A THEORETICAL FRAMEWORK FOR THE MONETARY AND FISCAL ANALYSIS OF UNDERDEVELOPED ECONOMIES[1]

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DEVELOPMENT THEORY contains no single, consistent and agreed-upon explanation regarding the interrelationships between inflation, output, and monetary and fiscal policies in underdeveloped economies. Conflicting viewpoints regarding the causes and consequences of inflation and growth have resulted in the serious practical implication that consistent formulation of economic policy is almost impossible in these countries.

This paper concentrates on constructing the most viable framework for studying the short-run macroeconomic interrelationships in underdeveloped economies and deriving the implications for the need and scope for monetary and fiscal policy in these economies. It assumes for this purpose familiarity with the broad nature of underdeveloped economies and with the short-run macroeconomic frameworks —Classical and Keynesian—relevant to the developed economies.[2]

The basic structure of the underdeveloped economies relevant for short-run macroeconomic relationships and the assumptions thus necessary for an applicable, simplified macroeconomic model for them are discussed in the next section. The model is brought together and its implications are discussed in Section II.[3]

Section III discusses the comparative statics properties of the model under the assumption that individuals, firms, and the government do not anticipate price changes or do not allow the rate of inflation to influence their decisions—in conformity with the static Classical and Keynesian models for the developed economies. The model is analyzed diagramatically in this section.

The implications derived in Sections II and III are interesting, plausible and confirmed by what is intuitively, and in an unorganized way, known about inter-

[1] I am grateful to my colleagues Myron Frankman and Martha Loutfi and to Nurul Islam for their comments and suggestions on this paper. "Monetary policy" is defined in this paper as working through changes in the money supply and "fiscal policy" as working through changes in the levels of government expenditures and revenues, any difference between them being financed by borrowing.

[2] This requirement explains the absence of references in this paper. The assumptions used and the implications derived are familiar to most students of the field and are to be found in innumerable writings. They have, however, never been brought together into a unified yet simple framework.

[3] The models presented are for a closed economy in order to simplify the analysis. A corresponding open model would not change any of the implications derived in this paper. Some implications of the existence of foreign trade and capital flows for the uses of monetary and fiscal policy are considered in Section IIE.

relationships in underdeveloped economies. This confirmation may be taken as an index of the usefulness and validity of the theoretical framework constructed in this paper.

Section IV discusses in general terms the impact of fiscal policy upon the economy, the criteria often used for the formulation of fiscal and monetary policies and their implications for stability, inflation and growth in the economy.

A note of warning may be necessary. The assumptions made in this paper are by necessity simplifications which, since they pertain to a structure as complex as the economy, had to be heroic. They are, however, no more heroic than those made for the developed economies and embodied in the Classical and Keynesian models, or those made in many policy-oriented models for the underdeveloped economies. Further, the implications of the models that follow from these assumptions are empirically reasonable and useful.

The symbols used in this paper and their definitions are:

Symbols for the Nonmonetary Sector:

y^1 = Output in real terms in the nonmonetary sector
p^1 = Price level of products of the nonmonetary sector
M^1 = The amount of money balances held by the nonmonetary sector
$y_A{}^1$ = Nonmonetary sector's output consumed by itself
$y_I{}^1$ = Nonmonetary sector's output purchased by the monetary sector

Symbols for the Monetary Sector:

y = Output in real terms
y_d = Personal disposable income in real terms
y_I = Output of the monetary sector consumed in the monetary sector
y_A = Output of the monetary sector purchased by the nonmonetary sector
p = Price level of products of the monetary sector
$\pi = \dot{p}/p$
I = Investment in real terms $= I_c + I_k$
I_c = Investment in consumer durables by households
I_k = Investment in capital goods by firms
S = Savings in real terms
G = Government expenditures in real terms
T = Government revenues in real terms, at a constant tax rate $\bar{t}$. $T = \bar{t}y$
$g = G - T$ = fiscal deficit in real terms
w = Real wage rate $= W/p$
n^s = Supply of labor
n^d = Demand for labor
n = Employment
W = Wage rate in nominal terms $= pw$
M^s = Money supply in nominal terms
M^d = Money demanded in nominal terms
K_o = Initial capital stock, exogenously given

The superscript 1 and the subscript A refer to the nonmonetary sector while

the subscript I refers to the monetary sector. Starred symbols will refer to the equilibrium values of the corresponding unstarred symbols.

Equations of the comparative statics model in Section II are identified by including A in their numbering.

I. THE STRUCTURE OF THE UNDERDEVELOPED ECONOMY

It seems useful to list the dominant empirical facts of the economic structure of the underdeveloped economies, especially in so far as they differ from those of the developed economies. These are basically the following.

1. The domestic economy is subdivided into monetary and nonmonetary sectors, the former mainly composed of the industrial sector but including also the commercialized agriculture near the urban centers. The nonmonetary sector mainly involves subsistence agriculture.

2. *The nonmonetary sector*

Capital per head is small. There also exists a considerable amount of unemployment or underutilization of the labor force. Output in the short run—a year or two—is dominated by climatic factors.

Formally, then, the only aspects of the nonmonetary sector relevant to macroeconomic analysis of the whole economy is that its output is exogenously given and that it trades part of this output with the monetary sector.

