

## **The problematic nature of structural budgets and ‘potential output’**

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### **Introduction**

Much discussion on fiscal policy has involved the idea of the structural budget position.<sup>2</sup> It has, for example, become the central part of the 'fiscal compact' of the Economic and Monetary Union (see European Commission, 2012); also the UK government sets its deficit target in terms of the elimination of the cyclically adjusted deficit; and more generally it is discussed in terms of fiscal consolidation (IMF, 2010a). This section starts by pointing to the difficulties in measuring the structural budget position, which is after all a hypothetical calculation of what would happen in a state of the world that differs from what actually appertains. It continues by arguing that the calculation of the structural budget deficit should check for consistency with private sector behaviour. The subsequent sub-section points to the contractions of setting the target of a balanced structural budget. This is followed by a discussion of the impossibility of ‘balanced structural budgets’. The final sub-section asks what the structural budget position should be.

### **Measurement Difficulties**

The structural budget position is intended to be the budget position, which would prevail when economic activity is at some desirable level. This will be given the label of potential output and signified by  $Y^*$ , and the difference between actual output and potential output is the output gap (and can be expressed in percentage terms relative to potential output). In the theoretical literature potential output can be seen as the level of output at which inflation would be constant: this is much in evidence in the new Keynesian and new consensus macroeconomics literature (Woodford, 2003). Such considerations may influence the choice of potential output as the level of economic activity for which the structural budget position is calculated. An alternative (though sometimes related) approach would be to treat the level of potential output as corresponding to some normal or average rate of capacity utilisation, which could be proxied in terms of the unemployment rate.

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<sup>2</sup> The term cyclically adjusted budget position is also used, e.g. HM Treasury (2012), and this is treated as a synonym for structural budget position.

The structural budget position is written as  $t^*(Y^*) - G^*$  where  $t$  is the tax and transfer function, which is the underlying ('structural') function and  $G^*$  the underlying (structural) government expenditure on goods and services. It is assumed that while tax receipts and transfer payments would vary with the level of economic activity for a given set of tax rates and transfer entitlements, government expenditure on goods and services would not. The automatic stabilising feature of fiscal policy would operate through tax receipts and transfer payments (where interest payments on government debt are included in transfer payments).

In the calculation of the structural budget position there are clearly three calculations to be made: the structural tax function, structural government expenditure and potential output. In relatively stable times it could be postulated that the present tax rates and structure and the present levels of public expenditure could be regarded as the structural ones. Whilst that could be done for the current year, making calculations for future years raises some difficulties - for example what would be regarded as the prevailing tax structure as nominal income changes. In more challenging times when tax rates and structure and public expenditure are varied in response to an economic downturn, then distinguishing temporary changes from structural changes, particularly as time proceeds, is not easy to say the least.

### **Potential Output**

It must first be said that the term 'potential output' is used in a number of different ways, which need to be distinguished, and that it is a theoretical notion that may or may not exist in the real world; and that any estimation of 'potential output' (for a given definition) is inevitably backward looking. The term 'potential output' is generally linked with the supply-side of the economy. In common usage it would suggest some form of maximum output. When we speak of someone's potential we are thinking of the most one is capable of or could potentially achieve. In economic terms 'potential output' can be linked with productive capacity. As such potential output could be interpreted as the (sustainable) physical capacity output, though more usually some notion of costs would be involved, such as the level of production at which costs would start to rise 'sharply'. This approach to 'potential output' is closely related to some upper limit to the level of output.

The notion of 'potential output' is the level of output at which inflation would be constant. In the context of a Phillips' curve analysis we have:

$$(1) p = a + by + c.pe$$

where  $p$  is the rate of inflation,  $pe$  is expected inflation and  $y$  output. When  $c = 1$ , potential output is the solution to  $a + by = 0$  (i.e. where actual and expected inflation are equal), hence  $y^* = -a/b$ . Even if there is a successful estimation, and as it is well known econometric estimates are subject to statistical errors, the estimates of  $y^*$  derived from the price Phillips curve could, at best, be placed in a confidence range. Staiger et al. (1997) conclude that “In our regressions (relating to the United States), there is a downward-sloping Phillips curve; it simply is difficult to estimate the level of unemployment at which the curve predicts a constant rate of inflation. For some purposes, such as targeting the level of unemployment at which inflation is stable, this is a problem”, and further “the natural rate probably lies between 4.3 and 7.3 percentage points of unemployment” (p. 47). These remarks can be carried over to the case of potential output, where precise estimates of this variable would be required if budgetary policy is to target a budget balanced where output is at potential.

It is also apparent that the estimation of potential output requires data - that is the estimation can only be conducted after the events. It is only if past estimates of potential output can be used to project forward future potential output can estimates of potential output be derived. As output tends to grow over time, this would involve not only scaling potential output against actual output, but also deriving estimates of the growth of potential output. Any shifts in the price Phillips curve relationship, which involved changes in the estimated potential output, would clearly be ignored in this approach.

