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OUTPUT, EMPLOYMENT AND WAGES IN THE SMALL OPEN ECONOMY

by

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Note

This paper was completed in its present form in March 1977 as part of other work, still continuing, on employment, output and wages in a small open economy. While much more work needs to be done before claiming a satisfactory theory of employment for an economy like Ireland, many of the points covered in this paper are so frequently misunderstood, that we feel it is worthwhile making it available, as it stands, in the Memorandum Series for circulation and citation.

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I. Introduction

The high level of employment consistently maintained by most western countries during the 1950s and 1960s lent credence to Keynes's view that the level of effective demand was the main determinant of output, and, therefore, of employment. A reappraisal of this view appeared necessary in the 1970s as governments faced accelerating inflation and unemployment. Alternative schools developed, attempting to discredit the notion that government-induced variations in aggregate demand could necessarily maintain output, and, thus, employment, at desired levels. The aim of this paper is to consider the short-run interrelations between output, employment and wages, with special reference to the small open economy; and to contrast the policy implications for such an economy with those arising from the traditional "Keynesian" closed economy model.

II. The Model

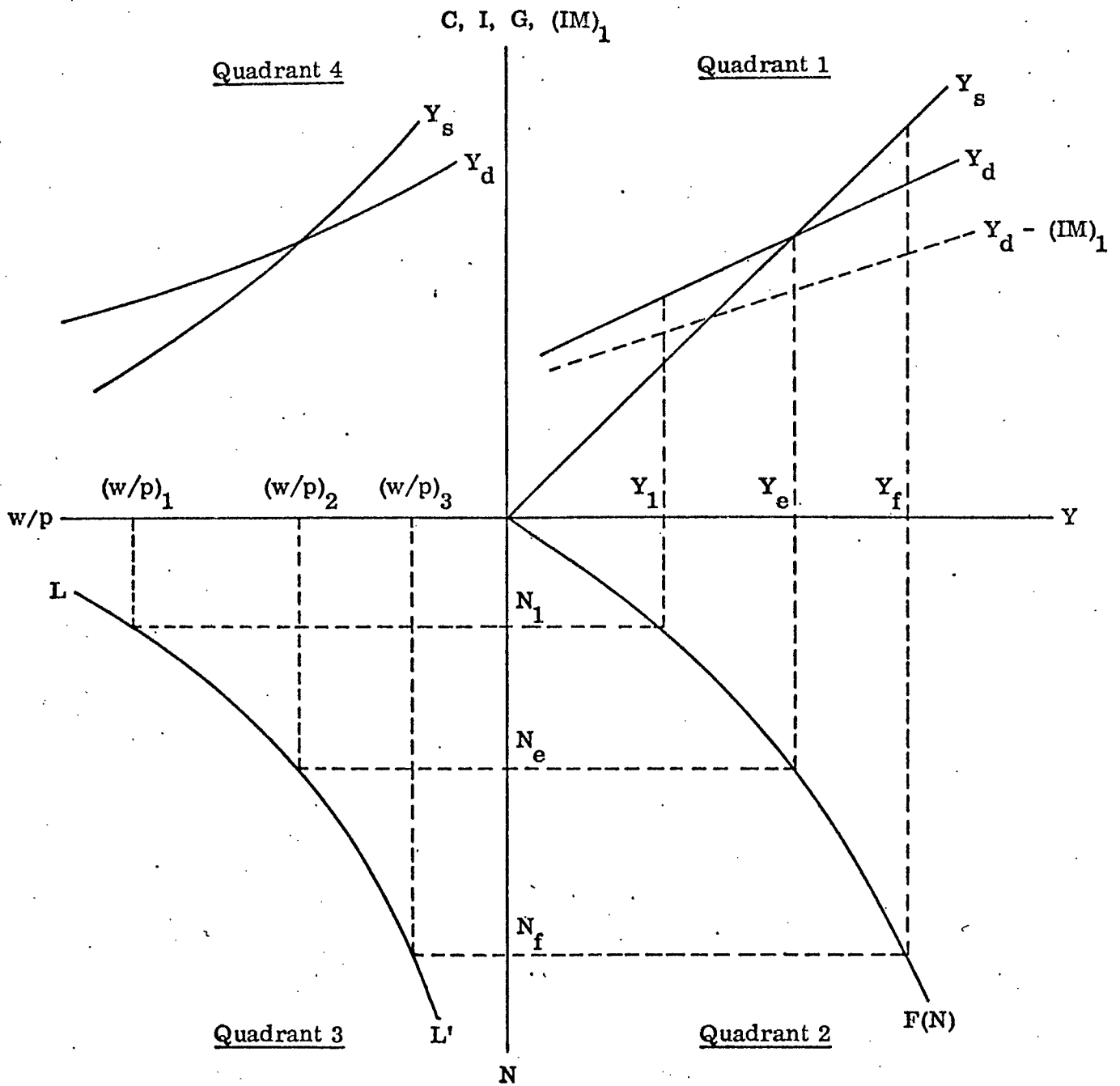
We take as our framework the standard macro model as illustrated in Figure 1, which will serve to illustrate both the closed and the small open economy models. Incomes and expenditures are measured in real terms, labour is homogeneous, and the capital stock is assumed fixed.

Quadrant 1 shows the relationship between domestic demand (Y_d) and the domestic supply of output (Y_s), the latter being equal to domestic income. In the closed economy, domestic demand is, of course, the same as aggregate demand. It consists of consumption, which is taken to be a function of domestic income, and of investment and government demand which are taken as exogenous. In the small open economy model considered here, all goods produced domestically are exportable in unlimited quantities, and are subject to unlimited competition from imports, at given world prices. Imports of goods not produced at home ("non-competing" imports: $(IM)_1$ in Figure 1) are taken to be a function of domestic income.

In Quadrant 2, $F(N)$ illustrates the relationship between total output and employment, under the assumption of a constant stock of capital

1. The authors would like to express particular thanks to their colleague, J. Durkan, who first called their attention to one of the basic ideas underlying this paper. They would also like to thank Tony Foley, Olympios Katsiaouni, Finola Kennedy and Robert O'Connor for commenting on earlier drafts.

Figure 1



goods. The form of the relationship depends on technological considerations, but assuming, as we do, that all relative output prices are unchanged,¹ $F(N)$ represents unambiguously the supply schedule of domestic real output; and it is possible to speak unambiguously of a single general price level for all producers and domestic consumers.² As drawn in Figure 1, $F(N)$ exhibits short-run decreasing returns to labour (SRDRL).

