

# International Reserves and World-Wide Inflation

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IN RECENT YEARS economists and policymakers alike have become more concerned with the international aspects of inflation.<sup>1</sup> Previously, inflation was thought of mainly as a national phenomenon and was analyzed as such. This change in emphasis from a national to an international vantage point is rather surprising given that the international monetary system underwent at the same time a transition from predominantly fixed to floating exchange rates. Many economists would have argued that fixed exchange rates facilitate the international transmission of inflation and that flexible exchange rates serve to insulate the national economies from external inflationary developments. According to this reasoning one might have expected inflation to be an international phenomenon under fixed exchange rates, but not under the current system of widespread floating exchange rates. However, recognizing the time lags involved, our experience with floating exchange

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<sup>1</sup> See, for instance, H. Johannes Witteveen, "Inflation and the International Monetary Situation," *American Economic Review, Papers and Proceedings of the Eighty-seventh Annual Meeting of the American Economic Association* (hereinafter referred to as *American Economic Review, Papers and Proceedings*), Vol. 65 (May 1975), pp. 108-14, and "Monetary Reform: Where We Stand Now," reprinted in *IMF Survey*, Vol. 4 (May 26, 1975), beginning on p. 145; J. Marcus Fleming, "International Aspects of Inflation," presented at the International Economic Association Conference on Inflation Theory and Anti-Inflation Policy, Stockholm, Sweden, August 28, 1975; Harry G. Johnson, "World Inflation and the International Monetary System," *The Three Banks Review*, No. 107 (September 1975), pp. 3-22; R. Sweeney and Thomas D. Willett, "The International Transmission of Inflation," and D. Logue and R. Sweeney, "International Monetarism," both presented at the U. S. Treasury Department Conference on Monetarist Models of National Economic Activity and the International Payments Accounts, Washington, April 4, 1975; T. Uchida and Richard N. Cooper, "The Threat to World Trade from Inflation and Recession," *American Enterprise Insti-*

rates is probably too limited to permit a conclusive assessment of the floating exchange rate period.

This paper analyzes the relationship between increases in international reserves and inflation from a global perspective. In particular, it is argued that the recent increase in international reserves helped to precipitate a world-wide monetary expansion that was an important causal factor in the world-wide inflation of the early 1970s.

By concentrating our attention on international monetary factors, we do not wish to imply that they were exclusively responsible for the world-wide inflationary forces experienced. Autonomous supply changes, some of them triggered by bad harvests or declining fish catches; the exercise of newly found monopoly power on behalf of producers; and increasing aggregate demand owing to increases in population and income played important roles as well. Furthermore, it should be recognized that the monetary changes analyzed here were often the result of fiscal policy actions taken.

There are two basic ways in which the relationship between international reserve changes and world price changes may be studied: one may estimate a complete structural model of the world economy incorporating all relevant supply and demand relationships between real and financial variables. Alternatively, one may estimate directly the reduced form relationship between reserves and prices. While the first approach has much to commend itself, we choose to follow the simpler and more direct second route. In doing so we have to abstract from many important relationships, the significance of which we do not wish to deny. In particular, the influence of supply factors on world prices was neglected—an omission that was made only with the greatest amount of hesitation. Nevertheless, it was hoped that the simplicity of

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tute Conference on the Threat to World Economic Order, Washington, April 7, 1975; Walter S. Salant, "The International Transmission of Inflation" and "A Supranational Approach to the Analysis of World Inflation," both presented at the Brookings Institution Conference on Worldwide Inflation, Washington, November 21, 1974; Ronald L. Teigen, "Interpreting Recent World Inflation," *American Economic Review, Papers and Proceedings*, Vol. 65 (May 1975), pp. 129-32; Gottfried Haberler, "Inflation as a Worldwide Phenomenon—An Overview," pp. 13-25, Arthur B. Laffer, "The Phenomenon of Worldwide Inflation: A Study in International Market Integration," pp. 27-52, David I. Meiselman, "Worldwide Inflation: A Monetarist View," pp. 69-112, James S. Duesenberry, "Worldwide Inflation: A Fiscalist View," pp. 113-24, and Robert A. Mundell, "Inflation from an International Viewpoint," pp. 141-52, in *The Phenomenon of Worldwide Inflation*, ed. by David I. Meiselman and Arthur B. Laffer, American Enterprise Institute for Public Policy Research (Washington, 1975); Donald Keating, "World-Wide Inflation: The Problem and Prospects," *Bulletin*, New Hampshire Council on World Affairs, January 1975; and Michael W. Keran, "Towards an Explanation of Simultaneous Inflation-Recession," *Business Review*, Federal Reserve Bank of San Francisco (Spring 1975), pp. 18-30.

the approach adopted might have its own virtue in highlighting the importance of world-wide monetary aggregates for world price developments.

Throughout the paper emphasis is placed on the analysis of the relevant global aggregates. The data pertain to 126 member countries of the International Monetary Fund (IMF), plus Switzerland. Given the long timespan covered in the study and various data deficiencies, the paper focuses attention on rates of change rather than on the global aggregates themselves to minimize possible data problems.<sup>2</sup> Conceptual problems encountered in deriving the global monetary aggregates are dealt with in a separate paper.<sup>3</sup>

Section I outlines the basic relationship between international reserve increases and world-wide inflation. Section II presents a look at the factors responsible for the recent increase in international reserves. Section III analyzes the relationship between these international reserve changes and changes in the world-wide money supply. Section IV focuses on the link between money and inflation. Section V investigates further the relationship between international reserve changes and world price level changes. Section VI examines the special role of the recent international reserve increase in causing inflationary tendencies in the international trade sector. Section VII draws certain policy conclusions.

## I. The Basic Hypothesis

It is our basic hypothesis that there exists a causal link between changes in international reserves and changes in world prices.<sup>4</sup> Changes in global international reserves have a direct and an indirect impact on the world money supply, and these changes in the world money supply in turn influence the world-wide rate of inflation.

Three basic factors can be identified as determining the changes in a nation's money supply: changes in the international base component,

<sup>2</sup> The data are presented in the Appendix.

<sup>3</sup> William H. L. Day and H. Robert Heller, "On the Definition of the World Money Supply" (unpublished, International Monetary Fund).

<sup>4</sup> The Managing Director of the Fund concluded recently that "the lack of control over the expansion of international liquidity had already become a weakness in the Bretton Woods system . . . and eventually contributed to its breakdown" ("Monetary Reform: Where We Stand Now," p. 149, cited in footnote 1). Arthur Burns has argued that excess international liquidity—mainly in the form of U. S. dollars—was a factor in world inflation (remarks at the American Bankers Association conference, Amsterdam, June 13, 1975, reported in *The New York Times*, June 14, 1975, p. 33).

that is, international reserves; changes in the domestic base components; and changes in the monetary base multiplier. An increase in international reserves will have a direct impact on a nation's money supply by expanding the monetary base. Furthermore, an increase in international reserves will have a direct impact on a nation's money supply if the monetary authorities feel that the increase in international liquidity has eased their reserve constraint, so that more expansionary domestic monetary policies may be pursued. Owing to the existence of the indirect effect just described and the noninstantaneous operation of the money multiplier, we might expect that a given change in international reserves will have a distributed-lag impact on the nation's money supply.

Aggregating the changes in international reserves and money experienced by all countries of the world, we can derive the changes in the respective global aggregates.

