Report to the Congress

of the Commission on the Role of Gold in the Domestic and International Monetary Systems

March 1982

Volume I

THE SECRETARY OF THE TREASURY
WASHINGTON 20220

March 31, 1982

To the Congress of the United States:

On behalf of my colleagues and myself, I submit herewith the Report of the Commission, established pursuant to Public Law 96-389, to conduct a study to assess and make recommendations with regard to the policy of the U.S. Government concerning the role of gold in the domestic and international monetary systems.

The specific findings and recommendations presented in this report represent in each case the views of the majority of the Commission, with an identification of minority views or recommendations where appropriate. As should be expected in a group of individuals with such diverse backgrounds, philosophies and responsibilities as the members of the Commission, there have been differing opinions regarding many if not all of the issues and questions raised by the Commission. Thus, not every member subscribes to each observation or conclusion contained in the report, but with this reservation and the specification of minority views, the report represents the product of the Commission as a whole.

In forwarding this report, we acknowledge the wide public interest in the issues examined by the Commission and are grateful for the cooperation the Commission received from many individuals in testifying before us and submitting written statements of view. The statements received by the Commission from the public, in response to its request for testimony and written views, are summarized in an annex to the report. The detailed records of all Commission proceedings, including meeting transcripts, written testimony, staff memoranda and all papers circulated to the Commission, are catalogued in an annex to the report and will be available for public inspection at the Treasury Department library, the National Archives and Records Service and the Library of Congress.

We hope that this report on the role of gold in the domestic and international monetary systems will be of help to the Congress and the public in evaluating the spectrum of proposals advanced with the objective of restoring greater monetary and economic stability in the United States, an objective we strongly support. We regard it as an honor and a pleasure to have had the opportunity to contribute in this capacity to the continuing effort to find solutions to the nation's economic problems.

Respectfully,

Donald T. Regan

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ACKNOWLEDGMENT

The Members of the Commission express their sincere appreciation to Dr. Anna J. Schwartz for her assistance to the Commission in its examination of this important and complex subject. Her work in organizing the Commission's deliberations, in providing timely and expert analyses and in assisting the Commission in the preparation of this report demonstrated a high degree of professionalism and dedication, for which the Members are deeply grateful.

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Report of the Gold Commission

Introduction and Recommendations

Establishment of the Commission

We, the members of the Gold Commission, were appointed by Secretary of the Treasury Donald T. Regan on June 22, 1981, pursuant to section 10 of Public Law 96-389 (94 Stat. 1555), to "conduct a study to assess and make recommendations with regard to the policy of the U.S. Government concerning the role of gold in domestic and international monetary systems."* The Commission was directed to transmit its report to the Congress no later than October 7, 1981, one year after the date of enactment. Due to the change in Administration and the delay in appointment of members, it was not until July 16, 1981, that we met for the first time. We were in general agreement that a satisfactory report could not be prepared by the October 7 date. Accordingly, we requested an extension of the Commission's life. Legislation to that end was introduced to the Congress and enacted as P.L. 97-47 on September 30, 1981. The date for the report of the Commission was thereby changed to March 31, 1982.

Commission Meetings

We held 9 meetings, at two of which we heard testimony concerning gold from 23 witnesses, representing a wide spectrum of views on the potential roles of gold. They commented on the use and effectiveness of gold in past domestic and international monetary systems, and offered varying proposals for a restored role for gold, or favored the continuation of the present system with no role for gold. In addition to the hearings, the Treasury Department invited written statements on the role of gold from organizations and individuals. Summaries of the testimony we heard and of the statements submitted to us are reproduced in Annex B to the Report.

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*Congressman Chalmers P. Wylie -- Since many observers feel the Gold Commission became a "runaway" Commission in the Report, I would like to call special attention to the verbatim charge of Congress in creating the Commission. As the transcripts will show, many, many hours were spent debating issues which were extraneous to the Congressional assignment for the Gold Commission. The job assigned to the Gold Commission by Section 10(b) of Public Law 96-389 was as follows: "The Commission shall conduct a study to assess and make recommendations with regard to the policy of the United States Government concerning the role of gold in domestic and international monetary systems, and shall transmit to the Congress a report containing its findings and recommendations not later than one year after the date of enactment of this Act."

Contents of the Report

The body of our Report reflects the range of issues we discussed during our deliberations.

Chapter 1 surveys economic developments of recent years that were the background to the establishment of the Gold Commission.* A distinguishing feature of the period since the mid-1960s was rising and persistent inflation without precedent in peacetime in the United States. Public attention to the activities of the Commission reflects a desire for some institutional arrangements to ensure a reasonable approximation of price stability in an economy whose resources are relatively fully employed in a balanced and sustainable way. The chapter presents the factual record of the performance of the economy, and reviews explanations that have been offered to account for the lack of success of several attempts to curb inflation in the decade and a half from 1965.**

Chapter 2 examines the historical evidence on the experience of the United States with gold. In 1834, though legally on a bimetallic standard, de facto the United States adopted a gold standard. The chapter deals with successive changes since then in the character of our country's monetary system.

In Chapter 3, we explore the strengths and weaknesses of alternative monetary standards, including different versions of a gold standard, commodity standards other than gold, and the present inconvertible paper system. International aspects of the alternative standards receive attention.

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*Congressman Chalmers P. Wylie -- Chapter 1 surveyed economic developments from a monetarist perspective and did not emphasize adequately the role of Federal budget deficits and fiscal policy in creating the economic problems of the last fifteen years. Since section 3 of Public Law 96-389 specifically stated that "Congress reaffirms its commitment that beginning with Fiscal Year 1981, the total budget outlays of the Federal Government shall not exceed its receipts" this ommission of references as to the role of fiscal policy as a cause of inflation should not be overlooked. Indeed, the fact that the Federal Government is running a deficit of $100 billion while paying a comparable sum in interest on the total Federal debt detracts from the credibility and utility of this Report.

**Congressman Chalmers P. Wylie -- This chapter does not mention that the total Federal debt increased from $317 billion at the end of 1964 to $1,004 billion at the end of 1981. It also does not mention that the net interest paid by the United States Treasury on the total Federal debt in 1982 may well exceed 30 percent of the total Federal debt for 1964. In short, Chapter 1 does not present the factual record of budget deficits and thus does not adequately explain the performance of the economy during the last fifteen to twenty years.

In Chapter 4, we review the current role of gold and consider possible changes. In relation to domestic monetary arrangements, the changes would affect the conduct of Treasury or Federal Reserve operations or both. Such changes, if adopted, would also affect private sector conduct. In relation to the international monetary system, the changes would affect foreign exchange rate arrangements, the settlement of the balance of payments, and the International Monetary Fund.

For each possible change in the current role of gold, we discuss the main elements of the change, transitional problems, if any, potential legal and international implications, and assess the advantages or disadvantages it presents.

Chapter 4 also brings together material on the historical market for gold that was dominated by central banks until 1968, changes in the location and operation of gold markets since then, the allocation of the stock of gold between monetary and nonmonetary uses, determinants of the demand for and supply of gold, and approaches to the determination of the equilibrium price of gold. In addition, the chapter provides a retrospective view on the record of gold production over past centuries and its relation to trend movements in commodity prices. A statistical compendium gives time series of world and U.S. production and stocks of gold, world and U.S. industrial use of gold, and the nominal and real price of gold.

Aims of the Gold Commission

Part of our mandate is to assess the role of gold in the domestic and international monetary systems. Assessments differ among members of the Commission not only with respect to the costs and benefits in the past when our monetary system was linked to gold but also with respect to the prospective costs and benefits, were such a link restored. Given the size of the Commission that the Congress specified, and the diversity of our views, that result may not be surprising. We decided that the best service we could render the country would be to set forth in an objective way the complex issues involved and give a fair hearing to different points of view.

Another part of our mandate is to make recommendations. Though it became apparent to us during our deliberations that we would not be able to achieve a unanimous set of recommendations, on some issues, it was possible to form majorities. Even so, a majority vote in favor of a specific recommendation did not signify that all so voting had the same purposes and/or interpretations in mind. Moreover, if each of us had been reporting singly instead of as one of a body of colleagues, individual members would not necessarily have expressed themselves in precisely the way the recommendations are stated. Differences in wording, emphasis and perceptions would have been evident. In some instances our recommendations touch on technical matters, such as legal and tax considerations, that need to be studied more exhaustively than it has been possible for us to do. Such technical questions should be given attention in any Congressional hearings in connection with our recommendations.

Recommendations and Dissenting Views

We report our recommendations on the following subjects:

1. The program of Treasury medallion sales
2. Treasury issue of gold bullion coins
3. Treasury issue of gold-backed notes or bonds
4. The gold stock owned by the United States
   a. The public accounting for the gold stock
   b. The relationship between gold certificates held as an asset of the Federal Reserve System and the gold held by the Treasury
   c. The appropriate size of the gold stock
   d. The price at which to value the gold stock
   e. Managing the gold stock
5. Domestic monetary policy arrangements*
6. International monetary policy arrangements*

With respect to most of these subjects, we first present the range of views expressed in our deliberations, followed by the Commission's recommendation. Dissenting views are given in footnotes.

1. The program of Treasury medallion sales

In July 1980, the Treasury began the sale of half-ounce and one-ounce gold medallions in accordance with the American Arts Gold Medallion Act of November 10, 1978 (P.L. 95-630). The legislation provided that not less than 1 million ounces of gold be struck into medallions each year for a five-year period and sold to the public at a price covering the market value of their gold content plus all costs. A different American artist is commemorated on each of the two sizes of medallions. In 1980, Grant Wood was honored on the one-ounce and Marian Anderson on the one-half ounce medallion. In 1981, Mark Twain was honored on the one-ounce and Willa Cather on the one-half ounce medallion. Under the 1980 program covering the period July 15, 1980, through February 28, 1981, less than 300 thousand medallions of each size were sold, containing 434 thousand gold ounces. Under the 1981 program, from July 15, 1981, through March 5, 1982, about 60 thousand medallions of each size were sold, amounting to 95 thousand gold ounces.

The price of the medallions varies daily with the market price of their gold content, based on the settlement price at the end of the previous day for spot gold traded on the Commodity Exchange of New York, plus a surcharge in 1980 of $12 and in 1981 of $14 per ounce to cover

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*Congressman Chalmers P. Wylie -- Omission of the phrase "the role of gold in" before "monetary policy arrangements" in items 5 and 6 clearly was technically appropriate considering the material included in that section but inappropriate given the charge to the Commission by the Congress as to what should have been discussed.

Governor J. Charles Partee -- I wish to be associated with this view.

the cost of production and marketing. The surcharge averaged under three percent of the underlying gold price.

The Bureau of the Mint sells the medallions directly to purchasers through mail orders placed at U.S. post offices. Delivery is made within six weeks.

The Treasury Department is planning a simpler and wider distribution of the medallions to be introduced this year through a network of dealers. Although details are not yet finally decided, the expectation is that sales to dealers will be made on the basis of the daily New York gold price, plus a three percent markup to cover costs including publicity by the Mint. The dealers would add a comparable fee in selling to the public and develop a secondary market for the medallions.

Recommendation. The Gold Commission supports the improvement of the program of medallion sales along the general lines that the Treasury plans.*

2. Treasury issue of gold bullion coins

In addition to gold medallions we discussed proposals for a Treasury issue of gold bullion coins of specified weights to be offered to the public at a price near market value.

Among those who support the proposal, two conceptions of the character of the demand for such coins are evident. Some of us expect the demand for such coins to be an investment demand, similar to the demand for Krugerrands, Maple Leafs, Mexican pesos, and other foreign coins that have found a market in this country. Others expect the demand for such coins to be (or have the potential to be) a demand for their use as money. Their value would change from day to day as the value of the gold content of the coin fluctuated in the free gold market.

Some advocates of this proposal see such coins as facilitating development of a dual monetary system, which would impose an additional degree of discipline on discretionary operation of monetary policy.**

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*Governor J. Charles Partee -- The procedures by which gold medallions are marketed can be substantially improved as an interim measure, but the program should be discontinued when and if the Commission's gold coin recommendation is implemented.

Mr. Arthur J. Costamagna -- I voted for this recommendation on the understanding that the new program would not increase fees charged to the consumer.

**Congressman Henry S. Reuss -- I disagree. A dual monetary system would impose chaos, not discipline, on monetary policy.

Governor Henry C. Wallich wishes to be associated with Governor Partee's and Congressman Reuss' views above.

However, those opposing the proposal believe that ample supplies of gold in forms other than Treasury coins are available to satisfy the demand for gold in the private sector.*

So that the new issues may compete with foreign coins, some proponents advise that the former be designated legal tender and as coin of the realm bearing the great seal of the United States and the motto "In God We Trust." In addition, they advise that changes in the dollar value of these coins should be exempt from capital gains taxation.

A Treasury issue of gold bullion coins involves technical matters, on some of which the Commission has adopted recommendations. Congress should explore the following considerations more thoroughly than was possible in our deliberations.

(a) Consideration of a quantity limit on the issue of the coins. This reflects concern that the demand for the coins might exhaust the Treasury gold stock. One approach would be to specify a quantity limit in any legislation to permit coinage. An alternative means of limiting the demand would be to set a seignorage fee well in excess of costs of minting.** Some who believe the demand for coins would be a demand for money oppose a limit. They would view large scale demand as an indication of public dissatisfaction with the management of the (dollar) money supply and as leading to de facto establishment of a gold coin standard.*** According to this view, establishment of an arbitrary quantity limit or a high seignorage fee would interfere with this expression of public preferences. A few others of both persuasions

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*Congressmen Henry S. Reuss and Chalmers P. Wylie -- We find this sentence to be an inadequate summary of our views in opposing the gold bullion coin and refer the reader to our dissenting views for an authoritative statement of the harm for the economy if this proposal were to be enacted.

**Congressman Chalmers P. Wylie -- A little known fact about gold bullion coins and other gold coins is that the gold alloys used in coinage are several times harder than silver, nickel, and copper alloys. The consequence of this is that entirely different machinery has to be used for making gold coins than regular coins. This waste and cost should be avoided.

***Congressman Chalmers P. Wylie -- Inadequate demand for the gold medallions produced by the Treasury for the Arts Medallion program has left the Treasury with many millions of dollars of unsold medallions. Concern about waste in government forces me to caution readers about the fiscal perils of forcing the Mint to turn our official gold bullion into gold bullion coins when there isn't any evidence of enough demand to absorb the official medallions we have been producing for the public for several years. At least, the gold medallion program should be discontinued, if we are to start producing gold bullion coins in accordance with Commission's recommendation.

Governor Henry C. Wallich wishes to be associated with Congressman Wylie's view.

favor Treasury purchases of gold to replace gold it has coined.* Those who believe the demand for coins would be an investment demand assume that it would not be quantitatively significant, and on this ground would neither oppose nor support a legislated limit.

(b) Enabling legislation to mint coins. Section 5 of the Gold Reserve Act of 1934 (31 U.S.C. sec. 315b) prohibits the minting of United States gold coin.

(c) The implications of legal tender status for newly minted coins. Treasury Counsel prepared for us a statement on this matter related to U.S. currency (see Annex C). Legal tender status essentially requires that, in any contract that does not otherwise specify the means of payment, a debt can be discharged by the tendering of any form of U.S. legal tender, and the creditor must accept that form of payment in full discharge of the debt. However, whenever a contract specifies a specific means of payment, such as gold, and the debtor breaches that provision and is taken to court by the creditor, the court, as in most cases of contractual breach, normally awards damages rather than specific performance of the contract provision.

For some who regard the demand for coins to be an investment demand, legal tender status is an adornment for coins, but nevertheless a sine qua non for generating public acceptance of them.**

For some who regard the demand as a demand (or a potential demand) for money, the implications of legal tender status require further consideration.*** Legal tender status for gold coins could compel their acceptance by private creditors for debts or by the

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*Mr. Herbert J. Coyne -- While I do not believe using one to two million ounces of our gold stock for a gold coin program would make excessive inroads into these stocks, any open-ended production of coins could in effect amount to unlimited Treasury gold auctions. Clearly most Commission members do not desire this. Thus, I believe the Treasury should purchase gold in the open market to replace any larger amount of gold used in minting a U.S. gold coin or to refrain from minting any larger quantities.

**Congressman Chalmers P. Wylie -- I do not believe an adornment can be a sine qua non.

***Congressman Chalmers P. Wylie -- This will be our first coin without legal tender status. It should have legal tender status or not be called a coin.

I had the Congressional Research Service summarize the laws of Canada and South Africa pertaining to the legal tender status domestically of their own gold coins which are useable in commerce in their country of origin. Their experience should be considered in evaluating questions pertaining to legal tender status for the gold bullion coins. The summaries by CRS can be found in an appendix to the "Dissenting Views of Congressmen Henry S. Reuss and Chalmers P. Wylie."

Treasury in satisfaction of taxes. Formidable problems, involving potential profits and losses to private creditors and debtors, could arise in assigning gold coins legal tender status at a fluctuating market value.

(d) The implications of capital gains exemption for changes in the dollar value of coins (a background paper on capital gains taxes prepared by the Treasury is part of the permanent record of the Gold Commission). Advocating such exemption for coins but not for gold bullion holdings or, for that matter, not for productive investments overlooks the inducement the exemption would provide to shift from such other assets to coins. Those who support the exemption, however, regard it as essential to the use of the coins as money. Legislation to prohibit local government imposition of sales taxes would involve similar considerations. It would clearly also deprive the states of a source of revenue.*

(e) Issues by private mints. The majority of us oppose private minting of official United States coins. We regard the production of "official" coins of a country as a governmental function. The government in effect guarantees the weight and fineness of the "official" coins issued. Private firms are perfectly free to mint gold pieces of any shape and size, so long as they do not purport to be United States coins with a U.S. Government guarantee of weight and fineness. Permission for private firms to mint U.S. coins would open possibilities for fraud and could involve the Treasury in a new and costly regulatory and monitoring function. Problems would be compounded if the Treasury had a convertibility obligation or an obligation to accept the coins in payment of taxes.

(f) Convertibility at Treasury of gold bullion coins. Of those favoring issue of coins, about half support assumption by the Treasury of an obligation to stand ready to purchase coin offered to it at the market price ** on the day of redemption, the conversion producing potential profits (or losses) for the Treasury.

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*Congressman Henry S. Reuss -- An October 5, 1981, bill, S.1704, cosponsored by Senator Helms, provides for the minting of gold coins exempt from U.S. and state capital gains taxes -- exactly as in the Gold Commission's recommendation below, which is supported by all of the Reagan Administration's Gold Commission members. Senator Helms' National Congressional Club expended $4.5 million on the 1980 Reagan campaign (see Congressional Quarterly, March 6, 1982, pp. 499-505).

**Congressman Chalmers P. Wylie -- "Market price" is determined in unique ways for gold which should be studied carefully before obligating the Treasury to convertibility with its potential for losses to the Treasury.

Congressman Henry S. Reuss -- In other words, about one-third of the Commission supports this dangerous proposal which could provide exhorbitant trading profits to those foreign interests who fix the gold price.

Recommendation. We favor Treasury issue of gold bullion coins of specified weights, and without dollar denomination or legal tender status, to be manufactured from its existing stock of gold and to be sold at a small mark-up over the market value of the gold content, and recommend that the Congress implement this proposal. Furthermore, we recommend that the coins shall be exempt from capital gains taxes and that the coins shall be exempt from sales taxes.*

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*Congressmen Henry S. Reuss and Chalmers P. Wylie -- We object strongly to this recommendation and call the reader's attention to a statement of objection to the recommendation signed by 30 members (two-thirds) of the House Committee on Banking, Finance and Urban Affairs. The recommendation ignores national problems of diminishing incentives for productive investment in plant and equipment, of confusion over what is and is not money, and of depriving states of the revenue needed to cover obligations enhanced by Federal cutbacks.

Governor Henry C. Wallich -- I would not object to a gold coin issued with a mark-up at least equal to that applying to coins like the Maple Leaf and the Krugerrand, issued in limited quantities, and subject to capital gains tax. In the absence of these specifications, a gold coin could lead to excessive depletion of the Treasury gold stock and harmful diversion of resources to unproductive investment. I also oppose convertibility of the coin at the Treasury.

Governor Emmett J. Rice wishes to be associated with Mr. Wallich's view. With respect to convertibility, no support for convertibility at Treasury of gold bullion coins was ever explicitly voted for the record. An amendment by Congressman Reuss to include specific mention in the recommendation on the issue of gold coins that such coins should not be convertible into dollars on demand at the Treasury was voted down, but one cannot necessarily infer from this that those who rejected the Reuss amendment supported the assumption by the Treasury of an obligation to stand ready to purchase coin offered to it at the market price on the day of redemption.

Governor J. Charles Partee -- I seriously doubt that the proposed gold coin should be exempted from capital gains taxes. Careful and detailed study is needed, not only of the equity considerations involved in such singular treatment, but also of the possibilities for unwanted speculative maneuvers involving the new coin in conjunction with other forms of gold and precious metals holdings. Such uses could in fact destroy the coin's value as a monetary indicator.

Congressman Henry S. Reuss -- This tax exemption proposal was adopted at the February 12 Gold Commission meeting, 8-6. Jerry Jordan, who cast in person and by proxy the decisive votes in favor, has since testified that he was merely recommending that Congress "consider" the tax exemption question. (See transcripts, Joint Economic Committee, February 18; Gold Commission, March 8.)

Mr. Arthur J. Costamagna -- Since a majority (9 to 6) rejected the idea that "such a coin should not be convertible into dollars on demand at the Treasury," by implication, I believe, a majority favored convertibility or redeemability of the gold coins at the Treasury.

3. Treasury issue of gold-backed notes or bonds

Several witnesses at the hearings we conducted suggested that Treasury issue of gold-backed notes or bonds would be a means of introducing gold into our monetary system. A limited issue, for example, of five-year Treasury notes with interest and principal payable in grams or ounces of gold, would provide deferred claims on gold. Initially, according to the advocates, the yield spreads between gold and inconvertible dollar obligations of the same maturities might be wide. Success in restoring long-term confidence in monetary discipline would eventually narrow the yield spreads. At that time, full gold convertibility of all dollar obligations might be contemplated. These witnesses emphasized the savings on interest payments by the Treasury, assuming the price of gold remained stable or rose only moderately, and hence a positive effect on Federal budget deficits.

In our deliberations, it was noted by opponents of gold-backed Treasury securities that a gold-backed Treasury note or bond, if convertible at maturity at the market price of gold at the date of issue, would in effect be a warehouse certificate for gold. Such an instrument would provide the owner the same chance of gain or loss as owning gold, without his incurring the cost of storage and insurance. No obvious guideline exists for pricing the instrument. A Treasury issue of gold-backed notes or bonds, paying even a low rate of interest, would permit speculation on gold with a sweetener of a coupon. Such issues would be comparable to a bond convertible into the common stock of a corporation that has a low coupon because of the possibility of speculative gain. Purchase of Treasury gold-backed issues would indicate an expectation that the price of gold would rise. The Treasury would then be betting against the market, with no assurance of gain and a major risk of Treasury losses. From a debt management viewpoint, no need exists for gold-backed Treasury issues.

Recommendation. We oppose the issue of Treasury gold-backed notes or bonds.

4. The gold stock owned by the United States Government

As of the end of February 1982, the Treasury Department reported that it held 264 million troy ounces of gold. The bulk of the gold is

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*Continuation from previous page.

Mr. Herbert J. Coyne -- The majority recommendation was made under the misimpression that making the U.S. gold coin legal tender would have made it money of the realm and usable in the payment of debts. The purpose of designating a U.S. coin "legal tender" is to allow it to compete equally with the foreign coins that are currently supplying the U.S. market. Popular foreign coins are designated legal tender and therefore a U.S. coin must be similarly designated in order to be successful. I recommend that the U.S. Congress consider this market fact when designing the U.S. gold coin.

stored in mint depositories: Fort Knox, Kentucky, and West Point, New York; U.S. Assay Offices in New York and San Francisco; and the Denver and Philadelphia Mints. In addition, the Federal Reserve Bank of New York is the custodian of a part of the gold stock.

a. The public accounting for the gold stock

Citizens have written to us expressing concern about alleged unauthorized large withdrawals from gold depositories. They fear that the actual amounts held by the Government are less than are reported officially. Stories in the press also have referred to missing gold.

Public and Congressional inquiries relating to the accuracy of the accounting records and security of the gold stock were directed to the General Accounting Office (GAO) in the early 1970s. In response, the GAO conducted a partial audit of the gold stored at Fort Knox in September and October 1974. In its report on the audit, the GAO recommended cyclical audits of the gold in the custody of the Bureau of the Mint.

During fiscal 1975, at the direction of the Secretary of the Treasury, the Fiscal Assistant Secretary of the Treasury established the Committee for Continuing Audits of United States Government-owned Gold stored at various depositories, with the responsibility to conduct audits at appropriate intervals. The Committee consists of one representative each from the Bureau of the Mint, the Bureau of Government Financial Operations, and the Federal Reserve Bank of New York, with GAO representatives invited to observe the audits. As of February 1982, 80.5 percent of the U.S. Government-owned gold had been audited and verified. The continuing audit program is planned to provide a complete audit of all U.S. Government-owned gold by the end of the 10-year cycle in 1984.

The Treasury has provided us with a detailed statement of the results of the continuing audit (see Annex D). With one or two exceptions, we are satisfied with the Treasury's continuing audit, find it thorough, and believe it should allay any public concern with regard to the accuracy of the inventory, the related accounting records, and the internal controls governing the depositories. One of us, however, expressed a preference for a speedier completion of the audit.

One member is not satisfied with an audit that spans ten years and contends that 31 U.S.C. 354 appears to require annual audits of the gold inventory. He disputes the Treasury's view that a 100 percent audit in a single year is not feasible, since on its own estimate of manpower requirements, 26 men could do it. The Treasury has provided us with an opinion that 31 U.S.C. 354 requires not annual audits but annual settlements of account, which are being performed regularly in compliance with this provision.

Recommendation. We are satisfied that the Treasury is meeting the requirements of 31 U.S.C. 354 regarding annual settlements of account

and that the Treasury's continuing audit of the Government-owned gold stock provides an adequate basis for full verification of the accuracy of inventory records.*

b. The relationship between gold certificates held as an asset of the Federal Reserve System and the gold held by the Treasury

Some citizens have expressed the view that for the Treasury to claim ownership of the gold stock and the Federal Reserve System to show gold certificates as assets appears to be double-counting of the same asset.

The gold is the property of the U.S. Government. The certificates do not represent Federal Reserve ownership of the gold.

Gold certificates, which are valued at $42.22 per ounce of gold, and are a liability of the Treasury, are issued to the Federal Reserve by the Treasury against its gold holdings. The certificates represent a Federal Reserve claim on the assets of the Treasury, for which the Treasury has received a counterpart deposit in its account with the Federal Reserve.

All gold held by the Treasury has been monetized in this fashion. New gold certificate credits may be issued only if additional gold is acquired by the Treasury or the statutory price at which gold certificates may be issued is increased. Similarly, gold certificates must be retired by the Treasury upon the sale of gold, with a corresponding decline in the Treasury's deposit balance.

Recommendation. We believe that the Treasury and Federal Reserve are following appropriate procedures in reporting Federal Reserve claims on the Treasury represented by gold certificates and payable in dollars.

c. The appropriate size of the gold stock

At year-end 1949, the U.S. gold stock was a little over 700 million fine troy ounces. At year-end 1967, the stock was about 50 percent smaller -- 345 million ounces. As already noted, it is now 264 million ounces.

One question we discussed was the appropriate size of the gold stock -- a non-interest bearing asset of the Treasury. All of us agree that a zero stock is not the appropriate size and therefore oppose auction sales which are intended to dispose of Treasury holdings over some stated period of years.

A minority prefers that the Treasury maintain the stock at its present level as an important strategic and monetary resource. This

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*Congressman Ronald E. Paul -- The Treasury should assign adequate manpower to complete a 100 percent audit of the gold stock every year.

view is consistent with the belief that an increase in the monetary role of gold is not now timely but the stock should be held as a reserve for possible future use, should a restored role for gold then appear feasible, or against other contingencies. In support of this view, it was suggested to us that should an international monetary conference of free world nations be convened to recommend changes in the international monetary system, it would be useful for the United States to hold a substantial gold stock to influence possible future deliberations and to be in a strong position if gold's role were reestablished.

A variant of that view, held by the majority of us, is that some depletion of the gold stock, for example, for the issue of medallions or the recommended program of coinage, is acceptable but to a limited extent only.

Recommendation. We recommend that, while no precise level for the gold stock is necessarily "right," the Treasury retain the right to conduct sales of gold at its discretion, provided adequate levels are maintained for contingencies.*

d. The price at which to value the gold stock

The Treasury currently values the gold stock it holds at $42.22 per ounce. Since the free market in gold was established in 1968, the price has fluctuated between $35 and $850 per ounce. It has recently been priced at under $350 per ounce.

One argument for revaluing the gold stock at a price closer to the market price is that it would enable the Treasury to raise revenues by sale of part of its gold. The revenue could be used to retire debt, thus saving interest payments on outstanding Treasury securities, or to finance the current Federal budget deficit. All these objectives are attainable simply by selling gold at the market price, and so there is no cogency to this argument for revaluing the gold stock. The same comment applies to the suggestion that an advantage of an international agreement to value gold at the market price is that it might be a step toward gold becoming an accepted

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*Mr. Herbert J. Coyne -- I favor the recommendation that was initially voted for by a larger majority of Commission members than the one that was passed. I believe this first recommendation more closely represents the sentiments of the Commission: "We are opposed to auction sales of gold stock held by Treasury and recommend that under circumstances such as those that presently exist, the stock be maintained at its present size."

Governor Henry C. Wallich -- While I would not rule out the sale of the gold stock when a particular situation may urgently require it, as a general rule the Treasury should avoid sale of the gold stock. Under circumstances such as those that presently exist, the gold stock should be maintained at its present size.

Mr. Arthur J. Costamagna -- The Treasury should retain the right to conduct purchases and sales of gold at its discretion.

international medium for payment of balance of payments disequilibria, and that it could also be used for intervention purposes in foreign exchange markets to influence the exchange rate of the dollar.

Another argument is that it is unrealistic to value the gold stock at an outdated fixed price. Doing so distorts the true significance and cost of the U.S. gold asset position.

We regard the choice of a price at which to revalue gold reserve assets as independent of a decision on the price at which to restore a gold standard. One proposal was made during our deliberations for a gradual increase in the statutory price of gold to a price closer to the market price. The proposal was incidental to a plan to require gold certificate reserves be kept behind Federal Reserve notes. No other proposal with respect to the determination of a price at which to revalue gold reserve assets was brought to our attention.

Recommendation. The Commission recommends that the Treasury and the Federal Reserve conduct studies of issues that would be involved in a move towards valuing gold realistically, at something more closely approximating market prices. The change should be subject to the legislative constraint that the proceeds of this new valuation not be monetized by the Treasury or in any way used to enhance the government's spending power. The studies should develop a formula and timetable for valuing U.S. gold stocks in a manner realistically related to gold market value.*

e. Managing the gold stock

One general proposition that we examined is the desirability of finding constructive uses of the gold stock rather than keeping it immobile, as is currently the case. Specific suggestions we considered included:

(1) The United States should offer swaps, leases and make other commercial arrangements with respect to its gold stock in order to generate a modest revenue flow.

(2) If revalued, gold should be used for intervention purposes in foreign exchange markets and for the settlement of the balance of payments (see subject 4d. above).

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*Governor Henry C. Wallich -- Any revaluation of the gold stock carries with it the danger of an inflationary use, directly or indirectly, of the resulting gold profit. Repayment, from this source, of part of the Federal debt poses the same temptations as would a more direct use of the profit for government expenditure. Revaluation close to the present market price further raises the question of what should be done if the market price should fall below the official price.

Governor J. Charles Partee -- Any such study must give important weight to the need for retaining ample central bank flexibility in meeting the "lender of last resort" function while at the same time avoiding unwanted overall monetary expansion. This requires the maintenance of an adequate stock of portfolio assets that could be sold as any such loans are booked.

