

# The Role and Effectiveness of Fiscal Policy

Neil Hart\*

## Abstract

*A meaningful discussion of the role and effectiveness of fiscal policy is not possible within the context of the antiquated textbook models, which in their current and likely future form (the 'New Neo-Classical Synthesis') have been used to endorse the deflationary bias in macroeconomic policy formulation during recent decades. This paper present a critique of the 'mainstream' textbook modelling of fiscal policy, and suggests a more meaningful framework in which to consider the role of fiscal policy; a framework which in particular recognises the realities of endogenous money and interest rate targeting by central banks.*

## 1. Introduction

This paper presents a critique of what may be termed the current 'conventional wisdom' on the role and effectiveness of fiscal policy. Central components of this conventional wisdom are to be found in the following statement taken from the 2004-5 Australian Commonwealth Budget papers:

The primary objective of the Government's medium-term fiscal strategy is to maintain budget balance, on average, over the course of the economic cycle. This ensures that the Government is not living beyond its means. It helps deliver macroeconomic stability, encourages private investment in a low interest rate environment, entrenches low public debt and ensures that, over time, the current

---

\* School of Economics and Finance, University of Western Sydney.

account reflects private saving and investment decisions (Australian Commonwealth Government 2004: 1-5).

The fiscal strategy outlined in this statement finds widespread support in most of the contemporary public commentary on macroeconomic policy. It alludes to the conventional view that a 'low interest rate environment' is generally inconsistent with deficit spending, which is instead associated with a higher interest rate regime leading to the 'crowding-out' of private sector spending and adverse current account ramifications. The statement also associates budget deficits with a Government 'living beyond its means', suggesting that a Government's capacity to spend is constrained by its ability to acquire revenue from the private sector, or the willingness of the non-bank public to hold government debt instruments.

The 'conventional wisdom' portrayed in the passage from the Budget statement can in turn be reconciled with the policy conclusions generally derived from the standard theoretical models that dominate contemporary macroeconomic textbooks. Generations of students have worked through macroeconomic models that lead them to conclude that fiscal policy, in an open economy setting with floating exchange rates and a high degree of international capital mobility, is relatively ineffective in terms of its real effects on the economy. Expansionary fiscal policy is routinely correlated with higher interest rates, an appreciating exchange rate, and a deterioration of the current account balance. Government spending is subject to the well known 'budget constraint', similar to that implied in the Treasurer's statement noted above.

This paper presents a critique of the traditional textbook representation of fiscal policy that has had such a powerful effect on contemporary thinking on the role and effectiveness of fiscal policy. In particular, the conclusion that fiscal deficits are likely to be associated with higher interest rates is disputed, as is the associated inference that fiscal policy is relatively ineffective in the case of an open economy with flexible exchange rates and a high degree of international capital mobility. These conclusions are shown to depend critically on representations of money and government finance that bear little resemblance to those found in modern economies with developed financial systems where the money supply is determined endogenously and central banks target short term cash rates as monetary policy instruments. The traditional textbook models are reconfigured to incorporate these features, in place of the antiquated assumptions of an exogenously determined money supply with monetary aggregates representing the monetary policy target. These modifications are shown to significantly change the conclusions derived in the standard textbook

analysis, and in turn suggest more fruitful approaches to thinking about the formulation and effectiveness of fiscal policy beyond the confines of the traditional textbook models.

The remainder of this paper is organised as follows. An outline of the 'standard' textbook macroeconomic modelling, replicated to a significant extent in the macroeconomic modelling of the Australian Treasury, is presented in the following section. A simple reconfiguration of the standard models to allow for endogenous money and interest rate targeting is presented in Section 3. In Section 4, the scope of the discussion is extended to consider the role and effectiveness of fiscal policy in the context of what has been termed here the 'New Neoclassical Synthesis' model; an approach that some influential writers have suggested will come to represent the standard 'consensus' model in the next generation of macroeconomics texts. The inferences derived from the reconfigured theoretical models then open the way for a more informed discussion of the role and effectiveness of fiscal policy in Section 5.

## **2. Fiscal policy and traditional macroeconomic theory**

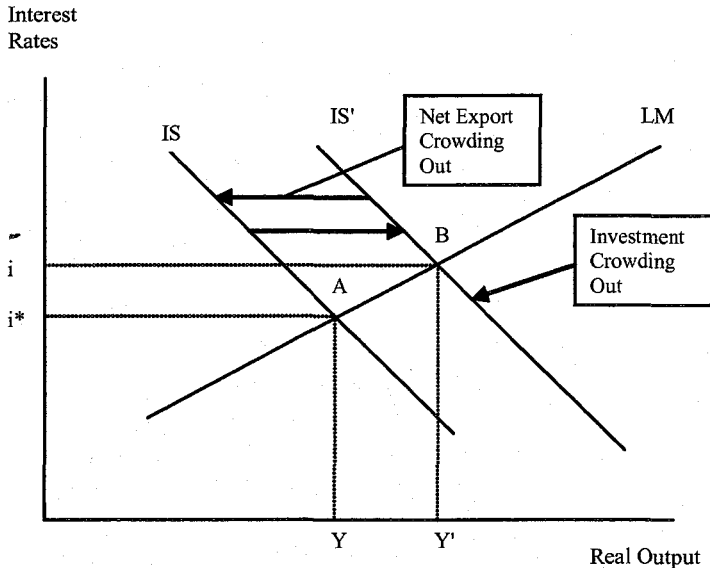
The extent to which the simple generic textbook models have influenced the thinking of professional economists can be illustrated with reference to the documentation accompanying the Australian (Federal Government) Treasury's macroeconomic modelling [TRYM]. This model has been formulated according to the following guiding principles:

The demand side and supply side of the model conform closely with contemporary expositions of economic theory. The model, therefore, brings to life text book analyses of comparative statics (comparison of equilibrium positions of the theoretical economy) by tracing the changes in economic variables as the economy moves to the supply determined equilibrium growth path. (Australian Commonwealth Treasury 1996: 1.2)

In order to render assessable to its readers the rather complex relationships contained in the model, Treasury explains the intuition behind the model's predictions through a simple textbook IS/LM model as illustrated in Figure 1.

