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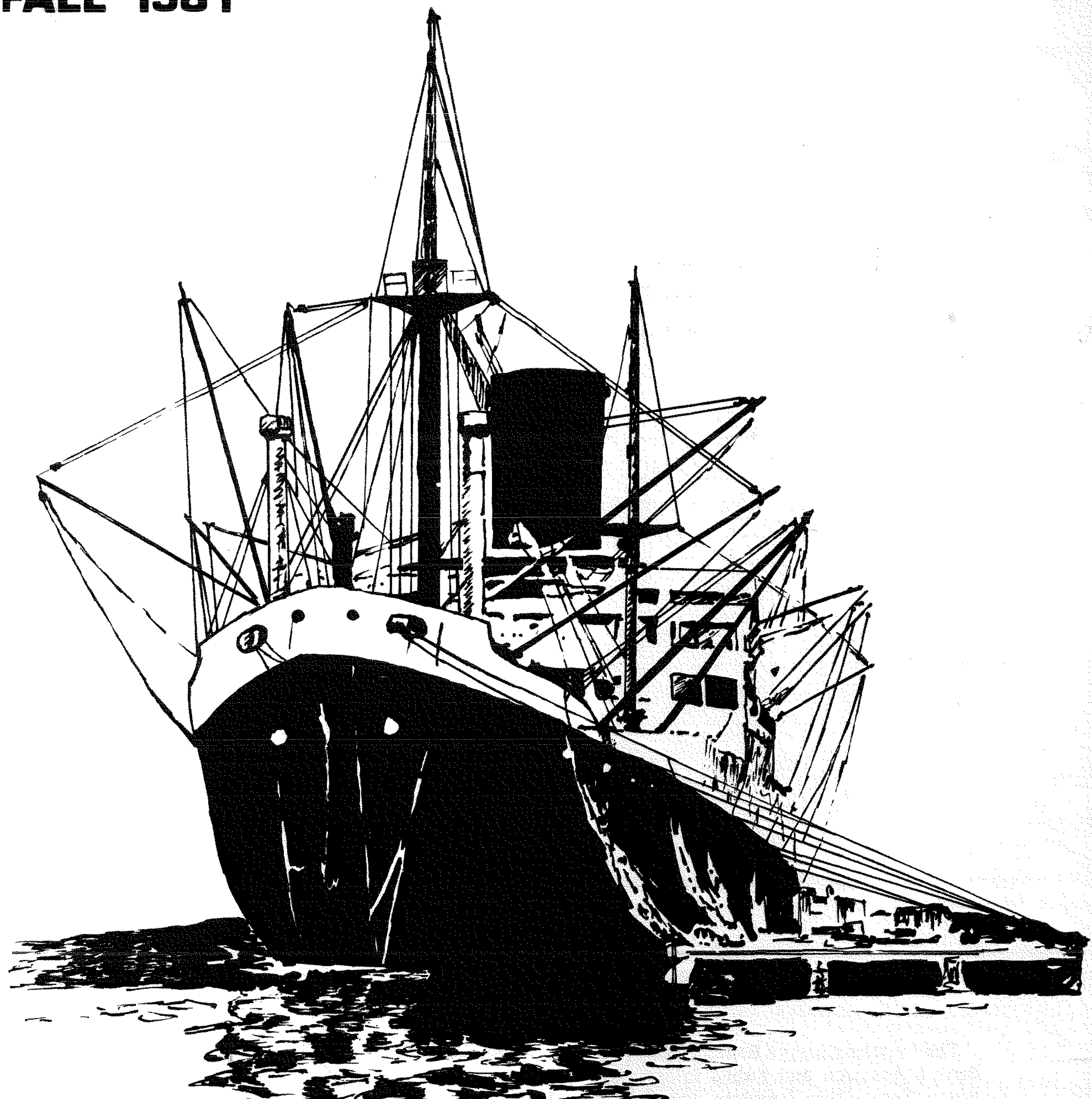

INFLATION, GROWTH AND EXCHANGE RATES

Inflation and Economic Growth in Pacific Basin Developing Economies

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The absence of any long-run relationship between inflation and the real rate of economic growth in **developed** economies has been well documented. The short-run positive correlation between inflation and real economic growth holds only so long as expectations of future inflation lag behind actual inflation rates. In the long run, the inflation/growth tradeoff disappears because actual inflation becomes fully anticipated.

Several **developing** economies have exhibited a negative correlation between long-run average inflation and real economic growth rates. One explanation may be financial repression — institutional interest rates fixed below their competitive, free-market equilibrium levels by administrative fiat. Under such circumstances, higher inflation rates generally produce lower real (i.e., inflation-adjusted) institutional rates — deposit, loan and bond rates of interest.