The increases in national money supplies prompted by the international reserve increases will in turn have an impact on national inflation rates. The channels via which monetary changes are translated into price changes are many and varied, as economic units rearrange their financial and real asset portfolios in response to monetary changes. The end result of a monetary expansion tends to be an increase in aggregate demand in the economy, which is then translated into an increase in the nation's nominal gross national product (GNP). Supply conditions play an important role in the division of the nominal GNP increase into real product and price increases. If velocity is secularly stable and monetary changes do not have a significant impact on real output in the long run,<sup>5</sup> we can expect that monetary changes will be reflected after a certain adjustment period in changes in national price levels.

Another important transmission mechanism links the various national economies in that aggregate demand increases will result in a greater demand for imports, which in turn will tend to increase the price of importables and to spread the demand and price pressures to other countries. Furthermore, as monetary policy becomes more expansionary in one country, interest rates tend to fall, leading to a capital outflow. In the other nations, the capital inflow will result in easier access to credit, lower interest rates, and an economic expansion, thereby accentuating the direct trade effects.

<sup>5</sup> Michael W. Keran (*op. cit.*) concludes in his study of world inflation and recession that there is no empirical relationship between changes in world money and changes in real or nominal income.

We will argue that the recent increase in international reserves also had a profound effect on the structure of world inflation. The increase in demand expansion triggered by the monetary expansion resulted in a sharp increase in the demand for traded commodities because the increase in international reserves had eliminated or substantially reduced the foreign exchange constraint in many countries. Consequently, the foreign trade sector became the leading sector in the recent inflation. The sharp rise in the prices of internationally traded goods was also a significant factor in making the recent inflation a truly world-wide phenomenon.

## II. The Sources of International Reserve Changes

International reserves grew at an average annual rate of 2.7 per cent during the years 1950 to 1969 (Table 1). During the following three-year period (1970–72), international reserves measured in terms of special drawing rights (SDRs) increased by 87 per cent and more than doubled in terms of U. S. dollars.

TABLE 1. INTERNATIONAL RESERVES, 1950–74

Period	Amount at End of Period in		Annual Growth Rate in Per Cent Based on	
	U.S. dollars	SDRs	U.S. dollars	SDRs
1950–59	57.7	57.7	2.3	2.3
1960–69	78.1	78.1	3.1	3.1
1970	92.4	92.4	18.4	18.4
1971	130.3	120.0	41.0	29.9
1972	158.1	145.6	21.3	21.3
1973	181.8	150.7	15.0	3.5
1974	218.0	178.1	19.9	18.1

Source: International Monetary Fund, *International Financial Statistics (IFS)*.

It is important to identify the sources of this sharp reserve growth. The relevant data are presented in Table 2. During the years 1970–72, there was a slight decrease in the gold component of international reserves amounting to SDR 3.3 billion and a decrease of SDR 0.3 billion in IMF reserve positions. Valuation adjustments related to exchange rate changes—mainly the U. S. dollar devaluation in 1971—accounted for a decrease of SDR 4.4 billion. These relatively small decreases were almost exactly offset by the increase in holdings of SDRs amounting to SDR 8.7 billion. This leaves an increase in foreign

exchange holdings of SDR 67.0 billion out of a total rise of SDR 67.6 billion in international reserves during the period 1970–72. Of this total, SDR 59.0 billion was identifiable increases in dollar reserves, SDR 45.2 billion of which was direct dollar claims on the United States, and SDR 13.8 billion was in Euro-dollars. It is likely that part of the unidentified residual increase was also in U. S. dollars, so that the major portion of the reserve increase can be attributed to an expansion of the dollar component.

TABLE 2. SOURCES OF RESERVE CHANGE, 1970–74

(In billions of SDRs)

	1970	1971	1972	1973	1974
Net annual transactions in reserves					
Gold					
Monetary gold	0.3	-0.1	0.2	—	—
Gold transactions (acquisitions -) by IMF, BIS, <sup>1</sup> and European Fund	-2.2	-1.0	-0.5	—	—
Countries' gold reserves	-1.9	-1.1	-0.3	—	-0.1
Special drawing rights					
Allocation of SDRs	3.4	3.0	3.0	—	—
IMF holdings of SDRs (increase -)	-0.3	-0.2	-0.1	0.1	0.1
Countries' SDR holdings	3.1	2.8	2.8	0.1	0.1
Reserve position in the Fund					
Use of Fund credit	-0.8	-1.9	-0.3	-0.1	2.7
IMF gold transactions (inflow +)	1.6	0.4	0.1	—	—
IMF transactions in SDRs (inflow +)	0.3	0.2	0.1	-0.1	-0.1
IMF surplus (increase -)	-0.1	—	—	—	—
Reserve positions in the Fund	1.0	-1.3	—	-0.2	2.7
Official foreign exchange holdings					
Official claims on United States	7.8	27.4	10.0	4.6	8.2
Identified official holdings of Euro-dollars	5.5	0.8	7.5	4.9	12.5
Official sterling claims on United Kingdom	0.4	1.6	0.5	0.2	2.6
Official deutsche mark claims on the Federal Republic of Germany	0.8	-0.4	0.1	-0.7	—
Official French franc claims on France	0.2	0.2	0.3	0.2	-0.2
Other official claims on other countries denominated in the claimant's own currency	... <sup>2</sup>	0.1	-0.1	0.6	-0.3
Foreign exchange claims arising from swap credits and related assistance	-2.2	-0.7	—	0.4	1.3
Identified official holdings of other Euro-currencies	... <sup>2</sup>	0.7	2.0	1.6	0.2
Identified official claims on IBRD <sup>3</sup> and IDA <sup>4</sup>	0.1	—	—	0.1	0.1
Residual	-0.4	4.1	0.7	2.5	0.9
Total official foreign exchange holdings	12.2	33.8	21.0	14.4	24.8
Effect of valuation changes on stock of reserves	—	-4.4	—	-8.6	-0.8
Total reserve change	14.4	29.7	23.5	5.8	26.7

Source: International Monetary Fund, *Annual Report, 1975* (Washington, 1975), p. 38.<sup>1</sup> Bank for International Settlements.<sup>2</sup> The underlying stock data were not available for 1970. The value of transactions in these assets is included with the residuals.<sup>3</sup> International Bank for Reconstruction and Development.<sup>4</sup> International Development Association.

It has been argued<sup>6</sup> that an excessive monetary expansion in the

<sup>6</sup> See, for instance, Johnson, *op. cit.*, and Logue and Sweeney, *op. cit.*

TABLE 3. RATES OF MONETARY EXPANSION, 1970-74

*(Currency plus demand deposits)*

	1970	1971	1972	1973	1974
World	10.4	13.0	15.1	12.8	10.6
Industrial countries	9.2	12.1	12.3	8.4	6.9
Austria	6.4	15.4	21.9	8.7	4.3
Belgium	8.4	11.1	14.0	8.8	8.8
Canada	13.8	27.8	15.5	13.8	11.7
Denmark	1.2	7.8	13.6	11.7	4.8
France	11.1	11.9	14.9	9.8	15.2
Germany, Fed. Rep. of	9.6	12.8	13.9	0.7	12.2
Italy	27.5	18.9	24.1	17.4	...
Japan	16.9	29.7	24.7	16.7	11.5
Netherlands	11.8	15.0	17.5	-0.1	12.5
Norway	12.6	11.6	16.3	15.4	11.9
Sweden	9.2	9.2	7.6	10.2	6.3
Switzerland	10.9	17.7	5.5	-0.2	-3.5
United Kingdom	9.3	15.3	13.9	5.1	10.8
United States	5.3	6.2	7.6	7.3	2.3
Other developed areas	7.8	12.2	23.5	24.1	...
Latin America	21.4	25.3	35.5	53.4	37.5
Middle East	8.4	15.3	28.1	27.1	29.2
Other Asia	16.0	16.1	20.4	22.2	12.1
Other Africa	16.8	10.7	17.1	20.5	47.1

Source: International Monetary Fund, *IFS*.