Figure 1. The Textbook IS/LM Model

## IS/LM Fiscal Expansion - ABA



Source: Australian Commonwealth Treasury (1996:4.2)

The explanations used to illustrate the effects of fiscal policy would be most familiar to any economics student who had completed a course in intermediate macroeconomics, as would be the commentary on this diagrammatic representation:<sup>1</sup>

Increased public spending shifts the IS curve (representing goods market equilibrium) to the right, increasing aggregate demand (AD), including investment demand. The increased level of activity and increased public borrowing requirement lead to higher interest rates. Higher interest rates 'crowd out' investment. Higher interest rates are also associated with a higher exchange rate (as foreign investors take advantage of the higher Australian interest rates, thus increasing the demand for Australian dollars). The higher exchange rate leads to a worsening of the trade deficit and net export deduction from growth. With a permanent fiscal expansion, the fundamental equilibrium exchange rate will be higher unless the deficit is fully

offset by higher private saving in the long term. In the medium term, the initial stimulus is fully crowded out by the effect of the exchange rate appreciation on net exports (Australian Commonwealth Treasury 1996: 4.2)

It is useful to examine a generic version of the theoretical model that forms the basis of the analysis provided by Treasury, as this enables the reader to isolate clearly the hypothesised functional relationships and assumptions that lead to the fiscal policy ineffectiveness conclusions, along with the associated interest and exchange rate implications.

The traditional textbook ('Mundell-Fleming') representation of an open economy (with flexible exchange rates) in the 'short-run' can be summarised in terms of the following relationships:<sup>2</sup>

$$Y = C + I + G + X - Z$$

$$C = C_0 + cY_d$$

$$I = I_0 - bi$$

$$G = G_0$$

$$X = X_0 - xR$$

$$Z = Z_0 + zY + wR$$

$$Y_d = Y - (T_0 + tY)$$

$$M = M_0$$

$$P = P_0$$

$$L = L_0 + kY - hi$$

$$BP = CA + K = 0$$

$$CA = X_0 - (Z_0 + zY + vR) \quad (\text{where } v = w - x)^3$$

$$K = K_0 + f(i - i_f)$$

where  $Y$  = output,  $C$  = consumption,  $I$  = investment,  $G$  = government expenditure,  $X$  = exports,  $R$  = real exchange rate (ratio of domestic to foreign prices, expressed in foreign currency),  $Z$  = imports,  $Y_d$  = disposable income,  $T$  = government taxation less transfer payments,  $M$  = nominal money supply,  $P$  = general price level,  $L$  = demand for money,  $i$  = domestic interest rates,  $BP$  = balance of payments,  $CA$  = current account,  $K$  = net capital inflow,  $i_f$  = foreign interest rates. All variables are measured in real terms unless specified (i.e. it is a fixed price model). The  $_0$  subscript denotes an exogenous variable and  $b, c, k, h, t, x, z, w, v, f$  are fixed valued parameters.<sup>4</sup>

The equilibrium conditions implied by these functional relationships can then be summarised in terms of the IS/LM/BP functions corresponding to those used in the Treasury explanations;

IS:  $Y = \alpha (A_0 - bi)$ , where  $\alpha = 1/(1-c+ct+z)$  (multiplier) and  $A_0$  is autonomous spending ( $C_0 + I_0 + G_0 - cT_0 + X_0 - Z_0 - vR$ ).

LM:  $i = 1/h (L_0 + kY - M_0/P_0)$

BP:  $i = i_f + 1/f [zY - (X_0 - Z_0) + vR - K_0]$ .

Consider now the effects of expansionary fiscal policy (represented by an increase in  $G_0$ ) on equilibrium values in this type of model. Assume initially a 'closed' economy:

$$\uparrow G_0 \Rightarrow \uparrow Y (= \Delta G_0 / (1-c+ct+z))$$

$$\uparrow Y \rightarrow \uparrow L (= k\Delta Y) \rightarrow \uparrow i \text{ (to ensure } L = M_0/P_0)$$

$$\uparrow i \rightarrow \downarrow I (= b\Delta i) \rightarrow \downarrow Y$$

The increased government expenditure, 'financed' by an open market sale of government securities to the non-bank public, leads to an increase in equilibrium output via the 'multiplier effect'. However, the increase in equilibrium output is partially offset by the dampening effect on output arising from higher interest rates. The extent to which 'crowding out' occurs depends on the income and interest rate sensitivities of the demand for real money balances ( $k$  and  $h$  respectively), and importantly, it occurs because higher interest rates are required to restore equilibrium between the increased demand for money ( $L$ ) and constant supply of money ( $M_0/P_0$ ).

It is easy to demonstrate that in an open economy setting, the 'crowding-out' of fiscal policy is more pronounced. Given the existence of highly mobile international capital flows (reflected in the value of the parameter  $f$ ), the higher domestic interest rates flowing from the expansionary fiscal policy are assumed to have the following effects:

$$\uparrow i \rightarrow \uparrow (i - i_f) \rightarrow \uparrow K (= f\Delta i)$$

The increased net capital inflow is assumed to lead to an increase in demand for domestic currency, leading to an *appreciation* of the real exchange rate ( $-R$ ). The textbook analysis further assumes that the exchange rate appreciation leads to a reduction in net exports (i.e.  $v < 0$ ), and subsequently, a deterioration of the current account balance. This dimension of the 'crowding-out' of fiscal policy can therefore be summarised as follows:

$$\uparrow i \rightarrow \uparrow (i - i_f) \rightarrow \uparrow K \rightarrow \uparrow R \rightarrow \downarrow (X - Z) \rightarrow \downarrow Y$$

The higher domestic interest rates attract capital inflow, leading to an exchange rate driven reduction in net exports, reducing equilibrium real output in the domestic economy. In the extreme case of perfect capital mobility, the process would continue until interest differentials ( $i - i_f$ ) are eliminated, which will occur where the equilibrium value of output (and demand for money) and interest rates return to their original values. In this context, often depicted diagrammatically in the textbooks, fiscal policy has no 'real' effects on the economy, being completely 'crowded out'.<sup>5</sup> In a more general sense, the effectiveness of fiscal policy is determined by the magnitudes of key elasticities, as captured by the values of parameters in the equations listed above, such as  $c$ ,  $b$ ,  $k$ ,  $h$ ,  $f$  and  $v$ . A more thorough investigation would also require a consideration of the stability of the relationships defined above, as determined by the behaviour of autonomous variables such as  $I_0$ ,  $L_0$  and  $K_0$  in particular.

It is of interest to compare the textbook model conclusions on the relative effectiveness of fiscal and monetary policy under the assumptions outlined above. In the textbook exposition, monetary policy is represented as being implemented via changes in the monetary aggregate ( $M_0$ ). The effects of expansionary monetary policy on equilibrium values of real output and interest rates can be summarised as follows:

$$\uparrow M_0 \rightarrow \downarrow i \rightarrow \uparrow Y$$

$$\downarrow i \rightarrow \downarrow (i - i_f) \rightarrow \downarrow R \rightarrow \uparrow (X - Z) \rightarrow \uparrow Y$$

In this case, the expansionary monetary policy has the effect of reducing equilibrium domestic interest rates (so as to assure  $L = M_0/P_0$ ), assumed to lead to an exchange rate depreciation and improved net exports and equilibrium real output. Clearly, the open economy repercussions reinforce the real effects of monetary policy, leading to the well known conclusion that, in terms of its effect on real output, monetary policy is more effective than fiscal policy in the setting of flexible exchange rates and a high degree of international capital mobility.

