

ESSAYS IN INTERNATIONAL FINANCE

No. 145, December 1981

HOW TO MANAGE A REPRESSED ECONOMY

RONALD I. MCKINNON
AND
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INTERNATIONAL FINANCE SECTION

DEPARTMENT OF ECONOMICS

PRINCETON UNIVERSITY

Princeton, New Jersey

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Library of Congress Cataloging in Publication Data

McKinnon, Ronald I.
How to manage a repressed economy.

(Essays, in international finance, ISSN 0071-142X; no. 145)

Bibliography: p.

1. Underdeveloped areas—Finance—Mathematical models. 2. Underdeveloped areas—Fiscal policy—Mathematical models. 3. Underdeveloped areas—Monetary policy—Mathematical models. 4. Underdeveloped areas—Foreign exchange problem—Mathematical models. I. Mathieson, Donald J. II. Title. III. Series.

HG136.P7 no. 145 [HG195] 332'.042s 81-20283
[339.5'2'091724] AACR2

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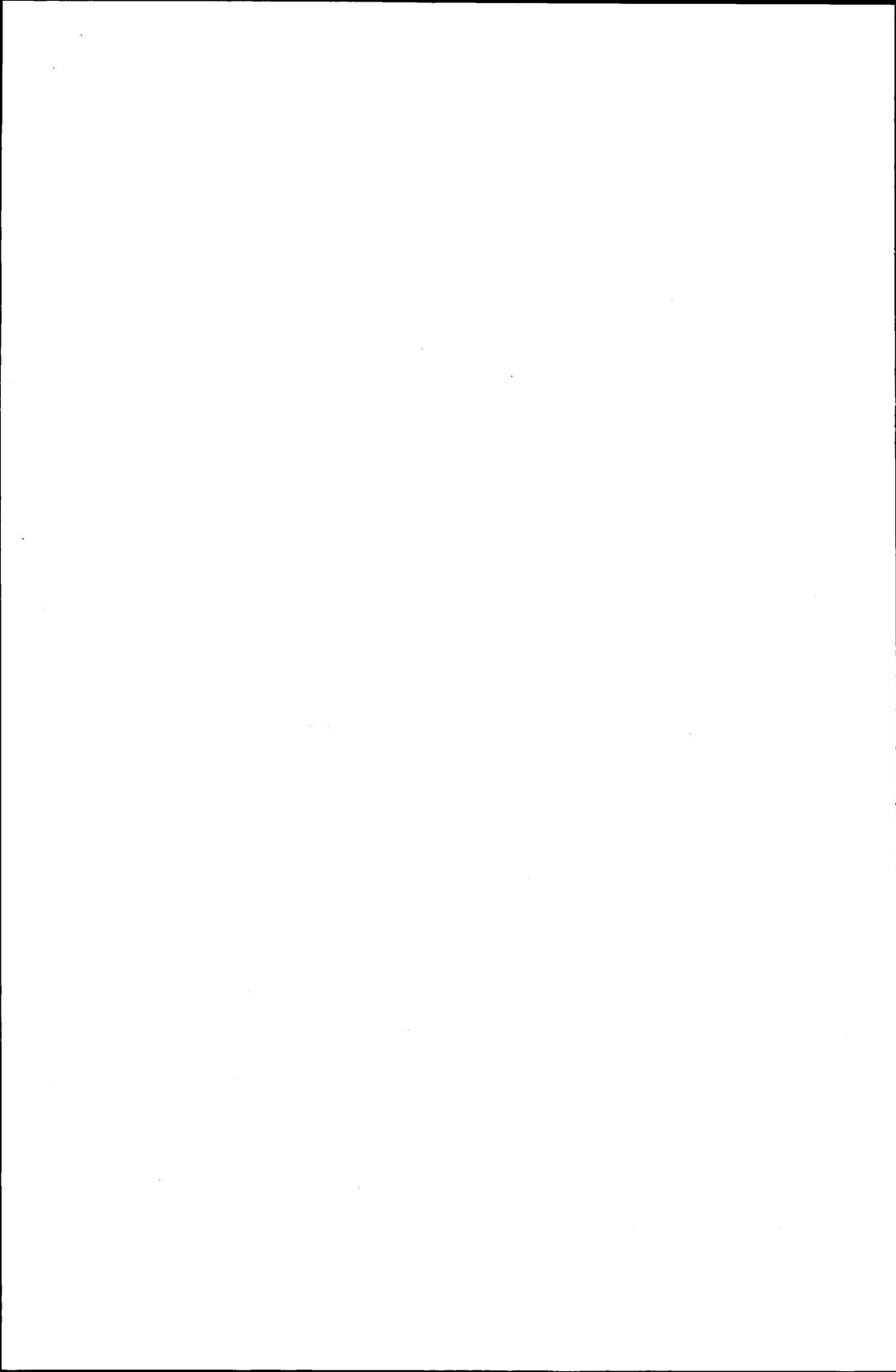
Printed in the United States of America by Princeton University Press at Princeton, New Jersey.

International Standard Serial Number: 0071-142X

Library of Congress Catalog Card Number: 81-20283 AACR2

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How to Manage a Repressed Economy

In 1974, Chile embarked on one of the few recent examples of a sustained economic liberalization. Fiscal, exchange-rate, and monetary policies were manipulated more or less correctly (with the possible exception of wage indexing) to secure free trade, an unrestricted domestic capital market, rapid real growth, and a stable currency. In 1976, Argentina began to follow foreign trade and financial policies similar to those being carried out in Chile, with some initial success. By 1980, however, its program of economic liberalization was in severe difficulty. A loss of financial control resulted in price inflation, serious overvaluation of the peso, and massive bankruptcies. These were followed in 1981 by forced devaluations, a sharp escalation of price inflation, and a negative rate of growth. Regression back to more import restrictions and more direct controls on domestic commerce and finance—in the mode of most countries in Latin America—seems likely.

This Essay does not analyze the whole liberalization process—the complex transition to a “liberalized” economy from one that is “repressed,” a term used to describe the set of monetary, fiscal, and foreign-trade policies found commonly (but not exclusively) in developing countries. The aim here is more modest. After identifying certain economic conditions that are essential if full liberalization is to be feasible, it addresses the problem facing a country when these conditions are not met: How can the government deal efficiently with economic repression while avoiding premature moves toward full liberalization like some, but not all, of the recent policies in Argentina?

The most fundamental difference between Chile and Argentina seems to lie in the degree of control each had over fiscal policy. Relatively early in its liberalization process, Chile curbed government expenditures and increased tax collections to the point where the Treasury accounts began to show large cash surpluses—anywhere from 1 to 4 per cent of GNP between 1976 and 1980. Equally important, the large credit subsidies to industry and agriculture that had been funneled mainly through the discount window of the central bank and through the state-owned commercial bank were virtually eliminated by 1979. Thus the swing from deficit to surplus in the “true” government accounts, where the monetary system is appro-

We would like to thank Philip Brock of Stanford University for making available his seminal work in this area. In his forthcoming Stanford Ph.D. dissertation, Brock has worked out a more general and complete model of monetary control for a repressed economy than the one presented here.

privately consolidated with the Treasury accounts, is all the more remarkable and was a necessary condition for fully liberalizing the Chilean economy.

