The Welfare Effects of Alternative Choices of Instruments and Targets for Macroeconomic Stabilisation Policy

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1. Introduction

Many debates in macroeconomic policy involve arguments about the appropriate choice of instruments and targets for stabilisation. Keynesian aggregate-demand-management policy was centred on the use of fiscal instruments to stabilise the level of employment or real activity in the short term. The monetarists of the late 1970s favoured the use of monetary instruments to stabilise the growth rate of money supply and therefore, it was assumed, the medium-term growth rate of nominal output. More recently, the use of interest rates and other monetary instruments to stabilise inflation rates has been advocated.

In these debates, macroeconomic stabilisation is commonly treated as an end in itself. Arguments concerning the choice of targets and instruments have therefore been based on considerations such as political feasibility, the ease with which instruments can be adjusted, and the lag between policy changes and impacts on the level of economic activity.

In debates over the choice of policy instruments and targets, direct impacts on individual welfare are rarely considered. Yet the nature and incidence of the effects of, say, an increase in interest rates are quite different from those of an increase in income taxes, even though, in macroeconomic terms, the two may be regarded as substitutes. Similarly, the welfare effects of policies that successfully stabilise real interest rates will differ from the effects of policies that stabilise the price level or the inflation rate.

Many of the critical issues in evaluating the relative merits of monetary and fiscal stabilisation arise when individuals are, at least *ex post*, heterogeneous. Such issues are particularly important in the evaluation of monetary policy. The net effect on consumption arises through changes in the relative price of current and future consumption. Hence, individuals may gain or lose depending on their pattern of borrowing and lending. By contrast, the effects of a contractionary fiscal policy, such as an increase in taxation, are more evenly spread. Within the period in which such a policy is applied, most individuals have their disposable income reduced and none have their income increased, at least by direct government action.[1]

In this paper, the welfare effects of alternative targets and instruments for stabilisation are examined in the context of a life-cycle model. The central idea is to model the effects

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1. If fiscal restraint is applied on the expenditure side, the effects may be more concentrated. For example, the cuts in the 1996/97 Budget affected Canberra more than other communities.

of alternative policy instruments on the *ex ante* riskiness of individual consumption. Policies have a direct effect on individual consumption, through the changes in relative prices and post-tax incomes which they induce, and an indirect effect arising from stabilisation of the target variables. A policy is regarded as successful to the extent that it reduces the riskiness of individual consumption, and therefore yields an increase in welfare. It is argued that the direct effects of countercyclical fiscal policy tend to reduce individual consumption risk, while the direct effects of countercyclical interest-rate policy tend to increase individual consumption risk. Hence, if stabilisation of aggregate output is desired, fiscal policy is the appropriate instrument.

The paper is organised as follows. Section 2 deals with the recent evolution of macroeconomic policy and the emergence of a policy framework based on the use of countercyclical monetary policy as the principal method of stabilisation. It is argued that the appropriate aggregate goals are minimisation of unemployment and stabilisation of real interest rates. Section 3 deals with the choice of targets for stabilisation and the desirability, from a microeconomic viewpoint, of stabilising output, consumption, prices, interest rates and unemployment. In Section 4, a life-cycle model in which these issues may be addressed more formally is presented. In Section 5, the model is used to analyse the microeconomic impact of fiscal and monetary stabilisation policies. It is argued that fiscal policy is the appropriate instrument for macroeconomic stabilisation. Section 6 deals with policy implications and particularly with the proposition that political constraints prevent the use of active fiscal policy. Section 7 deals with the choice of a long-term real interest-rate target for stabilisation policy.

2. The Emergence of Countercyclical Monetary Policy

In the history of postwar Australian macroeconomic policy, three main phases may be distinguished. During the Keynesian period, roughly from 1945 to 1975, monetary policy played a subordinate role. Fiscal policy was seen as the primary instrument for domestic macroeconomic stabilisation. In the Keynesian framework, achievement of internal balance was supposed to imply both full employment and price stability, while external balance could be dealt with by exchange-rate adjustments. Monetary policy could therefore be used either to stabilise interest rates or as a backup to fiscal policy.

