



EMPLOYMENT, INFLATION AND GROWTH

EMPLOYMENT, INFLATION AND GROWTH

An Inaugural Lecture by

A. W. PHILLIPS

*Tooke Professor of Economic Science and
Statistics in the University of London at
the London School of Economics and
Political Science*

28 November 1961

THE LONDON SCHOOL OF ECONOMICS
AND POLITICAL SCIENCE

G. BELL AND SONS, LTD
LONDON W.C.2

Copyright © 1962 by A. W. Phillips



Library

IAS, Shimla

PH 332.414 P 541 E



00020830



7/10/83

PH
332.414
P541E

Printed in Great Britain by
The Camelot Press Ltd., London and Southampton

EMPLOYMENT, INFLATION AND GROWTH



I. INTRODUCTION

SINCE the end of the Second World War economic policy and controversy in Britain have been directed to ways of attaining a number of related objectives, prominent among which are the maintenance of a high and stable level of employment, reasonable stability of the average level of final product prices, a fairly rapid rate of economic growth, a satisfactory balance of foreign trade and reasonable stability of foreign exchange rates. It can hardly be claimed that there has been complete success in the attainment of these objectives. It is true that employment has been maintained at an extremely high level. The average level of unemployment since 1948 has been little more than $1\frac{1}{2}$ per cent. of the work force. This is probably a lower level of unemployment than that attained in any single year in peacetime during the previous century, except perhaps in 1872. Even in the boom years of the pre-war trade cycle the percentage of trade unionists unemployed rarely fell below 2 per cent. and over the

fifty-three years from 1861 to 1913 it averaged $4\frac{1}{2}$ per cent. The actions taken to improve the stability of the system have also had some measure of success. Before the First World War there was a fairly regular trade cycle with an average period of about eight years, during which trade union unemployed fluctuated between about 2 and 10 per cent. Since the Second World War the cyclical movements in economic activity have become more rapid, with a period of 4 or 5 years, but the fluctuations have been smaller. Unemployment, indeed, has only fluctuated between about 1 per cent. and $2\frac{1}{2}$ per cent.—that is, over a range of about $1\frac{1}{2}$ per cent.—but the percentage fluctuations in gross national product about the growth trend have been about five times as large as this,¹ the range of the fluctuations as a percentage of the trend being about 7 or 8 per cent. Between 1948 and 1960 gross national product increased at an average rate of about $2\frac{3}{4}$ per cent. per annum and productivity per man hour at perhaps $1\frac{3}{4}$ per cent. per annum. Though these rates of increase probably compare favourably with those in earlier periods of British history they are lower than those of a number of other industrial countries in the same period. The average rate of rise of the retail price index between 1948 and 1960 was 3.7 per cent. per annum. There would be fairly general

¹ See F. W. Paish, 'Output, Inflation and Growth' in *Studies in an Inflationary Economy*, to be published, 1962.

agreement that this rate of inflation is undesirable. It has undoubtedly been a major cause of the general weakness of the balance of payments and the foreign reserves, and if continued it would almost certainly make the present rate of exchange untenable.

It is my belief that one of the main reasons for the difficulties that have been experienced in devising and implementing appropriate economic policies is lack of adequate quantitative knowledge and understanding of how the economic system works. Of course, economists do understand, in a general sort of way, quite a lot about the working of the economic system and do now have a mass of quantitative information about important economic variables. But in order to bring this knowledge to bear on the problem of formulating and attaining a consistent set of policy objectives we require also knowledge of the quantitative relations between economic variables. In particular, it is necessary to know what quantitative relations hold between those economic variables which are either the objectives of policy or the instruments through which we attempt to attain the objectives. For example, if some relation holds, in given institutional conditions and on average over a period of years, between the level of employment and the speed of inflation, failure to take account of it may lead to the adoption of inconsistent objectives and to a type of schizophrenic behaviour as attempts are made to attain these inconsistent aims. Knowledge

of the relation would lead either to modification of the objectives to make them consistent or perhaps, since an economic relation is only the result of fairly regular patterns of human behaviour, to some modification of institutions or behaviour which would alter the relation so as to permit some more desirable combinations of consistent aims. Or, again, if at a certain time unemployment is felt to be too high and short-term interest rates are lowered in order to raise the demand for goods and so for labour, how large will the effects be and when will they occur? Will the higher demand also lead to an increase in fixed investment, and if so, how large an increase and after what interval of time? Will wage rates and prices rise more rapidly as a result of the higher demand? If internal demand and prices rise, will imports rise and exports fall, and if so, when and by how much? If we are to assess the effects of our attempts to influence the course of economic affairs we need answers—numerical answers—to questions like these. If we do not have this knowledge the policy adjustments will almost certainly be inappropriate in magnitude or timing or both and may well cause, as I believe they have often caused in the past, unnecessary and harmful fluctuations in economic activity.

