Varieties of Fiscal Stimulus: A Conflicting Claims Analysis

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Abstract

This paper explores the effects of fiscal policy in a conflicting claims economy where monetary policy follows a Taylor rule. Fiscal stimulus is decomposed into distinct varieties, depending on whether the initial effect is primarily on consumption or investment. Policy type proves important for the understanding of growth, unemployment, and the distribution of income.
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by Alan G. Isaac

Contents

1 Introduction

This paper develops a Post Keynesian model of the effects of fiscal policy on a growing economy. The theoretical model integrates the core Post Keynesian model of inflation (the conflicting-claims approach) with a specific characterization of endogenous monetary policy. The policy objective is to determine how varieties of fiscal policy affect growth, unemployment, and the distribution of income.

In conflicting-claims economies, inflation emerges when the target claims of workers and firms exceed total income. At the level of the firm, a shortfall of the current price of output from the target price leads to price increases. Thus, in contrast with the neoclassical tradition but in alignment with some of the New Keynesian literature, the conflicting-claims model emphasizes the price setting activities of firms. Price setting behavior, subject to costs of adjustment, emerges as one of the important determinants of the evolution of the economy.[1]

[1]Isaac (1991) shows that the conflicting claims characterizations of price adjustment is compatible with the characterization of inflation as the result of a gap between capitalists' desired and actual profit share, as introduced in Desai's (1973) first modification of the Goodwin (1967) growth cycle model. Also see Rowthorn (1977), Flaschel and Krüger (1984), Dutt (1987), and Lavoie (1992,pp.391–421). In many set-

While the price setting of individual firms is the the proximate source of aggregate inflation, a macroeconomic description must not neglect the behavior of the monetary authority. Post Keynesians pioneered the recognition that monetary policy responds endogenously to the economic environment, which substantially complicates the characterization of economic causality. Despite the general Post Keynesian emphasis on the fundamental importance of endogenous money, however, the bulk of the conflicting-claims literature avoids explicit consideration of the monetary aspects of macroeconomic adjustment. This paper adopts a popular, simple characterization of that endogeneity: a "Taylor rule". Taylor (1993) proposed that the federal funds rate should move with inflation and against the GDP gap. Monetary policy discussions often treat Taylor rules as a descriptively plausible and prescriptively appropriate characterization of monetary policy.

This paper contributes to the literature on the role of aggregate demand in a growing economy (Harrod 1939, Rose 1966, Marglin 1984) and to the conflicting-claims literature (Goodwin 1967, Rowthorn 1977). The paper models a growing, conflicting-claims economy with endogenous monetary policy. It then applies this model to the analysis of various fiscal policies.

The next section lays out the model. Post Keynesian influences on the are evident in the savings function and the conflicting claims formulation of price adjustment. Monetary considerations are introduce by means of a simple Taylor rule characterization of monetary policy. The subsequent two sections explore the implications of various forms of fiscal policy, and the final section concludes.

2 Growth with Unemployment

Let N^s be the available supply of labor hours. Technological progress augments to an effective labor supply of AN^s, where A indexes the level of technological progress. Let K be the aggregate capital stock, and define the relative factor supply n^s by

$$n^s = AN^s/K \tag{1}$$

2.1 Natural and Warranted Growth Rates

Let g_{AN} be the growth rate of effective labor supply and g_K be the rate capital accumulation. Then we can characterize the growth rate of n^s by

$$\hat{n}^s = g_{AN} - g_K \tag{2}$$

g_{AN} denotes the natural rate of growth (i.e., the growth rate of the effective labor supply), and g_K denotes the warranted rate of growth (i.e., the actual saving rate, which determines the rate of capital accumulation). So n^s rises or falls as the natural rate of growth is greater than or less than the warranted rate of growth. In a steady state, the warranted rate of growth equals the natural rate of growth: $g_K = g_{AN}$. Exogenous growth models, this paper

tings, a constant desired profit share implies a constant desired mark-up over unit costs (Weintraub 1959, Harris 1978, Naish 1990). Short run variability and long run constancy of the mark-up has found empirical support in studies on the stability of the wage share (Klein 1989).

included, generally treat the natural rate of growth as given. Attention then turns to the determinants of the warranted growth rate.