The next phase was that of monetarism, in which the money stock became the key instrument and the rate of inflation the key target of policy. In Australia, as in most OECD countries, this phase ran from the mid 1970s to the mid 1980s and was followed by a period of some confusion, during which it was difficult to discern any coherent macroeconomic policy framework. Financial deregulation contributed to this confusion and was even more extensively used as an excuse for the lack of a framework.[2] More fundamentally, however, the problem was a lack of faith in traditional stabilisation policies combined with unwillingness to accept radical new classical arguments rejecting stabilisation in principle.

2. For example, few central banks explicitly rejected monetarism. Instead, most announced that financial deregulation had invalidated previous relationships between monetary stocks and activity, therefore necessitating a temporary suspension of monetary-stock targeting. In nearly all cases, the temporary suspension turned out to be permanent.

The new-classical arguments against stabilisation policy introduced, for the first time in the modern debate, explicit consideration of individual welfare effects. Two main streams of criticisms may be considered. First, in a model where the representative agent is an infinitely lived individual or dynasty, the Ricardian-equivalence proposition of Barro (1974) supports the new-classical view that stabilisation policy must be ineffective in the long run. Second, the real-business-cycle literature began as a development of the idea that observed business cycles may represent optimal individual responses to real shocks, such as fluctuations in the rate of technological change.

In response, the 'new Keynesians' used models of individual optimisation to justify stabilisation policy. Many of the criticisms of the Ricardian-equivalence model imply that macroeconomic stabilisation policy may not only be effective but may raise the welfare of the representative agent. For example, if individuals are risk averse and have a finite time-horizon, stabilisation policy may be justified on the basis of considerations of risk aversion as a form of intergenerational insurance. The potential benefits of stabilisation policy are reinforced by non-neoclassical features of the economy such as liquidity constraints.

A new phase in the evolution of macroeconomic policy began in the early 1990s and involved renewed attempts to stabilise aggregate economic activity, this time using interest rates rather than fiscal adjustments as the key instrument of policy. A similar policy framework emerged at the same time in the United States. Unlike the shift to monetarism, this change in approach was not officially announced and did not arise from theoretical debates within the economics profession. The new policy framework reflects a general belief in the necessity of some form of stabilisation, combined with a view, at least in Australia and the United States, that political constraints prevent the effective use of fiscal policy. The fact that income taxes can no longer be increased rapidly through bracket creep, and that successive prime ministers have made a fetish of not increasing income tax rates gives substance to this view.

An alternative approach, adopted in New Zealand and advocated in Australia, has been to target the inflation rate, rather than the level of economic activity. In practice, to the extent that short-run macroeconomic fluctuations are primarily movements up and down a short-run Phillips curve, the two approaches may imply similar policies. The main difference has been that, by tightly targeting a single indicator of economic activity, the New Zealand approach implies more active use of interest-rate variations than the Australian approach based on a range of indicators each with an implicit band of tolerance.

2.1 Macroeconomic policy in the 1980s and 1990s

Except where macroeconomic policy is rigidly based on a fixed rule, such as a monetary-growth rule, it is necessary to consider the discretionary choices made by policy-makers as well as the framework within which they operate. Two features of macroeconomic policy in the 1980s and 1990s stand out. The first is the persistently contractionist bias of policy. This bias may be viewed in a number of ways.

Particularly since 1989, official forecasts of economic growth rates and unemployment rates have been consistently over-optimistic, leading to the formation of policies based

on the need to avoid unsustainably rapid growth. Forecasting of growth rates has improved since the recession, but forecasting of unemployment rates has not.

Also, if it is assumed that the non-accelerating inflation rate of unemployment (NAIRU) is between 7 and 8 per cent, unemployment has been in excess of the NAIRU for all but three of the past fifteen years. The decline of unemployment to a rate of 5.9 per cent, perhaps 1 per cent below the NAIRU, in 1989 brought forth one of the most contractionary combinations of fiscal and monetary policy in Australia's history. By contrast, there was a three-year lag between the onset of recession in mid 1989 and a shift in fiscal and monetary policy to a stance that could reasonably be described as stimulatory.

The restrictive bias of macroeconomic policy over the 1980s has been retrospectively justified as the price of the reductions in inflation that took place over that period. However, despite the fact that inflation has been low throughout the 1990s, the stance of policy and the statements of policy-makers appear to indicate that the risks of excessive expansion are still viewed as more important than the costs of sustained high unemployment.