We may obtain tentative estimates of a quantitative relation in economics by making a preliminary subjective analysis of human motivation and behaviour and then carrying out a statistical

analysis of relevant data from past records. We also need to investigate the degree of error that there may be in the estimate, the extent to which the relation in successive short time periods departs from its average over longer periods and whether there is any evidence that the average relation changes in any systematic way through time. On the basis of quantitative estimates of this sort, it is possible to set up simplified models of the economic system and by studying the properties of different models with a variety of policy relationships we can form some judgment of the likely effects of alternative types of economic policy. The empirical study of economic relations and the quantitative investigation of the behaviour of models of economic processes are comparatively recent developments in our subject. The knowledge and understanding which have so far been gained are far from being adequate for a firm and detailed appraisal of economic policy. I think they do, however, make possible some attempt at clarification of the problems we face and justify some suggestions for methods of dealing with them.

II. SOME GENERAL PRINCIPLES OF FLUCTUATIONS AND STABILITY

The first policy objective I should like to consider is that of maintaining a stable level of employment, but before proceeding to this it seems desirable to

illustrate some general points about equilibrium, stability and fluctuations in the simplest possible way. Let me therefore consider a single commodity which is being continuously produced and consumed and which is traded on a perfectly competitive market. Assume that the rate of production is an increasing function of price, the rate of consumption is a decreasing function of price and that the rate of change of the price is proportional to the excess demand, i.e. to the rate of consumption minus the rate of production. This is the simple text-book example of supply and demand in a single competitive market. It is frequently stated, and has indeed been stated with some emphasis by such eminent economists as Walras, Marshall and Wicksell, that such a system is necessarily stable, i.e. that it always tends to an equilibrium in which the price is such that the rates of production and consumption are equal. The argument is usually very simple. Suppose the system is not in equilibrium; for example, suppose there is excess demand. Then the price will rise. This will increase production and reduce consumption and so reduce the excess demand. Since the price continues to rise so long as there is any excess demand and any rise in price reduces the excess demand the process will continue until the excess demand is eliminated. In brief, the existence of any discrepancy between production and consumption causes a movement in price which tends to

correct the discrepancy. Therefore, the argument runs, the system is stable. This argument is, of course, fallacious except on the assumption that the complete response of the rates of production and consumption to any change in price occurs instantaneously. If there are any time lags in any of the responses the system will usually fluctuate. Whether the fluctuations will die away or whether they will increase in amplitude and tend to some regular and sustained limit cycle depends on the precise forms of the time lags, on the slopes of the supply and demand curves and on the speed at which the price changes when there is a given excess demand.

The competitive model which we have been considering, and other so-called 'self-equilibrating' models of economic processes are in fact examples of what are known in other fields of study as 'negative feed-back control systems'. In order to see intuitively why these systems are often oscillatory and may well be unstable (which means in practice that they tend to produce fairly large and regular cyclical movements), let us consider again the competitive market. Assume this time that some factor other than price causes small cyclical changes in production or consumption, so that excess demand is alternatively positive and negative (see curve *a* of Figure 1). We shall call this an exogenous movement of excess demand and see what further movements in excess demand would be

induced by price changes which depended only on this exogenous movement. In other words, we shall find what would usually be called the corrective movements in excess demand which result from

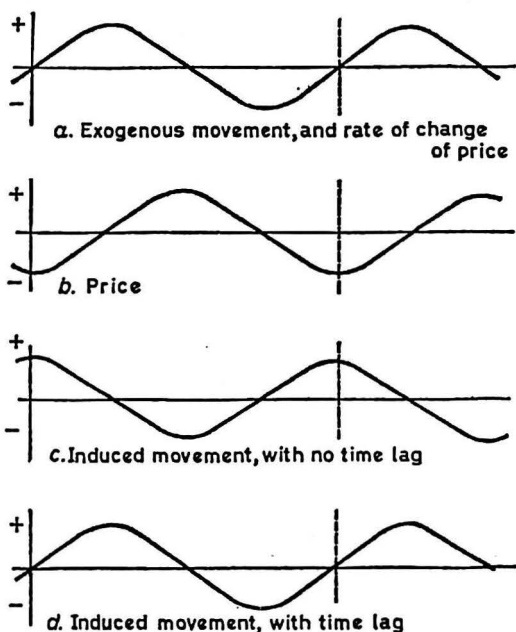


Figure 1

the price changes caused by the exogenous movements in excess demand. Since we are assuming that the rate of change of price is proportional to the exogenous movements in excess demand, the

