*The Effects of a Full-Employment Policy on Economic Stability: A Formal Analysis**

A FULL-EMPLOYMENT policy has come in recent years to mean both the adoption by government of a "high" and "stable" level of employment as a leading policy objective and the promotion of this objective by deliberate actions taken from time to time to add to or subtract from aggregate money demand for goods and services. It is by no means clear that this objective is capable of attainment by these means. Government actions undertaken to eliminate or offset economic instability may instead increase instability. They obviously will do so if they tend for some reason to be persistently perverse, so that government generally takes expansionary action when, at least from hindsight, contraction is called for, and conversely. But government countercyclical actions may also be destabilizing—and this is both less obvious and more important—even though they are more often in the right than in the wrong direction and even though they are smaller in magnitude than the fluctuations they are designed to offset.

Under what conditions will countercyclical action succeed in its objective of reducing instability? Under what conditions will it actually increase instability? How does its effectiveness depend on the magnitude of action? What is the optimum magnitude of countercyclical action? The present note considers these questions on a highly formal level. Its purpose is primarily to make it clear that they are important and relevant questions; secondarily, to indicate in general terms the considerations on which an answer in any particular case depends. It does not attempt to answer them for any particular case.

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I

Despite the enormous literature on full-employment policy, these questions have been almost completely neglected. The many proponents of full-employment policies seem to take it for granted that a full-employment policy will not be destabilizing, that this will be true regardless of the precise character of the policy, and that there is no serious problem about the magnitude of government measures to promote stability except to make them large enough. On the other hand, opponents have seldom attacked full-employment policies on the grounds that they may increase instability but rather on the grounds that such policies would strengthen the role of the government and threaten political freedom, or would reduce the rate of progress, or would strengthen pressure groups and promote inflation, etc.

The failure to recognize that there is a basic problem about the effectiveness of countercyclical action, that it is possible to do too much as well as too little, is paralleled by a frequent failure on the part of proponents of full-employment policies to specify precisely the policies they favor. And both, it seems to me, largely reflect the naïve theoretical model in terms of which full-employment policies have been defended and alternative policies judged, either implicitly or explicitly, even by economists who are fully aware, in other contexts, of the deficiencies of the model. This model, in its simplest form, takes investment as given by external circumstances and unaffected by government action, consumption as determined by current income, and current income as the sum of investment, consumption, and government expenditure. It largely neglects price movements, generally by regarding prices as essentially rigid when money income is below the minimum level consistent with "full employment" and as changing in proportion with money income when money income exceeds the minimum level consistent with "full employment."[1]

1. In symbols, if Y stands for income; C, for consumption; I, for investment; and G, for government expenditure on goods and services, all in "real" terms:

$$Y = C + I + G, \tag{1}$$

from which

$$C = f(Y), \tag{2}$$

$$Y = f(Y) + I + G. \tag{3}$$

If I is fixed, Y clearly becomes a function of G.

This model neglects such complications as the difference between gross national product and national income and between national income and personal income; it takes national income as the determinant of consumption expenditures, thereby supposing direct taxes to be either zero or a function of national income. The model could readily be extended to allow for these various complications as well as for others and in this way to make explicit the possibility of using changes in taxes as well as in expenditures to promote full employment. But such extensions would only complicate the exposition without changing the fundamental character of the model for our purpose.

For recent examples of the explicit use of such a model see E. Cary Brown, "Analysis of Consumption Taxes in Terms of the Theory of Income Determination," *American Economic Review,* XL (March, 1950), 74–89; Ta-Chung Liu and Ching-Gwan Chang, "Consumption and Investment Propensities Pre-war and Post-war," *American Economic Review,* XL (September, 1950), 565–82.

