CHAPTER IX

SOME CONCLUSIONS ON BUSINESS CYCLE POLICY

IX 1. GENERAL REMARKS

In this chapter we shall, with the help of our model of British business cycles before 1914, discuss the probable results of some measures of trade cycle policy often advocated. This is, in fact, one of the most important services our scheme is able to render and the main reason why we invested so much work in the construction of it. The basic idea is that any act of business cycle policy is equivalent to a change in attitude of one or more subjects, or a change in reaction or convention and can therefore be translated into a change of one or more of the elementary equations without changing the others. The more the elementary equations really represent direct causal relationships, the more will it be true that most of the other equations remain unaffected. But not always will only one equation at the time be altered. There are a number of equations which depend on the same basic decisions as one or two of the others and a change in such a basic decision necessarily changes all the elementary equations depending on it. An example is the consumption equation III 1. If consumption should become more sensitive to changes in incomes than before, this would not only enlarge the coefficients before Z_{-1} and Z_{-2} in this equation, but it would at the same time change the coefficients in equations IV 5 and IV 6, indicating the dependency of raw material prices on Z and Z_{-1}, since these coefficients are a consequence of the dependency of consumption on incomes. In the following sections we will have to find out which coefficients will be varied as the consequence of a given type of policy, and what are the consequences for the movements of the system.

It is not our intention to discuss difficulties in the practical execution of the various forms of policy. Therefore a final judgment of what is the best policy cannot be given. For the formulation of such a judgment, however, the knowledge of the consequences is of primordial importance. In general it may be maintained that the costs of most of these measures are only small in comparison to the cyclic fluctuations in total income occuring without any special policy and in comparison with the loss of production as a consequence of idle labour.

Quite generally, two types of business cycle policy may be distinguished, viz. systematic and incidental policy. A *systematic* business cycle policy is equivalent to a structural change of the economic model since it means a changed reaction to a certain situation, which will take place each time when that situation presents itself, and more or less automatically. An

incidental business cycle policy will not, as a rule, show a changed reaction recurring automatically when a certain situation recurs. In the language of our equations: a systematic business cycle policy means the addition of a systematic term to one or more of our equations. Incidental policy only means the addition of an incidental term. Our purpose is to discuss, as a rule, only systematic forms of business cycle policy.

We have seen that the real movements the economy performs are the results of (a) external shocks and (b) the reactions of the system to these shocks. Every shock brings the system out of its equilibrium and initiates a cyclic or other systematic process of reaction. This process lasts until a fresh shock occurs, which more or less disturbs the systematic movement. Another systematic movement follows. These external shocks are, to a great extent, beyond the control of man or at least of the authorities of one country. Business cycle policy has, therefore, to tackle the *reactions of the economy to these shocks*. The best thing it can do is to change these reactions in such a way that only *heavily damped* systematic movements are possible. Then the fresh shocks, whatever their origin, will do least harm. The equilibrium position will soon be reached again and *cumulative* processes, away from equilibrium, will not develop. Those measures of business cycle policy will therefore be best that increase the damping degree or, which is the same, decrease the value of r, the modulus of the root of the characteristic equation. But with unchanged damping degree a *shortening of period* is also favourable, since it means that, with a given initial disturbance, the turning point is reached at an earlier date and, hence, at a moment when the amplitude of the wave is smaller than at the turning point of a longer wave.

IX 2. CHANGES IN CONSUMPTION, SAVINGS AND INVESTMENT HABITS

We propose first to study the consequences of *systematic changes in consumption and savings habits*. These come to assuming that equation III 1, representing the amount consumed as determined by incomes, price level, etc. will be changed. This change in the general demand function will also change the equation determining raw material prices, as was pointed out in section 1 of this chapter. Further, a change in the demand equation for goods and services automatically implies a complementary change in savings, since savings are equal to income minus consumption outlay.

One particular change in consumption habits will be studied, viz. a reduction of the influence of incomes, or in Keynesian terms, a *reduction in the marginal propensity to consume*. This may be brought about by "compensating" public consumption, i.e. consumption in depression periods financed by credit creation, or out of taxes on higher incomes or finally, out of loans, to be repaid out of taxes in boom periods. The chief influence is very easily calculated since the consumption equation is substituted into the income equation at the last stage of the elimination

process only. The influence through prices is less important and still less important is the influence through interest rates.

The influence through prices means a decrease of the Z-terms in the equation (105) for p (table VIII 32). The influence through interest rates comes in as a consequence of the reduction of Z-terms in the value of imports, which depend on consumption, as is exactly to be found in equations 209—215 of the elimination process. Since, however, the influence of interest rates is found to be secondary only, we may, as a first approximation, neglect it. Our system of equations would, however, enable us to calculate these indirect influences in the same way as we did in the standard case without business cycle policy.