rate of change of price would have the same time-pattern as the exogenous movement. The price itself, however, would lag behind the rate of change of price by a quarter of a cycle (see curve *b*), since the price would be at its maximum when its rate of change was zero and changing from positive to negative, and would be at a minimum when its rate of change was zero and changing from negative to positive. If the complete response of production and consumption to any change in price was instantaneous, the excess demand induced by the movements of price would be at its minimum when price was at its maximum and vice versa (see curve *c*). Suppose, however, that production and consumption responded to changes in price with a time-lag equal to one quarter of the period of the cycle. Then the excess demand induced by the price changes would be exactly in phase with the exogenous movements in excess demand (see curve *d*). Instead of tending to offset or correct the exogenous movement, the induced changes would tend to accentuate or amplify the fluctuations in excess demand caused by the exogenous movement. It is intuitively plausible, and can in fact be proved, that if, in this case, what are usually called the equilibrating or corrective forces are strong enough to make the amplitude of the induced movements in excess demand greater than the amplitude of the exogenous movements, the system will be unstable, that is, the fluctuations will increase and

tend towards a regular and sustained limit cycle.

The exogenous movements or disturbances which affect economic activity are not usually, of course, of the simple type assumed in this example. They are more likely to be of a rather arbitrary or random pattern which can be described only in terms of a statistical or stochastic process. Such processes can, however, be analysed, by a method known as spectral density analysis, into cyclical components with periods ranging over the whole spectrum from zero to infinity. If disturbances of this sort operate on the model we have been considering, any cyclical component, whose period is such that the time-lag in the response of excess demand to price results in a lag in the neighbourhood of a quarter of the cyclical period, will be amplified, while cyclical components whose periods are widely different from this will be reduced in amplitude. If the 'correcting forces' are sufficiently strong, the cyclical components within a particular range of frequencies or periods will be amplified to such an extent that they will dominate the market movements, which will then exhibit large and somewhat irregular fluctuations, in which, however, cycles with this particular range of periodicities will predominate.

There are two more matters of some importance that I should like to refer to while dealing with the general principles of fluctuations and stability. The first concerns what I shall call the form or

distribution of the time-lags. Suppose the price in the commodity market we have been considering was constant for a long time and then suddenly rose and remained constant at the new level. The rate of production would eventually increase to some

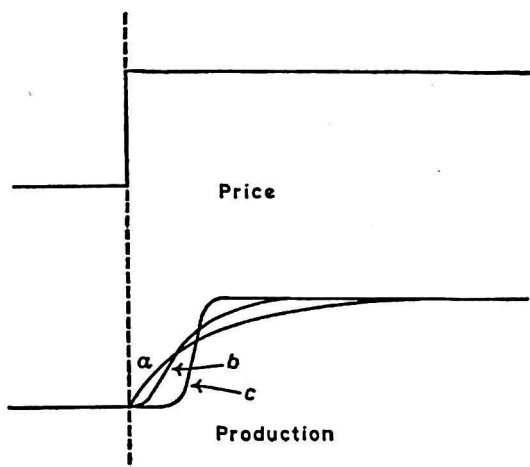


Figure 2

higher value, but there are any number of time paths that this increase might follow. For example, production might start to rise immediately and continue to rise at a gradually diminishing rate, or it might remain constant for a while and then increase gradually, or it might remain constant for a longer time and then increase very suddenly (see curves *a* and *b* and *c* in Figure 2). Now

it can be shown, but by methods which I shall not inflict on you here, that the existence of a time-lag of the first form in the corrective process is much less likely to cause fluctuations and instability than a lag of the second form, and a lag of the second form is less likely to cause these troubles than is the third form of lag. An important rule in devising a corrective system is therefore to get the corrective adjustment started immediately the discrepancy it is intended to correct begins to be observed. Provided a fair proportion of the effect of the corrective action is obtained fairly quickly it does not matter much if the remaining effects are delayed; but it does matter very much if the corrective action itself or all of its effects are delayed.

