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Abstract

In this paper we analyse countercyclical fiscal policy within the context of a microfounded analysis of business cycle stabilisation. We show that tax and spending instruments can have a useful counter cyclical role, even after allowing for the distortionary nature of the instruments and the need for debt sustainability. A critical barrier to the use of fiscal instruments may be political economy concerns, and we survey recent suggestions involving alternative fiscal policy institutions.

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1 Introduction

In the last few decades the public debate on macroeconomic fiscal policy has been on the size of public debt and deficits, rather than on business cycle stabilisation. However, with a number of countries entering European Monetary Union (and some still thinking about it), the potential stabilisation role for fiscal policy has resurfaced. In addition, the academic literature, which until recently has focused mainly on the role of monetary policy for macroeconomic stabilisation and inflation control, has now begun to look at how fiscal policy could in principle complement monetary policy.

The plan of this paper is as follows. In section 1 we will review recent developments in the theory of business cycle stabilisation. We show how

the analysis of traditional 'Keynesian' style policy has been integrated and reinterpreted in a framework with an explicit measure of welfare derived from optimising agents. In section 2 we use this framework to compare how monetary and fiscal policy can be used for macroeconomic stabilisation, either individually or jointly. This section deals with two 'complications' typically associated with fiscal stabilisation: tax distortions and government debt. We show that the neither necessarily rules out the use of fiscal policy for stabilisation purposes - indeed it is often the distortionary nature of fiscal instruments that gives them a potential stabilisation role within this framework. Despite this, many will be dubious about countercyclical fiscal policy on political economy grounds, arguing that any attempt to use fiscal policy to stabilise the business cycle may weaken the already fragile incentives for policy makers to control budget deficits and debt. This has led some to argue for new institutional arrangements for fiscal policy, and we review some of these proposals in section 3. A final section concludes.

2 Business Cycle Stabilisation

The modern approach to monetary policy is at heart quite straightforward. Policy has a role in managing the business cycle to the extent that that cycle is a result of a distortion caused by price rigidity/nominal inertia. The impact of the distortion can be measured explicitly by considering the utility of a representative agent, from which can be derived the objectives of policy makers. Thus a traditional Keynesian approach has become microfounded. One of the advantages of microfounding countercyclical policy in this way is that the benefits of stabilisation can be quantitatively compared to other aspects of budgetry policy, such as the distortionary impact of taxes, and this the literature is beginning to do. One potential disadvantage is that some complexities of real life, such as financial market inefficiencies, liquidity constraints or unemployment, may be difficult to model within this paradigm.

We can illustrate many of the points in this paper by looking at a very simple model of a closed economy. Typically in microfounded macroeconomic models the representative agent has the following objective:

$$\max_{\{C_s,y_s\}_{s=t}^{\infty}} E_t \sum_{s=t}^{\infty} \beta^{s-t}[u(C_s, G_s; \xi_s) - v(y_s(z), \xi_s)] \tag{1}$$

i.e. maximise discounted utility by choosing paths for aggregate consumption and labour supply. In (1) β is a discount factor, C is consumption of a an aggregate bundle of goods, G is an exogenously determined bundle of public goods, ξ is a vector of shocks to utility, v represents

both the disutility of providing labour to produce a particular good z and the production technology required to transform labour to output[1]. While standard, this form of utility function already embodies a crucial, if realistic assumption. While individuals are able to cushion some, but not all, of the impact of changes in the relative price of particular consumer goods on their utility by varying their consumption basket, they are tied to one particular good in supplying labour. As a result, they cannot avoid the consequences of being employed in a 'recession industry' by allocating some of their 'spare labour' to boom industries[2].

By assuming full financial markets so that workers all enjoy the same marginal utility of consumption[3], and that u is separable in C and G, maximising utility subject to a budget constraint implies that aggregate consumption/output dynamics are described by the consumption Euler equation,

$$1 + i_t = \beta^{-1} \left\{ E_t \left[\frac{u_c(C_{t+1}; \xi_{t+1})}{u_c(C_t; \xi_t)} \frac{P_t}{P_{t+1}} \right] \right\}^{-1}$$

where i is the nominal interest rate, and P the consumer price level.[4] It is perhaps more familiar in its log-linearised form

$$c_t = E_t[c_{t+1}] - \sigma(i_t - E_t[\pi_{t+1}]) - \xi_t + \beta E_t[\xi_{t+1}]$$

where π is inflation, and σ is the intertemporal elasticity of consumption. The other first order condition relates the marginal utility of consump-

[1] Since we are examining fluctuations at the business cycle frequency as a result shocks in the presence of nominal inertia we, in common with the literature, ignore capital. Woodford (2003) argues that this does not fundamentally affect the analysis.

[2] However, it should be noted that even if workers were able to allocate labour to many different firms, price dispersion would still increase the disutility of producing a given level of aggregate consumption, given the diminishing marginal product of labour within each firm's production function and the diminishing marginal utility of individual goods within the consumer's consumption basket. Nevertheless, the utility costs of price dispersion will clearly be greater when workers are tied to firms (see Woodford (2003), pp 163-173) since this increases the strategic complementarity between firms' pricing decisions.

[3] Implicitly we are assuming that at the point these contracts were written all consumers enjoyed the same expected human and non-human wealth. Any subsequent differences in income as a result of staggered wage and/or price setting are exactly compensated for as part of the contracts.