A common reference point for models of a growing economy is the basic Solow (1956) model, in which $g_K = \sigma(n^s)$.[2] The dynamics of the Solow model are therefore given by

$$\hat{n}^s = g_{AN} - \sigma(n^s) \tag{3}$$

Under the usual assumption that $\sigma(\cdot)$ is strictly increasing, a steady state in this Solow model is stable and unique.[3]

Models in the tradition of Keynes differ from those in the neoclassical tradition by specifically allowing that aggregate demand deficiencies can produce persistent involuntary unemployment. An economy experiences unemployment when the available supply of labor hours is greater than the amount of labor demanded, $N^s > N$, where N is the actual input of labor hours into the production process. In terms of effective-labor to capital ratio, we rewrite this as $n^s > n$, where

$$n = AN/K \tag{4}$$

We may interpret $n = AN/K$ as the labor intensity of production or as the rate of capacity utilization. In standard fashion, the output-capital ratio (y) is determined by the rate of capacity utilization:

$$y = y(n) \tag{5}$$

2.2 Goods Market Equilibrium

To economists in the Keynesian tradition, equation (3) looks strikingly odd for two related reasons: it links saving to potential rather than actual employment, and it ignores the need to explicitly link saving and investment. While the link between saving and potential income (and thereby to potential employment) is harmless given continuous full employment, it is noxious in the presence of persistent unemployment. Post Keynesian growth models therefore link saving to actual income and therefore actual employment.[4] We therefore replace the Solow saving function, determining saving by actual earnings rather than full-employment earnings. We also allow for an influence of income distribution on saving behavior: incorporating the standard Post Keynesian recognition of a lower saving rate among wage earners, saving is decreasing in labor's share of income, which for given n we index by the cost

[2]Depreciation is suppressed for presentational convenience.

[3]Note that we have chosen the state variable to be AN^s/K, not K/AN^s. For $g_{AN} > 0$, existence is assured if $\sigma : \Re_+ \to \Re_+$ is bijective (although much weaker conditions suffice). In the Solow model, $\sigma(n^s) = \bar{\sigma}y(n^s)$, where $\bar{\sigma}$ is the constant saving rate, $y = Y/K$ and Y is aggregate output as determined by the first degree homogeneous production function $Y = F(AN^s, K)$. Thus stability of the steady state is equivalent to a positive marginal product of labor ($y' > 0$), since $d\dot{n}/dn = -n\bar{\sigma}y'$ at a steady state.

[4]Rose (1966) offers an extensive discussion of this in his seminal paper on Keynesian growth models. He shows that setting $\sigma(n)$ offers a fairly general specification of saving behavior: for example, the saving specification of Kaldor (1966) can be transformed to this form in a Keynesian setting. In a setting with sales constraints, many Post Keynesians will nevertheless want to adopt a saving function of the form $\sigma(n, \omega)$, where $\omega = W/AP$ is the real wage per effective unit of labor (and therefore, given n, determines the wage share).

of labor, ω.[5] Finally, the tax rate (τ) and the national-income-share of government consumption expenditure (g^c) both influence aggregate saving. The resulting saving function is $\sigma(n, \omega, \tau, g^c)$, where $\sigma_n > 0$, $\sigma_\omega < 0$, $\sigma_\tau > 0$, and $\sigma_{g^c} < 0$. (The response $\sigma_\tau > 0$ embodies the assumption that private saving is reduced by less than the increase in public saving.) The evolution of the potential labor intensity of production is therefore determined as follows:

$$\hat{n}^s = g_{AN} - \sigma(n, \omega, \tau, g^c) \tag{6}$$

The core motivation for replacing (3) by (6) is that it allows for the possibility of unemployment: labor hired for production may be less than the aggregate supply of labor ($N < N^s$), and saving should respond to actual earnings rather than potential earnings. The evolution of the relative factor supply (i.e., the potential labor intensity of production) is determined by the actual level of saving, not the level of saving that would obtain at full employment. To give this a more traditional phrasing, we can say that at any given n, unemployment rises or falls as the natural rate exceeds or fall short of the warranted rate of growth.

