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Import Licencing and Macroeconomic Balance in a Simple Dynamic Model

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Abstract

This paper develops a simple dynamic model to analyze macroeconomic balance in a country employing a system of exchange control and import licencing. The use of import licencing to contain excess demand pressure forces the domestic price level of non-tradeables and importables subject to licencing above the world price level. This creates static losses due to allocative inefficiency, rent-seeking, and smuggling. These losses exacerbate the excess demand pressure. Depending on the setting of the exchange rate and the balanced government budget, the steady state can involve a chronic circle of import licencing and under-utilization of capacity. Further, it is possible for the economy to be caught in a vortex of economic atrophy and self-generated inflation. The conditions to avoid such a vortex are derived. The effects of employing three commonly used policy instruments are examined, and the condition to achieve a steady state of full capacity output is derived.

IMPORT LICENCING AND MACROECONOMIC BALANCE

IN A SIMPLE DYNAMIC MODEL

1. Introduction

This paper is concerned with the dynamic macroeconomic balance in a
country employing a system of exchange control and import licencing. A sub-
stantial literature dealing with the static micro--and general equilibrium--
theoretic effects of import licencing already exists. Yet, there is sur-
prisingly little formal analysis of how the institution of import licencing
affects the economy's dynamic macroeconomic behavior.

The major theoretical effects of import licencing are to generate
transfers of purchasing power--which appear to have no effect on aggregate
expenditure--and to create static income losses due to allocative inefficiency,
rent-seeking, and smuggling--which give rise to a once-and-for-all drop in
output. The link between these effects and the issue of macroeconomic
balance is the focus of this paper.

We start from the well-known point that use of non-price rationing
of foreign exchange to close the external deficit means that the pressure
of domestic excess demand is vented largely on domestic prices of non-
tradeables and importables. The model we develop contains two dynamic
responses to such excess demand pressure. The first is the response of the
government budget deficit, which we assume in this paper acts as an "automatic
stabilizer." The second is the static loss of real output arising from the
import licencing system. If the net effect of the two responses is to mop
up excess demand pressure, the system stabilizes, and converges on its
steady state. Depending on the setting of the government budget regime,
however, the equilibrium may involve a perpetual state of unused capacity.
Further, if in the face of the unused capacity the standard Keynesian

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prescription--increase aggregate demand--is applied, the effect is to exacerbate the state of unused capacity. There is also the possibility that the net effect of the two responses is dynamic instability, characterized by self-sustained inflation and growing real output losses. Ultimately the only escape from such a spiral would be to change some feature of the dynamic system.

2. The Model

We use the simplest possible version of a dynamic macroeconomic system in order to focus on the essential features of the economy's behavior under an import licence regime. Wherever possible we simplify rather than elaborate.

We use simultaneous difference equations in a log linear functional form. Each variable is a logarithm. The symbol Δ represents first differences and Δ^2, a second difference. Leads and lags are denoted by + and - subscripts. An overbar indicates an exogenous variable. An asterisk indicates the steady state value of an endogenous variable.

On the demand side we focus on the LM curve. We are dealing largely with situations which McKinnon (1973) has characterized as suffering from "financial repression." Organized financial markets are not a part of such a world. Consequently, we take the interest rate, not as an equilibrating endogenous variable, but as an exogenously given constant. A further feature arising from the absence of organized financial markets is that the effect of fiscal policy on aggregate demand cannot be felt through the IS curve: the effect is felt entirely through the LM curve via the monetization of government debt.[1]

Our LM curve focusses on the demand for and the stock of real balances. We write

(1) $M^D = bY + P,$ $b > 0$

where M^D = the logarithm of the demand for nominal money balances;

P = the logarithm of the aggregate price level; and

Y = the logarithm of the real output.

Equation (1) simply says that the demand for real balances is a log linear

function of real output, which in this model is the same as real income.

We depart from the usual assumption that the demand for money depends on

permanent income because, as will become apparent below, in this model it is

possible to have a steady state in which actual output is below capacity

output.

The aggregate price level is an index of domestic and foreign prices.

(2) $P = wDP + (1 - w)\overline{FP},$ $0 < w < 1$

where   DP = the log of the domestic price level of non-traded and imported

goods;

FP = the log of the world price level converted at the offical exchange

rate;

w = the share of the domestic price in the price index.

The base money stock is derived from the balance sheet of the monetary

authorities (central bank). The monetary base consists of currency plus com-

mercial bank deposits in the central bank. This is identically equal to

the sum of: (1) the accumulated government debt held by the central bank

(the log of which we denote by GD); (2) advances (i.e., credit) by the central

bank to commercial banks (the log of which we denote as C); and (3) the

holdings of foreign exchange, which for this discussion we take to be zero.[2]

Hence

(3) $M^S = c\overline{C} + gGD,$ $c + g = 1$

where c is the share of central bank credit to the commercial banks in the base money stock.[3] If we make the further assumption that the demand for money equals the actual stock in each period, we can drop the distinction between M^D and M^S, simply defining M as the log of the money stock in equations (1) and (3).

The level of the government debt is treated as endogenous in the model. This leaves us the task of explaining that level in a realistic yet manageable way. We begin by noting that government debt changes because there is a fiscal deficit or surplus. We assume that the size of the fiscal deficit or surplus is the outcome of the pre-existing <u>systems</u> of government receipts and expenditures, the principal arguments of which are the price level and domestic income. We allow for the fact that the government has discretionary authority in setting the level of the system of government receipts and expenditures. The government budget deficit then is a flow resulting from the initial setting of the tax and expenditure system relative to domestic nominal income.