The traditional textbook conclusions regarding fiscal policy can therefore be summarised as follows. Expansionary fiscal policy is likely to be associated with higher domestic interest rates, an appreciating exchange rate and deteriorating current account balance. In the context of flexible exchange rates and a high degree of international capital mobility, fiscal policy is relatively impotent in terms of its real effects, with monetary policy the preferred alternative.<sup>6</sup>



### 3. Fiscal policy with endogenous money and interest rate targeting

The conclusions detailed above are fundamentally contingent on the assumption of an exogenously determined monetary aggregate. By increasing the demand for a *given* stock of money, expansionary fiscal policy inevitably gave rise to higher equilibrium domestic interest rates. The same argument underpins the derivation of the LM curve referred to above. However, the assumption of an exogenously determined monetary aggregate, controllable by the central bank, is an assumption that cannot be defended.

The textbook representation of the money supply process is almost always introduced in the context of the so-called deposit multiplier model, linking monetary aggregates with the money base (or stock of 'high powered' money). This *definitional* relationship can be summarised as follows:

$$\Delta M = mm \Delta B$$

where M is the nominated monetary aggregate, mm is the 'credit creation' multiplier and B is the monetary base (or 'high powered money').<sup>7</sup> Central banks are depicted as engineering changes in the monetary aggregate by varying the monetary base, a process facilitated by a constant or predictable credit creation multiplier (mm).

The textbook exposition rarely acknowledges that the money supply-monetary base identity can equally be used to describe an endogenous money supply determination process, where the demand for bank borrowing, and not central bank changes in the monetary base, is the prime determinant of changes in monetary aggregates.<sup>8</sup> The absence of central bank control of the monetary aggregate could potentially arise for a number of reasons. Firstly, the monetary base may not be controllable by the monetary authority, although controllability of the monetary base in a flexible exchange rate regime may not be a major point of contention. More significantly, the multiplier (mm) itself may not be constant or predictable, but may instead reflect the decisions made by borrowers and lenders as they react to perceptions of changing economic circumstances.

Following from this scenario, the monetary authorities may not perceive monetary policy in terms of discretionary changes in the monetary base, as such changes would not have a predictable effect on the monetary aggregate being targeted. Rather than targeting monetary aggregates, the central bank may instead target interest rates. In a deregulated financial system where central banks are not able to directly control retail lending rates, central banks instead target a very short-term rate of interest that



determines the cost of liquidity for the banking sector. A targeted discount or cash rate is defended in what could be termed the 'inter-bank cash market' through market operations (involving government securities and/or associated derivatives such as repurchase agreements or currency swaps) between the central and the private sector banks. These transactions directly affect the cash reserves, or settlement accounts, of the market participants, and subsequently the prevailing cash rate. Movements in the cash rate in turn promote changes in other 'wholesale' short-term interest rates, which consequently impact on retail rates, sometimes with significant time lags. The cash rate therefore acts as the benchmark rate in a financial system where a spectrum of retail rates are observed, reflecting differences in perceived risk & liquidity and, in the case of long-term rates, partly incorporating market expectations about future real interest rate movements.<sup>9</sup> The eventual effects on monetary aggregates of this process are indeterminate, and of no consequence to the monetary authorities in the context of the implementation of monetary policy.

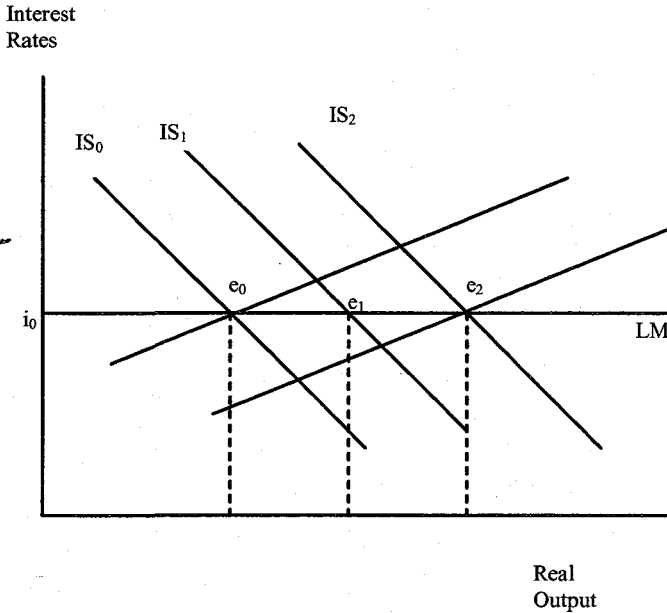
Under these circumstances, the money supply is more correctly defined to be an endogenous variable, with the rate of interest no longer simply a market determined variable that passively equates money demand with a given stock of money. As the following statement from the Reserve Bank of Australia [RBA] clearly indicates, the endogenous interpretation of money formation, accompanied by interest rate targeting, provides a much more accurate account than is to be found in the traditional textbook model:

The Reserve Bank has no prescribed target for the level of settlement balances [Cash], supplying whatever amount is needed to keep the cash rate near the target (RBA 2003: 4).

By extending an approach adopted by Aspromourgos (1999), it is possible to reconstruct the textbook IS/LM/BP model to reflect an endogenously determined money supply in which the monetary authorities target the short-term ('inter-bank') cash rate. The only change that has to be made to the model outlined in the previous section is the deletion of the exogenous money supply assumption  $M = M_0$ , adding in its place the principle that the money supply reacts passively to changes in money demand at a given set of market interest rates (captured by the target cash rate). Given that the Reserve Bank manipulates the monetary base to ensure that sufficient liquidity exists to defend the target rate, changes in money demand (driven, for example by changes in the equilibrium level of real output) will not lead to changes in 'equilibrium' interest rates. In this setting, the LM function will be perfectly elastic with respect to interest rates, and

the curve will be horizontal.<sup>10</sup> The textbook IS/LM/BP model shown in Figure 1 now takes on the following form:

**Figure 2. Fiscal Policy with Endogenous Money Supply**



In the above diagram, expansionary fiscal policy causes the IS curve to shift to the right (from  $IS_0$  to  $IS_1$ ). However, on this occasion the Reserve Bank defends the target cash rate ( $i_0$ ) through operations in the 'inter-bank cash market'. To restore balance of payments equilibrium at unchanged interest rates, the exchange rate must depreciate ( $\downarrow R$ ), which, according to the traditional textbook assumptions, would lead to an improvement in net exports. This in turn would lead to subsequent rightward shifts in the IS curve accompanied by downward shifts in the BP curve reflecting exchange rate depreciations. In Figure 2, equilibrium in all markets would be achieved at a position such as  $Y_2$ .