[4] It should be noted that the complete financial markets do not imply that we are ignoring uncertainty. Insurance against idiosyncratic shocks means that consumers compensate each other for any differences in the impact on their budget constraints of shocks arising from the random ability of their firm to reset its price, or their own ability to renegotiate their wage if wages are also sticky. However, consumers are not insured for aggregate shocks, giving policy makers an incentive to reduce business cycle fluctuations.

tion to the marginal disutility of labour

$$\frac{v_h(h_t(i);\xi_t)}{u_c(C_t,G_t;\xi_t)} = \frac{w_t(i)(1-\tau_t)}{P_t}$$

where τ_t is the tax rate on labour income.

The consumption aggregate is made up of a continuum of individual goods, where preferences between goods are CES in structure (following Dixit-Stiglitz (1977)). The market for each individual good is therefore imperfectly competitive, and each producer of good z faces the following demand curve for its output

$$y(z) = (\frac{p(z)}{P})^{-\epsilon}(C+G)$$

We can link output and employment using a simple linear production technology

$$y(z) = Ah(z)$$

where A is a stochastic parameter representing the level of technology.

A role for countercyclical monetary policy is introduced by assuming that the prices set by monopolistically competitive firms are sticky, typically through the mechanism of Calvo (1983) contracts whereby prices can only be adjusted after a random interval of time. This gives rise to the description of aggregate supply embodied in the New Keynesian Phillips curve[5],

$$\pi_t = \beta E_t \pi_{t+1} + \kappa \ln(mc_t + \mu) + u_t$$

where mc is a measure of real marginal costs (which will involve the real wage defined above, as well as productivity, sales taxes (υ), income taxes (τ) and a production subsidy), and μ is the firm's mark-up (based on the the elasticity of demand ϵ). If prices were flexible, $mc = -\mu$. We define an error term u as a 'cost-push' shock. This shock can be rationalised in various ways, such as changes in the desired mark-up of monopolistic firms, perhaps due to stochastic variations in the demand elasticty. In the absence of labour market frictions (such as nominal wage inertia and habit effects in labour supply) this can be rewritten in the more familiar form,

$$\pi_t = \beta E_t \pi_{t+1} + \kappa(\alpha_1 \ln Y_t^g + \alpha_2 \ln(Y-G)_t^g - \ln(1-\tau_t)^g - \ln(1-\upsilon_t)^g) + u_t$$

where $Y^g = Y/Y^n$ denotes the output 'gap': the ratio of the level of output to its level that would occur if prices were completely flexible

[5]Recent work has given econometric support for this model of price-setting (see Leith and Malley (2005) for example).

(its 'natural' level) . For tax policy instruments, natural levels refer to steady state levels. If there was no variation in tax rates or government spending over the business cycle then the forcing variable in this Phillips curve would be the output gap. Note that the impact of sales and income taxes on inflation is the same when only prices are sticky. However, as Leith and Wren-Lewis (2005b) show, in the presence of both sticky wages and prices, income and sales taxes will affect the 'costs' driving wage and price inflation, respectively.

The concept of a natural level of a variable plays a critical role in the analysis. If the rationale for stabilisation policy is to correct the distortion caused by nominal inertia, then the natural level of output - what output would be if prices were fully flexible - represents an obvious policy target. Unfortunately, nominal inertia is not the only distortion in this model. The introduction of monopolistic competition through Calvo contracts introduces a permanent distortion into the economy: output is lower than it would be under perfect competition. Sales and income taxes are also distortionary. This complicates the analysis, as there may be a temptation for policy to try and eliminate the effects of these distortions (i.e. output below its perfectly competitive level) as well as the effects of nominal inertia. This leads to the well known problem of inflation bias, analysed by Barro and Gordon (1982) and many others. To focus on pure stabilisation issues, we can abstract from this problem by assuming that there is in place a production subsidy which exactly offsets the steady state impact of monopolistic and tax distortions[6].

The final step in the analysis is to specify the objectives of policy. (The government's budget constraint is considered in the next section.) As agents differ only to the extent that they work in different industries, a benevolent policy maker will maximise the aggregate of (1) across individuals/goods. Taking a second order expansion, and after considerable manipulation, we can write welfare as

$$W = A_1\pi^2 + A_2(\ln Y - \ln Y^n)^2 + A_3(\ln G - \ln G^n)^2 + tip \qquad (2)$$

where A_i are combinations of model parameters (and are all negative), π is inflation, and tip represents terms that are independent of policy

[6] Alternatively we may retain the distortions, but assume that they are small (as in Woodford (2003), Chapter 6) such that our objective function contains the squared difference between the output gap and the extent to which the natural rate of output is inefficiently low. Or we can treat the distortions as being significant which means we cannot enjoy the simplicity of forming a linear quadratic problem, but need to take second order approximations of our model as well as welfare function to obtain valid policy conclusions (see Sutherland (2004), for example).

(i.e. terms involving the steady state or shocks alone) and terms higher than second order.

How do we get from (1) involving consumption, government spending, output and preference shocks to the expression above? The first, and most important, point is how inflation appears. Expanding the aggregate of utility across all agents introduces a term in the variance of output across goods. The intuition is straightforward. Firstly, from the form of the consumption basket, price dispersion reduces the utility generated by production of goods from a given level of labour input as the utility generated by extra consumption of cheaper goods does not compensate for the reduced consumption of the more expensive goods due to diminishing marginal utility for individual goods. Additionally, under any of the following conditions: (1)the firm has a convex production function; (2)workers suffer from increasing disutility of labour supply; and, (3) workers are tied to working in a single industry, variation in output across firms and industries that are not a result of changes in preferences to work will have costs, even if aggregate output is unchanged.