Quadrant 3 depicts the relationship ($L - L'$) between the real wage (w/p) and the demand for labour by firms. If there were perfect competition in all markets, the real wage would equal the marginal physical product of labour, and SRDRL would necessarily prevail. Although the $L - L'$ curve in Figure 1 shows an inverse relationship between employment and the real wage, we do not wish to limit the analysis, however, to perfectly competitive conditions or to the case of SRDRL. The curve may be viewed simply as an empirical relationship, dependent on such factors as the structure of aggregate output, the technology and the state of competition. The money wage is (initially) treated as exogenously determined - the effect of past history and bargaining between firms and trade unions. The determination of changes in the price level differs as between the closed and small open economy systems and is discussed later in considering the operation of these systems. At any given real wage, defined by the money wage and the price level, the supply of labour is regarded as perfectly elastic.

Quadrant 4 shows the relationships between the real wage and domestic demand and between the real wage and domestic supply. It is evident that these relationships derive from those in the other three quadrants; but it is important to emphasise that we have not yet specified the direction of causality.

The model may be seen to have four sets of agents: firms, households, the government, and, for the open economy, foreigners. Given

1. In the closed economy, the assumption of constant relative prices implies a further highly restrictive assumption that, when effective demand changes, the pattern of demand matches precisely the pattern of supply that may be evoked; otherwise, there would be excess demand or supply for individual goods, causing pressure for relative price changes. In the small open economy model all relative output prices are imposed by the international market.

2. If relative prices, as well as relative quantities, of output were allowed to vary, then not only would it be impossible to measure changes in the general price level unambiguously, but, more important, the real wage among producers, and as between producers and wage-earners, could vary differently; so that a more complex framework, not readily open to diagrammatic treatment, would be necessary. The mathematical appendix gives some consideration to this issue.

the capital stock, and the ruling prices of commodities and factors, firms will wish to produce certain outputs of commodities. With their desired outputs determined, firms will hire the requisite labour from households. The excess of sales revenue over the cost of producing outputs is the firms' profit, part of which may be retained for purposes of investment and part distributed to shareholders, who may either be domestic households or foreigners. With the incomes received from the sale of labour services and receipts of distributed profits, households may purchase the production of firms, and, in the open economy, they may also purchase goods from foreigners. Likewise, foreigners may purchase the outputs of domestic firms. The government may purchase goods and labour services. It can also receive income by taxing the incomes of individuals and the profit of firms, though for simplicity of exposition, this aspect has not been explicitly developed in the model.

The economy is in equilibrium when all markets are cleared. This position may not be attained, and we are concerned particularly with the case where the labour market fails to clear, i.e. where there are individuals willing and able to work at or below the going real wage, but unable to find offers of employment. In the neo-classical view, emphasis on non-market clearing has focussed on price inflexibility as the root cause of the trouble. As is now realised, flexibility of prices is not a sufficient condition for market clearing. Keynesians emphasise precisely the fact that markets may remain uncleared even with price flexibility. Unlike the neo-classical approach where all markets are of equal weight (in a causal sense) in a general clearing operation, the Keynesian viewpoint accords primacy to the commodity market. Given equilibrium between aggregate demand and supply for commodities, the demand for labour derived from the resulting level of output does not necessarily equal the available supply of labour. Although the labour market is not cleared, signals from the labour to the commodity market have no major effect. Even if workers were willing to accept a real wage cut, the labour market would still not be cleared, since aggregate demand would be insufficient to absorb the potential increase in output and employment. We have a situation of under-employment equilibrium in which feedback mechanisms between markets do not work.¹ The Keynesian system, therefore, envisages the following causal chain:

1. An allied stream of Keynesian theory may admit the existence of such mechanisms, but consider the Keynesian model to apply to the period in which feedback has not had time to operate - the so-called Keynesian "dis-equilibrium" model (see, for example, Clower (1965), Patinkin (1965), Leijonhufvud (1968), Barro and Grossman (1976)).

Aggregate demand → Output → Employment.¹

However, in a private enterprise economy, not necessarily competitive or profit maximising, but profitability conscious, the chain is not seen by producers in this fashion. In essence, output and employment decisions are made with regard to the most profitable position for firms. We, therefore, have an alternative chain as seen by suppliers:

Wage rate → Costs → Profitability → Output → Employment.

These two chains imply quite different constraints on market clearing: in different circumstances output and employment may be constrained by one of these chains and not the other. When expansion is limited by the first chain, we may speak of the economy as "demand-constrained"; in the second case, it is "cost-constrained".² The applicable case in any given circumstances is a matter for empirical investigation, and the widespread emphasis on the first chain, as evidenced in the literature, should not blind us to the other. In the following sections of the paper, we shall explore at a general level the circumstances in which each chain is likely to be most relevant.

It will be obvious that Figure 1 is not a complete representation of the usual macro system. We have not included money, or other assets. Our concern in this paper, however, lies only with the broad policy implications arising from the interrelation between the labour and commodity markets. Thus, monetary measures operating on output and employment through changes in the investment or consumption demand schedules are subsumed with other measures, such as fiscal policy, aimed at changing domestic demand; while monetary measures affecting the exchange rate are treated as part of exchange rate policy. For completeness, a monetary sector is added to the mathematical representation in the Appendix. Another omission as compared with the standard model is the neglect of explicit consideration of the effect of changes in income distribution on domestic demand. Within the terms of the model, however, each point on the $L - L'$ curve may be interpreted as defining not merely a unique level, but also a unique distribution, of domestic income, the influence of which on demand is taken into account in the shape of the Y_d curve.

1. This causal sequence of the Keynesian theory has been stressed in, for example, Pasinetti (1974). Fiscal and monetary instruments, of course, may serve to determine aggregate demand, as may the distribution of income, exports, etc.

2. Further constraints, e.g. resource or foreign balance, may also prevent the achievement of full employment.

III. The Closed Economy

We examine briefly the operation of the model in relation to the closed economy with a view to re-iterating some points which, though well established, are still sometimes neglected in the theoretical literature and more often in policy discussions.