United States contributed significantly to the increase in world liquidity and by this to world-wide inflation. However, there is not much convincing evidence to support this notion. In fact, the U. S. money supply increased at more moderate rates than the money supply in other countries in each of the crucial years 1970 to 1972. (See Table 3.) In 1970, the United States had a lower rate of monetary expansion than any other industrial country except Denmark; in 1971 it had the lowest rate; and in 1972 only Switzerland had a lower rate of increase in the money supply.<sup>7</sup> Also, in the period 1964-69 the United States

<sup>7</sup> Domestic credit in the United States also increased at more moderate rates than in most other industrial countries.

had maintained a lower rate of expansion in the money supply than any other industrialized country except Sweden. A similar comparison holds true with respect to the less developed countries.

Of course, it is still possible to argue that the U. S. monetary expansion was "excessive" in some absolute sense in spite of the fact that it was more moderate than in almost every other country. But the fact remains that relative to the rates of monetary expansion observed in other nations, the U. S. rates were lower, and hence it would be difficult to fault the U. S. monetary authorities for creating the inflationary pressures that then engulfed the entire globe.

We will argue that it was a shift by the private sector out of dollars and into other currencies that led to an excessive expansion of global liquidity and thereby laid the foundation for the world-wide inflation of the early 1970s.

The perceived strength of the U. S. dollar induced private foreigners to accumulate large dollar balances during the 1960s. However, as the volume of U. S. liquid liabilities in foreign hands increased, the U. S. gold guarantee and, by inference, the external stability of the dollar were called into question. Consequently, in the early 1970s private dollars shifted into other currencies, a move that resulted first in an increase in global international reserves and then in a secondary impact on the world-wide money supply. It was this shift in the private demand for U. S. dollars as an asset that helped to create the basis for the current inflation.

First, some evidence is presented for the hypothesis that private foreign entities initiated a substantial shift from U. S. dollars into other currencies, and then the role played by U. S. residents is examined.

Between the end of 1965 and the end of 1969, private foreign entities increased their liquid assets in the United States from \$11.5 billion to \$28.2 billion (Table 4). But as the U. S. inflation rate accelerated somewhat during the late 1960s, the real returns on these finan-

TABLE 4. U.S. LIQUID LIABILITIES TO FOREIGNERS, 1965-71 <sup>1</sup>

(In billions of U.S. dollars)

	1965	1966	1967	1968	1969	1970	1971
To private foreigners	11.48	14.21	15.76	19.38	28.23	21.77	15.09
To governments	15.83	14.90	18.19	17.34	16.00	23.33	50.65

Source: International Monetary Fund, *IFS*.

<sup>1</sup> End of calendar year.



cial assets fell. In addition, the growing volume of U. S. liquid foreign liabilities resulted in a questioning of the realism of the U. S. gold guarantee and the future external stability of the dollar.

Consequently, foreign private entities—in particular, foreign commercial banks—shifted out of dollars into other currencies. Between the end of 1969 and the end of 1971, liquid U. S. liabilities to private foreigners decreased from \$28.2 billion to \$15.1 billion. Demand deposit liabilities by U. S. banks to foreign commercial banks decreased from \$16.8 billion to \$7.0 billion, and time deposit liabilities decreased from \$2.0 billion to \$0.3 billion.<sup>8</sup>

During the same period the gross size of the Euro-dollar market continued to grow; however, the U. S. dollar component of the entire Euro-currency market decreased from 81.3 per cent of total liabilities in December 1969 to 72.4 per cent in December 1971. The net dollar positions of the Euro-dollar banks decreased from \$1.43 billion to \$0.75 billion over the same time interval, while their net positions in other Euro-currencies increased from \$0.06 billion to \$1.65 billion.<sup>9</sup>

There was virtually no net change in liquid U. S. liabilities to foreign monetary authorities and governments in the period 1965–69. Only as private individuals decreased their dollar holdings in the early 1970s did the official dollar holdings increase. But the decrease in private foreign dollar holdings is not able to explain the entire increase in official dollar holdings. Also, actions taken by U. S. residents may have played a role here.

There is some evidence that a decrease in the demand for dollars developed in the early 1970s in the United States. A demand for money function for the United States estimated over the period 1960 to 1970 consistently overestimated the demand for dollars for the years since 1971. The U. S. monetary authorities were aware of this apparent shift in the demand for money function.<sup>10</sup> Part of the reason for this decrease in the demand for money may have been that the increase in U. S. inflation rates led to a shift out of fixed-interest-yielding

<sup>8</sup> *Treasury Bulletin* (May 1975), p. 91.

<sup>9</sup> Bank for International Settlements, *Forty-Third Annual Report, 1st April 1972–31st March 1973* (Basle, June 18, 1973).

<sup>10</sup> Board of Governors of the Federal Reserve System, *57th Annual Report, 1970* (Washington, May 21, 1971), p. 20; Council of Economic Advisers, *Economic Report of the President* (Washington, January 1972), p. 58. See also F. Morris, "RPD's as the Target," Federal Reserve Bank of Boston conference, Melvin Village, New Hampshire, September 6–8, 1972; and Michael J. Hamburger, "The Demand for Money in 1971: Was There a Shift? A Comment," *Journal of Money, Credit and Banking*, Vol. 5 (May 1973), pp. 720–25. For a contrasting view, see Stephen M. Goldfeld, "The Demand for Money Revisited," *Brookings Papers on Economic Activity*: 3 (1973), pp. 577–646.

financial assets into real assets. The housing and stock market boom of the early 1970s can be cited as an example. There is also reason to believe that U.S. corporations and individuals correctly anticipated the dollar devaluations of 1971 and 1973 and moved substantial amounts of funds into currencies that were likely to appreciate.<sup>11</sup> Of course, such a shift in the private asset demand for dollars will result only in a once and for all increase in foreign official dollar reserves.

The Euro-dollar market might also have played a role in the process of international reserve expansion. If foreign central banks do not hold their dollar foreign exchange reserves in the form of direct claims on the United States but place their funds in the Euro-dollar market, a dollar deposit expansion results.

Of the total increase of SDR 67.6 billion in international reserves during 1970-72, more than 20 per cent was in Euro-dollar holdings. The share of Euro-dollars in total international reserves increased from 6.3 per cent at the end of 1969 to 12.2 per cent by 1972 and to 18.3 per cent by the end of 1974. The relationship between the Euro-dollar market and world monetary expansion is treated in a separate paper.<sup>12</sup>

We have argued that it was not an excessive monetary expansion in the United States but a decrease in the demand for dollars by private entities that led to a substantial expansion of the volume of international reserves held by foreign central banks. In addition, the Euro-dollar market may have played a role in the expansion of international reserves during the early 1970s.

### **III. The Relationship Between International Reserves and Money**

As private households, banks, and firms shifted their assets from dollars to other currencies, they forced foreign central banks to pur-

<sup>11</sup> A detailed investigation of 56 multinational corporations by the U.S. Senate Subcommittee on Multinational Corporations showed that liquid foreign assets of these corporations increased by 73 per cent, or \$2.06 billion, in anticipation of the second U.S. dollar devaluation, while their Euro-dollar holdings fell by 17 per cent, or \$500 million. Considering that these data pertain to a sample of only 56 corporations out of a universe of more than 4,000 multinational companies, we can conclude that the amounts involved were substantial indeed ("Multinational Corporations in the Dollar Devaluation Crisis: Report on a Questionnaire," Report prepared for the Subcommittee on Multinational Corporations, Senate Committee on Foreign Relations, 94th Congress, 1st Session, Washington, June 1975).