In many developing economies, commercial banks dominate the financial sector. Hence, institutional interest rates consist, in the main, of deposit rates offered to lenders/savers and loan rates charged borrowers/investors. Financial savings are held as bank deposits — a major component of the money stock. Money is defined throughout this paper to include savings, time and post office deposits, as well as sight deposits and currency in circulation.[1]

Higher inflation rates typically reduce real deposit rates of interest. And lower deposit rates tend to contract real money demand, i.e., demand for money expressed in constant-value terms. The decline in the real value of the banking system's deposit liabilities must be matched by a similar fall in the real value of the banking system's assets (or by a corresponding increase in bank capital). The primary asset of most banking systems is domestic credit.

A fall in real money demand may affect the price level in the same way as a rise in nominal money supply. Provided the money market clears, i.e., supply equals demand, inflation can be expressed as the difference between rates of change in nominal money supply and real money demand. In contrast, a fall in real money demand may not affect real economic growth in the same way as a rise in nominal money supply. **Ceteris paribus,** a decline in real money demand reduces real credit supply, but in the very short run, an increase in nominal money supply has exactly the opposite effect.

As inflation accelerates, and as real deposit rates, real money demand and real credit supply all decline, the government may expropriate an increasing proportion of the contracting supply of real domestic credit to finance its rising deficit. Hence, funds for both working capital and fixed investment are doubly pinched. The fall in real money demand produces a credit crunch which, in turn, reduces the real rate of economic growth.

The long-run negative relationship between inflation and real economic growth in financially repressed developing economies has important implications for stabilization policy. Policy-makers face the well-known dilemma: lowering the rate of monetary expansion to bring down inflation raises unemployment and

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reduces real economic growth in the short run. However, financially repressed economies can use both the money supply and nominal interest rates as independent policy instruments. While lowering the rate of monetary expansion, they can raise nominal institutional interest rates. The monetary deceleration has a **permanent** inflation-reducing but **temporary** depressing effect on real economic growth. Raising nominal institutional interest rates towards their competitive, free-market equilibrium levels, however, has a **temporary** inflation-reducing but **permanent** growth-enhancing impact. In combination, monetary deceleration with interest-rate increases could lower inflation and, simultaneously, raise the real rate of economic growth.

This paper tests the hypothesis that lowering real deposit rates below competitive levels increases inflation and, at the same time, reduces real economic growth. Section I examines the credit-availability mechanism. Section II applies a small-scale model of inflation and real economic growth to seven Pacific Basin developing countries. Section III analyzes alternative stabilization strategies for financially repressed developing economies.

I. Financial Repression and the Credit Availability Effect

Low interest-rate policies found in a number of developing economies are often part of a broader policy of financial restriction. Such a policy encourages financial intermediaries and financial instruments from which the government can expropriate a large seigniorage, while discouraging other entities. For example, the system favors money and the banking system: reserve requirements and obligatory holdings of government bonds can be imposed to tap this source of saving at zero- or low-interest cost to the public sector. However, the system suppresses private bond and equity markets — through transaction taxes, stamp duties, special tax rates on capital income, an unconducive legal framework, etc. — because seigniorage cannot be taken so easily from private bonds and equities. The government can impose interest-rate ceilings and foreign-exchange controls to stifle competition with government borrowing. It can then use high reserve requirements to increase the flow of resources to the public sector with minimum effects on inflation and/or borrowing costs.

Nominal interest-rate ceilings established to reduce competition under financially restrictive policies can be disruptive in the face of an inflationary shock. Just as U.S. deposit-rate ceilings have caused serious disintermediation in an environment of rising inflation and free-market interest rates, so developing economies' all-embracing interest-rate ceilings on financial assets have caused violent portfolio shifts from financial to tangible assets (i.e., inflation hedges) in a situation of accelerating inflation (Shaw, 1975). This type of reaction magnifies the initial inflationary shock. It also turns financial restriction into financial repression, a condition in which the financial sector contracts in real terms.

Typically, it seems, financial repression is the unintended consequence of an inflexible interest-rate system — established under financial restriction, selective credit policies and/or a bank cartel — in the face of accelerating inflation. Shaw's central proposition (1973, pp. 3-4) is that financial repression — indiscriminate "distortions of financial prices including interest rates and foreign-exchange rates" — reduces "the real rate of growth and the real size of the financial system relative to nonfinancial magnitudes. In all cases this strategy has stopped or gravely retarded the development process." More recently, Cheng (1980) has analyzed the phenomenon of financial repression and the process of financial deepening in seven Pacific Basin developing economies.