The basic point is illustrated in Figure 1 where the nominal government revenue schedule is mapped as a positive function of nominal income and similarly the nominal government expenditure schedule is mapped as a distinct function of nominal income. At point α the schedules intersect: the government budget is balanced at the level NI° with GR° = GE°. Should nominal income rise ti NI', we hypothesize that the levels of both GR and GE increase, but at different rates. Thus, as drawn, we assume a tax schedule that is progressive on nominal values (such as a progressive income tax) and an expenditure schedule that is more or less proportionate on nominal values (due to, say, indexed government salaries, and a real commitment of services that is proportionate to real income).

FIGURE 1
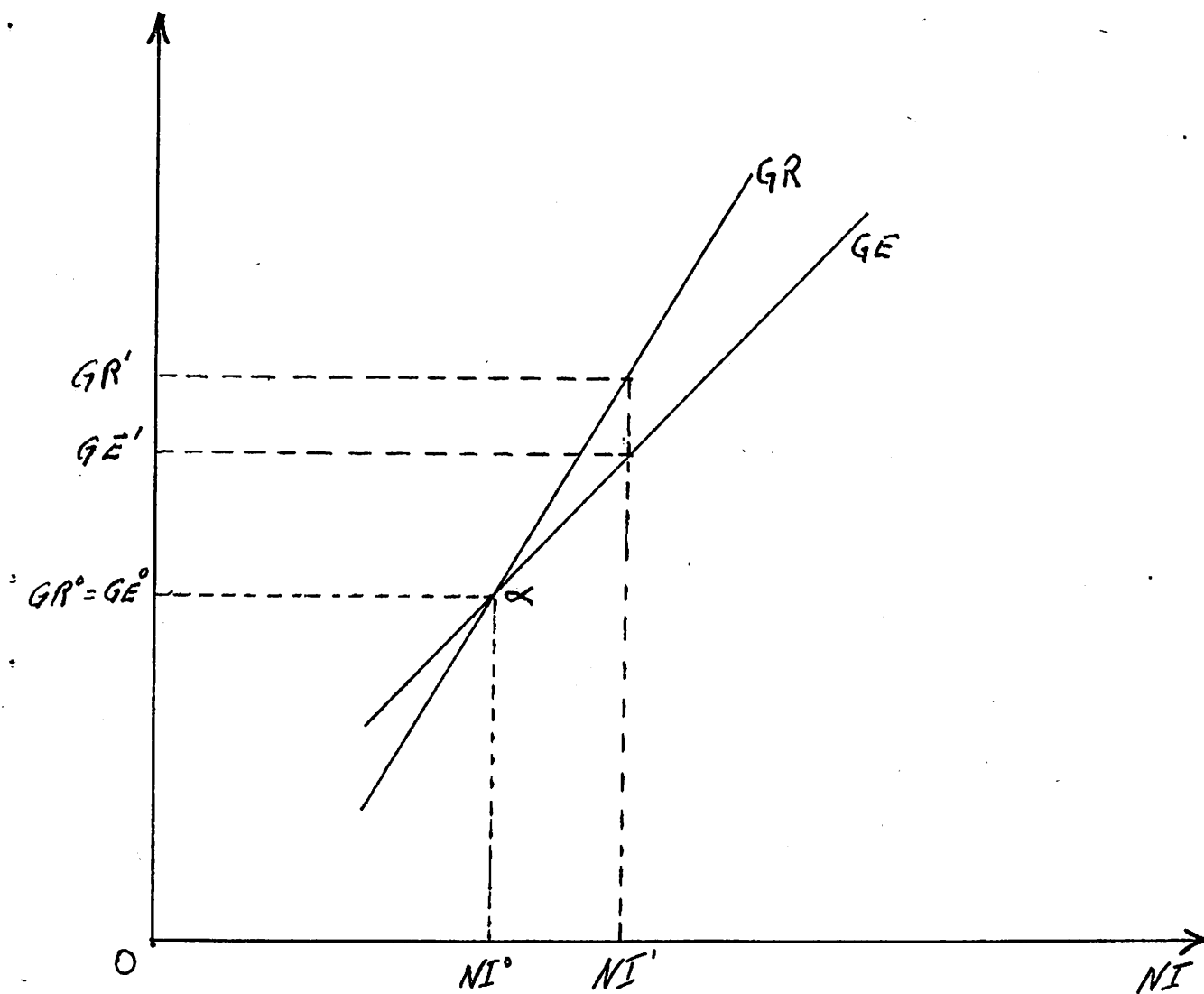
The intersection point, of course, depends on the position of the individual schedules. An increase in taxes, keeping the progressivity intact, would simply shift the GR function upwards and move the intersection point to the left. Similarly, an expansion of government expenditure would shift the GE function upwards but in this case would move the intersection point to the right.

In any case, we hypothesize that there is a well-defined government budget regime such that at some nominal income level the deficit is zero, and at nominal incomes above there is a surplus, and at nominal incomes below there is a deficit. We make the further assumption that the entire government budget surplus (deficit) extinguishes money stock (is monetized) because there is no financial sector in which the government could retire its debt (or borrow to finance its deficit). Consequently, the change in the government debt is identical to the government budget deficit. To conform with the log linear specification, we write the flow of new government debt (= the flow of the government budget deficit) as a rate of change of the accumulated government debt

$$(4) \qquad \Delta GD = \overline{G} - k(P + Y), \quad k > 0$$

where $\overline{G}$ is an exogenous constant term. Note further, that in writing (4) we are incorporating an "automatic stabilizer" or "fiscal drag" in the government budget regime. Since the level of nominal income acts _negatively_ on GD, and hence on the money stock through (3), excess demand pressure that yields higher nominal income tends to set in motion an offsetting force that mops up the excess demand pressure.