The second matter which I should like to deal with briefly is that of alternative types of corrective action. It is perhaps best introduced by asking what would happen if in the simple commodity model which we considered earlier it was the price rather than the rate of change of price which depended on the excess demand. We see from the curves that the price movements would occur a quarter of a cycle earlier as a result of this modification, and the induced movements in excess demand would no longer be in phase with the exogenous movements, so that the destabilising effects of the induced movements would be reduced or eliminated. Depending on the form of the time-lag it might or might not be possible to find a cycle

of higher frequency, that is, of shorter period, for which the lag in the response of excess demand to price was half a cycle instead of a quarter-cycle. If so, an exogenous movement of this higher frequency would lead to an induced movement in phase with the exogenous movement and if the amplitude of the induced movement was sufficiently large instability could still occur at the higher frequency. But since most forms of time-lag are in effect weighted averages and tend to produce a low amplitude of response to high-frequency cycles, the likelihood of cyclical instability would be reduced. On the other hand, this form of correction, which is called proportional control, could never ensure that production and consumption were brought into equality, since the price would be constant if excess demand were constant, even if it were not zero. However, a combination of proportional control and the type of correction used before, which is called integral control, overcomes this difficulty and gives better performance than integral control alone. We may go further in this direction and consider the effect of adding to the corrective action a component based on the rate of change of excess demand. Since the fluctuations in the rate of change of a cyclical variable lead the fluctuations in the variable itself by a quarter of a cycle, this component of corrective action, known as derivative control, has a somewhat similar effect to that which would be obtained by basing the

corrective action on a forecast of excess demand. A derivative component of control is used in combination with proportional and integral components in most negative feed-back control systems. By an appropriate combination of the three components it is usually possible to obtain very good regulating performance of a system, with corrective actions based only on the actual values of the variables and their rates of change in the immediate past, and without any recourse to predicted values or forecasts.

III. FLUCTUATIONS IN EMPLOYMENT AND ECONOMIC ACTIVITY

I hope I have not bored you too much by this rather long and somewhat technical digression on the general principles of fluctuations and stability. But I think some understanding of these principles is helpful in a discussion of the stability of employment and economic activity. For the corrective adjustments which affect employment and activity in the whole economy, whether they be inherent in the working of the economy or applied as deliberate instruments of policy, are again examples of control by negative feed-back. The use of forecasts in policy does not substantially affect this statement, since the forecasts are themselves largely based on observations of the economy and its movements in the recent past. Indeed, given the present state of

the art of forecasting, I believe that better results might be obtained by basing suitable corrective action directly on observations of the economy and its changes rather than on forecasts which are themselves largely derived, perhaps by dubious processes, from those observations.

Even if there were no special features which might accentuate disturbances and fluctuations in the economy as a whole, it could not be assumed that the existence of corrective adjustments, even quite powerful corrective adjustments, would stabilise an economy. If they operate with long time-lags, and especially if there are long delays before they commence to operate, they will cause cyclical fluctuations, and the stronger the corrective forces the more violent will be the fluctuations. But there is fairly general agreement among economists that there are special features of an economic system, in particular the multiplier process and adjustments in inventories and capital equipment, which accentuate disturbances and tend to cause cyclical fluctuations. These features increase the need for deliberate stabilisation policies, but also make it more difficult to devise suitable policies.

The problem is best studied by investigating the properties of a variety of models in which use is made of the limited amount of quantitative knowledge at present available about economic relationships. The work involved in such investigations is

greatly reduced and the range of possible models is widened by the use of modern electronic equipment. The results obtained in this way cannot of course be conclusive, but from the investigations I have done so far I have considerable confidence in two simple propositions. The first is that corrective action taken in an attempt to reduce the amplitude of the short cycle of four or five years which is typical of the post-war period is not likely to be successful unless it is based on recently observed rates of change of economic activity as well as on the level of activity. The other is that even if the corrective action is appropriate in this respect, it will still be unsuccessful unless a fair proportion of its ultimate direct effect on demand—say, about a quarter of it—occurs within three or four months of the occurrence of the error it is designed to correct, and at least one half of the full effect within about six months.