A related approach is based on a combination of a production function approach (relating output with factor inputs) with input utilisation at some equilibrium level, from which potential output can be derived. Hence if  $Y = F(L, K)$  is the production function, and  $L^*$  is the level of employment, which corresponds to a non-accelerating inflation rate of unemployment, then  $Y^* = F(L^*, K)$  where it is assumed that capital stock is operated at the desired capacity.

The more general theoretical framework within which ‘potential output’ is cast is one of the independence of demand and supply factors. The actual level of output is viewed as determined in the short run by the level of aggregate demand, whereas potential output is set on the supply side of the economy, and in general that the growth of potential output is unaffected by what happens on the demand side, and that the level of demand fluctuates around potential output (and hence output gap tends to average out as zero). This theoretical framework is seen clearly in the neo-classical growth model where the rate of growth is the ‘natural rate of growth’ and there is

no independent investment function; also, desired savings are assumed to flow straight into capital accumulation. Once an independent investment function is introduced then the time path of additions to the capital stock and the evolution of the capital stock are set by the investment function. It should be stressed that the concept of ‘potential output’ is a theoretical construct that may (or may not) be helpful in macroeconomic analysis, but which is not directly observable and may not exist. As indicated above, the level of potential output may be indirectly estimated, but that will always be after the event. Further, it relies on the Phillips’ curve, such as equation (1), being successfully estimated with a coefficient on expected inflation as unity – in the case where it does not then  $a + by = (1 - c)p$ , and potential output is dependent on the rate of inflation. Further, when other factors influence inflation, then potential output would be dependent on those other factors. Suppose instead of equation (21) the equation estimated was:

$$(2) p = c.pe + a + by + d.X$$

where  $d$  and  $X$  are vectors. Then  $y^* = [p(1 - c) - d.X - a]/b$ . It could be argued that if the variables included in  $X$  were supply-side variables, then this would be consistent with the general concept of ‘potential output’ as a supply-side concept. But if any of the variables in  $X$  could be viewed as demand-side variables then that would not be consistent with the general notion of ‘potential output’.

It is often implicitly assumed that the economy operates on average at the potential output level and also that the economy *should* operate at that level. This is formalised in the quadratic loss function, which appears in the ‘new consensus macroeconomics’ where the Central Bank loss function to be minimised is quadratic in inflation (minus inflation target) and output gap. Thus inflation below target is treated in the same way in terms of welfare losses as inflation above target, and positive output gap in same way as negative output gap. Actual output above potential generates losses comparable to those from actual output below potential. The zero output gap (actual equals potential output) does not in general correspond to full employment of labour. There are two distinct reasons here. First, potential output is often taken as akin to the average level of output (trend adjusted), and hence sometimes actual output is above and sometimes below potential output. Full employment of labour is more akin to a ceiling for employment and thereby economic activity: unfortunately, full employment is not seen as the average level of employment. Second, potential output can be taken to be the level of output that would correspond to the employment rate, which can be deduced from the NAIRU or NAWRU (Non-

Accelerating Wage Rate of Unemployment). The NAIRU is simply the rate of unemployment, which is deemed to be consistent with constant rate of inflation, and should not carry with it any connotation of full employment. The estimates of the NAWRU figures produced by the OECD (and also labelled 'structural unemployment' in OECD *Economic Outlook*), for example and for 2007 (used in order to avoid any influence from the financial crisis) were: France 8.4 per cent, Germany 8.4 per cent, Italy 6.3 per cent, United Kingdom 5.3 per cent and the euro area average 7.6 per cent.<sup>3</sup>

There are well-known, if often ignored, sectoral relationships based on national income accounting practices. The one to which we pay particular attention is:

$$(3) G - T = S - I - NX$$

where  $G$  is government expenditure on goods and services,  $T$  tax revenue net of transfers,  $S$  private savings,  $I$  private investment, and  $NX$  net exports (including net income from abroad). In terms of outcomes, this equation must always hold. In particular it would hold in outcome terms when output was equal to potential output. However the key question is whether interpreted in terms of intentions (*ex ante*) the equation would hold, that is does:

$$(4) G^* - T^* = S^* - I^* - NX^*$$

Hold, where a \* is used to signify the 'structural' value of the variable concerned in the sense of the intended levels of savings, investment and net exports corresponding to the economy operating at potential output. The consistency issue is then simply whether private sector's 'structural' behaviour is consistent with the public sector 'structural' budget position.

The fluctuations in economic activity arise from fluctuations in demand (for whatever reason those fluctuations occur). As the components of (private) demand fluctuate (around their average or structural levels) the budget deficit (or surplus) varies. But the structural budget does not, nor does the private structural position --that is why the label structural is applied!

The structural budget position as directly calculated above can clearly be changed by changing the structural tax function and structural public expenditure -- that is in effect making changes in tax rates and public expenditure which are deemed permanent. But in terms of eqn 2 above changing the left hand side of the equation cannot ensure a corresponding change on the right hand side of the equation. There can be one case where there would be a corresponding change--when some form of Ricardian equivalence applies in the sense that when there is say a reduction

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<sup>3</sup> Figures taken from OECD, *Economic Outlook*, Statistical Annexe, December 2010.

in the structural budget deficit there is a corresponding reduction in net private savings (savings minus investment) minus net exports.