Equation (4) also incorporates the role of fiscal policy in setting $\overline{G}$ as the net outcome of the government revenue and expenditure schedules,

hence the <u>level</u> of nominal income at which ΔGD would be zero. This is a log linear version of Figure 1. At a price level above the intersection of the government revenue and government expenditure schedules, there is a government budget surplus, reducing government debt and thus creating "fiscal drag" on the economy. Further, such fiscal drag would continue until the nominal income level adjusts to the point that the government budget is balanced. In other words, while we allow for a potential fiscal policy role, we also observe the government budget constraint in the steady state.

We turn now to the supply side of the model. We take as exogenously given to the economy a well-defined level of capacity output. The economy produces at this level of output <u>unless</u> there is some other influence at work. While in the typical dynamic macro model the principal other influence is taken to be the rate of inflation (or price level) relative to the expected rate of inflation (or expected price level),[4] for our purposes we focus on an entirely different source of lost output. Specifically, in a situation of substantial and sustained import licencing, we consider the cause of divergence of actual output from potential capacity output to be the allocation of real resources in search of income transfers rather than to the production of output.

In recent years an interesting literature has emerged which recognizes that real resources are used up in the pursuit of transfers. In some respects this is nothing new: the university president, the mendicant on the street corner, and the prime minister of an aid-receiving country all expend real resources attempting to persuade donors of their deserving nature. Donors, for their part, often go to considerable trouble to sort out the nearly infinite variety of solicitations. Both these aspects use up real resources.

What is new in the literature is the recognition that the economic good being transferred may simply be a rent-generating right such as a mineral right, an operating licence in a regulated industry, or an import licence. All of these, if their supply is restricted sufficiently, have values as economic goods. Potential recipients of the rights are likely to expend real resources in seeking the rights to a transfer to the point that the marginal rent-seeking expenditure is equal to the marginal value of the expected transfer.

The static effects of such diversion of real resources are analyzed formally in A. O. Krueger's (1974) model of "rent-seeking" in an LDC. A similar, but distinct, theme is followed in Munir Sheikh's (1974) analysis of the static effects of smuggling when real resources are expended in the smuggling activity. In both cases the _effective_ capacity of the economy is reduced by the amount of real resources spent in pursuit of transfers.

It is important to recognize that the loss in these models is beyond the efficiency loss attributed to the tariff-equivalent of the import licence premium. It is the loss, for example, due to the fact that while import licences are assigned on the basis of installed capacity, entrepreneurs find it profitable to maintain excess capacity.[5] It is the loss due to the fact that there is excess investment in human capital in order to obtain government positions because more highly trained people are required to administer the system and because some (but not all) holders of government positions can expect to supplement their incomes by appropriating a share of the transfers distributed at their discretion. It is also the loss due to the cost of circumventing the legal channels of trade such as the use of head-loading and canoes rather than railroads and ocean liners. Note that these losses exist regardless of whether or not the individuals involved pursue illegal activities. They simply invest their time and money to obtain a share of the transfers, and forego the output they would have obtained in directly productive activities.

The losses in these models are specific examples of the more general realization that import licencing regimes seem to involve massive losses that go far beyond the usual static efficiency losses that might be attributable to a tariff-equivalent of the import licence premium. As Bhagwati (forthcoming) observes, some of the losses from such regimes arise from features such as the high variance of incentives between activities, and the reliance on physical controls. In a similar vein, but a different context, Kornai (1976) attributes considerable losses to the debilitating paternalism of systems run by minute controls. In any case, there seem to be associated with restrictive foreign exchange regimes large losses of real output, and the size of the output loss is generally a function of the restrictiveness of the regime.

To capture the full richness of this pattern of experience in our macroeconomic model would make things hopelessly complex. However, our task is greatly simplified when we recall that the use of controls to close a balance of payments deficit transfers the excess demand pressure from the foreign sector to the domestic sector. The excess demand pressure, thus, forces the domestic price level of non-tradeables and of importables subject to controls, above the international price level. The difference between the world price level and the domestic price level at which the recipients of import licences are able to sell the importables is the unit value of the quantitative restriction. The total value of the import licences, or more generally the quantitative restrictions (QR's), depends on the unit value and the elasticity of the excess demand for tradeables (importables and exportables). Thus, we write

(5) $QR = q(DP - \overline{FP})$, $q > 0$

where   QR = the log of the premia on import licences and smuggled goods.

Next, we take the real output losses associated with the restrictive foreign exchange regime to be a function of the size of the expected QR's. Thus, the difference between actual output and capacity output is written

$$(6) \qquad \overline{Y}^C - Y = aXQR, \quad a > 0$$

where

XQR = the log of the expected QR, and

$\overline{Y}^C$ = the log of the exogenously given capacity output.

Thus, when expected QR's are zero, actual output equals capacity output, but when XQR > 0, then $\overline{Y}^C > Y$.[6]

The use of _expected_ QR's (not actual QR's) in writing (6) is justifiable on the ground that the current period allocation of resources in pursuit of transfers, rather than to production of output, depends on what the return agents _expect_ to obtain from such an allocation. In principle, that expectation may well differ from the actual.

The appropriate modelling of the expectations formation mechanism is itself a complex and contentious issue. Here we assume that expected QR's are a function of current and past QR's. We thus assume a mechanism whereby agents learn from experience. The rationale for this approach is that such a variety of forces impinge on the size of the QR, and that many of these forces are subject to arbitrary official behavior. Agents are unable to do any better than to learn from experience. We assume further that they learn slowly, taking each new observation as an additional indication of the underlying system. In the long-run steady state, the agents have learned what the system is, and expected QR's are equal to actual. But if some exogenous variable in the system changes, they have to learn again.[7] In short, then,

we assume that there is an adaptive expectations mechanism whereby expected QR's adjust in proportion to the difference between actual and expected QR's in a given period.[8]

(7) $\Delta XQR = d(QR - XQR), \quad 0 < d < 1$

This completes the model specification. The model consists of seven simultaneous equations--numbers (1) through (7)--to determine the endogenous variables Y, P, DP, M, GD, QR and XQR.

