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Should we forget Fiscal Stabilisation Policies?

A Critical Survey of the New anti Keynesian View of Public Finances[1]

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"While most economists would agree that an exogenous 10 percent increase in money supply will lead to some increase in prices after a while, perfectly reasonable economists can and do disagree even on the basic qualitative effects of fiscal policy",

R. Perotti (2004)

A key argument in favour of the Stability and Growth Pact (henceforth SGP) has been that fiscal policies do not have any favourable effect on economic activity. First, fiscal policy is said to be often inadequate because it is used for electoral, instead of stabilisation, purposes. Governments do not implement budgetary efforts when needed in good times. They are overoptimistic on potential output growth. Public deficit is generally excessive, leading to high levels of public debt. This allows governments to fund today's public expenditure through borrowing which will bear on future generations. Second, public deficits depress output since they raise interest rates and lower current private demand and supply (as households and firms anticipate future higher taxes). The only strategy for higher growth in Europe would therefore rely almost exclusively on lower public spending, which would allow for lower taxation and would generate higher aggregate supply and demand. Fiscal consolidations modify agents' expectations leading them to anticipate a durably lower level of taxation. Such consolidations may therefore have a favourable impact on activity. If it were true, domestic fiscal policies should be placed under the supervision of the European Commission or any other centralised institutional body, without any macroeconomic cost.

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In the present paper, we will refer to this widely shared view within European circles as the 'new anti-Keynesian view of public finances' (henceforth, NK view)[2], i.e. a literature within which consolidation fiscal policies have no contractionary impact on activity and may even have expansionary effects, and whose foundations are both theoretical and empirical.

The NK view raises at least five questions:

1. Are non-Keynesian effects (NK effects) conditional on economies being permanently at full-capacity, on full price and wage flexibility? What would happen if economies went through long-lasting periods of depressed activity? How are households' output expectations modelled in a Keynesian unemployment regime?

2. Do specific categories of public expenditures favour the emergence of non-Keynesian effects? What would happen if these expenditures were useful to households, i.e. transfers benefiting households or public investment increasing economic productivity?

3. What are the transmission channels of NK effects: lower interest rates; expectation of lower taxes, with a direct effect on income or with an indirect – maybe delayed – impact on production?

4. How do private agents anticipate the evolution of public finances?

5. Should structural and short-term stabilisation fiscal policies be considered differently? Are the NK arguments always valid whatever the type of fiscal policy measure that has been implemented? Do these arguments apply only to structural rises in public expenditure?

The rest of the paper is organised as follows. Section 1 presents a critical assessment of the theoretical models of the NK view, discussing the channels (consumption, investment, interest rates) and the assumptions (economic overall situation, expectations regarding the future stance of fiscal policies, usefulness of public spending). it is shown that anti-Keynesian effects can only take place in very specific cases. Section 2 addresses empirical evidence, considering econometric studies (based upon reduced forms of consumption, investment, and interest rates), statistical studies, case studies, VAR analyses and models simulations. Contrary to theoretical models, NK effects seem to operate mainly through the investment channel and not through consumption. The empirical effects seem closely related to concomitant favourable supply shocks as well as budgetary reforms. They cannot be generalised to stabilisation fiscal policies. Conclusion hence draws implications for the conduct of economic policy, especially in the Euro area.

Theoretical Channels for Non-Keynesian Effects

The non-Keynesian models (NK models hereafter) share the basic outcome that fiscal consolidation may have neutral and even positive effects on the level of economic activity. Different channels are called upon, most of them working through expectations:

1. Agents observing the reduction of public expenditure are brought to expect lower future taxation, which increases their permanent income and consumption (Giavazzi and Pagano, 1990). This increase in consumption will be large if households have Ricardian behaviour and/or if the cut in expenditures is expected to be permanent.

[2] Sometimes also called the 'German view' or the 'expectational view' of public finances.

2. The expected reduction in future taxes also induces expectations of higher production and income, as the distorting effect of taxation is reduced. This also generates an increase in current consumption larger than the initial cut in public spending (Perotti, 1999).
3. Reduction in public employment increases labour supply, exerting a downward pressure on wages. This raises profits which allows for higher investment (Alesina et al., 2002).
4. Lower deficits imply lower long-term interest rates, which also has a positive impact on investment (the usual reversed crowding-out effect).
5. Fiscal consolidation lowers the probability of financial crises as they ensure a higher profitability for firms in the traded sector (Lane and Perotti, 2003).

Usually, although opponents to this paradigm are less numerous than its zealots, criticisms are the following:

I. Expectations about future deficits play such a crucial role in the NK argument that assuming non-fully rational expectation formation processes reduces the scope for NK effects. Therefore, the most important fact at stake is in determining the switching point in agents' expectations about future taxes and public expenditures which can be related to the share of liquidity-constrained households. Only a "low" share of liquidity-constrained households motivates the introduction of rational expectations.
II. NK effects only hold at full employment, or, at best when full employment is assumed to be reachable in a near future.
III. Cyclical deficits, either discretionary or resulting from automatic stabilisers, may not necessarily impinge negatively on the business cycle.
IV. Finally, public expenditure may not be wasteful and/or a perfect substitute for private expenditure, so that their growth would be favourable to the whole economy. Among structural expenditures, it is thus necessary to distinguish between productive and unproductive ones. Only the latter would entail NK effects.

In the following, we will only describe the functioning of NK models focusing on the channels related to points 1 and 2 (the consumption channel), that are the ones more frequently analysed in the literature. Criticisms will hinge extensively on the abovementioned points I and II.

The main driving force of NK effects is the increase in private expenditure that may follow a fiscal consolidation, more than compensating the textbook Keynesian contractionary effect. The crucial element behind private expenditure increases is the change in expectations induced by the consolidation. Most of the theoretical literature, with one notable exception (Alesina et *al*., 2002), focuses on the consumption channel: fiscal consolidations may induce, by several different channels, an increase in permanent income and, through this, of consumption. This outcome ensues from a mix of Ricardian equivalence and fiscal sustainability argument. For instance, in Bertola and Drazen (1993), households are Ricardian in the sense that they internalise the government present value budget constraint (and the transversality condition). In doing so, they implicitly consider that public debt is not part of their net wealth. Households also give weight to fiscal sustainability as they attribute probabilities to future consolidations which are related to the actual levels of debt and deficit: they thus attribute some probabilities to the occurrence of future tax increases. When the consolidation occurs, this finally lowers the probability of future interventions, increasing permanent income and consumption. Hence the 'expansionary fiscal contraction'. A similar effect works through government credibility. If fiscal consolidation appears as a credible effort of the government to have sound public finances, interest rates will decrease, future income streams will be discounted at a lower rate, and permanent income will increase (Feldstein, 1982).

It is noticeable that most theoretical papers related to the NK models incorporate non-linearities in the macroeconomic effects of a fiscal contraction: in Bertola and Drazen (as well as in Sutherland, 1997), if households' expectations on future taxes are met, higher current deficits (looming towards the threshold deficit and debt) will have Keynesian effects: these higher current deficits bring the economy closer to the expected reversal of fiscal policy, hence closer to a future decrease in taxes.

NK results are less straightforward if consumers have finite lives (or a positive and constant probability of death whatever their age, see Blanchard, 1985, 1990), or if they are liquidity-constrained (Perotti, 1999). In both cases consumers are unable to perfectly smooth consumption across periods. However, even in such a framework, Perotti shows that a fiscal consolidation will induce households to expect future distortionary taxation (and the associated deadweight loss) to decrease, and permanent income to increase accordingly. The consequent increase in consumption may offset the (Keynesian) aggregate demand reduction caused by deficit consolidation. In Blanchard (1990), a *size effect* is also introduced. In practice, the distortion increases nonlinearly with the stock of debt, and hence there will be a threshold above which the non-Keynesian effect begins to dominate the Keynesian effect.

The rest of this section is as follows. We first consider the usual framework where liquidity-constrained and unconstrained individuals coexist in a closed economy and live for two periods: a Keynesian and a Classical one. Under this setting, NK effects are rare. We then turn towards more favourable framework in terms of NK effects. First, we incorporate distortions in the preliminary model to mimic Perotti's model. Within this new setting, NK effects gain support. Another solution consists in removing liquidity-constrained households from the model. This time, NK effects are almost certain. Finally, we turn to the issue of the underlying model in the long run. We show that within a short-run and long-run Keynesian model, NK effects disappear.

The Baseline Economy: Liquidity-Constrained Individuals

Assume the economy is populated by a unit mass of households, μ of which are liquidity constrained[3]. The economy lasts two periods. In the first ("Keynesian"), demand drives production, while in the second ("classical") the contrary holds.

$$y_1 = c_1 + G_1, \quad (1)$$
$$y_2 = \overline{y} \quad (2)$$

where y is production, c is private consumption and G are public expenditures.

Unconstrained individuals smooth consumption over their entire horizon: their consumption thus depends on their permanent income. Their program is as follows: assume a representative household who maximises its intertemporal utility function subject to the usual intertemporal budget constraint:

$$Max \quad u = \ln(c_1) + \beta \ln(c_2)$$
$$s.t. \quad c_1 + c_2 = R$$

where $R = y_1 + y_2 - (T_1 + T_2)$ is lifetime income, defined as the sum of disposable incomes, β

[3] Considering a high level of generality, liquidity constraints may well be substituted by myopic behaviour, or by finite lives. All of these assumptions in fact serve the same purpose, namely breaking Ricardian equivalence thus introducing effects of government choices on private sector variables.

is the discount factor, and *t* is total taxes on individuals.

We assume a zero interest rate on savings, as well as a constant intertemporal price of consumption. Furthermore, we assume perfect foresight so that future quantities are known to agents. The solution is:

$$\begin{aligned} c_1 &= \frac{1}{1+\beta} R \\ c_2 &= \frac{\beta}{1+\beta} R \end{aligned} \qquad (3)$$

Following Perotti (1999), but also Hayashi (1982) and Campbell and Mankiw (1989, 1990), we assume that liquidity-constrained individuals cannot borrow or lend, so that they consume all their disposable income in each period.

Global consumption in period 1 thus writes:

$$c_1 = \mu(y_1 - T_1) + (1-\mu)\frac{1}{1+\beta} R \quad (4)\,.$$

The government has an intertemporal budget constraint (BC):

$$B_0 + G_1 + G_2 = T_1 + T_2\,,$$

where B_0 represents the initial level of public debt in the economy.

We further assume (as in Perotti, 1999) that present and future public expenditures are correlated; stated differently, public expenditures follow an inertial process:

$$G_2 = \bar{G} + \rho G_1 \quad (5)\,,$$

where $\bar{G}$ are discretionary expenditures in period 2.

Defining $B_0 + \bar{G} = \Gamma$, the BC becomes:

$$\Gamma + (1+\rho)G_1 = T_1 + T_2 \quad (6)\,.$$

At equilibrium, production writes:

$$y_1 = G_1 + c_1 \quad (7)$$

Substituting (4) in (7) gives:

$$\begin{aligned} y_1 &= G_1 + \mu(y_1 - T_1) + \frac{(1-\mu)}{1+\beta}\left(y_1 + y_2 - \Gamma - (1+\rho)G_1\right) \\ &= \frac{\beta + \mu - \rho(1-\mu)}{\beta(1-\mu)} G_1 - \mu\frac{1+\beta}{\beta(1-\mu)} T_1 + \frac{1}{\beta}\left(y_2 - \Gamma\right) \end{aligned} \qquad (8)$$

so that:

$$\frac{\partial y_1}{\partial G_1} < 0 \Leftrightarrow \rho(1-\mu) > \beta + \mu\,.$$

It is straightforward to show that non-Keynesian effects occur if:

$$\mu < \frac{\rho - \beta}{1+\rho} \quad (9)$$

It should be made clear that NK effects only appear if a contractionary fiscal policy is attributed to lower expenditures; as future taxation is non distortionary, increasing current total taxes would always have Keynesian (contractionary) effects.

Condition (9) however is really tricky to obtain: imagine a share of liquidity-constrained households equal to 1/3, and a discount factor equal to 0.95, the degree of persistence in public expenditures necessary to yield NK effect would have to be $\rho \geq 1.95$.

Notice also in inequality (9) that as the fraction of liquidity-constrained agents approaches to 1, the area of NK effects decreases. The existence of Ricardian consumers is thus a key assumption in the NK literature; however, its empirical validity is generally very low (see Ricciuti, 2003, for a recent assessment and survey of the literature).

Furthermore a necessary, though not sufficient, condition to obtain (9) is that:

$$\rho > \beta \quad (10)$$

Condition (10) would become sufficient if there were perfect consumption smoothing ($\mu = 0$). Intuitively, if an increase in expenditure today is perceived as permanent, and consumers are not patient enough, then G crowds out private expenditure and has negative effects on income. NK effects would appear if the degree of persistence of fiscal policy is larger than the discount factor: long-lasting expenditure cuts thus improve permanent income as they testify for lower taxes in period 2.

It is also interesting to notice that within this setting, which disregards liquidity-constrained individuals, NK effects are more probable than within the baseline case; however, even in that case, they are far from automatic: only insofar as public expenditures are highly persistent, inequality (10) can be met.

Variant 1: Tax Distortion and Size Effects

Now assume that equilibrium in period 2 writes:

$$y_2 = \bar{y}_2 - \alpha B_0 T_2 + \gamma G_1 \quad (2')$$

where α represents the distortionary effect of taxation on income. Following Blanchard (1990), we assume that the distortion is a function of the stock of debt (B_0). Larger government liabilities increase the probability of a painful consolidation. Following Perotti (1999), γ is the inertial effect of public expenditure, e.g. investment in infrastructures, on income (a measure of the 'usefulness' of public expenditures).