It is now being argued that the timing of fiscal consolidation (taken to mean reduction in the structural budget deficit) should be put back until the level of economic activity revives. But the size of the structural budget deficit is (or should be) unrelated with the level of economic activity. Thus the current level of economic activity is (or should be) irrelevant for any issue of reducing the structural budget deficit. The current level of economic activity is not at potential output, and the reasons for that would include savings propensity being current relatively high (so that savings are higher than normal), investment and net exports are currently low (relative to some 'normal' or 'structural' level). Thus a higher budget deficit is required to offset those higher savings and lower investment and net exports in current conjuncture. When savings fall, investment and net exports rise, then the actual budget deficit will decline. But that tells us nothing about the relevant structural budget deficit nor that it should be more or less than the current structural budget deficit.

### **Some 'practical' problems**

The essential ideas of potential output and structural budget position are that they are independent of actual output and budget positions respectively. Further in order to use potential output and structural budget position as guides for macroeconomic policy they should be capable of firmly based measurement.

#### *Variation in estimation of potential output*

It would not be unusual for different organisations and researchers to arrive at different estimates for what appears to be the same concept. In the field of macroeconomics there are at least internationally agreed ways of measuring many variables, e.g. GDP, unemployment. The situation with 'potential output' (and thereby with 'structural budget') is a lack of an agreed concept (as partially illustrated by earlier discussion) and that 'potential output' cannot be directly observed but rather has to be inferred.

There are many examples of significant changes in the estimates of 'potential output'. 'For example, from its Spring 2010 to its Autumn 2012 forecast the European Commission revised its forecast of actual real GDP for the year 2011 onwards by +4.1 percentage points. However, the estimate output gap increased only by 2.6 percentage points (European Commission 2010 and 2012). This means the estimate of potential output was increased by 1.5 percentage points due to

the unexpectedly strong upswing. Multiplying this number by the budget sensitivity of 0.51 for Germany gives a 'present' in terms of fiscal consolidation of 0.75 percent of GDP' (Truger, 2013, pp.164-5).

A more general illustration is given in Figure 1. Each panel indicates the range of estimates of the output gap (i.e. actual output minus potential output) made by the named organisation for each time-period listed: that is for time  $t$  the organisation will report and then revise their estimate of the output gap at time  $t+1$ ,  $t+2$ , ... and it is the range of the estimate and their revisions which are given in Figure 1.

### *Hysteresis and feedback*

The notion that there are hysteresis effects of the path of unemployment on NAIRU (or structural unemployment) is well-known.

'The OECD routinely produces estimates of the structural unemployment rate, defined as the rate of unemployment consistent with stable inflation (the so-called NAIRU, or non-accelerating inflation rate of unemployment). For the purpose of projections, the NAIRU is normally held stable, or, if there are significant structural reforms being implemented, then these are evaluated and the profile of the NAIRU adjusted accordingly. However, this procedure is likely to be inadequate for projecting structural unemployment over a period when labour markets experience such a severe adverse shock. A particular concern is that much of the substantial increase in unemployment is transformed into higher structural unemployment as a result of so-called hysteresis' effects. Thus, following severe downturns in the major European economies over recent decades, even once output has returned to potential, there has been a rise in unemployment which is weaker. Such effects might arise because workers that remain unemployed for a long period may become less attractive to employers, as a result of declining human capital or because their intensity of job search diminishes (Machin and Manning, 1998). As a result, the long-term unemployed put less downward pressure on wages and inflation and so can contribute to the persistence of unemployment.' (OECD Economic Outlook July 2009 no. 85, pp. 218-221). And 'As is the case with almost all cyclically adjusted procedures, the structural balance will not remain unaffected by the cyclical conditions of the economy since, by the very nature of the method of cyclical adjustment, potential output and structural budget balances are sensitive to variations in actual output' (Truger, 2013, p. 164)

The co-movements of actual unemployment and the estimated NAIRU (the OECD estimates are used here) are illustrated in Figure 2 for the Eurozone as a whole, UK and Germany.

Figure 2 near here

The ways in which the calculated structural budget position moves with the actual budget position is illustrated in Figure 3 using data for the Eurozone as a whole. It is evident that there is substantial co-movement between the structural and actual budget position. This could be interpreted as saying that the movement in the actual budget deficit is being driven by the use of discretionary fiscal policy as well as by automatic stabilisers with the discretionary fiscal policy being picked up by the structural budget deficit, with the cyclically adjustments only correcting for the movements in output (as in the use of a formula by which the correction applied is related to the output gap). If that were the case, it would indicate some flaws in the calculation of structural budget position which does not allow for discretionary but temporary and/or reversible movements in tax rates and public expenditure. The alternative interpretation is that the structural budget position is rather endogenous to the actual budget position, which undermines the notion of there being a structural budget position independent of the actual.