The model is nearly as explicit in John M. Clark, Arthur Smithies, Nicholas Kaldor, Pierre Urie, and E. Ronald Walker, *National and International Measures for Full Employment: A Report by a Group of Experts Appointed by the Secretary General* (Lake Success, N.Y.: United Nations, December, 1949), pp. 20–23, particularly pars. 37, 38, 45. This report is hereafter referred to as *"UN Report."*

According to this model, increased government expenditure adds to income directly and thereby stimulates consumption, which leads to further additions to income through the consumption "multiplier." More important for our purposes, the system has no lags. In consequence, it implies for each time unit a particular value of real government expenditure, and a minimum value of money government expenditure, that would produce full employment, and these values do not depend on what has occurred in preceding time units.[2] If actual government expenditure were below this level, income would be below the full-employment level; if money government expenditure were above the minimum level consistent with full employment, prices would be unnecessarily high to produce full employment. Fluctuations in investment are the only important factor regarded as making for fluctuations in income, and these can always be offset by appropriate fluctuations in government expenditure. Finally, it is generally assumed—though this assumption is not strictly implicit in the model—that government expenditure (or the government contribution to the

2. If Y_0 is the "full-employment" income, then

$$G_0 = Y_0 - f(Y_0) - I_0$$

is the level of government expenditure that on this model will produce full employment. It should be noted that this can all be expressed in terms of the "government contribution" and so take account of tax changes as well. If the model is taken literally, real government expenditure cannot exceed this level. Any attempt to have it do so will simply mean higher prices.

income stream) can be altered at will and without significant lag, so that the "appropriate" fluctuations in government expenditure can be produced by deliberate action.[3]

With this model it is easy to see that there is no great problem, at least so far as maintaining a desired level of aggregate income is concerned. In any period in which income would otherwise be below the full-employment level, it is only necessary for government to spend more (or tax less) in order to raise income, and to spend more in any way whatsoever; so long as government does not spend more than the amount, in principle calculable, required to produce full employment, it can do no harm. Mistakes may lead to temporarily overshooting or undershooting the mark, but this is of no great moment, since errors do not affect the future and so can readily be corrected. The real danger is that government will not do enough; there is little reason to suppose it will do too much.[4] The techniques used to spend more or less (or tax less or more) may matter for other reasons—equity, economic efficiency, etc.—but are irrelevant to the technical effectiveness of countercyclical policy. Similarly, grasping trade-unions or producer pressure groups may by their actions steadily raise the minimum money value of the full-employment income and so make stable prices and full-employment incompatible, but again this is a "political" problem and is irrelevant to the technical effectiveness of countercyclical policy.

Few would explicitly accept this simple model as an adequate representation of the forces determining the level of economic activity. For example, it clearly provides no "theory" of cyclical fluctuations worthy of the name; it interprets cyclical fluctuations as simply a reflection of fluctuations in investment, which are themselves taken as given. Lagged reactions are the essence of cyclical fluctuations regarded as self-generating. In consequence, when those who follow this general approach seek to "explain"

3. The *UN Report* exemplifies almost ideally the position I am describing. See especially pars. 45, 67, 68, and 76.

4. Compare the following quotation from the *UN Report:* "Some decline in demand is therefore bound to occur before effective measures can be taken to check and reverse the movement. In present circumstances, this may be inevitable; what is essential is to ensure that such counter-measures are not taken too late, and that when they are taken they should be adequate for dealing with the situation" (p. 39).

cyclical fluctuations, they complicate their models by introducing lagged reactions of one kind or another and in this way have developed an embarrassingly wide variety of different cycle-generating models. Yet I think it is correct to say that these complications are neglected in discussions of the feasibility of full-employment policy and of the merits of alternative policies. For this purpose the analysis generally proceeds as if the simple model I have sketched were completely adequate.[5]

II

This model cannot, of course, be used to investigate the questions considered in this note—which is, indeed, a major reason why these questions have been so generally neglected. It answers them in a way that is almost equivalent to denying their significance. According to this model, countercyclical action by government can be destabilizing only if it goes so far as to convert what would otherwise be conditions of depression into conditions of boom, and conversely; the optimum magnitude of government action is that which produces complete stability of income, and there is nothing in the model to indicate that this result is incapable of attainment or that it requires knowledge not now available or what factors will interfere with its attainment. We shall, instead, investigate these questions by an altogether different route, one suggested by the theory of statistics rather than economic theory.[6]