This paper considers the effects of financial repression on credit availability in seven Pacific Basin developing countries: Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. The ratio of investment to GNP increased in all these countries between the 1960s and the 1970s. (Table 1). Yet in every case, except the Philippines, a higher investment ratio was required just to sustain the 1960s' real economic growth rate. In other words, incremental output/capital ratios fell. Also, five countries (Indonesia, Korea, Singapore, Taiwan and Thailand) showed a negative relationship between real economic growth and inflation. In fact, inflation accelerated in all the sample countries except Indonesia, where lower inflation was accompanied by substantially higher real economic growth.

Until 1975, institutional interest rates were determined, not competitively, but rather by a bank cartel in Singapore and by administrative fiat in the other six countries. With the worldwide acceleration of inflation in 1974, the real 12-month time-deposit rate declined in all the sample countries — indeed, became substantially negative in every case except Malaysia (Table 2). Apart from Indonesia, real deposit rates were considerably lower in the 1970s than they had been in the 1960s. The lower incremental output/capital ratios of the 1970s may have been due to lower capacity utilization, due to reduced credit availability for working-capital needs.

The traditional link between credit and output is through demand — the increase in credit created by monetary expansion is accompanied by an increase in demand which stimulates real output. Within the past decade, Kapur (1976), Keller (1980), Mathieson (1980), McKinnon (1973) and Shaw (1973) have analyzed the link between credit and real output through the supply side. This Wicksellian view holds that the availability of working capital determines, **ceteris paribus**, the volume of production which can be financed. In particular, as Keller (1980, p. 455) argues, "... production **expansion** may depend, entirely or in part, on credit availability and/or the cost of credit."

Evidently, this supply link between credit availability and real economic growth springs from the ratio of credit to output, or from the real rather than the nominal volume of credit. In the very short run, the real availability of credit can be increased through an acceleration in nominal domestic-credit expansion. **Ceteris paribus,** this accelerated credit expansion is accompanied — in fact, brought about — by accelerated monetary expansion. Momentarily, the money market does not clear — money supply exceeds money demand. The ensuing inflation erodes the real supply of domestic credit as well as the real money stock. If real money demand actually falls due to higher inflation, then the new equilibrium will, **ceteris paribus,** result in a lower ratio of credit to output.[2]

Conversely, a deceleration in domestic credit expansion decreases credit availability in the very short run (Kapur, 1976; McKinnon,

Table 1
Investment, Growth and Inflation, 1962-81

Country	Investment Ratio		Incremental Output/Capital Ratio		Real GNP Growth Rate		Inflation Rate	
	1962-71	1972-81	1962-71	1972-81	1962-71	1972-81	1962-71	1972-81
Indonesia	11.0	20.9	0.42	0.33	4.6	6.9	85.1	18.5
Korea	20.1	32.3	0.43	0.26	8.7	8.3	15.7	18.1
Malaysia	18.8	24.1	0.33	0.31	6.1	7.5	0.1	7.1
Philippines	21.1	25.6	0.23	0.24	4.8	6.2	6.9	12.1
Singapore	24.1	34.9	0.38	0.23	9.0	7.9	1.5	5.4
Taiwan	20.9	29.5	0.44	0.26	9.1	7.7	4.0	10.3
Thailand	24.1	24.4	0.33	0.30	8.0	7.2	1.1	9.9

Note: Growth and inflation rates are continuously compounded.
Source: World Bank, *World Tables* (1980), and IMF estimates.

1973). With the consequent disequilibrium in the money market, the real money stock is less than real money demand. The subsequent decrease in inflation may raise real money demand, and the new equilibrium will exhibit a higher ratio of credit to output. At this point, credit availability is greater than it was before the initial deceleration in credit expansion.

I am not concerned with the very short run, for which this annual model is unsuitable, but rather with the somewhat longer-run relationship between the rate of nominal domestic credit expansion and the ratio of credit to real output. Faster expansion of money and nominal credit raises the inflation rate. If the nominal deposit rate is fixed, the ensuing increase in expected inflation reduces the real deposit rate of interest — and this in turn reduces real money demand or decreases the ratio of money to nominal GNP. The ratio of domestic credit, DC, to nominal GNP, PY, also falls. In this way, an acceleration in nominal domestic credit and in money supply reduces credit availability in real terms, i.e., DC/PY declines.

The Pacific Basin countries considered here have placed little reliance on progressive income-tax systems. This results in inflation-inelastic real tax revenue due, in large part, to lags in tax collection. For fighting inflation, they tend to favor price controls on the output of nationalized industries. As inflation increases, nationalized industries tend to post larger losses. The gap widens between conventional tax receipts and public expenditure, and this is financed by heavier reliance on seigniorage and the inflation tax. The government extracts greater seigniorage by increasing the proportion of domestic credit allocated to the public sector, and thus reduces the ratio of private sector credit, DCp, to total domestic credit, DC. The government levies an inflation tax by creating more money than the public wishes to hold at the current level of prices. This creates a double squeeze on credit available for private-sector working capital, i.e., DCp/PY falls due to the decline in both DC/PY and DCp/DC.