In Argentina, the situation was different. The military takeover in March of 1976 led to a modest fiscal improvement (the combined public-sector deficit, including state governments and nationalized enterprises, fell from about 10 to 5 per cent of GNP by 1979). But this formal deficit in the public-sector accounts remained large relative to the real size of the domestic financial system. More important, the Argentineans were much less successful than the Chileans in phasing out credit subsidies to favored claimants in the nationalized and private sectors, which are channeled through the monetary system and are not formally captured in the public-sector accounts. Indeed, the great strain on Argentinean industry in late 1979 and throughout 1980 resulting from the overvaluation of the peso led to a series of actual and threatened bankruptcies that forced the central bank to extend these explicit and implicit subsidies. The result has been a large increase in effective government expenditure, much of which must be financed domestically. This lack of fiscal control should have discouraged the Argentinean authorities from proceeding with a full-scale financial liberalization similar to the one undertaken in Chile and from prematurely slowing the rate of devaluation of the peso.

In the formal theoretical model developed in this Essay, it is assumed that government authorities make a *realistic* estimate of the consolidated fiscal deficit for which the country's central bank must provide domestic finance by issuing base money. It is further assumed that monetary technicians at the central bank choose the combination of exchange controls, interest ceilings, and reserve requirements that will minimize the use of the "inflation tax" as an instrument of public finance without undue crowding out of private capital formation. The equations are set up as if the economy remained in the steady state of financial repression associated with the fiscal deficit. No attempt is made to analyze the transition to a more liberalized state that could take place if fiscal policy were improved in the Chilean mode. (That important subject is addressed in Mathieson, 1979, and in McKinnon, forthcoming.) In any case, a steady-state analysis of financial repression seems applicable at present to most developing countries, where continuing domestic fiscal deficits are more common than surpluses.

After one has specified an appropriate financial strategy for imposing the inflation tax and/or extracting seigniorage from the domestic financial system, a complementary and rather passive foreign-exchange policy follows naturally. Both capital inflows and outflows must be restricted, and the exchange rate should be indexed against domestic price inflation. It is as-

sumed that the flow of foreign commodity trade is also significantly repressed, by quotas, licenses, and high tariffs, although that would not be necessary for extracting the inflation tax efficiently. As in most countries in Latin America and Asia, this repression of foreign trade is biased against exporting and leads to general resource misallocation and reduced per capita real income. In the face of a domestic inflation tax, however, these trade restrictions have the incidental advantage of making exchange-rate indexing somewhat easier. Correspondingly, the repression of foreign trade, or merely an incomplete and uncertain trade liberalization, rules out an actively pegged exchange rate as an instrument by which to reduce domestic price inflation (see McKinnon, 1981b). The Argentinean overvaluation of the peso in 1979-80 was an unfortunate result of actively pegging the exchange rate at some predetermined level rather than passively indexing it against ongoing domestic price inflation.

Before spelling out the formal model of optimal financial control, however, let us examine in more detail the main characteristics of a repressed economy.

Characteristics of the Repressed Economy

Economists are generally aware of the highly protectionist foreign-trade policies that have been followed by most developing countries since World War II. The ten-country study by the National Bureau of Economic Research under the editorship of Jagdish Bhagwati (1978) and Anne Krueger (1978) has established that protectionism commonly takes the form of direct quantitative restrictions on imports and on some exports. Besides imposing a wide variety of direct quotas and prohibitions on the importation of specific goods, these regimes often impose exchange controls on purchases of foreign currency, making it difficult to import even goods and services that are not otherwise specifically restricted. Although protective tariffs are sometimes important in limiting imports in otherwise unrestricted categories, quantitative restrictions may well dominate.

In order to placate politically powerful urban groups, governments sometimes restrict exports of domestically produced foodstuffs and industrial raw materials, such as natural textile fibers that are used in urban industry. Generally, the domestic terms of trade are turned against agricultural and other exporters in order to protect urban consumers and urban industry.

When foreign trade is broadly repressed by quantitative restrictions (or high tariffs) on both the import and export sides, the prices of most goods produced and consumed are determined mainly by domestic supply and demand considerations and are insulated from any immediate impact of

exchange-rate changes. Similarly, the domestic financial system is usually insulated by exchange controls on the capital account of the balance of payments. In contrast to the very different situation facing a small open economy, therefore, we may reasonably begin analyzing fiscal and financial policy in a prototypical repressed economy *as if* it were isolated from the world economy.

Economists are less familiar with the syndrome of financial repression (McKinnon, 1973; Shaw, 1973), although it is just as common and just as important in developing countries as the repression of foreign trade. The same firms, individuals, and industries—whether private or nationalized—that are protected from potential imports of the goods they produce and granted import licenses for the goods they use often receive officially designated bank credits at what turn out to be negative real rates of interest once domestic price inflation or anticipated exchange depreciation is taken into account. Official interventions in the allocation of credit may be as pervasive, detailed, and bewildering as the proliferation of quantitative restrictions on foreign trade. Private borrowing and lending at equilibrium rates of interest are often completely preempted. There may be no open organized capital market where borrowers and lenders can freely contract at market-clearing interest rates.

How does such financial repression arise institutionally?

In developing countries, open markets for primary securities are usually insignificant. This situation does not itself constitute a distortion but merely reflects the low level of per capita income and the resulting small scale of individual acts of saving and investment. Information is insufficient for small farmers or merchants to be able to issue their own notes or publicly traded shares that can easily attract resources from small savers.

Thus the monetary system in developing countries plays a relatively more important role as an intermediary between savers and investors than it plays in industrial countries. Private financial savings consist largely of currency and deposits—claims on central banks, commercial banks, savings and loan associations, *financieras* (development banks), postal-savings depositories, and so on—which are attractive to small savers. Control over the flow of loanable funds that arises out of the issue of currency and of such deposits, money in the broad sense of M_2 , therefore assumes critical importance in the development process. What is purely a supervisory and monetary-control role for governments in most industrial countries becomes a highly activist credit-allocating role for governments in developing countries.

There is a fiscal root to this apparently philosophical difference in approaches to the conduct of monetary policy. Most developing-country gov-

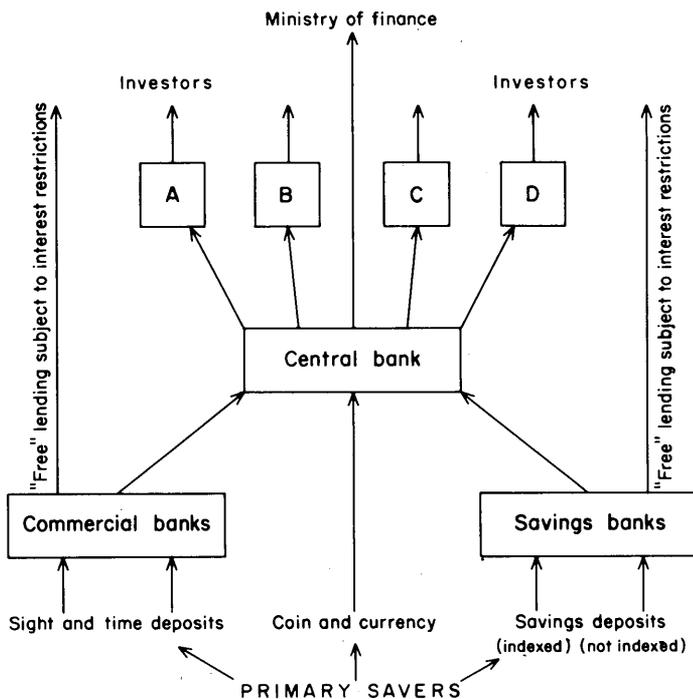
ernments feel constrained in the amount of revenue they can raise from conventional sources, such as income, sales, and property taxes, to support desired levels of expenditure on both current and capital accounts. The absence of open markets in primary securities means that the Treasury cannot directly market nonmonetary debt outside the banking system, unless it relies on capital inflows from abroad. However, forced sales of government debt to the banking system—accomplished by imposing an elaborate system of reserve requirements—give the government direct access to bank credit. In developing countries, reserve requirements of 50 per cent or more on deposits in commercial and savings banks are not uncommon. Less directly, comprehensive usury restrictions on both lending and deposit rates of interest allow the regulatory authorities to give credit subsidies to preferred claimants without having such subsidies appear in the official Treasury accounts. If sufficient resources cannot be mobilized at a stable price level to cover these explicit and implicit deficits in the public finances, inflation develops and interacts with the reserve requirements and usury restrictions to provide even more revenue to the government. This is the “inflation tax.”