Our problem is to compare the results of two alternative structures of economic policy: one including and the other excluding a specified "full-employment policy." Of course, the absence of the specified "full-employment policy" does not mean that government actions do not impinge on economic activity or that they may not in some sense be responsible for fluctuations in economic activity. It merely means that we take this latter set of actions

5. A striking example is the *UN Report,* which cites, as the reason why the above model is "a drastic simplification of reality," its neglect of the behavior of prices and does not even mention the problem of lags in reaction.

6. The formal analysis that follows is an expansion of footnotes in two earlier articles. See "Lerner on the Economics of Control," *infra,* p. 316, n. 12; "Rejoinder" to comment by Philip Neff, *American Economic Review,* XXXIX (September, 1949), 951, n. 2.

for granted and inquire about the effects of the additional actions grouped under the title "full-employment policy." We shall judge the effects of the two alternative policies by the behavior of national income, without specifying whether "real" or "money" income. The formal analysis that follows will apply equally well to either as well as to any other criterion of performance.

Let $X(t)$ represent income at time t in the absence of the specified full-employment policy. The full-employment policy may be regarded as having effects that add to or subtract from income. Let $Y(t)$ represent the amount so added to or subtracted from $X(t)$, so that

$$Z(t) = X(t) + Y(t) \tag{1}$$

represents income at time t in the presence of the specified full-employment policy.

Note that $Y(t)$ does *not* measure the effect of the countercyclical actions *taken* at time t. It measures instead the combined effect at time t of countercyclical action whenever taken. Thus it may reflect action taken very much earlier; it may even reflect action to be taken in the future in so far as anticipation that such action will be taken affects current income. Note also that nothing special is involved in writing $Y(t)$ as a magnitude to be *added* to $X(t)$. This is a matter of definition: we could have defined $X(t)$ and $Z(t)$ as income in the absence and presence, respectively, of a specified full-employment policy and then have defined $Y(t)$ as the difference between Z and X.

Income may, and generally will, display a trend as well as fluctuations about the trend. Similarly, the introduction of the policies whose effect is measured by $Y(t)$ may alter the average level of income or may introduce a trend into income. Since our interest is primarily in fluctuations, rather than in level or trend, we shall assume in the discussion that follows that all our variables have horizontal trends, that is, that the expected value of each variable is the same for all values of t.[7] This involves no loss of generality for our purpose, since we could equally well have defined Z, X, and Y as deviations from trends.

7. In other words, we shall regard $Z(t)$, $X(t)$, and $Y(t)$ as stationary stochastic series. The expected value of $Y(t)$ will be positive, zero, or negative according as the existence of countercyclical policy tends to raise the average level of income, leave it unchanged, or lower it.

We can measure the magnitude of fluctuations in many different ways, and it is somewhat arbitrary to select any one. At the same time I do not see that the results we reach will be critically affected by the particular measure we use, and it is mathematically most convenient to use the variance (or square of the standard deviation), that is, the mean square deviation of the series from its mean. Accordingly, we shall use the variance, which we shall designate σ^2 with a subscript to indicate the series considered.[8] For X or Z the variance measures the fluctuations in income in the absence or presence of a countercyclical policy. For Y the variance may be regarded as measuring the magnitude of the countercyclical action taken: if no action were taken, the variance of Y would be zero; the greater the magnitude of action, for a given kind and time pattern of action, the greater the variance of Y.

We can now rephrase our initial questions in terms of these concepts and symbols. Under what conditions will the variance of $Z(\sigma_Z^2)$ be less than the variance of $X(\sigma_X^2)$, so that the countercyclical policy succeeds in its objective of reducing instability? Under what conditions will σ_Z^2 exceed σ_X^2? How does the difference between σ_Z^2 and σ_X^2 depend on the magnitude of countercyclical action, that is, on σ_Y^2? What is the optimum size of σ_Y^2?