We assume for simplicity, first that discretionary public expenditures are equal to zero in period 2 and, second, that the rate of time preference is zero. Substituting (2') in (1) and (4) yields:

$$y_1 = \bar{y}_2 + \left(\alpha B_0 - \frac{2}{1-\mu}\mu \right) T_1 + \left(\gamma + \frac{2}{1-\mu} - (\alpha B_0 + 1) \ (\rho + 1) \right) G_1 \quad (11)$$

Within this new framework, a deficit reduction that may stem either from tax increases (that could reduce future distortionary taxation), or from expenditure cuts, may have NK effects (i.e. $\partial y / \partial t > 0$ and/or $\partial y / \partial g_1 < 0$) if:

$$\text{(tax channel) } \mu < \frac{\alpha B_0}{\alpha B_0 + 2} \quad (12)$$

$$\text{(expenditure channel) } \mu < \frac{(\alpha B_0 + 1)(\rho + 1) - \gamma - 2}{(\alpha B_0 + 1)(\rho + 1) - \gamma} \quad (13)$$

An increase in the tax distortion α , a larger initial debt stock B, and a decrease in the fraction of liquidity-constrained households μ, increase the probability of NK effects through both channels. The probability also increases, for the expenditure case, if there is inertia (large ρ), and/or low utility associated with government spending (small γ).

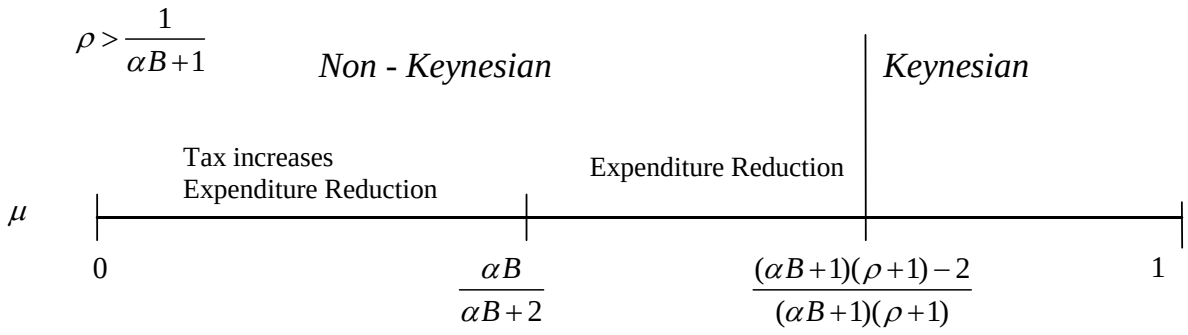
Notice that the literature on the argument usually assumes that government spending is wasteful ($\gamma = 0$). In this case, the NK effects appear for:

$$\text{(tax channel) [unchanged]}$$

$$\text{(expenditure channel) } \mu < \frac{(\alpha B_0 + 1)(\rho + 1) - 2}{(\alpha B_0 + 1)(\rho + 1)} \quad (13')$$

It can be shown that for $\rho > \frac{1}{1+\alpha B_0}$, $\frac{(\alpha B_0+1)(\rho+1)-2}{(\alpha B_0+1)(\rho+1)} > \frac{\alpha B_0}{\alpha B_0+2}$. In that case, expenditure reduction will yield NK effects over a wider range of μ, with respect to tax cuts. The intuition is clear: high values of ρ mean that expenditure cuts will carry on to the following period, so that the permanent income effect will be higher than that ensuing from a tax rise. Vice versa, for low values of ρ, and/or for a low initial stock of debt, tax cuts may be more effective than expenditure reductions. The first case is depicted in figure 1.

Figure 1



What this variant of the baseline case shows is that many assumptions are needed to achieve NK effects: expenditure persistence, tax distortions, high debt and a low share of liquidity-constrained households are crucially needed. Though not original, this results highlights the fact that NK effects are not straightforward, even within a usual framework in which the future with its (neo)classical features is not far-reaching.

Variant 2: A Keynesian World

Now assume that the long-run is not classical: even in the long run, price rigidities are still arising and aggregate demand drives production:

$$y_2 = c_2 + G_2 \quad (14)$$

Contrary to the previous models, we also assume that total taxes on individuals are proportional to income (they were lump-sum in the preceding cases), so that the intertemporal government budget constraint now writes:

$$B_2 + \tau(y_1 + y_2) = G_1 + G_2 \quad (15)$$

where the tax rate τ is assumed to be constant over time and the discount rate is supposed to be zero for simplicity[4]. This change in assumption regarding taxation allows to close the model substituting the long term $y_2 = \bar{y}$ condition.

Using the program of the representative household in the baseline case, imposing for simplicity $\beta = 1$, and considering equations (14) and (15) gives:

$$C_1 = 0.5(y_1 + y_2 + B_2 - G_1 - G_2) \quad (16)$$

Under the assumption that public stabilizes in the long run, the Christ (1968)'s result follows:

$$y_2 = G_2 / \tau \quad (17)$$

In the long run, public expenditures are fully financed through higher tax receipts at constant tax rate: rising income driven by fiscal policy is sufficient to raise these receipts. It ensues that:

$$c_2 = G_1(1/\tau - 1)$$

Private consumption raises with fiscal policy in the long run. The short run equilibrium level of income results from the substitution of (16) and (17) in (1):

$$y_1 = \frac{2}{1+\tau} G_1 + \frac{1-\tau}{\tau(1+\tau)} G_2 \quad (18)$$

It is obvious from (17) and (18) that expansionary fiscal policy have a positive (Keynesian) effect on production. Moreover, and contrary to the previous cases, a permanent fiscal policy has the most favourable outcome on production: $y_1 = G_1 / \tau$. This means that, though households do perfectly anticipate government's actions and internalize its behaviour in their own (they are Ricardian), fiscal policy has Keynesian effects and Christ's result can be obtained in the short run.

Though this variant may appear simplistic, it has been presented in order to shed light on the fact that the nature of the economic environment is the most fundamental information one needs to be able to distinguish between Keynesian and non-Keynesian effects. Once this environment has been known, the effects of fiscal policy on private consumption are straightforward in the fully Keynesian (variant 2) and in the most Classical setting (baseline case without liquidity constraints): fiscal policy has Keynesian effects in the former, non-

[4] This variant hinges extensively on Creel (1998a).

Keynesian effects in the latter. Nevertheless, when the economic framework lies between these two extreme representation of an economy, conclusions are more problematic.

Variant 3: The Far-Reaching Long Run

Now imagine the world lies between the two extremes. The world is not fully Keynesian, nor fully Classical: households expect at time 0 that *m* periods will be Keynesian and *n* periods will be Classical. Equation (14) is met at each Keynesian period. Assuming that expenditure and taxation are constant over, respectively, the Keynesian and Classical periods, the government intertemporal budget constraint may be written as

$$mT_m + nT_n = mG_m + nG_n \quad (19)$$

During the Classical (full-employment) periods, production and public expenditures are constant at their steady state levels:

$$y_n = \bar{y} \text{ and } G_n = \bar{G}, \forall n$$

Households internalise the government budget constraint and their consumption equals (assuming for simplicity no discounting and zero interest rates):

$$C_t = (my_m + n\bar{y} - mG_m - n\bar{G})/(m+n) \quad (20)$$

Consumption is smoothed over the whole time period, so that one can write:

$$C_t = \bar{y} - \bar{G} \quad (21)$$

From (20) and (21), it is straightforward to show that:

$$y_m = \bar{y} + G_m - \bar{G} \quad (22)$$

Ensuing from (22), it is obvious that higher public expenditures have a positive impact on output during Keynesian periods of time; however, the fact that households may expect higher expenditures at full-employment hampers production in the Keynesian short to mid-run.

As for taxes, they do not impinge on aggregate output: taxes are at their steady-state at full-employment or they lead to a compensating change in private savings in the Keynesian short to mid-run. The comprehensive model has thus Ricardian features.

With respect to the baseline model, the present variant has the noteworthy feature of highlighting the role of expectations during Keynesian periods, a key variable in the occurrence of NK effects. Suppose for example that taxes have a negative (distortionary) influence on output at full-employment:

$$\bar{y} = \bar{y}_0 - \alpha T_n \quad (23)$$

hence a variant expression of equation (2'). Using equations (19), (22) and (23) gives:

$$y_m = \bar{y}_0 + (1 - \alpha m/n)G_m + \alpha m/nT_m - (1+\alpha)\bar{G} \quad (24)$$

Now, taxes during Keynesian periods have a positive impact on the output. The Ricardian behaviour by households in fact leads to the following argument: the optimal strategy during Keynesian periods is to boost public expenditures and, in the meantime, raise taxes so that households will not expect a long-lasting rise in future taxes. This is a quite different strategy

from the one generally advocated in the Keynesian textbook. This figures out the complexity of reaching NK effects whose (micro-)foundations would appear acceptable to most economists. In our model, in order to obtain NK effects during the Classical period we have to accept counter-intuitive arguments during Keynesian periods.

What equation (24) also demonstrates is that, public expenditures cuts may have expansionary effects (NK effects) only insofar as the Classical long-run is really far away: *m* must be definitely superior to *n*. This is explained by the fact that the longer the Keynesian period and the longer the period of higher public expenditures (at constant taxes), the higher the probability for households of facing higher (distortionary) taxes in the future.

The Other Channels: Investment and Interest Rates

Before turning to an investigation of the empirical relevance of NK effects, it is worth spending some time describing two other channels by which fiscal consolidations may have an effect on economic activity: the investment channel and the interest-rate channel.

The investment channel

The investment channel has been given a theoretical rationale by Alesina *et al.* (2002). The basic idea is that fiscal consolidation (especially public expenditure reduction) reduces wage pressure for the economy as a whole, and hence increases the present discounted value of the stream of profits. This results in increasing investment. Following almost the same arguments put forward for the consumption channel, a public expenditure cut should induce a reduction in (lump-sum) taxes that would increase households' and workers' wealth. More specific to the labour market is the final part of the general argument: labour supply decreases as a consequence of the positive wealth effect and so does production. If this lower level of production induces a decrease in labour taxation, workers will face incentives to work more, so that labour supply will increase, thus decreasing wages and boosting investment.

Though absent from the NK literature, two other arguments could be invoked within the investment channel. First, suppose private investment depends exclusively on expected aggregate demand. Entrepreneurs are thus faced with the same situation as households: if they expect full-employment to be attained in the near future (a classical period), their present investment depends crucially on the impact of present fiscal policy on future taxes. Second, suppose private investment only depends on the expected stream of profits (without having recourse to the labour market): NK effects will be straightforward as future taxes hinge negatively on profits and thus generate lower investment as well as lower aggregate demand and supply.

The interest rate channel

The interest-rate channel can be related to the expectations theory of the term structure of interest rates, according to which the long term rate is equal to the average of the current and expected short rates. The long term interest rate must thus be equivalent to the average anticipation of the central bank's behaviour by the agents which can be described by a Taylor-type equation of the form:

$$\mathrm{i} = \mathrm{a} + \pi + \lambda(\pi - \pi_{\mathrm{M}}) + \mu\,\tilde{\mathrm{y}} \qquad (25)$$

i.e., the nominal short term interest rate *i* depends on the real short term interest rate a which is the central bank real target, the inflation rate π, the gap between inflation and the central bank inflation target $(\pi - \pi_M)$, and the output gap $\tilde{y}$.

Hence, if the central bank does not take into account the levels of public debt and deficit in the determination of the short term interest rate, the long term rate i_L does not depend either on the levels of debt and public deficit:

$$i_L = ki + (1-k)(a + \pi_M) + \xi \quad (26)$$

where ξ is a risk premium unrelated to the situation of public finances.

Within this framework, the indirect impact of public deficits and debts on long term interest rates also depends on the overall economic situation. If in a first period, the economy is in situation of under-employment, the monetary authority is expected to implement a low interest rate policy while the fiscal authority can maintain a deficit. Usually, markets may expect a return of the economy towards full employment, therefore a rise in the interest rates and a reduction in the fiscal deficit. The long rate is naturally higher than the short rate, without this discrepancy being induced by the public deficit. However, an expectation of a high level of structural public deficit could lead private agents to expect a future rise in the short rate when the economy goes back to full employment. However the setting of a restrictive fiscal policy is eased when the economy is at full-employment. It is therefore really debatable to make the assumption that governments *systematically* implement a procyclical policy during “good times”.

Now, investigating the direct effect of public debt on interest rates necessitates that the households’ behaviour and the overall economic situation be preliminarily specified:

- if private agents have a Ricardian behaviour, public debt has no impact on interest rates because the rise in the former is fully compensated by higher private savings;
- if private agents do not have a Ricardian behaviour, and if private consumption is low or firms want to decrease their own debt, the fiscal authority can provide the debt needed to allow households to reach their desired level of assets; in this case, an increase in the ratio of public debt to GDP will have no impact on the short and long term interest rates;
- if the economy is at full-employment and private agents have Ricardian behaviour, an increase of public debt is detrimental as it yields inflationary pressures which consequently cause a rise in the short and long term rates.

Eventually, arguing that public deficits and debts may drive interest rates up and, thus hampering economic growth, is linked to the assumption – empirically very debatable – that governments mainly run into debt in periods of full employment.

Notice, to conclude, that the interest-rate channel is incompatible with the consumption channel: to obtain NK effects, Ricardian behaviour has to be assumed away in the former but becomes necessary in the latter.

As a conclusion to the presentation of these theoretical channels, it has been shown that NK effects may indeed occur, but that necessitates the conjunction of a large number of substantial assumptions. Turning towards their empirical relevance is thus highly necessary.

Empirical evidence: where do we stand?

Since the seminal work by Giavazzi and Pagano (1990), a large number of articles have studied the empirical link between public spending and output growth, with a view to exhibit anti-Keynesian effects of fiscal policies. Hemming *et al.* (2002) provide an exhaustive survey on this literature. Although there has been growing empirical literature on anti-Keynesian effects of fiscal policies, lately with Giudice *et al.* (2003), several recently published articles have questioned the empirical evidence of anti-Keynesian fiscal policies (Van Aarle and Garretsen, 2003), and sometimes shown instead Keynesian effects (Hjelm (2002), Schclarek (2003)). The debate seems far from being over.

Five approaches are generally used: behavioural equations estimates (consumption, investment or interest rates); statistical analyses; descriptive studies; case studies; VAR analyses; macro-econometric models simulations. Some papers focus on the US economy, a few on Japan, most on EU countries. Anti-Keynesian effects appear more difficult to exhibit for the US than for the EU. Some papers focusing on the EU economies make a distinction between the contexts before 1992, between 1992 and 1997 (the convergence period) and after EMU. Analyses are in general based on annual data (due to data availability), although recent papers try to include quarterly data, thereby restricting their analysis to a small group of industrial countries (Perotti, 2004). The effects of fiscal policy on private consumption are the most commonly investigated empirical channels, while effects on investment are more rarely evidenced.

a) The impact of public finances on consumption behaviour

Since the early 1990s empirical studies have reached the conclusion that "expansionary (contractionary) fiscal policies" may have negative (positive) effects on households' consumption. Such non-Keynesian effects of fiscal policies can be found in Giavazzi and Pagano (1990), but also, with a focus on non-linear effects of fiscal policies, in Giavazzi and Pagano (1995), or Perotti (1999).