Consider a real wage rate $(w/p)_1$, starting in Quadrant 3. Firms will now wish to produce output of Y_1 , employing N_1 workers. At this level of national income, with aggregate demand exceeding aggregate supply, we may say that an "inflationary gap" exists. What is the mechanism by which this gap may be closed? Since there is excess demand in the commodity sector, the prices of commodities may be bid up, either by consumers unable to satisfy their wants or, more usually, by firms seeing their inventories depleted and finding themselves able to raise prices without reducing the demand for products. Will such price increases lead to a fall in the aggregate demand schedule or a rise in domestic output, so as to close the inflationary gap? Aggregate demand may be reduced if the price rise reduces the level of real money balances held by individuals. There is little empirical evidence, however, to show that such an effect, if it does take place, would be significant or would operate within a reasonable time. An increase in output can occur only if the real wage rate is lowered. If the money wage rate is exogenously determined, as in effect postulated by Keynes (1936), then a real wage cut will be secured by rising prices, and output will expand to close the gap. But if unions resist the real wage cut, then the money wage can no longer be viewed as exogenous, but responsive to price changes also. Where unions will not tolerate a fall in the real wage, changes in the price level will have little or no effect in closing the inflationary gap. We have then a "price-wage" spiral; prices are bid up and so are money wages; and there is no correcting mechanism in the system, unless the government acts to restrict demand by appropriate fiscal or monetary policy, thereby validating the real wage sought by the unions. Thus, we can see how an inflationary situation may develop, even though the economy is far from full employment. In this case, we may describe the economy as "cost-constrained".

Even if equilibrium were achieved in the commodity market (with the real wage at $(w/p)_2$ and income Y_e), this need not coincide with the full employment level of income. The economy has settled at an under-employment equilibrium of the kind identified by Keynes. In such a situation, the Keynesian prescription of increasing effective demand will succeed only if the real wage is permitted to fall to $(w/p)_3$. But if the real wage rate

remains at $(w/p)_2$, the economy is still cost-constrained; firms have no incentive to push output beyond Y_e ; and demand expansion will simply lead the economy into an inflationary position, even though far short of full employment.¹

The solution offered by the classical economists for an economy at Y_e was a real wage cut. Let us suppose that unions were agreeable to this, whether it came about through a rise in prices or a fall in the money wage rate. At the reduced real wage rate $(w/p)_3$, firms would wish to produce the level of output that would secure full employment. If they went ahead and tried to do so, however, the rise in aggregate demand would be insufficient to match the rise in supply. Firms would find their inventories rising, prices would decline, the real wage would revert to $(w/p)_3$, and the level of income to Y_e . The economy is then demand-constrained.

Thus, in a demand-constrained situation, a real wage cut alone is powerless to take the economy to full employment. Equally, demand stimulation may not work unless the real wage falls - the cost-constrained case.² Keynes was well aware of this, fully accepting that: "In a given state of organisation, equipment and technique, the real wage earned by a unit of labour has a unique (inverse) correlation with the volume of employment" (Keynes (1936), p.17). He did not envisage this as a problem, however:

1. Where unions are sufficiently powerful to keep the real wage at $(w/p)_2$ in the face of a rise in effective demand, it is clear that Keynes (1936) would regard the associated level of employment, N_e , as full employment. Full employment, in Keynes's terms, exists when "aggregate employment is inelastic in response to an increase in the effective demand for its output" (p.26); or, alternatively, when there is no "involuntary" unemployment, implying "equality of the real wage to the marginal disutility of employment" (p.15). Such use of the term "involuntary" would be reasonable if all individuals fully endorsed the union position. But in circumstances where some individuals would be quite willing to work at a lower real wage, but cannot find offers of employment due to union resistance to real wage cuts in any form, it seems strange to say that there is no involuntary unemployment. Keynes's position is rather akin to that of a doctor who, having invented a cure for sickness but being unable to apply it because of opposition from the healthy majority, proclaims that there is no sickness - or, at least, no involuntary sickness! It would probably be nearer the mark to say that involuntary unemployment exists as long as there are individuals not at work whose marginal disutility of labour is less than the real wage. While such a definition would suffice for our present purposes, even then, of course, it does not include other forms of unemployment that might reasonably be classed as "involuntary" - such as monopsonistic exploitation of labour.

2. If, at a level short of full employment, the demand curve for labour becomes completely inelastic, then no further increase in employment is possible even though the real wage were to fall to zero. This may be classed as resource-constrained unemployment, typical of undeveloped countries, to which the solution lies in longer-term measures, such as increasing the capital stock.

while holding that workers would fight a cut in money wages, he believed that they would not resist a fall in real wages induced by rising prices - at least until full employment approached. This belief might have been well founded in the circumstances of the 1930s, but it is doubtful if it accurately reflects present-day conditions. Where it does not apply, then as Viner pointed out so long ago: "In a world organised in accordance with Keynes's specifications there would be a constant race between the printing press and the business agents of the trade unions, with the problem of unemployment largely solved if the printing press could maintain a constant lead and if only volume of employment, irrespective of quality, is considered important" (Viner (1936), p.149).

This difficulty would be averted, of course, if there were a constant or increasing relationship between the demand for labour and the real wage. Such a relationship might arise for a number of reasons, such as the nature of technology or the greater utilisation of overhead labour as output expands.¹ An economy is indeed fortunate if that situation prevails since demand stimulation will then increase employment while maintaining, or even increasing, the real wage.² But there can be no certainty that this congenial position is of universal application even in developed countries, and the neglect of the cost-constrained possibility is part of a general tendency to over-emphasise demand, at the expense of supply, considerations.

IV. The Small Open Economy

The degree of openness of an economy may be viewed as depending on the impact of foreign sources of supply and demand in all markets of that economy. The small open economy may be taken as one where there is unidirectional causality from the foreign source to the domestic economy. In the completely open economy, with perfect mobility of factors as well as products, full employment may be maintained through migration, and both the need and the scope for domestic policy are greatly

1. See, for example, Kuh (1966). Keynes was reluctant to admit that such a relationship would apply all the way to full employment (Keynes (1939)). For some recent evidence on the subject, relating to production workers in United States manufacturing, see Sims (1974).

2. Even with an increasing relationship between the demand for labour and the real wage, an economy may still be cost-constrained where unions press for a higher real wage as unemployment falls - in other words, if the aggregate supply curve of labour becomes sufficiently inelastic even though there are unemployed workers prepared to work at the going real wage. This "dog-in-the-manger" situation is unlikely to be of practical significance except in special circumstances, however, since unions could secure a higher real wage by moderating their demands and allowing the level of employment to expand - provided, of course, the economy is not also demand-constrained.

attenuated.¹ The model of openness considered here is where there is imperfect labour mobility but complete capital and product mobility. Thus, with a fixed exchange rate, the rate of interest and the price level are taken to be determined externally, but there may be unemployed workers at a given real wage.