By a well-known statistical theorem

$$\sigma_Z^2 = \sigma_X^2 + \sigma_Y^2 + 2r_{XY}\sigma_X\sigma_Y \tag{2}$$

where r_{XY} is the correlation coefficient between X and Y.[9] Just as σ_Y measures one dimension of countercyclical policy—its magnitude—so r_{XY} measures another dimension—roughly speaking, its timing or "fit." If countercyclical policy were always timed and proportioned correctly, its *effects* would uniformly be in the opposite direction to the deviation of X from its mean and a fixed proportion of this deviation. In this case, Y would be perfectly negatively correlated with X, and r_{XY} would equal -1. On the other hand, if countercyclical policy were thoroughly random in its impact, its effects would be as likely to be in the same direction

8. Let $\bar{X}$ be the expected value of X. Then

$$\sigma_X^2 = E(X - \bar{X})^2,$$

where E stands for expected value.

9. $r_{XY}\sigma_X\sigma_Y = E(X-\bar{X})\,(Y-\bar{Y})$.

as the deviation of X from its mean as in the opposite direction, and r_{XY} would equal zero. A perfectly perverse cyclical policy would be described by an r_{XY} equal to $+1$. Thus σ_Y and r_{XY} provide a two-dimensional classification of all countercyclical policies by the only characteristics that are relevant for our present purposes.

It is clear from (2) that a countercyclical policy for which $r_{XY} = 0$, that is, which is about as likely to have effects in the wrong as in the right direction, is not "neutral" in its impact but rather destabilizing. For if $r_{XY} = 0$, the variance of Z exceeds the variance of X by the variance of Y; that is, by the magnitude of the countercyclical action. In order, therefore, for countercyclical action to succeed in its objective, its effects must be in the right direction more often than in the wrong.

For a more precise statement divide both sides of (2) by σ_X^2. This gives

$$\frac{\sigma_Z^2}{\sigma_X^2} = 1 + \frac{\sigma_Y^2}{\sigma_X^2} + 2r_{XY}\frac{\sigma_Y}{\sigma_X}. \tag{3}$$

The left-hand side of (3) is the ratio of the variance of income when the countercyclical policy is present to its variance when the countercyclical policy is absent. If this ratio is unity, the countercyclical policy may be regarded as having had no effect on stability; if the ratio is less than unity, the countercyclical policy has succeeded in its objective of promoting stability; if the ratio is greater than unity, the countercyclical policy has failed in its objective and has been destabilizing rather than stabilizing.

Clearly,

$$\frac{\sigma_Z^2}{\sigma_X^2} \lessgtr 1$$

according as

$$\frac{\sigma_Y^2}{\sigma_X^2} + 2r_{XY}\frac{\sigma_Y}{\sigma_X} \lessgtr 0$$

or

$$r_{XY} \lessgtr -\frac{1}{2}\frac{\sigma_Y}{\sigma_X}. \tag{4}$$

This equation indicates the conditions under which countercyclical policy will succeed in its objectives: if r_{XY} is between -1 and $-\frac{1}{2}\sigma_Y/\sigma_X$, the countercyclical policy will be stabilizing in its effects; if it is between $-\frac{1}{2}\sigma_Y/\sigma_X$ and $+1$, the countercyclical policy will be destabilizing. For example, suppose that, in line with the simple model described earlier, an attempt were made to produce complete stability. This would require making $\sigma_Y = \sigma_X$. Assume that this magnitude of countercyclical action were attained. In that case the actions taken would be destabilizing unless r_{XY} were between $-.5$ and -1. We shall have something to say later about the factors determining the magnitude of r_{XY}; but it is clear that the requirement that it exceed .5 in absolute value is a rather stringent one; yet, unless it does, the indicated countercyclical policy will do more harm than good.