<sup>12</sup> Manfred Willms, "Money Creation in the Euro-Currency Market" (unpublished, International Monetary Fund, December 17, 1975).

chase these dollars at the agreed parity of their own currency. In return, these foreign central banks issued their own currency or other central bank liabilities to the depositors of dollars and added the dollars to their foreign exchange reserves. This process laid the basis for a multiple expansion of the foreign money supply as the currency or central bank liability expansion increased the amount of high-powered central bank money in existence. The foundation for the familiar multiple expansion of the money supply was thereby created in these foreign countries.

The important point is that in the United States there is no decrease in the money supply, while in foreign countries the dollar inflow serves as the basis for a multiple expansion of the money supply.<sup>13</sup> This is a factor contributing to the net expansion of the world money supply.

International reserves are merely one component of the monetary base. While changes in international reserves have a direct impact on the monetary base, and by this on the money supply, other base components may change as well—either offsetting or accentuating the influence of the international reserve component, depending on the policy actions taken by the monetary authorities.

We will now turn to an examination of available evidence on the relationship between changes in international reserves and changes in the world money supply. Special attention will be given to the examination of the lag structure of this relationship.

Using data that show annual percentage changes from 1951 to 1974, corrected for autocorrelation, we find that current and lagged international reserves expressed in dollars ( $R^s$ ) can account for 57 per cent of the variation in the world money supply ( $M$ )—equation (1).<sup>14</sup>

*Annual percentage change data, 1951–74*

$$M_t = 7.34 + 0.08 R_t^s + 0.14 R_{t-1}^s \quad (1)$$

(0.62) (0.05) (0.05)

$$\bar{R}^2 = 0.57; \quad D-W = 2.01; \quad SEE = 1.72; \quad \rho = 0.30$$

<sup>13</sup> The U.S. money supply is defined to include all foreign demand balances at Federal Reserve Banks. An economically meaningful measure for purposes of inflation analysis would exclude foreign central bank and commercial bank deposits. Because these foreign balances are actually included in the U.S. money supply data, the data overstate the inflationary effect of the U.S. money expansion. (See "Note" to the table, "Measures of the Money Stock," *Federal Reserve Bulletin* (April 1975), p. 12 A.)

<sup>14</sup> If we do not correct for autocorrelation, we obtain an essentially identical equation, indicating that autocorrelation was not a serious problem in the first place.

$$M_t = 7.27 + 0.09 R_t^s + 0.14 R_{t-1}^s \quad (1')$$

(0.45) (0.05) (0.05)

$$\bar{R}^2 = 0.55; \quad D-W = 1.37; \quad SEE = 1.75$$

Only the lagged reserve coefficient is significant at the 99 per cent level.<sup>15</sup> Lengthening the lag beyond one year does not yield significant coefficients.

I may be argued that any change in reserves,  $R_t^s$ , is by definition an integral part of the change in money,  $M_t$ , and that therefore a simultaneity problem exists. Therefore, we also estimated the equation omitting the current-period reserve change, so that no elements on each side of the equation were determined simultaneously. Alternatively, one may think of the percentage change in reserves lagged by one period as a proxy for the entire lag structure of the relationship. As long as the structure of the lagged relationship is stable, the use of the lagged reserve variable as a proxy for the entire lag structure will be legitimate. Data corrected for autocorrelation were employed in the estimation of equation (2).

*Annual percentage change data, 1951-74*

$$M_t = 7.71 + 0.17 R_{t-1}^s \quad (2)$$

(0.67) (0.05)

$$\bar{R}^2 = 0.54; \quad D-W = 2.14; \quad SEE = 1.79; \quad \rho = 0.36$$

The coefficient of the lagged reserve variable is significant at the 99 per cent level.<sup>16</sup>

One might want to question the use of an independent variable (reserves) that is expressed in terms of U. S. dollars, and a dependent variable (money) expressed in terms of national currencies. Of course, both variables are expressed in percentage terms, so that the denomination problem is not serious. But beyond that, a conversion of national price index changes into dollars by using the exchange rate would be rather meaningless in the first place, as the two variables would tend to offset each other. As an example, let us assume that the U. S. inflation rate is zero and that a foreign nation, say the United

<sup>15</sup> The high value of the constant term may be indicative of the relatively limited role played by reserve changes in money supply changes. A more complete model incorporating also the changes in the domestic monetary base would presumably result in a lower constant term and a higher multiple correlation coefficient. Such an extension is beyond the scope of this study.

<sup>16</sup> The data unadjusted for autocorrelation yield a similar equation:

$$M_t = 7.49 + 0.21 R_{t-1}^s \quad (2')$$

(0.46) (0.04)

$$\bar{R}^2 = 0.51; \quad D-W = 1.42; \quad SEE = 1.84$$

Kingdom, experiences 10 per cent inflation during a certain period. If during the same period the pound depreciates by 10 per cent versus the dollar, we would conclude that the price level in the United Kingdom in terms of dollars has not changed at all. This would hardly be a satisfactory data base with which to study world-wide inflation. Similar arguments apply when we express international reserves in the local currency instead of a common denominator, such as dollars or SDRs.

To check on the possible bias introduced by denominating international reserves in terms of U. S. dollars, all equations were re-estimated with international reserves denominated in SDRs. Equations (3) and (4) show that no substantial differences exist in comparison with the equations expressing international reserves in terms of dollars. Only the equations incorporating the autocorrelation corrections are shown.

*Annual percentage change data, 1951-74*

$$M_t = 7.21 + 0.10 R_t^{SDR} + 0.19 R_{t-1}^{SDR} \quad (3)$$

(0.63) (0.05) (0.06)

$$\bar{R}^2 = 0.59; \quad D-W = 2.04; \quad SEE = 1.68; \quad \rho = 0.32$$

$$M_t = 7.71 + 0.21 R_{t-1}^{SDR} \quad (4)$$

(0.70) (0.07)

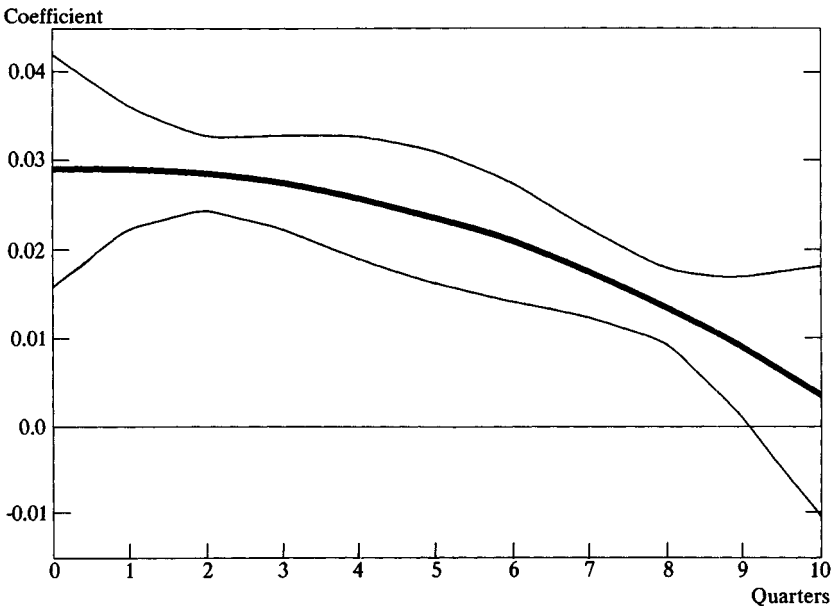
$$\bar{R}^2 = 0.54; \quad D-W = 2.16; \quad SEE = 1.77; \quad \rho = 0.38$$

To further investigate the lag pattern between changes in reserves and money, regressions imposing a second-degree polynomial lag pattern (without end constraints) were run, using quarterly data on percentage changes in reserves and world money for the period including the first quarter of 1958 through the fourth quarter of 1974. A ten-quarter lag pattern yielded the best results, with a mean lag of 3.8 quarters (standard error = 0.69) for the response of the world money stock to international reserve changes. Chart 1 depicts the estimated lag structure, with the thin lines indicating the standard error of estimate. In the relationship estimated, percentage changes in international reserves were able to explain 66 per cent of the variance in percentage changes of the world money stock. These results from the quarterly data confirm the existence of a mean lag of approximately one year in the relationship between reserve changes and money changes on a world-wide basis, reached on the basis of the annual data.

