A Primer on Inflation

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Journal of Money, Credit and Banking, Volume 10, Issue 4 (Nov., 1978), 505-521.

Stable URL:
http://links.jstor.org/sici?sici=0022-2879%28197811%2910%3A4%3C505%3AAPOI%3E2.0.CO%3B2-U

MONEY, CREDIT, AND BANKING
LECTURE

A Primer on Inflation

ARNOLD C. HARBERGER*

MY AIM IN THIS LECTURE is to distill and summarize the present state of knowledge about the phenomenon of inflation, in a fashion that I hope will be accessible to noneconomists as well as economists. With this purpose in mind, I have chosen to draw heavily on the actual experience of many countries, in all parts of the world.

1. CHRONIC AND ACUTE INFLATION

I think it is fair to say that most people consider inflation to be an economic malady of sorts. This suggests approaching the study of inflation in the same way that the medical profession approaches the study of other diseases. One thing we can learn from them is that it pays to concentrate at first on certified, known, unambiguous cases of the disease in question. Following this guideline, I have set out in Table 1 four examples of chronic inflation. I have for this purpose defined chronic inflation as a condition in which price increases of more than 20 percent per annum have been typical over an extended period. It turns out that only four countries (Argentina, Brazil, Chile and Uruguay) meet that condition during the period since 1950. The close contenders are

* The collection and analysis of data reported here were in part financed by NSF Grant No. SOC 76-11189.

This paper was presented as a public lecture at Ohio State University on March 9, 1978.
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0022-2879/78/1178-0505$00.50/0

TABLE 1

EXAMPLES OF CHRONIC INFLATION

Country	Period	Average Annual Rates of Increase (Percent) in Consumer Prices*	in Money Supply†
Argentina	1949–74	27	29
Brazil	1957–76	35	42
Chile	1952–70	32	38
Uruguay	1958–65	26	34

Source: International Monetary Fund, *International Financial Statistics*, principally 1977 *Supplement*, augmented where needed by data from other issues
* Basic data were yearly averages of monthly price levels.
† Basic data were end-of-year money supply figures.

Iceland (with four consecutive years of inflation over 20 percent in 1973 through 1976), Paraguay (with three years of over 20 percent inflation in 1954 through 1956), and Yugoslavia (which flirted with the 20 percent level from 1972 through 1975).[1]

Two key lessons flow from Table 1. The first is that there is a close relationship between the rate of inflation and the rate of increase in the money supply. The second is that the rate of monetary expansion tends, even in these chronic inflations, to be greater than the rate of increase of prices. Obviously, if the amount of real purchasing power that is held in the form of cash is to increase through time, the money supply must rise more rapidly than the price level. And it is only reasonable that, as population grows and the real standard of living improves, people will want to hold more purchasing power in the form of cash. Richer people typically have larger bank balances and currency holdings than poorer ones, and it is obvious that larger groups of families at any given level of income will hold more balances in the aggregate than smaller groups. So it is not surprising that the rate of increase of the money supply should normally exceed the rate of price inflation.

However, we know too, from common sense and from experience, that inflation operates as a tax on holdings of money. Thus it is also reasonable that the size of real cash balances should be less in an inflationary environment than it would be if there were little or no inflation. This tendency for inflation itself to lead people to economize on their holdings of cash does not show up in the data for chronic inflations. This can be explained in either of two ways. First, people reduce their cash balances in the process of adapting to an inflationary situation. Once they have made their adaptation—say by reducing their average bank balance from six weeks' income to four weeks' income, they will tend to stay at the new level unless the rate of inflation goes up. Therefore if we observe a country that has an inflation rate of 30 percent per year in the mid-1950s, and continues oscillating around that level into the mid 1960s, we should not expect people to be reducing their real cash holdings

[1] An exceptional case was South Viet Nam during the period 1966–74. This was left out because of the large role played by the U.S. dollar as a circulating medium.

in the interim. The reduction would have occurred earlier—in the process of getting from zero or low rates of inflation up to 30 percent.

The second reason underlying the observation that the money supply has risen more rapidly than the price level during periods of chronic inflation is simply that the forces of population growth and rising real income levels continue to work even in an inflationary setting. Their effects cumulate through time, and when a long span of years is involved they can easily outweigh the tendency for an increased rate of inflation to cause people to reduce their cash holdings.

The first of the above explanations assumes that the initial observation on a chronic inflation is taken at a time when people have already reduced their cash holdings as a consequence of the inflation. The second assumes the initial observation to be at an earlier time.