Quite clearly, in the context of endogenous money and interest rate targeting, fiscal policy can no longer be presumed to be relatively ineffective, despite the existence of flexible exchange rates and a high degree of international capital mobility. Expansionary fiscal policy does not lead to higher interest rates unless the interest rate target itself is increased as

part of a discretionary monetary policy action. There is no reason why the exchange should appreciate, and there is no reason why the current account should deteriorate given the predicted exchange rate depreciation and the usual textbook assumptions about exchange rate adjustments (i.e.  $v > 0$  in the model outlined above).

If the IS/LM/BP framework is to be used to derive conclusions relating to the implementation and effectiveness of macroeconomic policy, then the models have to be redrafted to capture the realities of money and interest rate determination.<sup>11</sup> Discussion in this section has indicated that the required redraft is surprisingly straightforward. However the resultant amendments to policy implications are significant, particularly with respect to the operation of fiscal policy.

#### **4. Fiscal Policy and the 'New Neo-Classical Synthesis' Model**

Recently, there have been calls within 'mainstream economics' for changes to be made to the macroeconomic models presented to students in 'principles' courses. Fundamentally, the 'monetary' equilibrium conditions that generate the 'LM' component of the standard equilibrium models are, somewhat belatedly, recognised as being inconsistent with 'the modern economy'. In place of the IS/LM/BP framework, a new set of equilibrium models has been formulated, by John B. Taylor (1999, 2000) and David Romer (2000) for example, that are meant to confront the realities of interest rate targeting monetary policy and, at the same time, capture a 'consensus' said to have emerged within 'mainstream' macroeconomics during recent times. It is conceivable that these models may form the basis of macroeconomic principles courses in the not too distant future, so an evaluation of the role accorded to fiscal policy in what could be termed the 'New Neoclassical Synthesis' [NNS] models, appears warranted.<sup>12</sup>

The 'consensus' that Taylor (2000: 90) believes 'modern macroeconomics' is founded on is worth noting. The 'long run real growth trend' or 'potential GDP' can be 'understood' using the Solow type growth model 'extended to make "technology" explicitly endogenous'. There is no 'long-run trade off' between inflation and unemployment, implying that monetary policy is neutral in the 'long-run'.<sup>13</sup> However, in the 'short-run', due largely to price and wage 'stickiness', an inflation-unemployment trade-off is likely to be present and money is non-neutral. Expectations regarding inflation and future policy decisions are endogenous, and 'quantitatively significant'. The final area of consensus related to monetary policy decisions:

monetary-policy decisions are best seen as rules, or reaction functions, in which the short-term nominal interest rate (the instrument of policy) is adjusted in reaction to economic events (Taylor 2000: 90)

The role and effectiveness of fiscal policy in the above description of the NNS macroeconomics is not obvious (at least, not in the 'short-run'). Therefore, further investigation of the model is required, with discussion focused initially on the 'short-run' properties of the model, as is the case with the traditional textbook model. Some observations on the 'long-run' policy implications will be discussed briefly later.

As outlined by Taylor (2000), a simple generic NNS model, suitable for textbook exposition purposes, can be formulated from the following three key relationships:

$$y = -ar + u \quad \text{['IS' relationship]}$$

$$r = b\pi + v \quad \text{[monetary policy reaction function]}$$

$$\pi = \pi_{-1} + cy_{-1} + w \quad \text{[Phillips Curve relationship]}$$

where  $y$  is real GDP *measured relative to potential GDP* 'that comes from the Solow growth model',  $r$  is the real interest rate,  $u$  is 'a shift term' capturing demand shocks,  $p$  is the inflation rate,  $v$  and  $w$  are undefined shift variables.

The first two equations can then be combined to form the 'aggregate demand' [AD] function:  $y = -ab\pi - av + u$

The first equation is analogous to the 'IS' curve relationship found in the traditional textbook models, suggesting an inverse relationship between aggregate demand and interest rates, for given levels of autonomous and induced spending. The second equation represents the monetary policy rule, somewhat analogous to the much heralded but ill-fated Friedman type monetary growth rule. In the NNS approach however, it is now nominal interest rates that are targeted, so as to increase (reduce) real interest rates as inflation rises (falls). The inclusion of the monetary rule endogenises interest rates, and the money supply is not a component of this rule. The third equation above is described as 'a standard expectations augmented Phillips curve' such that the inflation rate rises with a lag whenever real GDP rises above 'potential GDP' (i.e.  $y > 0$ ). Presumably, the textbook writers would suggest that this equation could be modified to incorporate some of the more exotic expectations – generating functions that have surfaced over recent decades.

Within this model, discretionary fiscal policy is simply classified as a 'demand shock', and as such would directly affect real GDP in the 'short-run' though its effect on the 'shift' variable ( $u$ ) in the first of the three equations listed above. Most significantly, the model implies that, in the absence of discretionary changes in monetary policy (beyond those defined in the monetary policy reaction function), interest rates and the general price level will not increase as a consequence of expansionary fiscal policy, provided real GDP is below the predetermined level of potential real GDP (i.e.  $y < 0$ ). In other words, as long as the economy is operating below the supply determined level of full capacity output, fiscal policy can impact on real GDP without any direct effects on interest rates or the rate of inflation. Therefore, the traditional textbook conclusions relating to the 'crowding-out' of fiscal policy are not to be found in the NNS model, at least not in the 'short-run'.

Unlike fiscal policy, the NNS model outlined above does suggest that the effectiveness of monetary policy may be constrained by a 'crowding-out' scenario. For monetary policy to be effective in achieving its goal of price stability, as represented in the policy reaction function, higher real interest rates must be able to impact directly on aggregate demand so as to move the economy towards the level of real output consistent with the inflation target (the level of which is not obvious in Taylor's exposition of the NNS model). However, in terms of the algebraic version of the model outlined above, the capacity of interest rates to impact on demand depends upon the value of the 'a' coefficient in the equations presented above, along with the stability of this relationship as dictated by the predictability or otherwise of the 'shift variable' ( $u$ ). In other words, the monetary policy transmission depends upon the strength and predictability of the relationship between investment (and other?) expenditure and real interest rates. No such qualification is placed on the effectiveness of fiscal policy, provided that real output does not exceed full capacity output, and there is nothing in the model to suggest that this would not be the normal state of affairs in the 'short-run'.

Two obvious questions emerge from the discussion of Taylor's exposition of the NNS model. Firstly, why is it that the rate of inflation is the policy target included in the policy reaction function? Secondly, why is (interest rate targeting) monetary policy preferred to fiscal policy as the (short run) macroeconomic policy instrument? Taylor's (1990: 92) justification for the reaction function is worth noting:

Central banks must decide how much to raise interest rates in response to inflation, taking the likely impact on unemployment or

real GDP into account as well. In policy research other terms such as real GDP are generally included in the policy rule, but at the Principles level it is much easier to keep the reaction to one variable.