A second and related feature of the policy scene is the way in which macroeconomic policy has repeatedly been derailed by policies of microeconomic reform. The collapse of monetary targeting following financial deregulation was the first such incident. The exceptional over-optimism of macroeconomic policy-makers in 1989 reflected the false belief that microeconomic reform had produced an economy so flexible that it would rapidly bounce back from the effects of fiscal and monetary contraction (Higgins 1989). Much of the resistance to stimulatory policies in the first years of the recession was due to a desire not to disrupt programs of microeconomic reform, such as tariff cuts, and to the generally anti-government ideology associated with microeconomic reform. Finally, the restrictionist bias of macroeconomic policy in the 1990s has been due, in large measure, to uncertainty about the aggregate impact of labour-market reforms. These reforms were based on an explicit rejection of concern about aggregate wage levels in favour of a decentralised approach to wage determination.

3. The Choice of Targets for Stabilisation Policy

From a microeconomic perspective, there is no reason to seek to stabilise aggregates such as gross domestic product (GDP) or the GDP deflator *per se*. The ultimate concern should be to stabilise individual consumption and relative prices, at least to the extent that fluctuations in these variables are generated by macroeconomic disturbances. The implications for major economic variables are considered below

3.1 Stabilisation of output and consumption

A microeconomic basis for the stabilisation objective implies that macroeconomic policy should stabilise the output of each sector in the economy, except insofar as output fluctuations reflect underlying microeconomic shocks. Policy should not induce excess contraction in one sector to offset expansion in another, since this will introduce additional noise into relative prices.

To illustrate this point, consider a country made up of two regions, east and west that do not engage in trade (say, Pakistan prior to the secession of Bangladesh). Suppose that the eastern region is characterised by a business cycle and the western region by a stable trend in output and consumption. It would be possible to stabilise aggregate output and consumption for the country as a whole by inducing cyclical fluctuations in the western region that are out of phase with those in the eastern region. It is obvious, however, that such a policy would reduce welfare in the western region, while having no effect in the eastern region. The use of the aggregate economy as a unit of analysis in this case simply obscures the issue. Problems of this kind can arise whenever macroeconomic policy affects different sectors of the economy differently. The ultimate basis for welfare analysis must be individual consumption, and this is most naturally analysed in the context of a life-cycle consumption model.

3.2 Unemployment

The variable contributing most directly to variation in individual consumption is the unemployment rate, along with closely related variables such as the rate of bankruptcies. High levels of unemployment imply high variability of consumption. Hence the main object of stabilisation policy should be to reduce the average unemployment rate. This will normally imply reducing the variability of the unemployment rate, but it should be recognised that stability in the unemployment rate is desirable primarily because stability is conducive to the achievement of lower average rates of unemployment.

Policies for reducing the average rate of unemployment have been the subject of some discussion. Three major classes of policy have been proposed. First, classical policy responses have been based on recommendations that minimum wages and social welfare benefits should be reduced. The underlying assumption is that high levels of unemployment are the result of policies that prevent the labour market from clearing. International evidence suggests that such policies have some impact on unemployment rates, part of which arises through increased employment. However, since they reduce the welfare of both the unemployed and low-wage employed workers, the impact of classical policies on consumption risk is unambiguous.

Active labour-market policies, such as those implemented in the Working Nation Job Compact, are designed to shift the short-run Phillips curve, which relates unemployment to nominal wage growth, and the Beveridge curve, which relates unemployment to vacancy rates, so that a lower level of unemployment is consistent with a given level of excess capacity in the economy as a whole. Evidence on the effectiveness of active labour-market policies remains limited.

Expenditure-switching policies, such as those proposed by Langmore and Quiggin (1994), are designed to increase the demand for labour associated with a given level of aggregate demand and, in particular, a given level of demand for imports. The underlying assumption is that high levels of unemployment reflect an underlying decline in the demand for labour, and that this decline has been exacerbated by government policies that have constrained the growth of labour-intensive areas of the economy such as the community-service sector. There has, as yet, been little discussion of the potential benefits and costs of an expenditure-switching policy.

Although reduction in the average level of unemployment must be a central objective of public policy, it may be regarded as logically distinct from the problem of macroeconomic stabilisation over the business cycle. The present paper is concerned with the latter issue.