The situation is quite different when the acute form of the inflationary disease breaks out. This form is characterized by exceedingly rapid bursts of inflation. The examples listed in Table 2 were selected by applying the criterion that inflation should run above 80 percent for three or more years. As can be seen in the table, in each of these cases of acute inflation, prices rose faster than the money supply—and quite a bit faster for all but South Korea.

TABLE 2

EXAMPLES OF ACUTE INFLATION

Country	Period	Average Annual Percentage Increase in Prices*	Average Annual Percentage Increase in Money Supply†
Argentina	1974–76	293	262
Bolivia	1952–59	117	100
Chile	1971–76	273	231
Indonesia	1965–68	306	223
Paraguay	1951–53	81	54
South Korea	1950–55	102	101
Uruguay	1965–68	95	66
Uruguay	1971–74	83	63

Source: International Monetary Fund, *International Financial Statistics*, principally 1977 *Supplement*, augmented where needed by data from other issues.

* Basic data were yearly averages of monthly price levels.

† Basic data were end-of-year money supply figures.

The interpretation here is that the bursts of inflation were not expected, so we see in the data the process of adaptation. In these cases of acute inflation the pressure to reduce real money balances is so strong that it outweighs handily the forces of population growth, and so forth, that work in the opposite direction. (Typically, in cases of acute inflation, real income is close to stagnant if not declining, so that pressure from that side toward increased real cash balances is probably negligible. I do not stress this point, however, since extremely high rates of inflation make it very difficult to measure real income, let alone its rate of change, accurately.)

2. THE WORLD INFLATION

For the cases of chronic and acute inflation discussed in the preceding section, there is no doubt that the country is the relevant unit of observation. Even where two neighboring countries (usually in Latin America) are undergoing high inflation rates simultaneously, there is no significant connection between their respective inflation processes.

TABLE 3

INDUSTRIAL COUNTRIES AVERAGE ANNUAL INFLATION RATES
(PERCENT PER ANNUM)

	1952–67	1967–72	1972–76
United States	1.5	4.6	9.5
Canada	1.7	3.9	9.2
Japan	4.3	5.9	13.9
Australia	2.5	4.3	13.2
New Zealand	3.2	6.6	12.7
Austria	3.1	4.3	8.2
Belgium	1.9	4.0	10.3
Denmark	3.9	6.1	11.0
France	3.7	4.7	10.5
Germany	1.9	3.5	6.1
Italy	3.1	3.9	15.9
Netherlands	3.0	6.0	9.2
Norway	3.3	6.1	9.4
Sweden	3.5	5.1	9.2
Switzerland	2.1	4.3	6.7
United Kingdom	2.8	6.6	16.4
Median	3.0	4.6	9.9
Range encompassing 80 percent of observations	1.7–3.7	3.9–6.1	8.2–13.9

However, the bulk of the recent experience has been of a quite different sort, with inflation proceeding in many countries at the same time, at closely similar rates. My intention in the present section is to present the evidence underlying this assertion. Table 3 gives the data on inflation in three different periods for sixteen industrial countries. It is clear from the table that the rates of inflation were quite different in each of the periods. The median rate goes from 3.0 in 1952–67, to 4.6 in 1967–72, to 9.9 in 1972–76. But perhaps even more interesting is the similarity of inflation rates within each period. In the first period 80 percent of the observations fall within the range from 1.7 percent to 3.7 percent per annum. In the second period the range from 3.9 percent to 6.1 percent per annum encompasses 80 percent of the rates. And finally, for 1972–76, four-fifths of the observed rates fall within the limits of 8.2 to 13.9 percent per year.

Even more striking, perhaps, is the evidence presented in Table 4, which covers twenty-eight less-developed countries. Here the median inflation rate

TABLE 4

SELECTED LESS-DEVELOPED COUNTRIES AVERAGE ANNUAL INFLATION RATES
(PERCENT PER ANNUM)

	1952–67	1967–72	1972–76
Costa Rica	1.8	3.8	16.2
Dominican Republic	0.8	3.4	12.6
Ecuador	2.2	6.4	15.5
Egypt	1.4	3.3	8.8
El Salvador	1.4	1.5	12.2
Guatemala	0.6	1.3	13.6
Haiti	1.8	3.3	15.7
Honduras	1.3	2.9	7.3
India	4.8	3.7	9.9
Iran	4.7	4.3	12.0
Iraq	0.5	4.2	8.2
Jamaica	2.8	6.9	18.3
Malaysia	−0.2	3.2	8.6
Mexico	4.3	4.4	16.6
Morocco	2.7	2.5	9.5
Nigeria	3.4	8.3	18.1
Pakistan	3.8	4.0	19.2
Panama	0.3	2.7	7.7
Philippines	2.7	8.5	14.2
Portugal	2.4	8.8	18.5
Spain	6.3	5.9	15.4
Sri Lanka	0.9	5.6	7.4
Sudan	2.7	3.9	16.4
Syria	0.9	2.7	16.5
Taiwan	6.7	4.4	14.5
Thailand	2.7	2.2	10.7
Trinidad and Tobago	2.4	5.2	16.0
Venezuela	0.9	2.5	7.5
Median	2.3	3.8	13.9
Range encompassing 80 percent of observations	0.8–4.8	2.2–6.9	7.4–16.5