It is scarcely necessary to warn that no small economy will conform precisely to our specification. Such factors as transport costs, non-traded goods, imperfect substitution between traded goods, taxes and subsidies, and many other institutional factors will give even a small open economy with a fixed exchange some degree of control over the level of, and, to a lesser degree, the rate of change in, domestic prices. But just as valuable insights can be derived at one extreme from the closed economy model, even though no western economy is wholly closed, it is also of interest to consider the small open economy model which, though it lies at the other extreme, may be nearer to the position of an increasing number of countries - particularly smaller countries within a customs union such as the EEC.

In terms of Figure 1, let us again consider the case where the real wage rate is at $(w/p)_1$, employment at N_1 , and income at Y_1 ; and there is, thus, a gap between domestic demand and domestic supply. Part of the gap is filled by "non-competing" (or "complementary") imports, as indicated by the curve $Y_d - (IM)_1$. In the small open economy with a fixed exchange rate, unlike the closed economy, prices cannot rise to attempt closure of the remaining gap. Prices are given internationally, and if domestic producers attempted to raise price they would lose their entire market share. In such circumstances, the excess of domestic demand (less non-competing imports) over domestic supply will be taken up by increased imports² and/or reduced exports. Thus, whereas in the closed economy the gap results in an inflationary spiral, in the small open economy it results in a deterioration in the current balance of payments. Can such a position persist indefinitely? If the current balance of payments deficit can be met by a continuing capital inflow, no pressure for change exists in the system. If this is not so, pressure may be expected on the exchange rate, which will have to fall eventually. Whether such a fall will improve

1. Even in the purely open case, however, matters such as the employment and total population sustained within the boundaries of the state, and the standard of living of that population, may remain of great importance, and susceptible to longer-term developmental measures.

2. These "shortfall" imports are in addition to the normal "complementary" imports, which may vary directly with national output.

the situation depends on the behaviour of wages. If, through rising money wages, the level of real wages is maintained in the face of rising domestic prices consequential on the falling exchange rate, then the balance of payments deficit will not be closed. Thus, with rigidity of real wages, we have a similarity to the "price-wage" spiral in the closed economy; this time, the "exchange rate - price - wage" spiral. Again, only corrective government action restricting domestic demand can bring about stability.

Suppose now that equilibrium is attained at Y_e with the real wage rate at $(w/p)_2$. At that point, current external payments are in balance, since non-competing imports are exactly matched by an excess of exports over competing imports. The economy, however, is still far short of the full employment level Y_f . In the closed economy, we saw that, given an inverse relation between the demand for labour and the real wage, both a real wage cut and demand expansion were required to move to full employment. The same would hold true for an open economy where exports are exogenously determined. But the assumption that the volume of exports is exogenously determined is quite untenable for the small open economy where prices are also assumed to be entirely determined abroad. The latter assumption necessarily implies a perfectly elastic demand for exports, and a perfectly elastic supply of imports, at the international price level prevailing for the particular goods in question. In that event, the small open economy would never be demand-constrained; and, provided it is not resource-constrained, a real wage cut will always suffice to bring the economy to full employment.¹ Changes in the domestic demand schedule, either exogenously or through the use of the government policies, will simply affect the trade balance; while, for employment expansion, there is no necessity to boost domestic demand if real wages are cut, since the extra output can be exported. In effect, the aggregate demand curve in Figure 1 lies along the 45° line. The situation is as if Say's law applied; but it is not that supply creates its own demand, but rather that there is an exogenous source of demand available to absorb any extra output that can be supplied at the going world price.

Some important implications from the small open economy model contrast sharply with the traditional closed and open economy models. First, saving has none of the undesirable connotations ascribed to it by Keynes. An *ex ante*, or intended, rise in the propensity to save is

1. Indeed, if there is a constant or increasing relationship between the demand for labour and the real wage all the way to full employment, then there is no constraint whatever on the attainment of full employment in the small open economy.

realised ex post. It does not restrict output or employment in the short run, and the resources can be held abroad in foreign balances to yield foreign income or, if so desired, used to finance increased domestic investment. Second, an autonomous cut in money wages is translated into a cut in real wages to the benefit of employment - unlike the Keynesian closed economy case where labour cannot normally effect a reduction in the real wage by accepting a reduction in the money wage. Third, unlike many open economy models, the trade balance always improves as the level of output and employment expands.¹ There is no trade-off, therefore, between full employment and the balance of payments. The economy may, indeed, have a current balance of payments deficit at full employment, but the deficit would be larger if employment were lower. A cut in domestic demand will correct the deficit without any adverse effect on the level of employment.

Finally, there is an implication arising from the simplification of keeping relative (world) prices unchanged, which must be qualified once that assumption is removed. The model implies that a depression in world demand, communicating itself through changes in the level, but not the relativity, of world prices, need have no effect on either the level of employment or real wages in the small open economy:

provided the money wage or the exchange rate were changed, full employment could be maintained at the same real wage. This need no longer hold, however, once relative world prices change. If, to take a topical example, a world depression is associated with a large relative rise in the price of non-competing imports (e.g. oil), then the small open economy may experience simultaneously a rise in unemployment, a fall in the real purchasing power of wages, and balance of payments troubles. It remains true, however, that the economy is not demand-constrained, and that a real

1. If this implication seems to clash with experience of small open economies, it is worth noting, however, that in a dynamic, Harrod-Domar, version of such a model, the balance of trade deficit will, in fact, increase with the growth rate of the economy. In Harrod's terminology, the equilibrium growth equation for the small open economy model with a given capital-output ratio is $G_w C_r = s + m_1 + z$, where G_w , C_r and s have the same interpretation as in Harrod (1948); m_1 is the propensity to import non-competing goods; and z is the difference between competing imports and exports as a proportion of domestic income. If there were no restriction on the size of z , G , the actual growth rate, and G_w , the warranted growth rate, would always be equated through adjustment in z , so that the highly unstable situation in Harrod's model would not apply; and, for given values of C_r , s and m_1 , the greater is G the greater is z . Obviously, it would be quite unrealistic to assume that z could continue indefinitely at a high level, but reconsideration of dynamic adjustment mechanisms lies beyond the scope of this paper.

wage cut, if sufficiently large, can restore full employment and improve the balance of payments.

V. Policy Implications

The policies that would be advocated, if the above representation were an adequate reflection of reality, delimit the usefulness of demand manipulation, via fiscal or monetary means, as an aid to seeking improvements in domestic output and employment. Even in the closed economy, the possibility exists that employment expansion may be cost-constrained, in which case increasing aggregate demand simply generates a price-wage spiral. In the small open economy, domestic demand management would be an irrelevancy from the point of view of expanding output and employment. What such demand management would accomplish is to determine the split of domestic demand between foreign and domestic supply, but not the level of domestic supply.¹ Hence, demand management is primarily an instrument for altering the balance of trade.