The output y^1 of the nonmonetary sector may be purchased by itself ($y_A{}^1$) or by the monetary sector ($y_I{}^1$). Hence,

$$y^1 = y_A{}^1(p, p^1, y^1) + y_I{}^1(p, p^1, y) . \tag{1}$$

Since demand functions are homogenous of degree zero in prices, given income in real terms,

$$y_A{}^1(p, p^1, y^1) = y_A{}^1\left(\frac{p}{p^1}, y^1\right),$$

$$y_I{}^1(p, p^1, y) = y_I{}^1\left(\frac{p}{p^1}, y\right).$$

So that

$$y^1 = y_A{}^1\left(\frac{p}{p^1}, y^1\right) + y_I{}^1\left(\frac{p}{p^1}, y\right). \tag{2}$$

Equation (2) determines the intersectoral price ratio p/p^1 as a function of y and y^1, where y^1 is exogenously given in the short run by climatic factors. Hence, $\frac{p}{p^1} = f(y, y^1)$. Assuming that $\partial y_I{}^1/\partial y > 0$, $\frac{\partial(p/p^1)}{\partial y} > 0$.

The nonmonetary sector may or may not spend all its proceeds from the sale of its goods on the products of the monetary sector. If it spends less on the products of the monetary sector than it receives, it may reinvest some part of the balance in the monetary sector, retaining the remainder for transactions and/or

idle monetary balances. A necessary condition for the relative contraction of the nonmonetary sector over time is obviously that there be a net inflow of money balances for transactions into it. Such a gradual "monetization" of the nonmonetary sector thus involves a transfer of products or resources to those in the monetary sector for money balances, thus subsidizing the monetary sector and involving a long run disequilibrium in the intersectoral balance of payments.

Such leakages of funds from the monetary sector (M^1) obviously depend upon the intersectoral price ratio and the levels of output. That is,

$$M^1 = M^1\left(\frac{p}{p^1},\ y;\ y^1\right). \qquad (3)$$

3. *The monetary sector*

A dominant fact of underdeveloped economies which differentiates them from the developed economies, is their lack of well-developed financial markets in which individuals can invest their idle money balances and in which firms and the government can borrow. Such economies are at a primitive stage in the Gurley and Shaw scheme of the evolution of financial markets and instruments. These may exist, but their impact on total borrowing and lending of funds in the economy and on total savings and investment is minimal.

Most of the borrowing or lending is done directly by individuals in small amounts. If banks exist, the real determinant of the level of borrowing from them is not the interest rate charged but whether the loan will be made or not and, from the banks' viewpoint, the size of the loan will depend not upon the rate of interest but the creditworthiness and influence of the borrower and possibly the state of the economy. There is a large element of rationing, and noneconomic considerations, in the lending and borrowing process. The level of investment in the economy is, then, not significantly related to the rate of interest.

Since lending by individuals and firms is a hazardous, unorganized process, funds available to the individual and not needed for financing current transactions have to be held idle (hoarded) by the individual economic unit or often invested by the unit himself. A prime determinant of this decision to hoard or invest seems to be the rate of inflation, which is the rate at which the purchasing power of such balances declines.[4] At high rates of inflation, individual economic units will decrease their idle balances; households increase their investment in housing, and other consumer durables, the most common direct form of investment open to them, and firms invest in inventories, a short term abode of real purchasing power.

The demand for money balances (M^d) then depends positively upon the expenditures (py) to be financed and inversely on the rate of inflation.

[4] It is implicitly being assumed here that the consumption-saving decision is independent of the rate of inflation in the presence of a sufficient variety of consumer durables whose purchasing power does not decline in a period of inflation. However, some increase in consumption does occur in the form of the services of these durables. This assumption is not necessary to the analysis. The conclusions of this paper remain unaltered even if the propensity to consume did depend upon the rate of inflation.

$$M^d = M^d(py, \pi)\,, \tag{4}$$

where $\partial M^d/\partial(py) > 0$, $\partial M^d/\partial\pi < 0$.

Investment is undertaken by households through their holdings of consumer durables (I_c) and by firms. The former depends positively upon the household's real income and, as argued already, positively upon the rate of inflation. It also seems reasonable to assume that firms increase their investment to meet the increased demand for output and that higher rates of inflation imply a higher profitability of investment in at least some forms. Therefore, total investment (I) in the economy is given by:

$$\begin{aligned} I &= I_c(y_d, \pi) + I_k(y, \pi) \\ &= I_c(y - T, \pi) + I_k(y, \pi)\,, \end{aligned} \tag{5}$$

where $\partial I_c/\partial y$, $\partial I_c/\partial\pi$, $\partial I_k/\partial y$, $\partial I_k/\partial\pi > 0$, with the second-order partial derivatives being negative in each case.

For the fiscal deficit (g), it seems likely that the government uses the current level of output or one of its proxies as an index of the capacity of the economy to absorb the deficit without inflation, but cuts down the size of this deficit as the rate of inflation increases. Hence,

$$g \equiv G - T = g(y, \pi)\,, \tag{6}$$

where $\partial g/\partial y > 0$, $\partial g/\partial\pi < 0$.