Our next model ingredient is a traditional specification of goods market equilibrium. The Solow specification of capital accumulation as $g_K = \sigma(\cdot)$ suppresses any difficulties in equilibrating the desired accumulation of equity by households and the desired level of investment by firms.[6] In the tradition of Kalecki and Keynes, we include (7) as our explicit characterization goods market equilibrium.[7]

$$\kappa(i - \pi, g^i) = \sigma(n, \omega, \tau, g^c) \tag{7}$$

The function $\kappa()$ represents the desired rate of growth of the capital stock, where i is the nominal interest rate, π is the rate of inflation, and g^i the share of government investment

[5]Here $\omega = W/AP$, where W is the nominal wage and P is the price level. Rose (1966) calls W/A the wage unit, so we could call the ω the real wage unit, but we instead we will call it the cost of labor. The wage share is $WN/PY = \omega NA/Y = \omega n/y$. Ruling out increasing returns to scale, $n/y(n)$ is increasing in n, so the wage share is increasing in n and in ω.

[6]For example, dependence of desired investment on the profit rate r—so that $g_K(r) = \sigma(n^s)$ in temporary equilibrium—would generally require the profit rate to adjust independently of the labor intensity of production. In the Solow model, however, this is not possible. The Solow model's assumption of competitive markets implies $r = y - y'n^s$ in equilibrium, where y and y' depend on n^s.

[7]The investment function $\kappa(i - \pi, g^i)$ is subject to many variants, the most popular of which are the inclusion of an accelerator or capacity-utilization effect (Bhaduri and Marglin 1990) and the "Wicksellian" replacement of the interest rate argument with the gap between the profit rate and the real interest rate (Rose 1966, Malinvaud 1982). Modest accelerator effects are empirically important but do not affect our results and are therefore neglected in this presentation. (A strong accelerator effect could change the sign of the slope of the IS curve (7).) "Wicksellian" formulations of investment demand are intended to capture in a stylized fashion the role of expected profitability in the investment decision. For simplicity of presentation, this paper has followed the Keynesian tradition of suppressing these influences except in discussions of volatility of the IS curve (Robinson 1970). Adopting a Wicksellian formulation would affect the slope of the IS curve: if sales constraints mean that the profit rate is increasing in n, this might potential cause the IS curve to slope upward (e.g., if price adjustment is very insensitive to the profit gap). Otherwise it has no effect on the points made in this paper.

Note that since investment behavior focuses on the *rate* of additions to the capital stock, which is a natural scaling in a growing economy, capital stock augmentations do not of themselves increase unemployment. Contrast with Palley (1996).

in national income. The behavioral response to the cost of borrowing is negative, $\kappa_r < 0$, and government can contribute to capital formation, $\kappa_{g^i} > 0$. Equation (7) is a standard representation of goods market equilibrium, aside from the Post Keynesian functional specifications.

As Keynes (1936) noted, it is not evident that (7) can be satisfied at $n = n^s$ for a positive nominal rate of interest. In addition, once the monetary nature of the economy is recognized, the interaction between the goods and assets markets becomes an important concern. Specifically, given π and the standard dependence of money demand on income and the nominal interest rate, there may be no interest rate compatible with simultaneous clearing of the goods and money markets at the full employment level of income. This is particularly true once we allow for sticky prices, a stylized fact of advanced capitalist economies (Romer 2000, Wolman 2000).

2.3 Price Adjustment

Price adjustment takes place in an economy with price rigidities: firms experience increasing costs in the speed of price increases.[8] The resulting price dynamics are given the conflicting-claims representation of equation (8). Firms initiate price increases when the the cost of labor (ω) is high or when capacity utilization (n) is high. In the aggregate, this manifests as inflation (π).

$$\pi = \pi(n, \omega) \qquad \pi_n, \pi_\omega > 0 \tag{8}$$

The price setting behavior of firms is decentralized, so that price adjustments that may prove pointless in the aggregate are nevertheless individually rational.

2.4 Monetary Authority

The final ingredient of the model is interest rate determination. Neoclassical models traditionally treat the money supply as exogenous, although the strong empirical evidence against this exogeneity has been slowly changing the mainstream characterization of the money supply process (Romer 2000). Formal Marxian macroeconomic models often neglect the financial sector altogether. The Post Keynesian tradition, in contrast, has persistently and more realistically stressed the endogeneity of the money supply and the reliance of the monetary authority on interest rate instruments (Hewitson 1995).