The whole process of extracting revenue from the banking system is much too complicated to be captured in a single diagram, but the use of reserve requirements to divert bank credit to the government (the central bank) can be portrayed as in Figure 1. With this very substantial resource flow at its disposal, the central bank channels cheap credits to various specialized banking agencies (*A, B, C, D*, etc., in Figure 1), who lend in turn at low, disequilibrium rates of interest to promote exports, extend credit to small farmers, subsidize certain industrial projects, and so forth. When the government has very detailed credit allocations in mind, these agencies decentralize the potentially huge administrative burden. Other central-bank credits can flow directly to the ministry of finance to cover explicit current-account deficits in the government's budget.

One consequence of taxing the monetary system in this way is to reduce the monetary tax base *and* the flow of loanable funds in the economy: the size of M_2 is truncated in relation to GNP. In typical economies in Latin America, where such policies are commonplace, the ratio of M_2 to GNP is about 0.20, and in Asia about 0.24, whereas the same ratio for industrial economies is closer to 0.6, and they also have significant markets in primary securities. Taiwan, one of the few developing countries with a long history of maintaining a liberalized financial structure, has a remarkably high ratio of M_2 to GNP of over 0.7, and Japan's is even higher (McKinnon, 1981a).

A second consequence is that the trickle of bank lending that does occur is badly distorted by the fragmented structure of interest rates. Investors

FIGURE 1
BANK INTERMEDIATION IN A TYPICAL SEMI-INDUSTRIAL DEVELOPING COUNTRY



NOTE: A, B, C, D, E, and so on are specialized credit agencies (banks) that get cheap finance from the central bank. A could be the export-promotion fund, B the agricultural bank, C the central mortgage bank, and D the industrial-development bank.

SOURCE: McKinnon (1981a), p. 374.

avored by the official agencies may borrow at negative real rates that often reflect all too accurately the poor quality of their investment projects, whereas other potential borrowers with high-yield projects are severely rationed.

In spite of these negative consequences, the repression of both foreign trade and domestic finance often persists in the same economies for long periods of time. It is politically feasible neither to eliminate trade restrictions nor to raise taxes and cut government expenditures so as to liberalize domestic financial processes. A certain consistency in repression of both sectors makes it difficult to liberalize one without the other. Given this common political constraint, let us sketch an "optimal" program of financial and exchange-rate management for a typical repressed economy as if it

were in a steady state. Besides being intrinsically interesting, such a program provides a natural starting point, a consistent set of initial conditions, from which to examine the liberalization problem if and when the underlying political constraints on fiscal and foreign-trade policies are altered.

Fiscal Deficits, Domestic Bank Finance, and the Wedge Effect

Consider the financing problem facing the government of a repressed economy. Let us consolidate the official uncovered Treasury deficit and the unofficial subsidy element in the flow of low-cost credits to preferred borrowers through government controls over the banking system. Let Z be the resulting total *flow* of revenue (seigniorage) to be extracted from the domestic banking system, so that the nominal fiscal deficit is

$$Z = G - T, \quad (1)$$

where G is our inclusive measure of government expenditures and T is the flow of ordinary taxes collected. Z is stated in purely nominal terms and will of course vary with the price level. In order to avoid specifying a complete macroeconomic model of domestic income determination and the way in which the public finances are embedded in it, let the government's need for real finance from the domestic monetary system be given exogenously. Its real seigniorage is

$$Z/P = \alpha Y + v, \quad (2)$$

where P is a general price deflator, Y is exogenously given real income (GNP) used here as a scale factor, and v is a random stochastic disturbance reflecting some lack of official control over the fiscal system. In principle, α could be treated as a policy parameter. A reduction in α could signal, say, an increase in ordinary tax collections or a decrease in official credit subsidies to preferred borrowers. However, to reflect *steady-state* financial repression, we assume that α is a positive constant and that v has significant variance. In effect, an ongoing and somewhat variable fiscal deficit is pre-determined and simply dumped into the laps of the monetary technicians at the central bank; they must design an overall financial policy to make the best of the situation.

What objective function should be imposed on the technicians? To simplify the analytics, suppose that the government instructs the technicians to minimize the rate of expected price inflation in the steady state—subject to the constraint that the fiscal deficit is fully financed. Apart from maintaining the interest-rate subsidies on credits to officially designated borrowers that are part of the government deficit in equation (2), the technicians

are not otherwise constrained to maintain general interest-rate controls (usury laws) unless they prove useful in reducing the rate of price inflation. Moreover, the technicians remain free to manipulate reserve requirements on all classes of deposits without any direct concern for the "crowding out" of private borrowers. (Somewhat surprisingly, it turns out that no conflict necessarily exists between minimizing inflation and limiting crowding out. To be sure, the fiscal deficit ensures that there will be some crowding out and some inflation. But as long as the monetary technicians allow the banking system to issue term deposits that are subject to reserve requirements but free of interest ceilings, minimizing the inflation rate need not lead to undue crowding out—as will become clearer later on.)

In the context of this repressed economy, how can the instruments of financial policy best be manipulated in order to minimize the inflation rate?

The government effectively taxes the financial system through its control over the supply of non-interest-bearing base money. (To avoid unnecessary complications, required bank purchases of government bonds at preferential rates of interest are ignored here, although they are not unusual in practice.) Suppose that the technicians decide that demand deposits will not bear interest because they compete directly with currency as a means of payment, and currency is part of non-interest-bearing base money. Official reserve requirements against demand deposits are set at a very high level, close to 100 per cent, that is roughly failed to absorb abnormal bank profits after the costs of servicing checking accounts are deducted. Although somewhat repressive, this "suboptimization" strategy has the advantage of maintaining the margin of substitution between currency and demand deposits in the portfolios of money holders despite possible variability in the rate of price inflation or in rates of interest on other financial assets.