The chief influence of a reduction of the Z-terms in the consumption equation will be to reduce the coefficient of the z_{-1}-term in our final equation. Supposing that the $z_{-0.6}$-coefficient in the consumption equation is reduced to one half of its original value, the final equation will become $0.77z = 0.71\ z_{-1} - 0.46\ z_{-2}$ giving a solution with a period of 4.7 years and $r = 0.78$. This means that there is no change in damping degree of the fluctuations, but there is considerable shortening of the period. With a given initial disturbance this means that the amplitude of the first wave will also diminish and, hence, a certain stabilisation is obtained if the propensity to consume is diminished. Since a decrease in the propensity to consume is equivalent to an increase in the propensity to save, it may also be stated that *an increase in the propensity to save* — i.e. more savings in boom times, fewer in depression periods — *would to some extent stabilise* (*and at the same time shorten*) *cycles*.

In order to prevent misunderstandings we may remind the reader of the fact that a *sudden* (*incidental*) increase in savings at the moment of the breakdown does not, however, prevent that breakdown, but rather reinforces it. What we have in mind in this section is not a sudden increase in savings at the top of the boom, but a smooth, systematic, increase in savings from the start of the boom (i.e. from the moment when the average level of incomes is passed).

Next, the consequences of a systematic *change in investment habits* will be considered. Again we assume that investment activity is less than before based on income; that the "marginal propensity to invest" is less. This may be brought about by compensating public investments. This means a change in our equation III 4, say a reduction to one half of the coefficients before Z_{-1} and Z_{-2}. Such a reduction also influences the fluctuations in investment good prices s (because it changes v, cf. eq. IV 7), and hence q; by changing q it changes a number of other variables; moreover, it changes w. The accurate way of treating the problem, is to recalculate the elimination process. By doing so, one finds that the chief

influence is the direct influence, but that the indirect influences are not negligible. The final equation runs:

$$0.77\, z = 0.79\, z_{-1} - 0.39\, z_{-2}\ ,$$

where the time unit has been chosen equal to 0.625 years; it yields movements with a period of 5 years and $r = 0.71$. In comparison to the standard case this is only a very moderate improvement: the value of r is reduced from 0.78 to 0.71 and the period from 7 to 5 years. This type of business cycle policy, too, will therefore *only partially contribute to a stabilisation of business.*

IX 3. STABILISATION OF PRICES AND WAGE RATES

A clear distinction should be made between a stabilisation of prices by *immediate action on prices* and an intended stabilisation by some action on *other economic phenomena*. In this last case it is not certain beforehand that the aim will be realised; it is a problem of dynamic analysis to find out the consequences of that action. As an example, take the discount policy of the Central Bank, aiming at stable prices. It may be that this discount policy is unable to stabilise prices; this must be found out with the help of our relations.

In this section only such stabilisation of prices is meant as consists of immediate action on prices by government price control or by control of market supplies of important raw materials [1]). Here we may indeed assume that prices will be stable and hence the consequences may be studied. This will be done by putting all prices equal to 0 (meaning that they do not show any deviation from trend) and performing the elimination process with these new equations.

The greater part of the elimination process is much simplified by the assumption of stable prices. The only part still requiring some work is that concerning the balance of payments. The rest of the elimination process may be done without paying attention to the influence of interest rates, since their rôle in the income equation is subordinate in comparison to that of prices. The final equation obtained is:

$$z = 0.61\, z_{-0.7} - 0.11\, z_{-1.2}$$

which may be approximated by

$$z = 0.58\, z_{-0.7} - 0.08\, z_{-1.4},$$

from which it is easily seen that it leads to an aperiodic damped movement: the roots of the characteristic equation being 0.35 and 0.23 respectively. This means therefore that a *high degree of stabilisation of the cycle is obtained*. It is interesting to know the chief reasons of this result, which

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[1]) This presupposes international action or, as an alternative, a policy of "compensating exchange rates", i.e. exchange rates moving anti-parallel with the index number of world market prices.

may be found by comparing the last few steps before the final equation is obtained in the standard case with the corresponding steps in the present case. The table below gives that comparison.