Acknowldeging endogeneity of the money supply does not close the question as to whether the monetary authority uses an interest rate or a money supply instrument. However many authors suggest an interest rate instrument characterization of the monetary policy reaction function. This characterization of the monetary authority seems aligned with actual central bank behavior.[9] This paper therefore models the monetary authority as controlling an

[8] A more explicit characterization of such costs can be found in Goldstein's (1985) treatment of the links between relative prices and market share. Also, see Brayton and Tinsley (1996) for a discussion of links between the target price and input costs.

[9] Many authors have argued that U.S. monetary policy is best characterized in terms of a federal funds rate policy instrument (Taylor 1993, Romer 2000). Goodfriend (1993) and Broadhaus (1995) have argued that this is true even when this rate has been targeted indirectly via manipulation of the discount rate or borrowed reserves. Cook (1989) has argued that even during the October 1979–October 1982 period most federal-

interest rate instrument, which it adjusts in response to prevailing economic conditions. Specifically, the monetary authority adjusts the interest rate in response to inflation and unemployment, in line with standard "Taylor rule" characterizations of central bank behavior (Taylor 1993).

$$i = i(\pi, n/n^s) \qquad \text{where} \quad i_\pi, i_\ell > 0 \tag{9}$$

Higher inflation leads to contractionary monetary policy, in the form of higher interest rates. This corresponds to the observation of Goodfriend (1993) that the monetary authority often builds an inflation premium into its interest rate instrument. In addition, higher unemployment (lower n/n^s) leads to monetary easing in the form of lower interest rates. This corresponds to Goodfriend's observation that in the U.S. the monetary authority "routinely lowers the funds rate in response to cyclical downturns and raises it in cyclical expansions." A fairly standard monetary policy result obtains: for economic stability it is important the monetary authority react strongly—or in Goodfriend's parlance, aggressively—to the rate of inflation. This also proves to be an important component of stabilization policy.

2.5 Model Summary

For convenience of reference, table 1 summarizes the model of section 2.

(6)	Growth Dynamics	$\hat{n}^s = g_{AN} - \sigma(n, \omega, \tau, g^c)$	$\sigma_n > 0$
(7)	Goods Market Equilibrium	$\kappa(i - \pi, g^i) = \sigma(n, \omega, \tau, g^c)$	$\kappa_r < 0$
(8)	Price Adjustment	$\pi = \pi(n, \omega)$	$\pi_n > 0$
(9)	Monetary Policy	$i = i(\pi, n/n^s)$	$i_\pi, i_\ell > 0$

Table 1: A Conflicting-Claims Model with Endogenous Money

3 Equilibrium

This section characterizes equilibrium in our conflicting claims economy. We find that the Taylor-rule parameters influence macroeconomic outcomes, influencing the distribution of income and the steady state unemployment rate. To keep the development simple, we will ignore the wage negotiation process, treating ω as exogenous.[10]

Combining (8) with (9) yields (10).

$$i = i[\pi(n, \omega), n/n^s] \tag{10}$$

funds-rate changes reflected judgmental actions of the Fed. Note that, by combining full accommodation of money demand demand shocks while still incorporating the policy reactions of the central bank to economic conditions, Taylor rules can be seen as finding a crude middle ground between the accommodationist and structuralist descriptions of the money supply process (Fontana 2003).

[10] Allowing ω to depend on unemployment, as in efficiency wage models, is a straightforward extension. (Details available from the author.)

Since this equation characterizes monetary policy, we follow Taylor (1995) in refering to its graph as the MP curve. The slope of the MP curve is positive:[11] An increase in employment reduces the pressure on the monetary authority to ease; it also indirectly increases inflation, thereby directly increasing the pressure on the monetary authority to tighten.