The vision impression given by Figure 4 is confirmed with some regression results in Table 1.

Some of the implications of these lines of argument for the euro zone and the 'fiscal compact' is indicated in the following. 'The Treaty [on Stability, Coordination and Governance] relies on the structural deficit concept. But its measurement is problematic, especially after strong macroeconomic shocks. In fact, the Treaty specifies that the Commission's estimates will have to be used. But they have two drawbacks. First, the Commission's potential output estimates are always close to observed output because they consider as structural the reduction of the capital stock resulting from a fall in investment during the crisis, like a large part of the decline in potential labour force (due to unemployed people's discouragement), of the fall in productivity, and the rise in the unemployment rate: thus they underestimate the cyclical element of the deficit and will hence impose pro-cyclical policies. Second, these estimates are strongly revised over time. For instance, potential output estimates for 2006 were revised substantially downwards in 2008.' (Mathieu and Sterdyniak, 2013, p. 177)

### **The 'impossibility' of balanced structural budget ?**

A structural budget position refers to the budget position, which would hold when the economy is operating at some pre-defined level of output such as equal to potential output often referred to

as zero output gap. This pre-defined level of output has connotations of the level of output around which the economy fluctuates, sometimes above that level of output, sometimes below. This level of output cannot then correspond to full employment when that term is interpreted (as it should) as the employment of all those seeking work, or at least as corresponding to a position where recorded unemployment equals the number of job vacancies. The structural budget position is calculated as equivalent to  $G - tY^*$  where  $G$  is government expenditure on goods and services and assumed here not to vary with the business cycle;  $t$  is a summary measure of tax and transfer rates (referred to as tax rate for simplicity) and  $Y^*$  is the pre-defined level of output such as potential output.

The national accounts identity can be written as in equation (3). This is an identity in terms of outcomes, but a similar looking equation has an interpretation in terms of equilibrium and intentions. This can be expressed as:

$$(5) G - tY = S^i(Y, \alpha) - I^i(Y, \alpha) - NX^i(Y, \alpha)$$

where superscript  $i$  is used to signify intentions of the relevant variable, and it is assumed (for simplicity) that intended government expenditure is carried through, and that tax rates and benefit rates applied as intended. The vector  $\alpha$  contains those variables, which would lead to shifts in the functions, and these variables could range over ‘animal spirits’, interest rates, exchange rate and world trade. What may be termed the ‘structural’ or ‘underlying’ equations would come from the entries in the  $\alpha$  vector, which is a vector of variables being set at some ‘normal’ levels, and the corresponding vector is labelled  $\alpha^*$ . Fluctuations in economic activity would then arise from fluctuation in the variables in the  $\alpha$  vector. From equation (24) an equilibrium (sustainable) level of income could be solved for in terms of the vector  $\alpha$ .

$$(6) G - tY = S^i(Y, \alpha^*) - I^i(Y, \alpha^*) - NX^i(Y, \alpha^*)$$

Consider the case when the vector of variables is at their ‘normal’ levels. Then in relation to equation (6) two questions can be asked. First, in order that output be at its potential level  $Y^*$  what would be the corresponding budget deficit (or surplus)? The approach of ‘functional finance’ (following from Lerner, 1943) would be to in effect set the balance between government expenditure and tax rates, such that the resulting equilibrium level of income is that of potential output. Second, can it be the case that the resulting budget position is one of balance? The (implicit) answer of the pre-Keynesian analysis would be a resounding yes, whereas the analysis

from a Keynesian/Kaleckian analysis would be in general no. In other words, does the following equation hold?

$$(7) S^i(Y^*, \alpha^*) - I^i(Y^*, \alpha^*) - NX^i(Y^*, \alpha^*) = 0$$

The central argument of this paper is that the Keynesian/Kaleckian answer is the relevant one, and that there is an absence of convincing reasoning that savings and investment intentions can be reconciled when output is at potential; and that the market forces, which ‘push’ the economy towards any such equilibrium, are weak. In terms of equation (7) this forms a constraint on the size of the budget deficit (or surplus); namely that the budget deficit be equal to the sum of net private savings minus net exports at potential output. This is no more and no less than a constraint that says the budget deficit has to be constrained at zero. Having a budget deficit, such as would be indicated by equation (7), still involves fiscal discipline, and fiscal responsibility, where that responsibility includes securing a high level of economic activity; and a budget deficit such as in equation (7) would be sustainable.

Table 2 near here

The figures in Table 2 illustrate that national governments tend to run budget deficits and tend to have public debt. The long-run tendency for budget deficits has gone alongside average actual output close to potential output. The average output gaps for the period 2001-08 are included in Table 2 and it can be readily seen that for the euro area as a whole an average budget deficit of over 2 per cent of GDP was accompanied by an output gap of less than 0.2 per cent. In light of the way in which potential output is estimated, based on trends in actual output, it is not surprising that the output gap averages out close to zero. But, further, there has been little sign of the crowding-out of private expenditure by budget deficits and little sign of domestic inflationary pressures building up (when the output gap is close to zero).