3. Long-Run Equilibrium

Solution of the model for the steady state values of the endogenous variables enables us to examine the equilibrium properties of the model. Of particular interest are the steady state values of the price level, the income level, and the size of the QR. In the steady state (denoted by *)

(8) $Y^* = \overline{Y}^C - aQR^*$

(9) $QR^* = q(DP^* - \overline{FP})$

(10) $DP^* - \overline{FP} = \dfrac{1}{w - aq} \left(\dfrac{1}{k} \overline{G} - \overline{Y}^C - \overline{FP} \right)$

These results tell us that, for a given capacity, the equilibrium real output depends on the size of the equilibrium QR. In turn the equilibrium QR depends on the equilibrium domestic price level relative to the foreign price level (in terms of local currency, converted at the official exchange rate). Finally, the equilibrium domestic price level relative to the exogenously given foreign price level depends positively on the size of the setting of the balanced government budget relative to capacity output.[9] Thus, an attempt to increase the share of government in the economy without a corresponding increase in taxes, means that the deficit is financed by money

creation which forces adjustment along the revenue schedule in Figure 1 until the government budget is balanced again in the steady state.

The steady state solution may be illustrated graphically. First, on the demand side, by combining equations (1), (2) and (3), we obtain an equation in DP and Y describing aggregate demand in the steady state. This is drawn as AD in Figure 2. Its slope is the negative of the ratio of the income elasticity of demand for money (b) to the share of domestic prices in the price index, and hence the curve is downward sloping as long as the coefficient b in (1) is positive. Second, on the supply side we combine equations (5) and (6) to obtain a steady state aggregate supply curve (AS). The AS curve is a vertical line where $Y = \overline{Y}^c$ to the point that $DP = \overline{FP}$. The AS curve then kinks backward with a slope of $-1/aq$. Finally, we draw a line describing the balanced government budget (GG), whose slope is the reciprocal of the share of domestic prices in the price index.[10]

FIGURE 2
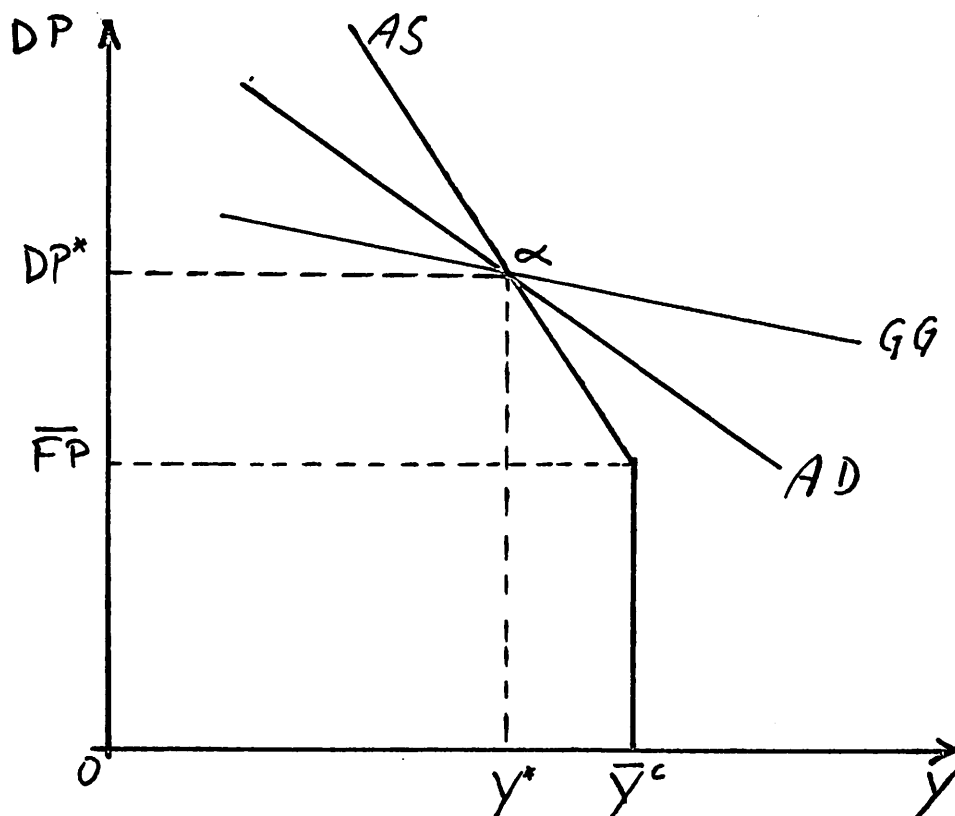
In the steady state equilibrium, all three curves intersect at a common point. In Figure 2 this is at α, illustrating the steady state solutions of QR*, Y*, and DP* from equations (8), (9) and (10). The case we have drawn is a steady state where DP* is above $\overline{FP}$, and Y is below $\overline{Y}^c$. Note the crucial role played by the setting of the exogenous policy variables in equation (10) that yielded this result. The setting of $\overline{G}$ (determining, in part, the intercept of the line GG) and the exchange rate (determining the level of DP at which the AS curve kinks backwards), together determine whether or not QR's and the associated output losses emerge. We shall return to this matter below when we examine the effects of changes in policy instrument settings.