	Standard case		Price stabilisation case
(1)	$U' - 0.45\Delta u' =$	$0.80\mathrm{L} + 0.53z_{-0.6} - 0.02z_{-1.9}$	$= 0.80\mathrm{L} + 0.31z_{-0.9}$
(2)	$V' =$	$0.38z_{-0.9} - 0.77z_{-1.5}$	$= 0.22z_{-0.6} - 0.05z_{-1.2}$
(3)	$-L =$	$-0.80\mathrm{L} + 0.01z_{-1.5} - 0.04z_{-0.5}$	$= -0.80\mathrm{L} + 0.01z_{-1.2} - 0.01z_{-0.4}$
(4)	$U^e + \ldots - U^i =$	$0.19z_{-0.4} - 0.13z_{-1.5}$	$= 0.07z_{+0.5} - 0.05z_{-1.4}$
(5)	$4.5\dot{r}^i =$	$0.23z - 0.13z_{-0.7} - 0.10z_{-1.4}$	$= 0$
(6)	$0.77z =$	$0.98z_{-0.7} - 0.46z_{-1.4}$	$z = 0.61z_{-0.7} - 0.11z_{-1.2}$

As is easily seen, the reduction of the coefficients in the final equation (line 6) is due to reductions in all the lines. Those in lines (1) and (2) are due to the fact that the demand for consumers' goods as well as that for investment goods is found to be inelastic; hence the value of total demand varies less if prices vary less than they did before. Line (3) is not very important and may be left out of consideration. As to the influence of price stabilisation on line (4), we have to deal here with the difference of influences on exports and imports. Therefore it would be difficult to predict the result beforehand. A stabilisation of prices might result in more violent movements of line (4) since a strong stabilisation of import values combined with a weak one of export values might conceivably lead to greater fluctuations in the difference. The result might as well be a stabilisation of (4), if the stabilisation attained in exports were about the same as that in import values. The fluctuations in line (4) could even be inverted. Now import demand is less elastic than export demand, and import values will therefore be more stablised by a price stabilisation than export values. This would have led to more violent fluctuations of (4), but for the fact that export prices fluctuate more intensely in normal times than import prices, primarily because of the high quota of investment goods in exports. The result appears to be a reduction in fluctuations even of line (4) — which can hardly be obtained otherwise than by calculations of the kind performed in this investigation. Finally, the influence of price stabilisation on line (5) is somewhat more complicated, but it may be understood in a general way that it also tends to reduce income fluctuations. We have already seen this in chapter VIII, section 5 (iv), where the influence of historical cost accounting was mentioned.

In this analysis we have assumed that also wage rates are stable (since they depend, in our model, only on coal prices). Tnis assumption is not, however, of great importance for the result.

Summarising we find that *price stabilisation brings business cycle stabilisation* chiefly because (i) the demand for most kinds of goods is *inelastic* and (ii) the *destabilising influence of historical cost accounting is counteracted.*

IX 4. BANKING AND CREDIT POLICY

(a) *Discount policy*

We have already observed that the influence of interest rates on the course of investment activity — which is the chief influence interest rates exert, according to our results — is only moderate. A rise in interest rates depresses investment activity, but only to a modest extent. Nevertheless it might be argued that booms could be avoided, if only discount rates were raised more in boom periods and lowered more in depression periods. In order to test this let us, first, assume that *discount rates show double the fluctuations* they actually had in the period considered. This means that instead of $m^s = 0.01\, z$ (IX 352) we now have $m^s = 0.02\, z$. Practically the only change in our equations is that to (VIII 355) a right-hand side term of $-\,0.05\, z_{-1}$ is added. This changes the final equation into:

$$0.77\, z = 0.98\, z_{-0.7} - 0.51\, z_{-1.4}\,,$$

leading to a movement with a period of 6.5 years and $r = 0.81$. The period is thus slightly shorter, the damping degree slightly less. These results illustrate the *futility of a change in discount rates for a regulation of the cycle.*

Next, we assume that not only the amplitude of discount fluctuations is doubled, but also that the fluctuations take place *somewhat earlier* than usual. Let us, in particular, assume that the additional term in the final equation is $0.05\, z_{-0.7}$ instead of $0.05\, z_{-1}$; this comes down to assuming that the total discount term is $0.10\, z_{-0.85}$ instead of $0.10\, z_{-1}$, hence a lead of two months in comparison with the usual movements. The final equation is then changed into:

$$0.77\, z = 0.93\, z_{-0.7} - 0.46\, z_{-1.4}\ .$$

This is an advantage, since now the additional influence contributes to a decrease in the absolute value of one of the right-hand side terms. The corresponding period is again 6.5 years, but now the damping degree is the same as in the standard case. A slight change towards stabilisation is thus obtained, but it is of a very subordinate influence still.

(b) *Regulation of amount of credits*

A regulation of the amount of credits granted can only mean a restriction and hence can only be applied in boom periods; not in times of depression. Its consequences are equivalent to a stabilisation of investment activity for e.g. half the period. The results will be of about half the order of magnitude found for a stabilisation of investment activity (this chapter, section 2), since approximately this type of policy means that in boom periods the new period and damping degree prevail, whereas in times of depression the old period and damping degree exist. Roughly the total period will then be the average of the two and so will the total damping degree.