Another angle on this can be seen by reference to savings and investment behaviour. Savings behaviour is taken to depend on savings out of profits and savings out of wages, written as  $s_p P + s_w W$  (where  $P$  stands for profits, and  $W$  for wages). Savings relative to income could then be written as  $s_p \pi + s_w (1 - \pi)$  where  $\pi$  is profit share. Investment behaviour would depend on many factors including profitability and capacity utilisation, but the ‘underlying’ investment behaviour as particularly linked with the trend growth rate of output and the capital-output ratio. Thus ‘underlying’ net investment relative to income would be  $NI/GDP = v dY/Y = v.g$ , and gross investment =  $v(g + \delta)$  where  $\delta$  is the rate of depreciation and  $g$  as above, namely the growth rate

of output. The question can then be posed as to whether  $s_p\pi + s_w(1-\pi)$  and  $v(g + \delta)$  are equal to one another. The Kaleckian/Keynesian perspective is that since savings and investment behaviour are separate activities, there is not a strong reason to believe that these ‘underlying’ relationships will be equal. In a closed private economy actual savings and investment would of course have to be equal. The processes whereby savings and investment intentions were reconciled would come through changes in the level of economic activity, which would, for example, tend to suppress investment below the ‘underlying’ level (through impact of capacity utilisation on investment). There are two other routes through which savings and investment behaviour can be in effect reconciled. The first is a budget deficit and/or net export surplus sufficient to bridge the gap between savings and investment forthcoming at potential output. The second would be policy measures designed to shift the distribution of income in the direction of stimulating demand (Sawyer, 2011).

The advocates of the objective of a structural balanced budget have to show that ‘underlying’ savings and investment intentions minus net exports would be equal when actual output is equal to potential output. In the absence of such an assurance, it is folly to pursue a structural balanced budget. It may be possible to balance the budget through deflation, but may be impossible to balance the budget consistent with a zero output gap. During the 2000s (prior to the financial crisis) for the EU-15, the savings ratio (to GDP) averaged 21.0 per cent, and the investment ratio 17.7 per cent (figures given in Sawyer, 2011) with an average budget deficit of 2.2 per cent and net exports of 1.1 per cent. The achievement of a balanced budget during that period (with the observed level of output) would have required some combination of significantly lower savings, higher investment and higher net exports. The case then has to be made that future savings, investment and net exports will differ from the pre-2008 experience in ways which would be consistent with a balance budget.

This sub-section has pointed out that the achievement of a structural balanced budget would require that the sum of investment minus savings plus net exports would also need to be equal to zero and be consistent with a zero output gap. We have argued that there is a lack of convincing arguments that the latter condition would come to pass, and have pointed out that the condition of balanced budget has generally not been met in industrialised countries.

## References

- European Commission (2012), *Treaty on Stability, Coordination and Governance*, Available at: [http://european-council.europa.eu/media/639235/st00tscg26\\_en12.pdf](http://european-council.europa.eu/media/639235/st00tscg26_en12.pdf)
- International Monetary Fund (IMF) (2010), “Will it Hurt? Macroeconomic Effects of Fiscal Consolidation”, *Economic Outlook*, Chapter 3, Washington DC: International Monetary Fund.
- Mathieu, C. and H. Sterdyniak, 'Can the new French economic policy be successful?', *European Journal of Economics and Economic Policies: Intervention*, pp.175-192
- Sawyer, M. (2011), “Progressive Approaches to Budget Deficits”, in O. Onaran, T. Niechoj, E. Stockhammer, A. Truger, and T. van Treeck (eds), *Stabilising an Unequal Economy? Public Debt, Financial Regulation, and Income Distribution*, Marburg: Metropolis Verlag, 143-159.
- Staiger, D., Stock, J.H. and Watson, M.W. (1997), “The NAIRU, Unemployment and Monetary Policy”, *Journal of Economic Perspectives*, 11(1), 37-49.
- Truger, A. (2013), 'Austerity in the euro and the sad state of economic policy in Germany and the EU', *European Journal of Economics and Economic Policies: Intervention*, pp. 158-74
- Woodford, M. (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton: Princeton University Press.

**Table 1 The Reaction of structural budget to actual fiscal positions**

	EC	IMF	OECD	OBR
Net Borrowing - UK	1.1767 <sup>***</sup> (0.0336)	1.1521 <sup>***</sup> (0.0352)	1.1413 <sup>***</sup> (0.0374)	1.2060 <sup>***</sup> (0.0252)
Net Borrowing - EA	1.5059 <sup>***</sup> (0.0652)	1.3766 <sup>***</sup> (0.0769)		
Net Borrowing - EU	1.5624 <sup>***</sup> (0.1230)			
Primary Balance - UK	0.8060 <sup>***</sup> (0.0291)	0.8189 <sup>***</sup> (0.0340)	0.8454 <sup>***</sup> (0.0339)	0.7836 <sup>***</sup> (0.0216)
Primary Balance - EA	0.5537 <sup>***</sup> (0.0663)	0.6328 <sup>***</sup> (0.0840)		
Primary Balance - EU	0.6154 <sup>***</sup> (0.0515)			