The essence of a solution to unemployment in the small open economy is a real wage cut.² In principle, this could be achieved by money wage cuts or devaluation. Although, unlike the closed economy, money wage cuts would work, they run up against Keynes's other objection, namely, that they would be unacceptable to any single group of workers because of fears that its relative wages would suffer in the process; whereas, in his view, "it would be impracticable to resist every reduction of real wages, due to a change in the purchasing-power of money which affects all workers alike" (Keynes (1936), p.14). Devaluation in the small open economy, which seeks to effect a reduction in real wages through a general price rise, is, therefore, closely analogous to boosting aggregate demand in the closed economy. And just as in the cost-constrained closed economy, boosting demand will only work if there is money wage restraint, so the success of devaluation in the small open economy depends on money wage restraint - otherwise, exchange rate flexibility simply leads to an "exchange rate - price - wage" spiral. If such restraint is not forthcoming spontaneously, then

1. Cf. Lindbeck (1976). Mundell (1968) concludes that fiscal policy may be effective in raising output and employment in a small open economy with a fixed exchange rate. In his model, however, the cost-constrained situation is not considered, and the demand constraint on output implies that the elasticity of demand for domestic supply is less than perfectly elastic.

2. Higher output per worker at the existing real wage level (whether attained through harder work, better organisation, etc) would, of course, serve equally well.

incomes policy is the only other possibility open to the government to try to secure the real wage cut needed to raise employment.

If world prices generally are rising, then money wage restraint, rather than an outright cut, would suffice to raise the level of employment. Full indexing of wages to prices, by eliminating the possibility of a real wage cut, would deprive the economy of any means of increasing employment. Once full employment is reached, revaluation is the appropriate measure to maintain domestic price stability in the face of generally rising world prices. Until full employment is reached, however, revaluation to maintain domestic price stability would be a misguided policy if employment is the primary goal - unless, of course, money wages are sufficiently flexible downwards.

In practice, of course, there are numerous reservations applying to the type of policy conclusions emanating from so simple a model, the most important relating to the fact that an economy is composed of a number of sectors, some of which are wholly or partly sheltered from foreign competition. With differing demand, as well as supply, conditions prevailing in different sectors, the government may be able to alter the composition of output to secure greater employment at any given real wage. Changes in policy with respect to restrictive practices may also increase the demand for labour at each wage level. In the longer-term, changes in the capital stock and in technology may accomplish the same object.

For short-term employment policy, however, the focus of attention in developed economies has been on the two restrictive chains discussed above - cost-constrained and demand-constrained - with primacy generally being accorded by most Keynesians to the latter. The analysis suggests that, for small open economies at least, the cost-constrained chain is more likely to be the operative one. The model of the small open economy developed here depends for its conclusions on two crucial assumptions: (a) perfect elasticity of demand for its output at ruling international prices; and (b) an inverse relationship between the real wage and employment. If (a) holds but not (b), then the only effective restriction on achieving full employment would be a binding constraint of a resource other than labour. Given that their own actions are unlikely to have a significant effect on international prices, the existence of small open economies with unemployed

labour and capital resources constitutes a prima facie case for the determination of output and employment by costs rather than demand.

VI. Conclusions

We have considered the implications of a small open economy model where all goods are subject to unlimited foreign competition. In such an economy, many of the old-fashioned virtues - such as saving and money income restraint - are fully restored to favour. Expansion of domestic demand is ineffective as well as unnecessary for increasing employment, and is relevant only to correcting a current balance of payments surplus.

Some of these lessons may have wider application, however. Even in a completely closed economy, the possibility exists that unemployment may be due to cost-constraints, in which case increasing aggregate demand simply generates a price-wage spiral. The overshadowing of such issues of supply management by the dominant emphasis on demand management may be the root cause of the poor performance of certain industrialised countries¹ since World War II. One may indeed suggest that the pre-Keynesian fallacy that supply necessarily creates its own demand has been widely replaced by the converse, and equally fallacious, assumption that demand necessarily creates its own supply.

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1. Ironically, some of these countries are now looking to new sources of supply of raw materials to maintain their existing standard of living.

References

- Barro, R. J. O. and Grossman, H. I. (1976). Money, Employment and Inflation. Cambridge: Cambridge University Press.
- Clower, R. W. (1965). "The Keynesian Counter-Revolution: A Theoretical Appraisal". In The Theory of Interest Rates (ed. F. H. Hahn and F. P. R. Brechling). London: Macmillan.
- Harrod, R. F. (1948). Towards a Dynamic Economics. London: Macmillan.
- Keynes, J. M. (1936). The General Theory of Employment, Interest and Money. London: Macmillan.
- (1939). "Relative Movements of Real Wages and Output". The Economic Journal, Vol.49, pp.34-51.
- Kuh, Edwin (1966). "Unemployment, Production Functions and Effective Demand". Journal of Political Economy, Vol.74, pp.238-49.
- Leijonhufvud, A. (1968). On Keynesian Economics and the Economics of Keynes. New York: Oxford University Press.
- Lindbeck, A. (1976). "Stabilization Policy in Open Economies with Endogenous Politicians". American Economic Review, Vol.66, pp.1-19.
- Mundell, R. A. (1968). International Economics. New York: Macmillan.
- Pasinetti, L. L. (1974). Growth and Income Distribution. Cambridge: Cambridge University Press.
- Patinkin, D. (1965). Money, Interest and Prices, 2nd ed. New York: Harper and Row.
- Sims, Christopher A. (1974). "Output and Labour Input in Manufacturing". Brookings Papers on Economic Activity, No.3, pp.695-728.
- Viner, Jacob (1936). "Mr Keynes on the Causes of Unemployment". Quarterly Journal of Economics, Vol.51, pp.147-67.

Mathematical Appendix

The main propositions in the paper may be given a more formal presentation by the construction of an algebraic model of the economy. A number of such models have, of course, been evidenced in the literature, and we may note particularly the celebrated analysis of Mundell (1968). The system used here consists of four markets - Labour, Commodities, Money, and Bonds, though the bond market is not considered explicitly.