The theoretical foundations of these models are that a significant number of households decide their level of consumption according to intertemporal optimisation; they are not liquidity-constrained; they anticipate public intertemporal financial constraints.

NK effects appear when a rise in public expenditures has a sufficient negative impact on consumption (with a coefficient larger than 1 for the overall effect to be anti-Keynesian); in that case only will a cut in public spending entail a rise in households' consumption large enough to over-compensate the depressive effect of the public spending cut on activity. NK effects also appear when transfers benefiting households have no effect (or even a negative one) or when taxes have no effect (or even a positive one) on consumption. Unfortunately, consumption is also influenced by many variables (inflation, wealth effects, income distribution) which panel studies often disregard in order to focus quite excessively on fiscal variables (following the method introduced by Giavazzi and Pagano, 1995).

Long-term consumption in these models is generally:

$\log(c) = \alpha \log(y) + \beta \log(g) + \gamma \log(transfers) + \delta \log(taxes)$ where y is output.

This specification in logarithm is not satisfactory because it does not allow to evaluate the long-run properties and to estimate directly the effects of one euro change in output, taxes or public expenditure on consumption. The coefficient may differ between countries only

because public consumption, taxes, transfers do not have the same weight relatively to private consumption.

Some studies try to evaluate if the coefficient varies with the situation of public finances or with fiscal policy orientations. Giavazzi and Pagano's (1995) seminal article discriminates coefficient values in normal times and important change in fiscal policy episodes (see table 1). The results are mixed. Households' behaviour seems to be rather Keynesian in normal times and to become anti-Keynesian in adjustment periods. The authors find a short-term negative effect of changes in public consumption, a negative long-term effect of public transfers and a positive long-term effect of taxes in times of strong and long lasting fiscal adjustment. Nevertheless, coefficients estimates are always too small to induce an expansionary fiscal contraction. The problem is that it is hard to understand what long-term means in that framework, since adjustment periods are always temporary. Is it possible to see an increase in transfers having no impact on taxes in the long run? Afonso (2001) reaches similar outcomes. The results are more mixed in van Aarle and Garretsen (2003) where most coefficients do not appear significant.

Table 1. Impact on private consumption

		Normal Times	Periods of fiscal policy changes
Public consumption	change	0.18 (2.2)	–0.19 (2.5)
	level	0.02 (1.2)	– 0.02 (0.7)
Transfers	change	– 0.04 (0.8)	–0.10 (2.6)
	level	0.02 (1.3)	–0.07 (4.0)
Taxes	change	– 0.04 (0.5)	0.02 (0.5)
	level	–0.07 (2.9)	0.05 (1.9)

Source: Giavazzi and Pagano (1995)
NB: t-stat are given in parenthesis.

Perotti (1999) estimates Euler equations and finds negative effects of public consumption innovations on households' consumption in bad times. The multiplier for unconstrained households (no credit constraint) is near -1 (from -1.05 to -1.14). However, the global multiplier (on credit constrained and unconstrained households) is never high enough (in absolute value) to provoke expansionary fiscal contractions solely through the consumption channel.

Another way to check non-Keynesian effects of fiscal policy is to estimate national saving rate equations, as in Giavazzi *et al.* (2000). They check if national saving rates react differently in normal and bad times and find that net taxes and government consumption have a smaller impact on national saving rates in bad times. However, their findings generally confirm that fiscal policy works in a Keynesian way, even if its effects are smaller in bad times: a rise in government consumption always has a negative impact on national savings and long-term coefficient estimates of its impact are near or above one in absolute value. Nevertheless, it is difficult to draw any clear conclusion from an analysis in terms of national savings rate as no difference can be made between consumers' and firms' (private investment) behaviours. This just means that consumers are far from being Ricardian, even in bad times.

Kamps (2001) focuses on pre- and post-Maastricht periods and tries to find the results from Giavazzi, Japelli and Pagano (2000): he fails to find linear non-Keynesian effects of fiscal policies and highlights the risk of spurious regressions resulting from panel data modelling. Non-Keynesian effects appear significant in three countries when regressing country-specific equations (Germany, Greece and Italy) but, as underlined by the author, the results are fragile and a richer specification should be considered. This is also clear from Creel (1998b) on the Danish case.

Van Aarle and Garretsen (2003) discuss Keynesian and non-Keynesian effects for EMU countries, before (1970-1989) and during the transition period to EMU (1990-1998). Their approach is particularly interesting as the Maastricht convergence criteria have implied strong fiscal adjustments in a number of EU countries. So, of course, if non-Keynesian effects can be found, the criteria may not be blamed for having impeded EU growth in these years. The authors include all EU-14 countries in their panel, *i.e.* even the UK, Denmark and Sweden. The authors claim they use the 'Blanchard fiscal impulse', (Blanchard, 1990b), although in their database appendix they refer to the CAPB/potential GDP estimated by the OECD to measure the stance of fiscal policy. They use several approaches to define 'fiscal stress' in EMU countries, considering the definition by Alesina and Perotti (1995). They estimate a panel consumption function for EU-14, testing non-linearities. They conclude that non-linear effects were limited in the transition period to EMU. They find small specific effects of fiscal policy on private savings. Of course the regression samples are short and, especially in the pre-EMU period (9 years only), which implies to be cautious when interpreting the results.

Many articles provide domestic consumption function estimates (Cour et al. (1996), Giavazzi and Pagano (1990) for Denmark and Ireland, Giavazzi and Pagano (1995) for Sweden), or panel data estimates. It is more relevant from an economic point of view to regress country-specific consumption functions than panel estimates since the former will allow for a richer specification, like taking into account inflation, interest rates, unemployment rates or wealth effects. For example, a rise in bond prices following a fall in inflation and nominal interest rates will raise households' wealth and may raise consumption, which can be negatively correlated with a fall in public consumption. Panel studies such as Giavazzi and Pagano (1990, 1995), and multi-country ones such as Cour *et al.* (1996) do not assess such wealth effects, due to data consistency problems. Hence they may possibly describe as non-Keynesian, effects which would disappear when estimating a richer consumption function. Regressions with very few variables as in panel estimates should be interpreted with caution since they provide a simple description of consumption behaviour.

Hjelm (2002) analyses the impacts of fiscal contractions (expansions) on private consumption, with a view to check if the Danish and Irish cases (Giavazzi and Pagano, 1990) can be generalised to other countries. The author estimates a consumption function based on a panel of 19 OECD countries (1970-1997). Fiscal contractions are defined like in Giavazzi and Pagano (1996, see box). Hjelm finds fiscal contractions to 'generate' worse expectations about future income, with fiscal expansions having no restrictive effect on consumption and sometimes a positive one. He estimates the share of credit-constrained consumers (using Campbell and Mankiw's approach[5]), which is found to be surprisingly low: 0.1-0.14 only, which should in theory pave the way for non-Keynesian effects. Hejlm also finds exchange rate movements to play a significant role in consumers' expectations: expectations of

[5] This method consists in estimating the relation: $\Delta c_t = \lambda(\alpha \Delta y_t + (1-\alpha)\Delta y_{t-1}) + \mu + \varepsilon_t$ and in using λ as the share of credit constrains consumers.

depreciations raise consumption, which may explain the Danish and Irish cases. Hjelm finds private consumption growth to be lower in fiscal contraction than in fiscal expansion periods, in contradiction with Giavazzi and Pagano. Schclarek (2003) starts with the same theoretical model as Perotti (1999) but reaches opposite conclusions: government consumption shocks have Keynesian effects on private consumption. Keynesian effects are not reverted in 'bad times'.

b) The impact of fiscal policy on business investment

The investment channel of NK effects has relatively weak theoretical evidence. But the investment channel seems to be more responsive than consumption in anti-Keynesian episodes.

Giavazzi and Pagano (1990) estimate a simple investment model for Denmark from 1971 to 1988. Investment is explained by its lagged value, two lags of real GDP and the real cost of capital. Dynamic forecasts over 1985-1986 are found to under-predict significantly investment, which leads the authors to provide two explanations. First, "investment decisions may reflect an increase in profitability associated with the anticipated cut in future taxes." Second, capital inflows followed the decision to peg the exchange rate and to remove capital controls. Giavazzi and Pagano (1995) estimate in a similar manner an investment model for Sweden and find that dynamic forecasts over-predict investment from 1991 to 1994. However, they detect a structural break in the investment function in 1990, and when they include an estimate of the Tobin's average "*q*", forecast errors are substantially reduced.

Nevertheless, we have found no investment estimations which incorporate public finance variables directly. Alesina and Perotti (1995) used some indirect channels. First, they provide evidence that investment depends heavily on firms' profits; second, that fiscal contraction increases the profit share in value added by diminishing wages. This means either that fiscal contraction raises the rate of unemployment or that it leads workers to anticipate lower labour taxation and thus to accept lower gross wage earnings. Hence fiscal contraction could have strong positive effects on private investment. However, if fiscal contractions were expansionary, then they should entail lower unemployment rate and wage increases. Moreover, if public spending cuts reduce workers income (for instance through lower pensions) then they will not lead workers to accept lower wages.

c) The impact of fiscal policy on interest rates

The crowding-out effect intensively relies on long term rather than short term interest rates[6], and the assessment of the public debt and deficit effects on long term interest rates is usually carried out by estimates of a reduced form of an interest rate equation.

A first group of studies gauges the impact of the current fiscal variables on the interest rates. Some studies use exclusively national data; others aggregate a part or the totality of OECD countries. For the United States, Hoelscher (1986) explains the real long rate by a real short rate, expected inflation, the variation of the GDP and the public deficit as a % of the GDP over 1953-1984. He finds that a one point rise of the public deficit involves a rise of 0.4

[6] Correia-Nunes and Stemitsiotis (1995) classify empirical work relating to the links between interest rate and public deficits according to whether one measures this impact on short term rate or the long term rate. They notice that the studies on short term rates generally come to the conclusion about the lack of effect of the deficits or the debt on the short term rate. Clarida, Gali and Gertler (1998), for example, do not test if the public deficit has an impact on short term rate. Especially, there is no evidence that a high level of public debt would force the central bank to set the interest rate low so as to avoid the public debt to become unsustainable.

point in the interest rate. Miller and Russek (1996) explain the US 10-year public bond rate by the real per capita public deficit, the real 1-year rate, expected inflation, foreign net real investments, the stock variation of real per capita federal debt held by the Federal Reserve and the variation of the real per capita GNP over 1947-1989. Depending on the methodology, they observe a rise in the interest rate of 0.0241 to 0.0294 point (ordinary least squares) or of 0.0084 to 0.0252 point (dynamic least squares) per point of real per capita deficit. Cebula (2000) models the 10-year real public rate by the federal structural deficit as a % of the potential GDP, the real per capita growth rate of GDP, net foreign capital entries on potential GDP and the real *ex ante* short term rate over 1973-1995. One point of structural deficit causes an *ex post* real interest rate rise of 0.86 point.

Faini (2004) studies the formation of long term real interest rates in EMU countries over 1979-2002. He explains the European real long rates by European factors (which explain the mean level of rates) and national ones (which explain the gaps between rates). Parameters are constrained to be equal between countries[7]. The author estimates an equation of European real average long rate and 11 equations of national real long rates. He concludes that the primary structural balance and the gross national public debt have a significant impact at the European level, less significant when one considers the countries one by one[8]. However, he applies its model over a period of convergence of the long rates in Europe (because of the creation of the EMU) without taking this convergence into account.

Other studies find weaker results. Evans (1985) tests on monthly data the effects of public deficit and public spending on the public short term and private long term rates over 1979-1983. The public spending is positively correlated with the interest rate, the deficit negatively. Mehra (1992) detects no significant effect of the fiscal deficit on the US 10-year public rate. Caporale and Williams (2002) measure the effects of the public deficit and public debt as a % of GDP on the 10-year public rates for Canada, France, Germany, Italy, Japan, the United Kingdom and the USA. The debt and deficit effects are positive or negative according to countries: the debt has a positive impact in Canada, France, Italy and United Kingdom, but a negative one in Germany and in the USA, like the deficit (positive impact: Canada, France, Germany; negative impact: Italy, Japan, United Kingdom, USA).

Tanzi and Chalk (2000) compute correlations between the stock of public debt and the real interest rates for 12 European Union countries. Over 1970-1998, they note that a rise of 10 points in the public debt/GDP ratio is correlated with a rise of 0.6 point of interest rates. However, over 1980-1998, the rise in the real rates is only 0.1 point by increase of 10 points of the public debt/GDP ratio. Country by country, the correlation is statistically positive in four cases only. The study does not take in account other factors like the disinflation and the change in monetary policy objectives.

Correia-Nunes and Stemitsiotis (1995) estimate interest rate equations for ten OECD countries and use aggregated data as instruments. They find a positive and significant effect of the national public deficits, but also a seldom significant and sometimes negative impact of

[7] This constraint on the effect of the national debt, not tested by the author, appears strong compared to the coefficients estimated by Chin and Frankel (2003). The latter find that the stock of debt impact on the long term rate, when it is positive, varies from 0.018 for Spain to 0.121 for Italy.

[8] A 1 point increase in the primary structural balance entails a drop of the European long rate of 0.29 to 0.43 point. The effect of the European debt on the interest rate is of 0.043-0.056 point by point of debt. A rise in the national primary structural balance causes a fall of the national rate of 0.047 to 0.063 point. The national debt effect is not significant, apart from the case when a country has a strong debt level.

the national public debt on the national rates. The impact of the deficit strongly varies from 0.21 (Japan) to 0.79 (the USA) point of interest rate per point of deficit[9].

Ford and Laxton (1999) test directly for nine OECD countries the effects of the aggregate public debts (as a % of nominal GDP), of the level and the variation of the real public expenditure (as a % of real GDP) on the public real 1-year interest rates. Overall, the authors detect a positive correlation between these three variables and the level of the real interest rates in the countries studied, but the coefficients are often insignificant (the three coefficients are all together significant only in the German and UK cases).