Let us examine some of the existing means of influencing demand in the light of these requirements. The response of investment to changes in monetary conditions and interest rates is almost certainly delayed and slow. There is probably a delay of some months before decisions to invest are significantly affected and with most types of investment there is probably a further long time-lag between the decisions to invest and the actual production of capital goods. If this is so, fluctuations are likely to be intensified rather than reduced by

attempts to correct them through operating on long-term interest rates and investment in fixed capital. This does not mean that interest rate policy is unimportant. I believe it has a vital role to play in the slower adjustments required as a result of changes in the desire to save or invest, and thus in influencing the average level of employment and the average rate of change of the price level over fairly long periods.

It is more difficult to judge the effect of operating on short-term credit and short interest rates. Adjustments in these can be made more quickly than in long rates, and to the extent that they affect the desire or ability to hold inventories they might have a significant effect on production within two or three months. But I think much more empirical work will be needed before one can judge with confidence the magnitude, speed and reliability of these effects. I suspect that if fairly large and rapid adjustments in short-term credit conditions were made in response to both the level and the rate of change of economic activity they would help to reduce the amplitude of the short cycle. But there is a difficulty in using adjustments of short-term credit and interest rates for this purpose. Short rates, and perhaps to a lesser extent credit, are closely related to Bank rate, and the level of Bank rate is often made to depend as much on the state of the foreign reserves as on the internal condition of the economy. To the extent that fluctuations

in the foreign reserves are the result of fluctuations in the balance of trade they will tend to lag behind fluctuations in the balance of trade by a quarter of a cycle. Since the balance of trade moves fairly closely with internal activity, fluctuations in the reserves tend to lag behind internal activity, so that changes in Bank rate tend to be too late for satisfactory correction of economic fluctuations.

My conclusion concerning monetary policy is thus similar to that of the Radcliffe Committee:¹ '... monetary measures cannot alone be relied upon to keep in nice balance an economy subject to major strains from both without and within. Monetary measures can help, but that is all.' My reasons for this conclusion are perhaps a little different from those of the Committee. I think that changes in interest rates and credit conditions probably do have quite powerful effects on demand, but that their usefulness for correcting short-period fluctuations is seriously limited as a result of the long time-lags in the response of investment to changes in interest rates, and in the case of credit as a result of the temptation or need to make the adjustments in response to the state of the foreign reserves rather than at the times appropriate to the correction of fluctuations in internal economic activity. Much more research will have to be done, however, before the last word is said on these matters, and I

¹ *Report of the Committee on the Working of the Monetary System*, Cmnd. 827 (1959), p. 183.

would heartily endorse the Committee's statement¹ that ' . . . it is essential to have much greater and more systematic knowledge of the factors that make up the financial system and of their relative movements'.

Turning to the fiscal methods of influencing demand, it is clear that adjustments through annual budgets do not meet the requirements I have stated for the correction of short-period cycles. Budget changes have probably played some part, together with monetary policy, in overcoming the more severe and longer cycles of pre-war days, though this may have come about as much through the confidence of business-men that the Budget could and would be used to avert a severe slump, with the consequent greater stability of their investment plans, as through the actual use of Budget changes. The recent introduction of general adjustments of purchase tax as a regulating device is a more promising development. It suffers, however, from two defects: the rather arbitrary and limited range of goods affected, and the fact that when demand is high there might be expectations of an increase in purchase tax which would lead to a further increase in demand and when demand is low there might be expectations of a decrease in tax which would further diminish demand. Hire purchase controls suffer even more severely from these defects.

None of the fiscal instruments at present in use

¹ *Ibid.*, p. 336.

satisfies the conditions for a satisfactory means of correction. If the purchase tax were changed into a general sales tax and adjusted by small amounts at frequent intervals it would do the job. But a preferable alternative would be the introduction of adjustments of direct taxes. A fairly simple way of adjusting direct taxes would be to calculate every tax to be paid in exactly the same way as is now done, and then to add or subtract a certain percentage to the calculated figure as a stabilisation adjustment. In the case of P.A.Y.E., which is calculated on the basis of income and allowances cumulated from the beginning of the tax year, the figure added or subtracted in each pay period as a stabilisation adjustment would be kept separate from the figure for the normal tax and would be neglected in forming the cumulated tax paid. The figure calculated for the normal tax in each pay period would thus not be affected by earlier stabilisation adjustments, and no change would be needed in existing P.A.Y.E. tables or in the method of using them. The percentage to be added or subtracted could be changed, if necessary, at regular intervals; quarterly intervals might prove to be short enough, though changes at monthly intervals should be possible. In this case those P.A.Y.E. taxes which are paid quarterly should be adjusted by the average of the percentages prevailing in the preceding three months. Similarly, all annual assessments for direct tax should be calculated as at present and then