Real savings (S) in the monetary sector equal the monetary sector's output (y) less its consumption of its own goods (y_I) and the expenditure on imports ($y_I{}^1$) from the nonmonetary sector. That is, given (2),

$$S = y - y_I\left(\frac{p}{p^1},\ y - T\right) - y_I{}^1\left(\frac{p}{p^1},\ y - T\right), \tag{7}$$

where

$$1 > \frac{\partial S}{\partial y_d} > 0\,, \qquad \frac{\partial S}{\partial(p/p^1)} \gtrless 0\,.$$

For equilibrium in the product market of the monetary sector, savings (S) must equal the sum of investment by households (I_c) and by firms (I_k), fiscal deficits (g) and expenditures in real terms by the nonmonetary sector on the monetary sector's output (y_A). That is, for equilibrium in the product market,

$$\begin{aligned} &y - y_I\left(\frac{p}{p^1},\ y - T\right) - y_I{}^1\left(\frac{p}{p^1},\ y - T\right) \\ &\quad = I_c(y - T, \pi) + I_k(y, \pi) + g(y, \pi) \\ &\qquad + \frac{p^1}{p} \cdot y_A\left(\frac{p}{p^1} \cdot y^1\right). \end{aligned}$$

Focusing attention on the labor market, the labor force consists of self-employed entrepreneurs and the employed labor force. The hours of work of the self-employed are likely to be independent of the actual level of their nominal earnings per hour or the rate of inflation since they tend to work for the maximum nominal income/profits under any conditions. Among those working for a wage,

most are likely to bargain individually or through their unions, in so far as these exist, for a nominal wage which has some counterpart in their thinking in terms of the purchasing power of agricultural products produced mainly by the non-monetary sector. That is, the supply of labor (n^s) depends upon the nominal wage (W) and upon the price (p^1) of products of the nonmonetary sector[5] as in

$$n^s = n^s(W, p^1) . \tag{8}$$

An increase in the nominal wage rate may increase the supply of labor by motivating each worker to work longer hours, reducing absenteeism, inducing others to work, increasing migration from the nonmonetary sector to the monetary one or improving the health of the workers. Correspondingly, an increase in the products, mainly food, of the nonmonetary sector reduces the supply of labor. Hence, $\partial n^s/\partial W > 0$, $\partial n^s/\partial p^1 < 0$.

It could alternatively have been assumed that the hypothesis of unlimited supplies of labor holds and that nominal wage rates are fixed by social custom or by the government at a level, say $(W/p^1)_o$ again in terms of their purchasing power over the products of the nonmonetary sector. Then,

$$\frac{W}{p^1} = \left(\frac{W}{p^1}\right)_o$$

so that

$$\frac{\partial(W/p^1)}{\partial n^d} = 0 .$$

This assumption can be encompassed within (8) by simply specifying that $\partial W/\partial n^d \geq 0$.

Labor demand (n^d) would, given profit maximizing firms, depend upon the real wage rate defined in terms of the prices of the products produced by the firms in the monetary sector and upon the output to be produced. That is,

$$n^d = n^d\left(\frac{W}{p}, y\right) = n^d(w, y) , \tag{9}$$

since $W/p \equiv w$. In (9), $\partial n^d/\partial w < 0$, $\partial n^d/\partial y > 0$.

Equilibrium in the labor market requires that

$$n^s(W, p^1) = n^d(w, y) .$$

From the standpoint of production in the economy, the gestation lag for most forms of capital is small. Assume that most of the private firms' investment is in quick-maturing forms of capital such as hammers and lathes etc., while the government investment is in infrastructure and large plants with a long gestation period. Investment by households, I_c, is assumed to be mainly in consumer durables, including housing, which does not affect production in the economy. Hence the short-run production function is:

$$y = y(n, K_o + I_k) , \tag{10}$$

where $\partial y/\partial n > 0$, $\partial^2 y/\partial n^2 < 0$, $\partial y/\partial I_k > 0$.

[5] The assumption that the supply of labor depends upon the price of the products of the nonmonetary sector, is not essential to the model and does not affect any of its conclusions. A Keynesian supply function for labor could alternatively have been assumed.

II. THE THEORETICAL FRAMEWORK

The previous section implies the following equations for the various sectors of a closed economy.

1. *The nonmonetary sector*

$$y^1 = y_A{}^1\left(\frac{p}{p^1},\ y^1\right) + y_I{}^1\left(\frac{p}{p^1},\ y\right) \tag{2}$$

which was equation (2) above. As argued already, this equation determines the intersectoral price ratio p/p^1 as a function of output in the monetary sector. That is,

$$\frac{p}{p^1} = f(y;\ y^1)\ . \tag{11}$$

2. *The monetary sector*

i) Labor Market Equilibrium

$$n^s(W,\ p^1) = n^d(w,\ y)\ , \tag{12}$$

ii) Production Function

$$y = y(n,\ I_k + K_o)\ , \tag{13}$$

iii) Expenditure Equilibrium

$$y - y_I\left(\frac{p}{p^1},\ y_a\right) - y_I{}^1\left(\frac{p}{p^1},\ y_a\right) = I_c(y_a,\ \pi) + I_k(y,\ \pi) + g(y,\ \pi) + \frac{p^1}{p}y_A\left(\frac{p}{p^1},\ y^1\right), \tag{14}$$

iv) Monetary Equilibrium

$$M^s - M^1\left(\frac{p}{p^1}, y;\ y^1\right) = M^d(py,\ \pi)\ . \tag{15}$$

The endogenous variables in this model are p, p^1, y, and w. The equations are (11) to (15). Since the number of equations exceeds the number of endogenous variables, the model is overdetermined and it is unlikely that there exists any set of values of the four variables which would satisfy the five equations. Equations (11) to (14) form a complete set—while no other combination of four equations does so—for determining the equilibrium values of the endogenous variables. It is examined first in the following subsection.

A. *Equations (11) to (14): The Monetary Equation Ignored*

In this model, equations (11) to (14)—ignoring equation (15)—are four equations in four unknown variables, p, p^1, w, and y. Assume that a solution exists and is unique. Let these values be p^*, p^{1*}, w^*, and y^*. The level of employment n^*, and investment I^* can then be determined, as can the leakage of funds M^{1*} be to the nonmonetary sector and hence the rate of its monetization.