was less than that of the industrial countries for 1952–67 and for 1967–72. Only in 1972–76 did these LDC's show a higher median rate. The tendency for rates to be similar across countries is once again evident here. Whereas in 1952–67 four-fifths of the industrial countries had average annual inflation rates between 1.7 and 3.7 percent, four-fifths of the LDC's listed in Table 4 had average rates between 0.8 and 4.8 percent. For 1967–72 the four-fifths range for the LDC's (2.2 percent to 6.9 percent) barely spans the 3.9 percent to 6.1 percent range for the industrial countries. And even in the later period the four-fifths range for the LDC's (7.4 percent to 16.5 percent) is quite in line with the 8.2 percent to 13.9 percent range for the industrial countries.

Thus we have (1) similarity of rates within each period among the industrial countries, (2) similarity of rates within each period between the selected LDC's and the industrial countries, and (3) a significant change in the pace of inflation

between periods. I believe that one must recognize from these figures the validity of the notion of a "world inflation." It is not by accident that so many countries have moved, almost in lock-step, through successive, closely similar inflationary experiences. Much more plausible is the idea that they were co-participants in a common process of world inflation.

This interpretation is further strengthened when it is realized that for most of the period under review the bulk of the world was on a system of fixed exchange rates. And just as the cause of inflation in Illinois cannot differ much from that of inflation in Ohio, so long as both states share a common currency and allow goods and services to move freely in and out, so too the cause of inflation in Costa Rica or Iran or the Philippines cannot be very different from that of the "world inflation" so long as they maintain a fixed exchange rate with the major currencies, and so long as they do not introduce dramatic new interferences with the movement of goods and services.

In a sense, countries with fixed exchange rates all share the same money supply, since the money of one is convertible into those of the others at a fixed parity. I could easily add many qualifications to that statement, but this is not the place to do so. My purpose is only to set the mind thinking in a particular direction. If we think there is a common process governing the inflationary experience reviewed in Tables 3 and 4, we must find a common link. To me, that link is found in the concept of a common money supply, with its separate components connected through fixed exchange rates.

Happily, the International Monetary Fund has now for several years been calculating the rate of growth of what it calls the world money supply. This is simply a weighted average of the growth rates of money in the different member nations. As such it includes countries undergoing chronic and acute inflations, though with only a modest weight because of the relatively small size of their economies. Nonetheless, the data on average rates of growth of "world money" accord well with the inflation rates shown in Tables 3 and 4. During 1952–67, when inflation rates centered around 2–3 percent per year, the world money supply was increasing at about 7 percent per annum. During 1967–72, when the center of gravity of the inflation rate moved up to 3.5–4.5, the rate of increase of world money rose to about 10 percent per year. Finally, in 1972–76, when average inflation rates shot up to the 10–14 percent range, the rate of increase of world money rose to 12.5 percent per year.

Not only is the relationship between the rates of monetary growth and of inflation one that would be plausible if it referred to a single isolated country; even more, the way the two rates changed over time hints that at successively higher rates of inflation a brake was put on what would otherwise be the normal increase in real cash balances.

Now it is quite clear that oversimplification is involved in our image of a large number of countries, all linked by fixed and unchanging exchange rates and therefore sharing, in a sense, a common money supply. A number of the LDC's listed in Table 4 devalued during the period 1952–72, as did France and

the United Kingdom, while Germany and Switzerland revalued modestly. Then in the period since 1973 the major currencies have all floated vis-a-vis one another, making the notion of a world money supply even more of an abstraction. Yet I still believe that the notion is a good one, generating insights that lead to more fruitful interpretations of reality than the alternative of assuming that each country's monetary authorities behaved independently. Even though we have had nearly five years of floating rates, it is my impression that the monetary authorities of the major countries have behaved with far less independence than the theorists of floating rates are prone to assume. Consequently, in terms of the way the international monetary system has worked since 1973, I would characterize it as a hybrid, functioning if anything more like a fixed-exchange-rate system than like a textbook case of floating rates.