(3) The Federal Reserve System should engage in open market operations using gold as well as government securities.

In our discussion of the general proposition, it was noted that the proposed uses were not easy to assess and the advantage of turning to unconventional uses of gold was not obvious.

Moreover, if any of the suggested uses of gold yielded a profit, use of the profit to retire public debt or to spend it for budgetary purposes might encourage fiscal imprudence.

Recommendation. We do not favor unconventional uses of the gold stock, since the objectives sought by adding gold to the policy instruments of the monetary and fiscal authorities are attainable without such use and the side effects of so using gold may be undesirable. We do favor continued study of the role of gold in the monetary system and recommend that Congress hold hearings on the subject.*

5. Domestic monetary policy arrangements

Currently, transactions in gold are not used in the implementation of monetary policy by the Federal Reserve System. Gold certificates are carried as an asset of the Federal Reserve and therefore comprise one element in the sources of the monetary base. However, the Federal Reserve does not use its holdings of these certificates as a device for changing the base.

We considered a number of alternatives that would serve to reintroduce gold into our domestic monetary policy arrangements. The

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*Mr. Herbert J. Coyne -- The Federal Reserve and the Treasury should conduct studies to consider different ways in which gold can be used as a helpful policy instrument. It seems implausible to keep our vast stocks of gold completely idle, if worthwhile uses can be developed which do not entail depleting those stocks.

Governor Henry C. Wallich -- I do not favor unconventional uses of the gold stock and would regard continued study and Congressional hearings on the role of gold in the monetary system as an unproductive use of government resources and a potential source of market unsettlement.

Governor Emmett J. Rice -- I believe that little would be gained from further study of the role of gold in the monetary system. The Commission has examined a variety of possible roles for gold in the monetary system. The Commission's recommendations state that it sees no merit in issuing gold-backed bonds, does not favor unconventional uses of the gold stock, does not regard restoring a gold standard as a fruitful way to deal with inflation, and does not favor change in the usage of gold in exchange rate arrangements. It would appear inconsistent to reach these conclusions and then call for further study of presumably these same "roles."

Congressman Henry S. Reuss -- I agree with Governors Rice and Wallich.

objective would be to improve monetary control through the discipline of gold for the purpose of reducing inflation. Linking changes in the growth rate of money or of some component of money, such as Federal Reserve notes, or of bank reserves, to the change in the gold stock is one approach which was considered for imposing the discipline of gold.

One way to reintroduce gold would be to require the Federal Reserve System to maintain a minimum ratio between the U.S. Government's gold stock and the Federal Reserve monetary base (i.e., Federal Reserve notes plus bank reserves) or some monetary aggregate. A variant would fix upper and lower limits to the ratio, so that the System would be required to take expansionary actions when the ratio was at its upper limit, or contractionary actions when the ratio was at its lower limit. The gold cover requirement might be valued at the price of $42.22, or adjusted gradually, or allowed to fluctuate with market prices.

Along traditional gold-standard lines, the United States could define the dollar as a specified weight of gold (that is, fix the price of gold), set gold cover requirements for the Federal Reserve System, and allow the value of the gold stock to be determined by domestic and international gold flows. If the value of the gold stock rose through an inflow of gold, the Federal Reserve would be required to undertake actions to expand the money stock. If the value of the gold stock declined, it would be required to take contractionary actions.

Most members of the Commission believe that a return to the gold standard is not desirable. Even if that were not our view, for most of us there are two major problems in contemplating the feasibility of a return to a domestic gold standard. One is the absence of a sound guide on how to determine the fixed dollar price of gold at which resumption of a gold cover requirement could be introduced. The other one is the absence of a sound guide on the extent of feasible convertibility of domestic dollar obligations.

Since the decade of the 1970s, not only in the United States but also in other industrialized nations, monetary authorities have experimented with self-imposed rules of conduct of monetary policy, sometimes expressed as target rates of growth of money. Long-term monetary discipline, not linked to gold, has been the objective. A variant of this approach would impose such discipline by legislative prescription, that is, a monetary rule.

Although some objection was expressed to consideration of domestic monetary arrangements not linked to gold as overstepping the Gold Commission's mandate, in fact we discussed all the foregoing alternatives.* In addition, we considered continuation of our present

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*Governor Henry C. Wallich -- No data or studies were presented, however, for this part of our discussion, nor did the discussion cover such aspects as the definition of the money to be targeted, the

domestic monetary arrangements, under which the Federal Reserve exercises full discretion with respect to monetary actions and chooses the ranges of growth in a variety of monetary aggregates, which it believes appropriate to the economy's needs and proposes to seek, reporting to several Congressional committees both its plans and their results.

Recommendation. The Commission recommends that the Congress and the Federal Reserve study the merits of establishing a rule specifying that the growth of the nation's money supply be maintained at a steady rate which insures long-run price stability. In addition, the Commission concludes that, under present circumstances, restoring a gold standard does not appear to be a fruitful method for dealing with the continuing problem of inflation. The Congress and the Federal Reserve should study ways to improve the conduct of monetary policy, including such alternatives as adopting a monetary rule.*

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techniques by which such targeting would be conducted, nor the effects of stable money growth on prices, incomes, and employment.

Governors Partee and Rice wish to be associated with Governor Wallich's comment.

*Governor Henry C. Wallich -- The Commission's mandate was to assess "the role of gold in domestic and international monetary systems." The only part of the recommendation that focuses on gold, and with which I agree, is the conclusion that restoring the gold standard does not appear to be a fruitful method of dealing with the continuing problem of inflation. The remainder of the recommendation deals with aspects of economic policy that are outside the Commission's terms of reference, and I, therefore, oppose this recommendation.

Governors Partee and Rice and Congressman Wylie wish to be associated with Governor Wallich's view. Congressman Wylie raised a point of order against the first and third sentences as being not germane.

Congressman Henry S. Reuss -- Since the Gold Commission's jurisdiction (P.L. 96-389) is concerned only with "the role of gold," the first and third sentences in this recommendation, commenting about a monetary rule, are outside the Commission's jurisdiction. In addition, the first and third sentences are redundant.

Governor Emmett J. Rice -- Besides being outside the mandate of the Commission, this recommendation does not recognize that the Federal Reserve already specifies ranges for the annual growth of money and bank credit aggregates with a long-term objective of promoting sustainable economic growth in a noninflationary environment. Adoption of and adherence to a rigid rule of a predetermined percentage rate of monetary growth to be achieved (if at all possible) regardless of developments in the economy would likely lead, in my judgement, to price and output instability.

*(Continued)

Congressman Stephen L. Neal -- I offered the following resolution:

"Whereas the majority of those who supported the creation of the Gold Commission did so with the hope of finding a method for better insuring consistent and persistent price stability** and;

"Whereas the inflationary process is ultimately related to excessive growth in money*** and;

"Whereas it is clear that inflation cannot persist over the long run in the absence of excessive monetary growth then;

"The Commission recommends that the Congress by legislation establish a rule specifying that the growth of the nation's money supply be maintained at a steady rate which insures long-run price stability."****

The members were evenly split on the vote for the resolution.

**Congressman Chalmers P. Wylie -- The preamble to the resolution is not a correct statement. The reader is referred to the Congressional Record of September 18, 1980, pages H9136-7 for the entirety of the House debate establishing the Gold Commission. Neither the concept of inflation nor the phrase "price stability" were mentioned in connection with the establishment of the Gold Commission.

***Congressman Chalmers P. Wylie -- I would like the record to show that I feel that our inflation problems since about 1965 are ultimately related to excessive Federal spending and to persistent deficits in the Federal budgets, rather than "excessive growth in money," as the resolution states.

****Governor Henry C. Wallich -- I am opposed to this resolution because it is outside the mandate of the Commission. The Commission, moreover, did not have before it facts or analyses upon which to base a recommendation, nor did it discuss the merits of a rule for monetary policy. My effort to introduce material to document the instability of the velocity of circulation of money and, therefore, the unworkability of a rule, did not lead to discussion of this evidence. Establishment of a fixed rule for monetary policy would invite the danger of destabilizing output, employment, prices, and the international value of the dollar.

Congressman Stephen L. Neal -- The merits of a monetary rule regulating the growth of the money supply have already been extensively studied and debated. Moderate and steady growth of the money supply is necessary, over the long run, for price stability, low interest rates, robust productivity, and full employment. The monetary history of the past decade suggests the need for a legislated rule to enforce monetary restraint. We need to enact such a rule, not endlessly debate its merits. Accordingly, I proposed the resolution quoted above, on which the Commission is evenly split. While I support the recommendation finally adopted by the Commission, I

6. International monetary policy arrangements

We discussed a number of aspects of international monetary arrangements during our deliberations.

Under present conditions, the exchange rate of the dollar is determined in foreign exchange markets by the demand for and supply of dollars and also by the demand for and the supply of other currencies. The foreign exchange value of the dollar floats, changing from day to day as market influences (or government interventions) determine.

Adopting a gold standard with a fixed price of gold in terms of dollars would fix exchange rates between the dollar and the currencies of those of the United States' trading partners that also fixed the price of gold in terms of their currencies. Those who support a system of fixed parities argue that it facilitates international trade and finance and, along with convertibility of the U.S. dollar to gold, would promote the goal of internal price stability.

Under present conditions, deficits or surpluses may be observed in our balance of payments, and the deficits or surpluses are settled in dollars automatically. Even though dollars are not convertible into gold at a fixed price, they are convertible into U.S. goods and services including gold at market prices. Other countries and their residents continue to use dollars as an intervention currency in foreign exchange markets, in payments and receipts for international transactions, and as a reserve asset. We do not use our gold in payments and receipts for international transactions and neither do our trading partners.

Most of us believe that even if other countries with substantial gold stocks and the major gold-producing countries were to agree with us on a restoration of an international gold standard, the United States -- and the system as a whole -- would confront an as yet unsolved problem of the vast quantity of dollars world-wide with potential claims to gold convertibility. We are not in fact aware of international interest in restoring a gold standard. Indeed, a number of foreign officials have expressed negative views towards a gold standard.

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think that, by recommending more study rather than outright enactment of a monetary rule, we missed a golden opportunity to help secure long-term price stability, low interest rates and high employment. I intend to continue my efforts to enact a monetary rule through legislation.

Mr. Lewis E. Lehrman -- I favor the restoration of a gold standard with a fixed price of gold. It is the means to achieve discipline in the U.S. monetary base which will then increase or decrease with gold purchases and sales by the monetary authorities.

One other question we discussed was the desirability of taking steps to seek a restitution of the gold that the United States and other member countries subscribed to the International Monetary Fund (IMF). The United States would be entitled to buy up to 23.6 million ounces of gold from the IMF at SDR 35, or approximately $40, per ounce at time of writing, if by an 85 percent vote of the IMF membership a decision were taken to sell gold for currency to members of the IMF in proportion to their IMF quotas as of August 1975.

The argument for such a restitution of IMF gold to its members is that currently gold has no central role in the international monetary system and no longer serves as the common denominator of a par value system or as the unit of value of the SDR; its official price has been abolished; members of the IMF have no obligation to use gold in transactions with the IMF; and the IMF is prohibited from accepting gold unless approved by an 85 percent vote of its members. The 1976-80 program of IMF gold sales also attests to the intention to establish a diminished role for gold in IMF resources.

The argument against seeking such gold restitution by the IMF is essentially the same one that underlies the belief that the United States should retain significant gold holdings. If gold is an important strategic and monetary resource for the United States, it should also be so regarded by the international community, and retained by the IMF for possible use in various contingencies.

Recommendation 1. We favor no change in the flexible exchange rate system. In addition, we favor no change in the usage of gold in the operation of the present exchange rate arrangements.*

Recommendation 2. We oppose action by the United States to seek a restitution of IMF gold to member countries.**

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*Congressman Chalmers P. Wylie -- I raised a point of order against references to the flexible exchange rate system since the House of Representatives made no reference to that subject in its charge to the Gold Commission. It is not germane to the report.

Congressman Henry S. Reuss and Governor Partee wish to be associated with Congressman Wylie's comment.

Mr. Lewis E. Lehrman -- I support fixed exchange rates for the U.S. dollar to be introduced at the earliest possible date.

**Congressman Ronald E. Paul -- I support steps to seek a restitution of IMF gold to member countries. I would use the additions to U.S. gold stocks for coinage by the U.S. Treasury.

Conclusion

In presenting our report, we are conscious of the complexity of an attempt to define what the role of gold should be in the domestic and international monetary systems.

The majority of us at this time favor essentially no change in the present role of gold. Yet, we are not prepared to rule out that an enlarged role for gold may emerge at some future date. If reasonable price stability and confidence in our currency are not restored in the years ahead, we believe that those who advocate an immediate return to gold will grow in numbers and political influence.* If there is success in restoring price stability and confidence in our currency, tighter linkage of our monetary system to gold may well become supererogatory.

The minority of us who regard gold as the only real money the world has ever known have placed our views on record: the only way price stability can be restored here (indeed, in the world) is by making the dollar (and other national currencies) convertible into gold. Linking money to gold domestically and internationally will solve the problem of inflation, high interest rates, and budget deficits.

We have made no attempt to conceal the divisions among us. In that respect, our views probably represent the range of opinions held by the country at large. We hope, nevertheless, that our report will make a contribution to public understanding of the important issues involved. In that event, the time we have devoted to preparatory study before our meetings and to the deliberations themselves will have been well spent.**

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*Congressman Henry S. Reuss -- I doubt it. More likely, those who advocate sensible fiscal, monetary, and anti-inflation policies "will grow in numbers and political influence."

**Mr. Arthur J. Costamagna -- Within three to five years, a new gold commission should be appointed to review the effects of the foregoing recommendations and Congressional implementation thereof, and to make their own recommendations at that time.

Chapter 1

Background to the Establishment of the Gold Commission*

The focus of this chapter is the period before October 1980 when the provision to create the Gold Commission was enacted. That provision was a product of growing concern in many quarters in this country over the persistence and acceleration of inflation here since 1964.** Many citizens believe that an expanded and more explicit role restored to gold in the U.S. monetary system is the solution to the problem of inflation, arguing that it will both promote monetary and fiscal discipline and reduce inflationary expectations.***

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*Governor Henry C. Wallich -- I dissociate myself from what seems to me a not sufficiently balanced and excessively monetarist interpretation of inflation.

Congressman Henry S. Reuss -- I associate myself with Governor Wallich.

**Congressman Chalmers P. Wylie -- This paragraph is in error, and this chapter should have been omitted from the Report of the Gold Commission. The Congressional Record of September 18, 1980 pp. H9136-7 records the brief discussion between Representatives Paul and Neal prior to the unanimous consent acceptance of Representative Paul's amendment which created the Gold Commission. The word "inflation" was not used even once during the entirety of the consideration of the amendment in the House of Representatives which created the Gold Commission.

Congressman Henry S. Reuss -- The Gold Commission was established as part of a legislative compromise to secure passage of a needed International Monetary Fund quota extension. It had nothing to do with concern about inflation, a fact which is reflected in the Commission's recommendations, which are irrelevant to the problem of inflation.

***Congressman Henry S. Reuss -- Very few citizens believe an expanded and restored role for gold would serve any useful purpose. But those few do have the wherewithal to make themselves heard.

The Record of Inflation

Inflation may be defined as a sustained rise in the price level.[1] It can be observed in the pattern of behavior of both the price deflator implicit in GNP and the consumer price index presented in Chart 1-1. The rate of increase in the deflator rose from less than 1 percent per year in 1961 to 9 percent in 1980, while the rate of increase in the consumer price index rose from 1 percent to 11 percent in the same period. We report the movements of the consumer price index since they are the measure of inflation with which the public is most familiar. However, there are well-known biases in this measure, particularly the effect of housing mortgage costs, that may overstate the degree of inflation in the economy.[2] The rate of price increase was not steady but ratcheted upwards with fluctuations in economic activity.

Economists are divided on the root causes of inflation. Some attribute it to excessive wage demands fostered by aggressive unions, profit-push pricing by monopolistic firms, random factors like poor agricultural harvests, and institutional and sociological patterns, each of greater or lesser importance in specific inflationary episodes. Other economists regard inflation as primarily a monetary phenomenon, explained by monetary growth in excess of the long-run trend of real output growth. They recognize, however, that other factors may temporarily affect the inflation rate independent of the rate of monetary growth.* No one has stated these propositions more lucidly than Chairman Paul A. Volcker of the Board of Governors of the Federal Reserve System who observed on February 1, 1980:[3]

> "Our policy, viewed in a long-term perspective, rests on a very simple premise -- that the inflationary process is ultimately related to excessive growth in money and credit. This

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***Continuation from previous page.

Congressman Chalmers P. Wylie -- It is much more true to say that the evolution of the Gold Commission went through a stage in its developmental process in which its creation was one of a number of political "cards" being played in an attempt to obtain funding to increase the quota of the United States in the Interanational Monetary Fund. Section 10 of Public Law 96-389 created the Gold Commission. Prior sections gained votes by taking politically popular positions on Taiwan, the Palestine Liberation Organization, and El Salvador. Section 3 assuaged fiscal conservatives by stating, "The Congress reaffirms its commitment that beginning with Fiscal Year 1981, the total budget outlays of the Federal Government shall not exceed its receipts."

*Congressman Henry S. Reuss -- Many other economists hold different and more sophisticated views.

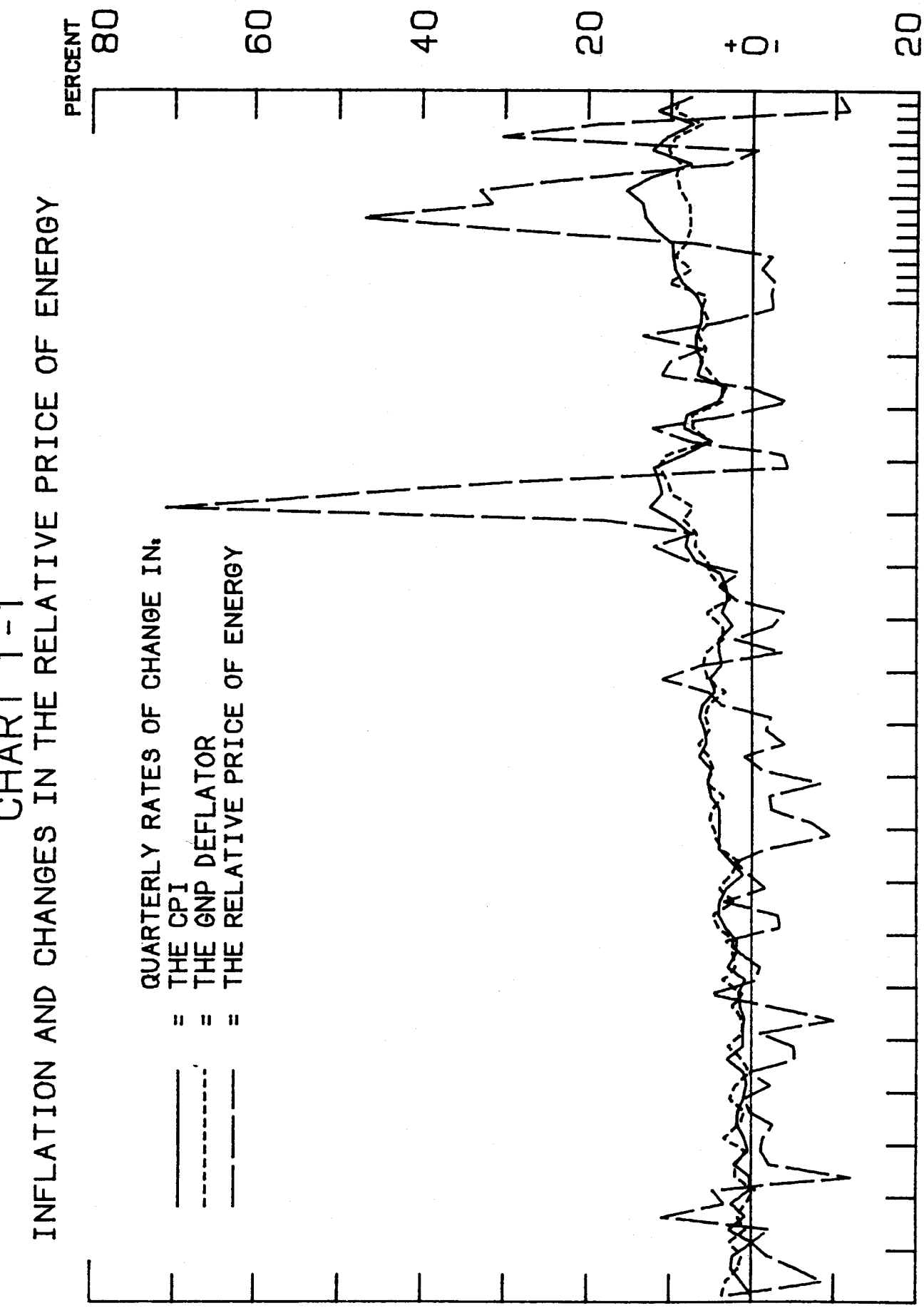
CHART 1-1
INFLATION AND CHANGES IN THE RELATIVE PRICE OF ENERGY
QUARTERLY RATES OF CHANGE IN:
= THE CPI
= THE GNP DEFLATOR
= THE RELATIVE PRICE OF ENERGY
PERCENT
80
60
40
20
+0
-20
1960
1963
1966
1969
1972
1975
1978
1981

> relationship is of course a complex one, and there are many facets of it that are sensitive to nonmonetary economic variables. But, in spite of all the nuances, it is clear that inflation cannot persist over the long run in the absence of excessive monetary growth."

It is not our purpose here to settle the long-standing division among economists on the causes of inflation. Our purpose is simply to present some pertinent background information on the state of the U.S. economy in the decade and a half preceding October 7, 1980.

In Chart 1-2, the quarterly rate of inflation at annual rates, calculated from the index numbers for the deflator, are plotted together with the trend rate of inflation generated by a twelve-quarter moving average of lagged monetary growth.[4] A fairly close link between the two series may be observed, with the major exceptions of several quarters in 1974-1975 and 1979-1980.[5] Both of these episodes can be explained by the large rise in the relative price of energy, defined as the annual rate of change in the producer price index of fuels and related products and power minus the GNP price deflator (see Chart 1-1). Though the inflation since the 1960s may be regarded as primarily a monetary phenomenon,* it is still essential to account for the factors that produced excessive monetary growth as well as other independent sources of inflation.

Table 1-1 presents, on an annual basis, as well as for six subperiods, a number of relevant measures of economic performance crucial to an understanding of the development of U.S. inflation from 1960 to 1980. Columns 1-5 give the annual (and subperiod average) rates of growth of the money stock, defined as M1B, real GNP, the GNP price deflator, the CPI, and the real price of energy. Columns 6-11 give the annual (and subperiod average) unemployment rate, the Federal budget surplus (deficit) as a ratio to actual GNP, the high employment surplus (deficit) as a ratio to high employment GNP, the ratio of funds raised by the U.S. Government to total funds raised by the nonfinancial sector, the balance of payments surplus (deficit) on an official settlements basis, the dollar value of the U.S. monetary gold stock, and the trade-weighted dollar exchange rate (beginning 1967).[6]

We begin by describing briefly six subperiods of the past two decades before turning to a more detailed examination of the salient factors that account for the persistence of inflation, despite recurrent attempts to curb it.

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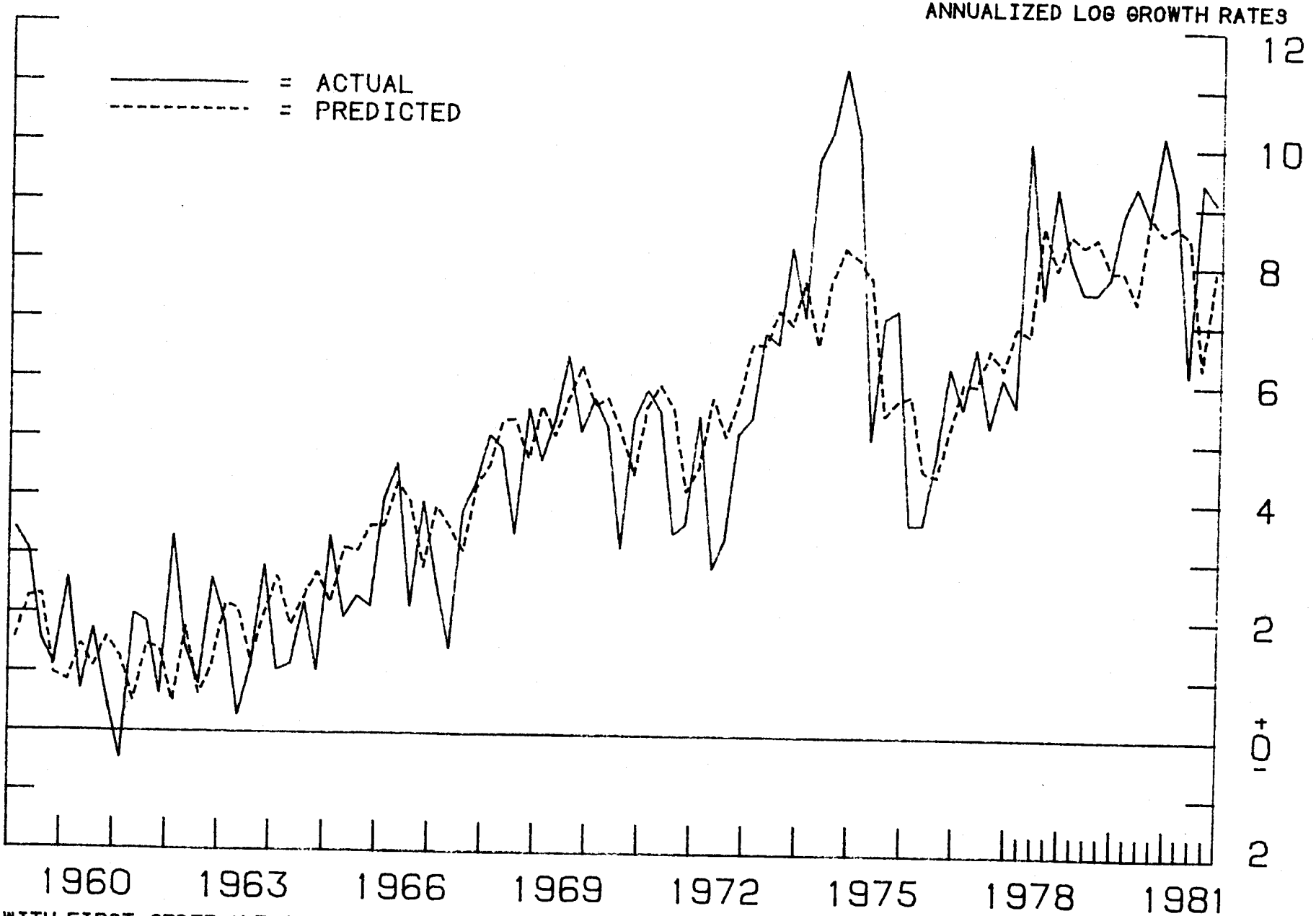
*Congressman Henry S. Reuss -- I dissent from this statement.

CHART 1-2
ACTUAL AND PREDICTED INFLATION[1/]



1/ WITH FIRST-ORDER AUTOCORRELATION CORRECTION

Table 1-1

Selected Economic Indicators, Annually, and by Subperiods, 1960-1980

Calendar Year	M1B (1)	Annual Rate of Change (in percent) Real Output (1972-100) (2)	Implicit Price Deflator (1972-100) (3)	CPI (1967-100)[a] (4)	Real Price of Energy (1972-100) (5)	Unemployment Rate (6)	Ratio of Federal Budget Surplus (Deficit) to GNP (7)	Ratio of High Employment Budget Surplus (Deficit) to High Employment GNP (8)	Ratio of Total Funds Raised by U.S. Federal Government to Total Nonfinancial Sector Funds (9)	Balance[c] of Payments Deficit(-) Surplus(+) ($ millions) (10)	U.S. Monetary Gold Stock[d] ($ millions) (11)	Trade-Weighted Exchange Rate of the dollar (1972-100) (12)
1960	0.6	2.2	1.6	1.6	-0.7	5.5	0.6	2.1	n.a.	672	17,804	
1961	3.1	2.6	0.9	1.0	0.2	6.7	(-0.7)	1.2	15.4	-158	16,947	
1962	1.8	5.8	1.8	1.1	-2.2	5.5	(-0.9)	0.4	12.9	265	16,057	
1963	3.6	4.0	1.5	1.2	2.1	5.7	0.1	1.1	6.9	-1,608	15,596	
1964	4.5	5.3	1.5	1.3	-4.4	5.2	(-0.5)	0.1	9.2	-1,489	15,471	
1960-64	2.8	4.3	1.4	1.2	-2.1	5.7	-0.2	1.0	11.1	-464	16,231	
1965	4.5	6.0	2.2	1.7	-0.4	4.5	0.1	0.1	2.6	1,091	13,806[e]	
1966	2.4	6.0	3.2	2.9	-0.8	3.8	(-0.2)	(-0.9)	5.2	1,242	13,235	
1967	6.3	2.7	3.3	2.9	-0.7	3.8	(-1.7)	(-2.0)	15.6	-5,874	12,065	119.96
1968	7.5	4.6	4.4	4.2	-5.6	3.6	(-0.7)	(-1.3)	13.7	-3,048	10,892	122.06
1969	3.1	2.8	5.1	5.4	-3.0	3.5	0.9	0.5	-3.9	-2,480	11,859	122.39
1970	5.1	-0.2	5.4	5.9	-0.1	4.9	(-1.2)	(-0.3)	12.6	-3,560	11,070	121.07
1965-70	4.9	3.1	4.1	4.2	-2.0	4.0	-0.5	-1.0	7.6	-2,105	12,155	121.37
1971	6.3	3.4	5.0	4.3	3.2	5.9	(-2.0)	(-0.9)	16.3	-23,813	10,206	117.81
1972	8.8	5.7	4.2	3.3	-1.1	5.6	(-1.4)	(-1.0)	8.5	-9,769	10,487[f]	109.07
1973	5.4	5.8	5.7	6.2	7.0	4.9	(-0.4)	(-0.7)	4.1	-5,868	11,652[g]	99.14
1971-73	7.0	5.6	4.8	4.6	2.8	5.5	-1.3	-0.9	9.6	-13,150	10,782	108.67
1974	4.2	-0.6	8.7	11.0	41.4	5.6	(-0.8)	(-0.4)	6.2	-12,013	11,652	101.42
1975	4.7	-1.1	9.3	9.1	7.4	8.5	(-4.5)	(-1.5)	40.5	-7,876	11,599	98.50
1974-75	4.5	-1.1	8.9	8.8	7.1	7.1	-2.7	-0.6	23.4	-9,945	11,626	99.96
1976	6.3	5.4	5.2	5.8	3.0	7.7	(-3.1)	(-1.1)	25.4	-20,251	11,598	105.63
1977	7.8	5.5	5.8	6.5	7.5	7.0	(-2.4)	(-1.1)	16.8	-36,950	11,719	103.35
1978	7.9	4.8	7.3	7.7	0.7	6.0	(-1.4)	(-0.6)	13.4	-34,025	11,671	92.39
1976-78	7.6	5.0	6.4	6.8	4.0	6.9	-2.3	-0.9	18.5	-30,409	11,663	100.46
1979	7.1	3.2	8.5	11.3	16.7	5.8	(-0.6)	(-0.1)	9.5	16,543	11,172	88.07
1980	6.2	-0.2	9.0	13.5	29.1	7.1	(-2.4)	(-0.7)	21.6[b]	-6,872	11,160	87.39
1979-80	6.2	-0.2	8.6	12.6	25.5	6.5	-1.5	-0.4	15.6	4,836	11,166	87.73

Notes to Table 1-1

[a] Year-to-year percent change.

[b] Average of first three quarters seasonally adjusted data.

[c] U.S. net official reserve assets minus net foreign official assets plus allocations of SDRs.

[d] See note a to Table 2-1 below.

[e] See note b to Table 2-1 below.

[f] See note d to Table 2-1 below.