For a given magnitude of countercyclical effects (i.e., a given σ_Y), it is obvious that, the closer the correlation coefficient between X and Y is to -1, the better, since this means that the countercyclical effects will be better adapted to needs. If r_{XY} were -1, and $\sigma_Y = \sigma_X$, the countercyclical policy would be ideal in the sense that the variance of Z would be zero. It is less obvious what the consequence is of varying the magnitude of countercyclical effects for a given correlation; though perhaps it is reasonably obvious that, for each value of the correlation, there is some optimum value of σ_Y and that this optimum value is zero if r_{XY} is zero or positive (i.e., countercyclical policy is perverse in its timing) and equal to σ_X if r_{XY} is -1.[10] For a more precise statement differentiate the right-hand side of (3) with respect to σ_Y, set the result equal to zero, and solve for σ_Y. This gives

$$\hat{\sigma}_Y = -r_{XY}\sigma_X \tag{5}$$

where $\hat{\sigma}_Y$ stands for the optimum value of σ_Y. Equation (5) gives the general rule and checks the above statements for $r_{XY} = 0$ and -1. For r_{XY} positive, equation (5) gives a negative value for $\hat{\sigma}_Y$,

10. If σ_Y is zero, r_{XY} as given by the formula in n. 9 will, of course, be the indeterminate form 0/0. We can, nevertheless, speak of this correlation as being zero or positive by evaluating the indeterminate form through a limiting process. The appropriate process is to let σ_Y approach zero by multiplying each deviation of Y from its mean by a common multiple that itself approaches zero. This change of scale of Y does not affect the correlation coefficient, which has the same value throughout the limiting process.

which is, of course, impossible. The best attainable value is then zero.

It is clear from these results that countercyclical policy can be "too" strong as well as "too" weak and that this can be true even though its effects are smaller in magnitude than the cyclical fluctuations that the policy is designed to offset. For example, suppose $r_{XY} = -\frac{1}{2}$. The optimum value of σ_Y would then be $\frac{1}{2}$ of σ_X. If this value were achieved, σ_Z^2/σ_X^2 would be equal to $\frac{3}{4}$; that is, this policy would reduce the variance of fluctuations in income by 25 per cent. Suppose, however, σ_Y were increased by engaging in larger countercyclical operations of the same time pattern. The result would be not so good as before: if σ_Y were made equal to $\frac{3}{4}\,\sigma_X$, the final variance would be reduced by only $18\frac{3}{4}$ per cent instead of 25 per cent; if σ_Y were made equal to σ_X, the improvement would be completely canceled.

Suppose that the countercyclical policy were of the optimum magnitude, so that σ_Y satisfied equation (5). If we substitute this value in (3), we can determine the maximum reduction in instability capable of being achieved as a function of r_{XY}. The result is:

$$\left(\frac{\sigma_Z^2}{\sigma_X^2}\right)_{\sigma_Y=-r_{XY}\sigma_X} = 1 - r_{XY}^2. \qquad (6)$$

This equation strikingly shows the crucial importance of the size of r_{XY} for the effectiveness of countercyclical policy. In order to be able to cut the variance of income fluctuations in half (which would cut the standard deviation by less than a third), r_{XY} must exceed .7, and σ_Y must be optimally related to σ_X.

III

We have so far described alternative countercyclical policies exclusively in terms of their statistical characteristics—σ_Y and r_{XY}. The relation of these characteristics to substantive countercyclical policy is clearly of crucial importance in applying the above results. From this point of view, the two characteristics are clearly very different. The average magnitude of effect, σ_Y, can be more readily increased or decreased—though it may be no easier to measure—than the timing of the effect, r_{XY}, can be improved. The former may well be a parameter of action capable of being readily

controlled for each type of countercyclical policy separately. The latter is, I conjecture, a relatively fixed (albeit unknown) characteristic of each type of policy that can be changed only by changing to a qualitatively different kind of policy or by an increase in knowledge about the sources of fluctuations.