Why does output differ across industries? In this analysis, the only reason is that firms set prices at different times because of menu costs in the manner suggested by Calvo contracts. Woodford (2003) shows that, under Calvo contracts, the variance of output is directly related to the level of inflation. Again the intuition is simple: the higher is inflation, the greater the change in relative prices induced by menu costs, and therefore the greater the resulting variation in output across industries. This is a particularly neat formalisation of an old idea, which is that inflation is costly because it induces relative price movements that do not reflect changes in technology or tastes. This is the only reason why inflation matters in this set up. The immediate implication is that the optimal rate of inflation is zero.

A second key step in obtaining (2) is the elimination of linear terms in consumption, government spending and output. These terms arise because more consumption is better, but people would like to work less, *ceteris paribus*. Of course the terms are linked: higher consumption requires more work. Under the assumption noted earlier that a subsidy exists that exactly counteracts the distortion due to monopolistic competition and taxes, and assuming that the steady state provision of public goods is optimal, we can use the first order conditions that follow from individuals maximising (1) to eliminate linear terms. If we do not make this, or some similar, assumption, then a linear term will remain in the objective function, implying that it is optimal for the policy maker to raise output above steady state permanently.

Third and finally, what about the terms in 1 involving preference shocks (ξ)? These have been eliminated by the concept of the 'natural' level of a variable discussed above. As we noted with the Phillips curve, this device of natural levels allows us to differentiate between movements generated by preferences or technology (which do not in themselves require a policy response), and those due to distortions which generate social costs which policy may be able to offset.

Equation (2) is close to the traditional form of objective function used in much macroeconomic analysis. However, whereas traditional analysis left the relative importance of inflation viz the output gap (i.e. A_1/A_2) up to policy makers, here it comes directly from the parameters of the model. In addition, output appears in the form of the output gap. The important but straightforward point is that policy makers should not attempt to stabilise output around its steady state, but instead accommodate deviations in steady state that represent preference or technology shocks. Note that government spending gaps also matter, because if the provision of public goods differs from its natural (assumed optimal) level, welfare will deteriorate.

By using a subsidy to eliminate the monopolistic distortion, we have ensured that the optimal level of steady state output is its natural level, which is also the steady state level of output if inflation is zero. We have also noted above that the optimum level of inflation is zero, because this eliminates any misallocation because prices adjust at different times. There is therefore no reason for macroeconomic policy to attempt to influence the steady state of the economy, beyond ensuring that inflation is zero. However, nominal inertia will mean that the economy may deviate from its efficient level when it is hit by shocks, and macroeconomic policy can attempt to minimise these deviations.

We have identified three types of shock in this model: preference shocks, technology shocks and cost-push shocks. However, in this very simple closed economy set-up, the first two shocks need not lead to any deviation from the flexible price equilibrium (i.e. gap variables can remain zero), provided monetary policy is set optimally. The intuition for this is that both preference shocks and technology shocks are real shocks, which do not necessarily require any change in nominal prices to bring about changes in real magnitudes. As long as nominal interest rates move with the natural interest rate (the natural interest rate will change as a result of these shocks), then inflation can remain zero. For example, a positive technology shock will decrease the natural rate of interest such that, if monetary policy changes interest rates in line with the natural interest rate, this will create demand for the additional goods without requiring a fall in the price of these goods. A simple rule for

monetary policy that will bring this about[7] is

$$i = r^n + (1 + \mu)\pi \qquad \mu > 0$$

In contrast, cost-push shocks cannot be completely overcome in this way, and so they will lead to disequilibrium even if monetary policy is optimal (see Clarida et al (1999) for example.) We can see this immediately by considering the Phillips curve: a non-zero value for u cannot be consistent with zero inflation and a zero output gap. However, the particular combination of inflation and output disequilibrium caused by this shock is unlikely to be optimal (i.e. it will not minimise (2)), and so policy will have a role in adjusting the output/inflation trade-off to achieve this optimal disequilibrium combination.

If monetary policy is the only policy instrument, therefore, at least cost-push shocks will lead to welfare costs, even if policy is set optimally. Additionally, the result that technology and preference shocks are potentially benign no longer holds once we introduce wage inertia alongside price inertia into the model. This is because either shock will require a change in real wages, and hence nominal wages and/or prices, and so we immediately encounter the nominal inertia distortions. However, it may be possible to utilise fiscal instruments to offset the welfare consequences of shocks in these, more complex, cases - we discuss this possibility below.

Open economies and monetary unions Do the results noted above continue to apply in an open economy? The answer is broadly yes, although potentially there are additional complications that can only be avoided in rather special circumstances. In particular, the assumptions required to prevent either the exchange rate or consumption appearing as an additional variable in 2 are quite strong. Kirsonova et al (2003) discuss these, and in particular show that if we allow for shocks to Uncovered Interest Parity or International Risk Sharing then the open economy welfare function is likely to contain terms related to real exchange rate disequilibrium, in contrast to Gali and Monacelli (2004).