This credit-availability mechanism can be tested for the 1961-77 period by regressing three ratios — domestic credit to nominal GNP, DC/PY; private-sector domestic credit to total domestic credit, DCp/DC; and private-sector domestic credit to nominal GNP, DCp/PY — on the real rate of interest, $d/\dot{P}^*$, where d is the continuously-compounded 12-month time-deposit rate of interest and $\dot{P}^*$ is the continuously-compounded expected inflation rate (see Appendix). The ordinary least-squares (OLS) estimates are (t values in parentheses):

Table 2
Real Deposit Rates of Interest, 1962-81

	Indonesia	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
1962-71	-65.3	3.6	5.7	0.5	3.9	6.6	5.6
1972	-10.4	0.2	5.4	-1.0	1.5	3.7	4.8
1973	-7.7	-1.8	2.2	-3.0	-1.4	-3.2	0.1
1974	-10.5	-4.5	1.6	-5.8	-3.0	-15.9	-3.0
1975	-5.8	-5.6	3.1	-4.1	-1.2	7.9	-1.4
1976	-3.2	-4.6	0.4	-2.9	0.8	6.5	-0.9
1977	-4.1	-2.9	-0.8	-1.9	2.6	3.4	-0.4
1978	-4.7	-2.8	-1.0	0.5	4.2	4.5	-0.1
1979	-9.9	-0.4	-1.4	2.0	4.9	-0.3	0.1
1980	-9.8	0.6	-0.4	1.9	3.2	-3.6	1.7
1981*	-9.1	-3.0	-0.6	1.0	3.2	-1.4	1.1
1972-81	-7.5	-2.5	0.9	-1.3	1.5	0.2	0.2

*Nominal deposit rates are assumed to remain at their December 1980 levels throughout 1981.

Source: Deposit rates are from central-bank publications. Expected inflation is from polynomial distributed lags estimated for each country in money-demand functions (Appendix).

$$\frac{DC}{PY} = \underset{(-0.983)}{-0.045} + \underset{(2.683)}{0.034}(d-\dot{P}^*) + \underset{(1.361)}{0.007}\, z + \underset{(35.348)}{0.972} \left(\frac{DC}{PY}\right)_{t-1} \quad ; \qquad (1)$$

$$\bar{R}^2 = 0.93$$

$$\frac{DCp}{DC} = \underset{(2.717)}{0.095} + \underset{(0.542)}{0.048}(d-\dot{P}^*) + \underset{(34.173)}{0.913} \left(\frac{DCp}{DC}\right)_{t-1} \quad ; \qquad (2)$$

$$\bar{R}^2 = 0.91$$

$$\frac{DCp}{DC} = \underset{(17.408)}{1.099} + \underset{(2.992)}{0.847}\,(d-\dot{P}^*); \qquad (3)$$

$$\bar{R}^2 = 0.06$$

$$\frac{DCp}{PY} = \underset{(3.125)}{0.014} + \underset{(2.399)}{0.025}\,(d-\dot{P}^*) + \underset{(52.344)}{1.005} \left(\frac{DCp}{PY}\right)_{t-1} \quad ; \qquad (4)$$

$$\bar{R}^2 = 0.96$$

$$\frac{DCp}{PY} = \underset{(20.825)}{0.227} + \underset{(4.158)}{0.203}\,(d-\dot{P}^*); \qquad (5)$$

$$\bar{R}^2 = 0.12$$

where z is the natural logarithm of per capita real GNP. All of these estimates are consistent with the credit-availability model presented in this section.[3]

II. Inflation and Real Economic Growth

Inflation in the Pacific Basin developing economies, as elsewhere, is a monetary phenomenon. Its analysis centers on the market for money, whose market-clearing or equilibrium condition can be expressed as the difference between the rates of growth in per capita nominal money supply and in real money demand (a dot is $\Delta \ln$):

$$\dot{P} = \frac{\dot{M}^s}{N} - \dot{m}^d, \qquad (6)$$

where $\dot{P}$ is the continuously-compounded rate of change in the GNP deflator, M^s is the nominal money supply, N is population, and m^d is the per capita demand for real money balances, i.e., $(M^d/P)/N$. It seems reasonable to expect that the market clearing or equilibrium condition — short-run demand equal to supply — would hold for this model because of the preponderance of auction markets in all the sample countries.