The steady state results, of course, refer only to the equilibrium situation. We also want to know whether or not the equilibrium will be achieved, and how the endogenous variables behave if we were to start from a situation out of equilibrium. It is to these questions that we now turn.

4. Disequilibrium Behavior

The current value of each endogenous variable is a function of its own past values, and of current and past values of the exogenous variables. Of particular interest are the solutions for DP_o and Y_o. These are

$$DP_o = -z_1 DP_{-1} - z_2 DP_{-2} + \frac{1}{ghw(1+d) + w(1+d) - abdq(b+gk)} \{cd\Delta\overline{C}$$

$$+ c\Delta^2\overline{C} + dg\,\overline{G} + g\,\Delta\overline{G} - dgk\,\overline{Y}^c - (gk+bd)\Delta\overline{Y}^c - b\Delta^2\overline{Y}^c$$

(11)

$$- [dgk(1-w) + abgkq]\overline{FP} - [gk(1-w) + abdq + d(1-w)]\Delta\overline{FP}$$

$$- (1-w)\Delta^2\overline{FP}\}$$

$$Y_o = -z_1 Y_{-1} - z_2 Y_{-2} + \frac{1}{ghw(1+d) + w(1+d) - abdq(b+gk)} \{-acdq\Delta\overline{C}$$

(12)

$$-adgq\ \overline{G} + adgkq\ \overline{FP} + adq\ \Delta\overline{FP} + dgkw\ \overline{Y}^C + (gk+d)w\Delta\overline{Y}^C + w\Delta^2\overline{Y}^C\}$$

where z_1 and z_2 are the coefficients of the characteristic equation.[11] From

these we are able to identify the following _impact_ effects of changes in the

exogenous variables:

(1) A reduction in the productive capacity of the economy due to,

say, a natural disaster such as a crop failure or a flood will

result in higher current prices and lower current income.

(2) An increase in commercial bank credit $(\overline{C})$ will increase

prices and reduce current income.

(3) An increase in autonomous net government expenditure $(\overline{G})$ will

increase prices and reduce current income.

(4) An increase in foreign prices $(\overline{FP})$ or, what is the same thing,

a devaluation, reduces the current domestic price level, and

increases current income.

These results, of course, conform with the type of trade-off built into

our model. Price and income levels are substitutes here not complements as in the

Phillips curve world. Anything that tends to move the domestic price level up,

increases the real output loss, while anything that reduces the price level

reduces the real output loss from the QR system.[12]

5. Stability

A further question is whether or not the current values converge on

the equilibrium values. The necessary and sufficient conditions for the con-

vergence of the endogenous variables on their steady state values are that

the roots of the characteristic equation are all less than unity in absolute

value. These are:

Condition	Sign of $w+d(w-abq) + gk[w+d(w-aq)]$
(i) $w - aq \gtrless 0$	$\gtrless 0$
(ii) $d(w - abq) + gkw + dgk(w - aq) \gtrless 0$	$\gtrless 0$
(iii) $4w + 2d(w - abq) + 2gkw + dgk(w - aq) \gtrless 0$	$\gtrless 0$

The first condition is simply that the GG curve must be flatter than the AS curve. Thus, condition (i) requires that a reduction in $\bar{G}$ which would shift the GG curve downwards, thus reduces DP, and increases Y. Condition (ii) has three terms. The first term is positive if there is positive adaptive expectations (d > 0), and if the AD curve is flatter than the AS curve (w > abq). The second term is positive if there is positive fiscal drag (gk > 0).[13] The third term in condition (ii) is positive if there is positive adaptive expectations, positive fiscal drag, and the GG curve is flatter than the AS curve (w > aq). Condition (iii), for all practical purposes, is redundant if the first two conditions are met.

Violation of the stability conditions is entirely possible. Hence, a country may well be caught not merely in a steady state of chronic under-utilization of capacity, but in a vortex of economic atrophy. An initial excess demand situation, whatever its cause--be it expansion of government expenditure to promote economic development, or be it a crop failure--forces a country to adopt an import licencing system. Import licence premia appear. Real output losses follow. Excess demand is exacerbated by the real output loss. The inflation and growing output losses feed on each other in a self-perpetuating spiral that continues until a crisis forces a change in the system. Such a spiral is, unfortunately, all too frequently the rule rather than the exception in a QR regime.

6. Policy Options

Three of the exogenous variables may be thought of as corresponding to commonly used policy instruments: the setting of central bank credit to commercial banks $(\overline{C})$, the setting of the net government budget function $(\overline{G})$, and the setting of the official exchange rate at which the foreign price level is converted to local currency $(\overline{FP})$.[14] In this section we examine how changes in these policy instruments affect the domestic price and output levels.

First, an increase in $\overline{C}$ is illustrated in Figure 3. The steady state equilibrium at α is disturbed by the increase in $\overline{C}$, shifting the AD curve upwards. There is then excess demand at DP*. The impact response to the excess demand situation is to force DP upwards, increasing QR's and creating further diversion of output in pursuit of transfers. Point β (above and to the left of α) represents a possible impact point on the AD curve. The increase in $\overline{C}$ has no effect on the balanced government budget schedule GG. In