3. EXPLANATION OF CHANGES IN MONEY SUPPLY AND OF INFLATION: DEFICIT FINANCING

The preceding sections have sketched a close and fundamental connection between the rate of increase in the money supply and the concomitant or consequent inflation. This connection is present for the chronic and acute varieties as well as for the world inflation. But while we can assert with great confidence that monetary expansion is in a sense the proximate cause of inflation, we should not be too smug about it, for it only pushes the explanation one step back. The car rolls down the hill when somebody takes the brake off, but who does that, and why?

The bulk of the cases of chronic and acute inflation, as well as the great majority of cases in which countries initially pursuing fixed-exchange-rate policies are ultimately forced to devalue their currencies, have their roots in fiscal deficits financed by recourse to the banking system. To an extent the banking system of a country can finance a modest amount of government borrowing year in and year out, because the economy is normally growing through time, and money and credit can grow along with it. But if the government tries to increase its debt to the banking system faster than the non-inflationary growth rate, then trouble of one kind or another usually ensues. At first the monetary authorities may try to resist the pressure to inflate; this they can do by taking credit away from private-sector borrowers (e.g., by failing to renew loans when they come due) and giving it to the government. But that course is invariably unpopular, and in any case there is a limit to the amount by which private sector credit can be squeezed. Sooner or later, then, a government intent on borrowing from the banking system at a rate more rapid than that compatible with stable prices, is going to have to expand the money supply at an inflationary pace. This has been the historic source of nearly all chronic and acute inflations.

TABLE 5

NET INCREASE GOVERNMENT DEBT TO BANKS, EXPRESSED AS RATIO TO SAME YEAR'S GNP

	Relative Frequency							No. of	
	< -0.02	-0.02 to 0	0 to 0.01	0.01 to 0.03	0.03 to 0.05	>0.05	Total	Obs.	Median
Industrial countries* (from Table 3)	0	0.23	0.40	0.25	0.08	0.04	1.00	48	0.007
Selected LDC's* (from Table 4)	0.06	0.16	0.32	0.25	0.16	0.05	1.00	80	0.007
Chronic inflation LDC's† (from Table 1)	0	0	0.25	0.33	0.17	0.25	1.00	12	0.020
Acute inflation LDC's‡ (from Table 2)	0	0	0.05	0.41	0.09	0.45	1.00	22	0.035

* For each country a year near the midpoint of each inflationary period was chosen. Barring problems of data availability, the years were 1960, 1970, and 1974 for each country.

† For each country, barring problems of data availability, the year of onset of chronic inflation was chosen, plus a year approximately one-third of the way into the chronic period, plus a year when approximately two-thirds of the chronic period had been passed. The years are: for Argentina, 1952, 1958, 1967; for Brazil, 1957, 1963, 1968; for Chile, 1952, 1959, 1964; and for Uruguay, 1958, 1961, 1964.

‡ The years were 1974–76 for Argentina, 1971–73 for Chile, 1966–68 for Indonesia, 1953–55 for South Korea, and 1965–67 and 1971–73 for Uruguay's two episodes of acute inflation. For Paraguay, data availability permitted only the use of 1953. For Bolivia's more extended episode, the years 1952, 1953, and 1956 were chosen.

Source: International Monetary Fund, *International Financial Statistics*, principally 1977 *Supplement*, augmented where needed by data from other issues.

Table 5 presents a summary picture of the recent historical record with regard to the connection between government borrowing from the banking system on the one hand and the inflationary experience of a country on the other. The horizontal classification tells whether the government was increasing its debt to the banking system (positive numbers), or paying it off (negative numbers). Thus, in the category "< -0.02" we count those cases in which a country, in a given year, reduced its debt to the banking system by more than 2 percent of that year's GNP. Similarly, in the category "0.03 to 0.05" we count those cases in which a country, in a given year, increased its debt to the banking system by between 3 and 5 percent of that year's GNP.

The conclusions emerging from Table 5 are

a) that, once again, no perceptible differences in behavior can be found between the industrial countries on the one hand and the "conformist LDC's" (from Table 4) on the other. The distributions shown in rows one and two are very similar, and their medians are identical (seven-tenths of 1 percent of GNP).
b) that the distribution for the chronic inflation countries shows a much stronger tendency toward deficit financing than is found for the industrial countries or the "conformist LDC's," and the median amount of bank borrowing is correspondingly higher (2 percent of GNP).
c) that the situation is still more extreme for the acute inflation countries, where nearly half of all cases showed the government borrowing in a single year from the banking system amounts in excess of 5 percent of that year's GNP.

These data reveal the sense in which there is a strong and clear association between deficit financing and the rate of inflation.