Of course, in addition to the discussed changes in international reserves, domestic variables affecting the monetary base also play an important role in determining the world money supply. The statistical results indicate that changes in international reserves can account for only slightly more than half of the observed variation in the world money stock.

It should also be borne in mind that the use of least-squares regression techniques gives considerable weight to large deviation from the trend, such as occurred in the early 1970s in all the variables studied. One might therefore argue that the use of these techniques gives an undue weight to one historic episode. On the other hand, it is evident that substantial changes in the relevant variables deserve the particular attention of economists and policymakers alike. Fractional changes in any of the variables studied are of relatively little consequence—especially when one considers the inherent deficiencies in the global aggregates analyzed here. One might therefore want to consider the increased emphasis given to large deviations from the trend by the use of regression techniques as entirely appropriate under the circumstances.

CHART 1. DISTRIBUTED-LAG EFFECT OF CHANGE IN WORLD RESERVES  
ON CHANGE IN WORLD MONEY



#### IV. The Relationship Between Money and Prices

It is by now a well-established proposition that changes in national monetary aggregates do have a significant lagged impact on national prices. In a world of permanently fixed exchange rates, it is also clear that there is a direct linkage between the various national money supplies and by this between the national rates of inflation. Individual countries linked by fixed exchange rates cannot escape international inflation any more than cities or states can escape national inflation. Of course, the pre-1971 par value system did not provide the permanent rigid link that a single currency provides between economic units within the same country. In particular, tariffs, quotas, and other trade impediments did prevent a complete product price equalization in the international trade sector, just as capital export and import levies and direct controls hampered the international equalization of rates of return on financial assets. It is therefore not surprising that the standard deviation of price changes experienced in the various industrial nations was two to three times as large as the standard deviation of price changes between U. S. cities measured in any year since 1960.

The use of widespread floating in 1971 and again since early 1973 leads us to suspect that the existing link between the various national money supplies and by this the national inflation rates might have been broken. Comparing rates of change in national money supplies in 14 industrial countries on a cross-sectional basis (Table 5), we find that the standard deviation in each year since the introduction of greater exchange rate flexibility lies somewhat above the 1960-70 average.

TABLE 5. PERCENTAGE CHANGE IN MONEY SUPPLY FOR 14 INDUSTRIAL COUNTRIES, 1950-74

Period	Mean	Standard Deviation	Coefficient of Variation
1960-70	8.9	5.2	0.60
1971	15.0	6.8	0.45
1972	15.1	5.8	0.39
1973	9.0	5.9	0.66
1974	8.0	5.6	0.70

Source: Calculated from *IFS*.

However, the average rate of change in the money supply changed as well, so that the coefficients of variation present a mixed picture. But, taking the years 1973 and 1974 alone, the mean rate of change in the

money supply of 9.0 and 8.0 per cent, respectively, did not differ greatly from the 8.9 per cent mean rate of increase during the years 1960–70. Both the standard deviation and the coefficient of variation for these two years lie above the 1960–70 average, which may indicate greater flexibility in monetary policy during the regime of floating exchange rates.

Given the lags involved, it is not surprising that we observe a marked increase in the dispersion of inflation rates only in 1974. The standard deviation of consumer price changes in 14 industrial countries shows a sharp increase, to 4.3 in that year, compared with an average of 1.6 for 1960–70 and 1.5 for 1971–73. In view of the concomitant increase in average inflation rates, the coefficient of variation shows a more mixed picture. However, the usefulness of this statistic is questionable, as the dispersion in inflation rates might be considered to be independent of the inflation rates themselves. (See Table 6.)

TABLE 6. PERCENTAGE CHANGE IN CONSUMER PRICES FOR 14 INDUSTRIAL COUNTRIES, 1950–74

Period	Mean	Standard Deviation	Coefficient of Variation
1960–70	3.6	1.6	0.46
1971	5.7	1.6	0.27
1972	5.9	1.2	0.19
1973	8.1	1.6	0.20
1974 <sup>1</sup>	12.4	4.3	0.34

Source: Calculated from *IFS*.

<sup>1</sup> Data for 1974 exclude Belgium, Italy, and the Netherlands.

We might therefore conclude that rates of monetary expansion and—with a lag—rates of inflation became somewhat more diffuse with increasing exchange rate flexibility.<sup>17</sup>

One might wonder why rates of monetary expansion and of inflation did not diverge more sharply than they actually did. Several reasons may be responsible for this. First, the time of experience with floating is rather limited and the increased scope for a more independent monetary policy may well find a greater expression in future years. Second, the lags involved may be such that our data do not yet fully capture the differences in the policies pursued. Third, the years

<sup>17</sup> Teigen concludes on the basis of similar data that “the evidence suggests that national inflation rates are not clearly converging, but rather appear to have become more diffuse in recent years,” *op. cit.*, p. 131.



1960–70, which were a period of “fixed” exchange rates, did see several exchange rate changes, and hence an opportunity for independent policy actions was afforded nations taking such actions. Fourth, several industrial countries participated in the European narrow margins arrangement—the “snake”—and other nations pegged to “floaters” or managed their floating rates by official intervention. The scope for exchange rate changes and thereby an independent monetary policy was therefore severely limited for such nations.

Turning to the relationship between money and prices, we find strong evidence on the national level for the existence of a significant causal relationship between changes in money and changes in prices.<sup>18</sup> We are interested in investigating this same relationship on a world-wide level. Of particular concern to us also is the lag structure of the relationship. The existence of such lags on a national level has been known for more than a century. According to William Stanley Jevons, “an expansion of the currency occurs one or two years previous to a rise in prices.”<sup>19</sup>

Less attention has been paid to the relationship between the world money supply and world prices, although some investigators<sup>20</sup> have recently provided relevant aggregate data. However, these studies are restricted to a limited number of industrial nations and do not provide data on the relationship between an appropriately defined *world* money supply and the *world* price level.

Regressing the percentage change in world consumer prices ( $P$ ) on the percentage change in the world money supply ( $M$ ) of the current year as well as the previous two years, we obtained the following equation:

*Annual percentage change data, 1952–74*

$$P_t = -3.86 + 0.07 M_t + 0.28 M_{t-1} + 0.66 M_{t-2} \quad (5)$$

(1.56) (0.19) (0.22) (0.20)

$$\bar{R}^2 = 0.60; \quad D-W = 1.47; \quad SEE = 1.82$$

The estimate shows that the monetary variables are able to explain 60 per cent of the variation in prices, but only the coefficient of money

<sup>18</sup> See, for instance, Christopher A. Sims, “Money, Income, and Causality,” *American Economic Review*, Vol. 62 (September 1972), pp. 540–52; Milton Friedman, “The Lag in Effect of Monetary Policy,” *Journal of Political Economy*, Vol. 69 (October 1961), pp. 447–66; and Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867–1960*, National Bureau of Economic Research (Princeton University Press, 1963).