The inflationary process in the sample countries can be properly understood only through an analysis of the determinants of nominal money supply and real money demand. The money-supply mechanism takes different forms in different countries, which precludes any generalized analysis of the money-supply process. I make one crucial assumption, however — the feedback mechanisms from inflation to money-supply growth occur with a certain lag (see Aghevli and Khan's (1977) study of Indonesia). Hence, the system is recursive and changes in the nominal money supply can be treated **as if** they were exogenous for the purpose of estimating the inflation function without biasing the estimate.

Real money demand, on the other hand, is invariably determined by one or more price (i.e., interest rate) variables and a budget constraint. Here, the price variable is the real deposit rate of interest, $d-\dot{P}^*$, and the budget constraint is per capita real permanent GNP, y*. A standard stock-adjustment process is added. The money-demand function then is expressed in first-difference, semi-logarithmic form:

$$\dot{m}^d = a_1\dot{y}^* + a_2\Delta(d-\dot{P}^*) + a_3\dot{m}_{t-1}. \quad (7)$$

The rate of change in per capita real permanent income, $\dot{y}^*$, and the change in the expected inflation rate, $\Delta\dot{P}^*$, were both estimated as polynomial distributed lags (see Appendix). This procedure allows expectations regarding future changes in inflation and income growth to be formed on the basis solely of current and past values of the variables themselves. Still, given the dearth of econometric forecasting and low levels of economic education in the sample countries, this seems reasonable. However, such expectations are "rational" only in special circumstances.

Equation (7) is substituted into equation (6) and the coefficient of $\dot{M}^s/N$ is no longer constrained to one. The OLS estimate of this inflation equation, with 1961-77 pooled time series data, is:

$$\dot{P} = \underset{(33.196)}{0.930}\left(\frac{\dot{M}}{N}\right) - \underset{(-4.359)}{0.927}\dot{y}^* - \underset{(-10.849)}{0.986}\Delta(d-\dot{P}^*) - \underset{(-4.303)}{0.280}m_{t-1}$$

$$\bar{R}^2 = 0.92 \quad (8)$$

The coefficients of the four variables in equation (8) all agree with **a priori** beliefs. The coefficient of the rate of change in the nominal money supply is not significantly less than one. The implied long-run real-income elasticity of money demand is 1.286, a figure comparable to those produced directly in most demand estimates for broad money aggregates. The implied long-run coefficient for the real deposit rate of 1.368 is also similar to coefficients estimated in money-demand functions for other developing economies (Fry, 1978). Finally, the coefficient of the lagged per capita real money stock indicates that over 70 percent of the adjustment to current expected real-income and interest-rate values takes place within the year.

The other equation of this model, equation (9), below is a modified Phillips curve with the credit-availability effect added. The real rate of economic growth, g (i.e., ΔlnGNP/P) — the dependent variable — is determined in the short run by the ratio of the actual to the expected price level, P/P*. If actual price exceeds expected price, entrepreneurs interpret the difference to reflect a real increase in the demand for their products. In response, they raise their rate of capacity utilization to increase output immediately, and also invest more to increase that capacity.

Expected inflation also affects short-run real economic growth through the real deposit rate of interest, $d-\dot{P}^*$. An increase in expected inflation reduces the **real** deposit rate in all the sample countries, except Singapore since 1975, because of the fixing of **nominal** rates by administrative decisions. In this situation, adjustments to nominal rates invariably occur too little and too late to prevent a decline in real deposit rates. A fall in the real deposit rate decreases real money demand — equation (8) — and the resultant contraction in the real size of the banking system reduces the real supply of domestic credit.

Rising inflation typically enlarges public-sector deficits in developing countries due to the lag in the collection of tax receipts (Tanzi, 1977), to the erosion of the tax base, and to price freezes on nationalized-industry products. The government finances the larger deficit by allocating a greater proportion of domestic credit flows to the public sector. Indeed, the private sector is doubly constrained as the real supply of domestic credit declines and as the government extracts increased seigniorage from the money supply. This credit squeeze dries up working-capital funds and reduces the utilization of the existing capital stock. Hence, the real deposit rate affects positively the real rate of economic growth, at least indirectly.

In the very long run, real economic growth depends on the volume and productivity of investment, both of which are related positively to real institutional rates of interest in the sample countries (Fry, 1980 and 1981). However, for this shorter-run analysis, I assume that investment raises productive capacity — so moving the transformation frontier outwards — smoothly over time. For industrial countries, the time trend of real GNP may provide a reasonable proxy for "normal" supply, the noncyclical component determined solely by productive capacity — but for most developing countries, annual fluctuations in agricultural output are also important. Year-to-year changes in farm-output growth determined largely by shifting weather conditions represent exogenous shifts in the production-possibility curve. Normal supply for this sample of developing countries thus may be defined as trend real GNP plus the difference between actual and trend real agricultural output.