3.3 Prices and interest rates

Price fluctuations reduce welfare when there are unpredictable variations in relative prices not derived from shocks to demand for, or supply of, particular commodities.[3] In particular, unanticipated general inflation reduces welfare since it implies unpredictable variations in the relative prices of consumption at different dates. However, this effect arises not through inflation *per se*, but through the resulting fluctuation in real interest rates. The need to stabilise relative prices rather than price indexes *per se* implies that the appropriate aggregate price targets are real interest rates, that is, relative prices of present and future consumption.

The welfare-relevant measure of stability of prices over time is the relative prices of consumption at different dates, that is, real interest rates. A policy that stabilises some measure of the inflation rate but destabilises real interest rates must reduce welfare. To the extent that there is a welfare-relevant case for an inflation target as opposed to a real-interest-rate target, it must be as a proxy for stabilisation of medium-term and long-term real interest rates at the expense of greater variability in short-term rates. Such a case needs to be made explicitly in any given situation rather than resting on appeal to some inchoate notion about the desirability of low and stable inflation rates.

As well as affecting intertemporal price ratios, monetary policy based on an inflation target may alter relative prices within a given period. There is a large literature devoted to the analysis of the proposition that inflation is associated with increased variability in relative prices. Golob's (1993) summary finds a preponderance of evidence in favour of the proposition, though this evidence has been criticised (Bomberger and Makinen 1993). Assuming that anticipated inflation is associated with increased relative-price variability, welfare benefits may be obtained from reductions in inflation, provided the instrument used to reduce inflation does not itself generate relative-price variability.

Stabilisation of indexes such as the GDP deflator *per se* is of no interest. Stabilisation of the general price level is desirable only as a proxy for stabilisation of relative prices of the large set of commodities that make up GDP. Hence, a policy aimed at stabilising the aggregate price level should not induce large fluctuations in relative prices, for example through differential impacts on different sectors of the economy. There is a danger that an activist monetary policy will have the effect of destabilising demand for the output of sectors such as housing, and therefore of destabilising relative prices. The success of a price-stabilisation policy should be measured by the variability of relative prices, not by variability of aggregate measures such as the GDP deflator.

If real interest rates are constant, variations in the inflation rate translate directly into variations in the nominal interest rate, and only the return to cash is affected. If the

3. If low-cost stockholding is feasible, price shocks due to temporary fluctuations in demand or supply may be smoothed by private speculation or through buffer-stock stabilisation schemes, and welfare will be increased as a result.

equilibrium real interest rate is constant, constancy of real interest rates, is equivalent to perfect anticipation of inflation. Hence, we derive the conclusion that the objective of stabilising real interest rates is equivalent to the objective of eliminating unanticipated inflation. It follows, for example, that to the extent that economic cycles are characterised by predictable procyclical movements in inflation rates, no attempt should be made to eliminate these cycles.

4. The Life-cycle Consumption Model

In the standard form of the life-cycle model, an individual i with wage income $w_i(t)$ seeks to maximise lifetime utility $V = \int_{t_0}^{t_1} e^{-\delta t} u(c_i(t))\,dt$ where δ is the rate of time-preference, $[t_0, t_1]$ is the individual's lifetime with $t_1 = t_0 + T$, $c_i(t)$ is consumption at time t, and u is an instantaneous utility function, subject to a budget constraint

$$\int_0^T c_i(t)\rho(t)dt = \int_0^T w_i(t)\rho(t)dt \tag{1}$$

or

$$\int_0^T (c_i(t) - w_i(t))\rho(t)dt = 0 \tag{2}$$

where $\rho(t)$ is the price of consumption claims at time t. To simplify, we will ignore the discount factor δ and begin by considering the case when $\rho(t)$ is identically equal to 1, that is, the real interest rate is constant and equal to zero.[4] Thus, the optimal policy under perfect foresight is to consume at a constant level w^*, where $w^* = \int_0^T w_i(t)dt/T$ is the annualised present value of wages over the lifetime. This yields $V = Tu(w^*)$.