[g] See note e to Table 2-1 below.

Source by Column

1-4, 6-8, 10: Economic Report of the President, January 1981, Tables B-59, B-3, B-31, B-74 as ratio of B-1, B-62, B-99. For Col. 8, before 1972, Economic Report, January 1979 Table B-62; February 1970, Table C-52.
For Cols. 2 and 9, full year data for 1980, from Survey of Current Business, March 1981, pp. S-6 and 50, lines 38 and 57.

5: Federal Reserve Bank of St. Louis data bank.

9: 1960-78: Survey of Current Business 60 (November 1980): 24-5; 1979-80: ibid. 61 (May 1981): 3.

11: Table 2-1 below.

12: Federal Reserve Bulletin 64 (August 1978): 200; 67 (October 1981): A-68.

. 1960-1964. This period of stability, which actually began .n 1958, was characterized by low monetary growth and, by historical standards, a low rate of inflation. Productivity growth was favorable and significant external shocks were absent. These years serve as a benchmark for the succeeding periods.

2. 1965-1970. The onset of steadily rising inflation in this period is generally associated with the financing of the Vietnam war and expanded Federal social programs. Both a rise in the rate of monetary growth and in fiscal deficits may be observed in columns 1 and 7. During the period 1965-1970, both monetary and fiscal policy were generally expansionary despite two significant attempts to reverse the inflationary process. Monetary growth was markedly reduced in 1966 in an episode commonly designated as "the credit crunch," and in 1969, a decrease in monetary growth supplemented a 1968 tax increase. The monetary gold stock declined in every year since 1960 except 1968-69, the declines reflecting the role of the United States as the world's central banker and the more rapid rise in U.S. inflation than elsewhere.

3. 1971-1973. In the belief that the inflation rate was slow in falling in response to the recession in business activity in 1970 and as a way of staunching the growing balance of payments deficits, the Nixon Administration sought a quick solution by resorting to direct controls on prices and wages in August 1971. The policy was in effect for the next three years. Initially, wages and prices were frozen for ninety days. Subsequently, mandatory wage and price guidelines were imposed that were gradually relaxed.

The measured inflation rate declined in 1971 and 1972, and there was satisfaction with the reduction in the inflation numbers. Yet, in retrospect, monetary growth was overexpansionary during these years and the first half of 1973. Consequently when the controls were eased in 1973, the pent-up excess demand quickly restored the inflation rate to its underlying trend rate.[7] To halt further depletion of its monetary gold stock, the United States closed the gold window in August 1971, and in 1973 abandoned the attempt to maintain fixed foreign exchange rates for the dollar.

4. 1974-1975. These unusual years were dominated by two sets of forces: contractionary money growth and an extraordinary rise in the real price of energy following the Arab oil embargo of 1973 (see Chart 1-1 and Table 1-1, col. 5). Some regard the energy price rise as retribution for the inflation the United States exported to the rest of the world in the 1960s.

The supply shock raised the inflation rate well above the trend rate for several quarters in the two years, substantially reduced real output growth, and raised the unemployment rate (Table 1-1, cols. 3 and 6).

5. 1976-1978. As a consequence of the 1974-75 recession, the unemployment rate rose to a level unprecedented in the post-World War II period. In reaction, the money growth rate was accelerated, and fiscal policy became generally expansionary. Once the effects of both the removal of price controls and the external energy supply shock had worked their way through economic processes, the inflation rate fell to its trend rate in 1976. In 1977 and 1978 the inflation rate moved up again.

6. 1979-1980. A further assault on the inflation problem in 1979 by means of monetary and fiscal restraint was thwarted by a second rise in the real price of energy. But in the face of overall monetary restraint in 1980, the effect of the energy price rise on the rate of inflation proved to be temporary.

Why the Setbacks to Success of Anti-Inflation Policies?

We now examine some of the reasons that explain the lack of success that has attended efforts since the mid-1960s to achieve a permanent reduction in the inflation rate.

1. The Inflation-Unemployment Tradeoff. Hidden within the brief sketch of the events of the past two decades is a dilemma in the implementation of anti-inflation policies -- the so-called tradeoff between inflation and unemployment. Empirical evidence lends support to the view that both monetary and fiscal policy have a lagged effect on economic activity measured in current prices. The initial effect of contractionary monetary and fiscal policy is on the level of real output and the unemployment rate (within one to three quarters after the policy is in place). The initial effect is temporary. It is attributable to the lag in the adjustment of wage and price expectations and inflexibility of contracts. The ultimate effect of contractionary monetary policy is on the price level and the rate of inflation. The time that elapses before the inflation rate is reduced, however, is measured in several years, not in several quarters.*

Accordingly, attempts to reduce inflation by monetary means have quickly led to reduced real output growth and increased unemployment. These results have occasioned a reversal of the contractionary policy before it could succeed in significantly reducing the inflation rate. The pattern is observable following the reduction in monetary growth in 1969, which initially led to the recession in real output and rise in unemployment

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*Congressman Henry S. Reuss -- This analysis is flawed in two respects. First, the history of postwar recessions is that inflation falls rapidly as output and employment fall. Second, this success against inflation has not been sustained in subsequent business expansions.

in 1970 (Chart 1-2 and 1-3). The contractionary policy was then reversed. A similar sequence occurred in 1974-1975, when contractionary monetary policy from mid-1973 and 1974 led in 1974-1975 to a dramatic decline in real output and a rise in unemployment, partly associated with the unexpected energy supply shock. The sequel for the next three years was an increase in monetary growth to levels not reached since 1973.

The evidence thus suggests that a policy of noninflationary monetary growth before 1980 was never maintained long enough to reap the benefits of the policy. The distinction between the short-run undesirable effects of such a policy and the long-run desirable effects has apparently not been understood by the public or political leaders. The negative effects on output and employment of monetary restraint have been perceived as likely to last forever, with no recognition that the benefits of reduced inflation will then emerge and have a positive effect on output and employment.

It is not surprising or irrational for the public to view the cost of a policy of monetary restraint as high and unrelenting and the benefits dubious. In the decade and a half before 1980, they experienced the costs and hardly any benefits of decelerating money growth. The experience in some other countries is different and the public perception of the effects of non-inflationary monetary policy is correspondingly different.

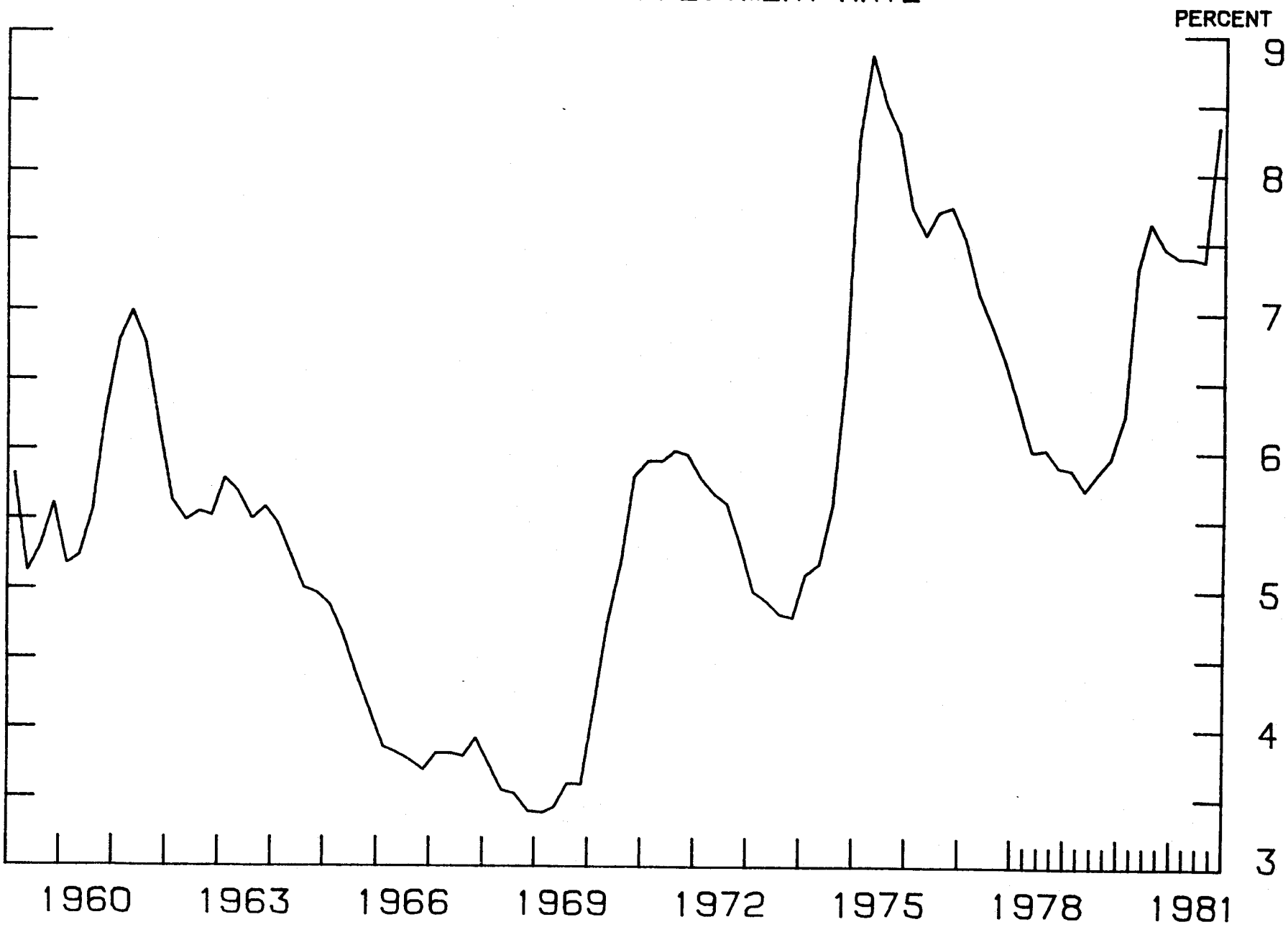
There is also no widespread public understanding of the inflationary long-run effects of rapid money growth. The public and many political leaders also fail to recognize the distortions and disincentives caused over the long run by persistent accelerating inflation. These produce long-run effects on output and employment that are largely unrecognized by the public.

Thus the policy of "buying" more output and employment growth is tempting and politically appealing, for the benefits are immediate and the costs are postponed and unrecognized. A policy of decelerating money growth is not appealing, for the costs are immediate and the benefits are delayed and not recognized by most of the public.

Finally, we note that the lag in the response of inflation to decelerating money growth seems to be getting shorter. The reaction time of export, import, and commodity prices has speeded up since market participants have begun to pay attention to the monetary growth rate and since the floating of dollar foreign exchange rates.

2. Sectoral Effects. The impact of anti-inflation actions falls disproportionately on certain sectors. Reduced provision of reserves to the banking system restricts the volume of loans to small business and the accompanying increase in interest rates restricts housing dependent on mortgage funds. Short-term interest rates may rise immediately when money growth

CHART 1-3
UNITED STATES UNEMPLOYMENT RATE



decelerates but it takes time until the subsequent decline in inflation leads to a fall in interest rates. If the response is expansion of Federal programs to alleviate the distress of small business and the mortgage market, anti-inflation actions may be nullified.*

Inflation, when not fully anticipated, has significant distribution effects. Generally, debtors gain at the expense of creditors, as do those with incomes indexed to inflation relative to those on fixed incomes. Home-owners in particular have been beneficiaries of inflation.

3. Inflationary Expectations. Inflationary expectations on the part of the private sector have been reinforced by the evidence of the past 15 years that inflation has only been temporarily reduced in response to contractionary policy. Hence, when a new round of contraction in monetary growth gets under way, the public may regard the new round as only temporary, as in past episodes, and not reduce their expectations of further inflation. The resistance of expectations to modification prolongs actual inflation by affecting wage demands and pricing decisions and maintaining upward pressure on interest rates.

Inflation expectations are believed to be incorporated rapidly and completely in asset prices that are determined in auction markets. A comparison of Charts 1-1 and 1-4 reveals that movements in a long-term interest rate (the yield on AAA corporate bonds) over the whole period are closely associated with the trend rate of inflation. Short-term interest rates (such as the three-month Treasury bill rate) are more volatile, reflecting both a negative response to short-term changes in monetary growth and a positive response to expected inflation.[8] Since the freeing of the gold market in 1968, the price of gold has also served as a good barometer of market anticipations of inflation. As can be seen in Chart 1-5, its movements are volatile but closely related to both world and domestic inflation rates.

To the extent that expectations of inflation are embedded in long-term contracts, both explicitly and implicitly, in labor and product markets, an attempt to reduce inflation by contractionary monetary growth must impose real hardship, at least

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*Congressman Henry S. Reuss -- I am pleased to see acknowledgement here of the highly discriminatory effect of monetarist anti-inflation policy, which does indeed fall most heavily on small business, autos, housing, agriculture, and capital investment.

CHART 1-4
YIELDS ON SHORT AND LONG TERM SECURITIES

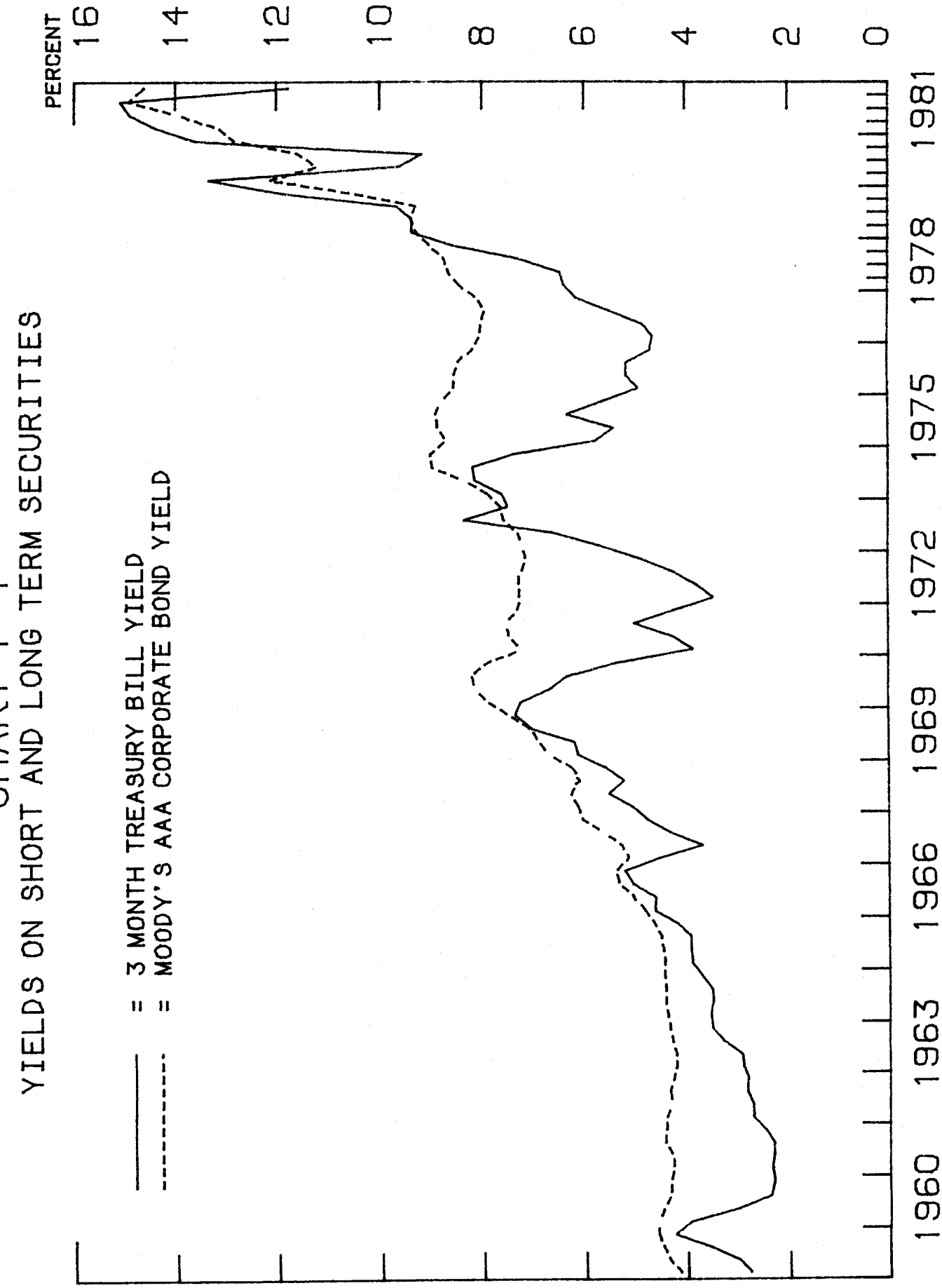
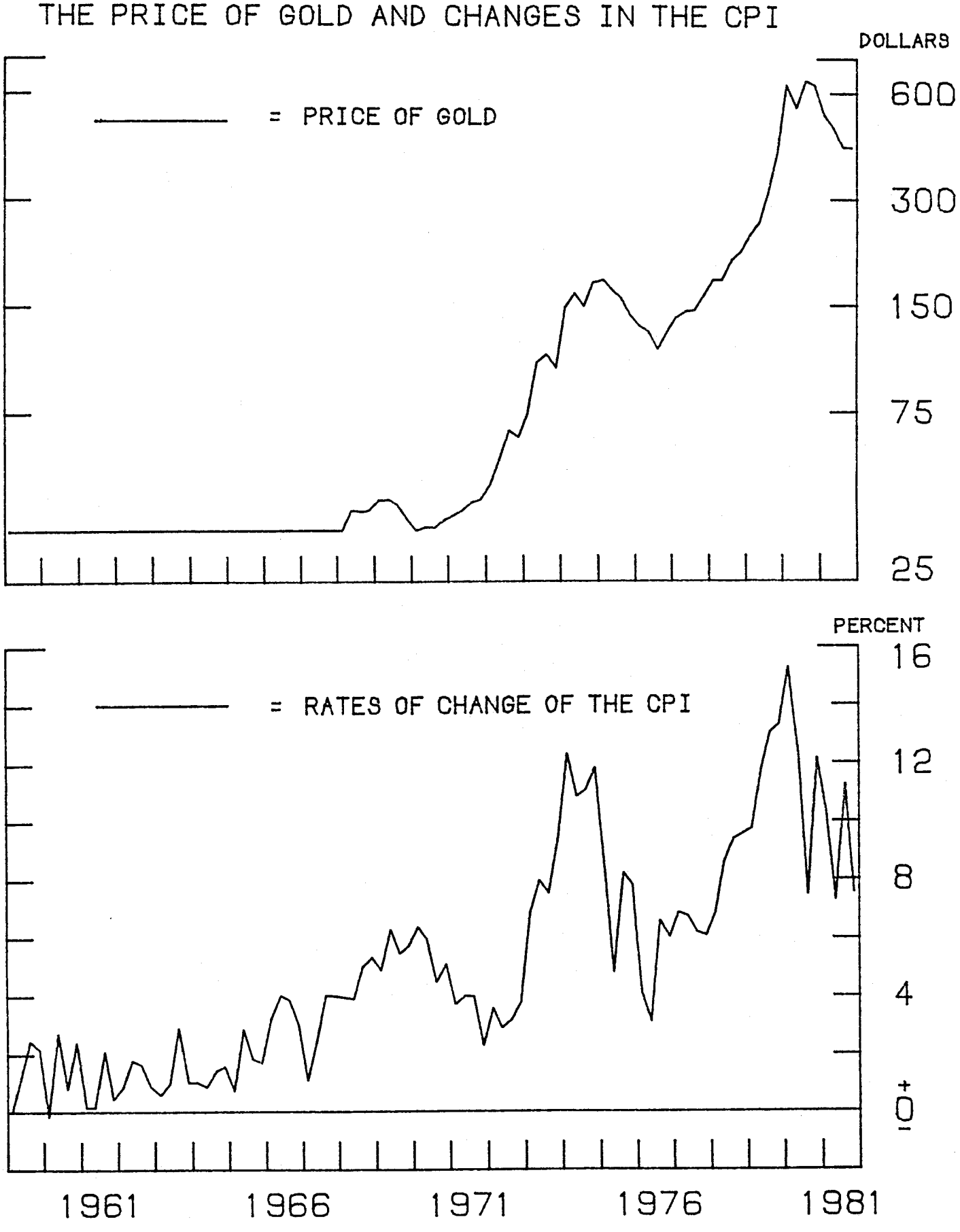


CHART 1-5

THE PRICE OF GOLD AND CHANGES IN THE CPI



until contracts can be adjusted. Yet the extent to which contracts will be renegotiated depends on whether the parties expect the policy to be enduring or quickly reversed.*

4. Structural Changes. A number of structural changes in the economy, independent of, or interacting with, the rate of monetary growth contributed to the difficulty of achieving positive results with anti-inflation actions. Four such changes are discussed: (a) declining productivity growth; (b) rising velocity; (c) persistent Federal budget deficits; (d) foreign influences on the open economy.

(a) Declining productivity growth. Growth in output per man-hour has declined in the United States (as it has in most industrialized economies) since the mid-1960s. Since reduced productivity growth implies a lower trend real growth rate, a given rate of monetary growth will be associated with a higher rate of inflation.

(b) Rising velocity. Income velocity of circulation of M1B (the ratio of GNP to the most widely used monetary aggregate) has been rising on average at slightly over three percent per year since the late 1950s. The trend reflects the process of financial innovation, that is, the substitution of new types of payments media for currency and deposits.** Because of this development, a given rate of monetary growth will be associated, other things equal, with a more rapid rate of inflation. Inflationary expectations will be incorporated in market interest rates and hence will tend to raise velocity. Although this phenomenon figures significantly during hyper-inflations, the evidence does not suggest that expectations have been a significant factor affecting velocity during the past two decades.

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*Congressman Henry S. Reuss -- This truism leaves unstated the fact that government policy can help by facilitating the adjustment of expectations and contracts. The Administration has ignored this fact, and so the costs of supertight money have been unnecessarily high.

**Governor J. Charles Partee -- The trend increase in velocity may also be associated in part with the trend increase in interest rates, which has made it more costly to hold low or zero yielding money assets.

(c) Persistent Federal budget deficits.* Budget deficits hamper anti-inflation policies in two ways. They may indirectly cause an increase in monetary growth when the authorities attempt to offset the high interest rates associated with bond financing of the deficit. Alternatively, budget deficits may increase velocity when the deficit is financed by the sale of government securities, in competition with private borrowers for private sources of funds. The rise in market interest rates leads to a rise in velocity and, for a given rate of monetary growth, a higher inflation rate. Both effects have undoubtedly been present in U.S. history. A controversy exists in the literature on the relation between budget deficits and monetary growth.[9] One channel emphasized in papers supporting such a link is the response of the Federal Reserve to increases in interest rates associated with deficits. The effect of Federal Reserve procedures before October 1979 was that an increase in monetary growth would accompany a rise in interest rates. Table 1-1 shows that the ratio of the Federal budget deficit to GNP is not closely correlated with either monetary growth or inflation on an annual basis, or even in a comparison of subperiod averages.** However, there is a significant correlation both on an annual and a subperiod average basis beween the ratio of the high employment budget deficit to high employment GNP and monetary growth and inflation.[10] Higher government spending by itself, without regard to its effect on budget deficits, has also been linked to monetary growth.[11]

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*Congressman Chalmers P. Wylie -- Budget deficits require Treasury security sales. Large deficits and large debt management sales take large percentages of personal and corporate savings to clear the market. The larger the deficit the smaller the residual savings remaining to finance private investment, including investment in plant and equipment. Without investment in plant and equipment, productivity slows and inflation rises, inventories are unsold, and unemployment spreads. This is a significant part of the problem in the automotive sector of our economy in Ohio and Michigan.

In addition, the process by which large deficits take large percentages of personal and corporate savings also brings higher interest rates as the Treasury prices its securities to clear the market, to sell. This leads to the current situation in which large corporations obtain a higher rate of return on their portfolio of government securities than they do on the corporate assets under their management. In these instances corporate savings are available but Federal deficits are robbing workers of jobs because managements can get higher yields from U.S. Treasuries than from outlays for plant and equipment. For example, the Bendix Corporation in Detroit has said that this is what it is doing with its $500 million pool of cash to maximize its corporate rate of return. (See the Wall Street Journal, January 29, 1982, p. 52.)

**Congressman Henry S. Reuss -- The relationship between deficits and inflation depends on the state of demand; therefore a simple correlation of the deficit/GNP ratio to inflation and money growth is not helpful.

The connection between bond-financed deficits, rising velocity, and inflation is also not empirically established. Since the mid-1950s, years of rapid inflation are not generally years when financing the Federal budget pre-empted a large share of total financial funds.[12] The subperiod averages also show the same result.

(d) Foreign influences on the open economy.* Under the Bretton Woods system, deficits in the U.S. balance of payments increased in the 1960s. Initially, the deficits were regarded as satisfying a rising world demand for international reserves, since the dollar served as the world's principal reserve asset. As the deficits persisted, they were regarded less benignly as a reflection of excess monetary growth. Because the dollar served as the principal reserve asset in the post-World War II period, there was less pressure on the United States by her trading partners than might otherwise have been the case to respond to the persistent balance of payments deficits by monetary and fiscal restraint. Moreover, the deficits served to increase world liquidity and so transmit inflationary pressures to other countries that either voluntarily or involuntarily fell in step with U.S. inflation rates.

The decline in the U.S. monetary gold stock and in the gold reserve ratio against Federal Reserve notes by the latter 1960s heightened concern abroad that convertibility of the dollar into gold was threatened, concern that culminated in runs on the dollar in 1967 and 1968, the establishment of the two-tier gold market in 1968, and the abandonment in August 1971 of the U.S. commitment to convert dollars held by foreign official agencies into gold.

Thus rather than acting as a constraint on domestic inflation, the Bretton Woods fixed-exchange rate system did not do so and also served to transmit U.S. inflation abroad. Finally, when convertibility domestically and internationally conflicted with overall domestic policy goals, it was abandoned.

In 1971 and 1973, the dollar was devalued, and since then, the exchange rate of the dollar has floated. Under a floating exchange rate system, the international economy provides even less of a constraint on domestic monetary and fiscal policy. If a country has a more rapid inflation rate than the rest of the world, then the exchange rate, which can be viewed as a measure of the purchasing power of its money relative to that of other countries, will steadily depreciate. The U.S. dollar

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*Congressman Henry S. Reuss -- The discussion which follows is interesting but not relevant to the purposes of the Gold Commission.

exchange rate has depreciated over the period since 1971 as a whole but there have been several significant upswings during the period (Chart 1-6 and Table 1-1, col. 12).

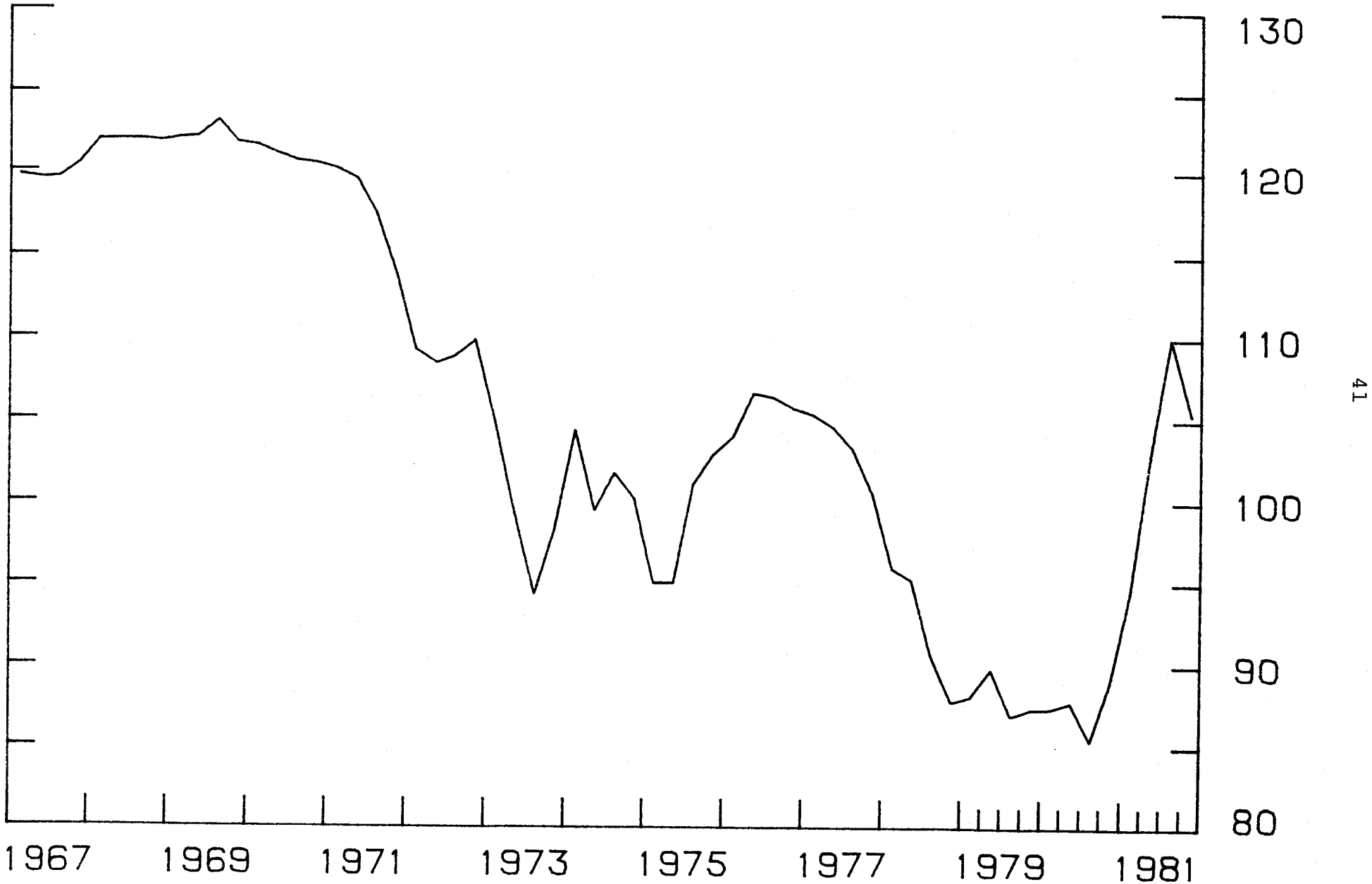
Theoretical arguments have been made that under floating exchange rates foreign influences can still have effects on domestic prices and activity, independent of domestic policy. One view is that the world is characterized by high capital mobility, and a rise in interest rates in one center is rapidly transmitted to another so that velocity behavior is similar internationally. If high capital mobility were a fact, then financial assets denominated in different currencies would be perfect substitutes. This conclusion breaks down if assets, that is, securities, are not perfect substitutes internationally because of risk with respect to exchange rate changes or to capital controls. With imperfect asset substitutability, there may be movements in relative national interest rates insulated from the rest of the world.

Another view is that independent monetary policy cannot succeed under floating exchange rates because of currency substitution, that is, an effort to restrict monetary growth domestically will be frustrated by the substitution of currencies issued by other countries. The argument is that the effect of reducing the growth rate of the domestic money stock is to impose a tax on domestic money holders, causing them to switch into holding foreign monetary assets including Eurodollars. Two problems undermine the argument. One is conceptual. The community is concerned with the real value of its money holdings -- what these will buy -- and receives a flow of real services from its real money balances. Thus a policy which reduces the rate of growth of the nominal money stock and the price level reduces the inflation tax on domestic real balances, and promotes holding larger real money balances. The second problem is empirical, whether the existence of foreign currency deposits as a possible substitute has had a significant impact on the demand for domestic real money balances. While theoretically possible, empirical evidence in support of the view is mixed at best.[13]

Just as a floating exchange rate makes possible monetary independence, it can also insulate a country from external real shocks. Floating exchange rates cushioned the U.S. economy against the effects of the rise in oil prices in 1979-1980. The decline of ten percent in the exchange rate from 1972 to 1973-1975 (bridging the devaluation of the dollar and the start of flexibility) and again in 1979-1980 was a source of insulation, since the extent of the decline was greater than would be explained by the trend rate of inflation. Nevertheless, the foreign oil shock did temporarily raise the domestic inflation rate. It did so through two channels. First, to the extent that the rise in imported oil prices was not fully absorbed by the exchange rate, it had a direct effect on the domestic price level. Second, a depreciating exchange rate itself tends to raise the domestic price level by raising the price of imports in general.