Normal real economic growth, g^+, exerts a positive effect on actual real economic growth, g. However, above-average growth in agricultural output may depress real growth elsewhere because of the higher priority accorded to the credit requirements of food-procurement and agricultural price-support programs, which are of course positively related to farm-output growth. Hence, other sectors would suffer a credit squeeze in real terms whenever agriculture obtained a greater share of the fixed real supply of domestic credit.

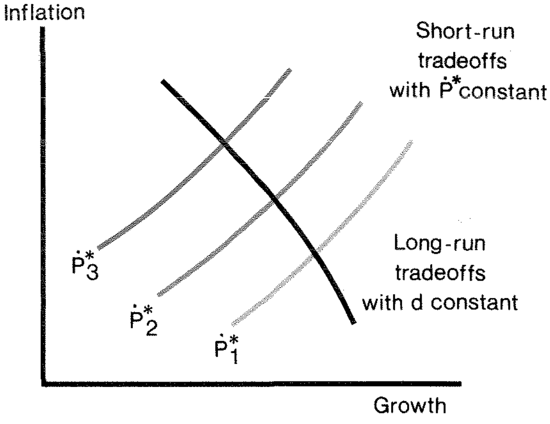
The effect of g^+ on g would therefore be expected to be positive but the coefficient of g^+ should be somewhat less than one, despite the fact that on average g equals g^+. Above-average growth in agricultural output imposes a credit squeeze on other sectors which reduces their capacity-utilization rates and hence their growth rates. The two-stage least-squares (2SLS) estimate of this short-run economic-growth equation for the 1961-77 period is:[4]

$$g = \underset{(9.139)}{0.390g^+} + \underset{(11.403)}{0.043}\left(\frac{\hat{P}}{P^*}\right) + \underset{(4.257)}{0.049}(d-\dot{P}^*). \qquad (9)$$

$$\bar{R}^2 = 0.26$$

Figure 1

Short and Long-Run Inflation/Growth Tradeoffs



The short-run Phillips curves show the standard positive relationship between inflation and growth. This is caused by price exceeding expected price in the short run as inflation accelerates and expected inflation temporarily lags behind. In the long run, expectations are realized. *Ceteris paribus.* a higher inflation rate results in a lower real deposit rate of interest. In turn, real money demand and real credit supply contract. The credit squeeze reduces the rate of growth, so producing a negative relationship between inflation and growth in the long run.

Equation (8) suggests that an acceleration in nominal money growth raises the inflation rate and so P/P*. This, in turn, seems to raise growth in real GNP (equation (9)), but expected inflation meanwhile starts to rise. In long-run equilibrium, P equals P* because inflation is fully anticipated. In the long run, therefore, inflation **per se** has no effect on real economic growth. With d held constant, however, the real credit-supply mechanism leads to a negative relationship between inflation and real economic growth in a financially repressed economy (Figure 1).[5]

III. Stabilization Strategies for Financially Repressed Economies

Central banks of financially repressed economies have at their disposal two independent monetary-policy instruments — the nominal money supply and the nominal deposit rate of interest. There is, in practice, an upper bound to the deposit-rate instrument — the free-market equilibrium rate in the absence of discriminatory taxation of financial intermediation (Fry, 1981). Since a higher real deposit rate appears to reduce inflation and raise real economic growth at the same time, an optimal monetary policy would set the nominal deposit rate at (or allow it to increase to) its upper bound. The obvious approach would be to abolish all institutional interest-rate ceilings and dismantle any discriminatory taxes. However, a **minimum** deposit rate might be needed to force cartelized and oligopolistic banking systems, found in all the sample countries except Singapore, to achieve the ideal competitive solution.

This analysis suggests that when the authorities accelerate money-supply growth, they should also change nominal interest rates to maintain an appropriate level of real interest rates and hence prevent a real credit squeeze. As shown above, monetary acceleration by itself tends temporarily to enhance or sustain growth, but this is followed by a credit squeeze which reduces growth. The real credit squeeze can be avoided through appropriate interest-rate policy designed to prevent administered rates from falling further below their market-equilibrium levels.

Interest-rate policy, by reducing inflation **and** raising real economic growth can be a useful instrument for stabilization purposes in financially repressed Pacific Basin developing countries. To illustrate, I simulate three alternative stabilization policies for a composite economy, using the model estimated in Section II. The usual caveats apply about the reliability of these forecasts.