Breedon, Henry and Williams (1999) test on the real long term public interest rates of Japan, USA and Germany, the impacts of the national and world public debts, like that of the national public deficit (jointly with the growth rate of GDP, the real short term interest rate and the foreign real long term interest rates). The debt variables have a positive effect on the real rates in Germany and in the United States, negative in the Japanese case. In addition, the fiscal deficit has a negative impact on the real US rate.

These studies have often the following shortcoming: they do not distinguish between current and structural balance. That the long term interest rate be higher than the short rate in a depressing situation (when public balance shows a deficit) does not tell us anything. They do not integrate the economic situation (and in particular private agents' debt) either. Finally, one can fear that they do highlight the opposite correlation: the big rise of the real rates after 1980 forced much countries to embark on active fiscal policies (see charts in appendix A). The public debt has blown up owing to the interest rate effect.

A second group of studies measures the impact of the public debt and deficit forecasts on interest rates. A first practice consists of modelling the deficits by means of VAR models (Plosser, 1982 and 1987; Evans 1987a and 1987b). The authors build forecasts of deficit, test if these forecasts have an effect on interest rates, and conclude that it is not the case[10].

Wachtel and Young (1987), Quigley and Porter-Hudak (1994) and Afonso and Strauch (2004) study the reaction of the interest rates the day of the announcement of forecasts revisions of the deficit. Wachtel and Young find for the USA that a non expected 1 billion dollar rise of the deficit brings about an interest rate average rise of 0.18 to 0.3 basis point according to the source of the forecast[11]. Quigley and Porter-Hudak show that the markets' reaction is usually transitory. Afonso and Strauch study the effects of announcements of non-respect of the SGP, or its reinterpretation, during the year 2002. They scrutinise the impact of the announcements on the spread between the 10-year swap rate and the interest rate on public bonds for 13 European countries. They then more precisely analyse the variations of the spread for Germany and Portugal: when announcements have a significant effect on the spread, this effect is weak (5-10 basis points) and temporary.

Canzoneri *et al*. (2002) estimate the impact of American fiscal surplus forecasts on the gap between the long and the short rate. The effect of a one-point rise in the fiscal surplus (as a % of the GDP) on the gap between the short and long rates fluctuates between -0.41 and -0.60. Laubach (2003, 2004) studies the effects of 5-year national public debt and deficit

[9] This result questions the practice consisting of imposing equality of the coefficients between countries, as do Orr, Edey and Kennedy (1995) and O' Donovan, Orr & Rae (1996).

[10] This demarche has been strongly criticised because of the weak informative capacity of forecasts built from VAR models (see Gale and Orszag (2002)).

[11] The deficit forecasts used by the authors come from the CBO (Congressional Budget Office) and the OMB (Office of Management and Budget).

forecasts on the real long term interest rates (5 and 10 year rates in 5 years, current 10 year rate on public bonds) jointly to those of the potential growth rate and the stock premium. A one-point rise in the expected public deficit increases the interest rates by 0.2 to 0.4 point. The effect of the expected public debt lies between 0.029 and 0.053 point per point of public debt as a % of GDP. However, when the author introduces expected inflation into an equation of current nominal long rate, the debt and deficit forecasts do not have any longer a significant effect. Besides, Laubach and Canzoneri *et al.* do not take into account the effect of the level of economic activity on interest rates: they explain the gap between the long rate and the short rate simply by fiscal surplus forecasts, without taking into account the fact that in periods of weak activity, the short term rate is lesser than its mean level (Brook, 2003).

Chin and Frankel (2003) model the nominal long rates of six countries[12] along with expected inflation, the stock of net public debt (as a % of GDP), the 2 year stock of net debt variation forecasts[13], the output gap and a foreign interest rate. Coefficient estimates for the stock of debt are seldom significant, those of its variation forecasts are significant in five cases out of six when the coefficient of expected inflation is set equal to one, but only in three cases when this constraint is removed.

The use of debt and deficit forecasts raises the problem of the assumptions retained as for the behaviour of the fiscal authorities. For example, the OECD debt and deficit forecasts lie on the assumption that the structural budget policy remains unchanged in the medium term[14]. This is equivalent to supposing that discretionary fiscal policy is systematically procyclical in the medium term[15]. One cannot thus assume that these forecasts correspond to medium term fiscal policy expectations of agents.

In order to illustrate the difficulty to find a robust link between public deficits, public debt and interest rates, we have estimated both reduced and structural long term interest rate equations for the US, UK, Germany and Japan (see appendix A). First, we find strong parameter instability of estimates, especially for reduced-form equations. Besides, reduced-form estimates show a negative correlation between real long-term interest rates and primary structural balances for the US and the UK over 1988-2002. But this result vanishes once we estimate structural forms. In the Japanese case, no effect arises. In the German one, we find a negative correlation between the structural primary balance and the nominal long-term rate over 1980-1998, but no such correlation appears with reduced-form estimates. Globally, there is little empirical evidence that public debt and deficits have a significant effect on interest rates. This is consistent with the view that if some public deficits are excessive, most of them are not.

d) Fiscal expansionary consolidations – Statistical studies

This part of the NK empirical literature analyses episodes of large fiscal policy shocks (measured by the size of the variation of a given indicator, typically the cyclically-adjusted primary balance, CAPB as a share of potential GDP), using statistical tools, to determine if, during these episodes, the effects of fiscal policy were Keynesian or anti-Keynesian (Alesina and Perotti (1995), Cour *et al.* (1996), OECD (1996), Mc Dermott and Wescott (1996),

[12] The USA, The United Kingdom, Germany, France, Italy and Spain.

[13] OECD *Economic Outlook* forecasts.

[14] It goes the same way for the CBO forecasts.

[15] See the OECD *Economic Outlook* No 74, Chapter 4, for a study on the pro or contra-cyclic nature of the fiscal policies in the OECD countries.

Alesina, Perotti and Tavares (1998), Alesina and Ardagna (1998) and Giudice *et al*. (2003)). A typical example of an anti-Keynesian fiscal consolidation episode is a period during which a country, albeit running a restrictive fiscal policy, will see an acceleration in output growth (relatively to similar countries or to the recent past), which cannot be explained by usual factors (like exchange rate depreciation, expansionary monetary policy, financial liberalisation, boom in equity markets). In that case, the only explanation will be expansionary effects resulting from expectations on future public finances (tax cuts, lower interest rates, public debt stabilisation).

Cour *et al.* (1996) find 19 episodes of large fiscal consolidation and 18 of large fiscal expansion. Among the former, 9 are associated with GDP expansion (relative to average G7 output growth, see table 2), and 6 episodes of large fiscal expansion are characterized by a lower GDP growth (relative to G7 growth). 6 cases among the 9 associated with GDP expansion do not coincide with loose monetary conditions and can thus be labelled anti-Keynesian consolidation episodes (shown in bold, table 2). Similarly, Alesina and Ardagna (1998) find 51 cases of large fiscal consolidation, of which 23 are expansionary, and 87 cases of large fiscal expansions, of which 52 are not expansionary. When excluding specific cases and grouping successive consolidation years for a given country, they find 7 cases of expansionary fiscal consolidations.

Table 2. 'Expansionary fiscal consolidation episodes'

	Cour et al. (1996)	Alesina and Ardagna (1998)	Giudice *et al.* (2003)
	Expansionary consolidations. 17 OECD countries – 1970-1995 OECD data	'Expansionary' cases. OECD countries – 1960-1994. OECD data	'Pure' Expansionary fiscal contractions in the EU EC data - AMECO
Australia	1980-82, 1985-88	1987	
Japan	1979-87		
Canada	1979-81	1986-1987	
Belgium		1984-1985	1985
Denmark	1983-86	1983-1986	1983, 84
Spain			1986
Italy	1976-77	1993-1995	1976,1977,1993
Netherlands	1991-93		
Portugal			1986
Sweden	1986-87, 1994-95	1986-1987	1983
UK			1997
Greece			1987
Ireland		1987-1989	

Notes: in Cour *et al.* (1996), large scale fiscal consolidations are defined as: improvement of at least 3% in the primary structural surplus on a period up to 3 years; in Alesina and Ardagna (1998): Blanchard-corrected primary balance improves by at least 2 percentage point of GDP a year, or 1.5% of GDP per year over 2 years.

Giudice *et al.* (2003) provide a survey of expansionary fiscal contractions in the EU. The authors combine different measures of size and persistence, with a benchmark case and three other cases, which all lead to similar results. Over 49 consolidation episodes, 24 are found to be 'expansionary', when considering the benchmark size and persistence criteria, 11 only are 'pure', in other words are not concomitant with a fall in real short-term interest rates. This reduces the number of expansionary consolidation episodes from 24[16] to 11.

The benchmark size criterion (taken from Alesina and Ardagna, 1998) is rather strict, at least as compared to the persistence criteria. The size criterion implies for instance that no consolidation episode is found for France over the period under review. However, the structural primary surplus estimated by the OECD has improved by 2 percentage points in France in 1996 and by 1 percentage point in 1997. Meanwhile, average GDP grew by 2.2 from 1996 to 1998, after 1.9 from 1994 to 1995: one may say that it is a case of expansionary fiscal episode. But according to current Commission estimates the CAPB improved by 1.6% only in 1996. There is of course a certain degree of arbitrariness, on criteria as well as on measurement issues, which may be discussed. Anyway, this would not be a 'pure' consolidation episode as there was a simultaneous fall in French short-term interest rates.

Denmark is found to be a 'pure' episode, which is not so clear for Ireland, depending on the criteria used. More surprisingly, the UK (1997), Spain (1986), Belgium (1985) and Italy (1976, 77, 93) also appear as 'pure cases' (see table 3). The authors consider that exchange rates are taken into account through interest rates, which is not true empirically. For instance, in Italy, the improvement in fiscal policy indicators has coincided with lower real interest rates and effective exchange rates in 1993 (taking the same definition as the authors for interest rates and applying it to real effective exchange rates). It seems difficult to consider that the Italian case of 1993 was a pure case. This is an illustration of how difficult it is to disentangle the role played by a monetary loosening from more restrictive fiscal policies.

Looking at the channel through which expansionary fiscal contractions occur, Cour *et al.* (1996) find that relative effect of fiscal consolidation on households' savings is greater than the one on investment in 6 cases among 9 the year of the consolidation. On the contrary, Alesina and Ardagna (1998) and Giudice *et al.* (2003) note that during these episodes, both consumption and investment increased, but the latter rose far more on average than the former during and after the year of fiscal contraction. Alesina and Ardagna (1998) find that expansionary fiscal contractions are characterized by a rise in profits, investment and growth, by a fall in wages and by a real long-term interest rate on average weaker than in the G7 countries. The results for fiscal expansions having a negative impact on growth are less clear-cut: investment and consumption fall, the exchange rate devalues more during contractionary episodes, and no difference can be drawn on labour market variables. If the theoretical models insist on consumption channel, empirical evidence favours the investment one.

[16] The number of cases seems lower to us when looking at recent AMECO database (19 cases only).

Table 3. How many 'Pure Expansionary consolidation episodes' in the EU? (1)

	(1)	Size of the consolidation (2), (4)	Expansion (3)	Short-term interest Real rates (5)	Real effective exchange rates	Domestic GDP growth/EU-15 GDP growth
		Change in CAPB, % potential GDP	*GDP growth, %*	*Average changes (t-1/t+1), in %*		*Difference, percentage point*
Belgium	1985	3.5 (in 1984) 1.8 (in 1985)	0.5	–0.3	1.6	0.0
Denmark	1983	3.8	2.6	0.2	0.0	0.9
Denmark	1984	2.8	1.4	0.8	-1.9	0.3
Greece	1987	*2.6*	0.4	1.2	1.4	–0.5
Spain	1986	*2.2*	2.6	3.0	0.0	1.8
Italy	**1976**	*2.0*	2.6	0.6	–3.7	0.1
Italy	**1977**	*2.0 in1976* *1.5 in 1977*	1.6	-0.1	0.4	0.6
Italy	**1993**	2.3 in 1992 1.8 in 1993	0.3	-2.1	–12.2	0.0
Portugal	1986	2.3	5.5	2.0	–1.6	4.8
Sweden	1983	*2.2*	2.3	-0.4	–1.7	0.6
UK	1997	1.7 in 1997 2.1 in 1998	0.3	0.9	– 0.5	–0.6

(1) 'Pure episodes' as in the benchmark cases taken from Giudice *et al.* (2003), i.e. combining the size criteria defined as (2) and the expansion criteria defined as (3). In **bold**: cases which do not seem pure to us; (2) Size criteria: A year of fiscal adjustment in which the CAPB improves by at least 2% of GDP, or a period of two consecutive years in which the CAPB improves by at least 1.5% of GDP per year, in both years (Alesina and Ardagna, 1998) (3) Expansion criteria: A period of fiscal adjustment is expansionary (contractionary) if the CAPB as a share of trend GDP improves by at least 2 percent in one year or by 1.25 percent in two consecutive years and the average real GDP growth in each adjustment year and in the two years after is greater (lower) than the average real GDP growth in the two years before (Alesina et Al., 2002). (4) In Italics, former definition, when data unavailable in ESA95 definition; (5) Using GDP deflator;

Source: European Commission – AMECO Database, Spring 2004, except for (4) AMECO Database Autumn 2002, own calculations.

Why did some large fiscal adjustments have anti-Keynesian effects, while others did not? Three approaches are confronted in the literature: the size of adjustment, its composition, the initial situation of public finances. Alesina and Perotti (1995) show that expansionary fiscal policies take place mainly though lower public expenditure (cut in households' transfers or lower general government wages), while contractionary fiscal policies occur through higher taxation. There is however no certainty that the Blanchard's method they use to estimate a structural deficit will allow to isolate deliberate expansionary policies from the rise in the public spending to GDP ratio resulting from declines in output. Unsuccessful adjustments occur when taxes are raised or when public investment is cut. This can be rationalised under the assumption that cuts in transfer or public wages will be viewed as irreversible, hence will be more disincentive and will have less negative effects. Conversely, the questions of the usefulness or transfers or public employment are not raised. The authors do not consider either the country-specific macroeconomic contexts at the time of the implementation of budgetary policy measures. Expansionary fiscal policy may support activity in a period of falling output (13 countries out of 19 are supposed to have run expansionary policies in 1975).