However, this is a rather unnecessary and unwarranted ‘simplification’. The inclusion of ‘other terms such as real GDP’ scarcely complicates the analysis, and, as the reaction function stands, it would advocate to ‘principles students’ that the primary macroeconomic responsibility of the central bank in the ‘modern economy’ is to control inflation, as opposed to targeting real output and employment. The textbook writer could avoid such a presumption by simply redefining the reaction function to read something like the following:<sup>14</sup>

$$r = b\pi + dy + v$$

In this form, the textbook model would then resemble more closely the interest rate determination equations found in the NNS model literature, and in particular would correspond with the so-called ‘Taylor rule’, which can be represented as follows:

$$r = b(\pi - \pi^T) + d(u - u^N) + r^N$$

where  $(\pi - \pi^T)$  represents the extent to which inflation departs from its target,  $(u - u^N)$  captures divergences between realised and ‘optimal’ capacity utilisation ( $u$ ), and  $r^N$  is defined as ‘the implicit real interest rate’ (presumably representing a natural real rate of interest, in ‘Wicksellian’ terms).<sup>15</sup>

Irrespective of the version of the Taylor rule used, the central bank’s reaction function would now explicitly acknowledge the need to balance often-conflicting macroeconomic policy choices, at least in the ‘short-run’ context.

In relation to the choice of macroeconomic policy instruments, there is nothing in the model that would counter the inference that variations in the structural fiscal budget balance would have a much more direct and powerful effect on the policy targets than its monetary policy alternative. Therefore, there would be some justification for representing the macroeconomic policy reaction function as follows:

$$BB^* = b\pi + dy + v$$

where  $BB^*$  represents the structural fiscal budget balance.

It could be argued that an obvious advantage of monetary policy is that it may be considered more flexible, in the sense that adjustments to nominal interest rates are easier to implement than changes in fiscal budgets. This would then suggest that monetary policy should be used as an accommodating macroeconomic policy instrument, used to ‘fine-tune’ the macro economy along the pathway defined by the stance of fiscal policy.



It has been argued therefore that there is nothing in the NNS model that would challenge the inference that fiscal policy should be the preferred instrument when macroeconomic variables are being targeted. However according to the NNS approach, in the 'long-run', both fiscal and monetary policy are neutral in the sense that they cannot influence equilibrium values of any real variables in the economy:

There is no long run trade-off between inflation and unemployment, so that monetary policy affects inflation but is otherwise neutral with respect to real variables in the long run (Taylor 2000: 90)

Again, the absence of any reference to fiscal policy is noteworthy, however its long-run impotency arises for the same reasons as monetary policy. The long-period equilibrium is presumably the position an economy would gravitate towards after the economy had fully adjusted to a change in one of the demand or supply variables included in the model. In terms of the algebraic representation of the model presented above, it is clear from the aggregate demand [AD] and 'Phillips Curve' relationships that real GDP will continue to change, driven by movements in the inflation rate, until it reaches its supply determined full capacity level. In a comparative static sense, the adjustment to long period equilibrium cannot be determined from the generic model presented above, as the nature of the 'lagged' adjustment is not specified. Clearly, in the context of the NNS model, the 'speed of adjustment' depends upon the way in which expectations are formed.

However, it is not only the possibility of incomplete adjustment of inflationary expectations that allows for the existence of a short-run trade-off between the level of unused resources and the rate of inflation:

There is a short run trade-off between inflation and unemployment with significant implications for economic fluctuations around the trend of potential GDP; the trade-off is due largely to *temporarily sticky prices and wages* (Taylor 2000: 90, emphasis added)

The existence of 'sticky prices and wages', presumably explains the inability of price adjustments to clear markets in the 'short-run', and it is the absence of these impedients that enables the economy to proceed to its predetermined 'long-run' equilibrium position. The critical issue therefore is the reason for the failure of price adjustments to occur, an issue that clearly drives a wedge between competing schools of thought in economic theory. The 'neoclassical' component of the NNS synthesis would suggest that these impedients are due to purely transitory imperfections in the



availability and interpretation of information. However the 'Keynesian' partners to the synthesis may provide different explanations. Adopting the so-called 'New Keynesian' perspective, it could be argued, for example, that the existence of price and wage (and nominal interest rate) 'stickiness' is consistent with 'rational' maximising behaviour under conditions of risk.<sup>16</sup> Under those circumstances, why would 'price stickiness' dissipate through the passage of time, and why would inflationary expectations be based on the presumption that these impediments would not remain as characteristics of the 'modern economy'? Other Keynesians, such as the Post Keynesian school, would argue that the smooth journey through logical time from the 'short' to 'long' run becomes even more problematical if decision making under uncertainty is contemplated, where expectations becomes subjective in nature (as Keynes had emphasised)<sup>17</sup> and the realisation of equilibrium configurations of economic variables through time is relegated to the realm of the mythical 'golden age'.<sup>18</sup> So clearly, the reasons for the failure of (various) price adjustments to operate in the 'short-run' needs to be established before a meaningful discussion of the distinction between 'short' and 'long' run properties of an economic system can proceed.<sup>19</sup>

Finally, it should be noted that the authors of the NNS synthesis claim to abide by the Solow-type growth theory framework (to describe the derived supply determine long-run equilibrium conditions), subject to a very significant 'extension'. This extension allows 'technology' to be 'explicitly endogenous' (Taylor 2000: 90), and presumably is meant to reflect a common thread found in the rather voluminous 'New Growth Theory' literature. However, there is nothing in Taylor's exposition of the NNS model that explicitly endogenises 'technology'. This is an important issue, as it is highly unlikely that plausible explanations of endogenous technology can be formulated independently from the 'short-run' demand variables contained in the NNS model. This would challenge the existence of the notion of a supply determined long-run that is somehow divorced from 'short-run' fluctuations in the level and composition of real output.

The central conclusion of this section therefore is that there is very little in the NNS approach, as presented by writers such as Taylor and Romer, which would challenge the proposition that fiscal policy represents a powerful instrument through which governments can influence macroeconomic outcomes. The 'long-run' neutrality of fiscal (and other) policy is a conclusion that becomes somewhat ambiguous when alternative explanations of 'price stickiness' are considered, and when the complications arising from the admission of endogenous technology are contemplated.

## 5. Fiscal Policy 'Reconsidered'

Not only does the traditional IS/LM/BP based textbook analysis conclude that fiscal policy is relatively ineffective in an open economy with flexible exchange rates; it also argues that its implementation is subject to a 'budget constraint'. This constraint may be summarised as follows:

$$(G - T) + iD_g = \Delta D_g + \Delta B$$

where  $D_g$  represent the stock of (interest bearing) government debt held by the private sector. Government spending is therefore depicted as being constrained by the government's revenue base ( $T$ ) and the willingness of the private sector to purchase government securities ( $D_g$ ). The option of the government 'monetising' deficit spending by 'selling' securities to the central bank is also noted; a financing option usually categorized as 'printing money' in the exogenous money context (presumably because the net result is an increase in the monetary base).

