

acting alone to restore equilibrium; then when both groups act, the total effect will be excessive.

If policy decisions are truly decentralized among nations, in the sense that the authorities in each nation pursue only their own objectives with their own instruments without taking into account the interactions with other countries, then the more interdependent the international economy is, the less successful countries are likely to be in reaching and maintaining their economic objectives. This is due to the greater impact of domestic measures on foreign economies, calling forth correspondingly greater offsetting responses which in turn affect the first country. Under these circumstances, countries must either reconcile themselves to prolonged delays in reaching their objectives or they must coordinate their policies more closely with those of other nations.¹⁵

It has of course long been true that small countries must watch closely economic developments and policies in their larger neighbors, and they would take these developments into account. For the Netherlands, forecasting German GNP and German economic policies is a critical component to forecasting Dutch GNP. But as economies grow interdependent, the importance of *two-way* interactions increases, so that economically large countries such as Britain, Germany, and even the United States must increasingly take into account developments and policies abroad.

INTERNATIONAL COMPETITION IN ECONOMIC POLICY

In an interdependent economy, governments do not have full control over the instrument variables needed to influence the trade balance or the balance of payments. Each government can effect the domestic interest rate in an attempt to influence international capital movements or can set tariffs on imports and subsidies on exports to influence the trade balance. But success in influencing capital movements or trade flows depends on what other countries are doing. It is interest rate *differentials*, not the absolute level of interest rates, which includes the movement of capital. And it is domestic tariffs *less* foreign subsidies which influence the level of imports. There are many instruments of economic policy for which relative differences affect international transactions, but the absolute value

¹⁵ These ideas are complex and are best stated somewhat more formally in a technical footnote.

In matrix notation, let $y = Ax$ describe the relationship between target variables (y) and small changes in policy instruments (x). The matrix $A = [a_{ij}]$, where a_{ij} indicates the impact of instrument x_j on target y_i . Arrange the variables so that all the targets and instruments of one country are grouped together, followed by those of another, etc. A can thus be partitioned, with blocks representing individual countries running along the diagonal, and blocks representing the degree of interdependence, or interaction between the instruments of one country and targets of another, lying off the block diagonal.

Suppose that y^* represents the target values the economic authorities of the various countries would like to reach, that the targets are all consistent, and that there are enough policy instruments to reach them all, giving the authorities the correct values for these instruments, $x = Ay^*$.

Suppose now that the target variables take on values different from their targets. How do the authorities react? Their reaction functions might be described by the following set of differential equations, $\frac{dx}{dt} = B(y^* - y) = B(y^* - Ax)$, which says that the authorities change their instruments at a rate which depends on how far the target variables are from their targets. If they do not take into account international interdependence, B , the matrix of reaction coefficients, will be a block matrix, indicating that each policy-maker look only at his own target(s).

The solution to this system of linear differential equations takes the form:

$$y_j(t) = y_j^* + \sum_i K_i e^{-\lambda_i t}$$

where the λ_i are the characteristic roots of BA and the K_i are constants determined by the initial disturbances. For a policy system which works in the sense that $y_j(t)$ will gradually approach y_j^* , the second term on the right is transitory. The system will be more efficient, i.e. achieve the policy targets more rapidly after any disturbance, the more rapidly this term fades away. It will fade more rapidly the larger are the λ_i .

In general, the larger the off-diagonal elements are relative to the diagonal elements, i.e., the higher the degree of ignored interdependence, the smaller the smallest root will be and the longer it will take after any given disturbance to reach the target values y^* . High interdependence which is ignored gives rise to the possibility of overshooting targets several times, and it even gives rise to the theoretical possibility that targets will not be reached at all until the nature of the adjustment process is changed.

Coordinating economic policy involves not only exchanging information on targets and use of instruments, but taking this information into account when using instruments. Convergence to targets is then much faster.