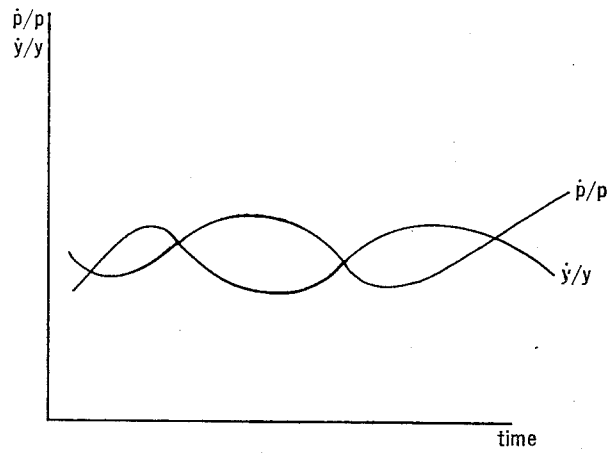
Equation (14) is a differential equation involving π $(=\dot{p}/p)$. The solution for

equations (11) to (14) thus gives a dynamic process of change in the endogenous variables in the system. While it is possible that a static (stationary) solution exists at a zero rate of inflation, such a solution is unlikely.

It is more likely that the model produces both a trend and fluctuations in the values of the endogenous variables. The fluctuations may be explosive or dampened. In the latter case, they would require exogenous "disturbances" for continuous fluctuations in the values of the endogenous variables. The level of generality makes it impossible to specify whether a trend and/or oscillations will exist or not and what the nature of the oscillations will be. Some comments are, however, possible. Different countries with different values of the parameters are likely to have different experiences on the explosiveness or nonexplosiveness of, say, the rate of inflation.

Another comment which is possible is that the time-paths of different variables are not likely to be identical. Thus, for example, periods of high growth rates in output may be related to both high and low rates of inflation, as may periods of low growth rates, as shown in Figure 1, for example.

Fig. 1.



Further, some variables may have ceilings and/or floors while others may not do so. Thus, output tends towards a (soft) ceiling as labor is fully utilized. The rate of inflation may have a floor at a zero level. It would not, however, have a ceiling if money supply increases in a purely passive response to pressures in the economy.

B. *The Expenditures Equation (14)*

Leaving aside the structure of the complete model, define $S = y - y_I - y_I$[1] and assume that $I_k = \bar{I}_k$ and $g = \bar{g}$. That is, firms' investment expenditures and government deficits are completely exogenous. Then, the investment multipliers are:

$$\frac{dy}{dI_k} = \frac{dy}{dg} = \frac{1}{\frac{dS}{dy} - \frac{\partial I_c}{\partial y}\Big|_{\pi=\pi_o} - \frac{\partial I_c}{\partial \pi} \cdot \frac{d\pi}{dy}} \tag{16}$$

where the multiplier depends upon the rate of inflation. At high rates of inflation, households invest "almost" their entire savings directly in consumer durables, i.e., $\partial I_c/\partial y \simeq dS/dy$, implying that the denominator is approximately zero and the multiplier is "extremely large." This indicates a high degree of instability at high rates of inflation and requires a high degree of restraint in investment expenditures by firms and in fiscal expenditures by the government.

However, the nature of the investment function is itself a further source of instability, since it incorporates the acceleration principle, that is, $\partial I/\partial y > 0$. Another factor making for explosive rates of inflation is the propensity of firms to invest more at higher rather than lower rates of inflation.

In the presence of extremely high investment multipliers and higher levels of investment at high rates of inflation, it becomes imperative that government expenditures are restrained. Stability may require, in fact, budget surpluses of sizeable magnitudes since the marginal propensity to consume and invest by households would approximate unity and the overall marginal propensity to spend $\{\partial(y_d - S)/\partial y + \partial I_k/\partial y\}$ would tend to exceed one at high rates of inflation.

Unfortunately, it seems virtually impossible, given the economic objectives and the political climate of underdeveloped countries, to achieve budgetary surpluses. High rates of inflation are then not only likely to be self-perpetuating but also cumulative—exploding into ever higher rates of inflation.

At low rates of inflation, the investment and fiscal multipliers are likely to be "relatively" small. Thus, at a zero rate of inflation, households may have little incentive to invest on their own and may have a high marginal propensity to save, say from 20 per cent to 40 per cent, which give a multiplier value about five as a maximum. Further, without the impetus of high rates of inflation, the investment by firms is restrained. The multiplier-accelerator process may then be stabilizing or produce "small" fluctuations in output and rates of inflation.

Underdeveloped countries would thus at low rates of inflation experience relative stability in rates of inflation without harm to their *long-run* growth potential —and possibly get high rates of long run growth since savings are channelled more into capital investment by firms than into consumer durables, including housing. If, however, high rates of inflation do come about—for instance, through an unrestrained fiscal or monetary policy, poor harvests etc.—these would seem to be cumulative, without necessarily any harm to *short-run* growth rates since investment is high under these circumstances.

C. *The Complete Model, Fiscal Versus Monetary Policy*

The complete model consists of four endogenous variables and five equations. The additional variable relevant in models with developed financial markets and missing in underdeveloped economies is the rate of interest. The model then brings out the inherent dearth of market mechanisms or equilibrating variables in an underdeveloped economy. Such a scarcity is an absolute one from the

point of view of the proper functioning of the economy.