However, again, the traditional textbook account of the so-called 'budget constraint' sheds little light on government finance in a world in which governments spend by crediting the private sector bank's settlement accounts (reserves) held at the central bank. Rather, an argument is outlined in this section that is consistent with the following conclusion succinctly stated by Mitchell and Mosler (2002: 257):

... the orthodox treatment of the accounting relation termed the government budget constraint as an *ex ante* financial constraint is in error. We show that government spending is only constrained by what real goods and services are offered in return for it. There is no financing requirement. Debt issuance is seen as part of a reserve maintenance operation by the RBA consistent with their monetary policy cash rate targets.<sup>20</sup>

The logic behind this conclusion is not difficult to accept provided textbook-generated preconceptions of an exogenously determined money supply can be cast aside. Consider an increase in government spending not financed through tax revenue or by the 'open market' sale of government securities to the private sector. The financial implications of this fiscal policy action in a world of endogenous money with interest rate targeting are relatively straightforward. The immediate effect of the government spending is to add to the settlement accounts ('cash reserves') of the private sector banks in which the government cheques are deposited. This in turn increases (net) liquidity in the inter-bank cash market, assuming that the central bank did not implement offsetting market operations (buying

and selling its own or government short-term securities, or associated derivatives such as re-purchase agreements). Under these circumstances the actual cash rate would tend to *decrease*. This in turn would lead to *downward* pressures on retail interest rates, a conclusion that would appear rather inconceivable to the readers of the standard textbook analysis outlined in Section 2 above. However, it is not a conclusion that the Reserve Bank of Australia [RBA] finds difficult to accept:

In a world where the Reserve Bank was undertaking no open market operations, the amount of cash that underpins the [Cash] market (exchange settlement funds, or what the academics call 'high powered money') would depend on the Government's fiscal balance, and it is not hard to see that this would be likely to result in monetary instability. Any government deficits not financed by an exactly coincident issue of debt to the public... would mean a rise in cash and a fall in interest rates. Similarly, a surplus not exactly matched by debt retirement would lead to shrinkage of the amount of cash and an escalation of interest rates (RBA 2001: 15-16).

Alternatively, as was the case outlined in Section Three above, the central bank could choose to defend the target cash rate in line with its pre-determined monetary policy stance. The central bank would have to *reduce* liquidity in the inter-bank cash market by 'issuing' securities to the private sector banks (i.e. debiting their settlement accounts and adding short term securities to their portfolios). It needs to be emphasised that these market operations would offset the tendency for the actual cash rate to *fall below the target rate*, an outcome that would have put *downward pressure* on market interest rates. The eventual outcome on broad monetary aggregates of this process is dependent entirely on how potential lenders and borrowers react to the policy changes. It should also be noted that the central bank operations being outlined relate to transaction with participants in the inter-bank cash market, and differ substantially in both their nature and outcomes to the open market purchase and sale of government securities involving the non-bank public.

It can be seen therefore that the 'monetary' implications arising from government deficit spending resolves around central bank transaction in the 'official' short term cash market associated with the achievement and maintenance of a target cash rate. If successful, these operations would 'sterilise' the effects on retail lending rates arising from changes in government spending; in this case to offset the tendency for *downward* pressure on short-term rates following an increase in government

expenditure. As has been emphasised, the increased government spending needs to be offset by the sale of government of central bank securities to participants in the market where the cash rate is being determined. The suggestion that these participants may decline to take up the central bank security issue would seem implausible, given the existence of cash ('reserves') in the form of required settlement accounts and the institutions' preference for interest earning risk free government securities over non income generating cash reserves. Budget deficits do not compromise the operation of monetary policy, provided that agreement exists between governments and their 'independent' monetary authority partners on the appropriate *stance* of macroeconomic policy. In the event that retail market interest rates were to increase independently from cash rates, perhaps as a result of 'negative' perceptions of government deficit spending, central banks could simply withdraw from operations in the inter-bank cash market (aimed at offsetting the tendency for the cash rate to *fall*).

So it can be seen therefore that the ability of governments to finance the provision of goods and services is not 'constrained' by the capacity to obtain revenue from the private sector, or the willingness of the non-bank public to hold government debt instruments. Balanced budgets do not represent 'sound budget management' and the acclaim accorded to government's achieving budget surpluses arises from a fundamental misunderstanding of the fiscal policy environment.

It should be emphasised however that the fiscal policy financing issue is distinct from debate over the appropriate stance of fiscal policy. The absence of the financial constraints imposed by textbook renditions does not imply that fiscal budget deficits are necessarily a component of the optimal macroeconomic policy package. The point is that the option of expansionary fiscal policy is not to be discarded on the grounds of 'financial constraints'. Similarly, the argument that fiscal policy is not necessarily rendered ineffective because of the various consequences claimed to occur because of higher short-term interest rates does not imply that fiscal policy will necessarily achieve the targeting macroeconomic outcome.

It has to be emphasised the while short term interest rates are the targets of monetary policy, it is the longer term rates that impact most directly on private sector spending decisions. If budget deficits widened the spread between short and longer-term rates, perhaps as a result of inflationary expectations (correctly formulated or otherwise), then the possibility of crowding out may need to be further considered. However, as John Nevile's (2000: 160-1) careful examination of the empirical studies suggests, there is little evidence of a relationship between budget deficits and interest rates in this context.

It is important also to recall that, within the 'modified' textbook model outlined in Section 3, the effectiveness of both fiscal and monetary policies was dependent to a significant degree on the assumed exchange rate adjustments, and subsequent trade and international capital flow responses. Conclusions derived from empirical studies suggest that, at least in the Australian context, the textbook assumptions are overly simplistic and require significant qualification in the theoretical models.<sup>21</sup> The effectiveness of fiscal policy is also questioned in much of the recent macroeconomic theorising associated with what could be termed the 'Lucasian revolution', where many of the economic relationships discussed in this paper tend to become submerged in the rather murky world founded on 'rigorous' inter-temporal optimising micro-foundations allied with rational expectations.<sup>22</sup> However, these pessimistic deductions are themselves often associated with depictions of fiscal and monetary policy implementation than are not dissimilar in substance to those found in the traditional textbook models.

Finally, caution needs to be exercised in evaluating the appropriateness and effectiveness of alternative policy strategies in the context of theorising based on equilibrium models. As John Hicks (1983: 61-62), the original architect of the IS/LM model subsequently cautioned, 'When one turns to questions of policy, the use of equilibrium models is still more suspect'.