Alesina and Ardagna (1998) estimate the probability to observe expansionary effects of fiscal consolidations according to the size of the adjustment and its composition. They find that only the second characteristic matters: the probability is stronger when governments cut primary expenditure or public transfers and wages, and smaller when governments raise taxes and reduce public investment. Giudice *et al.* (2003) come to the same conclusions, and note that expansionary fiscal consolidations started during periods characterized by lower output gaps. Doing probit analysis, they find a strong effect of primary expenditure cuts on the probability to observe expansionary effects from fiscal consolidations, while the debt level is not found to have any effect.

On a panel of twenty industrial countries, Mc Dermott and Wescott (1996) detect 74 consolidation episodes of which 14 only are successful (in the sense of a long-lasting decline in the debt to GDP ratio). Estimating a logistic probability models to assess the conditions of greater success of consolidation, they find that world growth is an important factor for a successful episode. The probability of success is higher for the episodes where government spending declines, especially public sector wages, government consumption, or transfers. However the successful cases are mainly concentrated in small countries (Ireland, Denmark, Norway, Sweden, Australia).

Using the change in the structural primary balances produced by the European Commission, Zaghini (1999) reaches similar conclusions as Alesina and Perotti (1995). Zaghini (1999) detects 12 successful contractionary episodes over 49: 3 in the 1980's, 9 over 20 in the 1990's. Adjustments are costly at the time they are initiated, even if GDP growth accelerates after the consolidation period. Successful episodes are characterised by higher GDP, consumption and investment, but also by higher unemployment, lower inflation and lower interest rates. The probability of success rises with the initial size of government deficit and debt. However, many of the successful episodes of the 1990's can be explained by the fall in real interest rates from 1995 to 1997, which have allowed for a reduction in the debt to GDP ratio. In this respect, the only 'anti'-Keynesian episode is the UK's (in 1997).

Lane and Perotti (2003) show empirically that fiscal tightening is more likely to be expansionary if it is accompanied by competitiveness gains, either through exchange rate depreciation or through lower wages (resulting for instance from a rise in unemployment due to cuts in public sector employment). This article raises four objections: the exchange rate channel no longer plays in EMU; the analysed effects are not specifically anti-Keynesian, these effects may only attenuate the negative impact on activity and may not reverse it; the authors do not analyse the spillover effects on trading partners. Small economies have been able to run non-contractionary restrictive policies with the help of exchange rate depreciation, but what would happen if all countries were running the same policy at the same time?

In view of the EU experience since the early 1980's, the Danish and Irish episodes remain the main episodes of tight fiscal consolidation associated with rapid output acceleration. In most other cases, fiscal tightening is smaller and growth acceleration is very moderate (around 0.3% a year). It may also be worth noting that no pure expansionary fiscal consolidation has occurred, in view of these criteria, in the Maastricht-pre EMU period, the only case being the UK which was not a candidate for joining the Union at that stage.

Box1. Expansionary fiscal consolidations: main definitions from the empirical literature

Fiscal consolidation

Giavazzi and Pagano (1995): fiscal contraction is defined as the cumulated improvement in the CAPB of more than 5% of GDP in four successive years, including year t; or more than 4% in three successive years; or more than 3% in two successive years.

Alesina and Perotti (1995): 'A period of fiscal consolidation is deemed to have occurred in a given year if the discretionary fiscal impulse is greater or equal to 1.5% of GDP.'

Alesina and Ardagna (1998): 'A period of fiscal adjustment is a year in which the CAPB improves by at least 2% of GDP, or a period of two consecutive years in which the cyclically adjusted primary balance (CAPB thereafter) improves by at least 1.5% of GDP per year, in both years.'

Cyclically-adjusted primary balance (CAPB)

The definitions of the discretionary impulse generally refer to variations in the CAPB as a percentage of potential GDP taken from OECD's estimates (or European Commission's). Some studies, as Alesina and Perotti (1995), Alesina, Perotti and Tavares (1998) or Alesina and Ardagna (1998) build a cyclically adjusted primary balance (CAPB) based on the method suggested by Blanchard (1990), who defines as an index of discretionary change, ie 'the primary surplus which would have prevailed, were unemployment at the same value as in the previous year, minus the value of the primary surplus in the previous year' , which they find 'simple, transparent and straightforward' contrary to OECD or IMF's concepts. Estimating potential output and the resulting cyclically-adjusted balance raises a number of methodological difficulties. But Blanchard's method is worse due to the delay between output and employment and the noises between employment and unemployment numbers. We suspect that Blanchard methods undervalue the cyclical part of public balance. We have the same feelings about EC calculation, where the output gap is always very small.

'Successful' fiscal consolidation

Alesina and Perotti (1995): 'A fiscal consolidation is successful if, three years after the consolidation attempt, the ratio of debt to GDP is at least five percentage points below the level observed immediately prior to consolidation attempt.

Alesina and Ardagna (1998): 'A period of tight fiscal policy is successful if (1) in the three years after the tight period, the ratio of the cyclically adjusted primary deficit to GDP is on average at least 2% of GDP below its value in the year of tight fiscal policy, or (2) three years after the tight period, the ratio of the debt to GDP is 5% of GDP below its level in the year of the tight period.'

'Expansionary' fiscal consolidation

Alesina and Ardagna (1998): 'A period of tight fiscal policy is expansionary if the average growth rate of GDP, in difference from the G7 average (weighted by GDP weights), in the period of the tight policy and in the two years after is greater than the average value of the same variable in all episodes of tight policy.'

Alesina et al. (2002): 'A period of fiscal adjustment is expansionary (contractionary) if the primary cyclically adjusted balance as a share of trend GDP improves by at least 2 percent in one year or by 1.25 percent in two consecutive years and the average real GDP growth in each adjustment year and in the two years after is greater (lower) than the average real GDP growth in the two years before'.

'Bad times'

'Bad times' (Perotti, 1999) may refer to two alternative definitions: 1) "cyclically –adjusted" government debt to GDP ratio above a certain level in t-1 (benchmark case: 80%; 70% and 60% also considered) 2) "cyclically-adjusted" deficit as a share of GDP, deficit being taken as the 'first difference in the CA government debt exceeds a certain value in the two preceding years (t-1 and t-2) 0.1 the change in (first difference).

e) Some pure cases of expansionary consolidation

Two well-known episodes of so-called 'expansionary consolidation' episodes are Denmark (in 1983-86) and Ireland (1987-89) (Giavazzi and Pagano, 1990) while Sweden (1990-94) is a typical example of non-Keynesian fiscal expansion (Giavazzi and Pagano, 1995). We will briefly consider the Danish and Swedish cases, before addressing three 'pure' expansionary consolidation episodes (Giudice *et al.*, 2003): the UK (1997), Spain and Portugal (1986).

Following a large deterioration of domestic public finances, deeply restrictive fiscal policies were implemented in the case of the Danish and Irish episodes in order to bring public deficits back to lower levels. At the same time both private consumption and private investment accelerated strongly. Giavazzi and Pagano (1990) underline the importance of exchange rate adjustments, monetary policy and wealth effects on private consumption but find these factors to explain only part of the story. They estimate consumption functions for each of these two countries and find consumption to be substantially underestimated in times of fiscal tightening. The authors explain this "Puzzle" by the rise in the consumers' permanent income resulting from fiscal retrenchment. However, they find no significant correlation between errors' estimates and public spending deviations. But Creel (1998b) shows instead that the Danish consumption behaviour reveals strong Keynesian features if financial liberalization and the temporary weakening of liquidity constraints it entailed are taken into account.

The Swedish case (1990-1994) combines a strong increase in government borrowing following tax cuts, associated with a fall in private consumption. Giavazzi and Pagano (1995) estimate a consumption function over the 1970-1989 period before forecasting consumption from 1990 to 1994: cumulated forecasted consumption turns out to be 3.7% higher than observed consumption. However, if unemployment is included in the equation, the over-estimate disappears, which gives some substance to the idea that Swedish consumers raised their savings in face of rising unemployment[17]. The large fall in housing prices may also have depressed consumption. Besides, the crisis of the Swedish financial system led the government in the early 90's to provide financial support to Swedish banks, which translated into higher government borrowing. The tax reform contributed only to 1 percentage point in government borrowing as a share of GDP and to 3 percentage points including the abolition of temporary taxes. The financial crisis may also have increased uncertainty on economic prospects and pushed households to raise precautionary savings.

The UK: the 'pure' case of 1997

The UK example of 1997 presented as a pure expansionary consolidation episode by Giudice *et al*. is one of the very rare examples among large EU economies[18]. Indeed, fiscal policy has been strongly tightened between 1996 and 1998 (see table 5), with not even a slight deceleration of output growth. But, contrary to other 'expansionary consolidations cases' from table 3, the budgetary effort is close to the lowest band of the definition (2% in the adjustment year, or 1.5% of GDP in two consecutive years), and the acceleration of output is only 0.3%, which is also very low as compared to the other 'successful' episodes.

[17] The authors do not test if other factors like inflation or real interest rates play a role in the Swedish consumption function.

[18] 1998 also appears to be a pure case, although not mentioned as such by Giudice *et al.*.

Table 4. Decomposition of the rise in government borrowing during the Swedish fiscal expansion

Total deficit deviation in % of GDP between 1990 and 1994	From -4.1% in 1990 to 13.3% in 1993= 17.4%
Financial crisis	3.5
Cyclical effects	7.0
Change in aggregate demand composition and fall of inflation effects on taxes receipts	4.0
Tax reform	1.0
Suppression of temporary taxes	2.0

Source: OECD Economic Studies on Sweden, 1995.

In 1997, fiscal tightening took place at a time of rapid growth, output gap being close to 0 in 1996 according to the EC estimates (-1.5% in OECD estimates), with a rate of unemployment still around 8%. Short-tem interest rates were gradually raised by the Bank of England in 1997 (from 5.75 in September 1996 to 7.5 in January 1998), but UK nominal long-term interest rates slightly decreased, converging towards the German long-term interest rates. Thus the average of short and long-term real interest rates increased only slightly. Meanwhile the real effective exchange rate appreciated, hence monetary conditions were tightened, making it possible to consider this consolidation as 'pure'.

However, the buoyancy of households' consumption in early 1997 was not only due to traditional determinants of consumption but also to the one-off effect of windfall gains from building societies conversions and life insurance companies demutualization £36 billion (6.5% of disposable income). 1997-98 was also a period of growth acceleration in continental Europe, and the case for an expansionary fiscal consolidation vanishes when the expansion criterion is considered as growth differential between the rest of EU-14 countries (as in Giavazzi and Pagano, 1995).

The Spanish and Portuguese 'pure' cases of 1986

The strong output growth acceleration in Spain in 1986-1987, starting from an output gap of -3.1 in 1985 coincided with an increase in taxes receipts: VAT was introduced and energy taxes were raised (which was facilitated by a drop in oil prices). The cyclically adjusted government primary balance improved from -3.5 in 1985 to -0.2 in 1987, but net government liabilities increased from 26 to 30% of GDP. Moreover, the fact that Spain joined the EU at that time attracted a lot of foreign investors, which led to an investment boom (net entries of foreign direct investment amounted 2.25%[19] of GDP in 1986). The boom was sustained by private consumption following increases in public employment and wages in order to reduce unemployment (the unemployment rate slightly decreased from 21.9% in 1985 to 21.5% in 1986 and 21% in 1987), and a strong 9% increase of credits to private sector. Finally, the Spanish case can hardly be considered as a 'pure' expansionary consolidation one: foreign investment, credit expansion and public employment speeded up growth in a Keynesian way.

[19] Data on private consumption, gross total fixed capital formation, prices and wages for Portugal and data on unemployment, credit and foreign investment for Spain come from OECD Economic Outlook n°41 (1987).

Table 5. UK: was there a pure expansionary fiscal episode in 1997?

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP growth, %	-1.4	0.2	2.3	4.4	2.8	2.7	3.3	3.1	2.8	3.8
CAPB, % of GDP (1)	0.9	-1.8	-3.5	-3.1	-2.1	-0.6	1.2	3.2	3.7	3.6
Change in the CAPB	-0.6	-2.7	-1.7	0.4	1.0	1.5	**1.7**	**2.1**	0.5	-0.1
GDP growth, %EU12	*2.5*	1.4	-0.8	2.4	2.2	1.4	2.3	2.9	2.8	3.5
Fiscal indicators, % of GDP										
Total revenue	40.9	39.1	37.6	38.1	38.7	38.6	38.9	39.9	40.3	40.8
Of which:										
current taxes on income and wealth	15.7	14.8	13.8	14.2	14.9	14.8	15.1	16.3	16.2	16.7
Total expenditure	43.9	45.6	45.6	44.9	44.5	42.7	41.1	39.8	39.2	39.4 (2)
Gen. gov. net lending	-3.1	-6.4	-7.9	-6.7	-5.8	-4.2	-2.2	0.1	1.1	1.5 (2)
Gross debt	34.4	39.2	45.4	48.5	51.8	52.2	50.8	47.6	45..0	42.1
Monetary conditions										
Short-term interest rates, nominal	11.5	9.6	5.9	5.5	6.7	6.0	6.8	7.3	5.5	6.2
Long-term interest rates, nominal	9.9	9.1	7.6	8.2	8.3	7.9	7.1	5.6	5.0	5.3
Short-term interest rates, real (GDP def.)	4.6	5.4	3.1	3.9	3.9	2.6	3.9	4.4	3.2	4.7
Long-term interest rates, real (GDP def.)	3.0	4.9	4.7	6.5	5.5	4.4	4.2	2.8	2.6	3.9
Real int. rates (avg)	3.8	5.1	3.9	5.2	4.7	3.5	4.0	3.6	2.9	4.3
Change in real effective exchange rate	3.6	-4.8	-10.0	-0.6	-3.8	2.5	18.2	6.4	1.4	4.0

(1) AMECO, cyclical adjustment based on potential GDP; (2) excl. proceeds relative to UMTS licences (2.4% of GDP in 2000)

Source: European Commission, AMECO Database Spring 2004.

In Portugal, the OECD data do not show any budgetary consolidation either according to size or persistence criteria used by Giudice *et al.* (2003). The CAPB improved by 1.8% of potential GDP in 1986. This was also due to increased energy taxation and the VAT introduction (as Portugal joined the EU in 1986). Private consumption increased by 6.5% in real terms owing to an unexpected fall in inflation from 21.7 to 12% combined with a 19% increase in nominal wages and higher social transfers. Private consumption boosted investment, which increased by 9.5%. Once again, data do not clearly indicate a 'pure' case of expansionary fiscal consolidation.