The magnitude of effect can in general be expected to vary directly with the magnitude of the initial stimulus. For example, suppose the countercyclical policy takes the form of deliberately produced changes in the government budget, a deficit being produced (or increased or surplus decreased) when it is desired to expand income, a surplus being produced when it is desired to contract income. So far as the mechanical linkages are concerned between the government budget and aggregate income, twice as large a deficit or surplus would have approximately twice as large an effect on aggregate income. Similarly, a decrease or increase in the quantity of money may be expected to have a larger contractionary or expansionary effect the greater the decrease or increase. Of course, these relations may be altered by other effects of the actions, such as their effects on "confidence" and the like, and these may not be strictly proportionate to the stimulus or even in the same direction, so that there may be some magnitude of stimulus beyond which the magnitude of effect is reduced rather than increased. But we may neglect these complications for our present purpose.

It follows that a larger magnitude of effect can be produced by taking more vigorous action when it is decided to take action, and conversely. While it is therefore relatively easy to change the magnitude of effect, it is much more difficult to measure what magnitude of effect is being produced. An example may illustrate some of the difficulties. A proposal for stabilization policy that I have elsewhere made avoids discretionary monetary or fiscal policy and relies exclusively on reactions automatically produced by the impact of changes in aggregate income on a stable monetary and fiscal framework.[11] Given a progressive tax and transfer structure, and a stable expenditure program, any increase in aggregate income would tend to increase government receipts in greater pro-

11. "A Monetary and Fiscal Framework for Economic Stability," *infra*, pp. 133–56.

portion than government expenditures and so tend to halt the increase in income, and conversely. What magnitude of effect might be expected from this policy?

It has been estimated that, given the current fiscal system of the United States, this policy would mean a change in the government's budget of approximately one-quarter to one-third of any change in income; that is, that an increase in national income of $10 billion would tend to involve changes in government income and expenditures that would have the effect of reducing a deficit or increasing a surplus by something between $2.5 and $3.3 billion.[12]

If this change in the government's budget had no other effects and if it bore a constant temporal relation to the changes in income producing it (e.g., lagged a fixed number of time units), it would follow that σ_Y was between $\frac{1}{4}$ and $\frac{1}{3}$ of σ_X. But clearly neither of these assumptions can be accepted. The change in the government's budget will have indirect as well as direct effects on income: through the multiplier process, through effects on the stock of money, and perhaps in other ways as well. And these effects will be spread over time with lags that will vary from time to time. In our previous notation the value of Y in any time unit will itself be a sum of components produced by budget changes in each of a series of preceding time units, and the number of such components is likely itself to change over time. The size of σ_Y will depend on the size and character of the indirect effects, on the variability in the time pattern of effects, and on the correlation among the components of Y in any time unit. This last will, in turn, depend on the correlation among successive stimuli and so, ultimately, on the correlation among successive values of X—on the serial correlation of the time series involved.

It seems reasonable that these complications would not reduce σ_Y below the value of $\frac{1}{4}$ to $\frac{1}{3}$ of σ_X that would be assigned to it

12. This estimate is based primarily on R. A. Musgrave and M. H. Miller, "Built-in Flexibility," *American Economic Review*, XXXVIII (March, 1948), 122–28. Subsequent changes in tax legislation have doubtless affected the exact figure but have probably not significantly changed its order of magnitude.

if they were absent, but even this is not certain.[13] They could easily multiply this figure several fold, so that about all that can be said about the magnitude of effect under this proposal is that it cannot plausibly be put lower than $\frac{1}{4}$ of σ_X and may be very much greater.