Next, suppose that the technicians allow banks of all classes to issue one other type of liability, thirty-day term deposits that are unrestricted as to the interest rate that may be paid to depositors. Moreover, the net proceeds from attracting such deposits may be lent out in the free part of the capital market, with no restrictions on the interest rate charged to various borrowers. However, a non-interest-bearing reserve requirement of k per cent is imposed on all such thirty-day deposits, whether they are in commercial banks, savings banks, or various classes of nonbank intermediaries such as money-market mutual funds. The idea is to make this a k per cent tax on all capital-market transactions. Thus k becomes the key monetary-control variable for responding to different levels of the fiscal deficit. We ignore the additional financial complexity associated with low-interest savings deposits, which are hardly different from demand deposits under high

inflation. We likewise omit deposits maturing in more than thirty days, because financing is very short-term in an inflationary environment anyway. Simplicity is a virtue both analytically and institutionally, and this two-asset strategy roughly corresponds to Chilean financial policy in the mid-1970s, when inflation was still severe. (A more differentiated structure of officially set interest rates at various terms to maturity is examined by Fry, 1981).

On the central bank's balance sheet, all narrow money usable for making payments to third parties is aggregated into the variable C , and all reserves against term deposits are denoted by R . The accumulated sum of past government deficits, ΣZ_t , is the central bank's only asset in this, as yet, closed economy.

Central Bank	
Government debt ΣZ_t	Currency and reserves against demand deposits C Reserves against time deposits $\frac{R}{M}$ Monetary base <u>$\frac{M}{M}$</u>

The real revenue flow accruing to the government from the issue of base money must be

$$Z/P = \dot{M}/P = (\dot{M}/M)(M/P) = \mu(M/P), \quad (3)$$

where \dot{M} is the absolute rate of change in base money, and μ is its proportional rate of change. Equation (3) yields the conventional result that real revenue from the banking system is the percentage change in nominal money times the real monetary base, whose scale in the steady state roughly depends on the level of real income, Y . We assume initially an exogenously given steady growth in real income to which there corresponds a steady-state inflation:

$$\pi = \mu - \gamma, \quad (4)$$

where π is the rate of price inflation, \dot{P}/P , and γ is income growth. In the steady state, minimizing π corresponds to minimizing μ , the percentage rate of issue of base money.

What is unconventional is to partition the demand for base money into two components: currency (plus demand deposits) and k per cent of term deposits, D . Disaggregation is necessary because the demand for currency is negatively related to the interest rate on term deposits, i_d , whereas the derived demand for reserves held against term deposits is positively related to i_d . (Remember that in a repressed economy there is no open-market interest rate on "bonds" that is the opportunity cost of holding "money", in the conventional sense of Keynesian liquidity-preference analysis.) The demand function for currency is

$$C/P = f(\underline{\pi}, \underline{i_d})Y . \quad (5)$$

The demand function for term deposits is

$$D/P = q(\pi, i_d)Y . \quad (6)$$

- +

These yield a demand function for base money:

$$M/P = kD/P + C/P . \quad (7)$$

Note that the demand for term deposits is *not* homogeneous of degree 0 in π and i_d . One cannot specify this demand purely in terms of the real deposit rate, $r_d = i_d - \pi$, because equal percentage-point increases in π and i_d will still attract depositors away from currency—which has no interest rate that can adjust in response.

An additional distinguishing feature of this analysis is the importance of the demand for unsubsidized loans in the free part of the capital market. Based on resources attracted through the issue of term deposits, commercial banks may lend at whatever interest rate—denoted by i_l —they can get. The demand function for real loans is

$$L/P = h(\pi, i_l) , \quad (8)$$

+ -

where L is the nominal quantity of loans. The deposit rate of interest has been left out of the function describing the demand for loans, and the loan rate of interest has been left out of the function describing the demand for deposits, because the qualitative direction of each effect is unclear.

However, the non-interest-bearing reserve requirement on term deposits drives a wedge between the open-market interest rate on deposits and that on loans. If we assume that the commercial-banking system is competitive and ignore the returns to factors of production employed in banking, the term-deposit intermediaries are constrained to making zero profits:

$$i_l(1 - k) - i_d = 0 . \quad (9)$$

The inflation tax on reserves is shared between depositors, whose yields are driven down, and borrowers, whose costs are driven up. The way in which price inflation interacts with the reserve requirement to make the wedge bigger can be illustrated by rewriting equation (9) in terms of the real rates of interest, r_d and r_l (McKinnon, 1981a). Substitute $r_d + \pi$ for i_d , and $r_l + \pi$ for i_l , to get the real loan rate:

$$r_l = \frac{k\pi}{1-k} + \frac{r_d}{1-k} . \quad (9')$$

The real loan rate is a weighted average of the rate of change in nominal prices and the real deposit rate. The tax effect of price inflation on real deposit and loan rates varies directly with k . To put the same point more forcefully, we rearrange the terms in (9') to show the wedge between either nominal or real interest rates:

$$r_l - r_d = \frac{k}{1-k} (\pi + r_d) = i_l - i_d. \quad (9'')$$

For a given real return to depositors, the wedge between borrowing and lending rates is positively associated with the rate of price inflation: as π increases and i_d rises equally, reserve requirements transfer to the government a larger share of the proceeds from lending by widening the wedge. How much r_l increases absolutely and r_d falls absolutely depends on the elasticity of demand for loans compared with the elasticity of supply of deposits—assuming that both markets clear.

Conversely, if the government puts a ceiling on the nominal interest rate on term deposits, the real rate on those declines by as much as price inflation increases. Then the wedge remains invariant to the rate of inflation if the zero profit condition is maintained.¹ Indeed, the real loan rate actually falls if a commensurate ceiling on nominal lending rates of interest is imposed in order to restrict bank profitability. Of course, the demand for loans will then exceed the supply of loanable funds, and some form of credit rationing will be necessary.

If inflation increases in the presence of these general interest ceilings on deposits and loans, government revenue from the term-deposit part of the system can be severely reduced: r_d and D/P decrease more, because no part of the tax is shifted forward to borrowers. This loss in financial efficiency from general usury restrictions implies that price inflation can be much higher than it needs to be for any given size of the fiscal deficit. Moreover, the crowding out of private borrowing becomes a more acute policy problem. *If the government must subsidize specific classes of borrowers, it will do far better to isolate them with direct interest subsidies that are counted formally as part of the budget deficit. General ceilings on deposit and loan rates of interest can then be relaxed and the capital market opened significantly.*

Reserve Requirements for Minimizing Inflation

Henceforth, we analyze the choice of the optimal reserve requirement k as if the government were proceeding efficiently by removing interest ceilings from term deposits and loans. Even for a repressed economy, the mainte-

¹ We would like to thank Leslie Lipschitz for pointing this out.

nance of interest ceilings on all monetary assets is unwise and is best discarded in favor of this degree of partial financial liberalization.