the average of the percentage adjustments prevailing over the year applied to this figure. Sufficiently fine adjustment would probably be obtained if the changes in the percentage to be added or subtracted were made in steps of $2\frac{1}{2}$ per cent., i.e. sixpence in the pound. The absolute value of the tax adjustment would, of course, be much larger for a person with a high income than for one with a low income. This has advantages from the point of view both of equity and of efficacy; the larger adjustment is needed to induce the person with the higher income to change his expenditure. There would no doubt be some administrative difficulties in introducing a scheme of this sort, but once it was in operation the additional work involved would not be very great. I believe that the choice lies between accepting the minor inconvenience of such a scheme and accepting the continuation of the fluctuations in employment and economic activity which we have experienced since the war.

IV. EMPLOYMENT AND INFLATION

I have so far been discussing fluctuations in employment and economic activity without any reference to the average level about which employment is fluctuating. Consideration of the average level of employment brings us to the question of the relations between employment, or unemployment, and inflation and the rate of growth. In the

past few years a number of people have carried out empirical studies of the relation between unemployment, or some other index of the demand for labour, and the rate of change of wage rates or earnings. Somewhat different methods and hypotheses have been used by different people. In my own very crude attempt to study this relation,¹ I assumed that changes in the cost of living only affect wage changes in years when prices are rising rapidly, usually as a result of rapidly rising import prices. Others² have assumed that changes in the cost of living have a proportionate effect on wage rates in every year. For the post-war years this is probably nearer the truth than the assumption I used. But we must then recognise that changes in the cost of living are in turn mainly the result of earlier changes in wages rates and to a lesser extent of changes in import prices. If these two behaviour relations are fitted to empirical data we can proceed to eliminate price changes and obtain a single

¹ 'The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957', *Economica*, vol. XXV (N.S.) (1958).

² See L. A. Dicks-Mireaux and J. C. R. Dow, 'The Determinants of Wage Inflation: United Kingdom, 1946-56', *Journal of the Royal Statistical Society*, vol. 122 (1959); L. R. Klein and R. J. Ball, 'Some Econometrics of the Determination of Absolute Price and Wages', *Economic Journal*, vol. LXIX (1959), and R. G. Lipsey, 'The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957: A further Analysis', *Economica*, vol. XXVII (N.S.) (1960).

relation expressing wage changes in terms of unemployment and changes in import prices, or alternatively we may eliminate wage changes and express price changes in terms of unemployment and changes in import prices. These new relations are not of course behaviour relations, but they are valid relations for prediction purposes, and are indeed in the most useful form for prediction. The relation I obtained is best considered as a prediction relation of this sort. If the other studies are also interpreted in this way there is reasonable agreement in the results obtained. It seems that if the average level of unemployment were kept at a little less than $2\frac{1}{2}$ per cent. the average rate of increase in wages over a period of years could be expected to be about 2 per cent. per annum, so that with the rate of increase of productivity experienced since the war the average level of prices would be almost constant. Also, in the range between $1\frac{1}{2}$ per cent. and $2\frac{1}{2}$ per cent. unemployment, for every 0.1 per cent. that the average level of unemployment was reduced wages and prices would rise at about 0.3 per cent. per year faster. If it is true that such a relation holds we are faced with a difficult choice. Then we can only reduce inflation, for any given rate of increase of productivity, at the cost of higher unemployment. I think such a relation does hold now, and unless it can be changed we shall probably move towards a compromise solution with a rather higher average level

of unemployment than in the past few years and a lower, though not zero, speed of inflation; perhaps about 2 per cent. unemployment with about 1 per cent. per year rise in prices.

To consider whether the relation can be modified we must know why it is that wages continue to rise while there is significant unemployment. A number of possible causes are often mentioned, in particular lack of mobility of labour and industry, resulting in uneven geographical and occupational distribution of unemployment, competitive bidding by employers for the most suitable labour and trade union pressure.

The mobility of labour and industry would be increased if geographical and occupational movements in relative wages were allowed to take place more freely. If wages in areas and occupations where unemployment is low or excess demand is high rise more than those where unemployment is high or excess demand is low, there will be a greater incentive for labour to move to the areas and occupations in which wages have risen most, and for industry to move to the areas where wages have risen least, and also for industry to adapt its production methods to use more labour in those occupations in which wages have risen least.

