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In 1963, Haavelmo [6], in commenting on a paper by Leontief, suggested that a very large foreign financial inflow, carrying a coefficient of unity in Leontief's investment function, might require negative domestic saving.[1] We believe that Haavelmo meant this statement only in an algebraic, not a theoretical, sense. Others, however, have taken him literally and have applied simple econometric tests to the "Haavelmo Hypothesis" that foreign financing and domestic saving are inversely related. Rahman [9] found for a 31 country sample of developing economies that the ratio of foreign finance to GNP was significantly and inversely related to the ratio of saving to GNP. Gupta [5], however, estimated the same equation for a 50 country sample and found a nonsignificant, positive relationship. More recently, Ahmad [1] classified the Gupta sample into four country groups and was able to lend support to the hypothesis of an inverse relationship between domestic saving and the foreign financial inflow.[2] None of the above authors formally developed this hypothesis, though Rahman suggested that developing economies which enjoy ready access to foreign financial markets or to foreign aid may exert less effort in mobilizing domestic financial resources than less creditworthy or less-favored economies. It is, we believe, in this sense--that foreign financial inflows may relieve the "pressure" on domestic financial institutions to develop--that the Haavelmo Hypothesis has significance. The present note, therefore, is addressed to both the issue of the direct relationship between the foreign financial inflow and domestic saving and the indirect relationship, through domestic financial development, between these two variables.

In an earlier paper [3], we advanced and provided empirical support for the hypothesis that the level of domestic financial development is an important determinant of the rate of capital formation in developing economies. This quantification of the role of financial structures in mobilizing savings was obtained through the introduction of a saving function, explicitly related to the level of financial development, that has specific relevance to developing countries. Our saving function was specified as:

$$(1) \quad S/Y = f(Z), \; 0 < Z < 1,$$

where S is total private saving in real terms, Y, is gross national product, and Z is an index of domestic financial development.[3] As a proxy for Z, we employ the ratio of currency in circulation to the money supply (CC/M). A decline of (CC/M) is taken as an indicator of the extent to which financial resources have been pooled and thus made subject to financial intermediation; (CC/M) therefore is an inverse indicator of the level of financial development.

Equating saving and investment to form the ex post equilibrium condition and solving for the investment rate (= saving rate, ex post) yields:[4]

$$(2) \quad I/Y = \alpha_0 + \alpha_1(CC/M) + \alpha_2(F/Y), \; \alpha_1 < 0,$$

where I represents gross investment and F is the net foreign financial inflow.

In the present paper, this equation is estimated as a country cross-section on means of the variables for the period 1963-68.[5] (Subsequent equations are also based on means of the variables over the same time period.) Since our previous research revealed that this equation was insensitive to small classification errors, we present results for a sample of 48 countries classified as developing, or nonindustrial, according to the IMF classification of industrial and nonindustrial countries.[6] The regression results for equation

(2), with "t" values of the coefficients shown in parentheses, are as follows:

$$(2a) \quad I/Y = .242 - .239\ (CC/M) + .334\ (F/Y)$$

$$(3.33) \quad (5.99) \qquad (2.14)$$

$$\bar{R}^2 = .427$$

These estimates support the proposition that the relationship between the investment rate (saving rate) and the foreign financial inflow is positive. Thus, our findings agree with those of Gupta [5].

Equation (2a) does not, however, bear directly on the issue of the relationship between the foreign financial inflow and domestic financial development.

Aside from the fact that access to foreign financial markets may relieve the pressure to develop domestic financial markets, as suggested by Rahman [9], the possibility also exists that some portion of the foreign financial inflow may be devoted to uses which have a small impact on economic growth, such that the expenditures may add more to aggregate demand than to aggregate supply. In the absence of an appropriate monetary or fiscal policy response to such a demand-supply disequilibrium, the effect may be financial disintermediation and a decline in the level of domestic financial development, hence a decline in domestic saving.

In an attempt to generate evidence on this possibility, we formulated and estimated an equation to determine the level of domestic financial development:

$$(3) \quad CC/M = \beta_0 + \beta_1(\Delta P/P) + \beta_2(\$Y/N),\ \beta_2 < 0,$$

where $(\Delta P/P)$ is the percentage rate of inflation and $(\$Y/N)$ is the level of per capita income in U.S. dollars.