The timing of effect, r_{XY}, is even more difficult either to control or to measure. As was suggested by our earlier discussion of the simple model implicitly accepted by most proponents of full-employment policy, r_{XY} is likely to be larger (in absolute value) the smaller the lags in the economic system relative to the movements it is desired to offset. If the need for action could be recognized immediately, the recognition translated immediately into action, and the action immediately effective, it is clear that r_{XY} could be extremely close to -1; and, indeed, this is the implicit assumption to which the simple model leads those who use it. In the absence of such instantaneous reactions, a high (absolute) value of r_{XY} requires a high ability to predict both the behavior of the system in the absence of action and the effect of action; for this would permit action to be taken in advance that would turn out to be correct when its effects occurred. I need hardly belabor the point that to date there is no reason for confidence in our ability to make such predictions.

If forecasting is ruled out, the value of r_{XY} can be controlled only by affecting the lags involved: the shorter and less variable the lags can be made, the higher is likely to be the absolute value of r_{XY}. These lags can, for this purpose, be thought of as composed of three parts: (1) the lag between the need for action and the recognition of this need; (2) the lag between recognition of the need for action and the taking of action; and (3) the lag between the action and its effects. The third component clearly depends on the fundamental characteristics of the economic system but may be different for different types of action—for example, it may be shorter for fiscal than for monetary action. The first two, on the other hand, may be capable of

13. σ_Y could be reduced below $\frac{1}{4}$ to $\frac{1}{3}$ of σ_X if there were a sufficiently high negative serial correlation in X and if the effects of the budget change in any time unit were spread over several successive time units.

deliberate control (successful forecasting may be viewed as making the first component negative). Even here, however, there are drastic limits on what can be done. I have elsewhere argued that there is a strong presumption that the automatic policy alluded to above would have a shorter total lag, and so a higher r_{XY}, than discretionary actions of the kind proposed but that even for such a policy the lags are likely to be substantial relative to the length of the movement it is desired to offset, so that r_{XY} may be very far from -1 in value.[14] In the present state of knowledge we cannot, of course, know what the potential magnitude of r_{XY} is, but it would certainly be wishful thinking to suppose that it is very large for any currently proposed policy.

In the present state of knowledge we cannot even be sure whether the completely automatic policy alluded to above would be "too strong" or "too weak." I have argued that, for the United States, it is reasonable to suppose that σ_Y is larger than $\frac{1}{4}$ of σ_X and perhaps much larger. Suppose the value of σ_Y for this policy is $\frac{1}{2}$ of σ_X. This will be "too strong" a policy if r_{XY} is less than $\frac{1}{2}$ in absolute value; "too weak," if r_{XY} is larger than $\frac{1}{2}$.

These conclusions suggested by our analysis are strikingly at variance with views commonly held. The proposal for relying exclusively on automatic reactions is generally criticized as not doing enough; it is seldom explicitly recognized that it may do too much. For example, in their report to the United Nations on full-employment measures the group of experts write:

> Such "built-in" . . . stabilizers, by the nature of the case, can only have the effect of dampening the range of economic fluctuations. They can mitigate the fall in consumers' demand that occurs in response to a fall in investment demand; they cannot conjure up an actual *rise* in consumers' demand that would be needed to offset the fall in investment demand. . . . A rise in consumers' demand could, however, be secured through budgetary measures if governments did not content themselves with the "built-in" stabilizers . . . , but undertook positive counter-measures through counter-cyclical variations in the rates of taxation in force. If the rates of taxation were lowered in times of declining demand, and raised in times of rising demand, the purchasing power in the hands of consumers could be altered sufficiently to maintain total demand at a stable level.[15]

14. See "A Monetary and Fiscal Framework for Economic Stability," *infra*, pp. 144–48.

15. *UN Report*, pp. 37–38.

In the light of our analysis this statement is, at best, misleading; at worst, downright wrong.