The proper functioning of the economy then requires an additional endogenous variable. This may be provided by making one of the exogenous (policy) variables an endogenous one. *Thus, either the money supply M^s or the budget deficit g must become an endogenous variable determined by the model. Both cannot play an independent role.* Further, assuming fiscal policy to be an independent variable, the appropriate change in the money supply is not that given by the size of the fiscal deficit but that implied by the structure of the economy, given the size of the fiscal deficit.

If both fiscal and monetary policies attempt to play an independent role, serious disequilibria result in the economy. One aspect of these is speculation in gold, thus changing its relationship with money supply as a source of idle purchasing power and inducing changes in the holdings of idle money balances. Another aspect would take the form of structural inflation. Since monetary and fiscal policies infringe on different sectors initially, an improperly coordinated set of policies would initially create relatively high rates of inflation in some sectors and monetary or fiscal stringency in others, with severe changes in resource distributions between sectors and between households (workers) and firms, especially those with an easy access to the financial authorities.

As pointed out earlier, equations (11) to (14) do provide a complete system for determining the equilibrium values of the variables. Equations (11)–(13) and (15) do not provide a complete system in this sense. That is, *monetary policy cannot play an independent role.* If it did so, equations (11)–(13) and (15) could, given an exogenous money supply, be solved for $I = f(\pi, p^1, y)$ which is unlikely to be identical with the economy's behavioral investment function $I_k(y, \pi) + I_c(\pi)$.

If, however, the structure of the model were to be modified such that the production function becomes

$$y = y(n; K_o) \tag{13'}$$

as in the Classical and Keynesian models of the developed economies, equations (11), (12), (13'), and (15) would form a complete set. Monetary policy could then play an independent role, as could fiscal policy. However, only one could be a genuine policy variable, the other still having to play an endogenous role.

Fiscal policy used as a direct instrument of development is more truly a policy variable than the money supply, the latter leaving an indirect and questionable impact on development. Further, the budget is a cumbersome and inflexible tool for assisting in continuing adjustments in the economy while monetary policy is both variable in amount and timing. It seems, then, that even if a choice were to exist, the money supply rather than budgetary deficits would tend to become the endogenous variable.

From a historical point of view, the money supply was an endogenous variable for countries adhering informally or formally to the Gold Standard. For instance, changes in the price level in a country, from an initial equilibrium position, would give rise to changes in its balance of payments with offsetting gold flows and a consequent change in the money supply. The money supply was then not a

discretionary tool of the monetary authorities but an endogenous variable in the open economy. This role of the money supply, unfortunately, escaped attention in the revision of macroeconomic theory achieved by Keynes, writing, it may be noted, at a time when the major Western economies had just completed their development of financial markets to escape the binds of the model in this paper.

D. *The Implications for Policies Versus Goals*

The preceding discussion has shown that there exists only one independent policy variable, other than direct controls over pricing, consumption, investment etc., or selective controls, and this is likely to be fiscal policy. It can at best be used for achieving only one goal among many that exist and are pressing in underdeveloped countries. High levels of employment, of output, of growth rates, price stability, balance of payments equilibrium and redistribution of incomes are among the foremost competing goals. The obvious outcome in the face of this relative scarcity of policy instruments versus goals is thus a failure to achieve any of them in a satisfactory manner. It is, in any case, unlikely that price stability ranks as highly with fiscal authorities as it might do with truly independent monetary authorities. Rates of inflation, then, are likely to be much higher on average in underdeveloped countries than in developed economies which can afford the luxury of independent monetary authorities.

The scarcity of policy instruments in the face of goals, the low degree of emphasis put on achieving price stability through fiscal measures and the errors in conducting an endogenous monetary policy imply a tendency to use direct controls on various variables and especially on prices, almost an ever-present fact in underdeveloped economies.

E. *Fiscal Policy in an Underdeveloped Open Economy*

This paper deals, by deliberate intent, with a closed economy. Most underdeveloped economies are not closed ones. Large exports of a natural resource may increase the degrees of freedom in the model presented above, for example, by making imports and hence the supply of goods policy variables. However, for less fortunately-placed economies, the goal of equilibrium in the balance of payments requires an equilibrating variable. If the exchange rate is fixed, the remaining policy instrument of fiscal policy may have to be diverted to this goal, implying further difficulties in the achievement of other goals in the economy.

Given high income elasticities to import, and low elasticities of demand for exports, an endogenous monetary policy and the tendency towards rates of inflation higher than in developed economies, maintenance of equilibrium in the balance of payments would require an increasingly deflationary fiscal policy over time. Since the rate of unemployment is already high, such policies are politically difficult—and unwise from an economic viewpoint at the degree of severity required over time—and direct controls on imports and exports are an inescapable fact over time. The fact that such controls are difficult to administer and never perfect implies that some constraint continues to be imposed by balance of payments considerations on fiscal policy, implying in turn higher rates of unemployment and lower growth than necessary from the standpoint of a closed economy

or of an open economy with flexible exchange rates.

The fixity of exchange rates thus imposes a greater cost on underdeveloped economies with balance of payments problems than on corresponding developed economies.

III. COMPARATIVE STATICS ANALYSIS[6]

The model presented in the previous section is a dynamic one. Its static version would have to assume that economic units do not anticipate price changes—an assumption also made in the static Classical and Keynesian models for developed economies. The following model then drops out the rate of inflation as a variable in the equations of the dynamic model in Section II. The resulting comparative statics model, again for a closed economy, is a useful and fairly simple devise for analyzing the effects of changes in autonomous investment, fiscal deficits and other parameters on output employment and prices in the economy.