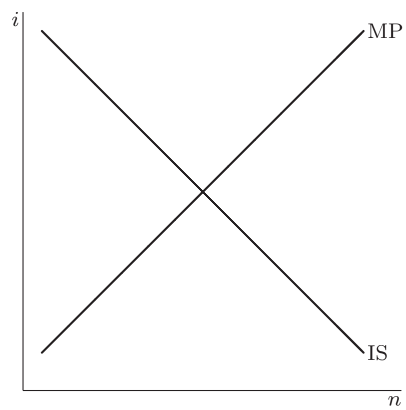

Figure 1: Temporary Equilibrium

Combining (8) with (7) yields (11).

$$k[i, \pi(n, \omega), g^i] = \sigma(n, \omega, t, g^c) \tag{11}$$

Since this equation is a fairly traditional representation of goods-market equilibrium, we will refer to its graph as the IS curve. The slope is indeterminate. An increase in the interest rate reduces desired investment. Equilibrium can be restored by higher inflation, which offsets increases in the interest rate, or by reduced saving. A decrease in n is produces reduced saving, but it also reduces price pressures: the relative size of these effects determines the slope.[12] For ease of exposition we treat the case when the slope of the IS curve is negative. (All that is needed for the analysis that follows is satisfaction of the familiar requirement that the IS slope not exceed the MP slope, which can always be assured by the monetary authority.) A negative slope means that the indirect response of desired investment to a reduction in unemployment does not exceed the direct effect on savings.

Figure 1 graphs (11) and (10) in i, n-space (for a given level of n^s). The IS curve is familiar, and Taylor-rule characterization of monetary policy replaces the traditional LM curve. As Goodfriend (1993,p.5) notes, use of an interest rate instrument effectively sets "money to the side, since at any point in time money demand is accommodated at the going interest rate." However, as Post Keynesian structuralists have emphasized, this does not

[11]The MP slope is

$$\left.\frac{di}{dn}\right|_{\text{MP}} = i_\pi \pi_n + i_\ell / n^s > 0$$

[12]The IS slope is

$$\left.\frac{di}{dn}\right|_{\text{IS}} = \frac{\sigma_n + \kappa_r \pi_n}{\kappa_r} \tag{12}$$

and so depends on $\sigma_n + \kappa_r \pi_n$.

imply a horizontal MP curve, since the monetary authority responds to current economic conditions. The slope of the MP curve represents the responsiveness of monetary policy to inflation and unemployment.

When the natural growth rate and warranted growth rate differ, the economy does not rest at the temporary equilibrium represented by the intersection in figure 1. To see why, reconsider the growth dynamics embodied in (6). If the natural rate of growth exceeds the warranted rate of growth, so that capital formation does not keep up with the growth of effective labor, then n^s rises. Movements in capacity utilization affect inflation and unemployment, leading to shifts in the MP curve.

The key question for stability is whether increases in n^s increase the warranted rate of growth. More formally, (6) implies that a steady state will be stable if

$$-\sigma_n n_{n^s} < 0 \tag{13}$$

Since desired saving is increasing in income and therefore in employment, $\sigma_n > 0$. Therefore stability requires $dn/dn^s > 0$.

An increase in n^s means greater unemployment at each value of n, which leads to a cut in interest rates. In the IS-MP diagrams of figure 2, this is represented by a downward shift in the MP curve to MP′. This increases n and thereby increases the warranted rate of growth. The economy is stable.[13]

This highlights the importance of monetary policy for economic stability. The response of monetary policy to unemployment is also a crucial determinant of stability. For example, a simple interest rate peg destabilizes this economy. Since the slope and shifts of the MP curve are determined by the policy rule adopted by the monetary authorities, monetary policy is a crucial determinant of stability in this conflicting-claims economy.

To recapitulate, if n is low then saving is low and capital formation is inadequate. As a result, labor becomes increasingly abundant relative to capital: n^s increases. The rise in unemployment shifts our MP curve down: interest rates are lower at each n because unemployment is higher at each n. Lower nominal interest rates provides a needed stimulus to the economy, raising n. Such an adjustment process is obviously stable.