The equation system is as follows,

$$Y_d = C + I + G \quad (1)$$

$$C = c(Y_s, P_h/P_{fh}) \quad (2)$$

$$G = \bar{G} \quad (3)$$

$$I = I(r) \quad (4)$$

$$(IM) = m(Y_s, P_h/P_{fh}) \quad (5)$$

$$Y_s = Y(N, \bar{K}) \quad (6)$$

$$Y_s + Z = Y_d \quad (7)$$

$$N = N(w/P_h) \quad (8)$$

$$P_h = \chi \bar{P}_{fc} \quad (9)$$

$$P_{fh} = \chi \bar{P}_f \quad (10)$$

$$P_w = \sigma_h P_h + \sigma_f P_{fh} \quad (11)$$

$$M^d = P_w L(Y_s, r) \quad (12)$$

$$M^s = S + R \quad (13)$$

$$r = \bar{r}_f \quad (14)$$

$$M^d = M^s \quad (15)$$

The interpretation of the model is straightforward. We have a two-good⁽¹⁾ model: a domestic good produced in competition with foreign suppliers, and a non-competitive import good (i.e. a good of which there is no home production). The list of variables is as follows (quantities of goods demanded and produced being measured in real terms): Y_d = domestic demand for the competitive good, comprising consumption (C), investment (I) and government (G) demands. Y_s denotes domestic supply of the competitive good, which equals real national income. (IM) are imports of the non-competitive good, a function of domestic income and relative prices. (IM) refers to the total demand for these imports,

(1) Each "good" may of course be regarded as a basket of different commodities with the relative price of the commodities within each basket remaining constant.

irrespective of whether it originates in the private or government sector, or on whether it is desired for consumption or investment purposes. Z denotes the disjunction between domestic supply and total home demand for the competitive good, and is thus equal to the value of competitive imports ($Z > 0$) or competitive exports ($Z < 0$). N denotes employment; w the money wage; r the rate of interest. Regarding the price equations, \bar{p}_{fc} denotes the ruling international price for the competitive good and X the exchange rate; so that the price of the competitive good on the home market is $p_h = X\bar{p}_{fc}$. Private producers will always seek this price. They need not charge less since they can always sell unlimited quantities on the international market at price \bar{p}_{fc} . They cannot charge in excess of $X\bar{p}_{fc}$, otherwise they would lose their entire market share to foreign competitors. \bar{p}_f denotes the ruling international price of the non-competitive import good, and p_{fh} its price in domestic currency. p_w denotes the overall domestic price level, which we take as a weighted index of the prices of the competitive and non-competitive goods in terms of the domestic currency. The weights, σ_h and σ_f , we shall specify à priori, ($\sigma_h + \sigma_f = 1$; $\sigma_h, \sigma_f > 0$), although a more elaborate procedure would be to relate the weights to the importance of competitive and non-competitive goods in total domestic expenditure. M^d denotes the domestic demand for nominal money balances; M^s the domestic supply of money balances, which equals the government's holdings of bonds (S), plus its holdings of foreign reserves (R), with S and R both measured in terms of domestic currency. Domestic and foreign bonds are perfect substitutes, and we assume complete capital mobility; the interest rate r is thus equated to the ruling international rate, \bar{r}_f .

The system (1) - (15) may be reduced to

$$Y_s = y(N, \bar{K}) \quad (16)$$

$$Y_s + Z = c(Y_s, \bar{p}_{fc}/\bar{p}_f) + l(\bar{r}_f) + \bar{G} \quad (17)$$

$$N = n(w/X\bar{p}_{fc}) \quad (18)$$

$$[\sigma_h X\bar{p}_{fc} + \sigma_f X\bar{p}_f] L(Y_s, \bar{r}_f) = S + R \quad (19)$$

The level of non-competitive imports (IM) does not enter into the determination of the level of domestic supply, Y_s , of the competitive good, although of course it remains an important factor in determining the balance of trade.

Taking the differential of (16) - (19), we therefore have,

$$dY_s - y_1 dN = 0 \quad (20)$$

$$dY_s(1 - c_1) + dZ - d\bar{G} - c_2 \frac{d\bar{p}_{fc}}{\bar{p}_f} + c_2 \frac{\bar{p}_{fc}}{\bar{p}_f^2} d\bar{p}_f = 0 \quad (21)$$

$$dN - \frac{n_1}{X\bar{p}_{fc}} dw + \frac{n_1 w}{X^2\bar{p}_{fc}} dX + \frac{n_1 w}{X\bar{p}_{fc}^2} d\bar{p}_{fc} = 0 \quad (22)$$

$$p_w L_1 dY_s - dS - dR + L(Y_s, \bar{r}_f) \left[\frac{p_w}{X} dX + \chi\sigma_h d\bar{p}_{fc} + \chi\sigma_f d\bar{p}_f \right] = 0 \quad (23)$$

where we have equated to zero the differential of those variables which we shall assume invariant throughout the analysis. n_1, c_2 , etc., denote the partial derivative of that function with respect to the first and second variable of its argument. We assume $y_1, c_1, L_1 > 0$; $c_2, n_1 < 0$.

Alternative solutions of (20) - (23) can now be considered depending on which variables are taken as endogenous or exogenous.

Case 1

The first case we consider is where the government uses the reserves (R) to stabilise the exchange rate. The endogenous variables are therefore, Y_s, N, Z, R ; and the system (19) - (22) may be written,

$$\begin{bmatrix} 1 & -y_1 & 0 & 0 \\ (1-c_1) & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ p_w L_1 & 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} dY_s \\ dN \\ dZ \\ dR \end{bmatrix} = \begin{bmatrix} 0 \\ d\bar{G} + \frac{c_2 d\bar{p}_{fc}}{\bar{p}_f} - \frac{c_2 \bar{p}_{fc} d\bar{p}_f}{\bar{p}_f^2} \\ \frac{n_1 dw}{X\bar{p}_{fc}} - \frac{n_1 w}{X^2\bar{p}_{fc}} dX - \frac{n_1 w d\bar{p}_{fc}}{X\bar{p}_{fc}^2} \\ dS - \frac{L p_w}{X} dX - LX [\sigma_h d\bar{p}_{fc} + \sigma_f d\bar{p}_f] \end{bmatrix} \quad (24)$$

The solution to which is given by,

$$\begin{bmatrix} dY_s \\ dN \\ dZ \\ dR \end{bmatrix} = \begin{bmatrix} 1 & 0 & y_1 & 0 \\ 0 & 0 & 1 & 0 \\ -(1-c_1) & 1 & -(1-c_1)y_1 & 0 \\ p_w L_1 & 0 & p_w L_1 y_1 & -1 \end{bmatrix} \begin{bmatrix} 0 \\ d\bar{G} + \frac{c_2}{\bar{p}_f} d\bar{p}_{fc} - c_2 \frac{\bar{p}_{fc}}{\bar{p}_f^2} d\bar{p}_f \\ \frac{n_1 dw}{X\bar{p}_{fc}} - \frac{n_1 w}{X^2\bar{p}_{fc}} dX - \frac{n_1 w}{X\bar{p}_{fc}^2} d\bar{p}_{fc} \\ dS - \frac{L p_w}{X} dX - LX [\sigma_h d\bar{p}_{fc} + \sigma_f d\bar{p}_f] \end{bmatrix} \quad (25)$$

Assuming that the money wage rate is fixed, and that the trade balance need not be in equilibrium, then we have the following implications regarding the impact of demand or supply management policies.