The static model is then:

$$\frac{p}{p^1} = f(y, y^1) \tag{11A}$$

$$n^s(W, p^1) = n^d\left(\frac{W}{p}, y\right) \tag{12A}$$

$$y = y(n, I_k; K_o) \tag{13A}$$

$$y - y_1\left(\frac{p}{p^1}, y_d\right) - y_I{}^1\left(\frac{p}{p^1}, y_d\right) = I_c(y_d) + I_k(y) + \bar{g}(y) + \frac{p^1}{p} y_A\left(\frac{p}{p^1}, y^1\right) \tag{14A}$$

$$M^s - M^1\left(\frac{p}{p^1}, y; y^1\right) = M^d(py)\,. \tag{15A}$$

Equations (12A) and (13A) imply the relationship

$$y = f(p^1, p, I_k; K_o)\,, \tag{17A}$$

where $\partial y/\partial I_k > 0$, $\partial y_1/\partial p < 0$ and $\partial y/\partial p > 0$. (17A) may be called the output-employment relationship or curve, designated as the n–y curve in Figure 2.

Equation (14A) can be solved for y in terms of p/p^1 and y^1. That is,

$$y = G\left(\frac{p}{p^1}, y^1\right). \tag{18A}$$

An increase in y^1 increases purchases from the monetary sector, y_A, increases total expenditures on the products of the monetary sector and hence has the same effect as an increase in investment expenditures. That is, $\partial y/\partial y^1 > 0$. Assume that $\dfrac{\partial y_I}{\partial p/p^1} - \dfrac{\partial y_I{}^1}{\partial p/p^1} > 0$. That is, net savings per dollar of income

[6] The diagrammatic method rather than the calculus one has been deliberately used in this section to achieve a textbook type presentation and to maintain similarity with the Hicksian IS-LM analysis of the Keynesian and Classical models.

depend only upon the level of income. A change in the intersectoral price ratio merely changes the allocation of consumption expenditures between the sectors but not its overall amount. Then, since $\frac{\partial y_A}{\partial p/p^1} < 0$, $\frac{\partial y}{\partial p/p^1} < 0$, $\partial y/\partial p < 0$, $\partial y/\partial p^1 > 0$. The signs of these derivatives reflect the fact that as p/p^1 falls, the nonmonetary sector will buy more of the output of the monetary sector.

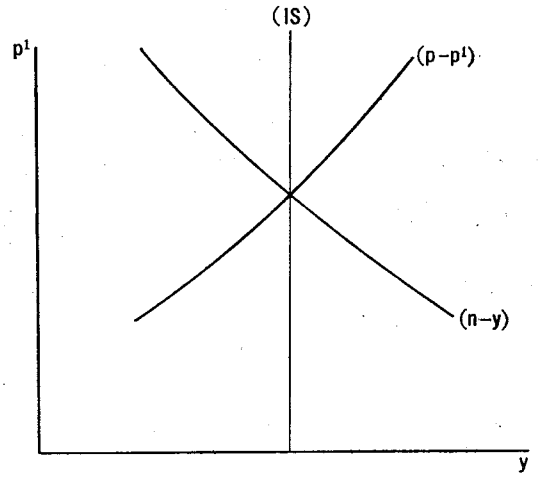
The relationship given by (18A) is designated as the *IS* curve in Figure 2, since it originates in the expenditures sector and bears that name in the Hicksian analysis for developed economies. However, the particular form of (18A) in this case depends critically upon the demand for the monetary sector's products by the nonmonetary sector.

Equation (11A) for the nonmonetary sector can be restated as

$$y = h\left(\frac{p}{p^1},\ y^1\right) \tag{19A}$$

where $\partial y/\partial y^1 > 0$ and, from (1), $\frac{\partial p/p^1}{\partial y} < 0$. Hence $\partial y/\partial p < 0$, $\partial y/\partial p^1 > 0$. This function can be designated as the p–p^1 curve in Figure 2 and is the locus

Fig. 2.



of all points at which equilibrium holds in the demand and supply for the output of the nonmonetary sector. The Classical and Keynesian theories have no curve to correspond to this one since these theories deal with only one sector.

Equations (11A), (12A), (13A), and (14A) are clearly adequate to determine the four endogenous variables p, p^1, w, and y. Assume that a solution exists and is p^*, p^{1*}, w^*, and y^*. Assume that it is unique and stable.

However, as argued above, the complete model is overdetermined. Equation (15A) acts as a constraint on the feasible set of values for p, p^1, and y. Dis-

equilibrium in the economy would exist as a normal state if monetary policy were to play an independent role. If the money supply becomes endogenous, then it is given by

$$M^s = M^1\left(\frac{p}{p^1}, y; y^1\right) + M^d(py) \,. \tag{20A}$$

Equation (15A) then ceases to be a constraint on the other equations and can be ignored. *This assumption is maintained in the following analysis.*

The model—excluding equation (15A) for monetary equilibrium and thus using the assumption of an endogenous money supply—is brought together diagramatically in the (p^1, y) space in Figure 2. The three curves shown are the loci of equilibrium points in the three markets and their equations are:

n–y Curve: $$y = f(p^1, p, I_k) \tag{17A}$$

where $\partial y/\partial p^1 < 0$, $\partial y/\partial I_k > 0$ and $\partial y/\partial p > 0$.

IS Curve: $$y = G\left(\frac{p}{p^1}, y^1\right) \tag{18A}$$

where $\partial y/\partial p < 0$, $\partial y/\partial p^1 > 0$ and $\partial y/\partial y^1 > 0$.

p–p¹ Curve: $$y = h\left(\frac{p}{p^1}, y^1\right) \tag{19A}$$

where $\partial y/\partial p < 0$, $\partial y/\partial p^1 > 0$ and $\partial y/\partial y^1 > 0$.