Competitive bidding up of wages in a particular occupation and area by employers can easily occur even when some labour in the same occupation and area is unemployed. The basic reason for this is

the wide range of ability that exists among different individuals in the same occupation. Some people, even in a single narrow occupational classification, are worth to an employer considerably more than the average rate of pay in the occupation; others through individual defects of character, intelligence or physique, are worth less. A wide awake employer will often find it profitable to pay 5 or 10 per cent. above the average rate of wages for a particular class of labour in his locality. In this way he can choose the best men and may well finish up with employees whose productivity is 10 or 15 per cent. above the average. If a large proportion of employers adopt this practice wages may be bid up quite rapidly even when there is a significant amount of unemployment. The best solution would seem to be to allow more flexibility in the wages paid to different individuals in the same occupation.

The fourth possible reason I mentioned for wage rates rising when there is significant unemployment was the power and pressure of trade unions. I have some doubts whether this has been an important factor, but if it has, and if the trade unions fully understand the results of their actions, it can only be countered at the cost of occasional major strikes. But have the results of an irresponsible use of their power been made clear to trade unions by governments? If it were widely and clearly understood among the members of trade unions that the full

use of their power to force up money wages would only lead, at a given level of unemployment, to a faster rate of inflation and that the Government would have no alternative but to check this higher rate of inflation, in part at least, by lowering demand and causing some increase in unemployment, it seems possible that the trade unions might see where their true interests lay.

I am not so naïve as to expect that the suggestions I have made for trying to shift the relation between employment and the rate of rise of wage rates in a way which would make it possible to maintain a higher level of employment with any given speed of inflation are likely to meet with an enthusiastic response. They are all suggestions for more flexible arrangements which would allow freer play to the market forces of supply and demand. But for at least a century and a half before the Second World War wage-earners frequently had a pretty raw deal from the market forces of supply and demand, for in most of the years of the trade cycle, and especially in the catastrophic inter-war years, there was a deficiency of aggregate demand. The traditions built up over that period still persist and will continue to persist for some years yet. But in due course it may be realised that continuously rising standards of living come only from continuously rising productivity and that provided the Government is not prevented by inflation from maintaining a high aggregate level of demand for

labour the market forces are no longer harmful, but play a vital part in helping adaptation and progress.

V. EMPLOYMENT AND GROWTH

I have suggested that a slightly higher average level of unemployment than that which we have had in the last few years, perhaps a little over 2 per cent., may be accepted as a necessary condition for moderating the speed of inflation. One often hears heated arguments against checking inflation in this way, on the grounds that if the rate of growth of the economy were more rapid prices would not rise so fast, and that the rate of growth will be reduced by operating the economy at a slightly lower level of employment. It is true, of course, that a higher rate of growth with the same rate of change of wages would lead to a lower speed of inflation. It is also true that while unemployment was actually increasing,—let us say from $1\frac{1}{2}$ per cent. to 2 per cent.—output would be rising less rapidly than it would have been if unemployment had been kept at $1\frac{1}{2}$ per cent. But the argument is often phrased as if the steady rate of growth of the economy with unemployment constant at 2 per cent. would be less than the steady rate of growth with unemployment constant at $1\frac{1}{2}$ per cent. I doubt whether this is true.

During short-period cyclical fluctuations the variations in output as a percentage of the growth

trend are about five times as large as the variations in the percentage unemployment. The difference is largely accounted for by variations in short-time and overtime; by some people, mainly married women, moving into and out of the labour force; and by 'hoarding' of labour during a recession which is expected to be short. If unemployment were to rise by $\frac{1}{2}$ per cent. and stay at the new level, the hoarding of labour and some of the initial change in short-time and overtime would be only temporary, and when the adjustments were completed the percentage fall in output would be considerably less than five times the increase in the percentage unemployment. If account were taken of the value of leisure the fall in real income would be still smaller, since that part of the fall in output which was due to a reduction in overtime and movement of people out of the labour force would be partly compensated by the value to the people concerned of the extra leisure. If an increase of $\frac{1}{2}$ per cent. in unemployment caused a decrease of $1\frac{1}{2}$ per cent. in output, with equal proportional decreases in investment and non-investment expenditures, investment would fall by $1\frac{1}{2}$ per cent. of its own value, and assuming that the growth rate was proportional to investment the growth rate would also decrease by $1\frac{1}{2}$ per cent. of its own value; for example, from 2.5 per cent. to 2.4625 per cent.; an extremely small decrease. If all the decrease in output resulted from a decrease in non-investment

expenditure there would be no change in the rate of growth. The main conclusion from this is that the difference in the steady state rates of growth before and after the transition to the higher unemployment would be extremely small if the growth rates were proportional to investment. Other influences, such as possible extra incentive or compulsion to invest in cost-reducing equipment might easily outweigh any small difference due to the slight change in investment.

