times of low debt. The effect of transfers does differ between high and low debt periods. A reduction in transfers during a period of low debt will lead to a increase in savings (\(S_{TR} = -0.97 + 0.25 \times 1.83 = -0.51\)) as predicted by a finite horizon model where transfers are viewed as a negative

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19A Wald test of null hypothesis that both coefficients are equal generates a p-value of 0.44.
tax \((S_{TR} = -S_T < 0)\). During periods of high debt, however, a reduction in transfers will lead to a decrease in savings \((S_{TR} = -0.97 + 0.85 \times 1.83 = 0.59)\). This is what we expect from the EFC hypothesis – reductions in transfers assures agents that the crisis is past and allows a reduction in precautionary savings. Furthermore these results support the evidence accumulated by Alesina and Perotti (1997) that stabilizations based on increases in gross taxes tended to fail whereas those that cut transfer programmes seemed to prove more credible and tended to be successful.

### 3.3 Denmark

The first column of table 5 reports the results of the basic regression without any interaction effects, estimated by OLS on the Danish data. As in the Irish case, the results are broadly consistent with Giavazzi and Pagano (2000). The estimate of the effect of the lagged savings rate suggest that the long run effect of savings determinants are approximately five times the short run effects. The estimate of the effect of the output gap is correctly signed, and significant – public and private savings rise in response to a positive shock to GDP. The effects of net taxes and government consumption expenditure on national savings are not significantly different from zero, although their point estimates are consistent with the finite horizon model. This insignificance is a little surprising given that Denmark was one of the two countries whose experiences lead to the formulation of the EFC hypothesis.\(^\text{20}\)

The other regressions in table 5 test the hypothesis that the relationship between savings and the fiscal policy variables is different in times of crisis. The second column examines the possibility that the effect of fiscal variables is different during periods of large adjustment (with “large” defined as before).\(^\text{21}\) The first thing to note is that the coefficients on the interacting term are significant whereas the coefficients on the level terms are not (although they have the sign predicted by the finite horizon model). This suggests that, in normal times, net taxes and government consumption have entirely orthodox “finite horizon” (or zero) effects on savings. Outside of normal times the sign of the effect changes. Thus we have some evidence of non-linear effects of fiscal policy induced by the expectations – and some support from the Danish data for the EFC hypothesis. In fact what is interesting is that in crisis time the net effect of increases in government consumption is positive \((S_G = -0.24 + 0.38 = 0.14)\). This implies that the fiscal policy multiplier is negative during times of crisis.

\(^{20}\)As in the Irish case, including lags of the fiscal policy variables or estimating the equation in first differences, has no substantial effect on the results.

\(^{21}\)For Denmark, large adjustments occurred in 1983-86.
The third column of table 5 examines the possibility that the effect of the fiscal policy varies with the level of debt. In contrast to Ireland, all the fiscal policy variables and their interaction are insignificant. This is almost certainly due to the fact that we only have 16 observations of debt available for Denmark.

Column 4 of table 5 shows the results of a regression with the two components of net taxes separated and interacted with a dummy for large fiscal adjustment. Column 4 shows that for their level effects taxes and transfers are insignificant, but their point estimates are of the same magnitude and of opposite signs – as we would expect. As with Ireland, the interactions with the “large adjustment” variable are insignificant with the exception of the gross tax variable. Thus during large adjustments, the effect of an increase in gross taxes on national savings is negative and significant whereas it seems positive (or zero) during normal times.22

4 Conclusions

In this paper we re-examined the Irish and Danish experiences for evidence regarding EFC theories. The results are mixed. In Ireland we find evidence in favour of a weak version of the EFC hypothesis – consumption (or savings) does seem to react to fiscal policy in a manner predicted by the EFC hypothesis. In particular during times of crisis, improvements in the governments budget seem to cause private consumption to increase and private savings to decrease. However, these effects are not strong enough to overcome the direct contractionary effect of a reduced budget deficit. Thus the multiplier is not negative and fiscal contractions are not literally expansionary – even in times of crisis. We cannot escape the conclusion that the Irish boom was driven largely by an export boom which itself was driven by rapid improvements in competitiveness and growth in our main markets.

The Danish evidence is slightly stronger. We find evidence that consumption and savings behave during crisis as the EFC hypothesis predicts. Furthermore, the magnitudes of the effect seem sufficient to justify the conclusion that the fiscal multiplier is negative at least during times of crisis.

22Strictly speaking we cannot reject the null hypothesis that gross taxes have a negative effect on savings even in normal times (p value = 0.135).
References


Table 1: Growth Rates During the Irish Fiscal Contraction

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<tr>
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<th>Growth Rates</th>
<th>Contribution to Growth</th>
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<td>-0.43 4.56 5.09 5.65</td>
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<td>C</td>
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<td>1.29 2.1 2.8 4.05</td>
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<tr>
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Table 2: Growth during the Danish Fiscal Contraction

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<td>2.97 2.49 4.3 4.2</td>
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## Table 3: Data

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<td>IFS</td>
<td>96F..ZF...</td>
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<td>91F..ZF...</td>
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<td>Government Expenditure</td>
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1. National Treasury Management Agency - www.ntma.ie
2. Only available since 1980
Table 4: Irish Savings Function

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Adj. $R^2$ | 0.66 | 0.69 | 0.83 | 0.92 |

1. Standard errors in parentheses
2. Taxes are net of transfers except in column 4 where they are gross
3. Sample is annual data from 1960 to 1997
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**Adj. R^2** 0.87 0.86 0.92 0.84

1. Standard errors in parentheses
2. Taxes are net of transfers except in column 4 where they are gross
Figure 1: The Irish Economy 1980-2000

Source: IMF International Financial Statistics and OECD Economic Outlook
Figure 2: The Danish Economy 1980-2000

Source: IMF International Financial Statistics and OECD Economic Outlook