FIGURE 3
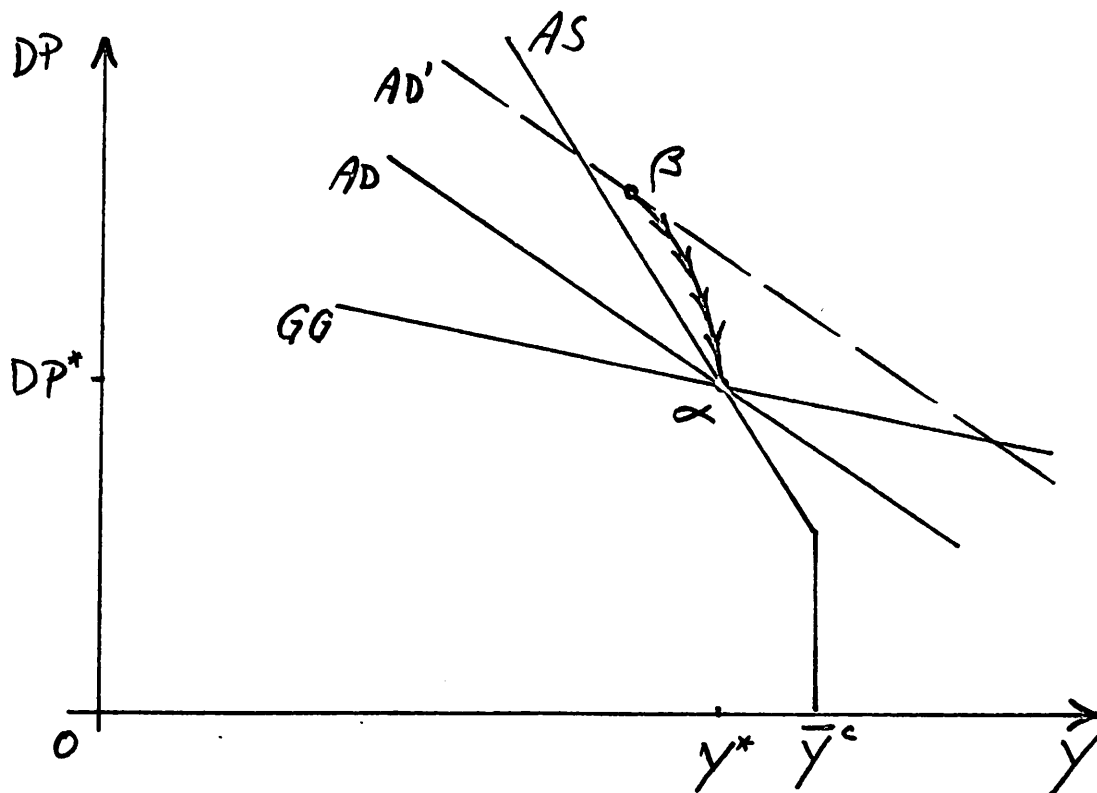
fact, because the impact point β is above GG, a government budget surplus emerges, retiring government debt to the monetary authorities, and drawing the AD curve back down to the initial position. The arrowed line βα traces out an adjustment path representing the locus of the shifting AD curve and the adaptive adjustment of aggregate supply with the disappearance of the temporary QR's as DP returns to DP*. Thus, the change in credit to commercial banks, which has no effect on the steady state, creates a temporary excess demand situation. The automatic stabilizer feature of the government budget regime mops up the excess demand and returns the system to its original steady state.

Second, consider a decrease in the government expenditure schedule or an increase in the government revenue schedule depicted in Figure 4. This reduces the value of $\overline{G}$. In Figure 4 the impact effect is to shift the GG curve downward to GG'. This policy change has no direct impact effect on

FIGURE 4
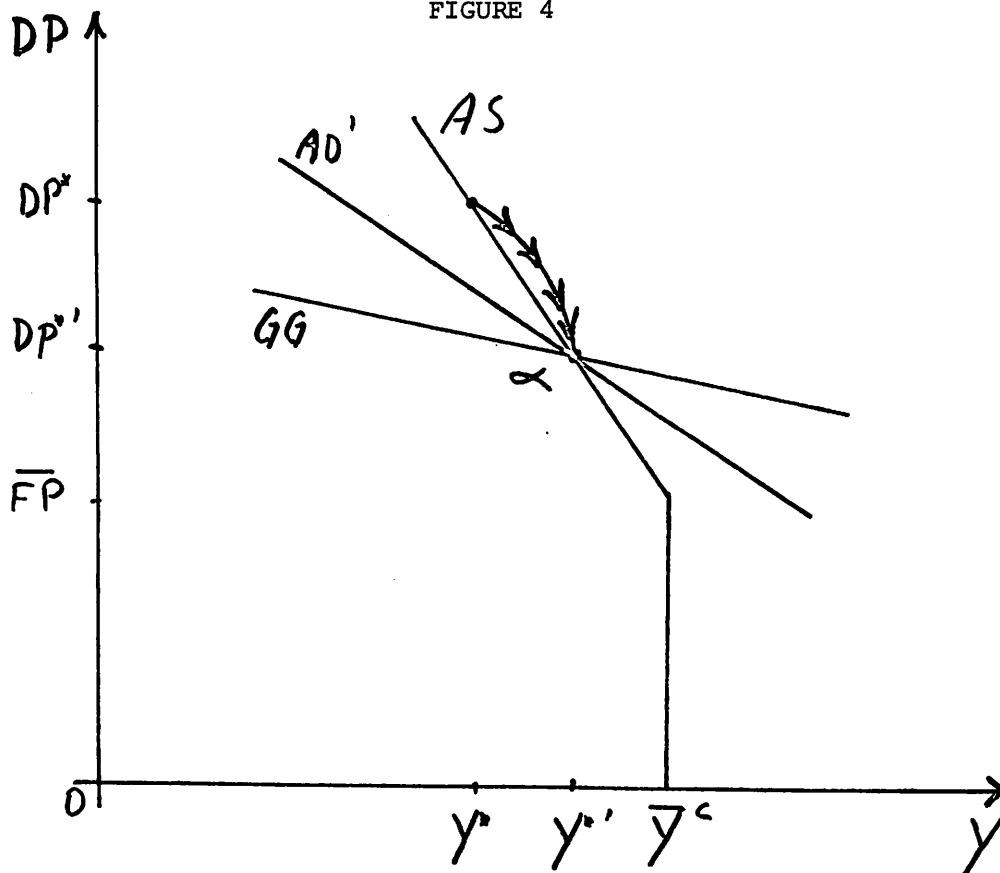
either AD or AS. However, the initial steady state point α is now above the balanced budget line, and the government budget surplus adds to aggregate demand, gradually drawing the AD curve downward until AD' intersects GG' and AS at α'. The adjustment path such as the arrowed line αα' is the locus of the downward shifting AD curve and the adaptive adjustment of aggregate supply as producers respond to the reduction of QR's, and reallocate real resources from the pursuit of transfers to the production of output. The long-run effect of a reduction in $\overline{G}$ then is to reduce excess demand and increase the real output of the economy.