Another interesting aspect of an open economy analysis is that the inflation measure in the social welfare function is the change in the price of output, not consumer price, inflation. Consumers can reduce the costs of relative price variability through substitution, but workers tied to one particular good cannot. As the costs of inflation therefore impinge on labour supply, it is output price inflation rather than consumer price inflation that matters for welfare.

[7] μ must be greater than zero to eliminate the possibility of self-fulfilling increases in inflationary expectations, even although in the face of technology and preference shocks inflation will remain zero.

However, neither of these points has a direct bearing on any countercyclical role for fiscal policy. Many of the results noted above for a closed economy continue to hold. If the only source of nominal inertia is price rigidity, then both preference and technology shocks can in principle be completely offset using monetary policy, but this is not the case for cost-push shocks. Furthermore, if we introduce nominal inertia in wage setting, then preference and technology shocks, like cost push shocks, cannot be completely eliminated by monetary policy alone.

The major difference in considering policy in an individual member of a monetary union is of course the absence of monetary policy, and the problem this poses in the face of asymmetric shocks, or different economic responses to symmetric shocks. Even without wage inertia, both preference and technology shocks will generate disequilibrium in an individual member of a monetary union, if these shocks are idiosyncratic. This is because, in an open economy under fixed exchange rates, the real exchange rate can only change through nominal prices changing, so we inevitably encounter the nominal inertia distortion.

However, the derivation of a welfare based objective function will not be fundamentally different for a monetary union member compared to a small open economy, even if fiscal rather than monetary policy is being used as a stabilisation instrument. This is an important point, because some discusion has suggested that any fiscal stabilisation by individual union members should adopt a different target variable (e.g. output) from the variable targeted by the monetary authority (e.g. inflation)[8]. In some circumstances, it might be possible to assign different targets to monetary and fiscal authorities, even though both authorities were benevolant (and therefore cared about inflation and output gaps). In Dixit and Lambertini (2003), for example, inflation is identical across all union members. In these circumstances they show that, if the objectives of national fiscal authorities and the union's central bank are similar, and in particular they agree about the level of natural output in each country, then the first best solution (inflation at target and output at its natural rate) can always be achieved. In these circumstances, it is quite possible to assign the inflation target to the central bank and national output targets to the national fiscal authorities. However, in the more general and realistic case where union members inflation rates may differ, the

[8]The concept of a policy target is not well defined. The term is used in variety of ways, from the components of an objective function to a value of a variable that must be met by policy makers unconditionally (e.g. money supply targets). The usefulness of targets in the context of monetary policy is hotly contested, as the current debate on inflation targets in the US illustrates. A discussion of these issues goes well beyond the scope of this paper.

welfare analysis cited above clearly shows that both domestic inflation and output should be focus of any national fiscal stabilisation.

A more tricky issue involves whether national governments should maximise the welfare of their own agents taking the policies of other union members as given, or whether they should maximise their own component of union wide welfare. The two policies will differ, because in the former case policy makers have an incentive to attempt to appreciate the terms of trade (relative to other union members) to increase domestic welfare. However, such a policy would be suboptimal from a union wide perspective, for the obvious reason that the terms of trade of union members relative to each other cannot all appreciate at once (see Gali & Monacelli 2004b). Dixit and Lambertini (2003) also highlight the importance of coordination on measuring the level of natural output.

Finally, in the context of monetary unions, we can note one possible extension to the model that could radically increase the importance of fiscal stabilisation. We note below how adding some price setters who marked up prices using a rule of thumb based on past inflation could introduce a backward looking element into the Phillips curve, and that this would change the form of the social welfare function. Kirsanova, Vines and Wren-Lewis (2005) show that it could also result in an economy developing severe cycles following an asymmertic shock. In such circumstances, countercyclical fiscal policy may become a necessity.

Robustness Woodford's analysis of welfare is sensitive to the form of nominal inertia, as Woodford (2003) himself shows. Woodford (2003, Chapter 6) discussing a number of alternatives to Calvo contracts, but one particularly interesting case is if the group of firms that do not set the optimal price in any particular period index their prices to last period's inflation rate, rather than keeping prices fixed. This has the effect of introducing a backward-looking element to the Phillips curve. In these circumstance, the variability of output across industries is no longer fully captured by inflation, but will also depend on the change in inflation. (See Steinsson, 2003 for detailed analysis of this case.)

Woodfood (2003) also explores the implications of adding monetary frictions to the benchmark model by, for example, assuming that money is a non-separable argument in utility. This implies that the objective function would include a quadratic term in the interest rate. When constructing an optimal policy based on an objective function which contains such a term, it turns out that this implies a desire to smooth movements in the policy instrument.

This line of analysis is still at an early stage. The results so far suggest that, while any objective function will contain terms in output disequilibria and output price inflation, it is unclear whether this is suf-

ficient in more complex and realistic models, and such models might introduce additional terms into the benevolent policy maker's objective function. Although the analysis is abstract and simplified, it does clarify the consequences of some basic economic ideas, such as the impact of inflation on relative price variability. The emphasis on output price inflation rather than consumer price inflation follows directly from this, and at the very least raises a challenge for real world policies that are based on consumer price inflation.