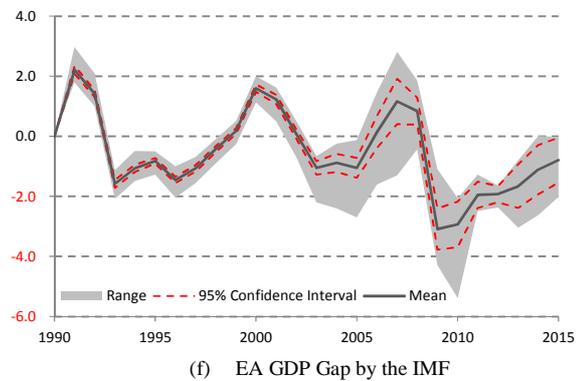
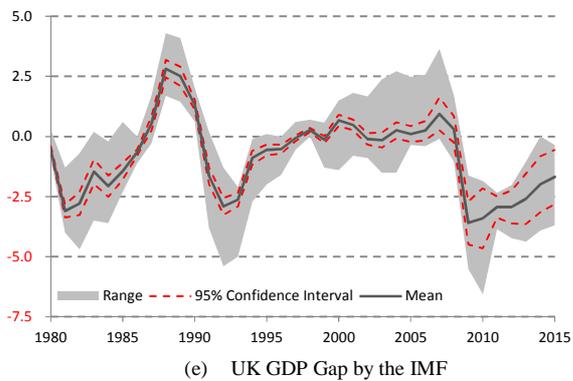
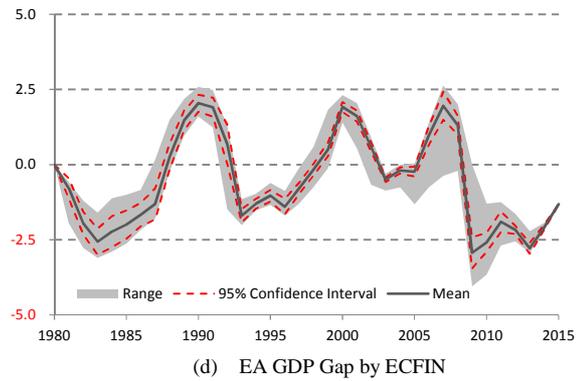
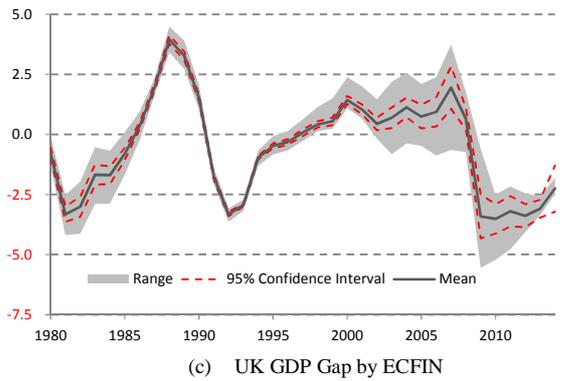
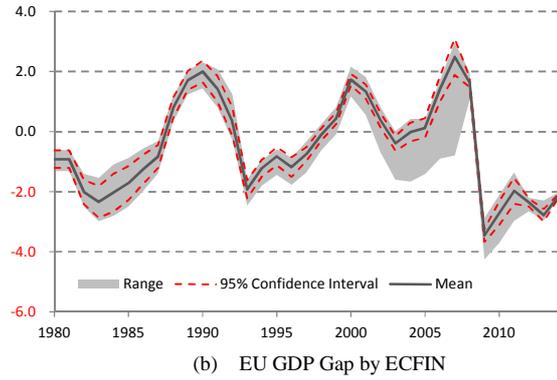
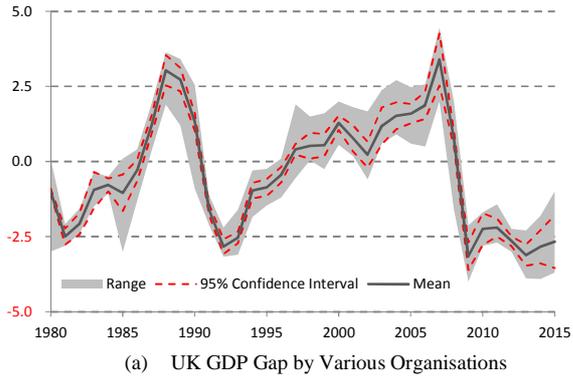
Note: The above figures are the coefficients of the parameter  $\alpha$  based on various versions of a robust generalised method of moments (GMM) estimation of the regression equation:  $\bar{B} = c + \alpha B + error$ , where  $\bar{B}$  and  $B$  as earlier defined are the CAB and actually fiscal balance, respectively. Figures in (·) are heteroskedasticity and autocorrelation consistent (HAC) standard errors, while the superscript, \*\*\*, indicates significance at the 1% level. Annual data utilised spanned the period 1980-2015, including missing data.