The impact of demand stimulation, via monetary or fiscal policies, can be seen as follows. Let the government attempt to expand the money supply via open market operations ($dS > 0$), by purchasing bonds from individuals. In the closed economy this can be expected to bid up the price of bonds and thus lower the rate of interest. Here, however, the country faces a supply curve of infinite elasticity for bonds at the ruling international price ($1/\bar{r}_p$). A shortage of bonds can therefore never develop, and if the domestic supply of bonds is insufficient to meet domestic demand, this demand can be met by the purchase of foreign bonds. These have to be bought in foreign currency, and thus foreign reserves are depleted (although foreign assets of the economy, taken as foreign bonds plus reserves, remain unchanged). Thus as (24) implies we have a straight feedback from government purchases of bonds (dS), to the reserves (dR), i.e. $dR = -dS$.

National Income (Y_s), employment (N), and the trade balance of the competitive good (Z) are unaffected by changes in S , and thus demand manipulation, via open-market operations are not an effective stabilisation tool in such an economy ($dY_d = c_1 dY_s = 0$). Fiscal policy, [$d\bar{G} > 0$], has no effect on the endogenous variables [$dY_s = dN = dR = 0$], except on competitive imports (or exports), in which case we have a straight feedback [$dG = dZ$], i.e. an increase in government expenditure leads to an equivalent reduction in competitive exports (or increase in competitive imports). Thus, in the case of money wage rigidity, the customary instruments of demand management have no effect on income and employment.

We turn now to "supply-oriented" measures which we shall assume refer to changing the costs and thus profitability of domestic production. In the present model, changes in profitability can only be induced by a change in the relativity of the money wage and the home price of the competitive good. A decline in the money wage will increase output and employment [$dY_s, dN > 0$], reduce competitive imports (or increase exports) [$dZ < 0$], and increase reserves [$dR > 0$]. If we assume money wage inflexibility, then a change in profitability can only be induced by a change in the home price through a change in the exchange rate. A depreciation of the currency, $dX > 0$, w constant, will affect all the endogenous variables, having positive effects on domestic supply [$dY_s > 0$] and employment [$dN > 0$], a reduction in competitive imports (or increase in exports) [$dZ < 0$] and a positive effect on reserves [$dR > 0$].

A rise in the price of the non-competitive good with the price of the competitive good unchanged [$d\bar{p}_f > 0$, $d\bar{p}_{fc} = 0$] has no effect on output ($dY_s = 0$) or employment ($dN = 0$). Insofar as it increases the general price level and thus increases demand for nominal money balances, it will lead to an increase in the reserves [$dR > 0$]. Insofar as it generates a switch away from the purchase of the non-competitive to the competitive good, it would entail a reduction in exports (or increase in imports) of the competitive good [$dZ > 0$].

A rise in the price of the competitive good with the price of the non-competitive good unchanged [$d\bar{p}_{fc} > 0$, $d\bar{p}_f = 0$] will increase output, employment, and the reserves, and reduce imports (or increase exports) of the competitive good.

The above results have relied on the assumption of a fixed money wage. However as the exchange rate or relative prices vary, fluctuations in the real wage will almost certainly occur. If workers seek to maintain constancy of the real wage, then different consequences from those already noted will ensue. The real wage may be defined as,

$$w_r = w/p_w \quad (26)$$

Assuming that workers seek constancy of this wage at some historically determined level (\bar{w}_r), then for changes in the prices of goods and foreign exchange, we must have the relationship,

$$dw = \bar{w}_r dp_w = w_r \frac{p_w}{X} dX + w_r X [\sigma_h d\bar{p}_{fc} + \sigma_f d\bar{p}_f] \quad (27)$$

Then substituting (27) in (22), we have,

$$dN + \frac{n_1 w}{\bar{p}_{fc}} \left[\frac{\sigma_f \bar{p}_f}{\bar{p}_{fc} p_w} \right] d\bar{p}_{fc} - \frac{n_1 w_r \sigma_f}{\bar{p}_{fc}} d\bar{p}_f = 0 \quad (28)$$

Thus, if real wages are maintained at a constant level, changes in the exchange rate will have no effect on output, employment or competitive imports (exports) [$dY_s, dN, dZ = 0$]. However a depreciation [$dX > 0$], will increase reserves [$dR > 0$]. A rise in the price of the competitive good with the price of the non-competitive good unchanged [$d\bar{p}_{fc} > 0$, $d\bar{p}_f = 0$] will increase output and employment [$dY_s, dN > 0$], reduce competitive imports [$dZ < 0$], and increase reserves [$dR > 0$]. A rise in the price of the non-competitive good with the price of the competitive good unchanged, will reduce output and employment [$dY_s, dN < 0$] and increase competitive imports [$dZ > 0$]; its effect on reserves is ambiguous depending on the sign of the quantity

$$\left\{ p_w L_1 y_1 \left[\frac{n_1 w_r \sigma_f}{\bar{p}_{fc}} \right] + L X \sigma_f \right\}$$

Case II

The second case we consider is where the government allows the exchange rate to fluctuate and maintains some desired level of reserves (in terms of domestic currency). The endogenous variables then become, Y_s , N , Z and X , and the system (20) - (23) may be written,

$$\begin{bmatrix} 1 & -y_1 & 0 & 0 \\ (1-c_1) & 0 & 1 & 0 \\ 0 & 1 & 0 & n_1 \frac{w}{\chi^2 \bar{p}_{fc}} \\ P_w L_1 & 0 & 0 & L \frac{P_w}{\chi} \end{bmatrix} \begin{bmatrix} dY_s \\ dN \\ dZ \\ dX \end{bmatrix} = \begin{bmatrix} 0 \\ d\bar{G} + \frac{c_2 d\bar{p}_{fc}}{\bar{p}_f} - \frac{c_2 \bar{p}_{fc}}{\bar{p}_f^2} d\bar{p}_f \\ \frac{n_1 dw}{\chi \bar{p}_{fc}} - \frac{n_1 w}{\chi \bar{p}_{fc}^2} d\bar{p}_{fc} \\ dS + dR - LX[\sigma_h d\bar{p}_{fc} + \sigma_f d\bar{p}_f] \end{bmatrix} \quad (29)$$