The composite economy (somewhat resembling Indonesia) starts off in a steady state, with a 20-percent continuous rate of inflation over the past decade and with expectations realized regarding both expected inflation and per capita real permanent income. The real deposit rate is -10 percent, the normal real economic-growth rate is 7 percent, and the population-growth rate is 2 percent. The lag coefficients for expected inflation and per capita real permanent income are: t-1, 0.4; t-2, 0.3; t-3, 0.2; t-4, 0.1. Equation (9) can then be solved to yield an actual real economic-growth rate of 6.54 percent, and per capita real permanent income growth, $\dot{y}^*$, of 4.54 percent. The steady-state solution of equation (8) shows a smooth increase of money-supply growth at 30.63 percent a year.

The first stabilization strategy reduces the growth of the nominal money supply from 30.63 percent in the base year, year 0, to 17.14 percent in year 1 and all subsequent years. This lowers the inflation rate in the new long-run equilibrium to 7 percent and, hence, raises the real deposit rate from -10 to +3 percent with no change in the nominal deposit rate. The new long-run equilibrium real-growth rate increases from 6.54 to 7.18 percent (Table 3). The second stabilization strategy again reduces nominal money growth to 17.14 percent, but also raises the real deposit rate (through deposit indexation) to 3 percent at the outset of the program, i.e., in year 1. The third strategy establishes the 3-percent real deposit rate, but sets money growth at whatever rate is required to maintain a constant real rate of economic growth of 7.10 percent.

The main point to note in the simulation results (Table 3) is that the first and second strategies both produce a recession. Per capita real GNP growth initially declines because actual prices fall below expected prices. To some extent, increased credit availability offsets this expectations-reduction in supply. Naturally, the credit availability effect is stronger for the second strategy — real economic growth does not fall so much and picks up faster, despite the fact that higher real money demand actually reduces the price **level.** Both economic growth and inflation converge to their new steady-state values

Table 3
Simulation of Three Stabilization Strategies*

Year	Strategy 1		Strategy 2		Strategy 3		
	Real Per Capita GNP	Price Level	Real Per Capita GNP	Price Level	Real Per Capita GNP	Price Level	Money Supply
0	4.54	20.00	4.54	20.00	4.54	20.00	30.63
1	4.09	7.45	4.27	-5.37	5.10	17.85	42.10
2	4.34	2.94	4.96	4.23	5.10	17.01	31.73
3	4.73	1.16	5.20	6.74	5.10	16.04	28.00
4	5.15	1.51	5.27	7.20	5.10	14.99	26.15
5	5.45	3.34	5.26	7.14	5.10	13.92	24.81
6	5.56	6.07	5.19	7.00	5.10	12.92	23.65
7	5.51	8.08	5.17	6.95	5.10	11.90	22.51
8	5.36	9.02	5.17	6.96	5.10	10.90	21.39
9	5.21	8.99	5.18	6.98	5.10	9.90	20.29
10	5.09	8.33	5.18	7.00	5.10	8.92	19.20
∞	5.18	7.00	5.18	7.00	5.18	7.00	17.14

*Continuously compounded percentage rates of change

faster under the second than under the first strategy. The third strategy maintains a constant per capita real growth rate somewhat below its new steady-state level. This permits a gradual and smooth reduction in the inflation rate. However, because of the sharp, deflationary increase in the real deposit rate in year 1, nominal money growth must initially **accelerate.** Thereafter, nominal money growth falls gradually and smoothly in step with the declining inflation rate.

The strategies of raising the real deposit rate are more successful than the money-growth-only strategy in achieving both higher real growth and lower inflation.[6] However, once the optimal real deposit rate has been fixed, higher nominal money growth always increases inflation as well as real economic growth in the short run — but does not affect the latter in the long-run steady state. Conversely, lower monetary growth reduces inflation and real economic growth in the short run, but again has no long-run influence on real economic growth. Optimal policy with respect to nominal money growth could be solved as a dynamic control problem, given policymakers' loss function.

The two strategies making active use of the nominal deposit rate are clearly superior to the strategy which relies solely on control over the nominal money supply. And, of course, other policy instruments are also important, such as fiscal, price, exchange-rate and foreign-trade policies. Indeed, fiscal policy strongly influences money-supply growth in all the sample countries, with the possible exception of Singapore. Again, appropriate price and exchange-rate policies are crucial for the success of any stabilization program. However, their consideration is beyond the scope of this paper, which was designed solely to examine the role of monetary policy for stabilization in financially repressed economies.

IV. Summary and Conclusions

The international economic environment over the past decade has not been conducive to stable economic growth. The oil shocks of 1973-74 and 1979-80 were accompanied by a worldwide acceleration in inflation. Economies with rigid nominal interest rates experienced declining real rates of interest. In turn, real money demand fell, compounding the inflationary forces. Declining real deposit rates also reduced the real supply of domestic credit and this credit squeeze lowered real rates of economic growth.