Overall equilibrium in all markets requires that the three curves intersect at the same point. The assumption of the existence and uniqueness of a solution to the model ensures that such a point exists and is unique. If overall equilibrium did not hold, changes in p would occur and shift the *IS* and p–p^1 curves until the three curves intersect at the same point.

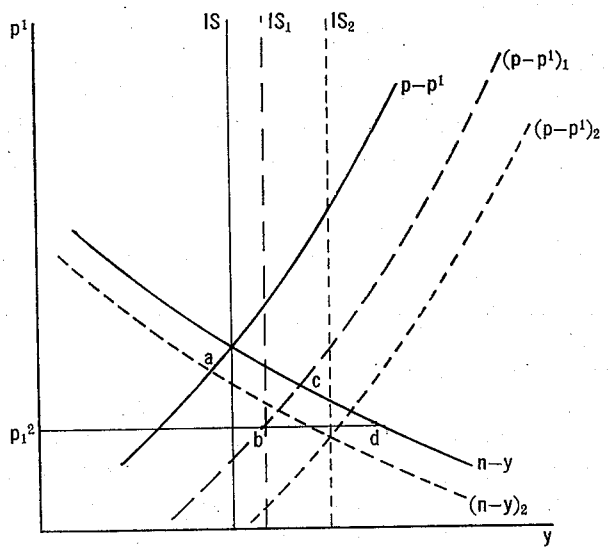
The comparative static properties of this model can easily be analyzed. Two cases are considered below.

In Figure 3, assume that overall equilibrium exists initially at the point a and that exceptionally favorable harvests occur, shifting the *IS* curve to $(IS)_1$ and the $(p$–$p^1)$ curve to $(p$–$p^1)_1$, the relative shift being greater in the $(p$–$p^1)$ curve under the assumption that changes in the output of the nonmonetary sector have their greatest impact on p^1, for given y. At $p_1{}^1$, equilibrium holds at b in the demand markets for the output of the two sectors but this demand is less than the actual output of the monetary sector as shown by point c on the n–y curve. Hence the price p of the monetary sector's products falls, shifting both the *IS* and p–p^1 curves further to the right and the n–y curve to the left until a new overall equilibrium is achieved at point d.

Hence, a fortuitous increase in the nonmonetary sector's output shifts the economy from point a to point d, thus causing a fall in the prices of the products of both the sectors and an increase in the output of the monetary sector.

In Figure 4, assume that overall equilibrium exists initially at the point a and that an increase in the autonomous component of investment shifts the *IS* and n–y curves to the right to $(IS)_1$ and $(n$–$y)_1$ respectively. The relative shift shown

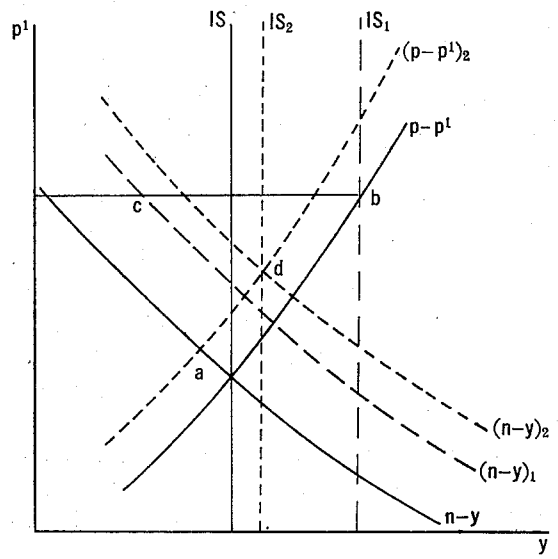
Fig. 3.



in these curves is based on the assumption that the impact of the increase in investment is greater on demand than on output in the monetary sector. At point *b*, equilibrium holds in the demand markets but the demand at point *b* is greater than the output of the monetary sector, as shown by point *c*. The price *p* of this sector's output rises until a new equilibrium is reached at, say, point *d*.

Hence, an increase in the autonomous component of investment in the monetary sector raises the prices of the products of both the sectors and increases the output

Fig. 4.



of the monetary sector.

The comparative statics of other exogenous changes in the values of the parameters of the model can easily be worked out but are not examined here. The ones worked out in the preceding four paragraphs are reasonable and most economists in the field would subscribe to them, thus providing a favorable test of the validity of the model and of its usefulness for rigorous analysis.

IV. FISCAL POLICY IN AN UNDERDEVELOPED CLOSED ECONOMY

Autonomous government expenditures play the same role in the static and dynamic models above—and in the Classical and Keynesian models for the developed economies—as autonomous private investment. From the point of view of fiscal policy, if consumption were a function of disposable income and if the tax rate on income were constant, the balanced budget multiplier for demand in the monetary sector would be unity. An increase in the size of a balanced budget would then increase, as in the case of autonomous investment, the price level in both the sectors and also increase the output of the monetary sector. An increase in government expenditures alone would have a similar, though stronger, effect. Fiscal policy can then be used for influencing the level of output and employment in the economy.

However, it must be remembered that the government has only one general tool at its disposal and this would generally be fiscal policy. It can use that tool for controlling the rate of inflation, or the levels of output and employment, or achieving some combination of the two along a trade-off curve given by the structure of the economy, or high long-run growth rates or equilibrium in the balance of payments etc., or some combination of these goals. Assuming that goals other than inflation and employment are disregarded, and given the tendency of underdeveloped economies to generate high levels of unemployment, fiscal policy tends to be expansive, promoting increases in output and employment. The degree of this expansiveness is only partly, if at all, dependent upon the structure of the economy and partly upon each country's political traditions and pressures.