## **Conclusion**

Traditional textbook accounts of the implementation and transmission of fiscal policy present misleading conclusions that have clouded debate on key policy alternatives. In a world where the money supply is determined largely endogenously, and in which monetary authorities target interest rates rather than monetary aggregates, the standard textbook conclusions relating to the relative ineffectiveness of fiscal policy in an open economy are misleading. A careful interpretation of the emerging NNS model, a suggested alternative textbook model, does not seriously challenge this conclusion. Similarly, the conclusion that budget deficits and higher interest rates are synonymous, a claim so often to be found in budget speeches that exhort the achievement of balancing fiscal budgets, is flawed. The notion that government spending is bounded by its capacity to collect revenue or borrow from the private sector must likewise be challenged. These widely held contentions are not based on the firm economic foundations that commentators and policy makers assert.

## Notes

- 1 Some more astute readers may, however, note that the assumption of perfect capital mobility, and the associated horizontal BP curve, do provide the opportunity to somewhat overstate the more general textbook conclusions.
- 2 Variants of the standard textbook model can be found in the widely used editions of Blanchard (2003), Dornbusch, Fisher and Startz (2001), Mankiw (2000) and Salvatore (2001). The original Mundell-Fleming contributions are to be found in Mundell (1963) and Fleming (1962). For further discussion of the models see Kenin (1985) and Frankel and Razin (1987), while its role in shaping macroeconomic thought is discussed by Laidler (1999) and by various contributors to Young and Zilberfarb (2000). An excellent critical account of the usage of the IS/LM model is developed by Kriesler and Nevile (2002).
- 3 Note the absence of net income (and transfers) paid overseas from this expression. This reflects the inappropriate omission (particularly so in the Australian context) of the term in most textbook models.
- 4 The  $L_0$  and  $K_0$  constants are normally absent from the mathematical formulations of the model, however autonomous changes in liquidity preference and in international capital flows often play a role in the subsequent diagrammatic representations of the standard model.
- 5 This conclusion corresponds to the 'twin deficits' proposition, more commonly derived rather naively from national income and saving identities.
- 6 The IS/LM/BP would normally be classified as a fixed-price 'short-run' model; a brief discussion of the nature of the most often found 'long-run' macroeconomic analysis is provided in Section 4 below.
- 7 The 'credit creation' (or deposit) multiplier ( $mm$ ) is normally shown as being equal to  $(1 + cu) / (cu + rr)$ ; where  $cu$  = public's currency/deposits ratio;  $rr$  = financial institutions' reserves/deposit ratio (with the chosen monetary aggregate defining deposits).
- 8 Chick (2004) presents an interesting account of how the interpretation of the deposit multiplier model has changed through time with changing perceptions as to the exogenous versus endogenous nature of money formation.
- 9 The relationship between official short term and retail rates is an important question that requires more attention. Biefang, Mariscal and Howells (2002) provide a recent study of these relationships in the UK context. In particular, it is possible that an increase in the spread between short term market rates and longer term rates (of more significance to investment decisions) may occur.
- 10 It is possible to argue that, even in the context of endogenous money, increased demand for money may lead to higher average market lending rates at an unchanged (target) cash rate. For example, higher lending volumes may be associated with higher default risk and/or may require higher rates to induce the associated portfolio adjustments accompanying increased lending. This would be consistent with Palley's (2002) conclusions that endogenous money 'flattens the LM curve' (without making the curve horizontal). Chick and Dow (2002) provide a detailed restatement of what could be termed the liquidity preference perspective on endogenous money. This argument could perhaps be qualified in a manner similar to



- the 'credit rationing' type arguments, stemming initially from the work of Stiglitz and Weiss (1981) that suggest higher lending rates may not be optimal responses to increased demand for funds. Piegay (2000) provides an interesting summary of the various representations of endogenous money, traditionally associated with the 'Post Keynesian' approach, together with the credit rationing type arguments generally associated with 'New Keynesian' theorising.
- 11 The notion of endogenous money supply determination is now noted in some introductory texts such as Sloman and Norris (1999: 442-4) (under the heading 'The creation of credit: The Real World'), while other intermediate texts such as Rogers and Neal (1994: ch 6) provide a framework in which interest rate targeting monetary policy may usefully be discussed. However, these 'modifications' are not to be found in the more traditional IS/LM/BP analysis of fiscal policy that follows in these texts.
  - 12 More formal representations and critiques of the NNS model can be found in Arestis and Sawyer (2003) and Kriesler and Lavoie in this symposium.
  - 13 The absence of a long-run trade-off is often described in the textbook model, however the 'empirical evidence' in support of the proposition is not as clear-cut as is generally implied. See for example Gruen et al's (1999) detailed empirical analysis of the Phillips Curve relationships in the Australian context, where the notion of a NAIRU that is independent from 'short-run' movements in unemployment, is called into question. Galbraith (1997) presents a very useful critical account of the theoretical and empirical foundations of the NAIRU concept.
  - 14 The associated AD function would become:  $y = (-ab\pi - av + u) / (1 + ad)$ , recalling that 'y' is real GDP measured relative to potential GDP.
  - 15 See Taylor (1999), and Kriesler and Lavoie in this symposium, for a commentary on other possible variations of the 'Taylor rule' type approach.
  - 16 The 'New Keynesian' position is discussed in Mankiw (1993), and the Mankiw and Romer (1991) volumes provide a collection of the various theories that come to form the 'microeconomic foundations' of this version of Keynesian Economics.
  - 17 Keynes (1936: 162-3): 'We are merely reminding ourselves that human decisions affecting the future... cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist; and that it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim, or sentiment or chance'.
  - 18 A term coined by Joan Robinson (1956: 99): 'We may describe these conditions as a *golden age* (thus indicating that it represents a mythical state of affairs not likely to obtain in an actual economy).
  - 19 Romer (1996: 241-308) discusses further the 'microeconomic foundations' of incomplete nominal adjustment, with respect to the 'neoclassical' and 'New Keynesian' perspectives discussed in this paragraph
  - 20 A similar conclusion is argued by Bell and Wray (2003) in the context of the relationship between the Fed and Treasury in the US.
  - 21 Some of the relevant empirical issues are discussed in Bludell-Wignall et al (1993).



- 22 An excellent discussion of the 'Lucasian Revolution' can be found in Snowdon and Vane (1996) and in Goodhart's (2004) special address to the 2004 European History of Economic Thought annual conference.