CHART 1-6

WEIGHTED AVERAGE EXCHANGE RATE OF THE U.S. DOLLAR



The effects on the inflation rate are temporary until expenditure and production are directed away from the more expensive oil-intensive sectors of the economy.

5. Incomes Policies.* Some observers believe that the reason anti-inflation policies have not succeeded is that demand restraint by itself is too costly to pursue. They argue that incomes policies that attempt to influence the setting of wages and prices directly will decrease inflation and increase the growth of output and employment that result from any given degree of demand restraint. One such policy that has some support would use the tax system to provide incentives to firms and workers to slow the rate of inflation. Different versions of tax-based incomes policy (TIP) exist. It is acknowledged that a TIP cannot substitute for demand restraint. The policy can only supplement it.

Conclusion

The basic economic problem that has plagued the United States (and the rest of the world) since the mid-1960s has been the persistence and acceleration of inflation,** with its associated economic distortions, disincentives and risks. We have reviewed the difficulties encountered by the U.S. monetary and fiscal authorities over this period in their successive attempts to pursue anti-inflation policies. The provision to create the Gold Commission was an expression of dissatisfaction with the unsucessful outcome of these past attempts.***

To determine if greater success is possible in the future, it is important to advance proposals that can cope with the difficulties that have attended policymakers' past efforts in dealing with the problem of inflation. Our mandate is to conduct a study to assess the role of gold. To do so, we examine the historical record of U.S. experience with gold (Chapter 2), discuss the different forms of the gold standard and alternative monetary standards (Chapter 3), and describe a host of proposals, some involving a role for gold, some not,**** that have been submitted to us as the means for achieving price stability (Chapter 4).

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*Congressman Henry S. Reuss -- This is a totally inadequate treatment of a most important topic. Incomes policies are widely accepted as necessary within the economics profession and by the Congress (see the Joint Economic Report). Certainly incomes policies enjoy vastly wider support among the American people than does the gold standard.

**Congressman Henry S. Reuss -- Stagnation, unemployment, and declining real living standards since 1973 are also important problems.

***Congressman Henry S. Reuss -- Nonsense.

****Congressman Henry S. Reuss -- We have no business describing proposals not related to gold.

Governor Henry C. Wallich wishes to be associated with Congressman Reuss' comment.

The test of the usefulness of these proposals is the extent to which they are immune to the kinds of pressures, noted in this chapter, that have prevented the achievemnt of a stable price level.

Notes to Chapter 1

1. The definition of inflation as a sustained rise in the price level has no implications as to its cause. It merely states that a rise in the price level that lasted for one day, one month, one quarter, or one year would not qualify as an inflation. A rise over a period of years would.

   Sympathizers with the views of the "Austrian" branch of economics are opposed to the use of the concept of "the price level." They hold that it is virtually impossible to construct a price index that accurately reflects changes in the value of money. They see the difficulty as heightened during an inflationary environment when relative prices change more than they otherwise would and a price index fails to capture these effects. Instead, this group defines inflation as a rise in the supply of money. See the writings of such Austrians as Ludwig Von Mises, The Theory of Money and Credit, London: Jonathan Cape, 1952 (reprinted by the Foundation for Economic Education, 1971); and Murray Rothbard, Man, Economy and State, Los Angeles: Nash Publishing, 1962.

2. On the limitations and deficiences of the consumer price index and feasible improvements in it, see Phillip Cagan and Geoffrey H. Moore, The Consumer Price Index, American Enterprise Institute Studies in Economic Policy, 1981.

3. Statement before the Joint Economic Committee of the U.S. Congress, in Federal Reserve Bulletin, February 1980, pp. 137 - 43 (quotation on p. 140).

4. The formula for the technique used is

$$P_t = a + \frac{b}{12} \sum_{i=1}^{12} \hat{m}_{t-1} + e$$

   Here p, $\hat{m}$, refer to the quarterly change in the logarithms. We adopted a 12-quarter lag because it produced the lowest standard error of estimate (a measure of the dispersion of the error term associated with the regression line) of successive lags, ranging from 4 quarters to 20 quarters. Other investigators have found a 12-quarter lag also worked best for the period of the 1970s. We omit other variables, such as velocity of circulation, because the regression is designed to measure the trend or underlying rate of inflation that is to serve as a benchmark. Additional explanatory factors can be added as required when the actual inflation rate deviates from the trend rate.

The equation (in logarithms), for the period 1959:I to 1981:II, relating the quarterly change in the implicit deflator to a 12-quarter moving average of the quarterly change in money (defined as M1 for the years 1956 - 1958, thereafter as M1B) is (t values shown in parentheses):

$$\ln P_t - \ln P_{t-1} : \underset{(-1.335)}{-.00208} + \underset{(9.682)}{1.18871} \sum_{\frac{1}{12}} (\ln m_t - \ln m_{t-1})_{t-1}$$

$$R^2 = 0.7669$$
$$SEE = 0.0034$$
$$DW = 2.081$$
$$\rho = 0.407$$

The t value is a test statistic for the statistical significance of the regression coefficient. A value greater than 2 generally indicates a significant coefficient.

R^2 measures the proportion of the variation of the dependent variable (the inflation rate) which is explained by variation of the independent variable (lagged money growth).

DW is the Durbin-Watson Statistic, a test statistic for the presence of serial correlation. A value close to 2 generally indicates the absence of serial correlation.

ρ (rho) is the first-order serial correlation coefficient. It measures the correlation between errors in adjacent time periods. When ρ equals zero, no first-order correlation is present, while a large value of ρ implies the existence of such serial correlation.

The equation uses M1B as the measure of the money stock because it has generally been accepted as the money aggregate most closely related to nominal income (GNP in current dollars) and the price level. Other definitions of money would not significantly alter the result.

5. The equation on which the predicted inflation rate is based was estimated using the Cochrane-Orcutt procedure -- a method to correct for serial correlation in time series regression models. This is a standard statistical technique. One interpretation of the predicted inflation rate so constructed is that it represents not only monetary influences but other unspecified influences as well. An alternative interpretation is that the Cochrane-Orcutt procedure corrects for lagged inflation or lagged money growth not represented in the underlying equation. There is no basis for choice between the two interpretations. If the first interpretation is accepted, omitting the correction for serial correlation in the estimation of the equation on which the

predicted inflation rate is based, the predicted inflation rate will represent only the influence of money. Chart 1-A-1 repeats Chart 1-2, except that the predicted inflation rate omits the auto-correlation correction. It does not appear that the omission of the auto-correlation correction in generating the predicted inflation rate in Chart 1-A-1 obliterates the general relationship between actual and predicted inflation rates. The exceptions remain in the years 1974-1975 and 1979-1980.

The relationship when the equation is estimated for the full postwar period will reveal exceptions reflecting disturbances special to the pre-1961 period, such as the impact of price decontrol after World War II and the Korean War episode, but these exceptions are fully consistent with the views expressed by Chairman Volcker in the text quotations.

6. The concept of the high (or full) employment is designed to show what the surplus or deficit in the budget would be if the economy were moving along its potential growth path free of fluctuation in business activity.

The definition of the balance of payments used in the table puts changes in international reserves below the line and focuses on the change in reserves as a product of the overall balance of payments deficit.

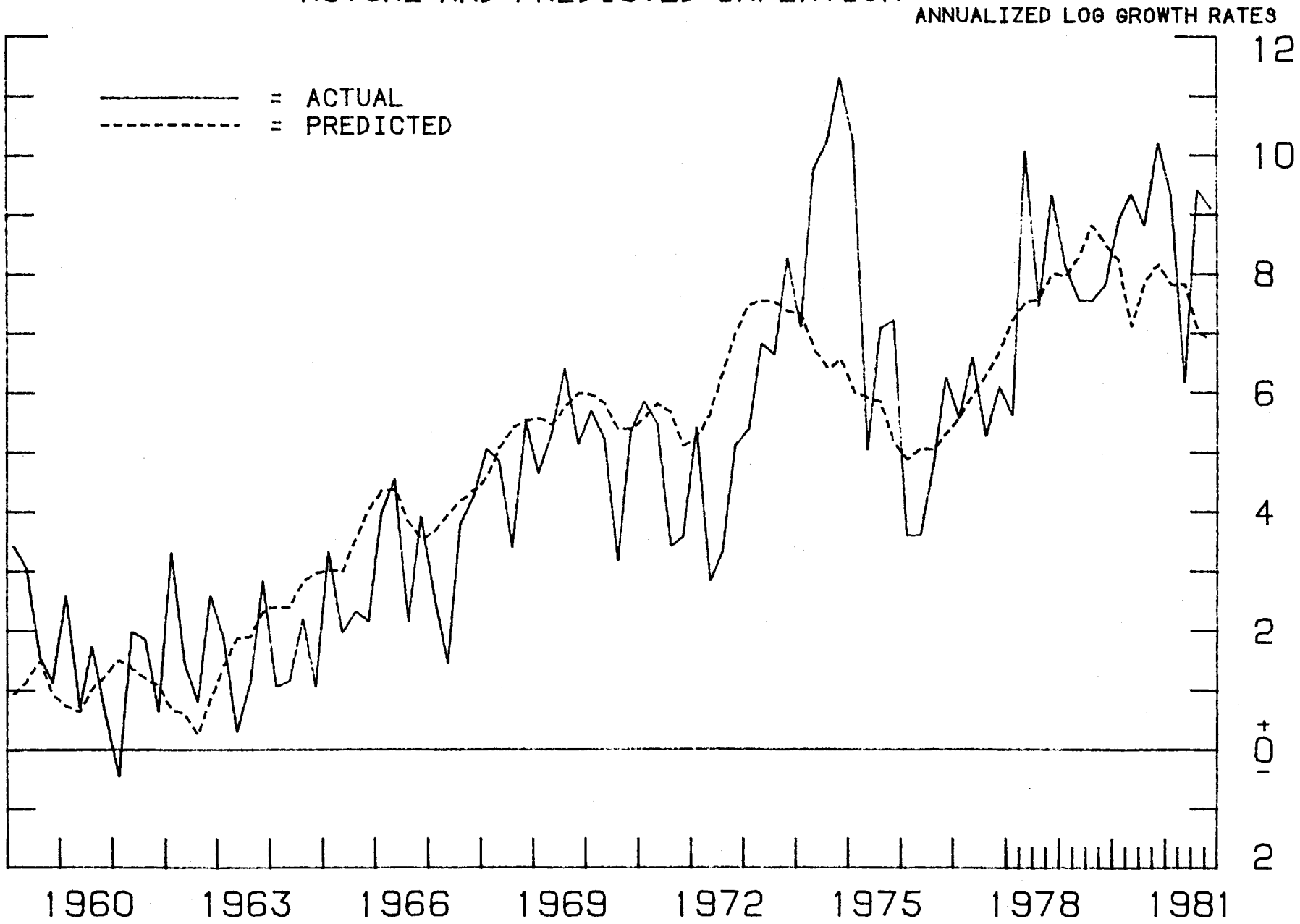
7. See Michael R. Darby, "Price and Wage Controls: The First Two Years," and "Price and Wage Controls: Further Evidence," in The Economics of Price and Wage Controls, K. Brunner and A.H. Meltzer, eds., Carnegie-Rochester Conference Series on Public Policy, vol. 2, 1976, pp. 235-63; 269-71. Alan S. Blinder and William J. Newton conclude that "catch-up inflation caused by the ending of controls carried the price level permanently 1 percent above what it would have been without controls." See "The 1971-1974 Controls Program and the Price Level: An Econometric Post-Mortem," NBER Working Paper no. 279, September 1978.

8. The relationship between interest rates and monetary growth is complex. In the past, interest rates tended to move negatively in response to short-term movements in monetary growth and positively in response to longer-term movements. In recent years, however, the negative short-term response of interest rates has not been regularly observed. One interpretation of the change in the pattern of interest rate behavior is that the market has come to regard any increase in monetary growth, however short-lived, as betokening a rise in future inflation rates and any decrease in monetary growth as betokening a subsidence of inflation. Hence interest rates recently have at times moved positively with short-term monetary growth.

9. R.J. Gordon, "World Inflation and Monetary Accommodation in Eight Countries," Brookings Papers on Economic Activity

CHART 1-A-1

ACTUAL AND PREDICTED INFLATION[1/]



[1/] WITHOUT FIRST-ORDER AUTOCORRELATION CORRECTION

(1977:2): 409-68; and W.A. Niskanen, "Deficits, Government Spending, and Inflation: What is the Evidence?" Journal of Monetary Economics 4 (August 1978): 591-602, dispute the validity of the link. W.D. McMillin and T.R. Beard, "The Short Run Impact of Fiscal Policy on the Money Supply," Southern Economic Journal 47 (July 1980): 122-35; and M.J. Hamburger and B. Zwick, "Deficits, Money and Inflation," Journal of Monetary Economics 7 (Janaury 1981): 141-50, find a significant impact of deficits on monetary growth.

Philip Cagan holds that the nominal deficit expressed as a percentage of GNP is overstated in real terms (see "The Real Federal Deficit and Financial Markets," The AEI Economist. (November 1981): 1-3). This is so because interest payments on the Federal debt, which are reflected in the deficit, include compensation for the depreciation of the debt in real terms. Hence the deficit should be reduced by the product of the federal debt in private hands and the rate of inflation. Expressing the deficit minus the decline in real value of the Federal debt as a percent of GNP reduces the nominal deficit considerably.

10. In Table 1-1, we report the ratio of the high employment budget deficit to high employment GNP constructed by the Department of Commerce. The conclusion that there is a close relation between monetary growth, inflation, and the ratio is obtained from a new set of estimates of potential (high employment) GNP, prepared by Jack Tatom. See his "Potential Output and the Recent Productivity Decline," Federal Reserve Bank of St. Louis Review 84 (January 1982): 16. L.O. Laney and T.D. Willett, "Presidential Politics, Budget Deficits, and Monetary Policy in the United States: 1960-1976," Claremont Working Papers (1981), also find a close link between high employment deficits and U.S. monetary growth.

11. R.J. Barro, "Comment from an Unreconstructed Ricardian," Journal of Monetary Economics 4 (August 1978): 569-81.

12. In the source cited in note 9 above (pp.3-5), Phillip Cagan adjusts the Federal budget deficit for the expected repayment of principal, on the assumption that the inflationary premium embedded in interest rates since the 1970s is equal to the depreciation in the value of the Federal debt due to inflation. On the further assumption that debt holders regard these additional interest payments as a return of principal rather than as income and therefore not to be consumed, they will reinvest the additional interest to maintain the principal of debt intact. The reinvestment will finance, without crowding out, an amount equal to the depreciation in real value of the debt.

13. Marc Miles, "Currency Substitution, Flexible Exchange Rates, and Monetary Independence," American Economic Review 68

(June 1978): 428-36, found evidence that currency substitution was significant for the Canadian demand for money. However, M.D. Bordo and E. Choudri, "Currency Substitution and the Demand for Money: Some Evidence for Canada," Journal of Money, Credit and Banking 14 (February 1982): forthcoming, find Miles's model to be misspecified and demonstrate that when the demand for money is properly specified, the influence of currency substitution (measured by expected changes in the exchange rate) is negligible. Bruce Brittain, "International Currency Substitution and the Apparent Instability of Velocity in Some Western European Economies and in the United States," Journal of Money, Credit and Banking 13 (May 1981): 135-55, found evidence for the significance of currency substitution for some countries but not for others.

Chapter 2

The Past Role of Gold in the U.S. Monetary System*

From 1834 to 1973, with the exception of the years 1862 through 1878 and of an interlude of less than a year's duration in 1933-34, the United States adhered to some form of a gold standard. The purpose of this review is to examine the operation of the successive types of gold standards in U.S. experience (including for each type the evidence on the stability of the price level and of real output), as well as the intervening episodes of floating exchange rates.

Chronologically, U.S. experience with the gold standard may be characterized as follows:

1. 1834-1861: a de facto gold standard in a largely bimetallic international monetary system

2. 1862-1878: the greenback standard

3. 1879-1914: a gold standard without a central bank, and a fractional reserve banking system, as part of an expanding international gold standard

4. 1914-1933: a managed gold standard, under the Federal Reserve System, which was legally obliged to maintain minimum gold reserves against its monetary liabilities, in a short-lived postwar international gold exchange standard

5. 1933-1934: a floating dollar in an international monetary system split between a depreciated sterling area and a gold bloc clinging to parity

6. 1934-1948: the interwar and World War II and immediate post war managed gold standard, in a fragmented international monetary system

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*Governor Henry C. Wallich -- I dissociate myself from a number of technical and historic points presented in this chapter.

Congressman Henry S. Reuss -- So do I. See my "additional dissenting views."

7. 1948-1968: the Bretton Woods dollar/gold standard system, with progressive dilution of the gold restraints on U.S. monetary conduct

8. 1968-1973: the breakdown of the Bretton Woods system

9. 1973-1981: the United States on an inconvertible paper dollar standard

U.S. Experience on the Gold Standard

1. 1834-61 -- a de facto gold standard

Before 1879, the United States was legally on a bi-metallic standard, but from 1834 until the Civil War suspension of specie payments, de facto it was on the gold standard. The Mint ratio established by the Coinage Act of 1792 made the dollar equivalent to 24.75 grains of fine gold and to 371.25 grains of fine silver, or a ratio of 15 to 1.[1] The Mint ratio at that time matched the market ratio. Subsequently, a great increase in Mexican and South American silver output led to a decline in the market value of silver relative to that of gold or a ratio approximating 15-1/2 to 1. Hence silver was overvalued at the Mint and relatively little gold was brought there. Instead, gold was shipped abroad where the price was higher. De facto during the period before 1834, the United States was on a silver standard.[2]

On June 28, 1834, the Coinage Act of 1834 changed the Mint ratio to 16.002 to 1, lessening the gold weight of a dollar to 23.2 grains of fine gold and leaving unchanged the silver weight of a dollar.[3] Before 1834, 100 ounces of pure gold or 1500 ounces of pure silver in coin would discharge a debt. After 1834, the debt could be paid with 94 ounces of pure gold in coin. But since silver was undervalued at the Mint, it was driven from circulation. Offering 1475.5 ounces of silver was sufficent at the market ratio to obtain 94 ounces of gold. The Coinage Act in effect debased the currency. Some supporters of the Act were aware that it would drive silver out of circulation. It was indeed their objective to achieve a gold standard and a permanent circulation of gold coins. Others urged that as the market value of silver relative to gold had been falling for many years before 1834, it would continue to do so in the future and therefore the Mint undervaluation of the metal would soon be eliminated. That prediction was wrong.[4]

The Act of 1834 was supplemented in 1837 by a law changing the proportion of alloy to pure metal in gold to correspond to that in silver. It established the ratio of alloy at one-tenth, changing the quantity of pure gold from 23.2 to 23.22 grains.[5] For each dollar weight in gold, there is a corresponding price of gold per fine troy ounce of 480 grains (480/23.22 = $20.67). The Mint ratio between silver and gold coins became 15.98 to 1 (371.25/23.22).

The gold discoveries in Russia, Australia, and California from 1848 on produced a fall in the market value of gold, accentuating the discrepancy between the Mint and the market ratios. By 1851, a silver dollar was worth about 104 cents of a gold coin, so no one would use silver in settlement of debts. Silver was used as a commodity, not as money.[6] Since subsidiary silver coinage was proportional to the weight of the dollar piece, it also disappeared from circulation. By 1850, there was a gold standard without adequate subsidiary money for retail transactions. The demonetization of silver may be dated from the Act of February 21, 1853, rather than the customary date of 1873. The Act reduced the number of grains of pure silver in 100 cents from 371.25 to 345.6, a reduction of nearly 7 percent which exceeded the difference between the value of the gold dollar and silver dollar.[7] The market value of the pure silver in subsidiary silver coins was thus less than the gold dollar (first minted in 1849; before then, only larger denominations had been coined).[8] The face value of subsidiary coins accordingly was greater than their value in bullion. The supply of subsidiary coins was left to the discretion of the Secretary of the Treasury, and their legal tender limited to a sum not exceeding five dollars. The Act also for the first time imposed a charge for seigniorage, which until then had been an expense borne by the Government, although subsidiary coins were not subject to seigniorage. (The Resumption Act of 1875 repealed the charge.)[9]

The overvaluation of gold at the Mint that made the dollar a gold currency, when the United States was legally on a bimetallic standard, was reinforced by the gold discoveries after 1848. In France, also legally on a bimetallic standard from 1803 on, the circulation was almost exclusively silver since the market ratio was higher than the Mint ratio of 15-1/2 to 1. When the gold discoveries after 1848 depressed the value of gold, as in the case of the United States, the divergence between the Mint and market ratios served to shift the franc to a gold standard de facto.[10] Only Great Britain was on a full-fledged gold standard during the period after 1821, when convertibility was restored after

the Napoleonic Wars. Since Great Britain was the world's leading trading country and the London money market was the hub of international capital movements, the gold standard had international scope despite the limited number of countries formally adhering to it.

External and internal shocks interacted during the decade beginning 1834, resulting in a highly unstable performance by the U.S. economy. The chief external shock was British in origin. British eagerness to invest in the United States in the early 1830s necessitated a U.S. trade deficit, made possible by a rise in U.S. prices above those prevailing in Britain. Thanks to an inflow of specie into U.S. bank reserves, the money supply expanded, causing U.S. prices to rise. (It is not clear that Andrew Jackson's war on the Second Bank of the United States had any independent consequences for monetary expansion.) Ultimately, loss of specie by the Bank of England led it in 1836 to restrain the capital outflow to the U.S. It raised the discount rate in July and August, refused to discount bills of exchange drawn on mercantile houses engaged in the Anglo-American trade, even at the higher rates, and as a result, produced financial pressure in the United States by early 1837.[11]

Simultaneously with the early capital outflow from Britain, a surge in British demand for U.S. raw cotton triggered a land boom. Between 1833 and 1836, land sales by the Federal Government at a constant price sextupled. News of the Specie Circular in July 1836, requiring payments to land agents in specie, concerned the Bank of England because of the implied rise in the demand for specie in the United States. Domestically, the planned distribution to the states in four equal installments (only three took place) of the surplus accumulated by the Federal Government from its land sales, starting January 1, 1837, might also have imposed a hardship on the banks as funds were transferred from one institution to another.[12]

Financial pressure in the United States in early 1837 was aggravated by a fall in the price of cotton, as British demand declined. As a result, debts secured by cotton became frozen, merchants holding such debts went bankrupt, and banks with such loans in their portfolios suspended specie payments as an alternative to the repayment of debts to Britain at a fixed exchange rate. In effect, the United States devalued the dollar during the period of suspension when foreign exchange was available only at a premium.[13]

The suspension continued for a year. In 1838, the economy revived when Britain resumed capital exports, but in 1839, loss of specie again prompted the Bank of England to raise the discount rate. As in 1837, both the supply of capital to the United States and the demand for its cotton fell. The successor Pennsylvania-chartered Bank of the United States, which had extended loans on cotton when the price was high, suspended specie payments in October 1839, followed by banks in the South and West. Nine states defaulted on their bonded indebtedness in 1841 and 1842, shutting off further capital flows from Europe until the 1850s. Bank failures were widespread, the supply of money fell sharply, and deflation ruled, 1839-43.

Banking panics also occurred in 1848 and 1857, but only the latter one was accompanied by restrictions on convertibility and a premium on gold.[14]

The gold standard experience of the United States before the Civil War was dominated by the role of the Bank of England. The standard imposed real adjustment costs on this country. External shocks produced boom and depression that further amplified the effects of internal shocks. Adjustment costs were the price the United States paid for maintaining a fixed exchange rate with sterling. When the costs became excessive, specie payments were suspended.

The record of the quarter-century from 1834 on reveals the magnitude of adjustment costs. Wholesale prices at annual rates varied as follows:[15]

1834-37 (+8 percent); 1837-43 (-7 percent); 1834-47 (+5 percent); 1847-49 (-5 percent); 1849-55 (+5 percent); 1855-61 (-4 percent).

The estimates of real output for the period 1834-59 are not continuous with the post-Civil War estimates.[16] At annual rates, they also suggest not much greater stability than in wholesale prices:

1834-36 (-1 percent); 1836-39 (+6 percent); 1839-40 (-1 percent); 1840-53 (+6 percent); 1853-54 (-4 percent); 1854-59 (+4 percent).

2. 1862-1878 -- the greenback standard[17]

Early in 1862, convertibility of Union currency into gold was suspended as a result of money creation in the

North to help finance the Civil War, disturbances in foreign trade, the general uncertainty arising out of the war, and the borrowing techniques of the Treasury. From then until resumption of specie payments on January 1, 1879, the United States was legally on a fiduciary standard -- the greenback standard. Despite support for inconvertible currency by many business groups before and during the war, and growing farm support after the war as agricultural prices fell, suspension of payments was generally regarded as temporary.

During suspension, greenbacks circulated side by side with gold, with the price of gold in terms of greenbacks varying from day to day. A floating rate of exchange existed between the two currencies. The major monetary use of gold was for foreign transactions. For foreign payments, gold was equivalent to foreign exchange, since Great Britain in particular maintained a gold standard. Dealers as well as others having extensive foreign transactions therefore found it convenient to maintain gold balances as well as greenback balances. To accommodate them, New York banks, and perhaps others as well, had two kinds of deposit accounts: the usual deposits payable in greenbacks or their equivalent, and special deposits payable in gold. The gold deposits were expressed in "dollars" like the greenback deposits, but the dollar stood for the physical amount of gold that had corresponded to a dollar before the Civil War and was to again after 1879. During the period of suspension, this physical amount of gold was worth more than a dollar in greenbacks -- it was worth well over two dollars in greenbacks from mid-1864 to early 1865.

Gold also retained an appreciable, though minor role, in domestic payments. Customs duties were payable in gold. In addition, the Treasury made virtually all interest and principal payments on its debt in gold at the pre-Civil War monetary value. Some private debt instruments required payment of interest or principal in gold. Finally, the West Coast remained largely on a specie basis. In the rest of the country, prices were quoted in greenbacks, and gold offered in payment was valued at its current market premium in greenbacks. On the West Coast, by contrast, prices were quoted in gold, at the pre-war parity, and greenbacks offered in payment were valued at their current market discount in gold.

Before the Civil War, the exchange rate between the U.S. dollar and the British pound varied around $4.86 within a narrow interval determined by the costs of shipping gold. From 1862 on, the exchange rate was not so limited and moved far outside those limits. It was determined by the demand for and supply of foreign exchange, and there was no legal commitments on the part of the United States that prevented the exchange rate from taking any value that was necessary to balance international payments.

The essential requirement for a return to the prewar parity was that the exchange rate so determined be within the initial range determined by the gold points. Once the Civil War was over, the most important factor affecting the exchange rate between the U.S. dollar and the British pound was the movement of internal prices in the United States relative to prices in Britain. A drastic decline in U.S. prices between 1867 and January 1879 made resumption possible. The price index fell at the rate of 5.4 percent per year (see Chart 2-1). Over the same period, the quantity of money rose at the rate of 1.3 percent per year. An exceedingly rapid rise in output was the primary factor producing the decline in prices.

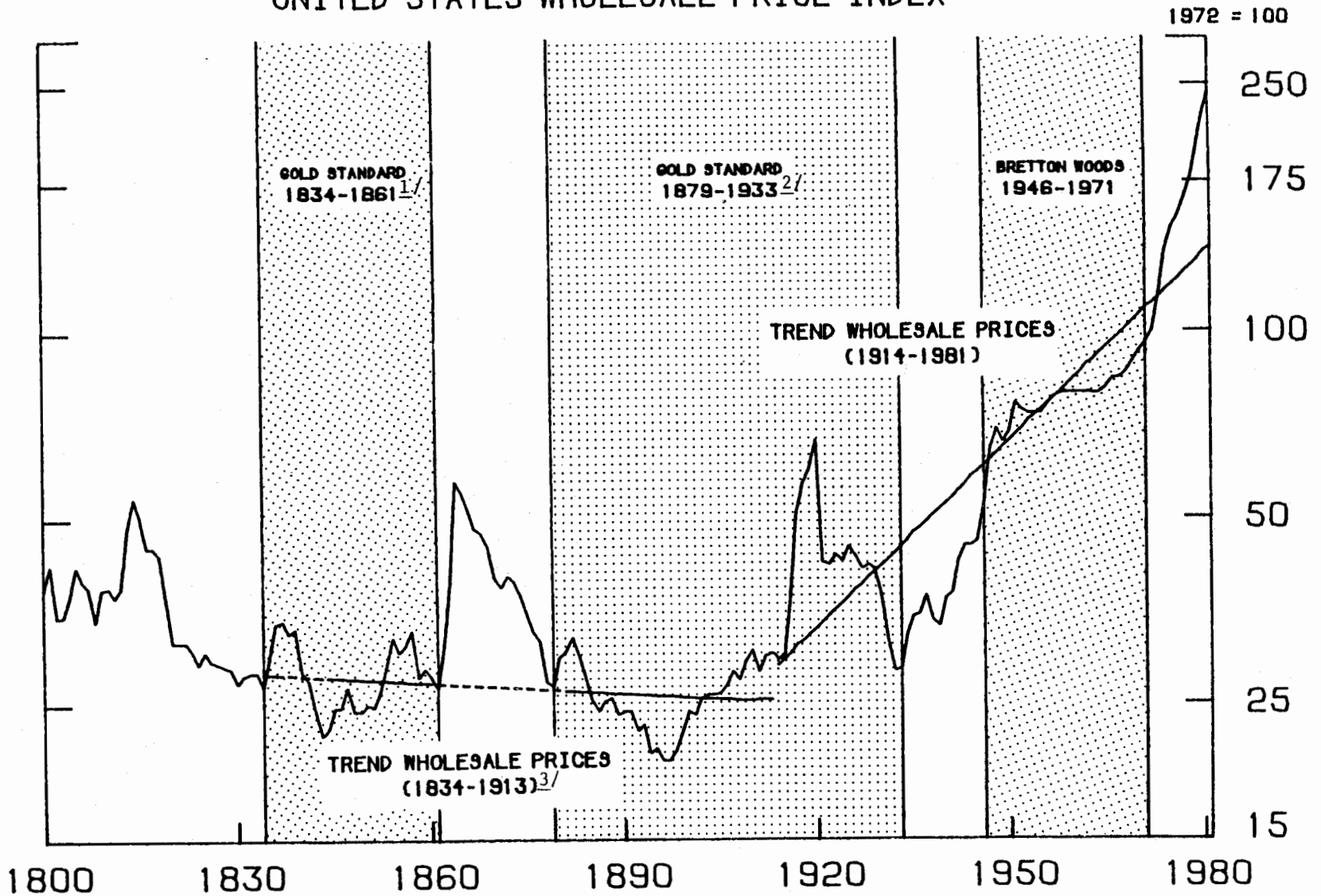
Specie resumption was a major political objective of the period and the question whether the government was proceeding toward this objective too rapidly or too slowly was a major political issue. Government action played a minor, if crucial, supporting role in contributing to successful resumption. It may have contributed to the rapid expansion of output through its policies on sale of public land, land grants to railroads, and other similar measures which contributed to the expansion of the West. But such government action was not of the kind that anyone at the time or since would have regarded as explicitly directed toward achieving resumption.

Government action had mixed effects on the mild rate of growth of the quantity of money outstanding. On the one hand, federal and state legislation laid the foundation for the rapid growth of commercial banking, particularly state banks after 1867, that produced increases in the ratios of deposits to reserves and deposits to currency. In addition, the elimination of reserve requirements against national bank notes in 1874 liberated reserves that encouraged a rise in the deposit-reserve ratio. The rise in the deposit ratios tended to increase the quantity of money outstanding, and thereby to inhibit price declines and to postpone the achievement of the prerequisites for successful resumption. On the other hand, the government did succeed in bringing about a minor reduction in the stock of high-powered money, mostly through use of government surpluses and debt refunding operations to retire Civil War currency issues from 1865 to 1869, and it thereby helped offset to a limited extent the effect of the rises in the deposit ratios.