For alternative inflationary steady states, our constrained macroeconomic optimization procedure may now be reduced to its bare essentials:

Minimize the inflation rate, π , with respect to k subject to these market-clearing conditions:

Private loanable funds are

$$\begin{aligned} L/P &= (1 - k)D/P \\ &= h(\pi, i_i) = (1 - k)q(\pi, i_d), \end{aligned} \quad (10)$$

official deficit finance is

$$Z/P = (kq + f)(\pi + \gamma), \quad (11)$$

and bank competition is

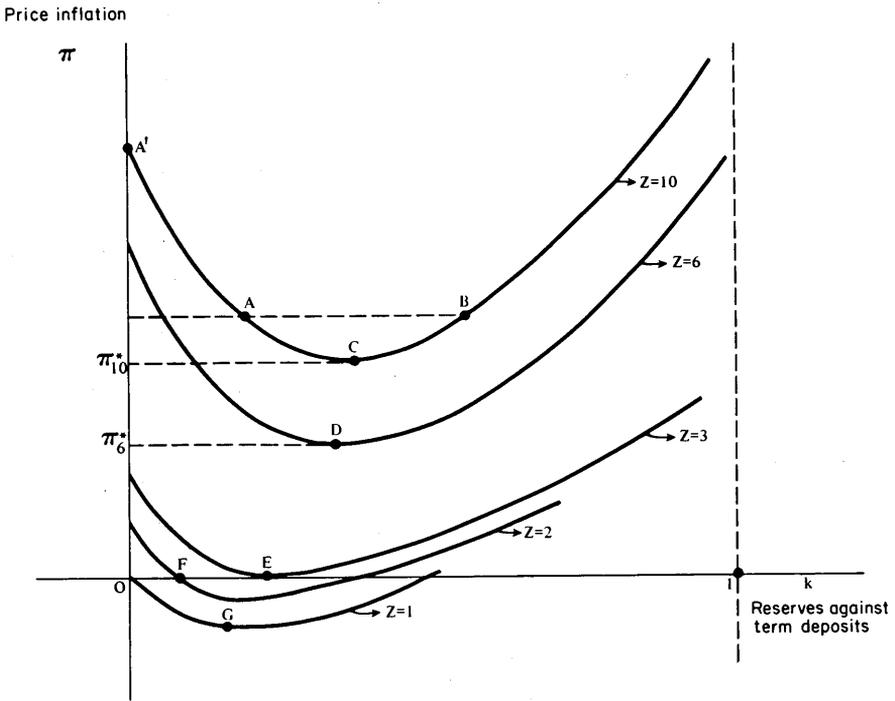
$$i_i(1 - k) - i_d = 0. \quad (12)$$

This optimization procedure determines the endogenous variables i_i , i_d , and π . Starting from equation (11), the real government deficit Z/P is exogenously given and must be financed by issuing base money against both term deposits and (100 per cent reserve) currency. As k increases, the relative tax burden is shifted toward the term-deposit part of the market; how much depends on the elasticity of response of depositors *and borrowers*. Given the inflation rate, π , the more inelastic is the demand for term deposits and for real loans with respect to a fall in i_d and a rise in i_i , the greater will be the optimal reserve requirement. Conversely, the more inelastic is the demand for currency, the lower will be the optimal reserve requirement, as more of the inflation tax burden is shifted toward currency holders. According to commonly accepted canons of public finance, one taxes where the inelasticity of demand is most pronounced in order to minimize the erosion of the tax base. Of course, the more inelastic the demand for either financial asset, the lower will be the minimum necessary inflation rate and rate of base-money creation. Similarly, from equation (11), the higher the natural real rate of growth and the flow of noninflationary seigniorage in the economy, the lower will be the minimum necessary inflation rate and the lower will be the corresponding rate of base money creation necessary to finance the given fiscal deficit.

A full algebraic development of the macroeconomic optimization problem, where interior solutions are distinguished from corner solutions, is too lengthy and tedious to present here. Instead, Figure 2 illustrates the more important ways in which the optimal reserve requirement, the inflation rate, and different levels of the exogenous fiscal deficit are likely to interact.

Each Z represents a given current level of real income and prices but a different level of the fiscal deficit. Our only decision variable, the reserve requirement, k , ranges between 0 and 1. If it is set at 0, the government gets no revenue from the term-deposit part of the system. Similarly, if it is set at 1, so that the nominal yield on term deposits falls to 0, everyone will abandon term deposits in favor of more liquid demand deposits and currency. Again, government revenue from the term-deposit part of the system goes to 0. For each possible fiscal deficit, therefore, the graph relating π to k must be U-shaped, with an interior solution for minimizing π where k is positive but less than 1.

FIGURE 2
INFLATION, THE FISCAL DEFICIT, AND OPTIMAL REQUIRED RESERVES



NOTE: Income growth and the current levels of income and prices are given. Z denotes various levels of the fiscal deficit.

SOURCE: Adapted and simplified from a similar diagram in Brock (forthcoming).

For $Z = 10$, the optimal solution is at point C, where the reserve requirement is set at a fairly high level to minimize the relatively high infla-

tion rate and high rate of issue of base money. If the monetary technicians set reserve requirements either too low, as at point A, or too high, as at point B, the inflation rate will rise above the minimum at C. Intuitively, this is easily understood for point A, because the reserve requirement is too low and term deposits are insufficiently taxed, so that a higher inflation tax is forced on currency holders. It may seem counterintuitive to many readers, however, that higher price inflation results when the reserve requirement increases beyond C to B. The reason is that setting reserve requirements too high shrinks the term-deposit part of the system unduly and also diminishes the real government revenue based on it. *Contrary to what simple textbook models of the money multiplier might suggest, increasing reserve requirements may be inflationary rather than deflationary!* (The inappropriate but standard textbook model of the money multiplier may be an important reason why Chilean authorities in 1976 and 1977 kept the reserve requirement too high despite the marked improvement in their fiscal situation. As long as price inflation remained very high, they were loathe to reduce it.) The apparent paradox is resolved if choosing the optimal reserve requirement is considered an exercise in the theory of optimal taxation for which the elasticities of response of depositors and borrowers are correctly weighed.

An equally serious error would be to leave large segments of the financial system with no reserve requirements at all. Important classes of deposit-taking financial institutions could be mistakenly classified as nonbanks not subject to the central bank's control. Real deposits would shift toward these unregulated intermediaries, people would avoid the inflation tax, and an unduly high rate of inflation would result—as depicted by A' in Figure 2.

As the size of the government's consolidated budget deficit is reduced, the U-shaped curves in Figure 2 shift downward and to the left: the optimal inflation and reserve-requirement solutions shift from C to D to E. Not only does the minimum inflation rate fall but the optimal reserve requirement also becomes progressively smaller in order to maintain the correct tax balance between the market for currency and the market for term deposits.² If there is substantial economic growth, the minimum necessary price inflation can fall to zero before the public-sector deficit is elimi-

² After this Essay was completed, Brock pointed out to us that insufficient conditions had been imposed on equations (10) through (12) to guarantee that in comparing steady states the optimal k would decline as the fiscal deficit was reduced, however intuitively plausible that might seem. In his dissertation (forthcoming), Brock has an ingenious argument showing that k and μ should be jointly reduced if the system is to remain dynamically stable as fiscal policy is improved. Sticking with steady-state comparisons, however, Remolona (forthcoming) shows that in a more complete model of intertemporal optimization, where one worries about crowding out in the capital market as well as reducing inflation per se, optimally k will decrease along with the fiscal deficit.

nated—point *E* along the graph $Z = 3$. Ongoing growth by itself generates just enough seigniorage to finance $Z = 3$ in a noninflationary fashion for given levels of prices and income (Friedman, 1971). Indeed, further cuts in the deficit will generate price deflation in the economy, as shown by point *G*, if the monetary technicians stick with the pure strategy of minimizing inflation by maintaining reserve requirements at a significant level.