The solution to (29) may be written,

$$\begin{bmatrix} dY_s \\ dN \\ dZ \\ dX \end{bmatrix} = \begin{bmatrix} -\frac{P_w L}{\chi y_1 (1-c_1)} & ; & 0 & ; & -\frac{P_w L}{\chi (1-c_1)} & ; & \frac{n_1}{(1-c_1)} \left(\frac{w}{\chi^2 \bar{p}_{fc}} \right) \\ -\frac{P_w L_1}{y_1 (1-c_1)} n_1 \left(\frac{w}{\chi^2 \bar{p}_{fc}} \right) & ; & 0 & ; & -\frac{P_w L}{\chi y_1 (1-c_1)} & ; & \frac{n_1}{y_1 (1-c_1)} \left(\frac{w}{\chi^2 \bar{p}_{fc}} \right) \\ \frac{P_w L}{\chi y_1} & ; & \Delta & ; & \frac{P_w L}{\chi} & ; & -n_1 \frac{w}{\chi^2 \bar{p}_{fc}} \\ \frac{P_w L_1}{y_1 (1-c_1)} & ; & 0 & ; & \frac{P_w L_1}{(1-c_1)} & ; & -\frac{1}{y_1 (1-c_1)} \end{bmatrix} X$$

$$\frac{1}{\Delta} \begin{bmatrix} 0 \\ d\bar{G} + \frac{c_2 d\bar{p}_{fc}}{\bar{p}_f} - \frac{c_2 \bar{p}_{fc}}{\bar{p}_f^2} d\bar{p}_f \\ \frac{n_1 dw}{\chi \bar{p}_{fc}} - \frac{n_1 w}{\chi \bar{p}_{fc}^2} d\bar{p}_{fc} \\ dS + dR - LX[\sigma_h d\bar{p}_{fc} + \sigma_f d\bar{p}_f] \end{bmatrix} \quad (30)$$

where

$$\Delta = \frac{P_w L_1}{(1-c_1)} n_1 \frac{w}{X^2 P_f} - \frac{P_w L}{X y_1 (1-c_1)} < 0 \quad (31)$$

The implications of (30) are as follows. With regard to monetary policy, if the government attempts to expand the money supply via open-market operations [$dS > 0$], this will lead to downward pressure on the interest rate and an outward movement of capital, which this time is not met from the reserves ($dR = 0$). There is a consequent depreciation of the currency [$dX > 0$], which leads to increased demand for domestic goods [$dY_s, dN > 0$], and a reduction in competitive imports (or increase in competitive exports) [$dZ < 0$]. Demand stimulation through an increase in government expenditure [$d\bar{G} > 0$], will have no impact on output [$dY_s = 0$], employment [$dN = 0$], or the exchange rate [$dX = 0$], but leads to straight feedback into competitive imports (or exports). Thus an increase in government expenditure is met by a one-to-one increase in competitive imports (or reduction in competitive exports) [$d\bar{G} = dZ$].

A reduction in the money wage [$dw < 0$], leads to an increase in output [$dY_s > 0$], and employment [$dN > 0$], a fall in competitive imports [$dZ < 0$], and an appreciation of the currency [$dX < 0$]. A rise in the price of the non-competitive good with the price of the competitive good unchanged [$d\bar{p}_f > 0, d\bar{p}_{fc} = 0$], has the effect of reducing output [$dY_s < 0$] and employment [$dN < 0$], increasing competitive imports [$dZ > 0$], and appreciating the currency [$dX < 0$]. A rise in the price of the competitive good with the price of the non-competitive good unchanged [$d\bar{p}_{fc} > 0, d\bar{p}_f = 0$], has the effect of increasing output and employment [$dY_s, dN > 0$], reducing competitive imports [$dZ < 0$], and appreciating the currency [$dX < 0$].

Turning to the case where we assume constancy of the real wage, then the solution of (29) becomes,

$$\begin{bmatrix} dY_s \\ dN \\ dZ \\ dX \end{bmatrix} = \begin{bmatrix} 1 & 0 & y_1 & 0 \\ 0 & 0 & 1 & 0 \\ -(1-c_1) & 1 & -y_1(1-c_1) & 0 \\ -\frac{X L_1}{L} & 0 & -\frac{X y_1 L_1}{L} & \frac{X}{P_w L} \end{bmatrix} \begin{bmatrix} 0 \\ d\bar{G} + \frac{c_2 d\bar{p}_{fc}}{\bar{P}_f} - \frac{c_2 \bar{P}_{fc}}{\bar{P}_f^2} d\bar{p}_f \\ -\frac{n_1 w}{\bar{P}_{fc}} \frac{\sigma_f \bar{P}_f}{\bar{P}_{fc} P_w} d\bar{p}_{fc} + \frac{n_1 w_r \sigma_f}{\bar{P}_{fc}} d\bar{p}_f \\ dS + dR - LX \left[\frac{d\bar{p}_{fc}}{h} + \sigma_f d\bar{p}_f \right] \end{bmatrix} \quad (32)$$

In this case monetary measures $[dS > 0]$ have no impact except on the exchange rate $[dX > 0]$. Government expenditures have no impact except a straight feedback into the trade balance $[d\bar{G} = dZ]$.

With regard to relative price changes, an increase in the price of the competitive good with the price of the non-competitive good unchanged $[d\bar{p}_{fc} > 0, d\bar{p}_f = 0]$, implies an increase in output and employment $[dY_s, dN > 0]$, an increase in competitive exports (reduction in competitive imports) $[dZ < 0]$, and an appreciation of the currency $[dX < 0]$. An increase in the price of the non-competitive good with the price of the competitive good unchanged, $[d\bar{p}_f > 0, d\bar{p}_{fc} = 0]$, reduces output and employment $[dY_s, dN < 0]$ and increases competitive imports $[dZ > 0]$. The effect on the exchange rate depends on the sign of the quantity

$$\left[-\chi^2 \frac{\sigma_f}{P_w} - \left(\frac{X y_1 L_1}{L} \right) \left(n_1 \frac{n_1 w_r \sigma_f}{P_{fc}} \right) \right].$$

Abstract

The aim of the paper is to consider the short-run interrelations between output, employment and wages for the small open economy; and to contrast the policy implications for such an economy with those arising from the "Keynesian" closed economy model. Particular stress is laid on the distinction between cost-constrained and demand-constrained unemployment. Investigation of ^{the} efficacy of various policy measures suggests that the usefulness of demand manipulation via fiscal or monetary means, as an aid to seeking improvement in domestic output and employment, is rather limited.