Table 6. Spain and Portugal – 1986 fiscal episodes

	Spain			Portugal		
	1985	1986	1987	1985	1986	1987
GDP growth, %	2.2	3.3	5.5	3.3	4.3	4.7
Cyclically adjusted government primary balance, % of potential GDP	-3.5	-2.0	-0.2	0.7	2.6	1.5
Cyclically adjusted government current expenditure, % of potential GDP	34.4	34.2	34.8	32.1	34.9	35.9
Cyclically adjusted government current receipts, % of potential GDP	33.5	34.0	35.5	30.6	31.9	31.6
General government net financial liabilities, as a % of GDP	26.1	29.3	29.9	55.8	54.0	60.8
Output gap	-3.1	-3.2	-1.1	-10.1	-8.3	-4.8

Source: OECD - Economic Outlook database, December 2003.

f) What do VARs models say?

Fatas and Mihov (2001) test the assumptions of a neoclassical model with a VAR model on US data. In a neoclassical model, a rise in public spending would induce lower private consumption and higher employment, households' wealth being negatively affected. In fact, it appears from Fatas and Mihov's estimated model that higher public spending is accompanied by higher private consumption and higher employment, as in a Keynesian world.

Blanchard and Perotti (2002) analyse the effects of fiscal policies on US output. They use quarterly data, which is of course much more appropriate than annual data, in order to make sure that the VAR analysis is done on contemporaneous shocks. The results are fairly Keynesian for output and consumption: they rise with public expenditure (the maximum multiplier is 1.29 or 0.90 according to the estimation method); fall when taxes rises (the multiplier is 0.78 or 1.33). A puzzling outcome is that imports and investment drop after a positive shock on public expenditures. Is the method reliable?

Mountford and Uhlig (2002) also find that, in the USA, government spending crowds out private investment but does not reduce consumption. A "revenue shock" lowers GDP and private consumption, which is not conform to a Ricardian point of view.

Gali *et al.* (2004) show empirically that an increase in government spending is followed by an increase in households' consumption, at least in the US, and has little effect on investment. The authors show that this result can be justified under the assumption that a sufficient number of households are liquidity-constrained and that prices are sticky with imperfect competition markets. Output reacts to demand (the world is Keynesian) and liquidity-constraints or wages-earners households follow the impulse provided by the government.

Perotti (2004) analyses the effects of fiscal polices in five OECD countries, where quarterly data on government budget are available: the US, West Germany, the UK, Canada and Australia. Using a structural VAR approach, his results are fivefold: (1) fiscal policies tend to have small effects on GDP; (2) there is no evidence that tax cuts work faster or more efficiently than spending increases; (3) effects of fiscal policies on GDP have fallen over

time; (4) private investment responds negatively (or does not answer) to government spending; (5) multipliers are bigger in the USA than in other countries. A positive element of the paper is to pay great attention to data and to test a model on quarterly data. Another originality of the paper lies in addressing not only the impacts of fiscal policy on GDP (and GDP components) but also its effects on prices and interest rates. Unfortunately, the article suffers from weaknesses from a statistical point of view (starting with the non-stationarity of the series which are simply corrected by a trend); the model is very simple; Perotti does not estimate fiscal reactions functions; many results look incredible: for instance, after 3 years, fiscal multipliers range from -1.4 in Canada to 1.3 in Australia.

g) Are macroeconometric models still Keynesian?

Many models, even among the most recent ones, are purely Keynesian, without any expectation effects. Among Euro area model, so are the AWM model built at the ECB (Fagan *et al.*, 2001); the MZE model developed in the French administration (INSEE and DP, Beffy *et al*., 2003) or the model built by IWH and IGIER (Dreger *et al.*, 2003)[20].

Wallis (2003) compares Quest, NiGEM, Multimod and AWM. The consumption function appears to be the main difference between these models. In the AWM model, households' consumption is based on current income. In NiGEM's simulation, households' consumption depends on future anticipated income; hence consumption will not be affected by a transitory income shock. In Multimod, some consumers are liquidity-constrained: their consumption is affected by current income. The share of liquidity constrained consumers is reduced to 44% in the IIIB version. As for investment, it depends on long-term profitability, and will not be affected by a temporary shock. Last, in Quest, only 30% of households are assumed to be liquidity-constrained; investment depends on profits, which are negatively affected by wage rises. All in all, the effects of public spending on private consumption and investment vary widely depending on models. However, a rise in public spending will always be expansionary and may therefore be implemented to counterbalance the effects of a negative private demand shock (see table 7).

Table 7. Impact in the first year of a temporary increase in 1% of GDP government spending (deviation from base en GDP point)

	In the euro area			In France		
	AWM	Multimod III	Multimod IIIB	Multimod III	Nigem	Quest
GDP	1.35	1.48	1.14	1.26	0.78	0.87
Consumption	0.72	0.60	0.19	0.51	0.04	0.09
Investment	0.54	0.01	0.01	0.00	0.35	- 0.08
Ext. account	-0.91	-0.13	-0.07	-0.25	-0.61	- 0.12

Source: Wallis (2003).

[20] The model by Bagnai and Calcucci (2003) is purely Keynesian; however, the long-term interest rate depends on the short-term interest rate and on the debt to GDP ratio, which does not make much sense in this context.

These simulations raise some problems: how are the consumptions equations estimated? How are future expected income series calculated? How are they used in forecasting? For instance, how do agents anticipate that the economy will return to equilibrium after a private demand shock?

In NIGEM, for instance, estimated equations are (Barrell *et al.*, 2002):

(1) $\Delta \ln C_t = a_0 - a_1(\ln C_{t-1} - \ln Y_{t-1}) - a_2(\ln C_{t-1} - \ln W_{t-1}) - \theta_1 \Delta \ln Y_{t-1} - \theta_2 \Delta \ln C_{t-1}$

They are totally backward looking, although there is no empirical evidence that all consumers base current consumption on their expected future income. Specifications in the Quest model are also debatable (see the appendix B).

To conclude, econometric models seem to confirm that fiscal policies have a Keynesian impact on activity in the short-run. Non-Keynesian effects appear only under doubtful assumptions on the wage-inflation equations and the share of liquidity constrained consumers.

Conclusion

The NK view provides a formalisation and generalisation of anti-Keynesian effects of fiscal policy based on some episodes of expansionary fiscal consolidation or contractionary fiscal expansion. According to this literature, a rise in public spending will have contractionary effects even in the short-term. Hence public spending should be cut even in times of falling output. The usefulness of stabilisation fiscal policies is therefore questioned most notably in Europe. In contrast, such is not the case in the USA, where monetary and Keynesian fiscal tools have been simultaneously and markedly used to stabilise activity from 2000 to 2003.

Past inadequate conducts of economic policy (mainly in Italy) probably help to explain why the NK view has expanded in Europe. It has also probably stemmed from the willingness of so-called 'European authorities' to impose structural reforms in Europe like lowering public and social expenditures and/or increasing labour market flexibility. This NK view is thus prevailing among 'European authorities' as it provides scientific support to their institutional plans. On the one hand, 'European authorities' advocate sharp reductions in the share of public spending in the economy, and they are reinforced in their 'self-reliant' view by the NK literature: public expenditures are said to be harmful on long-run output growth and lowering these expenditures is said to have a positive impact on short run growth. On the other hand, 'European authorities' advocate limitations on domestic rooms for manoeuvre in terms of short-term stabilisation fiscal policies[21]: such limitations gain support from the NK view since stabilisation policies are said to have opposite effects to that traditionally expected.

Considering that institutional and political plans are being influenced by scientific record is not flawed in itself. In the present case however, the dramatic issue is that the NK view suffers from deep scientific weaknesses. First, the assumption that public spending is useless leads one to conclude that reducing it (with the associated expectation of lower future taxes) will always raise households' permanent income. Unfortunately, public expenditures are generally useful, either for production purposes (public investment) or for households' (old-age pensions, health, education, unemployment benefits). None of the existing NK view

[21] Various reasons can be called upon among which the risk that 'lax' domestic fiscal policy may crowd out private investment or may force central banks to raise interest rates in order to curb expected inflation.

literature takes the question of public spending usefulness into account. It is striking that the NK view also feeds on politics, or on pure ideology. For instance, quoting Alesina and Ardagna (1998) « (European governments need) *to reduce the over-extensive welfare state (especially, pension and unemployment insurance system) and public bureaucratise. Hopefully, the Stability pact will force serious welfare reforms. There is a limit to the patience of European taxpayers* ». This type of political viewpoint has no roots in economic analysis. Evidence that (all) civil servants are useless or that lower public pensions would raise productivity need to be theoretically and empirically validated.

Second, the NK view only apply in an economy working at full capacity (or being supply-constrained), where useless public expenditure could be cut. It cannot apply in a Keynesian unemployment regime, in a situation where short-term stabilisation policy would be run. In that case, a rise in public spending will still have expansionary effects. Besides, the combination of the two extreme assumptions of (liquidity) unconstrained households and of consumption depending on households' expectations, lead to the indeterminacy of the equilibrium state of the economy. Expectations of future higher income are self-fulfilling.

Third, most empirical papers related to the NK view assume that agents consider that public spending shocks will be permanent, though shocks may also result from stabilisation (transitory) purposes.

Fourth, the empirical record of so-called 'NK effects' bears mainly on time episodes during which fiscal policy was tightened and had no output costs, thanks to expansionary monetary policies (often allowed by EMU prospects), to exchange rate depreciation (in particular for small economies), to rising equity prices, to financial liberalisation, or to structural reforms. These 'NK effects' cannot be straightforwardly generalised to large EMU economies, for instance, nor to large countries in general.

What lessons may be drawn from the NK view for the conduct of fiscal policies? As our critical synthesis has shown, stabilisation policies are still operational, although their different instruments (public spending, transfers, taxes) are not equally efficient. Public spending measures are more efficient than the other two fiscal instruments in theory: public spending may have Keynesian effects even if households have a Ricardian behaviour, provided they believe that public spending will have only temporary effects. Conversely, public expenditures are less easily reversed than the other two, and they also take time to be fully implemented. As for transfers, they will have an impact only insofar as they benefit liquidity-constrained households; one may think that social transfers meet this condition.

Finally, besides political support among the 'European authorities', what does the Keynesian view still lack? Most probably, a theory of optimal public debt. Disregarding the question of debt dynamics is no longer possible after net public debts have so largely grown since the late 1970s. One question thus arises: how is it possible to advocate the unlimited use of fiscal policy for stabilisation purposes and, meanwhile, insure public finance sustainability? One answer could be to define public debt targets as Pisani-Ferry (2002) advocated. Guaranteeing sustainability would quite automatically ensure private agents that future taxation will never be significantly raised. However, without any clear-cut theory of the equilibrium level of public debt, reliance on debt targets may have the same drawbacks as deficits targets: it would be consider too much automatic, too simplistic, etc. Moreover, it would not be operational as the optimal level of public debt surely fluctuates overtime, under the influence of interest rates and demographic evolutions. For these reasons, commitments by governments on fiscal policy rules, in order to avoid inflationary deficits, are preferable to a public debt target.

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Appendix A: Estimates of long term interest rate equations[22]

Usually, empirical interest rate studies do not take into account the fact that long rates equal the average of expected short rates since the estimated equations are reduced form ones. It seems more consistent to check the expectations of the term structure assumption, and to test if the deficit and debt levels have any effect on the gap between the average expected short rate and the current long rate. When the level of the structural deficit is high to support demand, it will have no impact on the long term rate if agents expect that this deficit will be removed once the economy goes back to full employment[23].

We first estimate a real long term interest rate equation assuming that this rate adjusts to balance demand to supply in the long term, with the assumption that current public expenditure is an indicator of future expenditure. Consider equation *IS* :

$$y = g - \sigma(rl) + \kappa B$$

Demand (in variation to its tendency) depends on public demand *g*, on private demand which is a decreasing function of the real long term interest rate and an increasing one of the stock of public debt *B* if one assumes that agents are not Ricardian. The equilibrium real long rate is set up so as the variation of production to be nil: $rl = \frac{g + \kappa B}{\sigma}$

We estimate an equation of the type $rl = \alpha + \mu(y - \tilde{y}) + \gamma_1 .SSP + \gamma_2 .B + \phi .rl^*$. rl^* is a real foreign long term interest rate[24]. Expected inflation is modelled as an adaptive process: $\pi_t^a = 0.7\pi_{t-1}^a + 0.3\pi_t$ [25]. The output gap $(y - \tilde{y})$ is the gap between GDP and its potential level, as computed by the OECD. The structural primary balance *SSP* is cyclically adjusted (see charts), and public debt *B* is the gross one as a % of GDP (see charts).

Estimates[26] over the recent period (table A1) show a negative and significant correlation between the primary structural balance and the real long rate only in the US and UK cases. The estimated coefficient is insignificant in the German case, and is of the opposite sign in Japan. Coefficients of the stock of gross public debt are insignificant, or of negative sign (Japan). Over longer period (table A2), only the coefficient on the British primary structural balance is significant and of the awaited negative sign. Public debt has a significant impact in the US case only.

If one compares both periods, one notes strong parameter instability, with sign changes, particularly for output gap, if one lengthens the period of estimate. The estimate of a reduced

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[22] This appendix hinges extensively on on-going research by Bruno Ducoudré.

[23] This result is coherent with fiscal reaction functions estimates, which show that fiscal authorities empirically correct high deficits. See Creel et al. (2002).

[24] For Japan and Germany, we take the American real long rate. In the case of the United Kingdom, we take the German real long rate. The significance of the parameters γ_1 and γ_2 is not changed by the omission of the foreign real long rates in the estimates.

[25] Helbling and Wescott (1995) take the same model of expected inflation, more suited to account for the non-stationarity of the inflation level. The series of real long rates obtained are the same ones as those represented graphically.

[26] The estimates are made on annual data rather than on quarterly or monthly data: Correia-Nunes and Stemitsiotis (1995) note that works carried out on monthly or quarterly data generally lead to reject any link between interest rates and public debt and deficits.

form thus does not allow to claim that a rise in public deficits or debt always entails a rise in real long term interest rates.