We may think of the individual's wage profile $w_i(t)$ over the interval $[t_0, t_1]$ as a sample from a stochastic process w with long-run mean value $\overline{w}$. Given the assumption of costless borrowing and saving, the only relevant parameter of the wage profile $w_i(t)$ is the present value w^* which is a random variable. We define the *ex ante* expectation of w^* as the expected value of w^* over a large number of draws from the stochastic process and observe that this *ex ante* expectation is equal to $\overline{w}$. The higher moments of the distribution of w^* will depend on the properties of the stochastic process w.

If u is a constant relative-risk-aversion utility function with coefficient of relative risk aversion α, we have the standard approximation

$$E[V] = T(1-\theta)u(\overline{w}) \tag{3}$$

where

$$\theta = \tfrac{1}{2}\alpha \operatorname{var}(w^*)/\overline{w}^2. \tag{4}$$

With this setup it is natural to think of macroeconomic instability as a factor that increases the variance of w^* for a representative individual. A simple representation arises if wage income for all workers, expressed as a deviation from mean lifetime

4. The analysis is essentially unchanged if the simplifying assumption that $\delta = \rho = 0$ is relaxed by allowing $\delta(t)$ to be a positive constant, and setting $\rho(t) = e^{-rt}$ for some constant interest rate r and arbitrary numeraire date 0.

income $\bar{w}$ may be represented as the sum of two orthogonal processes, an idiosyncratic process $z_i(t)$, and a common process $x(t)$, which represents exposure to systematic fluctuations in aggregate income. We may assume, without loss of generality, that $E[z_i(t)]=0$ for all t and i.

If each individual has an equal share in the aggregate process, we may write

$$x(t) = \bar{w} + \varepsilon(t) \tag{5}$$

$$w_i(t) = \bar{w} + z_i(t) + \varepsilon(t). \tag{6}$$

When the number of individuals is large, $\sum_{i=1}^{n} z_i(t)/n$ will be close to zero for almost all t and we have the approximation $\bar{w}+\varepsilon(t)\approx W(t)/n$.

Observe that in this case, we can derive the beta coefficient

$$\beta = n\,cov(w,W)/var(W). \tag{7}$$

Hence we can generalise by setting

$$w_i(t) = \bar{w} + z_i(t) + \beta_i\varepsilon(t) \tag{8}$$

where the average value of β_i, taken over all individuals i, is equal to 1. With this formulation, some individuals are more exposed to systematic risk than others.

A particularly interesting case is that examined by Mankiw (1986) as a possible explanation for the equity-premium puzzle (Mehra and Prescott 1985). Suppose that *ex ante*, the expected value of β is one for all individuals, but that *ex post*, β takes the value β/p with probability $p>0$, and zero with probability 1-p. That is, *ex post*, the losses associated with systematic economic fluctuations are concentrated on a subset of the population, for example, those who lose their jobs or go bankrupt. The risk premium in this case may be approximated by

$$\theta = \tfrac{1}{2}(1/p)\alpha\,\mathrm{var}(W^*)/\bar{W}^2 \tag{9}$$

with the term $(1/p)$ reflecting the increased cost of risk when it is concentrated *ex post*.

As long as preferences display risk aversion, welfare will be reduced by unpredictable variation in wage income. The welfare loss will be increased if losses are concentrated *ex post* on a small subset of the population. The welfare loss from wage variability will also be increased if individuals are credit constrained or face costs in borrowing and lending. Hence, there are potential gains to be obtained from an appropriately designed stabilisation policy.

5. Policy Options

In the presence of random shocks to aggregate income, a stabilisation policy is potentially welfare improving. The impact of fiscal and monetary policy may be examined in the context of a life-cycle model.

5.1 Fiscal policy

Now consider a stationary economy made up, at any point in time, of n individuals indexed by i and a fiscal policy operating solely through a lump-sum tax transfer instrument involving payment by each individual of individual $\tau(t)$, where τ is positive when, in the absence of stabilisation policy, aggregate income $W(t) = \sum_{i=1}^{n} w_i(t)$ exceeds its long-run expected value $\overline{W} = n\overline{w}$, and negative when $W \leq \overline{W}$. For simplicity, assume $\tau(t) = \kappa(W - \overline{W})/n$. Then $E[\tau(t)] = 0$.