Source: Estimation undertaken by Michael Ononugbo

**Table 2: Government Debt and Budget Positions in Four Countries and Euro Area Expressed as Percentage of GDP**

	1983	1983-1990		1991	1991-2000		2001	2001-2008			2008
	Debt	Total budget balance	Primary Budget balance	Debt	Total budget balance	Primary Budget balance	Debt	Total budget balance	Primary Budget balance	Output gap (%)	Debt
France	34.6	-2.5	-0.4	40.1	-3.8	-1.0	64.3	-3.0	-0.5	0.4	76.1
Germany	39.1	-1.6	0.6	40.3	-2.9	-0.2	59.7	-2.4	0.1	0.2	69.0
Italy	70.0	-11.0	-3.4	107.4	-6.4	3.2	120.2	-3.1	1.8	-0.1	114.5
UK	53.9	-1.8	1.1	40.1	-3.2	-0.5	40.4	-2.9	-1.0	0.6	57.0
Euro Area	47.3	-4.4	-0.7	60.1	-3.8	0.6	73.8	-2.1	0.7	0.16	73.4

**Source:** OECD, Economic Outlook, Statistical Annex, June 2000 (for statistics 1983-1990), and June 2009 (for statistics 1991-2008).



Source: Calculations undertaken by Michael Ononugbo based on data from IMF, Eurostat and Office for Budget Responsibility, UK

Figure 1

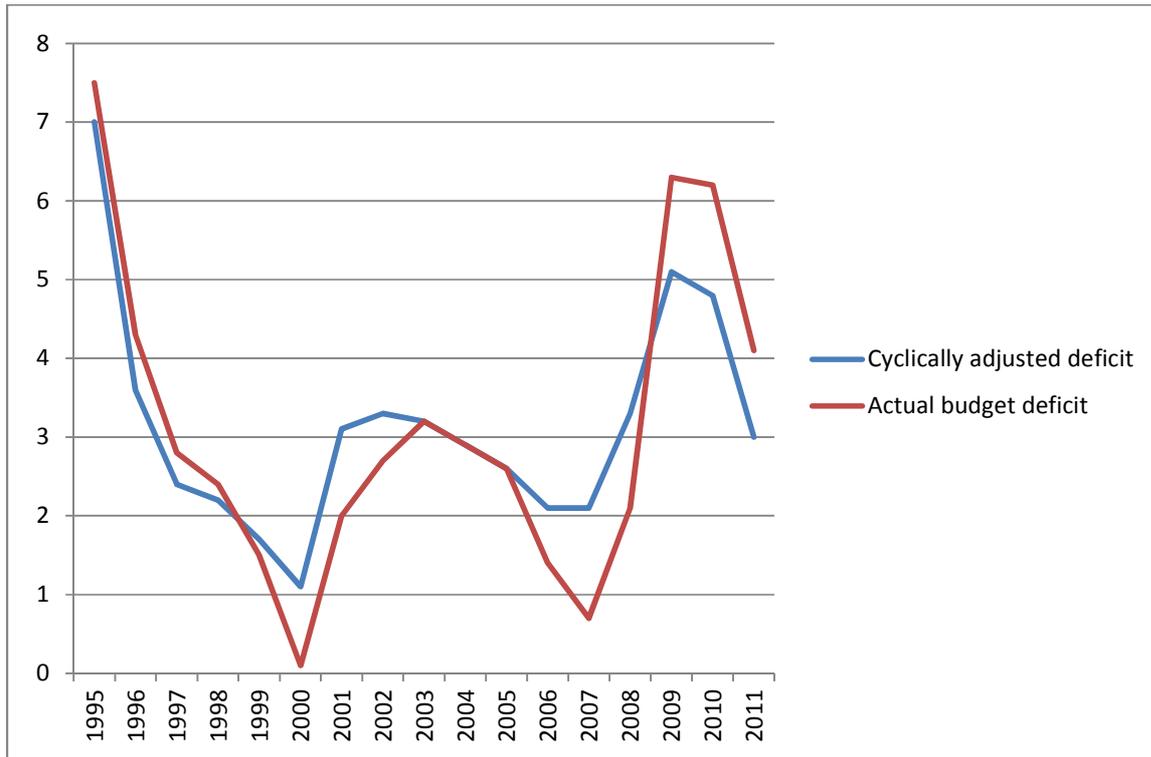
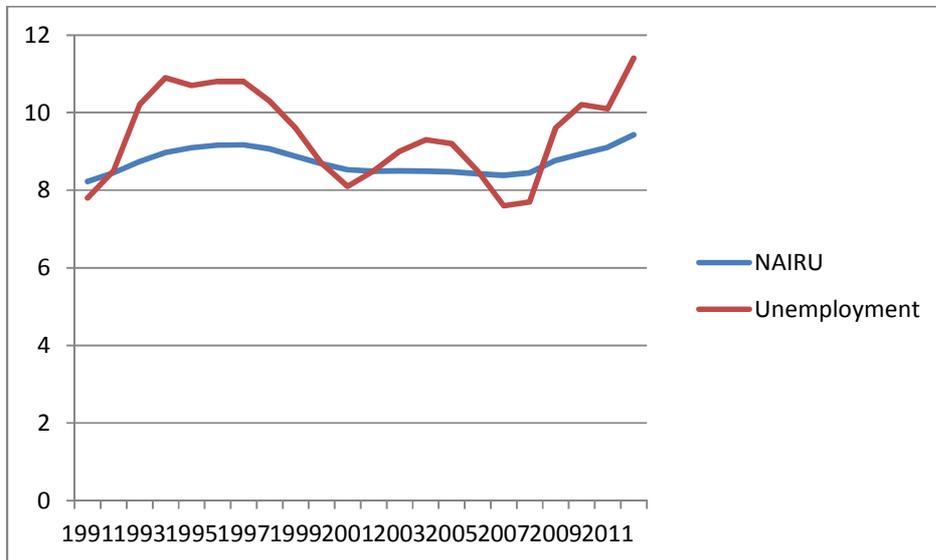