4. PRIVATE-SECTOR CREDIT INFLATIONS

Simple explanations have, however, a habit of oversimplifying, as is attested by the relatively substantial percentage of observations from chronic and acute inflations that reflect deficits between 0 and 1 and between 1 and 3 percent of GNP. Here is where there is a substantial overlap between the experience of serious inflationary episodes on the one hand and that of more "normal" countries on the other. It turns out that more than half of these observations (in the left half of the bottom two rows of Table 5) correspond to three situations of private-sector credit inflation—Brazil since 1967, Uruguay since 1958, and Paraguay in 1951–53.

In the case of Brazil, the government was the beneficiary of substantially more bank credit than was the private sector in 1967, yet by the end of 1975 the government was placing no net drain on the credit resources of the banks. Here is an obvious case where one must assign the blame for inflation to some

other cause than government budget deficits. In the case of Uruguay the government never placed any great drain on the credit resources of the banking system—usually occupying less than 10 percent of total bank credit. In the case of Paraguay (1951–53), the government accounted for only about a third of total bank credit, and this share actually fell during that episode of acute inflation.

The reasons why private-sector credit inflations get started (and keep going) are harder to understand than those relating to inflations caused principally by fiscal deficits. Usually there is some entity that has the power to expand credit without being subject to stern control by the Central Bank. In Uruguay this is the Banco de la Republica, in Brazil it is the Banco do Brasil. And the documentary evidence suggests that many people in the leadership of these entities truly believe that the credit they extend is not inflationary. The thought is that credit which is for productive purposes is not inflationary, a notion sometimes dubbed "the real bills doctrine." Plausible though it may appear at first glance, the proposition does not survive close examination. A country's money supply will typically be equal to something between one and two months' income. An effort to extend credit equal to even three or four months' production would be frustrated by inflation, unless the credit came from outside the monetary system. This is so simply because people would not be willing to hold three or four months' income in the form of money balances.

If one looks alternatively at a country's stock of productive capital, one finds that this is typically around three or four times a year's national income—i.e., around twenty-five times the normal money supply. It is clear that one could not even finance a tenth of this stock by bank credit without pushing the money supply far beyond what people would normally be willing to hold. Their reaction to an excess of cash in hand is to spend it, setting in train a sequence of price-level increases that ceases only when the real value of cash balances has been driven down (or eroded away) to normal levels via inflation.

Actually, the inflations in Uruguay and Brazil have had a tendency to perpetuate themselves. That is to say, before inflation has eroded January's excess expansion of credit (and money), new bursts of expansion have occurred in February or March. The most common result is a sort of inflation equilibrium in which the nominal amounts of credit and of money expand at rapid but more or less steady rates, while their real counterparts (i.e., nominal credit and nominal money deflated by a general price index) move only slowly over time. This description fits quite accurately the inflation of the past decade in Brazil and of the past two decades in Uruguay.

5. AN EXPLANATION OF VARIATIONS IN THE RATE OF WORLD INFLATION

When it comes to the world inflation—i.e., inflation in a large group of countries linked by exchange rates that are either fixed or do not move

dramatically—one cannot readily resort to explanations like excessive government deficits or unwise expansion of private-sector credit by particular banking entities. I believe here that one must view the system as a whole and look for some systemic reason underlying the common experience of so many countries.

The clue, I believe, lies in the notion of changes in the rate of expansion of the world money supply as the proximate cause of variations in the rate of world inflation. The next step is to ask what caused the variations in the rate of world monetary expansion. Here I turn to variations in international reserves as the key explanation. The IMF's figure on world reserves grew at an average rate of 3 percent per year up to 1965. From 1965 to 1970 it grew at an annual rate of 5.5 percent, and from 1970 to 1974 it leaped ahead at an annual average rate of 18 percent. Allowing for a lag between the growth of reserves and the expansion of the money supply and for another lag between a change in the rate of growth of the money supply and its reflection in prices, it surely seems that world reserve growth "explains" at first glance the shift of the median inflation rate in Tables 3 and 4 from 2–3 percent per year in the period before 1967 to 3.5–4.5 percent per annum in 1967–72, and finally to 10–13 percent per annum in 1972–76. I cannot present the idea as anything more than a hypothesis at this time, but it surely is the most plausible hypothesis I have come across.