Even in the absence of a stabilising effect on $W(t)$, such a fiscal policy will be beneficial. Consider the case when $W(t)$ is unchanged by fiscal policy, so that the only effects arise through changes in post-tax income. The individual's budget constraint now becomes

$$\int_0^T (c_i(t) + \tau(t) - w_i(t))dt = 0 \tag{10}$$

and the optimal policy is to set consumption equal to $w_i - \tau(0,T)$, where

$$\tau(0,T) = \int_0^T \tau(t)dt/T = \kappa \int_0^T W(t)dt/nT. \tag{11}$$

The variance of $w_i - \tau(0,T)$ will be less than that of w_i if and only if w is positively correlated with τ, that is, if and only if w is positively correlated with W.

Result 1: In the absence of stabilising effects on aggregate income, fiscal policy improves *ex ante* economic welfare for individual i if and only if the stochastic process w_i is positively correlated with the stochastic process W.

The question of whether fiscal policy systematically stabilises aggregate income and, if so, how, remains controversial.[5] For the purpose of the present argument, it is sufficient to require that the stabilising effect of countercyclical fiscal policy be modelled as a reduction in the variance of $w^*(t)$. If this condition is satisfied, we may derive:

Result 2: If wage income for all individuals follows a process of the form (6), countercyclical policy will yield an *ex ante* Pareto-improvement.

Result 2 will not apply to individuals for whom the idiosyncratic component of income is negatively correlated with aggregate income, such as specialists in bankruptcy law or services to the unemployed.

More importantly, Result 2 is valid only *ex ante*. An individual who happens to live through a period in which $w^*(t)$ is consistently positive will be worse off as a result of the application of countercyclical fiscal policy. *Ex ante*, though, countercyclical fiscal policy has a twofold beneficial effect. In addition to the beneficial effects of reducing the variability of $W(t)$, and hence, *ex ante*, of all $w_i(t)$, fiscal policy acts as an intergenerational insurance mechanism, levying taxes on 'lucky' generations and paying them out to 'unlucky' generations.

5. Suppose, for example, that individuals are credit constrained in periods of recession. A countercyclical fiscal policy will permit them to increase consumption in those periods, thereby increasing the demand for goods and services and therefore aggregate income. Credit constraints are not modelled here. If credit constraints are present, the welfare loss associated with any given level of variance in wage income will be greater than the cost derived above. This will only amplify the results derived here.

The intergenerational insurance benefit will be greater, the greater the variance of experience across generations. If individuals do not optimise over the life-cycle but over a series of shorter time horizons, or if they follow suboptimal rules of thumb, insurance benefits will arise within, as well as across, generations. The insurance benefit will disappear only in the case of infinitely lived individuals or dynasties. This is precisely the case of full Ricardian equivalence (Barro 1974).

5.2 Monetary policy

The analysis of countercyclical monetary policy is more difficult. In a life-cycle perspective, countercyclical monetary policy may be seen as raising the price of consumption in boom periods (those when $W(t)$ is high in the absence of active policy) and lowering the price of consumption in recessions. By destabilising intertemporal consumption prices in this fashion, monetary policy tends to stabilise aggregate demand and therefore W.

The problem of analysing the welfare effects of such a policy raises issues analogous to those of the debate over price stabilisation. Samuelson (1972) and Massell (1969) showed that feasible price stabilisation through the introduction of a buffer stock (assumed to be costless) must increase welfare. Conversely, feasible price destabilisation must reduce welfare.

As Samuelson observed, the fact that consumers' utility functions are convex in prices implies either that price destabilisation must reduce the mean price or that the operators of the destabilisation scheme must lose money. In the analysis of countercyclical monetary policy, the mean price may be assumed to be determined by an exogenous long-term real interest rate r, here assumed equal to zero. The requirement that no arbitrage profits be available implies that $\lim_{k\to\infty}\int_s^{s+\kappa}\dot{\rho}dt = 0$. Integrating by parts, this implies:

$$\lim_{k\to\infty}\int_s^{s+\kappa} log(\rho(t))\, dt = 0. \tag{12}$$

If $\rho(t)$ is not constant, $\int_s^{s+\kappa} log(\rho(t))dt = 0$ implies that $\int_s^{s+\kappa}\rho(t)dt > 1$. Since, under a countercyclical policy $\rho(t)$ and $W(t)$ will be correlated, the effect of the policy will be to raise the present value of a representative individual's income stream. This gain must be matched by a loss incurred by the monetary authorities, and taxes must be imposed to eliminate these losses. The scheme will be revenue neutral when the present value of aggregate consumption is equal to the present value of aggregate income at the prices prevailing in the absence of intervention.