The theoretical basis for this equation is simply that the higher the rate of inflation, the less confidence holders of money balances will have in financial assets and the more desirable holdings of currency will be because they are unquestionable claims to real assets. Also, ceteris paribus, the higher is the level of per capita income, the higher should be the level of financial sophistication of the populace and, hence, the greater the use of financial institutions. The estimated relationship is:

$$(3a)\quad CC/M = .341 + .335\ (\Delta P/P) - .00016\ (\$Y/N)$$
$$(14.02)\ (2.19) \qquad (5.53)$$
$$\bar{R}^2 = .410$$

Two additional relationships are now specified and estimated to allow us to obtain a reduced form equation for (CC/M) which isolates the net effect of (F/Y) on domestic financial development.

We first solve for the rate of inflation by specifying a simple demand for money function:[7]

$$(4)\quad M/P = \gamma_0\ (Y)^{\gamma_1}$$

$$(5)\quad \Delta P/P = (\Delta M/M) - \gamma_1\ (\Delta Y/Y),$$

where $(\Delta M/M)$ is the rate of change of the money supply and γ_1 is the income elasticity of the demand for money. The estimated relationship is:

$$(5a)\quad \Delta P/P = .004 + .991\ (\Delta M/M) - 1.62\ (\Delta Y/Y)$$
$$(0.305)\ (17.37) \qquad (7.55)$$
$$\bar{R}^2 = .841$$

Next, it is postulated that the following relationship exists between the rate of growth of output and the investment rate:

$$(6)\quad \Delta Y/Y = \Omega\ (I/Y)$$

The estimated relationship, with intercept suppressed, is:

$$(6a)\quad \Delta Y/Y = \underset{(14.52)}{.268}\ (I/Y)$$

$$\bar{R}^2 = .841$$

We now substitute equation (2a) into (6a), (6a) into (5a) and (5a) into (3a) to obtain a reduced form version of (3), primarily for the purpose of determining the sign of the coefficient of (F/Y). The result is:

$$(7)\quad CC/M = .318 + \underset{-.00016}{.344}\ (M/M) - .051\ (F/Y)\ (\$Y/N)$$

Since (CC/M) is an <u>inverse</u> indicator of domestic financial development, the negative sign associated with (F/Y) leads us to conclude that, in general, the net effect of the foreign financial inflow on domestic financial development is positive.

Numerous qualifications must, of course, be placed on these conclusions, qualifications which will be obvious to most readers. The findings nevertheless suggest that the Haavelmo Hypothesis, in either its literal or more sophisticated version, probably applies only in rather special circumstances.

FOOTNOTES

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1. More specifically, Haavelmo [6, p. 1062], in a question to Leontief, has suggested the following investment function for developing countries:

$$I = \alpha(Y+F)$$

where I is gross investment, Y is GNP and F is foreign capital.

2. Other studies that have recently considered the effect of foreign capital inflows on saving rates in developing countries are Weiskopf [10], Landau [7], Griffin and Enos [4] and Papanek [8].

3. For a more detailed discussion of the saving function and the basis for the choice of a proxy for Z, see [3].

4. See [3] for the full derivation of Equation (2). The equation is solved such that the parameters for government saving are included in the intercept.

5. The data for I (gross fixed capital formation), Y (gross national product), CC (currency outside banks), and M = CC + DD + TD, (where DD = demand deposits and TD = time and savings deposits) were obtained from IMF, International Financial Statistics, while the data for the net foreign financial inflow were taken from IMF, "Basic Global Statement," Balance of Payments Yearbook. These data were converted from U.S. dollar figures to national currencies through the exchange rates reported in International Financial Statistics.

6. The countries included are as follows: Argentina, Australia, Austria, Bolivia, Brazil, Ceylon, Chile, China (Taiwan), Colombia, Costa Rica, Cyprus, Dominican Republic, Ecuador, El Salvador, Finland, Ghana, Greece, Guatemala, Guyana, Honduras, Iceland, Iran, Ireland, Israel, Italy, Jamaica, Japan, Korea, Malaysia, Malta, Mexico, Morocco, New Zealand, Nicaragua, Pakistan, Paraguay, Peru, Philippines, Portugal, South Africa, Spain, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Arab Republic, Uruguay, and Venezuela.

7. While the rate of interest could have been included as an argument of the demand for money function, the unavailability of reliable interest rate data for developing economies argued against this inclusion.

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