In this setting, the monetary policy rule is also an important determinant of long-run unemployment. To see this, begin by reconsidering the growth dynamics embodied in (6). Long-run capacity utilization , $\bar{n}$, is the level that equates the natural and warranted growth rates. This long-run relationship is represented by (14).

$$\sigma(\bar{n}, \omega, t, g^c) = g_{AN} \tag{14}$$

Once we have determined the long-run rate of capacity utilization, $\bar{n}$, we can use our IS-MP model to determine the long-run interest rate, $\bar{\imath}$, and the long-run relative factor intensity of

[13] From the IS-MP model we find the responses to a change in n^s:

$$\begin{bmatrix} \kappa_r & -(\kappa_r \pi_n + \sigma_n) \\ 1 & -(i_\pi \pi_n + i_\ell / n^s) \end{bmatrix} \begin{bmatrix} di \\ dn \end{bmatrix} = \begin{bmatrix} 0 \\ -i_\ell \ell / n^s dn^s \end{bmatrix}$$

So we conclude $n_{n^s} = i_\ell \ell / n^s \Delta$, where $\Delta = (\sigma_n/\kappa_r + \pi_n) - (i_\pi \pi_n + i_\ell / n^s)$ is the difference between the IS slope and the MP slope. Since $i_{n^s} < 0$, stability requires $\Delta < 0$: the slope of the MP curve must exceed that of the IS curve. Satisfaction of the condition can always be assured by the monetary authority.

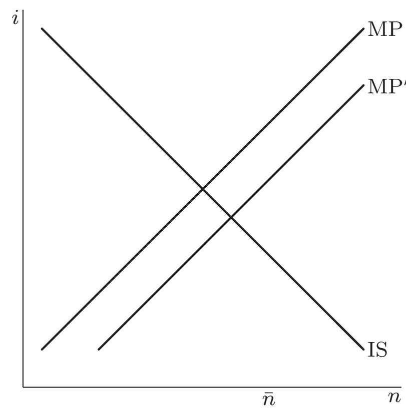

Figure 2: Adjustment Dynamics

the economy, $\bar{n}^s$. (Unemployment is of course determined by $\bar{n}/\bar{n}^s$.) The long-run role of the goods and assets markets can be represented by equations (15) and (16), which determine $\bar{\imath}$ and $\bar{n}^s$ for any given $\bar{n}$.

$$k[\bar{\imath}, \pi(\bar{n}, \omega), g^i] = \sigma(\bar{n}, \omega, \tau, g^c) \tag{15}$$

$$\bar{\imath} = i[\pi(\bar{n}, \omega), \bar{n}/\bar{n}^s] \tag{16}$$

A change in monetary policy to respond more aggressively to inflation can be represented as a shift up of the MP curve. This raises unemployment (lowers n) in the short run, but it also has a long-run effect. Higher interest rates discourage private investment, which produces higher unemployment even in the long run.[14]

4 Varieties of Fiscal Policy

This section explores how fiscal policy changes unemployment and the distribution of income. We consider the following varieties of fiscal policy: an increase in government consumption characterized as a simple demand expansion (an increase in g^c), and an increase in government real investment in capital formation (an increase in g^i).

4.1 Government Consumption

The short run effects of an increase in government consumption are familiar: we get an upward shift in the IS curve, a reduction in unemployment, and a contractionary response by the monetary authority (higher i). This shift is shown in figure 3. Along an upward

[14] We have found that monetary policy influences the level of unemployment in the long run as well as the short run. Of course the analysis up to this point maintains the exogeneity of the cost of labor, but evidentally this result is easily generalized to an efficiency wage environment—say, where $\omega = \omega(n/n^s)$.

Phillips curve models are more problematic and can produce quite different conclusions: they render long-run effects on the unemployment rate impossible in many mainstream, Marxian, and even Post Keynesian macromodels.

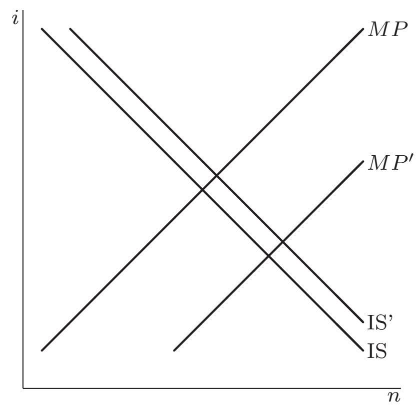

Figure 3: Effects of an Increase in g^c

sloping MP curve, we know i is higher but π is also higher, so it the short-run effects on the rate of capital formation depend on the aggressiveness of the monetary authority's response to inflation.