To eliminate inflation without going so far as to cause falling prices, one might want to truncate the optimizing procedure. Impose the additional condition that price deflation is to be avoided. Then, as the deficit is reduced below 3, the authorities respond by simply reducing reserve requirements. In Figure 2, reserve requirements are reduced from *E* to *F* to 0 with the significant additional advantage (not part of our formal optimizing procedure) of further liberalizing the capital market. At the origin in Figure 2, where k is 0, Z has been arbitrarily set at 1. Seigniorage from the currency part of the system is just sufficient to provide noninflationary finance for a deficit of this rather modest size.

Further reductions in the deficit below 1 will again cause deflationary pressure unless the monetary technicians reduce reserve requirements against demand deposits (not incorporated in our formal optimization procedure) or extend modest amounts of central-bank credit to the commercial banks. Either method will be sufficient to ensure that base money expands fast enough to prevent outright deflation as the public finances improve in the context of general economic liberalization.

An important characteristic of a repressed economy is the tendency to run high and unstable fiscal deficits, as portrayed in Figure 2 by the neighborhood around point *C*. Nevertheless, with an appropriate foreign-exchange policy, the repressed economy can limp along at inflation points such as *C*, unless the consolidated public-sector deficit, including hidden credit subsidies, goes wildly out of control.³

The Case for Exchange Controls

How best might foreign-exchange policy complement the domestic financial strategy outlined above? On the one hand, the monetary technicians wish to ensure that the inflation tax does not fall unduly heavily on the foreign

³ Our analysis of optimal inflationary finance omitted the important random or stochastic elements in the consolidated public-sector deficit. For a given reserve requirement, the wedge between deposit and loan interest rates will be sensitive to inflationary pressure and thus will, to a limited extent, accommodate unexpected changes in such pressure. The absence of interest ceilings on the term-deposit part of the market gives the system additional flexibility. Nevertheless, whether or not the system is dynamically stable in response to stochastic fluctuations in Z is an important analytical question that remains to be worked out.

sector: exporters should be protected. On the other hand, given the quota restrictions and high tariffs on international commodity arbitrage, the management of the foreign exchanges should not create additional monetary instability in the economy. We suggest that these goals can best be accommodated by imposing strict exchange controls on outflows *and* inflows of private capital and indexing the exchange rate to the domestic price level by a passive downward crawl.

Consider first the case for two-way exchange controls on international flows of *private* capital. The government could finance part of the fiscal deficit abroad by negotiating directly with foreign creditors. It was assumed above, however, that a substantial proportion of the fiscal deficit must be financed by taxing the domestic financial system. Obviously, real yields on currency and term deposits denominated in domestic money are depressed by this form of taxation, and depositors will substitute financial assets denominated in a "hard" foreign money (usually dollars) unless prevented from doing so. Hence, the tight controls on capital outflows so common in repressed economies are appropriate as long as the domestic financial system is being taxed (Nichols, 1974).

What is less obvious is that potential private *borrowers* from the domestic banking system can evade the tax by obtaining foreign credits. Equation (9") showed that reserve requirements interact in the domestic market with the inflation rate to drive a wedge between the interest rates on term deposits and loans. By forcing higher interest rates on borrowers, the government extracts more revenue for a given rate of inflation, *and* real yields to depositors hold up somewhat better. If, instead, businesses are free to borrow abroad, the domestic real loan rate is reduced, along with revenue to the government and yields to depositors. The term-deposit part of the domestic monetary tax base will therefore be unduly eroded unless such private foreign borrowing is restricted.

Because the governments of repressed economies often consider themselves to be short of foreign exchange, they are likely to encourage rather than discourage inflows of private capital—even though such inflows are artificially stimulated by the domestic inflation tax. Indeed, if the government is fixing the exchange rate, such private capital inflows directly augment official exchange reserves. In this case, the loss of real revenue from the domestic financial system is manifest in the higher rate of base-money creation (inflation) coming through the foreign component of the domestic monetary base. If private capital inflows are not restricted outright, they should therefore be taxed by reserve requirements or similar measures so that the net tax burden on firms that borrow abroad is roughly equal to the wedge effect imposed on those that must borrow domestically.

To obtain foreign exchange, the government should borrow directly rather than depend on private borrowers as financial intermediaries. Although private borrowing may augment official exchange reserves, it effectively lessens proceeds from the domestic inflation tax.

Modern examples abound of countries taxing their domestic financial systems without realizing the importance of two-way exchange controls for maintaining the tax base. To cite but two examples:

- In late 1977, Israel precipitously abolished exchange controls on residents holding foreign-currency deposits or borrowing abroad, but the real size of its fiscal deficit remained unchanged. The domestic rate of inflation, which had been running at about 30 per cent per year in 1974-76, then accelerated to over 100 per cent per year in 1978-80. The smaller size of the domestic financial system required a much higher rate of price inflation to extract the same real revenue.

- In 1977 and 1978, while still running a substantial (consolidated) fiscal deficit, Argentina loosened its controls on capital inflows and outflows. Then, in 1979-80, it reduced reserve requirements on all classes of bank deposits. These premature measures eroded the real size of the taxable part of the domestic financial system. The resulting inflationary explosion was temporarily forestalled in 1979-80 by fixing the exchange rate. Inevitably, the peso became overvalued. In 1981, the fixed-exchange-rate system broke down and domestic inflation accelerated dramatically.

As a postscript to these rather sad episodes, observers should remember that allowing an untaxed foreign-currency component of the domestic financial system to develop *within* the country is just as bad as allowing free international inflows and outflows of capital. Not only Israel and Argentina but Peru, Mexico, and Uruguay have permitted substantial "dollarization" of their economies. This greatly narrows the local-currency part of the domestic financial system and sets the stage for an unnecessarily violent inflationary explosion if and when fiscal control is lost. If the government develops an uncovered fiscal deficit that can no longer be financed abroad or by issuing dollar securities at home, the necessary issue of base money in domestic currency will lead to much greater price inflation.

Allowing untaxed dollar bank accounts to develop within the country can often be justified on the grounds of short-run expediency—for example to encourage expatriate workers or capitalists to remit their foreign-exchange earnings. But, once in place, a large foreign-currency component in the domestic financial system has the characteristics of an economic "time bomb" (a felicitous phrase owed to Jacob Frenkel).

Clearly, monetary technicians should view exchange controls as an integral part of the financial management of a repressed economy. Only *after*

very substantial fiscal, monetary, and foreign-trade measures are taken to relieve that repression should the lifting of such restrictions on international inflows and outflows of capital even be considered. It remains doubtful whether free transactions in foreign deposits or currency within the domestic economy can ever be justified. Even the ultra-liberal Chilean government forbids domestic banks to offer dollar term deposits to residents at market rates of interest.

Indexing the Exchange Rate

An immediate consequence of imposing exchange controls in a repressed economy is that the central bank must make the market for foreign exchange. Private foreign-exchange dealers, banks, or multinational firms cannot do so because exchange controls prevent them from moving capital into or out of the country. Potential private dealers cannot freely assume positive or negative positions in foreign exchange (against the domestic currency) and thus are not collectively capable of establishing a market-clearing exchange rate. Nonspeculative merchants are not by themselves capable of making a stable foreign-exchange market (McKinnon, 1979a, Chap. 7). Without direct government participation, therefore, the exchange market will be highly illiquid and hopelessly unstable.