The rapid rise in international reserves, which started in 1969, stemmed from a variety of causes. The expansion of the supply of United States dollars (which have been for half a century the key currency in the international system) accelerated somewhat under the strains of the Vietnam War. Simultaneously, the world banking system created important new supplies of dollars (Eurodollars) and of some other currencies (German marks, Swiss francs) as it expanded its lending operations denominated in these moneys. Quite independently, but more or less at the same time, there was a significant growth of SDRs (Special Drawing Rights), the new "world money" created within and by the International Monetary Fund to add to the supply of international reserves. Finally, in the mid-1970s there was an expansion of lending by the International Monetary Fund to the Central Banks of its member countries, most of it under the rubric of the IMF Oil Facility, a series of credits advanced to the countries that were hardest hit by the dramatic oil price rise of 1974.

These developments provided the fuel (international reserves) for the rapid expansion of the aggregate money supplies of the industrial countries and of the LDCs whose monetary systems were closely linked to that of the industrial world. This aggregate money supply in its turn fueled the rapid advance of prices that marked the first half of the 1970s.

6. ON THE MECHANISM BY WHICH A WORLD INFLATION IS TRANSMITTED

In this section I attempt to clarify the way in which a world inflation will be spread. For clarity, I will do this looking quite explicitly at the cases of small

countries with fixed exchange rates—e.g., the bulk of those in Table 4. Usually in such countries people have the idea that there are really two kinds of inflation—the imported kind and the domestically generated kind—and that the inflations we see in the real world are mixtures of the two, the interesting question about any given inflation being, what fraction of it is imported, and what fraction domestically generated—or alternatively, and somewhat more subtly, is it *predominantly* imported or predominantly domestic in origin?

Now the facts of that matter are, that operating strictly within the framework of a fixed-exchange-rate system there is only one kind of inflation—international inflation—that is to say, inflation of the system as a whole. For a large country this may mean that inflationary forces generated internally "spill over" to the rest of the world. But for all but the largest countries it means that inflationary forces originating abroad "spill into" the economy from the outside. The remainder of this discussion will be carried out in this (the small-country) framework. Here it is correct to say simply that the exchange rate (for a given structure of taxes, trade restrictions, etc.) determines the domestic price level, in much the same way that water finds its own level in the different parts of an interconnected hydraulic system. If a country initially does not fully share in an ongoing world inflation, it is only a matter of time before it will, so long as it maintains its exchange rate fixed.

It should also be noted that this proposition applies regardless of whether the country is tightly or loosely linked to the rest of the world economy. To continue with the hydraulic analogy, it does not matter whether the pipes that connect the different parts of the system are somewhat clogged up, or are completely open. As long as there is seepage through from one part of the system to another, the water will find its own level. Only if a part were hermetically sealed off could it maintain a water level independent of the rest.

So it is with a country's price level under a fixed-exchange-rate system. Tight linkage to the world system applies when internationally traded items contribute a large fraction of the total goods and services of the economy; loose linkage occurs when (usually because of prohibitions or similar quantitative restrictions to trade) the fraction of internationally traded goods in the economy is small.

If inflation begins in the rest of the world, the first thing that happens is that the prices of internationally traded goods rise. This impact will be more forceful, the more important are such goods in the economy, hence the initial effect of the international inflation on the local price level will be stronger in a tightly linked than in a loosely linked economy. The initial effect will produce a disequilibrium in relative prices between traded and nontraded goods, and at the same time a "shortage" of cash, the money supply being momentarily constant in nominal terms, while a significant component of the price level has risen.

Three effects now enter the picture, all produced by the disequilibrium situation just described:

a) People will attempt to reconstitute the shortfall in their real cash balances, simply by spending less than normal for a time. Part of this reduction in

spending will fall on purely domestic goods, but part will fall on traded goods, thus inducing a tendency to surplus in the balance of payments and a consequent "importation of money."

b) People will also attempt to reconstitute their shortfall of real cash by borrowing. This can be accomplished either through the domestic monetary authorities permitting the expansion of credit (and money supply), or through borrowing from abroad. If the domestic expansion takes place rapidly enough, this can forestall all the other adjustment mechanisms by itself "financing" a rise of domestic goods prices to match that of traded goods. But to the extent borrowing from aborad is also involved, this second avenue of adjustment also entails an "importation of money."

c) Finally, to the extent that neither (a) nor (b) succeeds in rapidly bringing domestic prices into line with world prices, there will be a substitution effect at work, causing people to shift their expenditures away from internationally traded and toward purely domestic goods and services, once again producing an improvement in the balance of payments and an "importation of money."