The long-run effects are interesting. In the long run, private saving must offset the effects of government consumption to restore equality between the warranted and natural growth rates. So in the long run, we must have a rise in n. (The increase in $\bar{n}$ must be such that $d\bar{n}/dg^c = -\sigma_g/\sigma_n > 0$.)

Does this mean a fall in unemployment? Not necessarily. To see this, recall that investment depends on $r = i - \pi$, so that in the long run the we must restore $i - \pi$ to its original steady state value. If the monetary policy responds aggressively to inflation ($i_\pi > 1$), then a constant real interest rate at a higher inflation rate implies that the monetary authority has eased somewhat in response to higher steady-state unemployment. An increase in government consumption can increase unemployment in the long run.

4.2 Government Investment

Our next fiscal policy experiment is an increase in government investment expenditure. That is, instead of a change in g^c, we increase g^i, which produces an exogenous increase in κ (a shift of the investment function). In our IS-MP framework, the initial effect is again familiar. Indeed it is unchanged from our previous experiment: the IS curve shifts up, and we get an increase in i and n.

The subsequent dynamics are quite different, however, as shown in figure 4. Since we have raised the warranted rate of growth above the natural rate, the unemployment rate will fall and (in response) interest rates will rise over time. This is represented by a shift up of the MP curve.

In the long run, the warranted rate returns to equality with the natural rate of growth, and n returns to its preshock level. However the increased capital accumulation has also changed the relative factor supplies: n^s has fallen. The real rate of interest has risen, crowding out private investment one-for-one with the rise in government investment. The inflation rate is unchanged, but the interest rate is higher, reflecting the response of the monetary authority to lower unemployment. An increase in government investment lowers unemployment, even

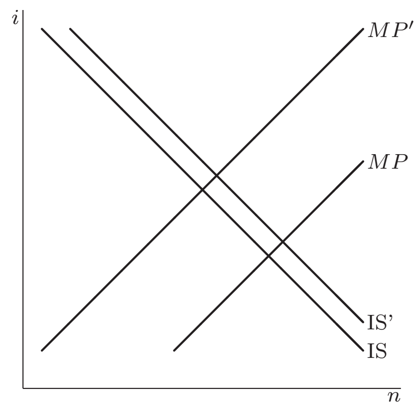

Figure 4: Effects of an Increase in g^i

in the long run.

4.3 Income Distribution

Finally, we briefly explore the effects of policies targetting the distribution of income, here characterized by an increase in the cost of labor (ω). In the short run, firms respond by raising prices, which encourages interest rate increases by the monetary authority. This is a shift up of the MP curve. At the same time, the shift toward wage earners reduces saving. This produces a shift up of the IS curve. The short-run effect on employment depends on the senstivity of private investment to the interest rate and on the aggressiveness of monetary policy. The long-run effect depends on the monetary policy stance. In the long run saving must rise again to restore the equality between the warranted and natural growth rates, so $\bar{n}$ must rise. The interest rate and inflation rate must therefore be higher in the new steady state. If monetary policy responds aggressively to inflation, then steady-state unemployment must rise. This suggests redistributional policies will be most successful when supported by an accommodating monetary policy.

5 Conclusion

This paper explores the short-run and long-run importance of a variety of fiscal policies in a conflicting-claims model of a growing economy with endogenous monetary policy. It extends existing conflicting-claims literature by incorporating a Taylor-rule characterization of monetary policy in a growing economy with variable factor utilization rates. Fiscal policy is shown to influence unemployment in the long-run as well as in the short-run. Increases in government investment lower long-run unemployment, but the pure demand effects of government consumption depend on the monetary policy stance. Neither policy affects long-run growth rates in this model: to raise long-run growth rates, fiscal policy must invest directly in increasing the rate of technological change (e.g., through R&D subsidies).

Directions for future research are suggested by the limitations of the present paper. In particular, the long-run growth rate remains exogenous in the models considered. One natural extension is to explore the ability of fiscal policy to affect the long-run growth rate when technological innovation responds to the state of the economy. The unemployment results of the present paper should prove robust to such extensions. Another important possibility to explore is that direct government investment in R&D can promote technological change. This raises the possibility that a specific variety of fiscal policy can influence not only output and unemployment, but even long-run growth rates in the macroeconomy.

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