<sup>19</sup> Milton Friedman, “Rediscovery of Money—Discussion,” *American Economic Review, Papers and Proceedings*, Vol. 65 (May 1975), p. 177.

<sup>20</sup> Meiselman, *op. cit.*; Logue and Sweeney, *op. cit.*; and Keran, *op. cit.*

lagged by two years is different from zero at the 95 per cent significance level. It is noteworthy that the sum of the lagged coefficients is equal to 1.01. The Durbin-Watson test statistic yields inconclusive results as to the presence of autocorrelation, but making the appropriate corrections results in no significant changes in the estimated parameters.

Following our previous reasoning, we chose the most significant independent variable as a proxy for the entire lag structure. We obtained the following truncated regression:

$$P_t = -2.72 + 0.89 M_{t-2} \quad (6)$$

(1.39) (0.16)

$$\bar{R}^2 = 0.58; \quad D-W = 1.63; \quad SEE = 1.86$$

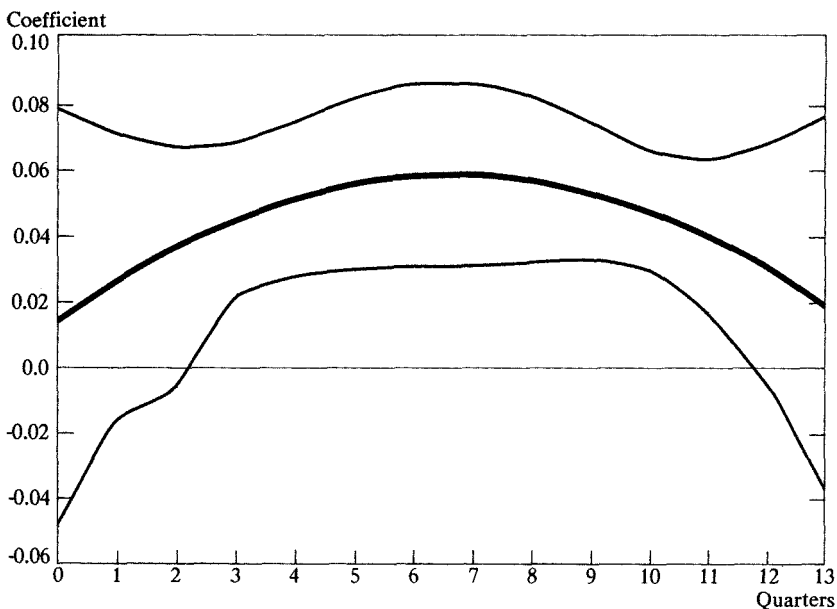
Percentage changes in the world money supply, lagged by two time periods, are able to explain 58 per cent of the variation in the percentage changes in the world price level. The Durbin-Watson statistic indicates that no significant autocorrelation exists.

Experimentation with quarterly data covering the period including the fourth quarter of 1956 through the fourth quarter of 1974 showed that percentage changes in the world money supply had their largest impact on world consumer price changes six quarters afterward. Using unconstrained second-degree polynomials with 13-quarter lags to model the lag structure, we determined a mean lag of 6.1 quarters<sup>21</sup> (1.5 years) with a standard error of 1.8 quarters. Chart 2 depicts the estimated relationship.

Both the quarterly and the annual data provide evidence that increases in the world money supply will result in increases in world consumer prices. The average distributed lag in the relationship was found to be approximately one and a half years.

<sup>21</sup> The price data used are percentage changes in period averages, while the money and reserve data are percentage changes in end-of-period stocks. Consequently, the price data lead the money and reserve data by one-half period. The appropriate corrections have been made in the text but not in the charts and regressions as half-period lags may be somewhat confusing.

CHART 2. DISTRIBUTED-LAG EFFECT OF CHANGE IN WORLD MONEY ON CHANGES IN WORLD CONSUMER PRICES



## V. The Relationship Between International Reserves and World Consumer Prices

It is tempting to add the mean lags of one year established in the relationship between reserves and money and the mean lag of approximately one and a half years in the relationship between money and consumer prices, and to conclude that we might expect a lag of approximately two and a half years between reserve changes and world price changes.

It is also possible to estimate directly the mean lag between percentage changes in reserves and percentage changes in prices. Using regression techniques to determine the nature of the lagged relationship, we obtained the following regressions between the percentage change in international reserves and the percentage change in world consumer prices (corrected for autocorrelation).

*Annual percentage change data, 1955-74*

$$P_t = 2.95 + 0.06 R_t^S - 0.04 R_{t-1}^S + 0.10 R_{t-2}^S + 0.12 R_{t-3}^S + 0.23 R_{t-4}^S + 0.03 R_{t-5}^S \quad (7)$$

(0.74) (0.03) (0.04) (0.04) (0.05) (0.09) (0.11)

$$\bar{R}^2 = 0.89; \quad D-W = 2.32; \quad SEE = 0.96; \quad \rho = 0.49$$

Dropping the coefficients insignificant at the 95 per cent level, we obtain:

$$P_t = 3.43 + 0.07 R_{t-2}^S + 0.17 R_{t-3}^S + 0.17 R_{t-4}^S \quad (8)$$

(0.64) (0.03) (0.04) (0.07)

$$\bar{R}^2 = 0.89; \quad D-W = 2.36; \quad SEE = 0.98; \quad \rho = 0.56$$

All three independent variables are significant at the 99 per cent level, with the largest impact indicated by the coefficients for  $R_{t-3}$  and  $R_{t-4}$ . This finding points to an average lag of two and a half to three and a half years in the relationship between international reserves and world prices.

Again we used distributed-lag functions to further investigate the relationship between reserve changes in world-wide inflation. The evidence presented in Table 7 shows a mean lag of three and a half to four and a half years between percentage changes in reserves and percentage changes in world consumer prices. The estimated lagged relationship using quarterly data with reserves expressed in dollars is depicted in Chart 3. A zero constraint was imposed on the second-degree polynomials in the estimation procedure.

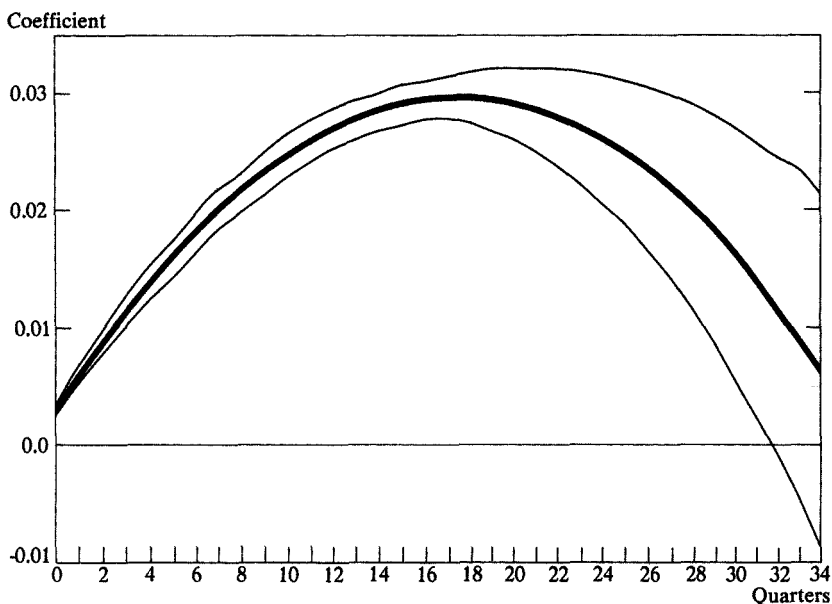
TABLE 7. MEAN LAG BETWEEN PERCENTAGE CHANGES IN RESERVES AND PERCENTAGE CHANGES IN CONSUMER PRICES <sup>1</sup>

Data Used on Percentage Changes in Reserves			Mean Lag	Standard Error	$\bar{R}^2$
Denomination	Period	Frequency	(In years)		
Dollar	1950-74	Annual	3.9	2.9	0.51
SDR	1950-74	Annual	3.6	2.8	0.49
Dollar	1958:I-1974:IV	Quarterly	4.4	1.2	0.82
SDR	1958:I-1974:IV	Quarterly	4.1	1.2	0.79

Source: Appendix.