Of these three mechanisms traditional international trade theory tended to emphasize (c), and the international finance literature (b). Recent developments in our thinking in this area, perhaps unjustly lumped together with other ideas under the general label of "monetary theory of the balance of payments," have tended to emphasize (a). Certainly it must be said that (a) is the only one of the three mechanisms that can explain cases in which the process of transmission of international inflationary pressures to a new economy is so rapid as to be essentially complete within a few months. Mechanism (b) can also act quickly, but it essentially replaces one disequilibrium with another in the sense that the country has gone into debt to acquire its new money. Under mechanism (a), in contrast, the country "buys" its new money through trade surpluses (just as it does under mechanism (c)). But (c) makes intuitive sense only as a slow-responding mechanism, in which people have time to perceive price differentials and alter their patterns of buying and of production accordingly. Mechanism (a) can work much more rapidly, as people simply perceive that their cash balances have been depleted and strive to replenish them. It is thus convenient to identify (a) with a hydraulic system with open pipes and (c) with one in which the pipes are somewhat clogged. The end result is the same, but the length of time it takes to restore equilibrium, and the pattern of movement through time of the key variables of the process, can be quite different.

7. ON DOMESTICALLY PRODUCED INFLATION UNDER FIXED EXCHANGE RATES

In the preceding section it was concluded that under a system of fixed exchange rates, a small country would have essentially no long-term control, through its own monetary policy, over its internal price level. The price level,

even of domestically produced and marketed goods and services, is determined, in the long run if not in the short, by developments in the rest of the world, and, of course, by the fixed exchange rate.

What happens, then, when a fixed-exchange-rate country pursues an excessively easy monetary and credit policy? The answer is implicit in mechanisms (a), (b), and (c) discussed above. The excess liquidity that an easy-money policy puts into the hands of the public can flow rapidly abroad as people spend their extra funds on goods, services, and assets (mechanism (a)). A part of it may also be reflected in a repayment of foreign debt, and (through lower local interest rates) in a reduced desire of foreigners to lend in this country's credit market. This, of course, is mechanism (b). Finally, under certain circumstances, the excess liquidity in the hands of the public might be reflected in an actual bidding up of the prices of domestic relative to those of internationally traded goods and services, and to a consequent shift (through mechanism (c)) of expenditure patterns away from the first and towards the second group of goods.

It should be noted that only mechanism (c) entails a specific rise of the local price level above that consonant in the long run with international prices at the prevailing exchange rate. But *all three* of the mechanisms entail a deterioration of the balance of payments, and therefore place in question the viability of the prevailing exchange rate. This, then (more than inflation as such), is the most important consequence of excessively easy monetary policy in a fixed-exchange-rate setting. If the balance-of-payments situation is not corrected, reserves will dwindle to the point where there is no escape from a devaluation, which in turn will cause the equilibrium level of prices to rise. But as long as the exchange-rate-discipline is maintained, as long as the monetary authorities act in such a way as to stem any incipient drain of international reserves before a devaluation becomes inevitable, there will be no permanent effect of domestic monetary policy on prices.

8. A NOTE ON LAGGED RESPONSES AND "OVERSHOOTING"

One of the aspects that has most plagued observers of the world panorama of inflation is the fact that there are often significant lags between cause and effect. We may be quite certain that an extra 10 percent increase in the money supply this year will (in an environment of chronic or acute inflation) ultimately cause an extra 10 percent rise in the price level, but how will that rise be spread through time? Here we are much less sure of ourselves, and the data do not seem to offer any very firm answers. We can be confident that lags of response are often present, and equally confident that the pattern of lags can be different on different occasions within the same country.

One is tempted, in such circumstances, to stop trying to improve one's understanding—frustration takes over so easily. That would be a mistake, however, because even though the lag mechanisms at work may change through

time, they have certain characteristics that, well understood, bring added insights to the observer.

To see the process clearly, it is well to work with hypothetical examples. In the case of a country undergoing chronic inflation, with a flexible exchange rate that actually moves with its inflation and thus unhooks its inflation rate from that of the "world inflation," it is best to consider a shift of the annual rate of monetary expansion from, say, 30 percent to, say, 40 percent. This will ultimately lead to the rate of expansion of prices being higher by 10 percentage points—suppose that it increases from 25 percent initially to 35 percent ultimately.

It is all too easy to adopt a theory or approach which implies that if there are lagged responses of prices to monetary expansion, the rate of inflation will move gradually up from 25 percent to 35 percent. The problem lies in the fact that, so long as the inflation rate moves up by less than the rate of monetary expansion, real cash balances will be increasing (above and beyond their normal increase due to the growth of population and real income). But we know that the effect of the "inflationary tax" on cash balances is to cause people to reduce, not increase, their real balances. *Somewhere* in the process of an economy's adjusting to a new and higher rate of monetary expansion there must be a period wherein the rate of price increase rises above the rate of monetary expansion. This is the phenomenon called "overshooting." Cases if it are illustrated in the acute inflations reviewed in Table 2.