Table A1 : Real 10-year swap rates

	USA	United Kingdom	Japan	Germany
period	**1988-2002**	**1988-2002**	**1990-2002**	**1988-1998**
α	**4.56** **(26.73)**	**3.89** **(26.59)**	**2.49** **(24.07)**	**4.35** **(30.15)**
μ	**0.50** **(3.30)**	**0.38** **(4.50)**	**-0.20** **(-1.71)**	**0.32** **(1.94)**
γ_1	**-0.30** **(-2.14)**	**-0.30** **(-3.18)**	**0.35** **(4.26)**	**-0.33** **(-1.65)**
γ_2	**0.00** **(0.15)**	**0.01** **(0.30)**	**-0.02** **(-2.33)**	**0.02** **(0.79)**
ϕ		**0.34** **(1.33)**	**0.74** **(4.37)**	**0.10** **(0.62)**
$\bar{R}^2$	**0.36**	**0.56**	**0.91**	**0.88**
DW	**1.62**	**0.77**	**2.25**	**1.82**

T-students are in brackets; $\bar{R}^2$: adjusted R-squared; *DW*: Durbin-Watson statistic.

Estimated equation : $rl = \alpha + \mu(y - \tilde{y}) + \gamma_1.SSP + \gamma_2.B + \phi.rl^*$

Source: B. Ducoudré's calculations.

Table A2 : Real 10-year interest rates on public bonds

	USA	United Kingdom	Japan	Germany
period	**1965-2002**	**1980-2002**	**1980-2002**	**1971-1998**
α	**3.45** **(16.71)**	**2.89** **(18.53)**	**2.50** **(19.84)**	**3.89** **(21.13)**
μ	**-0.16** **(-1.74)**	**0.16** **(2.54)**	**0.15** **(1.70)**	**0.23** **(2.44)**
γ_1	**0.09** **(0.58)**	**-0.22** **(-2.20)**	**0.21** **(3.00)**	**0.17** **(1.22)**
γ_2	**0.05** **(2.63)**	**0.04** **(1.21)**	**0.00** **(0.37)**	**0.01** **(0.44)**
ϕ		**0.27** **(3.06)**	**0.21** **(1.69)**	**0.20** **(2.40)**
$\bar{R}^2$	**0.17**	**0.68**	**0.65**	**0.23**
DW	**0.70**	**0.85**	**1.21**	**0.75**

T-students are in brackets; $\bar{R}^2$: adjusted R-squared; *DW*: Durbin-Watson statistic.

Estimated equation : $rl = \alpha + \mu(y - \tilde{y}) + \gamma_1.SSP + \gamma_2.B + \phi.rl^*$

Source: B. Ducoudré's calculations .

As the reduced form estimates induce substantial parameter instability, we also estimate structural long term interest rate equations. We simultaneously estimate impacts of the short term rate, public balance and gross public debt on the long term rate. The nominal long term rate is equal to the weighted sum of expected nominal short rates. We thus estimated:

$$il = \alpha + \beta.\overline{ic} + \gamma_1.SSP + \gamma_2.B + \phi.il^*$$

$\overline{ic}$ is the expected nominal short term rate. It is obtained by filtering the nominal short term rate with a Hodrick-Prescott filter. Expectations theory proves correct either if $\beta = 1$, or if $\beta + \phi = 1$ if a foreign interest rate is introduced. The estimate enables to test if the primary structural balance or the public debt level have any specific effect on the long term interest rate level, once monetary policy effects are taken into account. If agents expect that fiscal policy conflicts with monetary policy goals, one must find $\gamma_1 < 0$ and/or $\gamma_2 > 0$.

Over the recent period[27] (see table A3), there is no significant effect either of the primary structural balance or of the gross public debt on the nominal 10-year interest rate. In any case, the hypothesis $\beta = 1$ cannot be rejected, whether there is a foreign interest rate or not in the Japanese and UK equations.

Table A3: Nominal 10-year swap rates

	USA	**United Kingdom**	**Japan**
period	**1988-2002**	**1988-2002**	**1990-2002**
α	**1.76** **(2.54)**	**1.68** **(1.98)**	**1.46** **(4.06)**
β	**0.99** **(8.16)**	**0.83** **(7.96)**	**1.02** **(7.06)**
γ_1	**-0.03** **(-0.33)**	**0.04** **(0.38)**	**-0.12** **(-1.42)**
γ_2	**-0.05** **(-2.08)**	**-0.06** **(1.17)**	**-0.01** **(-1.09)**
$\overline{R}^2$	**0.85**	**0.86**	**0.99**
DW	**2.05**	**1.43**	**2.66**

T-students are in brackets; $\overline{R}^2$: adjusted R-squared; *DW*: Durbin-Watson statistic.

Estimated equation : $il = \alpha + \beta.\overline{ic} + \gamma_1.SSP + \gamma_2.B + \phi.il^*$

Source : Source: B. Ducoudré's calculations.

[27] In the German case, the brevity of the estimate period (1988-1998) brings about insufficient results.

Over a longer period (see table A4), one can again verify the lack of effect of the primary structural balance and of the gross public debt on the long term rate[28], once the expectations theory of the term structure has been confirmed[29]. For the United Kingdom, there is no effect of the primary balance and public debt either with or without the US rate in the equation, while introducing the German rate implies the rejection of the hypothesis $\beta + \phi = 1$. Finally, introducing the US rate in the German equation does not bring different results.

Table A4: Nominal 10-year public rates

	USA	United Kingdom	Japan	Germany
period	**1980-2002**	**1980-2002**	**1980-2002**	**1971-1998**
α	**1.57** **(1.78)**	**0.40** **(0.45)**	**-1.15** **(-1.22)**	**0.15** **(0.13)**
β [30]	**1.07** **(7.69)**	**1.01** **(10.32)**	**0.75** **(2.37)**	**1.12** **(6.15)**
γ_1	**0.04** **(0.26)**	**0.08** **(0.57)**	**-0.08** **(-0.96)**	**-0.20** **(-1.92)**
γ_2	**-0.03** **(-1.37)**	**-0.05** **(-0.80)**	**-0.01** **(-0.37)**	**-0.02** **(-1.16)**
ϕ			**0.28** **(2.16)**	
$\bar{R}^2$	**0.90**	**0.83**	**0.93**	**0.74**
DW	**1.79**	**0.64**	**0.86**	**1.02**

T-students are in brackets; $\bar{R}^2$: adjusted R-squared; *DW*: Durbin-Watson statistic.

Estimated equation : $il = \alpha + \beta.\overline{ic} + \gamma_1.SSP + \gamma_2.B + \phi.il^*$

Source : Source: B. Ducoudré's calculations .

[28] The coefficient on the German public balance is significantly different from zero at the 10% threshold. This may be due to a conflict of objectives between the monetary authorities and the fiscal authorities at the time of the German reunification. The estimate of an equation with a rupture in 1980 (see table 6) confirms this result.

[29] In the American case, the estimate over 1965-2002 reveals a significant effect of the gross debt, but this one disappears when the period of estimate is shortened. The estimate of an equation with a break in 1980 corroborates our preference for an estimate over 1980-2002, the debt having no significant impact on each sub-period (see table 6).

[30] For Japan and Germany, the expected mean short rate is constructed according to an adaptive expectation formation process : $\overline{ic} = 0{,}8.\overline{ic}_{-1} + 0{,}2.ic$. We take this specification because the SEE is smaller than with HP-filtered series (that is not the case for the USA). For the United Kingdom, the SEEs are close to each other, but the hypothesis $\beta = 1$ is rejected with adaptive expectations.

Regime shift in 1980

We estimate American and German long public rate equations introducing a break into the parameters' value in 1980, which is justified by the modification of monetary policies which occurred in 1979. Post-1979 coefficients measure the gap with the reference period (1965-1979 for the USA and 1971-1979 for Germany). Thus, the average American real long term interest rate is equal to 3.63 over 1965-1979 and 4.66 over 1980-2002.

The estimates reveal the rise of the real interest rates in 1980. The strong instability of the parameters is noticeable. Concerning the real long rate equations (see table A5), the coefficients on the national debt undergo a sign change in both cases from one period to the other, as it is the case for the primary structural balance in the US rate equation. One finds also the positive correlation between the US real rate and the gross public debt for the first sub-period, and the negative correlation between the public balance and the US real rate for the second sub-period. Regarding Germany, the estimates show no relation between the long real rate and the public debt or public balance (apart from a negative correlation in the first sub-period between the debt and the real rate).

Estimates of nominal long rate equations show dissimilar results (see table A6): a break in the expectations formation, the lack of effect of the US public debt and balance, and a negative correlation between the long term interest rate and the German public balance over 1980-1998.

Table A5: Real 10-year interest rates – Break in 1980

	USA		**Germany**	
period	**1965-1979**	**1980-2002**	**1971-1979**	**1980-1998**
α	**3.63** **(4.31)**	**1.03** **(1.17)**	**-0.44** **(-0.15)**	**4.82** **(1.58)**
μ	**0.05** **(0.45)**	**0.02** **(0.13)**	**0.06** **(0.18)**	**0.27** **(0.75)**
γ_1	**0.30** **(1.10)**	**-0.49** **(-1.66)**	**-0.05** **(-0.07)**	**0.03** **(0.04)**
γ_2	**0.15** **(2.07)**	**-0.20** **(-2.57)**	**-0.32** **(-2.78)**	**0.34** **(2.90)**
ϕ			**0.61** **(0.77)**	**-0.50** **(-0.62)**
$\bar{R}^2$	**0.67**		**0.64**	
DW	**1.58**		**1.95**	

T-students are in brackets; $\bar{R}^2$ **: adjusted R-squared;** ***DW*****: Durbin-Watson statistic.**

Estimated equation : $rl = \alpha + \mu(y - \tilde{y}) + \gamma_1.SSP + \gamma_2.B + \phi.rl^* + dummy_{80}(\alpha + \mu(y - \tilde{y}) + \gamma_1.SSP + \gamma_2.B + \phi.rl^*)$

$dummy_{80}$ **equals 1 in 1980 and after.**

Source : Source: B. Ducoudré's calculations .

Table A6: Nominal 10-year interest rates – Break in 1980				
	USA		Germany	
period	1965-1979	1980-2002	1971-1979	1980-1998
α	1.75 (2.01)	0.02 (0.01)	-1.87 (-0.97)	4.35 (1.78)
β	0.57 (2.49)	0.50 (1.92)	1.28 (3.51)	-0.48 (-1.13)
γ_1	0.04 (0.20)	-0.01 (-0.03)	-0.06 (-0.26)	-0.38 (-1.47)
γ_2	-0.16 (-1.71)	0.13 (1.32)	-0.09 (-1.28)	0.08 (1.00)
$\bar{R}^2$	0.90		0.83	
DW	1.83		1.91	

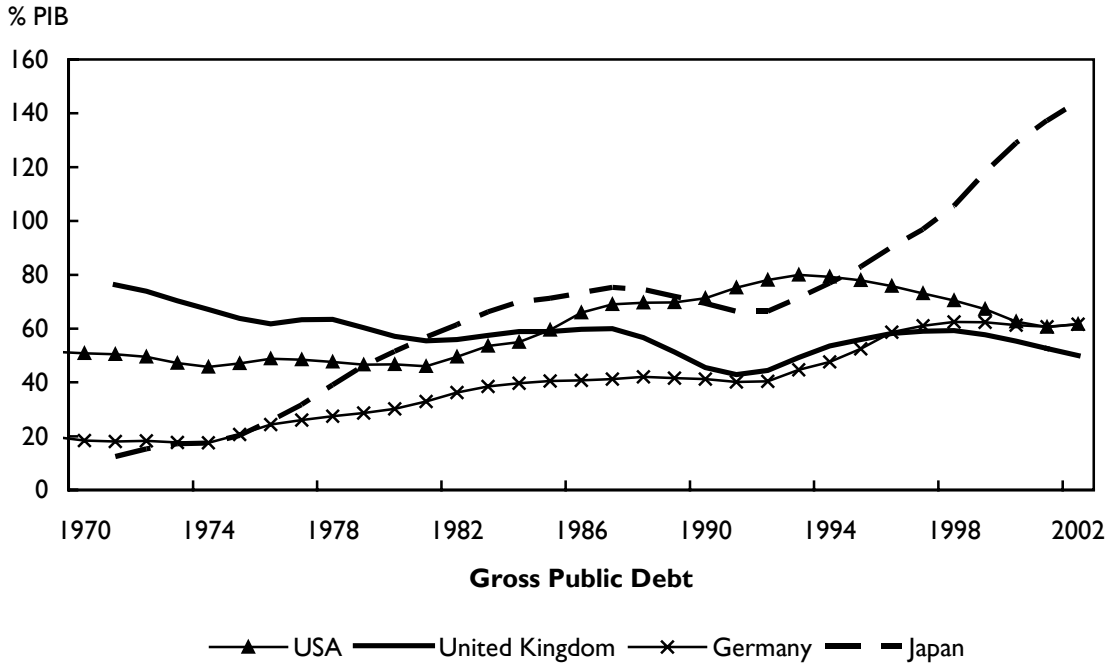
T-students are in brackets; $\bar{R}^2$ **: adjusted R-squared;** ***DW*****: Durbin-Watson statistic.**

Estimated equation : $il = \alpha + \beta.\bar{ic} + \gamma_1.SSP + \gamma_2.B + \phi.il^* + dummy_{80}(\alpha + \beta.\bar{ic} + \gamma_1.SSP + \gamma_2.B + \phi.il^*)$

$dummy_{80}$ **equals 1 in 1980 and after.**

Source : Source: B. Ducoudré's calculations .