In view of the recurrent political pressures to expand the greenback issues -- to which the government in fact yielded in 1873-74 following the banking panic of 1873 and the subsequent business contraction -- and the political difficulty then as now of obtaining budget surpluses to retire debt, the achievement of even a minor decline in highpowered money was not a negligible accomplishment.

The Resumption Act of January 14, 1875, which announced the intention to resume specie payments at the pre-war parity

CHART 2-1
UNITED STATES WHOLESALE PRICE INDEX



1/ Excludes 1838-1843 when specie payments were suspended.

2/ United States imposes gold export embargo from September 1917 to June 1919.

3/ Broken line indicates years excluded in computing trend.

Note: See Michael D. Bardo, Federal Reserve Bank of St. Louis Review, 63 (May 1981)

on January 1, 1879, contained a variety of provisions designed to appeal to silver advocates (replacement of fractional currency -- a Civil War paper issue -- by silver coins); paper money advocates (removal of existing limits on the aggregate issue of national bank notes and linking the retirement of greenbacks -- the aggregate outstanding not to fall below $300 million -- to the increase in national banknotes; for every five dollar increase in national bank notes the Treasury was to retire four dollars in greenbacks); and gold standard advocates (its main provisions). The Act authorized the Secretary of the Treasury both to use surplus revenue and to sell bonds in order to accumulate a gold reserve. At the time, the Act was little more than the expression of a pious hope and, insofar as it had any contemporary effect, it was to heighten the opposition to resumption.

That opposition was reflected in the free silver movement that arose in the mid-1870s. The Monetary Commission that was formed late in 1876 by a joint resolution of the Congress presented a year later one majority and two minority reports. The majority argued against resumption as "not practicable under the circumstances, until the laws making gold the sole metallic legal tender are repealed." Some of the majority recommended the old silver dollar of 412.5 standard grains (equivalent to 371.25 grains of fine silver); the rest recommended a legal relationship between silver and gold of 15.5 to 1 instead of the old relationship of 15.98 to 1, achievable either by reducing the silver content of the silver dollar to 399.9 or by increasing the gold content of the gold dollar. They favored the former inflationary effect. One minority report rejected silver as unsuitable for a standard of value but recommended devaluation of the gold dollar by about 2.6 percent. The second minority report supported the principle of silver remonetization only on condition that an international conference would accept silver as a universal legal tender.[18] There was clearly a range of views on the proper monetary standard, with some diehard attitudes toward resumption at the pre-Civil War parity. Late in 1877, the House passed a bill to repeal the Resumption Act. The bill was defeated in the Senate by one vote. This paper-thin decision turned out to be politically decisive.

The decline in the quantity of money in the last years before resumption, which helped foster the particularly rapid price decline in those years, in part owed something to the decline in the two deposit ratios associated with bank suspensions in 1877-78, in part to the influence of the Resumption Act. The clause in the Resumption Act requiring a withdrawal of $4 of greenbacks for every $5 of new national bank notes was interpreted in a manner that served to contract total circulation. The failure to deduct the voluntary surrender of national bank notes issued by banks retiring their notes from the gross increase in national bank notes by other banks effectively reduced outstanding note issues.[19]

Both before and immediately after resumption, the Treasury in its refunding operations went to great lengths to avoid the introduction of even temporary disturbances of any magnitude in the foreign exchange market. In 1877-79, the Treasury refunded about half the average outstanding interest-bearing public debt, to take advantage of lower rates of interest. For foreign holders of securities, calls of old bonds were so timed that one collection of securities was replaced by another or, if offsetting sales of new bonds were not possible, surplus from current account was available to pay for old bonds retired without export of U.S. gold. During these years, in fact, the United States was a net importer of over $5 million in gold, despite a repatriation of over $300 million of U.S. Government securities by foreigners.

The Resumption Act, and the borrowing and accumulation of a specie reserve under its provisions, had three effects, working in different directions, on resumption.

1. Insofar as the Act and the specie reserve instilled confidence in the prospective maintenance of specie payments, it inhibited either a speculative withdrawal of funds from the United States or a speculative accumulation of specie, and enhanced the willingness of foreigners to hold U.S. dollar balances. Had there been no Resumption Act, repatriation by foreigners of U.S. securities in 1876-78 might well have been greater than it was. More important, by setting a definite exchange rate that was to be attained and a definite date at which it was to be attained, the Act offered those speculators with confidence that the government would in fact succeed in achieving those aims an incentive to proceed so as to hold it there. In fact, the monthly average premium on gold dropped below 2 percent by March 1878 and never thereafter rose above that level. This effect clearly favored resumption.

2. The sale of bonds was an open market operation. The sale of bonds at home for gold was equivalent to selling bonds for greenbacks and then using the proceeds to purchase gold, with the effect of an open market purchase combined with an equivalent open market sale, the two together leaving the total monetary base unaffected. In practice, though gold was not the legal standard, it was used for monetary purposes alongside greenbacks. In consequence, insofar as the gold purchased came from gold held for monetary purposes by either the domestic public or the domestic banks, it did, in the first instance, reduce the reserve basis of the system. However, the banks and others could always replace gold holdings, if they so wished, by purchasing gold or its equivalent, sterling, in the free market at home or abroad and, in fact, that is what happened. The increase in the Treasury's gold reserves was not appreciably at the expense of the high-powered money holdings of the public or the banks. This effect was essentially neutral with respect to the growth of high-powered money.

3. Since gold was the equivalent of foreign exchange, the Treasury's purchase of gold constituted an increase in the demand for foreign exchange. Insofar as it borrowed abroad resources that would otherwise not have been available for loans to this country, it increased the supply correspondingly. But some of its borrowing abroad must have been at the expense of other lending to this country (lending was going on even though the net capital movement from this country was outward); to that extent, the supply was increased less than the demand even by foreign borrowing. Borrowing at home had this effect to an even greater extent. By borrowing at home, the Treasury acquired resources that would have been used in other ways, some of which might have involved a demand for foreign exchange. At most, however, only part of the resources would have been used to purchase foreign exchange, whereas the Treasury used all of them in this way. The result of the greater increase in demand than in supply was to make the greenback price of sterling higher than it otherwise would have been. The effect therefore made resumption more difficult; it required, that is, a decline in domestic prices sufficient not only to balance foreign payments on current account at the desired exchange rate but also to produce a large enough balance of payments surplus to finance the accumulation of the specie reserve. Whether the Resumption Act on balance hindered or helped resumption therefore depends on whether this effect was more or less important than the effects on confidence and speculation, and on the growth of high-powered money.

Whatever the conclusion on this score, the cessation of government borrowing to build up a gold reserve, once resumption had taken place, removed a source of pressure on the exchange rate and permitted domestic prices to rise sharply immediately after resumption, without producing balance-of-payments problems.

3. 1879-1914 -- a gold standard without a central bank[20]

The success of resumption did not end uncertainty about the monetary standard. For nearly two decades thereafter, the U.S. financial scene was dominated by controversy, which had started in the seventies, over the place of silver in the monetary system.

The rapid expansion of output in the Western world during those decades and the adoption of a gold standard over an area far wider than before added substantially to the demand for gold for monetary purposes at any given price level in terms of gold. That expansion in demand more than offset a contemporary expansion in supply, as a result both of increased production of gold and improvement of financial techniques in erecting a larger superstructure of money on a given base of gold. The result was a slow but rather steady downward tendency in product prices that prolonged and exacerbated the political discontent initiated by the rapid decline in prices after the end of the Civil War. "Greenbackism" and "free silver" became the rallying

cries. The silver forces were strong enough to obtain concessions that shook confidence in the maintenance of the gold standard, yet they were not strong enough to obtain the substitution of silver for gold as the monetary standard. The monetary history of this period is therefore one of repeated crises of legislative backing and filling.

The political campaign of 1896 on these issues was conducted with notorious bitterness involving both class and sectional conflicts. Fear and smear techniques were used freely on all sides. The free-silver advocates succeeded in capturing Democratic state conventions and in maneuvering adoption of a free-silver plank in the Democratic national convention, which chose William Jennings Bryan as candidate.* The National Silver party and the People's party -- an agrarian party -- deflected from its extensive reform program by the hope of victory on the silver issue, also nominated Bryan. A conservative Democratic group seceded, held an independent convention, and nominated its own candidate (John M. Palmer). The Republic party nominated McKinley who was persuaded to accept along with the nomination a platform favoring the gold standard until "international agreement with the leading commercial nations of the earth . . . can be obtained" for coining gold and silver at a fixed ratio. A rump group seceded from that convention and went over to the Democrats.

The election was won by the Republicans, largely, it has been claimed, because the farm vote swung to the party as a result of the rise in price and quantity of farm-product exports during the fall of 1896. Once the party was in power, Republican political action for monetary reform was restrained. Bryan's strength at the polls, however, compelled the Republicans to keep a campaign promise to propose another international conference in Europe to remonetize silver. The defeat of the silver inflationists had improved the United States' bargaining position, but by that time, rising gold output had snatched from the silver advocates the chance of achieving an international bimetallic standard. Not until March 14, 1900, however, was the Gold Standard Act passed. It declared the gold dollar to be the monetary standard of the country and prescribed a reserve of $150 million in the Treasury for the redemption of paper money.

The defeat of William Jennings Bryan in the Presidential election of 1896 marks in retrospect the end of the period. His defeat happened to follow gold discoveries in South Africa and Alaska and the perfection of the cyanide process for extracting gold. These developments produced a rapid expansion of the world's production of gold. Bryan's second defeat in the Presidential election of 1900 sealed the doom

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*Congressman Henry S. Reuss -- I include at this point an excerpt from the speech made by William Jennings Bryan at the Democratic convention:

"There are two ideas of government. There are those who believe that, if you will only legislate to make the well-to-do prosperous, their prosperity will leak through on those below. The Democratic idea, however, has been that if you legislate to make the masses prosperous, their prosperity will find its way up through every class which rests upon them."

of silver as a major issue dominating national politics. The gold standard had finally triumphed in the United States. The price reversal, which farmers had sought to achieve with silver, was produced after 1897 by the prodigious increase in the international supply of monetary gold. It was sufficiently large to force an upward price movement over the next two decades despite a continued growth in world output. The "money" issue retreated from the center of political controversy. The gradual rise in prices rendered the gold standard secure and unquestioned in the United States until World War I.

Monetary disturbances during the period from 1879 to 1914 were associated with banking difficulties in 1884, 1890, 1893, and 1907. Under a fractional reserve banking system, the public's withdrawal of currency from the banks not only reduced the banks' reserves but also produced a multiple contraction in deposits. In some episodes, as in the period 1834-1861, the banks restricted convertibility of deposits into currency. As a consequence, currency sold at a premium, which was equivalent to a depreciation of the deposit dollar in terms of gold or foreign exchange. These monetary disturbances, however, were attributable to the U.S. banking structure rather than the gold standard system, as was clear from the case of banking difficulties in 1873. The need for reform of the banking structure was widely acknowledged after 1907.

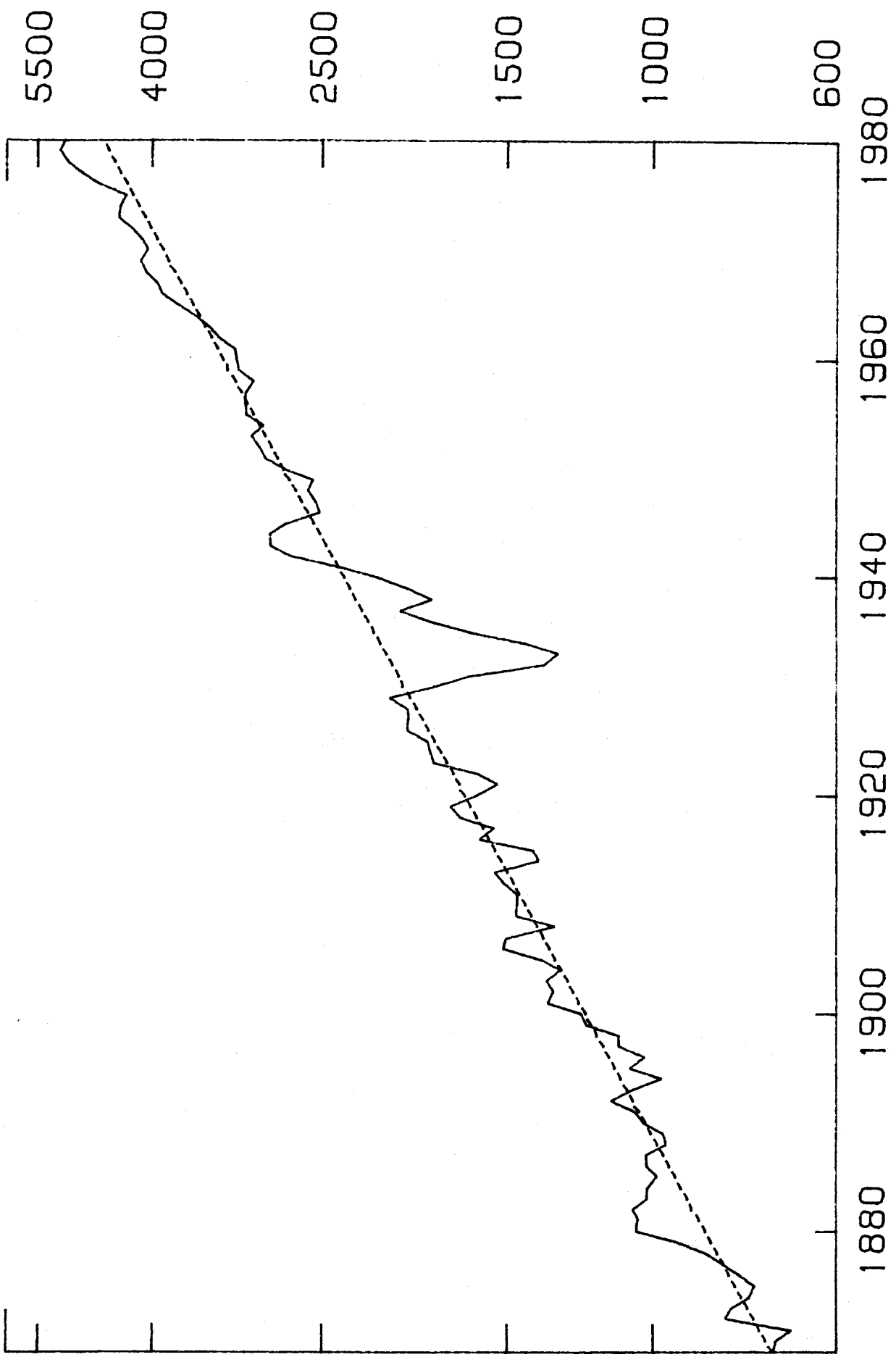
To form a judgment about U.S. experience under the gold standard, we can examine the behavior of prices and real per capita output (Charts 2-1 and 2-2), and of the monetary gold stock and the purchasing power of gold (Chart 2-3). The trend of the wholesale price index for the period 1834-61 and 1879-1914 was slightly downward, with a marked degree of variance about the trend.[21] Despite a sharp decline in estimated holdings between 1890 and 1896, the trend of the U.S. monetary gold stock was positive from 1879 to 1914.[22] The trend of the purchasing power of gold was positive (a falling price level) from 1879 to 1896, negative (a rising price level) from 1897 to 1914, reflecting the more rapid growth in U.S. monetary gold than in real output in the later period. Deviations from trend in the monetary gold stock were negatively associated with deviations from trend in the purchasing power of gold, with some tendency for the purchasing power deviations to lead the monetary gold stock deviations. This would be consistent with a tendency for the price level to revert towards a long run stable value under the pre-World War I gold standard, though over the short run inflation or deflation was experienced.

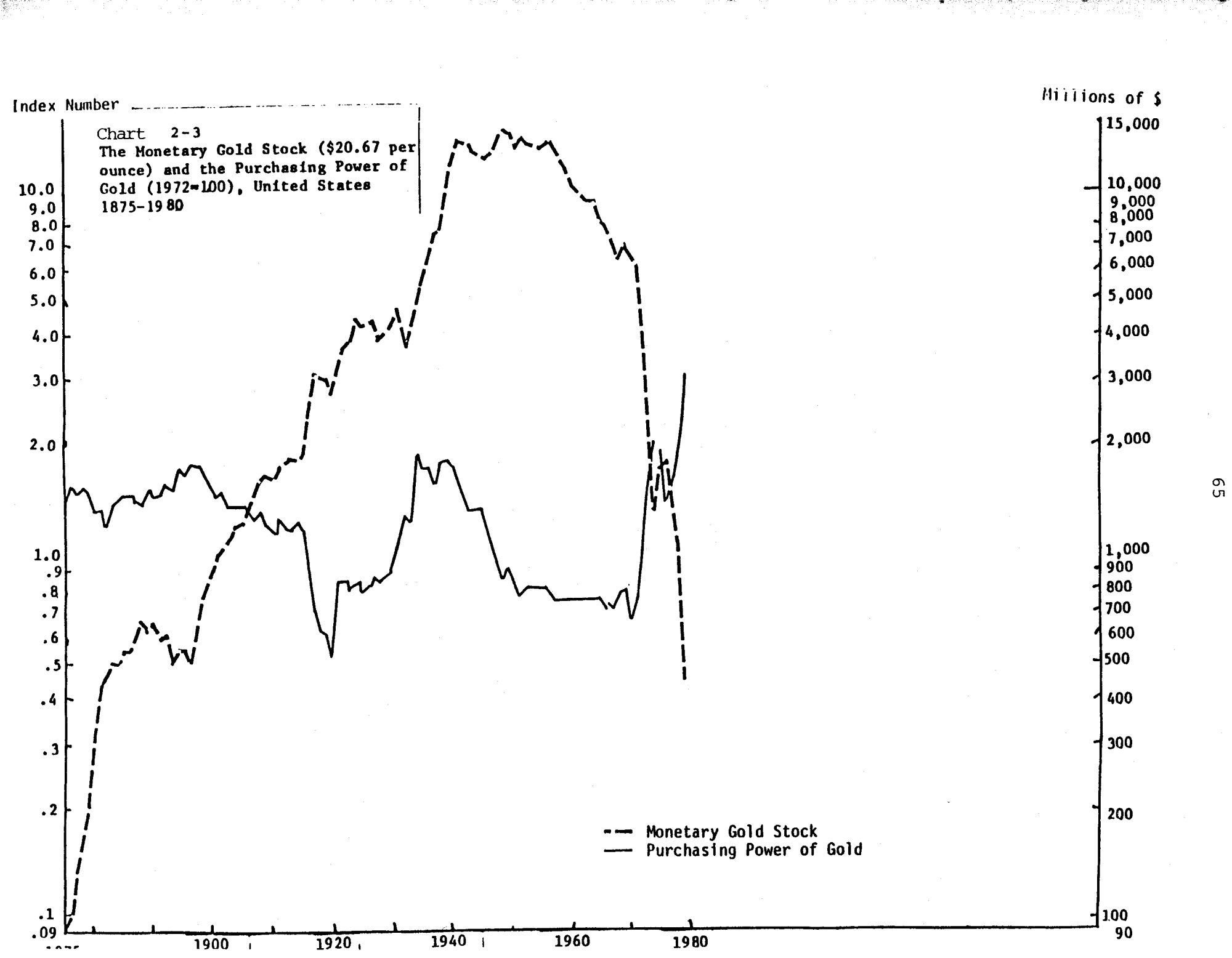
As might be expected, the trend of U.S. real per capita income was strongly positive from 1879 to 1914, but with substantial variance about the trend.[23]

In sum, contemporaries regarded the pre-World War I gold standard as a successful commodity standard, international in scope from the late nineteenth century on. It provided long-run stability despite short-term price instability. Years might elapse before a tendency to decline or rise in the price level was reversed. Real output growth around a rising trend was not steady but the instability was attributed to special features of the U.S. banking structure.

CHART 2-2

U.S. PER CAPITA REAL INCOME IN RELATION TO TREND




Index Number
Millions of $
Chart 2-3
The Monetary Gold Stock ($20.67 per ounce) and the Purchasing Power of Gold (1972=100), United States 1875-1980
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
.09
15,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
900
800
700
600
500
400
300
200
100
90
1900
1920
1940
1960
1980
Monetary Gold Stock
Purchasing Power of Gold

Relative to Great Britain, the United States was only a small country in the world economy. The Bank of England dominated the world economy, influencing international flows of capital and managing the gold standard on a narrow gold base, so that the rest of the world had to keep in step with its actions. With the monetary systems of many countries linked together through fixed exchange rates, international payments imbalances led to movements in money supplies, price levels, the relative prices of exports and imports, incomes and interest rates.

The extent to which these results were due to relative international peace, relatively free international trade, factor mobility within and across countries, the concentration of world capital and money markets in London, and the willingness of gold standard countries to maintain fixed parities can be judged by comparison with the absence of these conditions in the post-World War I decades.

4. 1914-1933 -- a managed gold standard[24]

The Federal Reserve Act was passed in 1913 under peacetime conditions when it was taken for granted that the gold standard would prevail. The Act included a gold standard rule incorporated in gold reserve requirements for Federal Reserve notes and deposits and also a "real bills" rule, according to which the criterion for determining the quantity of money would be linked to "notes, drafts, and bills of exchange arising out of actual commercial transactions" (section 13), offered for discount at rates to be established "with a view of accommodating commerce and businesss" (section 14d). Both were regarded as quasi-automatic in their operation. Taken literally, the two rules were contradictory. Maintenance of the gold standard means that the stock of money must be whatever is necessary to balance international payments. The real bills rule sets no effective limit to the quantity of money.

The Act was no sooner passed than the conditions taken for granted ceased to hold. Before the Federal Reserve System began operations in November 1914, World War I had begun. Very soon the belligerents effectively left the gold standard and a flood of gold started coming to the United States to pay for purchases by the Allies. Between September 1917 and June 1919 the United States controlled gold exports by export licenses and in effect suspended interconvertibility between paper money and gold. The gold standard criterion set a largely ineffective limit on the total quantity of money. A worldwide gold standard was re-established for a brief period in the 1920s, yet the gold standard never again played the role that the framers of the Act took for granted. The real bills criterion fared no better. Once the United States entered the war, loans on government securities began to rival commercial paper as collateral for Reserve Bank rediscounts. The Reserve System was authorized to issue notes against rediscounted assets other than commercial paper, mainly members' 15-day notes secured by government bonds. Thus the Federal Reserve System began operations with no effective legislative criterion for determining the quantity of money.

This conclusion can be documented by comparing the actual course of events with what would have happened under a fully operative gold standard. The wartime experience under a gold standard might not have differed from what actually occurred: the large inflow of gold up to the entry of the United States into the war would have produced a price rise through 1918 similar to actual experience. The big difference would have emerged between the end of the war and 1920 when nearly half of the monetary expansion from 1914 on occurred because the Federal Reserve subordinated monetary policy to the alleged necessity for facilitating Treasury funding of the floating debt plus unwillingness to see a decline in the prices of government bonds. The monetary expansion and the accompanying inflation led to an outflow of gold after the lifting of the embargo despite the great demand abroad for U.S. exports and despite the departure of most countries from a fixed parity between their currencies and either gold or the dollar. The ensuing decline in the reserve ratio of the Federal Reserve System finally compelled action to slacken monetary growth. The initial action -- a sharp rise in discount rates in January 1920 -- produced a reversal of the gold outflow of May. The following action -- a second rise in discount rates in June 1920 to the highest level in Federal Reserve history until 1973 -- was a deliberate act of policy involving a reaction stronger than was needed, since a gold inflow had already begun. It was succeeded by a heavy gold inflow and a negative rate of monetary growth over the following year, as both bills discounted by the Federal Reserve and its portfolio of government securities were sharply reduced. Wholesale prices were nearly halved by June 1921 from their level in May 1920. Real output fell precipitously.

The postwar increase in the quantity of money occurred because the Federal Reserve System did not observe the rules of the gold standard but exercised discretion. The subsequent collapse occurred because the power to manage money was not limited by the requirement to maintain gold reserve requirements. Had there been no discretion, neither the postwar increase, nor the postwar collapse need have occurred. Other things equal, the conversion from a wartime to a peacetime economy would likely have lowered temporarily the level of economic activity, but the Federal Reserve exacerbated the severity of the contraction.

The price and output movements of the post-World War I years in this country were part of a worldwide movement. Throughout most of the world, for victors, vanquished, and neutral alike, prices rose sharply before or into 1920 and fell sharply thereafter. About the only countries that escaped the price decline were those that were to experience hyperinflation. Though many national currencies were not rigidly tied either to gold or to the dollar, central bank policies nevertheless produced linkages sufficiently strong to result in common movements of prices in most national currencies. Flexible exchange rates were regarded as a temporary expedient pending return to gold, and monetary authorities everywhere sought to facilitate such a return to fixed parities. The results under managed fiduciary currencies were therefore similar to those that would have been experienced with fixed parities.

During the balance of the 1920s, the Federal Reserve System did not permit gold movements to affect the quantity of money outstanding. Inflows were offset by open market sales of government securities, outflows, by open market purchases. Federal Reserve credit after 1923 moved inversely with movements in the gold stock. The System achieved stable economic growth with falling wholesale prices, but this achievement was largely at the expense of economic stability in Great Britain and the peripheral countries tied to sterling. Britain's return to gold in 1925 at a parity that overvalued sterling would have caused her less difficulty if prices in the United States had risen instead of fallen thereafter. The United States would then have gained less gold or lost some, and the pressure on the pound would have been eased. When France returned to gold in 1928 at a parity that undervalued the franc and also did not permit gold inflows to affect its money stock and prices, the British position was further undermined.

The monetary standard to which most countries had returned by 1929 was the gold-exchange standard. They kept their monetary reserves in the form of balances of other currencies convertible into gold at fixed prices, notably sterling and dollars, rather than in the form of gold itself. Official agencies in such countries, usually the central banks, often fixed exchange rates directly by standing ready to buy or sell the national currency at fixed rates in terms of other currencies, rather than indirectly by standing ready to buy or sell gold at fixed prices in terms of the national currency.

Since the gold-exchange standard, like the gold standard, involved fixed exchange rates, it also meant that, so long as the standard was maintained, prices and incomes in different countries were intimately connected. They had to behave so as to preserve a rough equilibrium in the balance of payments among countries. The gold-exchange standard, however, made the international financial system more vulnerable to disturbances because it raised the ratio of claims to gold available to meet those claims.

The links by fixed rates of exchange ensured a worldwide decline in income and prices after 1929.* As is well known, shocks in one country's income, employment, and prices, tend to be transmitted to income, employment, and prices of its trading partners under a fixed exchange rate system. The evidence is clear that the United States was in the van of the movement and not a follower. If declines elsewhere were being transmitted to the United States, the transmission mechanism would be a balance of payments deficit in the United States as a result of a decline in prices and incomes elsewhere relative to prices and incomes in the United States. That decline would lead to a gold outflow from the United States which, in turn, would tend -- if the United States followed gold-standard rules -- to lower the stock of money and thereby income and prices in the United States.

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*Congressman Henry S. Reuss -- The view expressed here of the events leading up to the Great Depression is controversial and not shared by all economists.

However, the U.S. gold stock rose during the first two years of the 1929-33 contraction and did not decline, demonstrating that other countries were being forced to adapt to our monetary policies rather than the reverse.

The international effects were severe and the transmission rapid, not only because the gold-exchange standard had rendered the international financial system more vulnerable to disturbances, but also because the United States did not follow gold-standard rules. The Federal Reserve did not permit the inflow of gold to expand the U.S. money stock. It not only sterilized it, it went much further. The U.S. quantity of money moved perversely, going down as the gold stock went up. In August 1929, at the start of the business contraction, the U.S. quantity of money was 10.6 times the gold stock; by August 1931, it was 8.3 times the gold stock. The result was that other countries not only had to bear the whole burden of adjustment but also were faced with continued additional disturbances in the same direction, to which they had to adjust.

The effects first became severe in those countries that had returned to the gold standard with the smallest actual gold reserves, and whose financial structure had been most seriously weakened by World War I -- Austria, Germany, Hungary, and Rumania. To shore up the financial systems of those countries, international loans, in which the Reserve System participated, were arranged. But so long as either the basic pressure on those countries deriving from deflation in the United States was not relieved, or the fixed-exchange rate link which bound them to the U.S. dollar was not severed, such assistance was at best a temporary palliative. In country after country, that is what it proved to be. As they experienced financial difficulties, the United States was in turn affected by the reflex influence of the events it had set in train.

The first major country to cut the link was Britain, after runs on sterling precipitated by France and the Netherlands. Britain abandoned the gold standard in September 1931. The international monetary system split in two, one part following Britain to form the sterling area; the other following the United States, in the gold bloc. The trough of the depression in Britain and in other countries that accompanied Britain in leaving gold was reached in the third quarter of 1932.

In the two weeks following Britain's departure from gold, central banks and private holders in a number of foreign countries converted substantial amounts of their dollar assets in the New York money market to gold. The U.S. gold stock declined by the end of October to about its level in 1929. The Federal Reserve System, which had not responded to an internal drain from December 1930 to September 1931 as a series of runs on banks, bank failures, and shifts from bank deposits to currency by anxious despositors produced downward pressure on the U.S. quantity of money, responded vigorously to the external drain. A sharp rise in discount rates ended the gold drain temporarily but intensified bank failures and runs on banks. In 1931, unlike the situation in 1920, the System's reserve ratio was far above its legal

minimum. The System overreacted to the gold outflow and magnified the internal drain.

The Federal Reserve System justified its passivity in relation to the internal drain by reason of a shortage of free gold. The law specified that the System hold against Federal Reserve notes outstanding, the volume of which had increased with the internal drain, a reserve of 40 percent in gold and additional collateral of 60 percent in either gold or eligible paper (which consisted of commercial, agricultural, or industrial loans, or loans secured by U.S. government securities rediscounted by member banks; loans to member banks secured by paper eligible for rediscount or by government securities; and bankers' acceptances, i.e., "bills bought" in Federal Reserve accounting terminology). Because the System did not have enough eligible paper to furnish 60 percent of the collateral for Federal Reserve notes, part of the gold in excess of minimum requirements had to be pledged for this purpose. The amount of gold not needed to meet either minimum gold requirements or collateral requirements was therefore less than the amount of excess gold reserves. The Federal Reserve System asserted that the shortage of free gold was an important factor preventing the System from engaging in open market purchases. Such purchases would have reduced eligible paper holdings still further by reducing rediscounts and therefore could have been conducted only to a very limited extent without eliminating free gold entirely. Whatever the validity of the Federal Reserve view, the Glass-Steagall Act of February 27, 1932, disposed of that problem by permitting government bonds in the Reserve Banks' portfolios as well as eligible paper to serve as collateral against Federal Reserve notes in addition to the 40 percent minimum gold reserve.

The downward movement of money, income, and prices in the United States was reversed for a few months in the second quarter of 1932, when the Federal Reserve undertook a program of open market purchases, following which there was widespread revival in the real economy in the summer and fall. The termination of the program during the summer was followed in the six months from October 1932 by mounting banking difficulties, leading to state banking holidays. By February 1933, fears of a renewed foreign drain added to the general anxiety. For the first time, also, the internal drain partly took the form of a specific demand for gold coin and gold certificates in place of Federal Reserve notes or other currency. The Federal Reserve System reacted as it had in September 1931, raising discount rates in February 1933 in reaction to the external drain but not seeking to counter either the external or internal drain by extensive open market purchases. In the first few days of March, heavy drawings of gold, both internal and external, reduced the New York Federal Reserve Bank's reserve percentage below its legal limit. With some reluctance, the Federal Reserve Board suspended requirements for thirty days. On March 4, the Federal Reserve Banks remained closed as did all the leading exchanges. A nationwide banking holiday was proclaimed after midnight on March 6 by the incoming administration. All banks were closed until March 9 and gold redemption, gold shipments abroad or dealing in foreign exchange were suspended during the bank holiday.