Consider the case where, in the absence of countercyclical monetary policy, $\rho(t)=0$ for all t, and consider first a population of infinitely lived individuals all of whose income is exactly proportional to $W(t)$. In the absence of countercyclical monetary policy, such an individual will consume a constant amount equal to expected long-run income. Under a revenue-neutral countercyclical policy, the optimal solution for a representative individual will involve a variable stream of consumption with an average value equal to expected long-run income. By the convexity of preferences, this must involve a reduction in welfare.

Now consider a heterogeneous population where individuals differ in their intertemporal elasticity of substitution. Individuals with a sufficiently high elasticity of substitution will benefit from the opportunity of increasing their consumption in periods when $\rho(t)$ is set low by policy. On the other hand, individuals with a low elasticity of consumption will suffer a greater than average loss. Nevertheless, there must be a net welfare loss.

Countercyclical monetary policy also gives rise to redistribution between individuals with different profiles of income and consumption. The direct welfare impact of countercyclical policy is given by

$$\int (\rho(t) - \rho^0(t))(w_i(t) - c_i(t))dt \tag{13}$$

where $\rho^0(t)$ is the price of consumption claims in the absence of policy.

Other things being equal, individuals will benefit from countercyclical policy if they have positive net saving in periods when policy increases the price of consumption claims and negative net savings in periods when policy reduces the price of consumption claims. That is, individuals will benefit when $(w_i(t) - c_i(t))$ is positively correlated[6] with $(\rho(t) - \rho^0(t))$, and will lose if $(w_i(t) - c_i(t))$ is negatively correlated with $(\rho(t) - \rho^0(t))$. The correlation between $(\rho(t) - \rho^0(t))$ and $(w_i(t) - c_i(t))$ will be determined partly by the behaviour of the idiosyncratic component of income and partly by life-cycle considerations. Individuals who borrow to buy a house or start a business at the beginning of a period of policy-induced high interest rates will suffer losses as a result. If we suppose that, on average, net borrowers have debt equal to one year's income, a 3 per cent increase in real interest rates implies a loss equal to 3 per cent of income for this group. This is comparable to the aggregate income reduction associated with a recession. Hence, it seems reasonable to suggest that for this group, even if countercyclical policy were successful in stabilising aggregate income, the cure would be as bad as the disease.

By contrast with the case of fiscal policy, the main direct intergenerational effects of countercyclical monetary policy are random. Generations will be made worse off by countercyclical policy if they experience tight monetary policy during their periods of high indebtedness and loose monetary policy during periods of positive financial wealth. Conversely, generations with the opposite experience will be made better off.

6. Policy Implications

The analysis presented above leads to a straightforward conclusion. Fiscal policy, and, more specifically, tax-welfare policy, should be used to stabilise aggregate output, while monetary policy should be used to stabilise real interest rates. Stability of the inflation rate or the aggregate price level should not be a target, although policy should be consistent with the maintenance of a suitably low medium-term average inflation rate.

These policy conclusions are derived from consideration of the microeconomic impacts of aggregate stabilisation policy. Surprisingly, although orthodox Keynesianism is the brand of aggregate macroeconomics least concerned with microfoundations, the

6. More precisely, individuals will benefit if the correlation between their own net savings and the change in policy is greater than the correlation between aggregate saving and the change in policy.

policy prescription derived from a microeconomic analysis is quite similar to the policy program that prevailed during the long postwar boom. This policy program combined reliance on fiscal policy as the main instrument of aggregate stabilisation with a commitment to low and stable interest rates.

The desirability of using fiscal rather than monetary policy was a central Keynesian claim in the early stages of the Keynesian/monetarist debates which took place in the late 1960s and early 1970s. However, at least at a formal level, the Keynesian critique of monetary policy rested on fairly dubious theoretical constructs such as the liquidity trap, and the debate was cast in terms of the question 'does money matter?'. Although concerns about the effects of high interest rates were clearly a factor in the Keynesian rejection of monetary policy, these concerns were never clearly articulated.