Charts


% PIB
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140
120
100
80
60
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1974
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1982
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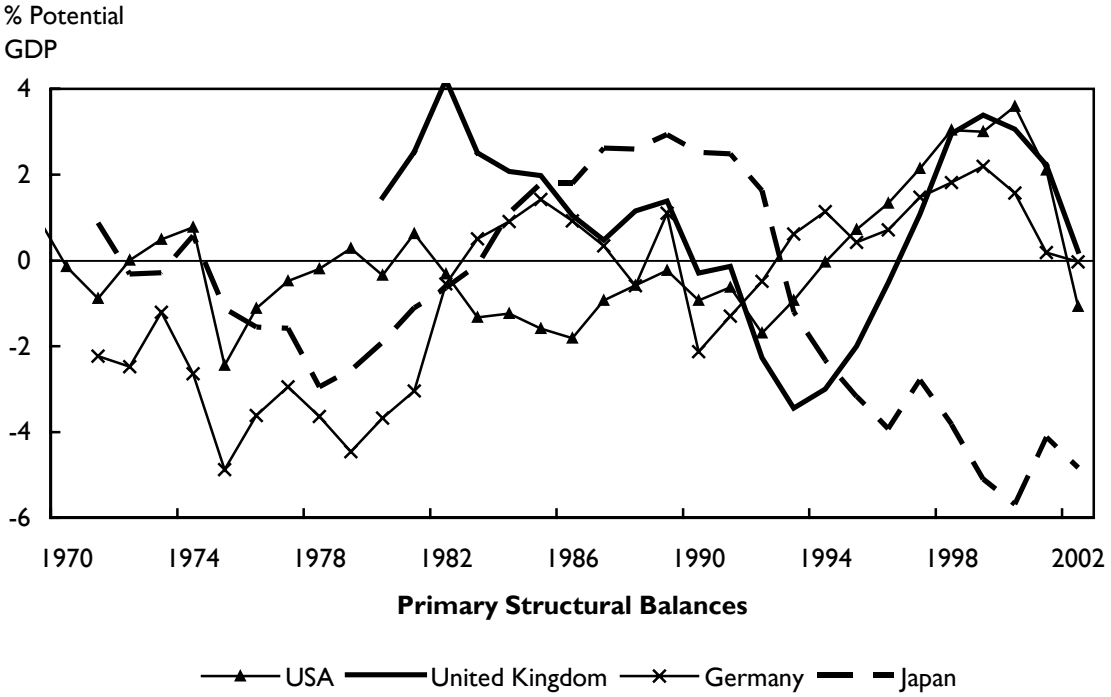
1998
2002
Gross Public Debt
USA
United Kingdom
Germany
Japan


% Potential
GDP
4
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-2
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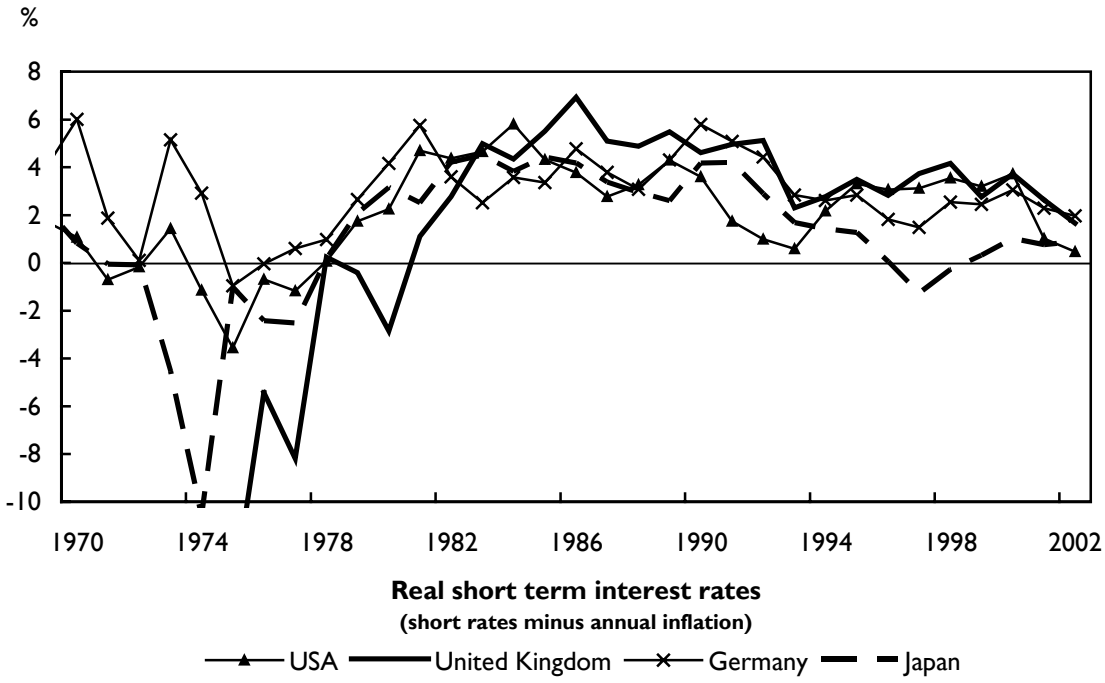
Primary Structural Balances
USA
United Kingdom
Germany
Japan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4
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-2
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-8
-10
1970
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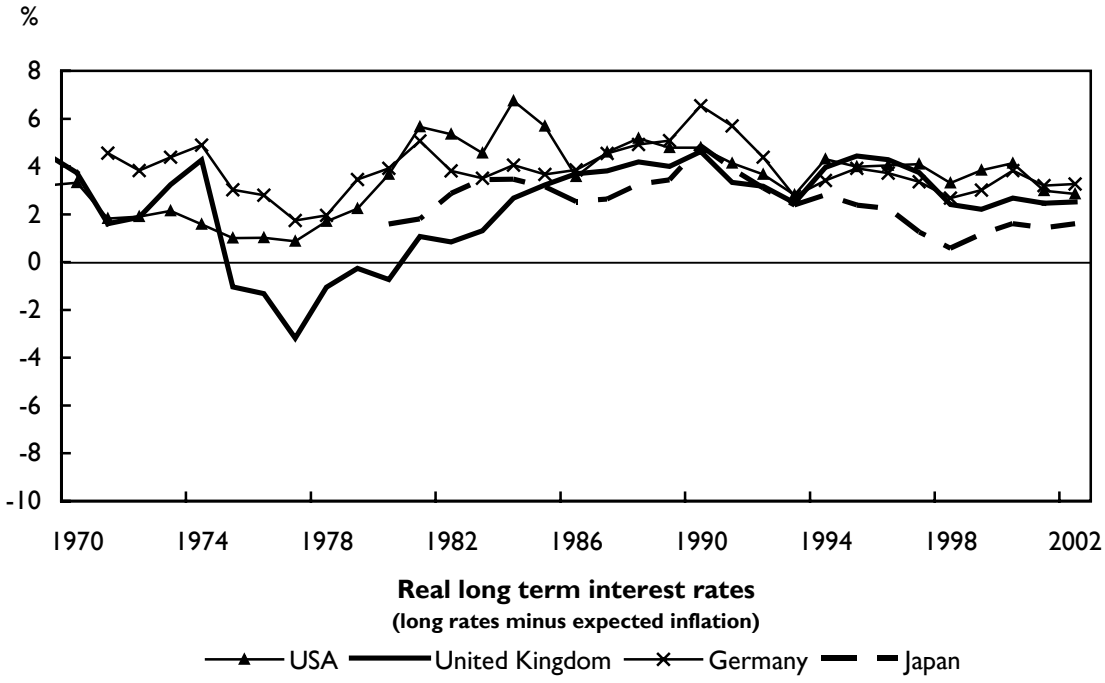
1994
1998
2002
Real short term interest rates
(short rates minus annual inflation)
USA
United Kingdom
Germany
Japan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1970
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1998
2002
Real long term interest rates
(long rates minus expected inflation)
USA
United Kingdom
Germany
Japan

Data

Interest rates

The long term swap rates are 10 year swap interest rates. The short term rates are the 6 month Libor rates. They come from Datastream.

USA. The short term public rate is the second market 3 month Treasury bond rate. The 10 year public rate is a constant maturity 10 year Treasury bond rate. These series come from the Federal Reserve.

United Kingdom. The interest rates come from the Bank of England database. The short term rate is the monthly average on 3 month Treasury bond rate (series IUMAAJNB). The long rate is the 10 year public bond one (series MNPY).

Japan. The short term rate is the monthly average of the day-to-day rate of the Bank of Japan (Collateralized Overnight rate). The 10 year public rate comes from the financial database Datastream (JP interest bearing government bond ; series JPGBOND.).

Germany. The short and long term public rates come from Datastream: the 3 month inter-bank offered rate (FIBOR; series BD3MTH..R), and a 10 year rate on federal obligations.

Primary structural balances and gross public debts

The cyclically adjusted primary public balances come from the database of OECD *Economic Outlook*.

USA. The gross public debt (as a % of nominal GDP) comes from the Flow of Funds. It is computed as the sum of stocks of debts of the central administration and the states and local governments (series s314190005.q, s214190005.q). The series is centred on the middle of period.

United Kingdom. The gross public debt comes from the U.K. Economic Accounts. The (quarterly) series is seasonally adjusted, computed as a % of nominal GDP, and centred on the middle of period.

Japan and *Germany*. The gross public debts as a % of nominal GDP come from the database of OECD *Economic Outlook*. The series are centred on the middle of period.

Price index

USA. We take the GDP deflator from the OECD *Economic Outlook*.

United Kingdom. We take the RPI and chain it with the RPIX in growth rate in November 1992.

Japan. The consumer price index comes from the « MINISTRY OF PUBLIC MANAGEMENT, HOME AFFAIRS, POSTS AND TELECOM ». It is the seasonally adjusted wholesale and retail sales consumer price index (2000 = 100). Data prior to 1995M12 are rebased figures.

Germany. The consumer price index is the one of the German Federal Republic until 1991M12. Since 1992, it is chained in growth rate with the reunified Germany consumer price index. It is a mean to avoid a jump due to the reunification.

Output gaps

Output gaps come from the OECD Economic Outlook

Appendix B: The Quest model

In Quest model, the wage equation is of the WS type, mixing three considerations. First, wages are set following a mark-up on unemployment allowances (equation A2a); in that case the equilibrium rate of unemployment depends only of the replacement ratio, and will be affected by taxation only if taxation has an impact on the replacement ratio. Second, wages result from a mark-up on the preference for leisure (equation A2b); in that case, lower taxation will reduce the equilibrium rate of unemployment. The problem is that the equilibrium rate of unemployment has a deterministic trend due to the difference between the evolution of preference for leisure and labour productivity. Last, in the third equation (equation A2c), wages are determined by the share of value added between employees and employers. In that case, the equilibrium rate of unemployment appears to have the requested characteristics. But the modeller assumes arbitrarily that workers accept earning growth decelerations due to decelerating productivity gains, but oppose wage decelerations due to higher taxation (even if they help funding social benefits) or to higher real interest rates.

$$(A1) \quad p = w + (y - n) + \gamma r$$

$$(A2a) \quad w = a + \theta_c - bu \qquad u = (\theta_c + \gamma r - (y - n))/b$$

$$(A2b) \quad w = a + t + p + l - bu \qquad u = (t + \gamma r + l - (y - n))/b$$

$$(A2c) \quad w = a + t + p + (y - n) - bu \qquad u = (t + \gamma r)/b$$

Quest has been used in The Economic Commission to analyse the costs of budgetary consolidation (Giudice *et al*, 2003, and European Economy, 2003). This analysis provides an example of the conditions needed for a model to find expansionary effects of fiscal consolidations. Public spending cuts may have a positive impact on non liquidity constrained consumers if they expect higher future income, directly through lower taxes and indirectly through the impact of lower taxation on output. Giudice *et al.* think lower public spending could have a positive impact on investment through higher unemployment, which would lower wages and raise profits, consequently investment. But this channel can only limit the size of the negative impact of fiscal policy (and not reverse it). It do not appear in the simulations.

The model is used to simulate the effects of permanent credible fiscal consolidation episodes only on Germany. In all simulations, the final objective is to cut the level of the public debt to GDP ratio by 10 percentage points, by adjusting taxes on wage income.

Raising public revenues always has a negative effect on output, in the short as in the long run. It is the case for higher labour income taxation, which is strange as there should be no impact in the long run, since it would disappear once the desired level of public debt is reached.

Conversely, a permanent fall in public spending has initially a depressive effect, then a expansionary one (table A7). The expansionary effect results from higher consumption rather than from investment: households consume the future income which will result from lower taxation. However, this effect relies on two strong assumptions: public spending has no usefulness for households; households consume companies' profits. Let us consider for instance the example of lower government transfers. Let us assume that the government reduces the level of pensions, of unemployment or health benefits, while announcing at the same time a future reduction in social contributions. In practice, households will have to compensate this reduction with private insurance or saving : it is difficult to understand how the overall effect will be positive. In Quest, employees will not ask for higher wages to compensate for reduced benefits; lower social contributions would allow for lower wage costs

which would translate in higher output; households would raise their consumption despite lower transfers and despite the fact that they would not benefit directly from lowered taxation, since companies would raise their profits.

A transitory shock would however have a depressive effect on activity in Quest. This confirms the efficiency of stabilisation policies[31].

Table A7. Impact of a cut in public spending of 1% of GDP on GDP, according to Quest

After…	Government purchases	Government transfers	Government employment
1 year	-0.33 (-0.75*)	-0.20 (-0.21*)	-0.93 (-1.21*)
3 years	-0.04	-0.08	-0.20
5 years	-0.04	-0.06	0.02
10 years	0.41	0.19	0.62

* Impact of a transitory shock.

Source: Giudice et al. (2003)

The authors also analyse the impact of an expansionary monetary policy accompanying the fiscal consolidation. Since a fall in interest rates has an expansionary impact (a 1 percentage point fall in the European interest rate raises German GDP by 0.6%), the initial depressive effect of any fiscal policy can be counterbalanced by some interest rate fall. But the authors do not show that the requested fall in interest rates is in line with the fall the ECB would implement. They do not consider that in EMU there is no certainty that a country running a restrictive fiscal policy will benefit from lower European interest rates. So this simulation only illustrates the fact that budgetary consolidation will be more easily implemented in a country where domestic monetary policy still exists.

Last, the authors analyse the impact of a lower risk premium on interest rates resulting from lower public debt. They consider that the 10% fall in the debt to GDP ratio would generate an immediate fall in 0.1 percentage point in the interest rate (the reader does not understand if short or long run interest rates are considered; if European or German rates are considered). The fall in the risk premium would have a strong expansionary impact: 0.35 of GDP in the first year, and 1.2% of investment. This would mean that a 1% fall in interest rate raises GDP by 3.5%, investment by 12%. The results seem very optimistic.

[31] It may be however noted that a cut in transfers of 1% of GDP will have an impact of -0.21% of GDP in the first year, 0.04 the following year, 0.02 after five years and 0.12 after ten years. This raises some doubt on the long-term properties of the model.