Other conclusions may be less robust, however. For example, Woodford (2003, Chapter 6) argues that reasonable calibrations imply that A_2 in (2) is small relative to A_1 (a relative magnitude of the order of 0.05 to 1), implying that inflation is much more costly to social welfare than output gaps. This is a variant on an older argument due to Lucas (see Lucas 2003 for a restatement), which is that the costs of business cycles due to consumers being off their optimal consumption path is small. It is far from clear that this result would survive in a more realistic model which allowed for unemployment. (In addition, there may be other important costs of inflation besides relative price distortions.) It would also be interesting to re-examine the importance of the exchange rate gap in models with both traded and non-traded goods.

3 Fiscal Policy as a Stabilisation Tool

In much of the discussuion above, policy involved moving the monetary policy instrument so as to get as close as possible to the natural level of output (the level that would occur under flexible prices) and zero inflation. This could done perfectly in the case of taste or technology shocks when there was only one source of nominal inertia (wages or prices). Such a first best outcome is not achievable in the presence of either cost push shocks, nominal inertia in wage setting or the case of monetary union subject to idiosyncratic shocks of any kind. In principle, in such situations, fiscal instruments could be utilised as well as (or in the case of a monetary union, instead of) monetary policy to get closer to the first-best solution.

Therefore, we briefly discuss how tax (sales and income taxes) and spending instruments could, in theory, be used to offset the kinds of shocks discussed above. It is possible to generalise the above analysis by including sticky wages as well as prices. As noted above, with these two sources of nominal inertia, sales taxes enter the Phillips curve for prices and income taxes enter the definition of 'marginal costs' for wage inflation. Putting aside any debt sustainability issues for a moment, it is clear that these instruments can in principle be altered to completely offset the impact of any cost-push shock on either wage or price

inflation. So, in at least this simple case, fiscal policy can enhance the stabilisation role of monetary policy. In reality, the economy is likely to be subject to many more distortionary shocks that may have macroeconomic conseqences, and there may be additional tax instruments that can mitigate these[9]. In the case of government spending acting as the fiscal instrument, this affects aggregate demand directly, and therefore, in the context of monetary union, can potentially compensate for the loss of the monetary policy instrument.

In the remainder of this section we will explicitly compare fiscal and monetary policy instruments, with a view to assessing the desirability of using fiscal variables in macroeconomic stabilisation. There are three key aspects to this comparison: the role played by government debt, the distortionary role of fiscal instruments and the political economy aspects of the use of fiscal instruments. We consider each of these in turn.

The government budget constraint It seems natural to see the government's intertemporal budget constraint and government debt as complications introduced by fiscal stabilisation, but which can be ignored if we confine ourselves to monetary policy. However this is incorrect, at least in principle. Monetary policy has an impact on the government's budget constraint, because it changes the servicing cost of government debt, because through inflation it alters the real value of government debt, and because by changing output it alters the tax take. If fiscal policy does nothing in response to these changes (by which we mean that government spending and tax rates remain unchanged), then the economy will either enter an unstable debt spiral, or it will enter a regime similar to the Fiscal Theory of the Price Level (see Woodford (1998), Leeper (1991), Leith and Wren-Lewis (2000)). The latter outcome is undesirable, as Kirsanova and Wren-Lewis (2005) among others show.

So a complete analysis of the impact of monetary policy has to include its impact on government debt and the government's budget constraint. However, these issues are medium to long term, and so their impact on short term stabilisation need not be large. A number of authors (e.g Leith and Wren-Lewis, 2000 and 2005a) have shown that quite weak fiscal rules are sufficient to ensure long term fiscal sustainability, where by weak we mean that spending and taxes only correct any debt disequilibrium gradually. (Kirsanova and Wren-Lewis (2005) show in the context of a closed economy that such weak rules are also optimal.) As a result, fiscal stabilisation of debt may have very little impact on any stabilisation policy, whether that policy is monetary or fiscal. In this

[9]The existence of multiple tax instruments has also led some to suggest that this may be a more appropriate tool to deal with asset price bubbles than the monetary policy instrument (see Muellbauer,2004, for example).

sense, it is feasible to examine business cycle stabilisation independently of the government's budget constraint, and for that stabilisation to involve both monetary or fiscal policy, as long as appropriate long term debt control is in place.

The discussion above assumes that policy aims to return to some steady state target for government debt. However recent studies have suggested that even a fixed debt target of this kind may not be optimal. Benigno and Woodford (2003) and Schmit-Grobe and Uribe (2004) both suggest that optimal debt policy may involve debt exhibiting random walk behaviour. By this we mean that if some shock raises government debt, it may be optimal to (at least in part) leave debt higher permanently, rather than eventually bring it back to its original level. The reason for this is that the costs of keeping debt permanently higher (higher taxes, which add to distortions, or lower spending, which makes public goods provision suboptimal) are discounted, and are therefore finite. As a result, they may be outweighed by the short term costs of adjusting taxes or spending to get debt back to its original level.

So a common result from the recent literature is that the control of government debt can, and probably should, be a very gradual affair. As a result, control of government debt does not significantly impact on the possibility of either monetary or fiscal business cycle stabilisation. However, an implicit assumption in this literature is that the fiscal authorities can commit to stabilising the debt stock through the use of fiscal instruments. In the absence of credible commitment technologies, fiscal authorities may be tempted to pressurise the monetary authorities to monetise the debt, thereby generating an inflationary bias problem. The result that debt is relatively unimportant ignores this and other key political economy considerations, and we address those in our discussion of fiscal institutions.