Whereas one method of controlling r_{XY} is to change the kind of action taken, another method is to limit the objective. The effect of action is clearly likely to be in the right direction much more frequently if action is taken to counteract only substantial movements in income than if it is taken to counteract mild movements as well. In the case of substantial movements the lag between action and its effects is likely to be much shorter relative to the movement itself—even if not in absolute terms—than for mild movements, and so r_{XY} is likely to be greater. This is the fundamental idea behind such proposals as the "two-part policy" suggested by Bach, who proposes to rely on automatic reactions so long as a price index stays within a fairly broad band and to supplement these reactions by discretionary action if the index moves outside the specified band.[16]

According to our analysis, in any such multipart approach, a larger magnitude of effect is called for, the larger the movement to be countered, for two reasons: first, σ_Y should be larger, the larger σ_X; second, σ_Y should be larger, the larger (in absolute value) r_{XY}, and it is assumed that r_{XY} is larger in absolute value for those movements giving a large σ_X.

The preceding discussion is by no means exhaustive. Indeed, it raises many more questions, and more difficult questions, than it answers. Its purpose is much more modest, namely, to suggest the relation between the substantive content of policies designed to promote stability and the two statistical parameters describing their operations that we found to play so fundamental a role in determining their effectiveness.

IV

In writing this note, I feel at one and the same time as if I were preaching in the wilderness and belaboring the obvious. For the major conclusions of this paper are important and widely neglected, yet they seem distressingly obvious.

There is some limit to the possibilities of stabilizing the level

16. G. L. Bach, "Monetary-Fiscal Policy Reconsidered," *Journal of Political Economy*, LVII (October, 1949), 383–94.

of economic activity by policy measures intended to do so. This limit depends on two major characteristics of the action taken: the extent to which the effects of the action are proportioned to the effects needed—to put it loosely, the frequency with which the effects are in the "right" direction—and the magnitude of the action taken. For any given magnitude of action the total effects of the policy may be destabilizing even if effects of the actions taken are more frequently in the "right" than in the "wrong" direction; there is some minimum frequency of "right" to "wrong" action required in order that the actions on balance be stabilizing. Similarly, for any given frequency of "right" to "wrong" actions, there is an optimum magnitude of action. More vigorous action than this, however well intended, will do more harm than good. A relatively high frequency of right to wrong actions is required if fluctuations are to be substantially reduced; and this frequency is not readily subject to control except as the advance of economic science may enable us to predict more accurately than we now can the consequences of action. In short, good intentions, however admirable, are not enough. They will be abortive unless matched by the capacity to put them into effect.

Obvious though these conclusions are, I believe them to be of the greatest importance for discussions of full-employment policy. Much of this discussion is vitiated by a failure to distinguish between objectives and means and simply consists of exhortation to do the right thing with no advice how to know what is the right thing to do. There has been little realistic examination of the inevitable limitations to the effectiveness of countercyclical action. There has been almost no recognition that vigorous countercyclical action may result in more instability than milder action. In this field, as in all others, the "will" is too often mistaken for the "deed."

*A Monetary and Fiscal Framework for Economic Stability**

DURING the late nineteenth and early twentieth centuries the problems of the day were of a kind that led economists to concentrate on the allocation of resources, and, to a lesser extent, economic growth, and to pay little attention to short-run fluctuations of a cyclical character. Since the Great Depression of the 1930's, this emphasis has been reversed. Economists now tend to concentrate on cyclical movements, to act and talk as if any improvement, however slight, in control of the cycle justified any sacrifice, however large, in the long-run efficiency, or prospects for growth, of the economic system. Proposals for the control of the cycle thus tend to be developed almost as if there were no other objectives and as if it made no difference within what general framework cyclical fluctuations take place. A consequence of this attitude is that inadequate attention is given to the possibility of satisfying both sets of objectives simultaneously.

In constructing the monetary and fiscal framework proposed in this paper, I deliberately gave primary consideration to long-run objectives. That is, I tried to design a framework that would be appropriate for a world in which cyclical movements, other than those introduced by "bad" monetary and fiscal arrangements, were of no consequence. I then examined the resulting proposal to see how it would behave in respect of cyclical fluctuations. It behaves surprisingly well; not only might it be expected not to contribute to cyclical fluctuations but it tends to offset them and therefore seems to offer considerable promise of providing a tolerable degree of short-run economic stability.

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