To this day the phenomenon of overshooting is only rarely discussed in textbooks of monetary economics, but it is well appreciated in some of the more technical literature on inflation, particularly that which deals with what I have called acute inflation or with the even more traumatic phenomenon of hyperinflation.

What I believe is less well appreciated is the fact that overshooting has its counterpart in the analysis of inflation for fixed-exchange-rate countries. Here, as has been indicated above, in the long run the rate of a country's inflation will be determined by the world inflation rate. But if the world inflation rate rises from 5 to 10 percent rapidly, and then stays at 10 percent, a country cannot respond with an inflation rate that moves only gradually up from 5 to 10 percent and then stays there (along with the rest of the world). This would mean that the price level of the rest of the world had "permanently" moved up by more than that of the responding country. Normally this would mean a situation of disequilibrium, whose resolution would require that the responding country's price level would move up to "parity" with the world price level. In the process, then, the responding country would have to experience a period of more than the 10 percent rate of inflation prevailing in the world at large.

I believe that this type of overshooting has been characteristic of a number of less-developed countries in the recent past. El Salvador's rate of inflation, for example, lagged far behind the world rate up through 1973, then leaped ahead of it in 1974 and 1975. The same is true for Panama, which overshot in 1975, and for Paraguay, which overshot in 1973 and 1974. In other parts of the world,

Singapore and India appear to have experienced a strong overshooting and Malaysia a mild one, in 1973 and 1974, and Madagascar and Morocco had a similar episode in 1974 alone.

Of course we cannot, just by noting that a fixed-exchange-rate country has an inflation rate above that of the rest of the world, infer that it is the product of a delayed response to the world rate of inflation. The presumption is in this direction, however, so long as the "overshoot" appears with a lag behind the world rate of inflation, and if later the country's own inflation rate stabilizes once again in the neighborhood of the world rate. The judicious statement of overshooting for fixed-exchange-rate countries is not the positive assertion that such overshooting is to be adduced whenever such a country's inflation rate significantly exceeds the world's, but rather a negative caveat indicating that such discrepancies in rates may merely reflect a phenomenon of necessary overshooting, and need not in any way reflect imprudent monetary management on the part of the country in question.

9. SUMMARY AND CONCLUSION

In section 1 of this paper we identified the cases of chronic and acute inflation in the period since 1950 and indicated the close connection between their rates of inflation and their rates of monetary expansion. It was noted that in acute inflation the rate of price increase tends to exceed the rate of monetary expansion, while the reverse was true for chronic inflation. This difference was explained on the basis of people's reducing their real cash balances when a new burst of inflation breaks out—such reductions are an intrinsic part of episodes of acute inflation, but play no continuing role (after an initial adaptation) in chronic inflations.

In section 2 the existence of a world inflation was demonstrated, with many countries sharing experiences that were closely similar within each period, but that differed markedly from one period to another. The notion of a "world money supply," in which different currencies were linked by fixed (or nearly fixed) exchange rates was introduced, and it was shown that variations in its rate of increase could explain the observed changes in the rate of world inflation from one period to another.

In section 3 the various types of inflationary experience were examined with reference to the degree of reliance by governments on financing their budget deficits through recourse to the banking system. The data clearly show a significantly stronger tendency for chronic inflation countries than for "normal" countries to rely on such financing, and a still stronger tendency for acute inflation countries to do so. Budget deficits financed by the banking system were thus a dominant source of the increases in money supply that fueled most of the major inflations.

There were, however, some cases of chronic and acute inflation that were fueled predominantly by expansion of credit to the private sector. These were discussed, and their institutional peculiarities explored, in section 4.

In sections 5 to 8 our attention returned once again to the world inflation shared by the overwhelming majority of countries. Its underlying cause was found (in section 5) to rest not in any massive increase in deficit financing but rather in changes in the rate at which world reserves were expanding.

Sections 6 and 7 then looked at the world inflation process from the point of view of a single small country and showed how that country's inflation rate was beyond its own control, so long as it maintained a fixed-exchange-rate policy. For such a country, excess credit expansion at home simply results in a loss of international reserves. Carried too far, this policy would ultimately force devaluation upon the country, but so long as the discipline of the fixed exchange rate is maintained, the country's inflation rate cannot be much different from that of the world system.

Finally, in section 9, attention was called to the phenomenon of "overshooting." Here it was shown that a small country with a fixed exchange rate will normally, in the process of "importing" the world inflation, experience significant periods in which its inflation, through no fault of its own, is faster than the "world's." A number of recent examples of such overshooting were cited to emphasize the present relevance of the phenomenon.