The Emergency Banking Act of March 9, 1933, granted the President emergency powers over banking transactions and over foreign exchange dealings in gold and currency movements. The next day, March 10, the President issued an executive order extending the restrictions on gold and foreign exchange dealings beyond the banking holiday proper and, in effect, prohibiting gold payments by banking and nonbanking inssitutions alike, unless permitted by the Secretary of the Treasury under license. These measures were the precursors to a far-reaching alteration in the legal structure of the monetary standard.

5. 1933-1934 -- a floating dollar[25]

Despite the effective suspension of gold payments in March 1933, the price of gold or the rate of exchange between the dollar and currencies that remained rigidly linked to gold, hovered around "par" for over a month. The suspension was regarded as part of the banking emergency and hence expected to be temporary; foreign exchange transactions were strictly controlled and limited; the Administration made no official announcement that it proposed to permit the dollar to depreciate or be devalued; and after some weeks, several licenses to export gold were granted. Moreover, the technical gold position was sufficiently strong so that there was little doubt the preceding gold parity could have been maintained if desired; the ratio of the gold stock to the total stock of money was higher than at any time since 1914.

One important step, unprecedented in the United States, was taken during this period. On April 5, an executive order forbade the "hoarding" of gold and required all holders of gold, including member banks of the Federal Reserve System, to deliver their holdings of gold coin, bullion, or certificates to Federal Reserve Banks on or before May 1 except for rare coins, reasonable amounts for use in industry and the arts, and a maximum of $100 per person in gold coin and gold certificates. The gold coin and gold certificates were exchanged for other currency or deposits at face value, and the bullion was paid for at the legal price of $20.67 per fine ounce. The "nationalization" of gold outside Federal Reserve Banks was later completed by order of the Secretary of the Treasury, dated December 28, 1933, excepting only rare coins and a few other minor items from the requirement that all gold coin, gold bullion, and gold certificates be delivered to the Treasurer of the United States at face value corresponding to the legal price of $20.67 per fine ounce. The expiration date for the surrender of gold was later set for January 17, 1934, when the market price of gold was in the neighborhood of $33 per fine ounce.

An executive order of April 20, 1933, extending and revising the gold embargo, and comments by the President at his news conference the preceding day ended the period of stability in the price of gold. The President made it clear that the Administration intended to permit the dollar to depreciate in terms of foreign currencies as a means of achieving a rise in domestic prices. The order applied the restrictions on foreign exchange transactions not only to banks licensed under the executive order of March 10, but also to

all persons dealing in foreign exchange. On the same day, the Thomas amendment to the Agricultural Adjustment Act was offered in Congress. The amendment enacted into law on May 12, and explicitly directed at achieving a price rise through the expansion of the money stock, contained a provision authorizing the President to reduce the gold content of the dollar to as low as 50 percent of its former weight. The dollar price of gold immediately started rising, which is to say that so also did the dollar price of foreign currencies, including those like the French franc that remained on gold and those like the pound sterling that had gone off gold at an earlier date. In the next three months, the market price of gold rose to $30 an ounce, and thereafter fluctuated erratically between a low of about $27 and a high of nearly $35 until January 30, 1934, when the Gold Reserve Act was passed. During that period, the United States had a floating exchange rate determined in the market from day to day, as in the period from 1862 to 1879. However, there was considerably greater government intervention in the market. On September 8, 1933, an official gold price, to be fixed daily at the estimated world market figure less shipping and insurance cost, was established. The Treasury agreed to buy gold at that price to give American miners a price as high as they could have obtained by export in the absence of the export embargo.

Starting in October, the government intervened actively to raise the price of gold. The Reconstruction Finance Corporation was authorized to buy newly mined domestic gold from October 25 on, and a few days later, through the agency of the Federal Reserve Banks, to buy gold abroad. The purchase price was raised almost daily. For a time, the large-scale RFC purchases abroad made the announced price for newly mined domestic gold the effective market price. From the end of November, however, until the end of January 1934, the announced price exceeded the market price abroad.

The aim of the gold policy was to raise the prices of farm products and raw materials. Most farm products and raw materials exported by the United States had a world market, hence the decline in the foreign exchange value of the dollar meant a roughly proportional rise in the dollar price of such commodities as cotton, petroleum products, leaf tobacco, wheat, and similar items.

The decline in the foreign exchange value of the dollar was initially a product of speculative sale of dollars in the expectation of devaluation -- a short-term capital outflow. The decline was sustained by shifts in the demand schedules for imports and the supply schedules of exports produced by the cessation of internal deflation. Prices rose in the United States relative to prices in other countries. If the exchange value of the dollar had not fallen, the price rise would have discouraged exports and encouraged imports. These forces were subsequently reinforced by U.S. purchase of gold at home and abroad.

U.S. purchase of gold involved a reduction in the supply of goods for export, since gold is a potential export good, and hence a reduction in the demand for dollars by holders of other currencies

(to buy the domestically produced gold). The purchase of foreign gold involved an increase in the demand for goods for import (namely, gold) and hence in the supply of dollars offered in exchange for foreign currencies (to buy foreign gold). The combined effect was to create a potential deficit in the U.S. balance of payments at the former exchange rate. Given a flexible rate, the potential deficit was closed by a depreciation of the dollar sufficient to generate, through an increase in exports or a decline in imports or a movement of speculative funds, an amount of foreign currencies exceeding the amount demanded for other purposes by enough to pay for the gold.

These effects depended very little on the fact that gold was the commodity purchased. Given a floating exchange rate, essentially the same effects on the dollar prices of internationally traded goods would have followed from the same dollar volume of government purchase of wheat or perfume, or from the economically equivalent program, adopted after World War II, of building up stockpiles of foreign-produced strategic goods. As it was, the use of gold as the vehicle necessarily meant an accumulation of gold, just as the use of wheat or perfume would have meant the accumulation of that commodity.

The choice of gold as the vehicle did have an important effect on the impact of the program on foreign countries. In the first place -- and a corresponding effect would be present for any particular commodity -- the program had a special impact on gold-producing countries. In the second place -- and this effect would be present only for a commodity serving as the basis of a monetary standard -- it had a special impact on gold-standard countries. Being committed to sell gold at a fixed price in terms of their own currency, these countries necessarily experienced pressure on their gold reserves, which in turn necessitated either abandonment of the gold standard or internal deflationary pressure. Those countries were placed in the position of having to adjust downward their whole nominal price level.

The device used to achieve a decline in the exchange value of the dollar -- borrowing funds (through the issue of RFC securities) to purchase gold -- was not unprecedented. The identical device was employed before 1879 but that time for precisely the opposite purpose: to promote a rise in the exchange value of the dollar. As noted above, the mechanical as opposed to the psychological effects of the accumulation of a gold reserve rendered resumption more rather than less difficult.

A major obstacle to using gold as a vehicle for lowering the exchange value of the dollar and thereby raising prices was the existence of the so-called gold clause in many government and private obligations and in private contracts. That clause, whose use dated back to the greenback period after the Civil War, required payment either in gold proper, or in a nominal amount of currency equal to the value of a specified weight of gold. It was designed precisely to protect lenders and others against currency depreciation. This clause, if honored, would have multiplied the nominal obligations

of the federal government and of many private borrowers for interest and principal of debt by the ratio of the new price of gold to the old price of gold. Accordingly, a joint resolution was introduced in Congress on May 6, and passed on June 5, 1933, abrogating the gold clause in all public and private contracts, past and future. In February 1935, the Supreme Court, by a five-to-four decision, in effect upheld the constitutionality of that resolution. Not until the Act of October 28, 1977, was the prohibition against gold clauses removed, and express allowance for their use provided.

At the outset, the gold policy was one of two mutually inconsistent policies with respect to the monetary standard simultaneously pursued by President Roosevelt. The other was the organization of a World Monetary and Economic Conference which convened in London in June 1933. President Hoover had set in train the arrangements for the convocation of the Conference in May 1932, and it was originally scheduled to be held in January 1933. The aim of the Conference was to achieve cooperative action on international economic problems, and hopes were high that it would produce an agreement stabilizing foreign exchange arrangements. But the Conference was nearly a complete failure. One reason was that, while it was in process, the President apparently decided definitely to adopt the path of currency depreciation. He sent a message to the Conference on July 2, 1933, which disassociated the United States from any attempt to achieve what was described as a "temporary and probably an artificial stability in foreign exchange on the part of a few large countries" and was termed a "specious fallacy." The message was at the time given much of the public blame for the failure of the Conference. However, whatever the President might have said and however consistent U.S. policy might have been, it seems dubious that the economic preconditions existed for a viable exchange stabilization agreement. The fundamental difficulties were the probable incompatibility of the exchange rates of the sterling bloc and of the nations that still remained on gold, and the unwillingness at the time of the gold-bloc countries to change their gold parities.

The period of a variable price for gold came to an end on January 31, 1934, when the President, under the authority of the Gold Reserve Act passed the day before, reduced the gold content of the dollar to 13.71 grains and thus specified a buying and selling price of $35 an ounce for gold (480/13.71 = $35). He thereby devalued the gold dollar to 59 percent of its former weight. Under the terms of the Act, title to all gold coin and bullion was to be vested in the United States; all gold coins were to be withdrawn from circulation and melted into bullion and further gold coinage was to be discontinued; the Secretary of the Treasury was to control all holdings and dealings in gold; and the President was authorized to fix the weight of the gold dollar at any level between 50 and 60 percent of its prior legal weight.

Since the Treasury had formerly valued its own gold holdings at $20.67 an ounce, and paid only that price for gold it acquired from private individuals, commercial banks, and the Federal Reserve System, it realized a large "paper" profit from the revaluation of

the dollar; which is to say, the Treasury could print additional paper money entitled "gold certificates" to a nominal value of nearly $3 billion without acquiring additional gold and yet conform to the legal requirement that it hold a specified weight of gold (now less than before) for each dollar printed. Those gold certificates could not be legally held by private individuals, but they could be held by Federal Reserve Banks. Accordingly, to realize its "profits," the Treasury had to turn over gold certificates to the Federal Reserve System, receiving in return a deposit credit that it could convert into Fedeal Reserve notes or pay out by check. Stripped of its legal trappings, the economic effect was identical with a simple grant of authority to the Treasury to print and put in circulation nearly $3 billion of fiat currency in addition to the $3 billion in greenbacks already authorized by the Thomas Amendment to the Agricultural Adjustment Act.

Of the paper profit, $2 billion was appropriated to a stabilization fund set up under the control of the Secretary of the Treasury, who, with the approval of the President, was authorized to deal in gold, foreign exchange, and such other instruments of credit as he deemed necessary for the purpose of stabilizing the exchange value of the dollar. Of the balance of the paper profit, $645 million was used for the redemption of national bank notes, which simply substituted one form of fiduciary currency for another; $27 million was transferred to the Federal Reserve Banks for making industrial loans; $2 million was charged off to losses in melting gold coin; and $141 million remained in the General Fund cash balance.

Thus the interlude during which the United States was not on a gold standard was concluded. The type of gold standard on which it operated thereafter is the subject of the section that follows.

6. 1934 - 1948 -- the interwar, World War II, and postwar managed gold standard[26]

The official price of gold remained fixed at $35 an ounce from February 1, 1934, until March 31, 1972, when the official price was altered to $38. In this sense, the date in 1934 marked the return to a gold standard. But the gold standard to which the United States returned was very different, both domestically and internationally, from the one it had left less than a year earlier. The Treasury bought all gold offered to it by domestic producers at the price of $35 an ounce and sold at this price to licensed domestic industrial users. Internationally, the Treasury bought and sold gold at the fixed price in monetary transactions with foreign monetary authorities. The holding of gold coin and bullion was forbidden to private individuals in the United States, except for use in industry and the arts and for numismatic holdings, and gold no longer circulated domestically. The Federal Reserve continued to have a gold reserve requirement, but the state of the reserve was not a direct influence on policy at any time from 1933 until the threatened depletion of the gold reserve in the period from 1948 to 1968, under the Bretton Woods arrangements. In 1945, when the System was approaching the then existing requirement (40 percent for

Federal Reserve notes and 35 percent for Federal Reserve deposits), the law was changed to require a uniform 25 percent.

Fixed buying and selling prices for gold were no longer the main reliance for maintaining rigid exchange rates with other currencies, even those of countries nominally on gold. Instead, a new finance ministry organ was created, the stabilization fund, with powers to engage in open market purchase and sale of foreign exchange and gold to influence exchange rates. During the late 1930s, most of the so-called gold-bloc countries finally left gold, and nominally floating exchange rates with government intervention through stabilization funds became the rule. During the war, many countries fixed "official" exchange rates but sought to maintain them by extensive control over foreign exchange transactions, imitating the devices developed by Hjalmar Schacht for Germany in the 1930s, rather than by free purchase or sale at fixed prices of either gold or foreign exchange. Since then, an even wider variety of multiple exchange rates came into use.

After 1934, the role of gold in the United States was not that of the base of the domestic monetary system. Rather it became a commodity whose price was officially supported in the same way as the price of wheat, for example, was under various agricultural support programs.* The major difference is that the support price for agricultural products was paid only to domestic producers, the gold-support price to foreign monetary authorities as well. In addition, the agricultural products accumulated were freely sold at the support prices to anyone, the gold only to certain foreign purchasers and to licensed domestic industrial users. In consequence, the gold program set a floor under the world price of gold in terms of dollars.

The substitution in 1934 of a fixed price for gold, rather than a variable price as under the earlier purchase program in 1933 and early 1934, meant that the number of dollars spent on gold was no longer under the direct control of U.S. authorities. Having fixed the price, they were committed to buy all that was offered by foreign monetary authorities and domestic producers. But the effects of such purchases were the same as under the earlier program. For the United States, the purchases meant an increase in the dollar value of other exports relative to the dollar value of imports, thanks to a rise in prices of internationally traded goods relative to domestic goods through the combined effect of changes in exchange

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*Herbert J. Coyne -- Many economists would generally consider gold's role more distinctive than that of an ordinary commodity in this period. Indeed, Dr. Schwartz states in the book she authored with Milton Friedman, A Monetary History of the United States, 1867-1960 (on p. 473) that: "The link between gold purchases and Treasury authorization to create high-powered money is, of course, the main remnant of the historical role of gold, and still serves to give gold some special monetary significance."

rates and in domestic price levels of the various countries. For gold-producing countries, the purchases meant a higher price for one of their products, hence an expansion in the gold industry relative to other industries and a rise in income. For gold-standard countries, the price fixed for gold in the United States determined the rate of exchange between their currencies and dollars. They either had to adjust their internal price level to that new rate -- in the process presumably disposing of some of their reserves as measured in ounces of gold -- or to change their own fixed price of gold. For all gold-standard and gold-producing countries except the United States and for nongold-standard and nongold-producing countries, the gold purchases meant a reshuffling of international trade in response to a decreased U.S. demand for products other than gold, and an increased demand for such products by gold-producing countries; the program meant an increased supply of products from the United States and a decreased supply of products other than gold from gold-producing countries. Finally, international trade had to adjust to measures adopted by gold-standard countries to meet loss of their reserves.

The price fixed for gold initially overvalued the product and therefore stimulated a rapid increase in production and a rapid accumulation of government stocks. Production in the United States including its possessions rose from less than 2.6 million ounces in 1933 to 6 millon in 1940; in the world from 25 million ounces in 1933 to 41 million in 1940. The rise in prices of other commodities and services from 1940 to 1948 lowered the relative price of gold and reduced U.S. gold output (1948) below its 1933 level, though world output still exceeded the level of that year.

There was an initial sharp jump in the U.S. gold stock from January to February 1934 that was accounted for primarily by the revaluation of gold, but part was produced by the substantial amount of gold imported, as foreigners took advantage of the higher buying price that became official on January 31. Gold was almost immediately shipped to the United States. In the six weeks from February 1 to March 14, more than $0.5 billion of gold (valued at the new price) was imported. Once the initial rush of gold imports ended, the gold stock continued to rise at a fairly steady rate to the end of 1937. Until France left gold in late 1936, roughly half of U.S. gold imports came from France. For the next year, France was a net importer of gold from the United States rather than a net exporter. During the last quarter of 1937, a large-scale withdrawal of foreign short-term balances followed rumors that further devaluation of the dollar was being considered as a possible counter-cyclical measure. Withdrawal of European short-term funds from the United States ceased in July 1938. These counter movements roughly offset the forces making for a continued flow of gold to this country, so the total gold stock remained fairly steady from autumn 1937 to autumn 1938. Munich then led to a further flight of capital from Europe and a sudden increase in the rate of gold inflow. The outbreak of war simply maintained the rate of the gold inflow. The intensification of Britain's war effort after the fall of France in early 1940 and her attempt to tap American supplies of war material, as she had in

World War I, produced a further increase. Finally, the enactment of lend-lease in early 1941, which relieved Britain and her allies of the necessity of acquiring dollars to finance war purchases, brought an end to the rapid growth of the gold stock. In sum, the gold stock in the Treasury rose from 200 million ounces when the support price was fixed in early 1934 to 630 million ounces by the end of 1940, a rise that was 1-3/4 times as much as aggregate world output during the intervening period. The gold stock declined somewhat during the war, but an inflow in 1946-48, arising from the demand for U.S. goods of war devastated and neutral countries, brought the stock to nearly an all-time high in 1948 (exceeded only in 1949).

The rise in the dollar price of currencies of gold-bloc countries was at first much greater than that of currencies not linked to gold. From January 1933 to September 1934 the rise was 70 percent for the currencies of France, Switzerland, Belgium, the Netherlands, and Italy, and less than 50 percent for the pound sterling. The gold-standard currencies therefore appreciated not only relative to the dollar but also relative to other currencies. The differential appreciation measured the special impact of our gold price-support program on the position of the gold-standard countries. The fact that they lost gold meant that they bore, as it were, a larger part of the effect of the expansion of U.S. exports and contraction of U.S. imports other than gold than other countries did, and thereby cushioned the initial impact on those other countries.

Had nothing else intervened, the gold-standard countries would have had to reduce their internal price levels relative to those of other countries in order to stay on gold, that is, in order to render something like the new structure of exchange rates consistent with no pressure on the balance of payments. In fact, something else did intervene, but it intensified rather than eased the problem of the gold-standard countries. Gold purchases under the fixed price-support program coincided with a flight of capital to the United States from Europe largely induced by political changes: first, the rise to power of Hitler in Germany which led to a large-scale attempt to transfer capital out of Germany; then the increasing fears of war which led to flight of capital from France, Britain, and other European countries.

If the United States had continued its floating exchange-rate policy of 1933 and had fixed no firm price at which it was willing to buy the world's gold, the capital flight would have produced an appreciation of the U.S. dollar relative to other currencies, which would have discouraged exports from the U.S. and encouraged imports into the U.S. That outcome would have produced the unfavorable balance of trade required as the physical side of the capital import -- and incidentally, would have worked against one of the domestic objectives of New Deal policy, namely, to raise exports relative to imports as a means of stimulating employment. If, instead, the U.S. and other countries involved had all been on a gold standard of the nineteenth century variety, the attempt to transfer capital to

the U.S. would have increased gold reserves in this country, even without a rise in the dollar price of gold, and decreased gold reserves abroad; it would have increased proportionately the money stock in the U.S. and thereby have promoted a rise in domestic prices and income; and it would have decreased the money stock abroad and thereby have promoted a fall in prices and income in foreign countries. These changes would have tended to produce precisely the same shift in relative prices and the same unfavorable balance of trade as the appreciation of the dollar under the hypothetical floating exchange rates would have done.

Since the flight of capital constituted an increased demand for dollars, its effect on exchange rates and on U.S. trade in commodities and services other than gold were in precisely the the opposite direction to those of the gold price-support program and tended to offset them. There was simultaneously an increased offer of dollars for gold on the part of the U.S. Government and and an increased demand on the part of foreigners for dollars to hold. By trading assets held abroad for gold and transferring the gold to the U.S. Treasury, foreigners could acquire dollars and the Treasury could acquire gold without in any way affecting the rest of the U.S. balance of payments. To the extent that such offsetting occurred, the gold program did not affect U.S. trade currents and the relative prices of internationally traded goods in ways referred to earlier. Since such changes in trade currents and relative prices tended to reduce the amount of gold offered for sale to the United States at its fixed price, the capital inflow meant that this country acquired a larger amount of gold at $35 an ounce than it otherwise would have. Hence, while the capital inflow and the gold price-support program had opposite effects on U.S. exchange rates and on U.S. trade in commodities and services other than gold, both tended to raise its gold stock. For gold-standard countries that were themselves subject to a capital outflow -- that is, for all the important gold-bloc countries that had remained on gold after 1933 -- the capital outflow reinforced rather than offset the effect of the gold price-support program. It required an additional reduction in internal price levels beyond that called for by the support program. Exports had to be still larger relative to imports if they were to finance the capital outflow without a continued outflow of gold.

The deflation that would have been required by the combined effect of the U.S. gold price-support program and the capital outflow was more than the gold-bloc countries were willing to undergo, as perhaps the effect of either alone might also have been. Accordingly, in the fall of 1936, France and Switzerland devalued their currencies in conjunction with a tripartite agreement between the United States, France, and Great Britian. The governments of Belgium and the Netherlands, which followed suit, and Switzerland also subscribed to the agreement.[27]

All these countries set up exchange stabilization funds. The Tripartite Agreement of September 25, 1936, provided that stablization fund holdings of foreign currencies would be used to avoid undesirable fluctuations in exchange rates. Arrangements for

mutual currency support were undertaken, based on daily gold settlements at prearranged prices. Each day the authorities of the six countries would cable each other the prices in terms of their own currencies at which they would sell and buy gold for the next twenty-four hours. Each party would then decide, without risk of exchange losses, the buying and selling rates for the currencies of the other participants. Foreign balances at the end of each day were convertible into gold at the guaranteed price. The Agreement was a precursor of the swap arrangements that the industrialized countries perfected during the Bretton Woods period of international monetary arrangements. Under the Agreement, the U.S. Exchange Stabilization Fund purchased foreign currencies in New York at rates the foreign funds determined and that day converted these currencies into gold earmarked to its account abroad or released to it from foreign earmarked holdings in the United States. Mainly, however, gold imports into the United States were sold directly by foreign monetary authorities or private importers to the U.S. Treasury.

In purchasing gold, as in purchasing agricultural or other commodities, the U.S. Government can be said to have three sources of funds: tax receipts, borrowing, or money creation. The one difference is that the support program for other commodities (excepting silver) carried with it no authorization to create money, whereas the support program for gold did, thereby automatically providing the financial means for its continuance. Treasury deposits at Federal Reserve Banks could be increased through gold purchases by gold certificate credits equal to the amount of gold purchased times the official price of gold. Except for a minor handling charge (1/4 of 1 percent), this was also in practice the amount the Treasury spent by drawing a check on its deposits in acquiring gold. Gold purchases were usually financed in this way; hence, increases in the gold stockpile produced no automatic budgetary pressure. The link between gold purchases and the Treasury authorization to create high-powered money was the main remnant of the historical role of gold, and seemed to give gold some special monetary significance. The one important occasion when a different method of finance was used was in 1937, when the Treasury "sterilized" gold by paying for gold with funds raised through security issues.[28]

It is easier to describe the gold policy of the United States during the years 1934-1948 than it is to describe the resulting monetary standard of the United States. It was not a gold standard in the sense that the volume of gold or the maintenance of the nominal value of gold at a fixed price could be said to determine directly or even at several removes the volume of money. It was clearly a fiduciary rather than a commodity standard, but it is not possible to specify briefly who managed its quantity and on what principle. The Federal Reserve System, the Treasury, and still other agencies supervising the banking system affected the quantity of money by their actions in accordance with a wide variety of objectives. In principle, the Federal Reserve System had the

power to make the quantity of money anything that it wished, within broad limits, but it seldom stated its objectives in these terms. It sometimes, as when it supported the prices of government securities from 1942 to 1951, explicitly relinquished its control. And it clearly was not unaffected in its actions by gold flows. So long as the exchange rate between the dollar and other currencies was kept fixed, the behavior of relative stocks of money in various countries was necessarily close to what would be produced by gold standards yielding the same exchange rates, even though the mechanism might be quite different.

7. 1948-1968 -- the Bretton Woods dollar/gold standard system[29]

The international monetary system that was designed at the Bretton Woods Conference in 1944 reflected professional views on the defects of the arrangements that had prevailed in the 1930s. Protectionist trade policies, exchange controls, and competitive currency depreciation of the pre-World War II period were the cautionary experiences to be avoided by the postwar world. Removal of controls on trade and payments under a system of fixed exchange rates, with adjustment of parities limited to "fundamental" disequilibrium in the balance of payments, accordingly were the goals of the system created by the delegates to the Conference. The lending facilities of the International Monetary Fund were to be available to supplement IMF members' gold and foreign exchange reserves to provide them liquidity when in temporary balance of payments deficit.

Under the Bretton Woods Agreement of 1944, the Articles of Agreement of the International Monetary Fund provided that currency par values should be expressed in terms of gold or the U.S. dollar expressed in gold. IMF members were required to pay 25 percent of their quota subscriptions in gold, with some discretion allowed to reduce the gold proportion for countries with a weak reserve position. Gold subscription payments became a permanent asset of the Fund available to supplement its lending resources; many types of transactions between the IMF and its members were required to be made in gold; and members were required to maintain the gold value of IMF holdings of their currencies. Thus gold was to play a central role in virtually all aspects of IMF operations, and of countries' international monetary obligations as defined in the IMF Articles.*

As the Bretton Woods system evolved in practice, most countries maintained the legal par values for their currencies by intervening in the exchange markets to maintain exchange rates for their currencies at specified levels in terms of the U.S. dollar. Only the United States met its par value obligations by undertaking freely to buy and sell gold in official transactions at the official price -- the dollar's par value. The entire system of exchange rates was thus linked to gold through the convertibility undertakings of the United States.

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*Congressman Henry S. Reuss -- This interpretation distorts the meaning of the Bretton Woods system and exaggerates the role of gold in it. In fact, the Bretton Woods system was designed to allow exchange rates to vary in an orderly way, not to fix them. Its authors, including Keynes, viewed it as the very antithesis of a gold standard.

The establishment of par values for currencies was an important item on the Fund's agenda. Canada, France, the Netherlands, the United Kingdom and the United States declared their par values in December 1946; Germany and Japan in 1953, shortly after they became members; and Italy, not until 1960. Some of these parities were short-lived. An abortive attempt at convertibility of sterling in 1947 ended in September 1949, when the pound was devalued. The Netherlands thereupon devalued the guilder, and France, which had had separate rates for financial and commercial transactions, unified them, depreciating the franc vis-a-vis sterling.

In private gold markets until 1953, the price of gold was at a premium, but the IMF rule required monetary authorities to refrain from selling gold at premium prices. In March 1954, several months after the premium had been eliminated, reflecting balance of supply and demand, the London gold market reopened. For the rest of the decade, the price of gold in private markets remained at $35 an ounce.

With the return of many European currencies to convertibility in 1958, the achievement of the Bretton Woods conception of international monetary normalcy seemed only a matter of time. The outflow of dollars in U.S. official aid, military spending, and private investment, and economic recovery in Europe and Japan had enabled foreigners to add to their holdings of dollars and gold. Apart from the 1950-51 Korean war upsurge, U.S. prices were generally stable until the middle of the decade of the '60s, and their rate of rise generally lower than in the rest of the world. Money supplies in the rest of the world (except in the U.K.) grew at a faster rate than in the U.S. perhaps as a result of the U.S. contribution to the buildup of other countries' monetary reserves. The dollar's status as the reserve currency of the international economy seemed impregnable. Commercial banks and private firms could make foreign payments in their convertible currencies without the approval of central banks. Tariff and quota restrictions on commodity trade among the industrialized countries were eased and foreign trade grew at a rapid rate during the period. International transfers of capital grew, with New York at the center of the flows, and the dollar assumed the role as the vehicle currency in which the borrowers obtained capital and the investors lent their savings.

The successful operation of the system depended on foreign central banks intervening with their own currencies against the dollar to maintain par values, and the United States standing ready to buy or sell gold at $35 per ounce in transactions with foreign monetary authorities. The U.S. balance of payments accordingly was determined largely by the exchange parities other countries established. In general, other countries desired surpluses that would add to their dollar reserves, and the system tended to produce a steadily weakening U.S. balance of payments and growing doubts about the sustainability of the U.S. gold convertibility commitment.

A portent of the troubled future of the system was that 1960 was the first year in which U.S. gold reserves declined below the level of its total liquid liabilities to all foreign holders of assets denominated in dollars (Table 2-1).

Concern over the continuing conversion of dollars into gold led the Treasury to activate the Exchange Stabilization Fund. In its initial operations on March 13, 1961, acting through the Federal Reserve Bank of New York as its agent, the Fund sold foreign D-marks to reduce the premium on that currency.[30] On February 13, 1962, the Bank was also authorized to buy or sell foreign currencies on behalf of the Federal Open Market Committee in both spot and forward markets. For this purpose access to a stock of foreign currencies in addition to those acquired from the Stabilization Fund was needed. The Federal Reserve therefore negotiated a network of swap facilities with the central banks of other countries. The swap provided a specific amount of foreign currency in exchange for an equivalent dollar credit for the foreign central bank, with each party protected against loss due to a change in the par value of the other party's currency. Invested balances of both parties earned the same rate of interest, foreign balances in special U.S. Treasury certificates, Federal Reserve balances in interest-earning deposits abroad. Balances were available for payments to the other party or for foreign exchange market transactions. The swap was a credit line, usually for 3-month periods, renewable at maturity. By drawing on the credit, both parties initially raised their gross reserves. The Federal Reserve normally used the proceeds of a swap to absorb foreign official dollar holdings; these transactions in effect, provided forward cover to foreign official dollarholders, reducing their incentive to convert dollars into gold.

Repayments of short-term swap credits meant a corresponding decline in gross reserves. For the U.S. this could entail a loss of gold. To deter this eventuality, the U.S. began issuing nonmarketable securities, with maturities of 15 months to two years, denominated in the holder's currency, to fund outstanding swap debt.

A further indication of U.S. concern about gold was the prohibition after mid-1961 on holding of gold outside the U.S. by U.S. firms and households, and on March 3, 1965, the abolition of gold reserve requirements against Federal Reserve deposits.

A focus of pressure on the U.S. dollar was the London gold market. In March 1960, the price rose above $35 an ounce, as European central banks and private investors bought gold for dollars. The Bank of England sold gold to stabilize the price, but the U.S. Treasury initially was not willing to restore the Bank's holdings. Hence, when a rise in the price of gold occurred in October, the Bank did not intervene. On October 27, with the price reaching $40 an ounce, the Treasury agreed to sell gold to the Bank, reserving for the Bank the decision on intervention in

Table 2-1

U.S. Monetary Gold Stock and Liquid Liabilities to Foreigners

(millions of dollars)

End of Year (1)	Total Monetary Gold Stock[a] (2)	Total Liquid Liabilities to All Foreigners[c] (3)
1954	21,793	12,454
1955	21,753	13,524
1956	22,058	15,291
1957	22,857	15,825
1958	20,582	16,845
1959	19,507	19,428
1960	17,804	20,994
		21,027
1961	16,947	22,853
		22,936
1962	16,057	24,068
1963	15,596	26,361
		26,322
1964	15,471	28,951
		29,002
1965	13,806[b]	29,115
1966	13,235	29,904
		29,779
1967	12,065	33,271
		33,119
1968	10,892	33,828
		33,614
1969	11,859	41,735
		41,894
1970	11,072	43,291
		43,242
1971	10,206	64,166
		64,223
1972	10,487[d]	78,680
1973	11,652[e]	87,620
1974	11,652	120,325[f]
1975	11,599	127,432[f]
1976	11,598	152,468[f]
1977	11,719	193,977[f]
1978	11,671	244,577[f]
1979	11,172	268,451[f]
1980	11,160	295,627[f]
1981	11,151	343,683[f]

Notes to Table 2-1

Source: Col. (2): Treasury Bulletin, December 1965, IFS-1; July 1975, IFS-1; February 1982, IFS-1.