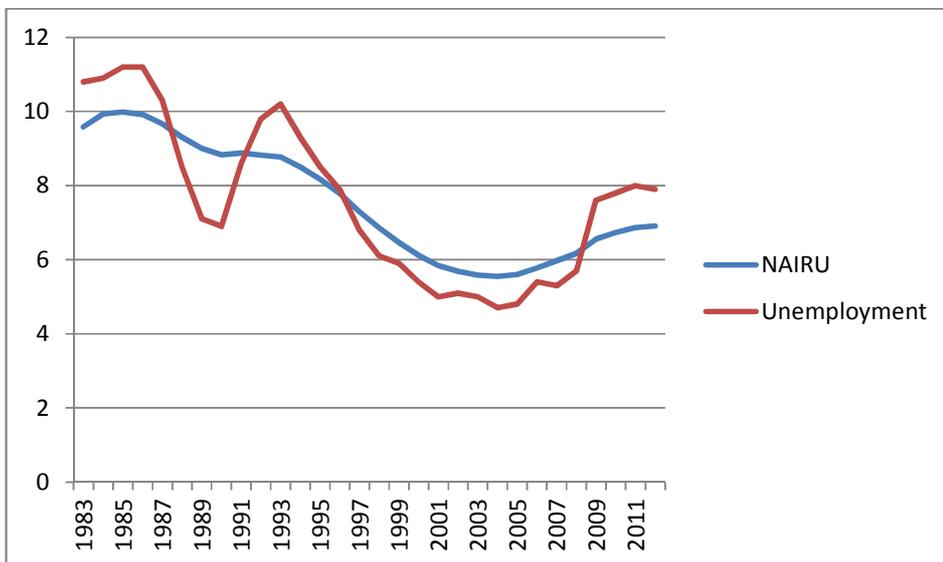
Figure 1: Budget deficits: Eurozone (per cent of GDP)

Figure 2: Unemployment and the NAIRU

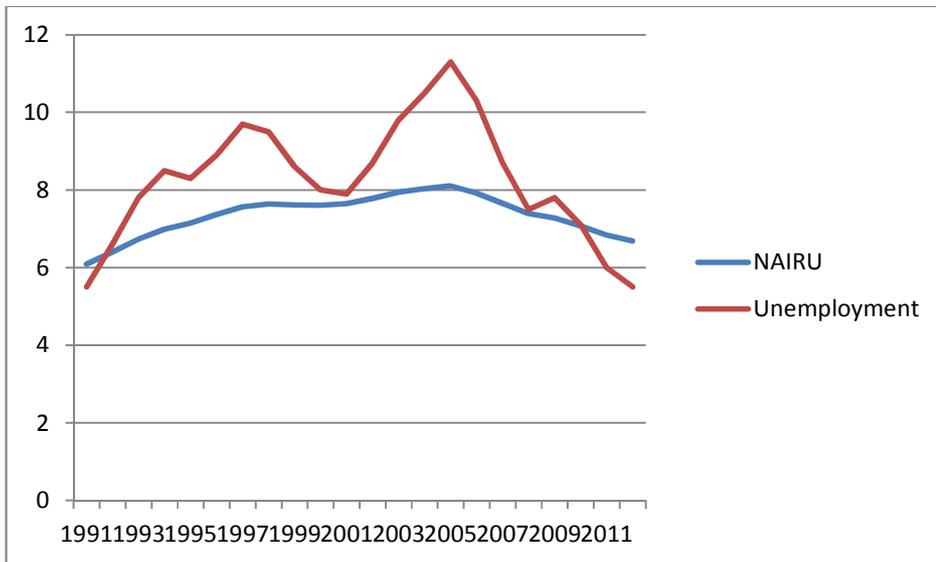
(a) Eurozone



(b) United Kingdom



(c) Germany



Source: Data taken from OECD Economic Outlook database