The remaining policy instrument is the exchange rate. Consider the effect of a devaluation, which raises $\overline{FP}$.

From an initial equilibrium at α in Figure 5, a devaluation shifts the AS curve upwards by the size of the demand times the ratio of the share of foreign prices to domestic prices in the price index. The devaluation, by reducing the QR's, releases real resources that were formerly spent in

FIGURE 5
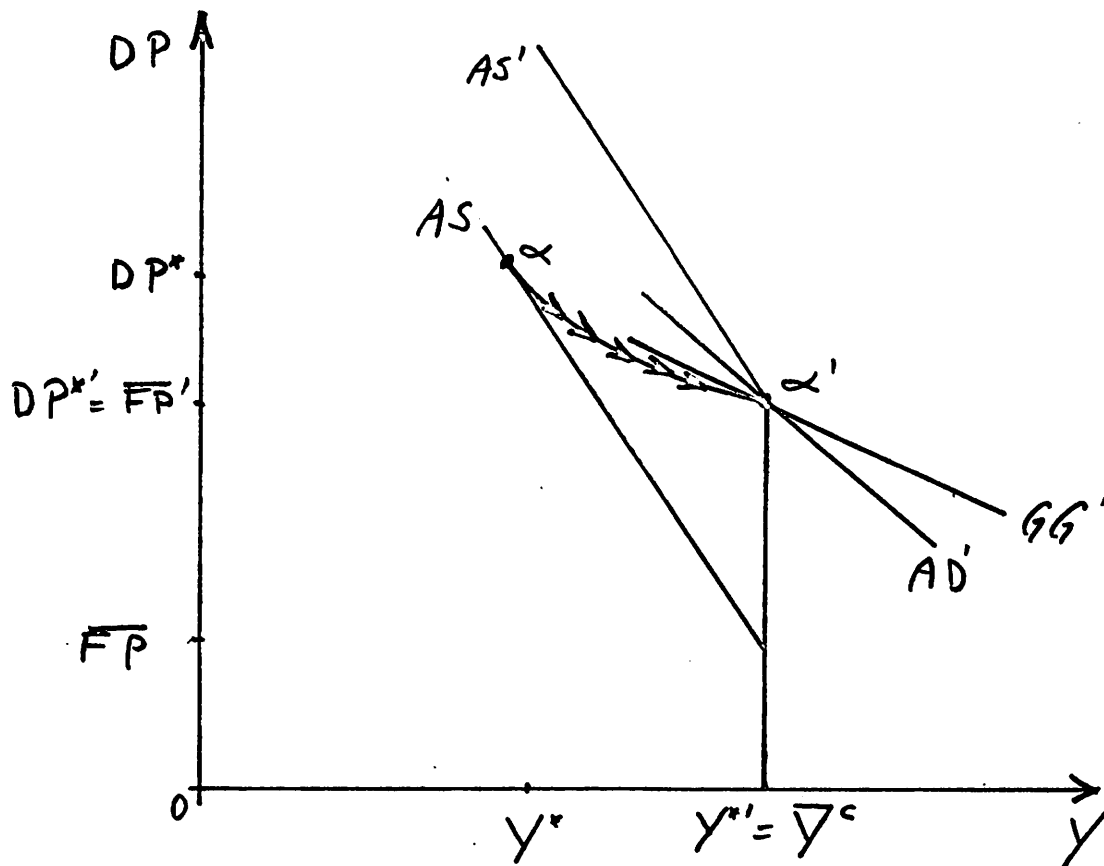
seeking QR's, and these resources are now available to produce output. Point α thus represents a long-run excess supply situation. The adaptive response of agents to the elimination of QR's traces out the arrowed adjustment path αα' in which the domestic price level falls and output expands.[15] The new steady state is reached at α' where AS' intersects GG' and AD'.

We have drawn Figure 5 so that the devaluation exactly eliminates the QR's. More generally, we may be interested in the setting of policy instruments which would ensure that the economy achieves full capacity output in the steady state. Since this will occur where QR* = 0, from (9) we see that this holds when DP* = $\overline{FP}$. Thus, setting (9) = 0 and solving (8), (9) and (10) simultaneously, we obtain for the value of $\overline{G}$ which yields Y* = $\overline{Y}^C$. This may be termed the <u>full capacity budget setting</u>.

(13) $\overline{G} = k(\overline{Y}^C + \overline{FP})$

This result tells us that to achieve a steady state of full capacity output we must set $\overline{G}$ so that <u>the government budget is balanced at the full capacity output valued at international prices</u>.