To confuse matters further, the monetarist position combined a defence of the proposition that money does matter, at least in the short run, with opposition to any kind of active countercyclical policy. Thus, the policy of countercyclical monetary policy that has emerged by default in Australia and the United States has never been properly defended or criticised.

The use of fiscal policy as an active instrument of stabilisation will be feasible only if the current political obstacles to increases in tax rates are removed. However, it would not be desirable to use tax rates as a finetuning instrument, since frequent changes in tax rates are costly. A reasonable strategy would be to allow taxes to be reduced once during the contractionary phase of an economic cycle, preferably as early as possible in the cycle, with the remainder of the fiscal stimulus being given through more frequent increases in public expenditure. Conversely, an increase in taxes should be imposed early in the recovery phase of the cycle with cyclical expenditure programs being wound back more gradually.

It is useful to consider whether, if fiscal policy is not available, it is preferable to use monetary policy as an active instrument of stabilisation or to do nothing. The analysis presented above suggests that policy-makers should be very cautious in adopting countercyclical monetary policies as a substitute, particularly where they involve sustained periods of high interest rates. The destabilising effects on individual incomes may more than outweigh the benefits of stabilising aggregate income.

7. Where Should Real Interest Rates be Stabilised?

In the long term, Australia's real interest rate will be determined by the world real interest rate. If securities in different countries are not perfect substitutes, the long-term equilibrium rate may be higher for small capital-importing countries like Australia than for the world as a whole, but, in view of the potential for arbitrage profits, it is unlikely that any premium will be large.

There are a number of reasons for believing that the appropriate range for real interest rates is between 2 and 5 per cent, with a preferred target between 3 and 4 per cent. During periods of price stability and political stability in the nineteenth century, real interest rates of around 3 per cent prevailed for long periods. The average real rate over the twentieth century in the United States has been around 1 per cent, but the twentieth century has been characterised by repeated episodes of unanticipated inflation.

Another way of approaching the real interest rate is from considerations of intergenerational equity. Technological progress appears to contribute on average around 1.5 per cent per year to growth. Following the Ramsey rule of saving, and assuming a coefficient of relative risk aversion between 1 and 2, the real interest rate must lie between 1.5 and 3 per cent. The Ramsey rule of saving is based on the assumption that future utility is not discounted. If a pure discount factor of 1 per cent, approximately equal to the annual mortality rate, is admitted, the real interest rate will be between 2.5 per cent and 4 per cent. These arguments are addressed further in Quiggin (1996).

When inflation is low, a normal yield curve, with long rates above short rates represents an allowance for the fact that inflation is more likely to rise than to fall over the life of, say, a 10-year bond. Assuming an underlying equilibrium real interest rate of between 3 and 4 per cent, the current 10-year bond rate of 8 per cent implies an expected average inflation rate of between 4 and 5 per cent over the next decade.

7.1 The rate of inflation

The difficulty of determining the equilibrium real interest rate is exacerbated by the difficulty of forecasting future inflation rates. Since the principal instrument of monetary policy is the nominal interest rate, an estimate of the future rate of inflation is an essential element of a policy of stabilising the real interest rate. One estimate of the long-term future rate of inflation is given by the long-term bond rate, which is determined on world markets rather than by domestic monetary policy. Thus, a practical method of implementing a target of stable real interest rates when the future inflation rate is expected to be stable is the maintenance of a standard yield curve. Short-term inflationary shocks – those that had no significant effect on the long-term bond rate – would be reflected in corresponding adjustments in nominal interest rates.

Exact stabilisation of real interest rates may not be a feasible guide to practise in the short term. Nevertheless, acceptance of the desirability of such an objective would imply significant changes in the practice of monetary policy. In particular, large swings in interest rates over the course of the economic cycle would be avoided.

8. Conclusion

In this paper, attention has been focused on the microeconomic implications of stabilisation policy in a world of heterogeneous individuals and overlapping generations. It has been shown that countercyclical fiscal policy will, on average, stabilise individual as well as aggregate income and consumption. By contrast, any aggregate stabilising effects of countercyclical monetary policy are achieved at the cost of considerable random destabilisation of individual consumption. For individuals who are more vulnerable to fluctuations in real interest rates than to fluctuations in aggregate income, the cure may be worse than the disease.

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