## References

- Arestis, P. and Sawyer, M. (2003) 'Reinventing Fiscal Policy', *Journal of Post Keynesian Economics*, 26 (1): 3-25.
- Aspromourgos, T. (1999), 'Open-Economy IS-LM and Monetary Policy Conducted by Interest Rate Instrument', *Economic Papers*, 18 (1): 33-41.
- Australian Commonwealth Government (2004), Budget Statement 1: Fiscal Strategy and Budget Priorities. Canberra: AGPS.
- Australian Commonwealth Treasury (1996), *The Macroeconomics of the TRYM Model of the Australian Economy*. Modelling Section, Macroeconomic Analysis Branch, Commonwealth Treasury. Canberra: AGPS.
- Blanchard, O. (2003), *Macroeconomics*, New Jersey: Prentice-Hall.
- Blundell-Wignall, A., Fahrer, J., and Heath, A. (1993), 'Major Influences on the Australian Dollar Exchange Rate' in Blundell-Wignall, A. (ed) *The Exchange Rate, International Trade and the Balance of Payments*, Reserve Bank of Australia.
- Bell, S. & Wray, T. (2003), 'Fiscal Effects on Reserves and the Independence of the Fed', *Journal of Post Keynesian Economics*, 25 (2): 263-270.
- Biefang, I., Mariscal, F. & Howells (2002), 'Central Banks and Market Interest Rates', *Journal of Post Keynesian Economics*, 24 (4): 569-585.
- Chick, V. (2004), 'Lost And Found: Some History Of Endogenous Money', Paper presented at the Eighth Annual Conference of the European Society for the History of Economic Thought (ESHET), Venezia and Treviso 2004.
- Chick, V. & Dow, S. (2002), 'Monetary Policy with Endogenous Money and Liquidity Preference: A Nondualistic Treatment', *Journal of Post Keynesian Economics*, 24 (4): 587-606.
- Dornbusch, R., Fischer, S. & Startz, R. (2001), *Macroeconomics*. New York: McGraw-Hill (Eighth Edition).
- Fleming, M.J. (1962), 'Domestic Financial Policies Under Fixed and Under Floating Exchange Rates' *International Monetary Fund Staff Papers*, November 1962: 369-379.
- Frankel, J.A. & Razin, A. (1987), 'The Mundell-Fleming Model a Quarter Century Later', *International Monetary Fund Staff Papers*, December: 567-620.
- Galbraith J.K. (1997), 'Time to Ditch the NAIRU', *Journal of Economic Perspectives*, Vol.11, (1): 33-49.
- Goodhart, C.A.E. (2004), 'Monetary and Social Relationships', Paper presented at the Eighth Annual Conference of the European Society for the History of Economic Thought (ESHET), Venezia and Treviso 2004.
- Gruen, D., Pagan, A. & Thompson, C. (1999), 'The Phillips Curve in Australia', RBA Research Discussion Paper 1999-01: 1-29.
- Hicks, J. (1983), 'IS-LM: An Explanation', in Fitoussi, J.P.(ed), *Modern Macroeconomic Theory*, Oxford and New York: Basil Blackwell: 49-63.

- Kenen, P.B. (1985), 'Macroeconomic Theory and Policy: How the Closed Economy Was Opened', in Jones, R.W & Kenen, P.B. *Handbook of International Economics*, Vol. II, Amsterdam: North Holland: 625-677.
- Keynes, J.K. (1936), *The General Theory of Employment Interest and Money*, London: MacMillan.
- Kriesler, P. & Nevile, J.W. (2002), 'IS-LM in Macroeconomics after Keynes', in Arestis, P., Desai, M. & Dow, S. (eds), *Money, Macroeconomics and Keynes Essays in Honour of Victoria Chick, Volume 1*, London: Routledge: 103-114.
- Laidler, D. (1999), *Fabricating the Keynesian Revolution. Studies of the Inter-war Literature on Money, the Cycle, and Unemployment*, Cambridge: Cambridge University Press.
- Mankiw, N.G. (1993), 'The New Keynesian Synthesis', *Journal of Economic Perspectives*, 7 (1): 5-22.
- Mankiw, N.G. (2000), *Macroeconomics* (Second Edition), New York: Worth Publishers.
- Mankiw, N.G. & D. Romer (1991) *New Keynesian Economics*, vols. 1 & 2, Cambridge, Mass.: MIT Press
- Mitchell, W.F. and Mosler, W. (2002), 'Fiscal Policy and the Job Guarantee', *Australian Journal of Labour Economics*, 5 (2): 243-249.
- Mundell, R. (1963), 'Capital Mobility and Stabilization under Fixed and Flexible Exchange Rates', *Canadian Journal of Economics and Political Science*, 29: 475-485.
- Nevile, J.W. (2000), 'Can Keynesian Policies Stimulate Growth in Output and Employment?' in Bell, S. (ed.) *The Unemployment Crisis in Australia: Which Way Out?*, Cambridge University Press: 149-174.
- Palley, T.I. (2002), 'Endogenous Money: What it is and why it matters', *Metroeconomica*, 53 (2): 152-180.
- Piegay, P. (1999-2000), 'The New and Post Keynesian Analysis of Bank Behaviour: Consensus and disagreement', *Journal of Post Keynesian Economics*, 22 (2): 265-284.
- Reserve Bank of Australia [RBA] (2001), 'The Movement of Interest Rates', *Reserve Bank of Australia Bulletin*, October: 12-18.
- Reserve Bank of Australia [RBA] (2003), 'The Reserve Bank's Open Market Operations', *Reserve Bank of Australia Bulletin*, June: 1-7.
- Robinson, J. (1956), *The Accumulation of Capital*, London: MacMillan.
- Rogers, C. & Neal, P. (1994), *Macroeconomics and the Australian Economy*, Sydney: Prentice-Hall.
- Romer, D. (1996), *Advanced Macroeconomics*, New York: McGraw-Hill.
- Romer, D. (2000), 'Keynesian Macroeconomic without the LM curve', *Journal of Economic Perspectives*, 14 (2): 149-169.
- Salvatore, D. (2001), *International Economics*, New York: John Wiley.
- Sloman, J. & Norris, K. (2002), *Macroeconomics*, (Second Edition). Sydney: Pearson Education.
- Snowdon, B. & Vane, H. (1996), 'The Development of Modern Macroeconomics: Reflections in the Light of Johnson's Analysis After Twenty-Five years', *Journal of Macroeconomics*, 18:381-401.
- Stiglitz, J. & Weiss, A. (1981), 'Credit Rationing in Markets with Imperfect Information', *American Economic Review*, 71: 393-410.

- Taylor, J.B. (1999), 'Monetary Policy Guidelines for Employment and Inflation Stability', in Solow, R.M. & Taylor, J.B. (eds) *Inflation, Unemployment, and Monetary Policy*, Cambridge (Mass): Harvard University Press: 29-54.
- Taylor, J.B. (2000), 'Teaching Modern Macroeconomics at the Principles Level, *American Economic Review*, 90 (2): 90-94.
- Young, W. & Zilberfarb B.Z. (2000), *IS-LM and Modern Macroeconomics*, Boston Dordrecht, London: Kluwer Academic Publishers.