It is sometimes argued that the decrease in demand would slow down growth by reducing the desire of firms to invest; but this could always be remedied by reducing interest rates. Indeed since we are assuming that a Government could hold unemployment at the new level, investment in the new steady state, as in the earlier one, would have to be brought into equality with savings. It is on the willingness to save, and the more general influences of educational improvement, research, and so on, that the rate of growth depends in present circumstances. I do not think that very small changes in aggregate demand and unemployment have much effect on these.

VI. RATES OF EXCHANGE

The final question I wish to discuss, very briefly, is that of rates of exchange. The other major trading countries have problems of employment,

inflation and growth which are similar to those of Britain. The question arises whether all countries are likely to hold that balance of internal objectives which would be consistent with the maintenance of fixed exchange rates.

Professors Samuelson and Solow¹ have considered the relation between unemployment and the rate of change of the consumer price index in the United States. Their tentative conclusion is that assuming continuation of the conditions of the post-war period the price index might be stable if unemployment were held at 5 to 6 per cent., and might rise at about 2 per cent. per annum if unemployment were 4 per cent. Some estimates which I have made lead me to think that the situation in the United States is less favourable than this. I estimate that 7 to 8 per cent. unemployment would be needed to maintain a stable price level, and that at 4 per cent. unemployment the price level would rise at about 4 per cent. per annum. Of course, efforts to increase the rate of growth and to reduce structural unemployment may improve the relation between unemployment and price changes; but unless my estimates are badly out or considerable improvements are obtained it seems likely that if unemployment is reduced, as seems to be hoped, to 4 or 5 per cent., the United States may

¹ P. A. Samuelson and R. M. Solow, 'Analytical Aspects of Anti-inflation Policy', *American Economic Review*, vol. L, No. 2 (1960).

well have a rather faster rate of inflation than Britain would have with 2 per cent. unemployment.

In Germany similar problems are beginning to appear. Unemployment has fallen steadily from about 10 per cent. in 1950 to 1.2 per cent. in 1960, and labour costs are now rising rapidly. The growth rate is still high, but some special factors which contributed to it, such as reconstruction after the war and the currency difficulties, and availability of skilled labour from unemployed or from refugees, are passing. It may well be that in Germany too the problem of choosing between inflation and unemployment will become acute. These three countries, and others, may perhaps be prepared to adjust their own choices about internal balance in order to make them consistent with a régime of fixed exchanges. But I have some doubts whether they will be prepared to do so, or if they are whether they in fact know the quantitative workings of their own and other economies well enough to choose the appropriate objectives before gradual divergencies in price levels have cumulated to such a degree that they impose a heavy strain on the international monetary system.

If this is so, it might be better to allow a limited flexibility into the exchange system, so that gradual drifts in relative prices, which would probably not be at a rate of more than 1 or at most 2 per cent. per year, would not produce cumulative disequilibria in balances of trade which might eventually

necessitate large and sudden movements of exchange rates and do serious damage to the international monetary system. A limited flexibility could be introduced by an agreement that the par value of any one currency, in terms of gold, could be changed at any time, provided the total change in one direction in any period of twelve months did not exceed 1 per cent. There would, I think, be much more confidence that a country could in fact work within this rule than that it could for ever succeed in keeping the par value constant, so the fear, or hope, of a sudden large change in the rate, with the tremendous speculative movements it causes, would be greatly diminished. The maximum permissible rate of change of the par rate, 1 per cent. per year, could easily be offset by short-term interest differentials, so it need not lead to any major transfers of capital. And this limited degree of exchange flexibility would allow each country time to find by trial and error that compromise between its internal objectives which was consistent with its exchange rate policy.

I said at the beginning of this lecture that I believed one of the main difficulties in devising and implementing appropriate economic policies is lack of quantitative knowledge and understanding of how the economic system works. By now I have no doubt amply demonstrated at any rate my own lack of knowledge and understanding, and it only remains to apologise to any of you who may

have come here expecting clear and definite answers to the problems I have been discussing. I hope the next person to face the ordeal of giving an inaugural lecture on election to the Tooke Chair will be in a position to explain these matters more clearly.