<sup>1</sup> All lags were obtained by fitting second-degree polynomials to the lagged data. Annual lags of eight years and quarterly lags of 34 quarters were allowed. A near constraint ( $t-1 = 0$ ) was imposed for the quarterly calculations. The annual polynomial lags were unconstrained.

CHART 3. DISTRIBUTED-LAG EFFECT OF CHANGE IN WORLD RESERVES  
ON CHANGE IN WORLD CONSUMER PRICES



As a final check on the direction of causation, we estimated an equation where percentage changes in reserves were leading as well as lagging the observed percentage changes in world consumer prices. The estimated coefficients obtained on the limited data base 1954-70, owing to loss of observations, are presented in Table 8.

TABLE 8. MULTIPLE REGRESSION COEFFICIENTS OF PERCENTAGE CHANGES IN RESERVES VERSUS PERCENTAGE CHANGES IN WORLD CONSUMER PRICES, USING ANNUAL DATA

Reserve Changes	Coefficient	Standard Error
Lead by 4 periods	0.25	0.21
Lead by 3 periods	0.37	0.27
Lead by 2 periods	0.44	0.21
Lead by 1 period	0.02	0.22
Current period	0.16	0.16
Lag by 1 period	-0.06	0.09
Lag by 2 periods	0.08	0.07
Lag by 3 periods	-0.03	0.06
Lag by 4 periods	0.02	0.05

The regression coefficients with reserve changes leading price changes are all positive and sum to 1.08, while the coefficients for reserve changes lagging price changes have changing signs and sum to 0.01. Also, the coefficient for reserves leading by two periods (one and a half years) is significant at the 95 per cent level, and the coefficient for reserves leading by three periods (two and a half years) barely misses the significance test. On the other hand, none of the lagging reserve coefficients is close to being significant at the 95 per cent level.

On the basis of this evidence, we may conclude that the direction of causation is indeed from reserve changes to price changes rather than the other way round.

We have shown that there is reason to believe that there exists a significant lagged relationship between changes in international reserves and changes in the world price level. We will now examine the effect of the large reserve increases experienced during the early 1970s on the *structure* of world prices.

## **VI. International Reserve Changes and the Structure of World Inflation**

We will now investigate the hypothesis that the sharp increases in international reserves witnessed during the years 1970–72 also had an effect on the *structure* of world prices. Of particular interest is the relationship between prices of traded and nontraded commodities. Lacking an adequate index of the prices of nontraded goods, we will use the world-wide consumer price index as an indicator of general price developments and the world export and import price indices as indicative of price developments in the traded-goods sector.

Since World War II, prices of internationally traded goods have shown a marked stability and have generally exercised a restraining influence on domestic price developments. Only minor changes in world trade prices occurred between 1950 and 1969. It is one of the hallmarks of the recent world-wide inflation that this historic tendency has been upset. Table 9 illustrates the relatively greater changes in consumer prices compared with the prices of traded commodities during the 1950s and 1960s, while in the years since 1972 the rate of price change of traded goods has been greater than the changes in the consumer price index.

The reason for this change in the structure of inflation may be found in the role played by international reserves in the excessive monetary

TABLE 9. PERCENTAGE CHANGES IN WORLD CONSUMER PRICES, 1950-74

Years	Consumer Prices	Export Prices	Import Prices
Average, 1950-59	3.5	1.2	0.5
Average, 1960-69	4.4	0.6	0.6
1970	6.2	6.4	5.3
1971	5.9	4.0	6.0
1972	5.9	8.7	6.6
1973	9.6	24.8	24.8
1974	15.1	43.3	38.3

Source: International Monetary Fund, Data Fund.

expansion of the early 1970s. In virtually all earlier inflationary episodes, an excessive expansion of the domestic component of the monetary base was responsible for the creation of inflationary pressures. We have argued that the high rate of expansion of the international reserve component of the monetary base played a significant role in the recent inflationary process. This difference had several far-reaching consequences.

For one, international reserves have often played the role of a constraint to economic expansion. However, in the years 1970 to 1972, all the industrial and more developed countries registered an increase in international reserves except the United States and South Africa; only a few of the less developed nations experienced reserve losses, with most countries making substantial reserve gains. The industrial countries as a group increased their international reserves by 92 per cent, and the less developed countries increased theirs by 106 per cent during the first three years of the 1970s.

Such substantial reserve gains were not without influence on commercial policy. Between 1970 and 1972 out of a total of 111 members of the Fund, the number of countries with any restrictions on current account transactions decreased from 73 to 59. (See Table 10.) Other

TABLE 10. STATUS OF 111 FUND MEMBERS WITH RESPECT TO RESTRICTIONS ON CURRENT ACCOUNT TRANSACTIONS, 1969-72

Year	With Restrictions	Without Restrictions	Practice Not Determined
1969	73	35	2
1970	75	33	2
1971	58	43	9
1972	59	50	1

Sources: International Monetary Fund, *Annual Report on Exchange Restrictions*, 1970-73.

countries substantially reduced their import restrictions. The response by importers was not surprising: imports increased by an average annual rate of 12 per cent in *real* terms in the years 1970 to 1972. The plentiful supplies of international reserves fueled this world-wide import boom, but it is clear that this rate of real increase was not sustainable at constant prices. The index of world import prices almost doubled, rising from 100 to 195 in the period 1970–74 with most of the increase coming—as was to be expected—in the last two years of the period.

A further factor contributing to the inflation in traded-goods prices was that many international prices are quoted in dollars. Given the declining value of the dollar itself, many commodity prices looked very attractive indeed to foreign buyers, and consequently the quantity that was demanded increased.

The inflationary experience of the early 1970s was unique in that the international sector played a leading role in the initiation and dissemination of the inflationary impetus. This development was made possible by the lessening of the reserve constraint owing to the international liquidity increases experienced by virtually all countries.

## VII. Conclusion

In this paper we have argued that there exists a systematic relationship between changes in the world-wide aggregate of international reserves and the rate of world-wide inflation, with changes in the world money supply serving as the crucial link.

The evidence examined shows that changes in global international reserves have a significant impact on the aggregate world money supply. We determined that there is an average lag of about one year in this relationship.

It is a well-known proposition that changes in the national money supply play a role in determining the rate of national inflation. We established that there exists a similar relationship between changes in the world money stock and changes in world prices. The evidence indicates a mean lag of approximately one and a half years in this relationship.