The static model showed that an expansive policy must be inflationary. Arguments based on the dynamic model showed that while the rate of inflation in underdeveloped economies may be stable at very low rates, it becomes unstable and has a tendency to snowball at high rates of inflation. Further, periods of rapid increases in the rate of inflation are likely to divert investment to consumer durables and thus harm long-run growth prospects. The limits upon the expansiveness of fiscal policy in terms of long-run rates of inflation and growth in employment and output then seem to be extremely severe. This counsels moderation in the use of fiscal policy for achieving high rates of employment and output in the current period.

Fiscal policy has in recent years often abandoned the role of a general short-run macroeconomic tool in many underdeveloped countries and has come to occupy increasingly the role of providing some of the physical capital so sadly lacking and necessary in these countries. The two roles need not be inconsistent

but the former one seems to have become generally subservient or secondary to the latter in countries where the existence and size of fiscal deficits are determined by development plans formulated on the basis of desired growth rates in output or capital equipment. These plans have generally called for fiscal deficits, sometimes high and increasing over time. The relative neglect of the role of fiscal policy as a short-run macroeconomic tool for general guidance of the economy in these countries, has in turn imposed both a short-run and long-run cost in terms of the instability of the economy, higher rates of inflation, higher rates of investment in consumer durables in the private sector. The long-run *net* contribution of fiscal deficits in the development plans then becomes an open question, possibly with a different answer for each country.

Both the dynamic and the static models brought out the need to make the money supply an endogenous variable in the economy. Unfortunately, this seems to have been rarely realized or put into practice in these economies. Changes in the money supply have often been tied to a desired or acceptable rate of inflation —implying an independent role for monetary policy—or to the financing of fiscal deficits not covered by borrowing from nongovernmental sources. Neither of these considerations is relevant or necessarily consistent with the changes in the money supply necessary for maintaining equilibria in the various sectors of the economy. The cost of such policies, then, has been in continuing and often serious disequilibria in the economy.

Since fiscal expenditures and taxation, and changes in the money supply, have their initial impact on different sectors, industries and individuals in the economy, even perfectly co-ordinated fiscal and monetary policies would have had the appearance of structural inflation and involved redistribution of incomes between industries and economic groups. Uncoordinated monetary and fiscal policies have made these structural imbalances virtually permanent, without any implication or necessity that these imbalances are desirable from any political or economic viewpoint such as that of inducing development or growth.

A *caveat* is perhaps necessary about the comments made on the role of monetary policy in this paper. These comments are not meant to detract from the efficacy of monetary policy and, in fact, changes in the money supply are likely to have a more direct and rapid impact on the price level than changes in government expenditures since the demand for money is as postulated by the Quantity Theory. Unfortunately, the appropriate models do not leave room for governmental discretion in the money supply and its very efficacy would ensure that a discretionary monetary policy would result in immediate and severe disequilibria in the economy.

CONCLUSIONS

Considerations on the nature of the basic economic structure of underdeveloped economies were used to construct a macroeconomic framework for them. Such a model—and a large number of its possible modifications which would deny the working of money and capital markets—implies that both fiscal and monetary

policies cannot play an independent role in the economy. One must be determined as an endogenous variable if the system is to attain equilibrium. In general, this would be monetary policy.

Many other implications can be derived from both the dynamic and the comparative static forms of the model. Thus, *inter alia*, it was shown that an exceptionally good harvest will lead to a fall in the prices of the products of both the nonmonetary and monetary sectors and to an increase in the output of the monetary sector. An increase in autonomous investment in the monetary sector was similarly shown to raise the price level in both the sectors and increase output in the monetary sector. An increase in fiscal deficits would have these effects also.

It was pointed out that since monetary and fiscal policies have their initial impact upon different sectors and economic groups in the economy and are rarely co-ordinated as required by the structure of the underdeveloped economy, structural imbalances arise as a continuing phenomena and give the appearance of permanence. They need not have any redeeming political or economic justification, other than that for the pressure groups brought into existence by the imbalances, and may add to other structural imbalances caused or required by the processes of economic development and political and social change.

The relative scarcity of macroeconomic tools as compared with the goals in underdeveloped economies is more acute than in the developed economies. Further, since the goal of fostering development even through the use of fiscal deficits financed by the new creation of money, has a relative priority in these countries, the tendency towards a high rate of inflation is a serious one. Given the tendency of the economy as shown by the dynamic model, to snowball high rates of inflation into hyperinflation, the net value of deficit financing over the long run then becomes an open question, with possibly different answers for different countries at different stages of development.

An open underdeveloped economy with a fixed exchange rate and a tendency towards deficits in the balance of payments, itself in turn at least partly due to the tendency towards high rates of inflation discussed above, presents a further problem in requiring the diversion of the only available policy instrument—fiscal policy—towards maintaining equilibrium in the balance of payments. However, the existence and priority of other goals prevent achievement of this goal in any satisfactory or systematic manner, as in the achievement of price stability, so that the devaluation of the exchange rate tends to become a recurrent possibility.

These remarks emphasize the seriousness, often hardly realized, of diverting fiscal policy away from its short-run macroeconomic functions of stability in rates of inflation, employment, output, or the balance of payments. Fiscal policy is also peculiarly sensitive to political and social pressures.

Disequilibrium is, hence, the normal state of the underdeveloped economy. The use of selective and wide-ranging direct controls seems then to be not only a social and political imperative but an economic one also.