Col. (3): Treasury Bulletin, July 1975, IFS-2; February 1982, IFS-2.

(a) The Stock includes gold sold to the U.S. by the IMF with the right of repurchase, and gold deposited by the IMF to mitigate the impact on the U.S. of foreign purchases for the purpose of making gold subscriptions to the IMF under quota increases.

(b) The figure excludes $259 million gold subscription to the IMF in June 1965 for a U.S. quota increase that became effective February 23, 1966.

(c) The total includes small amounts due to the IMF arising from gold transactions, amounts due to official institutions, commercial banks abroad, to other foreigners, and to nonmonetary and regional organizations. Nonliquid liabilities to official institutions in the source beginning 1962 through 1973 have been deducted. Years for which two entries are shown show differences because of changes in reporting coverage. Figures on the first line are comparable with those for the following dates.

(d) Change in par value of the dollar on May 8, 1972, increased the recorded value of the total gold stock by $828 million.

(e) Change in par value of the dollar on October 18, 1973, increased the recorded value of the gold stock by $1,165 million.

(f) Includes categories of liabilities previously classified as nonliquid.

the market. European central banks soon after agreed to refrain from buying gold in the London market for monetary purposes whenever the price rose above $35.20, the U.S. price plus shipping costs. When the price fell below that level in 1961, the central banks returned to the market. However, in October 1961, when the price again was reacting to heightened demand, an agreement to create a "gold pool" was reached among the U.S. and seven European central banks. Each member undertook to supply an agreed portion of net gold sales to stabilize the gold market, as the Bank of England, as agent for the group, determined to be appropriate. The members of the pool subsequently agreed not to buy gold individually on the market, but to give the Bank of England the right to buy on their joint account when gold supply exceeded demand, the amount purchased to be distributed in proportion to each country's contribution to the pool. The pool functioned until a surge of buying led to the suspension of the arrangement in March 1968. During the period of the pool's operation, the participants sold a net total of $2.5 billion of gold on the London market, of which $1.6 billion was provided by the United States.

A key development for the international monetary system that was not perceived as such at the time was the acceleration of the monetary growth rate and the subsequent acceleration of the U.S inflation rate in the final years of this subperiod. What was perceived was the cumulative growth of deficits in the U.S. balance of payments. Assets denominated in dollars grew in excess of the demand for them by the rest of the world. Their conversion into gold, by shrinking U.S. gold reserves, threatened one of the basic underpinnings of the Bretton Woods structure, namely, convertibility of dollars into gold.

The Bretton Woods system might have been able to survive an end of gold convertibility. It could not survive the inflationary policies of the center country that characterized the decade from the mid-60s on. Crisis management by the IMF and the central banks of the leading industrialized countries became the hallmark of the international monetary system during the heyday of Bretton Woods.[31] The chief currency under pressure, apart from the dollar, was sterling. Persistent or recurring U.K. balance of payments deficits impaired the credibility of sterling's external value, already insecure by reason of the size of sterling balances held worldwide relative to U.K. gold and foreign exchange reserves. Private agents displayed lack of confidence in the dollar and sterling by shifting to currencies whose external values were regarded as stable or likely to appreciate (during this period, the D-mark and guilder). Repeated rescue operations to support the exchange value of sterling were overwhelmed in November 1967. Sterling, however, was a sideshow. The main act was the dollar's performance.

The gold market was the market in which participants expressed lack of confidence in the dollar-based international monetary system. After the devaluation of sterling in November 1967, the

vulnerability of the dollar took center stage. In the winter of 1967-68, a surge of demand for gold threatened both the London gold pool and the $10 billion statutory backing for Federal Reserve notes. On March 12, 1968, the U.S. gold reserve requirement was abolished. Ostensibly, the gold stock was then available for conversion of dollars held by foreign central banks. On March 17, however, the London gold market was closed to avoid further U.S. gold losses. The members of the gold pool announced that they would no longer supply gold to the London or any other gold market and that they no longer felt it necessary to buy gold from the market. Official transactions between central banks were to be conducted at the unchanged official price of $35 an ounce, but the gold price for private transactions was to be determined in the market. Central banks were still free to buy U.S. Treasury gold for dollars but some in fact refrained from doing so. Germany had explicitly forsworn converting its dollar holdings into gold in May 1967.

One measure the U.S. authorities might have taken was a rise in the dollar price of gold, thus increasing the value of the stock and the flow of reserve assets. If other countries did not follow suit by adopting a proportional increase in the price of gold in their currencies, the U.S. in this way might have obtained a devaluation of the dollar. Had the price of gold risen, the gold demands of other countries might have been satisfied without the rundown in U.S. reserve assets. Some countries might also have revalued because of the inflationary consequences of their payments surplus, given the gold-based increase in their asset holdings.

The U.S., however, resolutely opposed a change in the monetary price of gold. Such action would have required an Act of Congress which would have produced a long and unsettling debate in the two Houses, during which time the foreign exchange markets would have been disturbed. Moreover, there was no assurance that other countries would not make corresponding changes in their own par values, and it was feared that confidence in the stability of the monetary system would be seriously impaired by a change in the official dollar price of gold. Given the fixed price of gold when national price levels were rising, gold became an undervalued asset with a resulting gold shortage.

The measures adopted to avoid exchange rate changes were intended in part to limit international transmission of price changes.[32] Surplus countries tried to avoid price increases; deficit countries, price declines, both as external consequences of their balance of payments positions. Intermittently, depending on cyclical conditions, countries in both categories took steps to right payments imbalances.

Since palliatives to improve the balance of payments proved ineffective, deficits had to be financed either by drawing down reserves or seeking external credit or borrowing facilities, while surpluses obviously increased reserve accumulations. During the heyday of the Bretton Woods system, despite the growth of dollar assets, the adequacy of international liquidity, in the sense of

the quantity of international monetary reserves, was widely debated. Discussions during this period growing out of concern for the supply of reserves led to the creation of Special Drawing Rights by the IMF.[33] Until 1968, international reserves, however, were limited to gold, convertible foreign exchange, and reserve positions in the IMF.

Contrary to the expectation of the way the Bretton Woods system would operate, financing of payments imbalances for the most part was arranged through credits governments extended on a bilateral basis and through international borrowing and lending activities of commercial banks. Thus, facilities for international borrowing and lending activities, apart from the IMF drawing facilities, became an increasingly important part of the system.

Official dollar reserves of the surplus countries were augmented at times by actions those countries took in the Eurodollar market. Dollars acquired by their central banks and deposited in the Eurodollar market either directly or through the Bank for International Settlements would usually be relent to private borrowers who could resell the dollars to the central banks.

In sum, world reserves grew rapidly during the period.

8. 1968-1973 -- the breakdown of the Bretton Woods system

The devaluation of sterling in November 1967 was not regarded as the prelude to changes in the par values of other currencies, the devaluation of the dollar in terms of gold, the realignment of exchange rate relationships among the major currencies, and the substitution of a short-lived regime of central rates for the par value system -- all of which took place between November 1967 and December 1971. Instead, it was hoped that balance in the U.S. and U.K. external payments was finally on the point of achievement, and that the creation of a Special Drawing Rights Facility in the IMF would provide the basis for future expansion of official reserves, supplementing dollars, sterling, gold, and other reserve assets.

The hope was belied. The pattern of deficits and surpluses persisted and worsened in 1970 and 1971. The U.S. current account surplus dwindled and the U.S. capital account deficit grew dramatically, producing current account surpluses and capital inflows in other countries. The allocation of SDRs in 1970-72 provided additions to already massive acquisitions of dollar reserve assets.[34]

As in the heyday of the Bretton Woods system, disbelief of market participants in the pegged external values of currencies precipitated turbulence in the foreign exchange market.

The persistent outflow of funds from the U.S. overwhelmed foreign exchange markets in the first few days of May 1971. On May 5, seven European countries closed their foreign exchange markets, and five others on several continents withdrew their

support for the dollar and suspended dealings in D-marks, guilders, and Swiss francs. On May 9, both Germany and the Netherlands announced that their currencies would float, since they could not maintain exchange rates within the established margins.

In March 1971, before the panic of the foreign exchange market, there was a request from several European countries for conversion of officially held dollars into gold to enable them to pay for an increase in their IMF quotas. The payout reduced the U.S. gold stock to the lowest level since 1936. The dollar outflow meanwhile accelerated, leading, as noted, to the floating of European currencies. The imbalance between U.S. gold reserves and outstanding dollar liabilities and the weakening U.S. balance of payments position occasioned the changes the U.S. introduced on August 15, 1971, to achieve a dollar devaluation. Chief among them (besides a price and wage freeze, tax increases and federal government spending cuts) was a 10 percent import surcharge on 50 percent of total U.S. imports. The convertibility of the dollar into gold was formally suspended, as was the use of the swap network through which dollars could be exchanged with central banks for other currencies. The effect was to oblige other countries to hold dollars or to trade them for a price determined in the market and so revaluing their currencies. Foreign exchange markets abroad, except in Japan, shut down. The Japanese initial attempt to maintain the pegged rate of the yen compelled them to purchase $4 billion in the two weeks after August 15. The yen was then freed to float upward; other currencies floated when exchange markets were reopened on August 23. France introduced a dual exchange market, with trade and government exchange dealings based on the par value, financial exchange dealings at a floating rate. Restoration of a repegged system of exchange rates, however, remained the goal of the U.S. and its partners.

After much negotiation, a readjustment of currency parities was arranged at a meeting at the Smithsonian Institution in Washington on December 17-18, 1971. In return the U.S. agreed to withdraw the import surcharge. The par values of four currencies were revalued by percentages ranging from 2-3/4 (Belgium, Netherlands) to 7.7 percent (Japan), with the proviso that 2-1/4 percent margins of fluctuations (replacing the former 1 percent margin) above and below the new so-called "central" exchange rates were permissible. The Canadian dollar continued to float. The Smithsonian agreement also specified that the official dollar price of gold would henceforth be $38, a formal devaluation of the dollar of 7.9 percent. While the dollar remained inconvertible, the new official dollar price of gold implied a depreciation of the gold-value of the dollar rather than an appreciation of the dollar value of other currencies.

The central rates established at the Smithsonian meeting crumbled during the nine months following the floating of sterling in June 1972. Once again, the disbelief of market participants in those rates was revealed in the gold and foreign exchange

markets. The London free market price of gold rose with few reversals. Money growth and inflation rates continued to rise in the U.S. and both the balance of trade and the U.S. balance of payments deficit soared, with a corresponding surge in dollar holdings of the industrialized European countries and Japan. Capital controls were imposed in 1972 by the Netherlands and Japan before sterling was floated and Germany followed suit afterwards. On February 10, 1973, Japan closed its foreign exchange market and suspended support of the dollar. New central values were set in a hurried round of negotiations, although the lira, yen, Canadian dollar, the U.K. and Irish pounds, and the Swiss franc all floated. Again, the official dollar price of gold was raised (this time to $42.22), leaving unchanged the gold value of other currencies. The new central rates did not staunch the flow of dollars abroad, and a further crisis erupted in March 1973. This time the major industrial countries discontinued pegging their exchange rates to the dollar. The EEC countries in the snake, which had been activated in April 1972, plus Sweden and Norway agreed to a joint float, with Germany revaluing by 3 percent (in terms of SDRs) in relation to the other members. Canada, Japan and Switzerland floated individually, as did a handful of other countries. Though a large group of non-industrialized countries pegged to the dollar, the dollar currency area worldwide contracted; smaller groups of countries pegged to the French franc or to the pound.

In retrospect, it is likely that under an adjustable peg system, such as the Bretton Woods system turned out to be, whichever currency is at the center ultimately becomes overvalued. The reason is the asymmetry of action of the nonreserve currency countries in the system. An overvalued currency tends to induce prompt readjustment because weak exports and excessive imports create pressure for action. On the other hand, an undervalued currency tends not to produce pressure for readjustment because strong exports and weak imports are easy to live with. On net, the nonreserve currency countries that demanded action by the United States to right its balance of payments produced devaluations of their currencies against the dollar.

9. 1973-1981 -- the United States on an inconvertible paper standard

When pegged rates were abandoned in March 1973, it was initially assumed that floating was a temporary expedient to be succeeded by a reformed par value system. The U.S. took the lead in opposing the return to such a system. The dispersion of inflation rates among the industrialized countries and the higher variability of rates in inflation since the late 1960s enforced more frequent changes of exchange rates. Under the earlier system, changes in par values were delayed until foreign exchange market crises were provoked. The lesson since the shift in March 1973 was that floating provided more flexibility. The U.S. view prevailed. With the suspension of official gold convertibility, and widespread departures from the IMF's par value

provisions, negotiations were held to codify, in the form of amendments to the IMF Articles, the international monetary arrangements that had evolved in practice.

Under amendments to the IMF Articles agreed in early 1976 and implemented in April 1978, gold was formally removed from its previous central role in the IMF and IMF par value obligations were eliminated. The official IMF gold price was abolished, as were also par value, gold convertibility, and maintenance of gold value obligations. Gold was eliminated as a significant instrument in IMF transactions with members, and the IMF was empowered to dispose of its large gold holdings. Although the amended IMF Articles do provide for the future possibility of establishing a system of stable but adjustable par values, such a decision by the Fund would require an 85 percent affirmative vote by the IMF members, thus giving the United States an effective veto. The provisions in the amended IMF Articles relating to establishment of par values specify that the common denominator of the system shall not be gold or a currency.

It was widely believed that the desired stock of reserve assets would contract in a world of floating exchange rates compared to a world of pegged rates. In fact, official holdings of reserve assets have increased in every year since the float. From 1950 to 1969, on average, world reserves including gold rose by less than 3 percent per year, the foreign exchange component by 5 percent per year. From the end of 1969 to the end of 1972, the average annual rate of increase of foreign currency reserves was 43 percent. Since 1973, the average annual rate of increase has been 15 percent. The main source of growth of foreign currency reserves since 1973, as in earlier years, has been in the form of dollars. The apparent demand for reserves has increased even under floating rates.

A significant change in the distribution of foreign exchange reserves has occurred since October 1973 as a result of the rise in the price of oil. Total foreign exchange reserves of industrial oil-importing countries have increased at a slightly slower pace than reserves of all countries, which sextupled since 1970, but the major oil-exporting countries, which in 1970 held only about 8 percent of total world foreign exchange reserves, by the end of the decade held about one-quarter of the total. The motivations of oil-exporting countries for holding foreign-currency denominated assets are, however, clearly quite different from those of industrial countries.

Although other currencies have increased their roles as reserve currencies in recent years, the dollar has continued to serve as the main reserve currency, accounting for on the order of four-fifths of the world's official foreign exchange reserves. To the extent of intervention, as under pegged rates, the U.S. has settled its payments deficits in dollars, which foreigners willingly add to their asset holdings and use in payments to other countries. (There has been no intervention in foreign exchange markets by the

U.S. for a year and it is forseeably nil, so there are no current payments imbalances.) The dollar also remains the main official intervention currency in foreign exchange markets, and serves as a common vehicle currency in the interbank market for foreign exchange. In effect, the world has adopted an inconvertible dollar standard.

One change in the international reserve profile was the creation on March 13, 1979, of the European Monetary System -- replacing the "snake", the European joint float -- by nine European countries (Belgium, Denmark, France, Germany, Italy, Luxembourg, and the Netherlands; the U.K. is a member but does not participate in intervention arrangements). The center of the system is the European Currency Unit (a basket of all nine currencies), issued by the European Monetary Cooperation Fund in an amount equal to a deposit of 20 percent of gold and dollar reserves of participating countries, to be used for settlement of intervention debts. ECUs, now included in foreign exchange holdings of the participating countries, do not increase world monetary reserves, except for revaluation changes. The ECUs issued value gold on the basis of either the average market price of the six preceding months or the average market price on the day before issue, whichever is lower.

With gold valued at market price, world gold reserves at the end of 1979 were larger than foreign exchange reserves. The U.S. and a number of other countries, however, continue to value their gold assets at the old official price of $42.22 per ounce, despite the abolition of an official IMF price for gold.

After the float, the U.S. took the position that gold should be demonetized. An opposing view was promoted principally by France. Developments reflect the extent to which one or the other dominated international decisions. At issue was the use of gold in official transactions at the free market price, and the substitution of gold for the dollar in inter-central bank settlements at a fixed but higher official price.

The prescription against official transactions in the gold market that had been adopted in March 1968 was terminated in November 1973, but the official price of $42.22 posted in February 1973 was so far below the private market price that central banks were unwilling to buy and sell gold among themselves at the official price. The central banks were equally reluctant to sell gold on the private market in view of the possible depressive effect of sales on the market price or in anticipation of the opportunity to sell in the future at a higher price. In December 1973, the IMF terminated arrangements made four years earlier, under which it had been prepared to purchase gold from South Africa.

In June 1974, countries in the Group of Ten agreed that gold could be used as collateral for inter-central bank loans

at a price other than the official gold price, and in September, Italy obtained a loan from Germany on the pledge of Italian gold valued at a mutually agreed price. In December, the U.S. and France agreed that central banks were at liberty in valuing gold holdings for balance sheet purposes to use the market price, which the Bank of France proceeded to do.

Early in 1975, the countries in the Group of Ten and Switzerland agreed for a two-year period not to increase the sum of their and the IMF's gold holdings and to contribute no support to the price of gold in the free market. In August 1975 agreement was reached by an IMF committee that[35]

-- the official price of gold would be abolished

-- members would not be obliged to use gold in transactions with the Fund

-- a part of the Fund's gold holdings would be sold at auction for the benefit of developing countries and another part would be returned to member countries in proportion to their quotas.

The first public auction of part of the Fund's gold holdings was held in the June 1976. A four-year sales program was scheduled. In the first two years, 16 auctions were held approximately every six weeks, with aggregate sales of 12.5 million ounces. The balance of 12.5 million ounces was sold mainly in 24 auction lots through May 1980, and a small amount in noncompetitive sales. Restitution of 25 million ounces to member countries over a four-year period was completed in December 1979/January 1980.

The U.S. repealed the prohibition against gold holding by U.S. residents as of December 31, 1974, and Treasury offered gold at auction to help meet the expected increase in public demand for gold. The first auctions were held in January and June 1975, when the Treasury disposed of 1.3 million ounces. No auctions were held in 1976 and 1977. They were resumed in 1978 and 1979, when the Treasury sold 4.0 and 11.8 million ounces, respectively, motivated both by the desire to reduce the U.S. balance of payments deficit on current account and by the belief "that neither gold nor any other commodity provides a suitable base for monetary arrangements."[36]

The gold sales were equivalent to open market operations, in their economic effect, approximating $0.8 billion in 1978 and $3.3 billion in 1979. Gold sales by the Treasury reduced the public's deposits and also bank reserves. The sales thus initially may have served as a partial offset to Federal Reserve open market purchases of government securities that increased the public's deposits and bank reserves. It was a partial offset only because the System's portfolio of government securities showed a net increase of $7.7 billion

in 1978 and of $6.9 billion in 1979. It was an offset initially only depending on the Treasury's use of the proceeds of the gold sales. To the extent that the Treasury used the proceeds to retire gold certificate credits and thereby reduced its deposits at the Federal Reserve, the monetary effects of the gold sales were contractionary. However, to the extent that it disbursed the remainder of the funds it acquired, the Treasury's action restored the public's deposits and bank reserves, so the contractionary effect on the money supply of the gold sales was limited.[37]

Since 1979, the Treasury has sold no gold bullion. In July 1980, however, it began the sale of half-ounce and one-ounce gold medallions, in accordance with P.L 95-630, November 10, 1978. The legislation provided that not less than 1 million troy ounces of fine gold per year be struck into medallions and sold to the public over a five-year period at a price covering the market value of the gold content plus all costs. At the end of 1981, U.S. Government gold inventories amounted to 264.1 million ounces.

Direct official intervention to maintain the open market price of currencies within narrow limits has not lessened under floating rates compared with the pegged parity system. Intervention in some countries is assigned to nationalized industries that borrow foreign currency in order to buy their own currency on the foreign exchange market, in Italy and the U.K. with government provision of insurance against foreign exchange loss; in France with no such provision. In Japan and sometimes France, dollar deposits held by the government at commercial banks are used for intervention. Italian and French commercial banks intervene at the government's behest. Central bank intervention may thus be conducted by a variety of institutions at the direction of the monetary authorities.

Intervention by major industrial countries has been motivated by a number of considerations during the period since generalized floating began in early 1973. The United States has intervened primarily to avoid disorderly market conditions and at times (notably after October 1978) to correct severe movements in the dollar's value not related to fundamental economic conditions. Since early 1981, U.S. policy has been to intervene only in case of severe conditions of market disorder. Other countries also have, from time to time, joined in efforts to maintain the value of their currencies within narrow margins around central values established in terms of one another. Such efforts have been supported by both intervention and other policies.

There was apparently little intervention during the four months following the float in February 1973. The progressive decline in the weighted exchange rate of the dollar between February and July 1973 vis-a-vis a group of major currencies led to a decision by the governors of the central banks of

the Group of Ten to support the dollar. In July 1973, the Federal Reserve began to intervene in the New York exchange market to avoid "disorderly market conditions." Intervention was effected with the Federal Reserve's own small holdings of foreign currency or by activating the much larger total of foreign currency resources available through swap agreements.

Concerted exchange intervention was agreed to by the Federal Reserve, the Bundesbank, and the Swiss National Bank in May 1974, after several months of dollar depreciation. The dollar strengthened until September when renewed weakness developed through March 1975. The explanation given by the Board of Governors was:[38]

> Contributing to this decline in the dollar's exchange value was the asymmetry in intervention policies between countries with weaker currencies and those with strengthening currencies. Intervention sales of dollars by countries supporting weaker currencies exceeded purchases of dollars by countries resisting the appreciation of their currencies. The net effect of these operations was to add to the market supply of dollars, depressing the dollar's average exchange rate.

Explicit though limited approval of management of floating exchange rates was expressed by the IMF in guidelines it issued in June 1974.[39] Acceptance of intervention as desirable to counter disorderly market conditions was reiterated in a November 1975 meeting that preceded the revision of the IMF's Articles of Agreement in 1976.

The dollar showed little weakness in 1976, and the Federal Reserve intervened to sell dollars on behalf of other currencies. In January the Italian lira came under pressure. The decline in its exchange value weakened the French franc within the European currency "snake," leading to substantial French intervention. Massive intervention to support sterling, which declined from $2.00 in March to $1.77 in mid-September, was provided by a $5.3 billion stand-by credit arranged by the Group of Ten countries, Switzerland, and the Bank for International Settlements. Sterling's further decline later in the year led to an IMF drawing, further borrowing, and a facility to reduce official sterling balances. Intervention was also conducted to moderate appreciations of the D-mark, the Swiss franc, and the yen.

Renewed weakness of the dollar in early 1977 was masked in part by large intervention purchases of dollars by the Bank of England and the Bank of Italy undertaken to limit the appreciation of their currencies and to rebuild their reserve positions. The Federal Reserve intervened only occasionally during the first three quarters but, as the dollar dropped more sharply, the Federal Reserve increased the scale of intervention. In January 1978, the Federal Reserve was joined

by the U.S. Treasury Exchange Stabilization Fund, which negotiated a new swap facility with the Bundesbank.

The decline in the weighted average exchange value of the dollar accelerated in 1978 through the end of October.[40] An anti-inflation program announced on October 24 (involving fiscal restraints, voluntary wage and price standards, and a reduction in the cost of regulatory actions) did not moderate the dollar's slide on the exchange market. On November 1, the Administration and the Federal Reserve took further action. Foreign exchange resources equivalent to $30 billion were mobilized to finance intervention as needed to support the dollar in cooperation with Germany, Japan, and Switzerland. The Federal Reserve raised the discount rate from 8 1/2 percent to 9 1/2 percent, and imposed a 2 percent supplementary reserve requirement on large time deposits. During the last two months of 1978, U.S. exchange market intervention in support of the dollar totaled $6.7 billion, accompanied by significant purchases of dollars by Germany, Japan, and Switzerland. By mid-June 1979, the dollar's value (measured on a trade-weighted basis) had risen from its 1978 low by about ten percent, and U.S authorities had repurchased a greater sum of foreign currencies that had been sold in the last two months of 1978. The dollar then began to weaken, and U.S. intervention sales of foreign currencies, chiefly D-marks, resumed. Gross sales amounted to $9-1/2 billion equivalent between mid-June and early October. In addition, the Federal Reserve raised the discount rate to 11 percent in September.

On October 6, 1979, the Federal Reserve announced a wide-ranging set of measures to tighten monetary control (a shift in operating procedures from control of the Federal Funds rate to control of bank reserves; an increase in the discount rate to 12 percent; a marginal reserve requirement on banks' managed liabilities), and the dollar began to appreciate. After April 1980, however, the dollar began to decline, a movement that was reversed in September. From October 1979 on, the United States intervened frequently, operating on both sides of the market. When the dollar was in demand, it acquired foreign currencies in the market and from correspondents to repay earlier debt and to build up balances. The United States was a buyer from February to March. From late March to early April and beyond, it sold D-marks, Swiss francs, and French francs. By the end of July, the U.S. was again accumulating currencies, making net purchases of D-marks and lesser amounts of Swiss francs and French francs. By the end of 1980, the U.S. was intervening in the foreign exchange markets virtually on a day-to-day basis. For 1980 as a whole, U.S. authorities were net buyers of foreign currencies in an amount of $8.7 billion equivalent.

Shortly after taking office, the Reagan Administration announced its intention to limit U.S. intervention only to instances of serious market disorder. The reason given for

the shift in policy was the Administration's view that intervention is costly and ineffectual -- and may indeed be harmful -- and that the way to restore exchange rate stability is by the creation of more stable domestic economic conditions. Many foreign central banks, while generally in agreement with the basic principles underlying the Administration's views, continue to employ a more active intervention policy. It is doubtful, however, that such intervention has much effect over time on the exchange value of their currencies.

The Bretton Woods system broke down in part because non-reserve currency countries were unwilling as a group to adopt the inflationary policies the reserve-currency country was pursuing. To achieve independent monetary policy, the only workable exchange rate system was floating, and it was hoped that flexible exchange rates would permit a country to choose its desired long-run trend rate of monetary growth and of inflation, independent of other countries' choices.*

Even when autonomy exists, monetary policy may perform badly. It is in this context that the movement in a number of countries during the 1970s toward the improvement of monetary control must be viewed.

Central banks have typically used short-term interest rates as the instrument to control monetary growth. Under non-inflationary conditions, this conduct produced a procyclical movement in monetary growth. Under the gathering inflationary conditions since the mid-1960s, the inflation premium that became imbedded in interest rates made the instrument unreliable as an indicator of restriction or ease. Reliance on it contributed to a secular rise in the rate of monetary growth. Central banks in a number of countries, some more willingly than others, in the 1970s adopted targets for monetary growth without necessarily abandoning their desire to hold down interest rates or exchange rates, so that successful targeting has not invariably been the result. If it was hoped that public announcement of targets for monetary growth would itself reduce expectations of inflation, the failure time after time to achieve the targets has diluted any possible effect on the formation of expectations.

The period since October 6, 1979, when the Federal Reserve announced a new procedure to improve control of monetary aggregates, is probably too brief to pronounce judgment on the likelihood that the System will achieve its objectives of deceleration in monetary growth. The inconvertible paper monetary standard operated at the discretion of monetary authorities is on trial.**

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*Congressman Henry S. Reuss -- While I support floating exchange rate arrangements, I do not subscribe to this analysis.

**Congressman Henry S. Reuss -- On the contrary, it is monetarism that is on trial.

What is the current role of gold? IMF members no longer define the exchange value of their currency in terms of gold and account for gold at any price consistent with their domestic laws. Gold is no longer the numeraire of the international monetary system. The introduction of SDRs (valued in terms of a basket of national currencies, as of July 1974, rather than in terms of gold) was intended to supplement the dollar, gold, and other reserve assets in the international monetary system.*

The market price of gold until 1980 increased more rapidly after the float than the prices of most other durable assets.[41] The future role of gold in the international monetary system as a reserve asset and as a determinant of the world's price level may depend importantly on the

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*Herbert J. Coyne -- Again, the Friedman-Schwartz book acknowledges the present monetary role of gold on p. 684 of A Monetary History of the United States, 1867-1960, in the summary chapter:

"Today gold is primarily a commodity whose price is pegged rather than the keystone of the world or the U.S. monetary system. However, the legacy of history and the use of gold as a vehicle for fixing exchange rates still give it a monetary significance possessed by no other commodity subject to government price-fixing." (Emphasis added)

In addition, while gold does not have an officially defined position, this paragraph fails to take into account the acceptance of gold as the world's most important reserve asset and its current use in facilitating official transactions. Further, it is not mentioned that efforts to demonetize gold have faltered. In addition, gold has been utilized in the European Monetary System, gold restituted to member countries by the IMF was largely kept and not converted into foreign exchange, and less developed countries have had a tendency to build their gold stocks. Central banks in general have been net buyers of gold for the first time since 1972, and many central banks are remonetizing gold and using it for government financing purposes. As one observer of gold notes, "The simplest way to acknowledge gold's role is to buy it."

In the Journal of Law and Economics, Joseph Gold, the former legal counsel of the IMF, comments on gold's present and future status:

"It is a widespread view among members that gold continues to be a reserve asset and continues to have monetary functions. This view persists notwithstanding the change in the legal status of gold and the absence of its use in official settlements or in support of currencies."

performance of the dollar. If the performance of the dollar improves, gold may play a minor role even if its use as a reserve asset continues. Failure of the dollar to perform in a stable fashion in the future leaves open the possibility of a restoration of a significant role for gold.*

Summary

The United States adopted a de facto gold standard in 1834. Thereafter, it adhered to some form of a gold standard with only two extended interruptions, once for 17 years in the 19th century, and again in this century, for 13 years, if one dates the interruption from 1968, when the two-tier London gold market was created; for 10 years, if one dates it from 1971 when convertibility of the dollar, even for official transactions, was formally suspended; for 8 years, if one dates it from 1973, when floating exchange rates were adopted by the United States and the industrial countries. The political objective of returning to the gold standard was achieved in the 19th century case, despite opposition from silver and paper money advocates. Whether that political objective exists or is currently achievable cannot be determined from a retrospective view.

In addition to the two extended interruptions in U.S. adherence to a gold standard, temporary suspension of a few weeks to a year's duration occurred in 1837, 1839, 1857, 1893, 1907, 1917-19, and 1933. In all cases but the latter two, the years in question climaxed periods of economic expansion in the United States, fostered by external as well as internal factors. The pace of the expansions raised U.S. prices and incomes above those prevailing in the rest of the gold standard world. To bring the U.S. price and nominal income structure into alignment with that of its trading partners entailed reductions in the U.S. money stock, usually resulting from a decline in U.S. gold reserves and in capital imports from abroad. Prices, output, and employment subsequently declined, accompanied by bankruptcies of firms and bank failures. Suspension of specie payments in the years under review was a means of mitigating the costs of deflationary adjustment that maintaining par values of the exchange rate imposed. The devaluation implicit in suspension gave the economy a breathing spell. With recovery, the former par value of the exchange rate was restored.

No special comment is needed on the World War I restriction of interconvertibility between paper money and gold and the free international movement of gold. The situation in

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*Congressman Henry S. Reuss -- I dissent from this statement.

1933, however, does require comment. That year was in no respect similar to the earlier examples of temporary devaluations. The year 1933 was a year of a business cycle trough after four years of deflation. The deliberate reduction in the gold content of the dollar was arranged to achieve a price rise of nongold commodities, and the devaluation was never reversed. Moreover, the fixed exchange rate gold standard to which the United States returned in 1934 was the same in name only to the pre-1933 gold standard.