Estimates relating changes in global international reserves directly to changes in world consumer prices found a significant lagged relationship between these two crucial variables. The mean length of the lag was determined to be two and a half to four and a half years. All



these lags are averages of distributed-lag relationships, and the standard errors vary between six months and three years, indicating that there is considerable variability in the estimated lag structure.

We also argued that the sharp increase in international reserves that helped to trigger the world-wide inflation of the early 1970s had an effect on the structure of the recent inflation. The increase in international means of payments in the hands of individual countries led to a world trade boom that resulted in a sharp increase in the prices of internationally traded commodities. In contrast to the post-World War II experience, the international sector represented an intensifying rather than a mitigating inflationary influence during the early 1970s.

While an increase in the U.S. dollar component of international reserves was the proximate cause of their increase in the early 1970s, there is little evidence that a monetary expansion that was more excessive in the United States than in other countries was responsible for this. Instead, a decrease in the demand for dollars as an asset by U.S. residents and private foreign entities alike resulted in a conversion of dollars into other currencies and a consequent expansion of the volume of foreign official dollar holdings in the form of international reserves.

While we have established that international reserve increases played a significant role in the recent world-wide inflation, it should be recognized that other factors played important roles as well. Nevertheless, the large increases in the world monetary aggregates created the scope for the translation of what might have been sectoral price increases into a world-wide inflationary surge. Had the same real changes taken place within a framework of global monetary restraint, the outcome would in all likelihood have been different.

While the volume of international reserves in existence has no direct effect on price levels, the changes in national monetary aggregates that accompany changes in international reserves do have a significant lagged impact on national and international price developments—unless national monetary authorities take appropriate actions to neutralize these induced monetary changes. An alternative is provided by a better control over international liquidity creation, so that the aggregate volume of international reserves may be expanded “in such manner as will . . . avoid economic stagnation and deflation as well as excess demand and inflation in the world.”<sup>22</sup>

<sup>22</sup> International Monetary Fund, *Articles of Agreement*, Article XXIV, Section 1(a) (Washington, 1969).

## APPENDIX

The international reserve data are percentage changes calculated by using the world totals provided in *International Financial Statistics (IFS)*. Data refer to changes in end-of-period stocks.

The world money supply and consumer price data are calculated as geometric averages of percentage increases in national money supplies; the 1970 dollar values of GDP are used as weights. In calculating the world average, it is assumed that missing country observations had the same value as the weighted average of the countries for which data were available. Money data refer to changes in end-of-period stocks, while price data refer to changes in period averages. For further information on the construction of the data, refer to the introductory section of *IFS*.

TABLE 11. ANNUAL CHANGES IN WORLD AGGREGATES: YEARLY DATA, 1951-74  
(In per cent)

Year	International Reserves in		World Money Stock	World Consumer Prices
	U.S. dollars	SDRs		
1951	0.8	0.8	9.7	10.6
1952	1.3	1.3	6.2	4.1
1953	3.8	3.8	5.8	1.4
1954	3.3	3.3	6.8	2.2
1955	1.8	1.8	7.1	1.5
1956	3.6	3.6	5.4	3.0
1957	1.1	1.1	4.5	3.7
1958	1.8	1.8	7.9	5.5
1959	-0.7	-0.7	7.5	2.7
1960	4.8	4.8	6.1	3.4
1961	3.5	3.5	8.6	2.7
1962	1.0	1.0	7.7	3.4
1963	5.7	5.7	10.7	4.3
1964	3.5	3.5	9.4	4.7
1965	2.9	2.9	9.5	5.0
1966	2.3	2.3	7.0	6.0
1967	2.1	2.1	10.9	4.8
1968	4.2	4.2	10.8	4.8
1969	0.8	0.8	7.8	5.1
1970	18.4	18.4	10.4	6.2
1971	41.0	29.9	13.0	5.9
1972	21.3	21.3	15.0	5.9
1973	15.0	3.5	12.9	9.6
1974	19.9	18.1	10.1	15.1

Source: International Monetary Fund, Data Fund.

TABLE 12. ANNUAL CHANGES IN WORLD AGGREGATES: QUARTERLY DATA, 1958-74  
(In per cent)

Period	International Reserves in		World Money Stock	World Consumer Prices	
	U.S. dollars	SDRs			
1958	I	1.04	1.04	4.7	4.1
	II	-1.11	-1.11	5.2	6.2
	III	2.62	2.62	7.1	5.1
	IV	5.53	5.53	7.9	4.9
1959	I	-12.39	-12.39	8.6	4.7
	II	3.86	3.86	9.3	2.0
	III	6.90	6.90	7.7	2.7
	IV	0.91	0.91	7.5	3.7
1960	I	-0.65	-0.65	6.1	3.3
	II	8.38	8.38	5.5	3.6
	III	6.07	6.07	6.2	3.1
	IV	3.22	3.22	6.1	2.1
1961	I	2.81	2.81	8.0	2.2
	II	4.27	4.27	8.8	1.9
	III	8.18	8.18	8.4	2.8
	IV	-1.21	-1.21	8.6	3.1
1962	I	-6.38	-6.38	7.4	3.8
	II	6.07	6.07	7.4	4.4
	III	-0.19	-0.19	7.7	3.8
	IV	4.06	4.06	7.7	3.7
1963	I	4.54	4.54	8.9	3.8
	II	6.23	6.23	9.8	4.0
	III	2.80	2.80	9.6	4.1
	IV	6.89	6.89	10.7	4.7
1964	I	-2.08	-2.08	9.0	4.8
	II	2.65	2.65	8.9	4.7
	III	3.26	3.26	8.9	4.5
	IV	10.44	10.44	9.4	4.8
1965	I	-4.16	-4.16	9.5	4.7
	II	2.94	2.94	9.7	4.9
	III	4.08	4.08	9.0	5.0
	IV	8.93	8.93	9.5	4.8
1966	I	-3.46	-3.46	9.8	6.1
	II	6.76	6.76	9.3	6.0
	III	0.49	0.49	8.0	6.2
	IV	5.32	5.32	7.0	6.0
1967	I	-7.77	-7.77	7.0	5.0
	II	5.17	5.17	7.8	4.6
	III	6.41	6.41	9.2	4.4
	IV	4.92	4.92	10.9	4.7
1968	I	-4.06	-4.06	8.4	4.9
	II	2.85	2.85	10.8	4.8
	III	1.69	1.69	9.9	4.9
	IV	16.31	16.31	10.8	5.0
1969	I	-11.33	-11.33	11.9	4.6
	II	10.53	10.53	9.9	5.3
	III	16.71	16.71	8.5	5.5
	IV	-11.88	-11.88	7.8	5.5
1970	I	18.13	18.13	8.0	6.1
	II	12.67	12.67	8.2	6.1
	III	14.73	14.73	9.9	6.0
	IV	23.70	23.70	10.4	6.3
1971	I	30.52	30.52	12.1	5.9
	II	22.00	22.00	13.4	5.8
	III	48.05	48.05	13.6	6.1
	IV	43.37	8.37	13.0	5.7
1972	I	25.15	25.15	13.5	5.6
	II	23.97	23.97	12.5	5.7
	III	17.54	17.53	13.0	5.8
	IV	12.54	12.54	15.0	6.3
1973	I	50.90	5.80	14.4	7.3
	II	8.53	8.53	15.5	8.9
	III	9.27	9.27	14.0	10.2
	IV	-9.38	-9.38	12.9	11.8
1974	I	8.45	8.45	11.4	13.8
	II	26.35	26.35	10.8	14.8
	III	21.03	27.84	9.5	15.6
	IV	18.58	5.86	10.1	16.1

Source: International Monetary Fund, Data Fund.