Given the necessity of intervention, the government must still decide whether to establish an official parity or be a market maker within a no-par regime. How often and by what procedure should the exchange rate be adjusted—if ever? We suggest that the foreign-exchange rate in a repressed economy be unified and *passively* adjusted to whatever degree of inflation tax—possibly zero—the government is levying on the domestic financial system. A passive downward crawl need not add to the price-level instability of an inflation-prone economy if foreign trade is substantially restricted by quotas and high tariffs and capital flows are blocked by exchange controls. Consider how a number of countries—Chile, Brazil, Peru, Portugal, and others—have sometimes indexed against domestically generated price inflation by continuously adjusting the nominal exchange rate in order to stabilize the real one.

Suppose E is the nominal exchange rate in pesos per dollar, P^* is the foreign price level in dollars, and P is the domestic price level in pesos. Even if P and P^* are based on internationally tradable goods, commodity arbitrage is too weak to link foreign and domestic price levels at the prevailing exchange rate. When quota restrictions and high tariffs are prevalent, the “law of one price” need not hold naturally. There is imperfect commodity arbitrage:

$$P \neq EP^* \quad (13)$$

In effect, quantitative restrictions convert most potentially tradable goods, whose domestic prices would normally be determined by international arbitrage, into "pseudo-nontradables," whose domestic prices are determined mainly by domestic supply and demand (McKinnon, 1979b). Hence, domestic price inflation, as measured by the left-hand side of equation (13), may proceed independently of the right-hand side, unless the authorities consciously manipulate the nominal exchange rate to offset it.

Why might the authorities wish to manipulate the nominal exchange rate to offset domestic price inflation? Most repressed economies still depend heavily on unprotected export activities that must compete at world prices. In addition, some import-substituting industries may still face unrestricted competition from abroad. To stabilize the cost-price relationships for these few genuinely tradable activities, the authorities would like to maintain the real exchange rate, e , at a predictable level:

$$e = EP^*/P \quad (14)$$

For a given foreign price level, any upward movement in P could be quickly offset by an upward adjustment in E (a depreciation or downward crawl of the domestic currency). The competitive position of exporters is then protected: the rigid real exchange rate ensures that a variable inflation tax does not fall unduly heavily on them. Exporters are taxed (along with everyone else) to the extent that they hold domestic currency or borrow from the domestic financial system, but they are *not* taxed when foreign exchange is translated back into the domestic currency. There is not an unpredictable cycle in which overvaluation (high domestic inflation and a fixed exchange rate) is followed by a massive devaluation and a period of currency undervaluation.⁴ In effect, an official commitment to indexing gives exporters valuable assurance that their domestic prices will not change capriciously relative to their costs of production. Because of this insulation from monetary or foreign-exchange instability, investment in export activities can be undertaken more efficiently.

In the presence of a continuing and independently determined inflation in domestic prices, such indexing implies a passive and variable downward crawl in the nominal exchange rate. However, the authorities might have

⁴ This argument is a bit oversimplified. Insofar as there are substantial restrictions on imports coming into the domestic economy, even an equilibrium exchange rate associated with balanced trade will be biased against exporters. This bias can be eliminated only under full trade liberalization. An indexed exchange rate merely avoids an additional cyclical unplanned bias against exporting.

to make several adjustments when determining how much and how fast the exchange rate actually moves:

First, there may be more than one price index for measuring the inflation rate, rather than the single P in our model. A broadly based index of tradable-goods prices would be preferable to a consumer price index. But if the latter is the only comprehensive index available, it is still worth using if price inflation is at all significant. There may be need, however, for discretionary adjustments in the nominal rate to compensate for imperfections in the price index as these become apparent.

Second, there is the question of what adjustments should be made for international inflation. Often the price levels of trading partners do not move in unison. Some appropriately simple weighting system is not difficult to establish, but it may also call for periodic adjustments to compensate for imperfections in the weighting scheme.

Third, the authorities should not adjust the exchange rate discretely every month. Rather, if the domestic price index jumps 6 per cent in a month, as announced on a single day, the required 6 per cent adjustment in the exchange rate is best smoothed over thirty days, with adjustment of, say, 0.2 percentage points per day. In the classic mode of the crawling peg (Williamson, 1965), this would minimize the propensity of traders to undermine the exchange controls by speculating on discrete exchange-rate changes. Each small movement in the rate is not worth the transactions costs of taking a speculative position.

Finally, if changes in the monthly price indices are highly variable (say 6 per cent one month and 2 per cent the next) and the authorities have reason to believe that one month is "unusual," some *ad hoc* intermonth smoothing of the variable crawl is warranted.

However, the basic objective should be well advertised: to adjust the nominal exchange rate at deliberate speed by whatever amount domestic price inflation exceeds that of the trading partners to whose currencies the domestic currency is pegged.

Currency Substitution and Financial Instability: Repressed vs. Open Economies

Wouldn't a variable downward crawl further exacerbate domestic financial instability? A fixed exchange rate, besides being an important political symbol, is often deemed necessary to stabilize price-level expectations and inspire confidence in the government's financial future. While this traditional view is more or less correct for a completely open economy, it is invalid for a repressed economy that is insulated from financial and commodity

arbitrage with the outside world and must resort to the inflation tax. Far better to regularize the inevitable exchange-rate adjustment in a series of small steps that are reported only in the back pages of the newspapers than to endure the occasional massive devaluation, following a squeeze on exporters, that is a threat to both political and economic stability.

First, consider why exchange controls on capital account facilitate the management of an indexed exchange rate. Suppose that our hypothetical price index is published on August 1 and shows 6 per cent inflation for the month of July, a substantially higher rate of inflation than the monthly average of 3 per cent that has been experienced in the first half of the year. Everyone now knows that the government is committed to speeding up the rate of mini-devaluation—the downward crawl—into the “near future.”

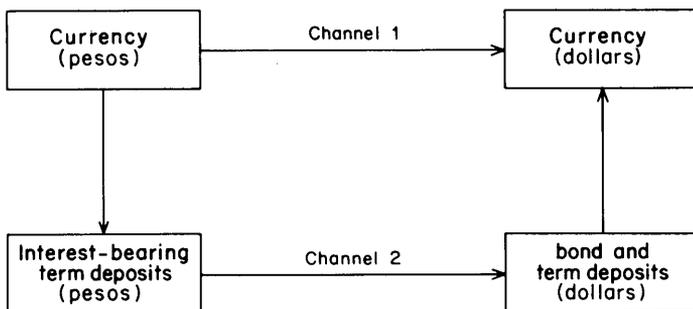
Suppose that, despite the continuing domestic inflation, the authorities in a completely open economy operate this indexing procedure *without exchange controls*. In the first half of the year, firms and individuals will have adjusted their portfolio holdings of currency and term deposits on the basis of a relatively low anticipated rate of inflation and exchange depreciation, the rates of interest on term deposits and loans having been determined endogenously. On July 1, however, the expected rate of smooth exchange depreciation suddenly increases. Because individuals have unrestricted access to foreign-currency holdings, the demand for domestic money will fall sharply in favor of foreign-exchange assets. Destabilizing currency substitution (in either direction) will occur continually as the government varies the rate of downward crawl without imposing exchange controls. (These short-run effects are additional to the long-run shrinkage of the domestic monetary base caused by individuals who are avoiding the domestic inflation tax by holding foreign-exchange assets.) For an open economy, then, the demand functions for currency and term deposits, equations (5) and (6), have to be respecified to include the expected rate of exchange depreciation as an important determining variable.