IX 5. COST ACCOUNTING AT REPRODUCTION VALUE

We have already stressed the important influence on the nature of the cyclical movements exerted by the method of historical cost accounting (ch. VIII, section 4). To repeat once more the result found, the absence of the corresponding "term" in the equation determining profits would diminish the value of r from 0.78 to 0.57, this being a considerable increase in damping degree. This means that a transition from the method of historical costs to that of reproduction cost constitutes an *important type of stabilisation policy*. If this new profit calculation is followed, exaggerated profit figures during periods of price rise will be avoided and both investment activity and consumption outlay will be more modest. A flatter boom will be followed, as a rule, by a flatter crisis; the cycle will be damped down considerably.

IX 6. OPTIMUM BUSINESS CYCLE POLICY

Having, in the preceding sections, considered the consequences of given types of policy, we may now ask, *What type of policy gives the best result*? This is the problem of the optimum business cycle policy. Since the aim must be, as we already saw (cf. section 1), to maximise the damping degree, the question reduces itself to how the coefficients of the final equation must be chosen in order that the damping degree may be as high as possible.

If the final equation is $z = az_{-1} - bz_{-2}$, the damping degree is $1/\sqrt{b}$, provided that the roots of the characteristic equation are complex. The condition for complex roots is

$$b > \tfrac{1}{4}\, a^2$$

A high damping degree is evidently obtained for small values of b; the second condition then means that a should be a small number too. Both coefficients are, in our model, the sum of a number of other coefficients, to be found again, e.g. in equations (VIII 354) to (VIII 358). The necessary condition for an optimum business cycle policy would therefore be that only these sums are small numbers, but not necessarily also each component of them. Some of these components should, however, be negative then. To give an example, the condition of smallness of a would be fulfilled if the marginal propensity to consume remained the same, but the marginal "propensity to invest" got negative and of about the same absolute value. This means that investment activity would move inversely with respect to profits; which is only conceivable if there are not only compensating but even over-compensating public investments.

It will be safer, however, if not only the sums a and b are small numbers, but also *each of the components of these sums*. This — much more special — condition is sufficient, but not necessary. It has the great advantage that it would also be sufficient *if the lags occurring in the various terms should change*. For considerable changes of the lags our approximations might

no longer be acceptable; and a more complicated final equation, showing more than three terms, might be the consequence. For such a more complicated case it would also be sufficient if only all separate terms contributing to the right-hand side of the final equation were small.

This condition would certainly be completely fulfilled if all regression coefficients in all elementary equations should be zero or near to zero. Again this is not necessary, however. The coefficients having already a small influence on the final equation may be left out of consideration. *If the marginal propensities to consume and to invest and the coefficients in the price equations were small, the result would already be an almost complete stabilisation.* A reduction of the marginal propensities to consume and to invest may be obtained by compensating public consumption and public investment or one of these two activities. A reduction in the coefficients of the price equations means, however, a stabilisation of the price level and therefore presupposes a type of action with an international aspect. Either international stabilisation schemes or compensating exchange rates are necessary in order to stabilise the general price level in a country like the United Kingdom.

The conditions formulated would only then be logically impossible, if two or more of the coefficients in the elementary equations could not, at the same time, be small. Such would be the case if, e.g. the marginal propensity to consume and the marginal propensity to save should both occur in the final equation. Since their sum must always be one, a reduction of one of them implies a rise in the other. Still this would not be very serious if one of them, say the marginal propensity to save, were multiplied by another regression coefficient which itself can be made small. By way of approximation, we have left the marginal propensity to save altogether out of the picture. But if it were to be included, it would be as one of the regression coefficients in an explanation of interest rates: high savings leading to low interest rates and vice versa. Let us suppose that it is included in that way. Now the interest rate only plays a rôle of some significance in the final equation through its influence on investment activity. The coefficient with which it influences investment activity is not very large and hence the influence of the marginal propensity to save on the final equation is only small. So we need not bother too much about this point. Moreover, there is another possibility, viz. that of compensating the influence that savings exert on interest rates by deliberate action of the Central Bank.

Up till now we have only considered a variation in the size of the coefficients a and b. Another possible type of variation is given by changes in the *lags*. A uniform shortening of all lags would mean that the whole process develops in a shorter time, but it does not mean any change of the damping degree. It would therefore be hardly preferable; it would even make things going more "nervously." Non-uniform changes in lags may have all sorts of other consequences which the equations enable us to

find. The subject need not, however, occupy us very much, since in the end it is not a new problem. A given change in the final equation may always be described either as a change in lags or as a change in coefficients.

These few remarks on business cycle policy may suffice to show how the analysis of the preceding chapters can be used for the purpose of finding the best type of business cycle policy. The main object of this chapter was to stress the applicability of our equations, once they are established, in a great variety of directions. Once the extensive work of establishing the elementary equations and of performing the elimination process has been done, this "roundabout way" yields abundant services.