Fiscal distortions In the analysis above, monetary policy could be seen as having two roles. First, it ensures that the steady state inflation rate is optimal (in the basic model above, zero). Second, in the face of shocks, monetary policy adjusts to ensure that the impact on inflation and output gaps is minimised. It can do this by setting the nominal interest rate, because with nominal inertia changes in nominal rates would lead to short term changes in real rates, and real interest rates have an impact on demand by changing the intertemporal pattern of consumption spending.

Setting the steady state inflation rate is a role unique to monetary policy. By choosing some steady state interest rate (or alternatively some money supply growth target) policy largely determines the steady state inflation rate. (In a monetary union, the steady state inflation rate in

an individual union member is set by the union wide inflation rate.) So fiscal policy cannot normally substitute for this role. However, the short term stabilisation role for monetary policy can also be accomplished in principle by fiscal instruments: in the model above, changes in government spending in particular has a direct effect on aggregate demand, and so can help achieve the optimal inflation/output gap trade-off.

One important difference between fiscal instruments and monetary policy is that fiscal instruments all have an impact on welfare, besides any impact they might have on stabilisation. Changing government spending distorts the optimal allocation of consumption between private and public goods, and taxes are directly distortionary. This implies that it is quite possible to build optimality theories about fiscal instruments that are quite independent of any stabilisation role they may have: tax smoothing is a well known example. However this alone does not imply that fiscal instruments should not be used for stabilisation.

This can be seen most clearly when a distortionary tax can be used to directly offset the impact of a distortionary shock: the distortions offset each other to produce a first best solution. For example, sales taxes can be used to completely offset the impact of a cost-push shock, and we noted above that this was something that monetary policy cannot do.

Even in cases where a distortionary tax cannot completely eliminate a distortionary shock, it may help reduce its impact, such that the net effect of the moderated shock and the distortionary tax change is significantly better than before. For example, suppose a technology shock occurs in a model in which there is wage inertia as well as price inertia. This inertia will mean that real wages adjust more slowly than is socially optimal, and monetary policy alone will not be able to eliminate this distortion.

The Table below is taken from some recent work (Leith and Wren-Lewis, 2005b) where we analyse a 1% autocorrelated technology shock in an economy of this kind where policy-makers can precommit[10]. It assumes in each case that monetary policy is optimal, but different rows and columns include or exclude optimal use of a particular fiscal policy instrument. It shows how using all three fiscal instruments can completely eliminate the costs of sticky wages and prices in the face of this shock, whereas using monetary policy alone leaves costs equivalent to 0.58% of one period's steady-state level of consumption. Note that in this case government spending is not a very effective instrument, because it acts in a similar way to monetary policy. In contrast, we find the government spending is potentially more useful in dealing with asymmetric

[10]Leith and Wren-Lewis (2005b) also consider policy under discretion, but for this shock the numbers are similar to the case of precommitment.

shocks in a monetary union.

Table 1 - Consumption Costs of Technology Shock in an Open Economy.

	No Taxes	Income Tax	Sales Tax	Both Taxes
Govt Spending	0.5793	0.0673	0.0863	0
No Govt Spending	0.5804	0.0708	0.0915	0

Does microfounded analysis make countercyclical fiscal policy more or less potent? In traditional Keynesian models, taxes were important because they influenced personal disosable income, and therefore consumption. In contrast, this 'income effect' of taxes in the model above is unimportant, because of Ricardian Equivalence. Changing taxes alters the intertemporal distribution of personal disposable income, but this can and will be offset by changes in saving by consumers in order to achieve the optimal intertemporal allocation of spending. Part of the received wisdom appears to be that this alone makes countercyclical fiscal policy ineffective.

Our discussion above illustrates why this view is incorrect. Taxes matter in the model above because they influence key relative prices: for example, income taxes change the return from supplying labour. In this sense, fiscal policy becomes much richer in microfounded models. Three important conclusions follow.

1) It is illegitimate to treat fiscal policy as if it is a single instrument. The three varieties of fiscal policy examined above are quite distinct. This has a potential advantage once we recognise that business cycle disequilibrium is unlikely to have a single cause. What is common to this analysis of business cycles is the 'propagation mechanism': nominal inertia (here in the form of Calvo contracts). However, this mechanism can be initiated by a wide range of 'shocks': we identified three above (preferences, technology and cost-push), but more complex models will create additional possibilities. In these circumstumstances having a variety of instruments which impact on the macroeconomy in different ways is a distinct advantage.

2) It follows that the way fiscal policy instruments impact on the economy is different from monetary policy. Perhaps the fiscal policy instrument that is closest to monetary policy in terms of how it influences the economy is government spending, because both work by influencing demand. Even in this case, however, there are important differences, particularly in an open economy.

3) To the extent that the economy suffers from additional distortions, such as liquidity constraints, such that Ricardian Equivalence does not hold, then this provides an *additional* route by which fiscal actions can influence the cycle.

This leads to the following general conclusion. Unless monetary policy can completely eliminate the impact of particular shocks on the economy by itself, then fiscal instruments can complement the stabilisation role of monetary policy. Although changing fiscal instruments will result in a welfare cost (because of a sub-optimal level of public goods provision, or because taxes are distortionary), this may be more than outweighed by a positive effect they can have in reducing the distortion caused by nominal inertia, and in some cases may enable policy to directly counteract a distortionary shock.