International currency substitution, in response to predictable exchange-rate changes in an open economy, may occur both directly and indirectly. *Direct substitution* out of domestic currency (and demand deposits) into foreign currencies is one channel, but one mainly confined to international traders with working cash balances both at home and abroad. Currency narrowly defined does not bear any protective market-equilibrating rate of interest to dampen such switching.

Less obviously, *indirect substitution* occurs within the domestic financial system as people move from currency to term deposits. With unrestricted international financial arbitrage, nominal rates of interest on domestic term deposits and loans increase in response to the anticipated faster exchange-

rate depreciation. This induces the broad mass of domestic transactors to move out of currency, with a high reserve requirement, into term deposits, with a lower reserve requirement. Through this second and probably more important channel, the demand for domestic base money falls and capital flows out. Both channels are portrayed in Figure 3.

FIGURE 3
INTERNATIONAL CURRENCY SUBSTITUTION IN AN OPEN ECONOMY



Clearly, unrestricted international currency substitution induced by *predictable* alterations in the speed of downward crawl in the exchange rate will seriously destabilize the short-run demand for domestic base money. And the indexing procedure proposed here would be predictable. Such a system may well be dynamically unstable unless the government maintains the strict exchange controls on both capital inflows and capital outflows appropriate for managing a repressed economy.

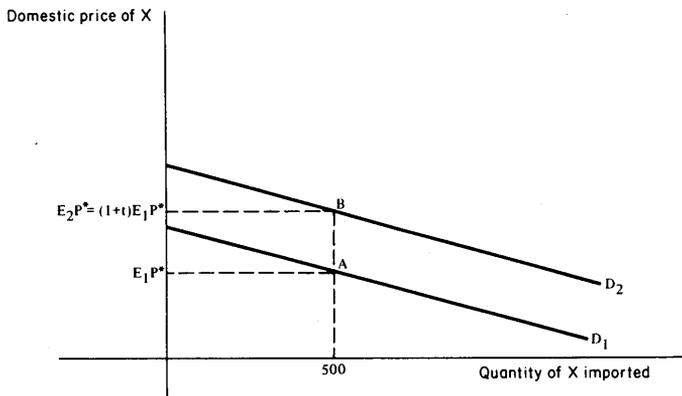
Similarly, international arbitrage in the commodities market induced by an indexed exchange rate has different implications for an open economy than for a repressed one. Consider again a small increase in the domestic price index that induces offsetting indexed devaluations. In an open economy, these are more likely to cumulate over time because there are no quota restrictions or licenses to inhibit international commodity arbitrage. The mini-devaluations quickly feed back into domestic prices and accentuate the initial inflationary impulse, whether random or not, which then requires further mini-devaluations according to the indexing procedure. The rate of domestic price inflation is no longer an independent datum to which the exchange rate passively adjusts. Exchange-rate movements themselves directly accentuate domestic price fluctuations in addition to destabilizing the demand for money. For an open economy, the intuitive opposition of government officials to such an indexing procedure is well founded.

For a repressed economy, however, international commodity arbitrage is

(by definition) blocked. Feedback effects from passively adjusting the exchange rate to the domestic price level are largely absent, except for those few open categories of exportables and import substitutes that the government wishes to protect by maintaining their real exchange rate. Otherwise, the domestic prices of the more typical quota-restricted goods are well insulated from the *immediate* consequences of exchange-rate changes. Fluctuations in the exchange rate are reflected by fluctuations in the economic rents accruing to quota holders—the implicit or explicit market value of a license to import.

This simple point is illustrated in Figure 4, where the market for a typical restricted import good, *X*, is considered in partial equilibrium. Only 500 units of *X* may be imported over the time horizon for which its net domestic demand, *D*, is drawn. At point *A*, where D_1 is such that the domestic price is exactly equal to the foreign price at the beginning exchange rate E_1 , the value of an import license is exactly zero. Now suppose an inflationary surge in demand to D_2 that raises the domestic price of *X* and all similar goods. At point *B*, if the old exchange rate E_1 holds, a premium of t per cent develops on a license to import *X*. However, if our indexing procedure comes into play, the exchange rate is adjusted from E_1 to E_2 . Notice that the only effect of the depreciation is to eliminate the license premium: there is no further upward movement in the domestic price of the commodity. Hence the exchange-rate adjustment does not reinforce the inflationary momentum in the prices of such pseudo-nontradables.

FIGURE 4
THE DOMESTIC PRICE OF A QUOTA-RESTRICTED COMMODITY



NOTE: E is the domestic-currency price of foreign exchange; P^* is the foreign price of good *X*; t is the *ad valorem* license premium; and D is net excess domestic demand for *X*.

Unlike their colleagues in open economies, monetary authorities in a repressed economy seem well placed to manage an indexed exchange rate. Moreover, to keep the inflation tax as "pure" as possible, other officially controlled prices in the economy should be subject to the same quantitative indexing procedure. If the government is setting price ceilings on a few basic foodstuffs, or official prices for public utilities, or minimum wages, all should be subject to continual small changes of a similar nature. (This requirement presumes that most domestic prices are not set directly by the government, so that market-determined price inflation can provide an independent datum for the indexing authority.)

A Concluding Disclaimer on Economic Repression

In less developed countries, the repression of foreign trade and of the domestic financial system is commonplace. International agencies and foreign academic advisers often react to this situation by advocating the liberalization of trade, financial, and fiscal processes. And if the difficult transition to a liberalized economy can be successfully carried out, the empirical evidence does indeed suggest that the economic welfare of the average citizen will improve dramatically.

What is rational and desirable in a successfully liberalizing economy, however, may be counterproductive in a repressed one. The basic problem is the continuing fiscal deficit. If the deficit is not eliminated, liberalization can be economically disastrous, whether it is attempted by reducing reserve requirements, by removing exchange controls, or by slowing the rate of depreciation more than warranted by the indexing procedure. In the absence of a fiscal surplus and a concurrent movement to free trade, serious overvaluation will develop if the fiscal authorities try to gain control over the domestic price level by slowing depreciation or fixing the exchange rate.

Accordingly, we have advanced a second-best strategy for managing a repressed economy. For a given fiscal deficit, we have proposed financial guidelines to minimize the necessary rate of inflation without unduly penalizing exporters and without crowding out the private capital market more than is necessary. The main elements in this strategy are:

1. Government authorities should replace general usury restrictions with direct interest subsidies to certain preferred borrowers, and these should be included in the Treasury accounts. Once other interest rates are freed, the true fiscal deficit can be calculated more accurately.
2. In the open part of the capital market, a comprehensive non-interest-bearing reserve requirement against term deposits should vary directly with the size of the fiscal deficit.

3. Flows of private capital both to and from the rest of the world should be subject to exchange controls or reserve requirements.

4. If the minimum necessary rate of domestic inflation exceeds that of the country's principal trading partners, the exchange rate should be indexed by a passive downward crawl.

Using this strategy and avoiding premature liberalization, our repressed economy can limp along in a second-best way without becoming dynamically unstable. The principal costs are a wedge in the domestic capital market between the interest rates for bank deposits and loans, a rigid real exchange rate that reflects the economy's inability to adjust the trade balance automatically to capital flows, and the continuing microeconomic distortions in the import-competing and export sectors with which we are so familiar.

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