This analysis provides an important policy conclusion: flexible interest-rate policies in financially repressed economies can be used to counter inflationary shocks and accelerate the real rate of economic growth. An increase in the real deposit rate of interest towards its competitive, free-market equilibrium level raises real money demand, so reducing inflationary pressures. At the same time, the availability of credit increases in real terms. Consequently, real economic growth rises, which increases real money demand some more. Inflation drops; the virtuous circle is complete.

Appendix

The lag coefficients for per capita real permanent income and expected inflation were obtained by applying polynomial distributed lags to the rate of change in per capita real GNP and to the rate of change in inflation in the following first-difference semi-logarithmic money-demand function:

$$\dot{m} = a_1\dot{y}^* + a_2\Delta\dot{P}^* + a_3\dot{m}_{t-1}; \qquad (A.1)$$

where m is per capita real money holdings.

Unconstrained first-, second- and third-order polynomials were applied to the coefficients of the current and (up to six) past rates of change in inflation and real per capita income. Choices of polynomial degrees and lag lengths were based on the pattern of the lag coefficients, a nonnegativity criterion and the $\bar{R}^2$s. **Ceteris paribus,** monotonically declining or inverted U-shaped coefficient patterns were preferred as being most consistent with an **a priori** assumption about formation of expectations. For the same reason, sign changes were inadmissible — the nonnegativity criterion. "Satisfactory" results were obtained for all the sample countries with first- or second-order polynomials. The lag coefficient estimates used for the pooled time-series analysis reported here are presented in Tables A.1 and A.2.

Table A.1
Permanent Income Lag Coefficients

Country	Order	t	t-1	t-2	t-3	t-4	t-5	t-6
Indonesia	1	0.597	0.403					
Korea	1	0.652	0.348					
Malaysia	1	0.300	0.247	0.193	0.140	0.086	0.033	
Philippines	1	0.338	0.662					
Singapore	0	1.000						
Taiwan	0	1.000						
Thailand	2	0.594	0.159	0.247				

Table A.2
Expected Inflation Lag Coefficients

Country	Order	t	t-1	t-2	t-3	t-4	t-5	t-6
Indonesia	2	0.326	0.236	0.164	0.109	0.071	0.050	0.046
Korea	2	0.304	0.245	0.190	0.137	0.086	0.039	
Malaysia	1	0.243	0.213	0.182	0.151	0.121	0.090	
Philippines	2	0.187	0.234	0.240	0.206	0.133		
Singapore	1	0.780	0.220					
Taiwan	1	0.994	0.006					
Thailand	2	0.334	0.240	0.166	0.113	0.080	0.068	

FOOTNOTES

1. The annual financial-stock figures used in this paper, i.e., the money stock, domestic credit, and domestic credit to the private sector, are centered monthly averages. End-of-month figures were averaged first to provide mid-month estimates. Then the 12 mid-month estimates were averaged for the annual figures.

2. With perfectly elastic international capital flows, an increase in domestic credit would, in the main, produce a decline in foreign-exchange reserves under a fixed (including crawling peg) exchange-rate system. Exchange-rate policy, not domestic credit policy, thus would determine nominal money growth and inflation. In none of the Pacific Basin developing countries, with the recent exception of Singapore, are international capital flows perfectly elastic. Indeed, capital controls permitted the independent interest-rate policies pursued by all these countries until 1975. Singapore abolished its interest rate-setting bank cartel in 1975 and thereafter dismantled such controls. With capital-account controls at least partially effective, an acceleration in domestic credit expansion raises the rate of growth in the nominal money supply while reducing foreign-exchange reserves.

3. The coefficients of the lagged dependent variables are biased upwards, since country dummy variables were not used (see Fry 1978, p. 469).

4. The instrumental variable technique is used to deal with both simultaneous-equation bias and measurement error in P/P^*. The instruments used in the first stage were the rate of change in per capita real permanent GNP, the real deposit rate of interest, income terms of trade, the ratio of foreign exchange receipts to GNP, the lagged ratios of national saving investment to GNP, the lagged real deposit rate of interest, the normal growth rate, the rate of change in per capita nominal money balances, exchange-rate overvaluation as measured by the ratio of the black/free market to the official exchange rate, and the real exchange rate.

5. In the long run, financial repression also affects the saving rate and the average efficiency of new investment (Fry, 1980 and 1981).

6. How to control the money supply is a separate issue beyond the scope of this paper. One prerequisite for monetary control in all the sample countries is undoubtedly fiscal discipline.

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