Exactly how the two policies should work together remains relatively unexplored[11]. In addition, any realistic analysis would need to incorporate some of the rigidities associated with fiscal actions: unlike monetary policy, tax rates or government spending cannot be changed overnight. Using the welfare based analysis outlined above allows us to directly measure the extent to which lags in the implementation of fiscal policy may negate the benefits of fiscal stabilisation. Such an analysis may also suggest some form of target zone approach, where fiscal policy is only changed if disequilibrium becomes large.[12]

4 Fiscal Policy Institutions

One of the striking results discussed above is the separation that can in principle be achieved between two potential roles for fiscal policy: the medium to long term goal of ensuring solvency, and the short term aim of business cycle stabilisation. In the type of models that are now the focus of macroeconomic analysis, the optimal speed at which debt disequilibrium is corrected is very slow, and in some models some permanent drift in debt following shocks is optimal. These results appear to be at odds with the received wisdom in this area, which sees the control of government debt as a much more urgent priority, and which therefore severely restricts or rules out the use of fiscal policy for business cycle stabilisation. To many, the embodiment of this received wisdom are the debt limits that are central to the European Monetary Union's Stability and Growth Pact.

The contrast between the macroeconomic analysis and the received wisdom may have a very simple explanation. The discussion above had

[11] Benigno and Woodford (2003) suggest one particular policy assignment, but note that several other assignments would also achieve the optimal macroeconomic response to shocks.

[12] The analogy here is with menu costs and price changes: if there are fixed costs to changing an instrument, then these may outweigh the benefits of fine tuning. However if the size of any shock is initially unknown, then there will be costs in initially delaying action if the shock turns out to be large.

at its heart a benevolant policy maker, that aimed to maximise the welfare of the representive consumer/worker, who in many cases acted as if they lived forever (by caring about the next generation as much as themselves). In practice, fiscal policy is managed by policy makers who may not have the interests of this representative agent at heart (because they do not exist), and whose effective discount rate may be very high.

The worry that many have with using fiscal policy as a short term stabilisation tool is that this may give these more shortsighted, partisan policy makers an additional excuse to neglect intertemporal fiscal prudence. As an example, we need look no further than recent developments in the United States. The current administration in its first term introduced a number of tax cutting measures, which have lead to a large budget deficit. This deficit will need to be corrected at some stage, but at present there is no clear indication as to how this will be done. (The tax cuts were either permanent, or are planned to be made permanent.) One of the justifications for introducing these tax cuts was that they would help reverse the decline in growth that was occuring at the time. To the extent that the tax cuts (or at least the lack of any clear explanation of how they would be financed) are viewed as irresponsible, then short term stabilisation issues appeared to encourage that irresponsibility.

Many would argue that episodes of this kind are endemic in modern democracies. In the 25 years prior to the formation of European Monetary Union, for example, Euro area government debt appeared to be on a steadily rising trend. (See Wren-Lewis (2003), who contrasts this with the lack of any similar trend in the UK.) The essential difficulty is that balanced budget changes are politically unpopular, but that the constituency that is mainly hit by increasing debt is future generations, who do not have a vote.

Fiscal Rules One response has been the analysis and implementation of fiscal rules that are either imposed on governments (as in EMU), or self-imposed (as in the UK). Probably the simplest possible rule that ensures solvency is an annually balanced budget rule[13]. The detrimental impact this would have on short term stabilisation is well known. Fixing an upper limit on deficits, as in the Stability and Growth Pact, should in principle allow for more flexibility, while retaining long term solvency. However, this approach is problematic for many reasons. The limit has to be qualified in some way, because there are bound to be occasions when a country falls foul of the limit through no fault of its policy

[13]If either inflation or growth were positive, and there was existing government debt, then balancing the budget each year would in fact steadily reduce the debt to GDP ratio.

makers. There may also be good reasons why a country may choose to run a series of deficits and increase its debt (to improve infrastructure, for example), and so some allowance must be made for this. In addition, the specification of upper limits could still be consistent with an economy gradually raising its debt to GDP level overtime.

Some of these difficulties are overcome by the rules adopted by the current UK government. There is explicit allowance for debt to rise to finance investment. In addition, the level of the debt to GDP ratio is stabilised over the course of the cycle, rather than in any particular year. This in principle allows policy makers infinite scope to engage in countercyclical fiscal policy over the course of the cycle (and it certainly allows for automatic stabilisers), as long as the cycle is symmetric. These rules and their internal consistency have been criticised (e.g. Buiter (2003)), but in many respects they do appear to represent an improvement on crude upper limits (Wren-Lewis, 2003).

One interesting issue is whether targets should be one sided or symmetric. If the focus is on government default or forced monetary accomodation, then upper limits on deficits and debt are clearly appropriate. However, in most mature developed economies, the likelihood of default is remote. Equally, with the gradual adoption of independent central banks, the possibility that growing government deficits will force monetary accomodation and therefore hyperinflation is also small. This is not to discount either completely, but it seems likely that an issue that will arise prior to this one is intergenerational equity. The current concern about large US public sector deficits, and even larger projected deficits into the longer term, is not about potential default by the US government, or that the Federal Reserve will suddenly start printing money. Instead it is that large deficits today will require higher taxes in the medium to long term, and that therefore future generations will have to pay higher taxes to pay for tax cuts today. In this case it is in principle possible for the opposite problem to arise: that large surpluses could emerge, which favoured future generations at the expense of todays taxpayers. Although this possibility may be small, for the political economy reasons noted above, the recent experience of the Australiasian economies suggest it is not inconceivable.