This result also points to the fact that the government budget setting and the exchange rate setting are substitutes for each other in erasing excess demand. Thus, if the government budget setting cannot be made more restrictive, and if the QR's are to be eliminated, the exchange rate must be adjusted to satisfy (13). Further, if at the time of a devaluation the common practice of easing up on fiscal restraint is followed, the size of the devaluation necessary to eliminate excess demand must take into account the reduced fiscal restraint. In other words, the <u>package</u> of changes in $\overline{FP}$ and $\overline{G}$ to satisfy (13) is likely to be important.

7. Conclusion

In this paper we have developed a simple dynamic model of the macro-economic behavior of an economy employing a system of import licencing. The model sheds considerable light on the macroeconomic policy options facing such a country. If it is caught in a spiral of self-generated inflation and growing excess capacity, the policymakers must first of all stop the spiral by introducing sufficient fiscal drag to create stability in the system. Second, even if the system is stable, the country may find itself in a chronic circle of QR's and underutilized capacity. In such a state, the model indicates that the standard Keynesian solution of aggregate demand stimulation by increasing government expenditure would not break the circle. Rather, it would exacerbate the situation of excess demand and underutilized capacity. It does not follow, however, that a policy of commercial bank credit restriction would resolve the difficulties. While having a temporary effect of reducing QR's and stimulating output, it would not affect the steady state DP* and Y*. It would merely change the equilibrium composition of the base money stock. This is because the automatic stabilizer effect of the government budget regime acts to restore the total money stock to the equilibrium money stock by increasing government debt to compensate for the reduced commercial bank credit.

Finally, because we prefer to avoid trouble in the first place rather than scramble to get out of it when things fall apart, the analysis of this paper provides some simple guidelines for the design of a government budget regime:

The budget regime should act as an automatic stabilizer.

The budget regime and the exchange rate should be set, relative to each other, so that the aggregate domestic price level will converge on the world.price level.

Obviously such guidelines will not resolve all the problems of achieving macroeconomic balance. They will, however, serve to minimize the macroeconomic difficulties arising from a QR regime.

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FOOTNOTES

[1] Effectively, there is a horizontal IS curve at the exogenously given rate of interest.

[2] If the government were to float its debt in foreign capital markets, the monetizing effect of government debt would not change, for it would still enter as an asset of the monetary authorities.

[3] Strictly speaking, the share c is endogenous, making the fixed shares assumed in (3) a valid approximation only in the region of the initial shares. Since, however, the steady state involves a constant level of GD, this has a potential biassing effect only on the disequilibrium path.

[4] See, for example, Laidler's (1975) model of price and output adjustment using an expectations augmented Phillips curve in a fixed exchange rate economy.

[5] Schydlowsky (1976) reports the results of several Latin American studies showing capital idleness in the midst of capital scarcity, and elaborates the microeconomic reasons why such idleness is privately profitable.

[6] We should note that the argument is perfectly symmetrical if the quota restriction is placed on exports--witness the outward smuggling of export crops subject to export controls. However, the sign of q in (5) would be negative.

[7] It is perhaps worth emphasizing that *if* a particular exogenous variable were to change often enough in a particular way, with the same consequences for the system each time, the adaptive expectations assumed here would no longer apply, for agents would no longer have to learn what

the effect of the change would be. They would already have learned from the previous experience.

[8]The specification of (7) focusses on the size of the QR. However, from (5) we know that QR depends on both DP and FP. Hence, a more complex expectations mechanism might have separate expectations formation for each of DP and FP.

[9]We are assuming for the present that the coefficients of the multiplier are such that $w > aq$. We shall see below that this is a necessary condition for stability of the system.

[10]The equations for the curves are:

(1) AD curve

$$DP = \frac{1}{w} [g\ GD + c\bar{C} - (1 - w)\overline{\overline{FP}}] - \frac{b}{w} Y$$

(2) AS curve

$$DP = \overline{\overline{FP}} - \frac{1}{aq} (Y - \overline{Y}^C)$$

(3) GG curve

$$DP = \frac{1}{kw} [\bar{G} - k(1 - w)\overline{\overline{FP}}] - \frac{1}{w} Y$$

Note that the relative slopes of AD and GG depend on whether the income elasticity of demand for money (b) is greater than or less than unity. However, this plays no significant role in the model. We simply restrict b to positive values.

[11]These are: $z_1 = - \left\{ \dfrac{gkw + w(2 + d) - abdq}{gkw(1 + d) + w(1 + d) - abdq(b + gk)} \right\}$

$$z_2 = + \left\{ \frac{w}{gkw(1 + d) + w(1 + d) - abdq(b + gk)} \right\}$$

[12]One could incorporate in this model a short-run Phillips curve with the long-run backward-sloping aggregate supply curve. However, such a blend, while it might lend greater "realism" to the short-run properties, would make the stability conditions much more complex and would run the substantial risk of obscuring the basic properties of this model.

[13]This condition is commonly used in macroeconomic models to ensure stability: see, for example, Dornbusch (1976). The failure of this condition has been used in models of self-generating inflation such as those of Aghevli and Khan (1977), and Dutton (1971).

[14]The list of possible policies is not meant to be exhaustive. Most other policies, however, involve some variant or combination of the essential features of these. Prior deposits on imports amount to a reduction in credit to the private sector, decreasing $\bar{C}$. A tariff or import surcharge is equivalent to a partial devaluation together with an increase in the government revenue function, thus increasing $\overline{FP}$ and decreasing $\bar{G}$. Note, however, that because a tariff is not a uniform across-the-board change in all foreign prices, there may be relative price effects which would change the weights in the price index.

[15]The AD curve and the GG also shift slightly down with the impact of the devaluation, but this has a relatively minor effect on the path $\alpha\alpha'$, and the direction of the shifts cannot be stated a priori.