The difficulty with sophisticated rules and targets, such as those in the UK (relative to EMU), is that complexity may be the enemy of credibility. This has been illustrated by the recent move by H.M.Treasury to start the economic cycle two years earlier than previously assumed. Whatever the statistical merits of this move, it has reduced the immediate pressure on the government, and the general public reaction has been extremely cynical. In addition, these rules remain much more

simple than anything that might be regarded as optimal. We noted in previous sections, for example, that optimal debt correction might be far more drawn out than a single cycle, and that some drift in the target may even be appropriate. Buiter (2003) makes a similar point, from a much more wide ranging perspective. Thus simple rules may impose large macroeconomic costs, but more complex rules may be open to abuse, and may therefore not solve the credibility problem they are designed to overcome. Wyplosz (2001) writes 'The problem with rules is that they tend to be rigid and artificial...The appropiate response is to build institutions which create the proper incentives'.

Alternative Institutions An alternative to rules that has been explored by a number of authors is to take some authority for fiscal decisions away from elected politicians. These proposals have varied widely, in part because they have focused on different types of economy and time frames (they include Eichengreen et al (1999), Wyplosz (2001) and (2005), Wren-Lewis (1996) and (2003) and Ball (1997)).

One motivation for looking at alternative institutions has been the perceived success of independent central banks (ICBs) (see Calmfors (2003) for example.). If our focus is purely on using fiscal policy for business cycle stabilisation, then the parallels are straightforward. (Indeed, the literature stemming from Barro and Gordon that is often cited by economists as justifying ICBs, does not specify what instrument is used to control output and inflation, and so it applies equally to fiscal countercyclical policy.) The main problem with the ICB analogy is how to separate fiscal stabilisation policy from issues of longer term sustainability and equity, and also from microeconomic budgetry policy. Wren-Lewis (2003) suggests giving a 'fiscal stabilisation authority' a small number of fiscal instruments, chosen for their potency in influencing the macroeconomy. This authority would only be allowed to make temporary changes in these instruments, and might even be given its own budget which would have to be balanced within a specified time frame. Wren-Lewis (2003) also suggests that a good candidate for this fiscal authority might be the central bank.[14]

One of the problems in such proposals is summed up in the famous phrase 'no taxation without representation'. Wren-Lewis (2003) argues that this criticism is rather weak if the fiscal authority has only limited power to temporarily change a few fiscal instruments, because changing

[14]Wyplosz (2001) argues that independent central banks also have authority over economic decisions in the short and long term, because they can determine the long run rate of inflation. However this not universally true: in the UK the inflation target is fixed by the government, and in New Zealand it is negotiated between Bank and Government.

interest rates has quite significant distributional impacts. However, when we move on to longer term issues that may involve permanent changes in taxation, them the anti-democartic argument becomes much stronger. Wyplosz (2001) counters that a Fiscal Policy Committee (FPC) could impose the overall size of the budget deficit, but still leave to elected governments how to achieve that goal. In a sense, the FPC could be seen as representing future generations. However, whether society is prepared to cede that role to an unelected body remains to be seen.

Partly for this reason, some authors have proposed bodies that only have oversight over fiscal policy, without any direct authority. In the UK, the audit commission does have a limited oversight role. However Wyplosz (2005) and Wren-Lewis (1996) suggest setting up a body that is solely responsible for this task. This is sometimes refered to as the 'Wise Men' approach, alluding to advice regularly given to the German government by the heads of leading research institutes. If this body was to provide authoritive comment on longer term budgetry policy, it would require the use of dedicated resources. The UK government regularly publishes a projection of income and spending up to 2050. Although the difficulties involved in such a long term forecasting exercise are huge, it is exactly this which is required for any serious analysis of intergenerational equity. (It is similar analysis for other European economies, and the US, that has lead to growing concern, particularly concerning pension provision.) Any monitoring institution would require the capability of completing a similar exercise. As no real world counterpart to a Fiscal Policy Committee currently exists, both caution and political reality suggest that the first such FPC should have an advisory role.

5 Conclusions

In the modern theory of business cycle stabilisation, benevolant policy makers can vary monetary and fiscal policy instruments to improve the welfare of representative agents by eliminating or reducing the costs associated with price rigidity. We set out a very simple model in which Ricardian Equivalence held, so there was no point in policy makers attempting to influence the economy by changing the intertemporal pattern of consumers' income. Despite this, we showed that different fiscal policy instruments would have an impact on the economy, and that this impact was not only distinct from monetary policy, but also differed between fiscal instruments. We showed that, as a result, fiscal policy can have a potentially useful role in complementing monetary policy in its stabilisation objective. (It follows almost directly that fiscal policy can play a vital stabilisation role for individual members of a monetary

union.)

We also cited recent literature which showed that this short term stabilisation role need not conflict with longer term stabilisation of government debt. The main reason for this is that the optimal speed of debt stabilisation appears to be pretty slow, and some recent studies have even suggested that, provided policy can commit to using fiscal instruments to stabilise debt in this way, some drift in debt may be appropriate. However, this analysis completely neglects political economy considerations, which may arise because the interests of agents in the economy may differ, and politicians may have much shorter horizons than society. This led us to consider various proposals to change the institutional structure in which at least some fiscal decisions are made.

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