Before 1914, gold flows in and out of the United States were an important determinant of the expansion or contraction of the economy. Between 1919 and 1933, large outflows of gold occasioned contractionary actions by the monetary authorities; small outflows and both large and small inflows of gold were sterilized. After 1934, both inflows and outflows were not permitted to determine monetary growth and the performance of the economy. When the gold reserve ratios applicable to Federal Reserve deposits and notes were close to the minimum legal requirement, the minimum was lowered and eventually abolished. Gold became a symbol rather than an effective constraint on the operation of the monetary authorities.

Charts 2-1 and 2-2 summarize the evidence on the performance of the economy; Charts 2-3 and 2-4 summarize evidence on the purchasing power of gold, whether the gold standard was suspended or in effect.

Trend movements in prices are the most striking feature of Chart 2-1. From 1834 to 1861, a mild downward trend prevailed, with pronounced cyclical upswings and downswings around the trend. The greenback period from 1862 to 1878 shows the sharp wartime price rise to 1865 followed by a decline of equal magnitude spread over the years to the close of the period. That decline persisted during the gold standard period to 1896, reflecting the disparity between the rate of growth of the monetary gold stock and the enlarged world demand. The reversal of the downward trend from 1896 to 1914 reflects the dramatic increase in world gold output during that period. World War I, like the Civil War period, shows a steep price increase to 1920, followed by the steep price decline from 1920 to 1921, rough stability during the 1920s, and then the great deflation of 1929-33 that restored the wholesale price series to its pre-World War I level, and the implicit price deflator to a somewhat higher point than the pre-World War I level. The contraction of 1937-38 is apparent in the post-1933 upswing which continues into and beyond World War II. The wholesale price series shows rough stability in the early 1960s, whereas the implicit price deflator continues an upward movement. Both series accelerate after the mid-1960s.

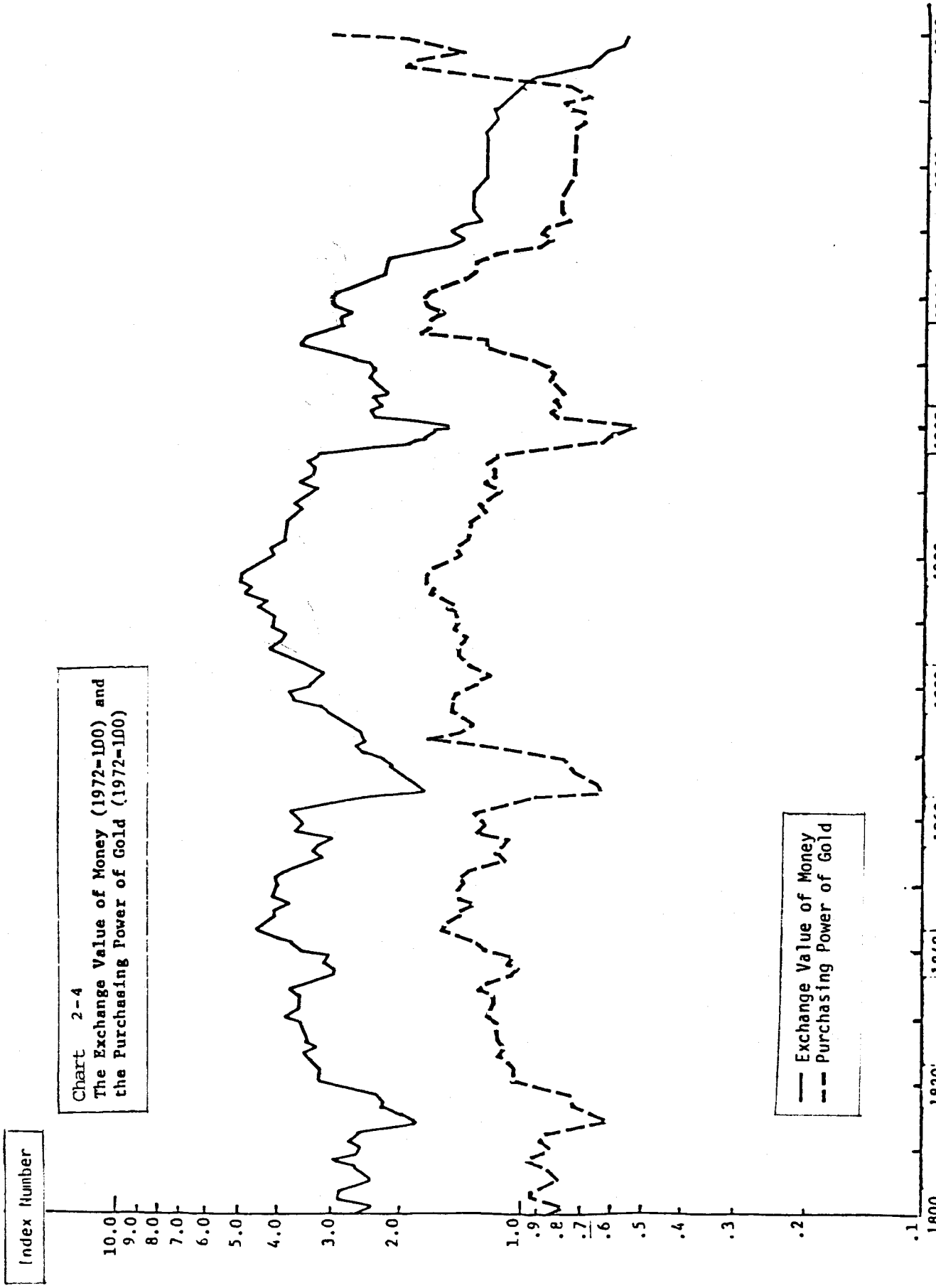

Chart 2-4
The Exchange Value of Money (1972=100) and the Purchasing Power of Gold (1972=100)

Chart 2-2 plots the deviations of real per capita income from its long-run trend. The trend has been strongly positive from 1870 to 1980, as might be expected. There was substantial variance about the trend before 1914 but far smaller in magnitude than from 1914-47, reflecting the sharp swings in the three interwar deep depressions, 1920-21, 1929-33, 1937-38, as well as the wartime movements. However, the pre-World War I variance was marginally greater than the variance of the deviations from trend post-1948. A comparison of the standard deviations of year-to-year percentage change in real per capita income also shows little difference between the pre-World War I gold standard experience and post-World War II experience: 5.8 percent vs. 5.5 percent. Unemployment was on the average lower in the pre-1914 period than in the post-World War I period; 6.8 percent vs. 7.5 percent. But again, excluding the interwar years, unemployment 1946-80 averaged 4.8 percent, reflecting the government's commitment to maintaining employment.

Chart 2-3 compares the purchasing power of gold, derived in index form from the quotient of the price of gold divided by the wholesale price index, with the U.S. monetary gold stock. Under the gold standard, a rise in the purchasing power of gold ultimately increased the growth of the U.S. monetary gold stock by raising the rate of world gold output, and inducing a shift from nonmonetary to monetary use of gold.* Movements in the purchasing power of gold thus preceded long-term movements in the monetary gold stock. This relationship underlay the reversion of the price level towards stability under the gold standard. Price increases or decreases tended to be reversed after a run of years.** Persistent inflation of post-World War II experience, without a force to reverse the trend, could not have occurred under a fully functioning gold standard. The absence of this positive association after World War II between the purchasing power of gold and long-term movements in the monetary gold stock reflects the loosening of the link between the money supply and the gold stock.

Over shorter periods, the relationship under the gold standard was in the opposite direction. Changes in the monetary gold stock, by influencing changes in the money supply, produced a negative association between the purchasing power of gold and the gold stock. Thus an increase in the

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*Congressman Henry S. Reuss -- New discoveries were a far more important source of change in the world gold stock than changes in demand.

**Congressman Henry S. Reuss -- Such price stability as the world achieved under the gold standard was measured over decades and centuries, not years. From year-to-year price level changes were as common and as serious as today.

gold stock would lead to an increase in the price level, and for a given nominal price of gold, lower the purchasing power of gold. The negative association may be observed during the gold standard period, changes in the monetary gold stock leading short-term movements in the purchasing power of gold.

Chart 2-4 compares the exchange value of money, computed as the reciprocal of the wholesale price index, with the purchasing power of gold. The two series are closely related until 1968, when the two-tier market for gold was introduced. The direct relationship until 1968 reflected the existence of a fixed nominal price of gold. The inverse relationship thereafter reflects the increase in private demand for gold as a hedge against inflation and political instability, once private transactions were determined in the free market.

To conclude: The gold standard provided long-term but not short-term price predictability. Long-term inflation or deflation under the pre-World War I gold standard would predictably be reversed as gold output was discouraged or encouraged by decreases or increases in its purchasing power. Thus the price level tended to revert toward a long-run stable value under the gold standard, providing a degree of predictability with respect to the value of money. Subsequent to World War I, the discipline of the gold standard came to be regarded as an impediment to the management of the economy to achieve the objectives of growth and high employment. The deep depressions of the inter-war years were the measure by which the economy under a gold constraint was judged to be a failure. The loosening of the link to gold after World War I and its abandonment fifty years later reduced long-term price predictability. Belief in long-term price stability eroded as public perception of the absence of a long-run constraint on monetary growth took hold. Although price stability was generally included among the goals of the post-World War II era, in fact stability of employment took precedence. In the event, by early 1981, neither goal was in sight.

Notes to Chapter 2

1. Act of April 2, 1792, sec. 9, in National Monetary Commission Laws of the United States Concerning Money, Banking, and Loans, 1778-1909 [Laws], Washington: Government Printing Office, 1910, p.475.

2. J.L. Laughlin, The History of Bimetallism in the United States, 4th ed., New York: Appleton, 1901, pp. 51, 57.

3. Laws, p. 496.

4. Laughlin, op. cit., pp. 64-71.

5. Act of Janaury 13, 1837, in Laws, p. 502.

6. Laughlin, op. cit., p. 77. See also David A Martin, "1853: The End of Bimetallism in the United States," Journal of Economic History 33 (December 1973): 825-44. Laughlin dates the 4 percent premium on silver coins as of 1853; Martin dates it as of 1851.

7. Laws, p. 512, The Act of Feb. 21, 1853, states the standard weight of silver in a 50-cent coin as 192 grams, which is equivalent to 172.8 grams per one-half a fine troy ounce.

8. Laws, p. 508.

9. Laws, p. 574.

10. Laughlin, op. cit., pp. 118-20; J.E. Cairnes, Essays in Political Economy: Theoretical and Applied, London: MacMillan, 1873, p. 142.

11. George Macesich, "Sources of Monetary Disturbances in the U.S., 1834-1845," Journal of Economic History 20 (September 1960): pp. 407-34; Peter Temin, The Jacksonian Economy, New York: Norton, 1969, pp. 28-82, 138-39.

12. R.H. Timberlake, Jr., The Origins of Central Banking in the United States, Cambridge: Harvard University Press, 1978, Ch. 5, "The Specie Circular and Distribution of the Surplus," pp. 50-62; Temin, op. cit., pp. 120-136.

13. Temin, op. cit., 113-20; pp. 141-47.

14. Bray Hammond, Banks and Politics in America from the Revolution to the Civil War, Princeton: Princeton University Press, 1957, pp. 707-17.

15. U.S. Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part 1, Series E-52, p. 201.

16. These are unpublished partial estimates of GNP in 1860 prices, constructed by Robert E. Gallman. The estimates are partial because they do not include the change in inventories. It is for this reason that the annual rates of change do not show the cyclical movements of the economy. Those movements are dominated by change in inventories. An alternate real income series, in 1929 prices, is available in Thomas Senior Berry, Estimated Annual Variations in Gross National Product, 1798 to 1909 (Richmond, Bostwick Press, 1968). Annual rates of change of these estimates (shown there in Table 1, col 3, p. 32) are: 1834-37 (+5); 1837-38 (-1); 1838-56 (+4.6); 1856-57 (-8); 1857-59 (+6).

17. This section draws heavily on Milton Friedman and Anna J. Schwartz, A Monetary History of the United States, 1867-1960 [History], Princeton, Princeton University Press, 1963, pp. 15-88.

18. Report and Accompanying Documents of the United States Monetary Commission Organized Under Joint Resolution of August 15, 1876 [44th Congress, 2d Sess., Senate Report No 703], Washington, G.P.O., 1877, vol. 1, pp. 1-160.

19. Timberlake, op. cit., Ch. 8, "The Panic of 1873 and Resumption," pp. 108-119.

20. See Friedman and Schwartz, History, pp. 89-188.

21. Sources of wholesale prices: 1800-1889, U.S. Bureau of the Census, Historical Statistics, Series E-52, pp. 202-203, shifted from 1910-14 to 1972 base; 1890-1970, ibid., Series E-23, p. 199, shifted from 1967 to 1972 base; 1971-1979, U.S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics, December 1980, Bulletin 2070, Table 140, p. 334, shifted from 1967 to 1972 base; 1980, Survey of Current Business, August 1981, pp. 5-7, producer prices, all commodities, shifted to 1972 base.

22. Source of monetary gold stock: 1875-1878, Phillip Cagan, Determinants and Effects of Changes in the Stock of Money, 1875-1960, New York, Columbia University Press for NBER, 1965, Table F-7, p. 340; 1879-1913, Friedman and Schwartz, History, Table 5, col. 1, p. 131, Table 8, col., 1 p. 180; 1914-1941, Board of Governors of the Federal Reserve System, Banking and Monetary Statistics, 1914-1941, 1943, p. 536, plus $237 million deducted by the source restored annually 1914-1933, and 1934-41 figures recalculated at $20.67 per ounce instead of at $35; Banking and Monetary

Statistics, 1914-1941, 1943, p. 536, plus $237 million deducted by the source restored annually 1914-33, and 1934-41 figures recalculated at $20.67 per ounce instead of at $35; Banking and Monetary Statistics 1941-1970, p. 899, recalculated; 1971-1980, Federal Reserve Bulletin, Dec. 1976, p. A59; Dec. 1978, p. A55; Aug. 1981, p. A53, recalculated. Purchasing power of gold: See Statistical Compendium below.

23. Sources of real per capita income: Derived from a nominal income series; population; and a price deflator implicit in net national product in Milton Friedman and Anna J. Schwartz, Monetary Trends in the United States and the United Kingdom, 1867-1975 (in press), Ch. 4, extended 1976-80, in the same way as the figures were constructed for preceding years. The price deflator, in 1929 prices in the source, has been shifted to a 1972 base. The trend line shown on Chart 2-2 was derived as follows:

$$\log y = \underset{(316.1)}{6.58} + \underset{(52.9)}{0.016687}\ \text{time},$$

where y = real per capita income.
$\bar{R}^2$ = .962
SEE = .10
D.W. = .342

An alternative series that was discussed at one of our meetings is a Bureau of Labor Statistics series of real net spendable weekly earnings of a worker with three dependents. This series diverges markedly from 1962 on from a series of real per capita disposable personal income, showing a progressively steeper decline that does not characterize the real per capita disposable personal income series (or the real per capita income series).

As an article by Paul Ryscavage, "Two divergent measures of purchasing power," Monthly Labor Review, Aug. 1979, pp. 25-30, explains, the real earnings series is a faulty measure. It is constructed from estimates of average hourly earnings and average weekly hours of both full-time and part-time workers. The two estimates are multiplied to obtain average weekly earnings. From the gross average figure, the BLS deducts the social security tax and the Federal income tax liability applicable to a married worker with three dependents. The Consumer Price Index is then divided into the net spendable earnings to arrive at real net spendable earnings.

The key problem with the series is the measure of gross average weekly earnings. It includes not only

weekly earnings of men, the majority of whom work full time, but also the weekly earnings of women and teenagers, many of whom work part time. The earnings of the latter two classes of workers pull down the overall average for production and nonsupervisory workers.

Since the series of real net spendable weekly earnings of a worker with three dependents is not based on earnings data for a worker with these characteristics, it does not provide a reliable measure of his economic well-being, as the BLS acknowledges.

At the Hearings we conducted on November 13, Professor Roy Jastram suggested that "the use of real per capita income as a measure of the comparative fluctuations in the economy with and without the gold standard" was misleading. Specifically, he argued that unionization of labor and the growth of transfer payments since 1934 tended to diminish declines in real per capita income thereafter. Since transfer payments do not raise aggregate real incomes, it is hard to see why per capita results would be affected. Unionization might have increased instability insofar as it reduced income for those not covered by unions. In any event we reject Professor Jastram's suggestion that manufacturing production is a more even-handed measure of the severity of cyclical movements in both gold standard and post-gold standard periods. Since manufacturing production has declined relative to aggregate GNP, it is a statistically biased measure of economic well-being over the past half century.

24. Friedman and Schwartz, History, pp. 189-406.

25. Ibid., pp. 462-71.

26. Ibid., pp. 471-76; 508-11; 550-51.

27. Arthur I. Bloomfield, Capital Imports and the American Balance of Payments, 1934-39, Chicago: University of Chicago Press, 1950, pp. 158-66.

28. During the first nine months of 1937, the Treasury did not use the cash balances it could create on the basis of the gold it bought. Instead, it paid for the gold by borrowing from the public and banks. What the Treasury took from the public and the banks by the sale of securities offset what it paid to the public and the banks by the purchase of gold. Accordingly, high-powered money did not reflect the growth of the gold stock.

The operation was economically identical with the sterilization actions of the Federal Reserve in the 1920s, when the System sold bonds on the open market to offset the increase in high-powered money that would otherwise have arisen from a gold inflow. The Treasury program became effective at about the same time the Federal Reserve was imposing two increases in reserve requirements on member banks (on March 1 and May 1, 1937; an earlier increase was imposed in August 1936). The sterilization program sharply reinforced the effect of the rise in reserve requirements in producing monetary restrictiveness: the rise in reserve requirements increased the demand for high-powered money; simultaneously the Treasury's action virtually brought to a halt an increase in high-powered money which had been proceeding with only minor interruptions since 1933.

A start toward desterilization was made in September 1937, when the Board of Governors of the Federal Reserve system requested the Treasury to release $300 million from the inactive gold account. The Treasury released the amount requested by the Federal Reserve, but it continued to sterilize all further gold purchases, which amounted to $174 million in that month. Hence inactive gold held by the Treasury fell only $126 million in September 1937.

As of January 1, 1938, the Treasury limited the addition to the inactive gold account in any one quarter to the amount by which total gold purchases exceeded $100 million, and on April 19, 1938, discontinued the inactive gold account, which then amounted to about $1.2 billion. In the first half of 1938, accordingly, there was a more rapid increase in high-powered money than in the gold stock. The Treasury printed gold certificates corresponding to some of the inactive gold in the Treasury, deposited the certificates at the Reserve Banks, and drew on the balances it thus established to pay government expenses or to redeem debt. The operation was essentially an open market purchase of securities undertaken at Treasury initiative.

Initially, the shift of inactive gold from Treasury cash to Treasury deposits at the Federal Reserve Banks had no immediate monetary effect. Effective desterilization did not occur until more than a year after formal desterilization. Only after February 1939 did the sum of Treasury cash holdings and deposits at Reserve Banks decline toward the level that had prevailed before the sterilization program.

29. This section draws heaviliy on Chapter 2 of The International Transmission of Inflation (in press) by M.R. Darby, J.R. Lothian, A.E. Gandolfi, A.J. Schwartz, and A.C. Stockman.

30. See "Treasury and Federal Reserve Foreign Exchange Operations," in Federal Reserve Bulletin, Sept. 1962, pp. 1138-53.

31. Margaret G. de Vries, The International Monetary Fund 1966-1971: The System Under Stress, Washington, D.C., 1976, Part Five, "Exchange Rates in Crisis," pp. 432-48.

32. For a description of the controls that were imposed, see International Monetary Fund, Annual Report on Exchange Restrictions, various editions.

33. Lance Girton argues that the emphasis upon international liquidity during this period and the subsequent introduction of SDRs stemmed from the application of the real-bills doctrine to the international monetary system. See his "SDR Creation and the Real-Bills doctrine," Southern Economic Journal 41 (July 1974); pp. 57-61. The real-bills doctrine is the notion that if banks restricted their advances to the nominal value of trade, the money supply would have a desirable elasticity. In fact, it would become unstable. The fallacy in the doctrine is that it sets no effective limit to the quantity of money.

34. By the end of the fourth quarter of 1972, the value of SDRs was slightly over $9.4 billion or 6 percent of total world international reserves as reported in International Financial Statistics, July 1974.

35. IMF, Annual Report, 1975, p. 44.

36. See Annual Report of the Secretary of the Treasury on the State of the Finances, 1978, p. 491, Exhibit 60, a press release on the increase in the amount of gold sales, announced Aug. 22, 1978 ("The sales will make an important contribution toward reducing the U.S. balance of payments deficit on current account") and Exhibit 61, a statement by Assistant Secretary Bergsten before the Senate Committee on Banking, Housing and Urban Affairs in which the quotation in the text appears.

37. Only $42.22 of the price obtained for every ounce the Treasury auctioned was applied to the retirement of gold certificates. The balance was applied to the Treasury's General Fund.

38. Board of Governors of the Federal Reserve System, 61st Annual Report, 1974, pp. 65-66.

39. The first guideline stated: "A member with a floating exchange rate should intervene on the foreign exchange market as necessary to prevent or moderate sharp and disruptive fluctuations from day to day and from week

to week in the exchange value of the currency." A second guideline encouraged intervention to moderate movements from month to month and quarter to quarter "where factors recognized to be temporary are at work." A third guideline suggested consultation with the Fund if a country sought to move its exchange rate "to some target zone of rates." A fourth guideline dealt with the size of a country's reserves relative to planned intervention; a fifth, with avoiding restrictions for balance of payments purposes; a sixth, with the interests of other countries than the intervening one. IMF Annual Report, 1974, pp. 112-116.

40. The index of weighted average exchange values of the dollar against the "G-10" contries plus Switzerland (March 1973=100) declined at an average annual rate of 9.3 percent between January and November 1978. From January 1976 to January 1978, it had declined at a 3.3 percent annual rate.

41. The price of gold from the end of 1973 to the end of 1980 increased at an average annual rate of 20.7 percent. By comparison, the total returns on common stock and on long-term corporate bonds increased at average annual rates of 7.2 percent and 4.0 percent, respectively. (These figures appear in R.G. Ibbotson and R.A. Sinquefield, "Stocks, bonds, bills and inflation: Year-to-year historical returns (1926-1974)"; "Simulations of the Future (1976-2000)" in Journal of Business 49, Jan. 1976, pp. 11-47, and July 1976, pp. 313-338.). The U.S. CPI over this period increased at a rate of 7.8 percent per year on average and the London Economist's world commodity price index increased at a 9.5 percent rate.

Chapter 3

Types of Monetary Standards

The original meaning of the term monetary standard was that a particular weight of either gold or silver served as the supreme form of money with which all lesser forms of money were interconvertible. The term has since come to be used as meaning a monetary system, that is, the institutions and practices relating to payments for the settlement of debts. In this chapter, we examine the character of various types of monetary standards, including some of which we have no examples in modern times.

I. Alternative Standards

A monetary standard has two aspects, one domestic and one international. The domestic aspect applies to the arrangements regulating the quantity and growth rate of the internal money supply. The international aspect applies to the arrangements by which the external value of the currency is determined. These two aspects are present for any type of monetary standard. It is possible to adopt a purely domestic monetary standard with the external value of a country's currency floating with respect to other currencies. On the other hand, a country could choose arrangements that fixed the external value of its currency with respect to other currencies. Whether or not the international aspect would govern the domestic aspect depends on the design of a given monetary system.

The two broad divisions of monetary standards are commodity and paper standards. Commodity standards may be based on metals, other commodities, or baskets of commodities including metals. Metallic commodity standards have usually been based on silver or gold or a combination of both known as bimetallism.[1] We limit our examination of metallic standards to variants of the gold standard before turning to the examination of other commodity standards and of paper standards, commenting first on domestic and then international aspects of each. Finally, we consider the strengths and weaknesses of the gold standard variants as a group, of other commodity standards, and of paper standards.

A. Variants of the Gold Standard

The basic argument that is offered in support of all variants of a gold standard is that gold has intrinsic value and therefore serves as a standard of value for all other goods.* In addition, supporters view gold as a store of value because new production adds only a small fraction to the stock accumulated over centuries, hence prices denominated in terms of gold will not vary greatly from year to year. If other forms of money exist, for example, government-issued or bank-issued paper currency and bank deposits, then convertibility into gold at a fixed price would assure that, even if inflationary policies were adopted, the monetary authorities would be compelled to abandon such policies. An increase in government paper currency would tend to raise prices in terms of paper currency, would reduce the purchasing power of paper currency, and induce money holders to convert their paper dollars to gold, putting pressure on the government's gold holdings. At the same time, with gold as a country's reserve asset, adjustment to balance of payments deficits and surpluses would be automatic. Thus an increase in the domestic money supply by ultimately raising the price level would raise the price of exports relative to the price of imports, leading to a balance of payments deficit and a gold outflow. In addition, the increase in the money supply would lower domestic interest rates relative to those abroad, inducing a capital outflow and a further gold outflow.

Another attribute claimed for gold standards is that the rate of increase in the gold money supply would vary automatically with the profitability of producing gold, and hence assure a stable money supply and stable prices at least in the long run. Thus, a rapid increase in the output of gold, due to gold discoveries or technological improvements in gold mining, would raise the prices of all other goods in terms of gold, making them more profitable to produce than gold, and ultimately leading to a reduction in gold output. Moreover, the initial reduction in the purchasing power of gold would lead to a shift in the demand for gold from monetary to nonmonetary use, thus reinforcing the output effects. Conversely, a decline in prices of goods and services, due to technological improvements in the nongold sector, would increase the profitability of gold production, encouraging increased gold output, which would ultimately tend to raise the price level. The initial increase in the purchasing power of gold would also lead to a shift in the demand for gold from nonmonetary to monetary use, thus reinforcing the output effects. Long-run price stability would be the result.

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*Congressman Henry S. Reuss -- This view is, of course, purely mystical.

Gold standards vary depending on the presence or absence of the following elements:

1. a national money unit
   a. present
   b. absent
2. nongold national money issued by either the government or by a fractional-reserve commercial banking system
3. a central bank
   a. with gold reserves only
   b. with mainly foreign exchange reserves
4. convertibility of nongold money into gold coin or gold bars
5. classes of holders for whom nongold money is convertible

1a. 100 percent gold coin standard with national money

Under such a standard, the national unit is defined as a specific weight of gold which thus sets the price of an ounce of gold in terms of that unit. There are 480 grains of gold in a fine troy ounce. Dividing 480 grains by the weight of the national unit in gold yields the price. Defining a dollar, for example, as 11.368 grains of gold sets the price of an ounce of gold at $42.22+. Under a 100 per cent gold coin standard, gold would be money, but prices would be expressed in terms of the national unit -- dollars, pounds, marks, or francs. Banks would exist to issue warehouse receipts for gold in the national money unit and would hold 100 percent reserves. Terms of loans by the banking system and others would be expressed in the national money unit. Exports or imports of gold coin would be unlimited and free of taxes and restrictions.

The supply of money and the prices of goods in terms of that money would be determined in the market by the demand for gold for monetary and nonmonetary uses[2] and by the supply of gold, which would be governed by the opportunity cost of producing gold. The demand for gold for nonmonetary use would be governed by the relative price of monetary gold and all other commodities. The demand for monetary gold would be governed by (a) total wealth available to hold in asset form; (b) the total amount of goods and services produced; (c) the average price of those goods and services; (d) the return on holding monetary gold relative to the return available on alternative assets; and (e) the tastes and preferences of holders of money.

In this system, the market would be free to choose forms of money other than gold and warehouse receipts.

Government intervention in the monetary system would be limited to its undertaking to buy gold from the public at a fixed price and converting it into coin, and to sell gold to the public at a slightly higher fixed price, if it so chose, the difference between the two prices representing brassage -- the government production fee to cover cost of coin manufacture.

The determination of the external value of a national currency under a 100 percent gold coin standard may be explained with an example drawn from a variant of the gold standard to be discussed below. The principle is the same for all variants based on a national monetary unit.

The external value of the currency is fixed in terms of gold. For example, consider the reason the external value of pound sterling in terms of a dollar was $4.8665 before World War I and from 1925 to 1931. The dollar was defined as 23.22 grains of fine gold and a pound sterling as 113.0016 grains of fine gold, hence 4.8665 was the multiple of the weight of gold in a pound sterling compared with the weight of gold in a dollar. This was a fixed exchange rate because the gold weight of each currency was fixed or, equivalently, the price of gold per ounce was fixed. If the United States had adopted one dollar price of gold and the British a different dollar price, obviously, the equivalence between the exchange rate and the respective weights defining each currency would have disappeared. A variable price of gold among countries would have meant variable weights of gold represented by each currency.

The link between currencies is gold at a fixed price. Imbalances in international payments might be settled by claims on the national currencies of other countries which had fixed gold equivalents, financed in the example cited mainly by the use of bills of exchange. If the demand for and supply of a national currency did not balance, gold flows would be activated. Thus whenever the dollar price of a British pound at the official or par exchange rate of $4.86 deviated by more than one or two percent above or below par (these limits, referred to as the gold points, represented the cost of transferring -- packing, shipping, and insuring -- gold between the two countries), it paid either to convert U.S. dollars into gold and transfer it abroad, or else to convert British pounds into gold and transfer it here. If U.S. demand increased, for example, for cheaper British goods, this raised the dollar price of the pound (that is, bills of exchange). Once the dollar price of the pound reached $4.92, referred to as the U.S. gold export point, it paid to convert U.S. dollars into gold, ship the gold to England and purchase pounds at $4.86. Conversely, at the U.S. gold import point,

which might have been as high as $4.83, it paid to convert pounds sterling into gold, ship the gold to the U.S., and purchase dollars. Gold shipments in either direction would then act to restore the price of foreign exchange to parity.

Thus it is not only gold flows from new gold output but inflows or outflows related to movements in the balance of payments that affect the size of the domestic money supply. A reduction in a country's domestic money and ultimately in its price level enhance the country's appeal as a source of goods and services to foreigners and reduce domestic demand for foreign goods and services. An increase in a country's domestic money and ultimately in its price level diminish that country's appeal as a source of goods and services to foreigners and increase domestic demand for foreign goods and services. Thanks to this automatic adjustment process, the duration and size of imbalances of international payments would tend to be self-limiting. Gold flows serve to equalize price movements across countries.

Economists debate the details of the process just described.[3] Some argue that gold flows under the gold standard before 1914 were minimal and that prices worldwide adjusted rapidly. There was one world price level and the external adjustment process posed no greater problem than interregional adjustment of prices within a country. These are refinements that need not detain us.

1b. Gold standard without national money

The key feature of such a standard is that the role of government would be limited to assuring the weight and fineness of coins minted by the private sector. No national money unit would exist -- no dollars, pounds, marks, or francs. Coins of different weights would circulate and prices would be denominated in weights of gold. Banks might exist to issue warehouse receipts for gold with a cover of 100 percent reserves. Borrowing and lending, limited to the private sector, would be conducted, the debt instruments denominated in weights of gold. Settlement of international payments would rarely be made in weights of gold. Instead, international capital flows would occur in the form of interest-bearing debt instruments, denominated in weights of gold, or the transfer of ownership of equities to foreign holders.

The proponents of the conception of the gold standard here sketched regard it as superior to any other form of monetary standard because it eliminates money creation by both government and banks. In their view the record of government and banks shows them to have overissued the currency. In a real gold standard, such as the one described, the quantity of gold available for monetary use would determine the level of prices. If the demand for gold exceeded the supply, prices, expressed in weights of gold, would fall.

In the idealized arrangement that is proposed, the market might choose forms of money other than gold and warehouse recipts, including promises to pay gold on demand or at a future date. Private contracts would specify payment in whatever form was mutually agreeable, including the use of technological means for electronic transfer of funds that could significantly economize the means of making payments with physical gold or the need to hold gold in physical possession.

Introducing de novo a real gold standard would clearly change the character of the existing political and financial system.*

2. Gold standard with nongold money issued by either the government or a fractional-reserve commercial banking system

The earliest departure from the idealized 100 percent gold coin standard was the creation of substitutes for gold. The motive for substitution was a reduction in the real resources employed in mining gold. Paper money substitutes may be produced with much smaller real resources. Such substitutes included fiat currency issues by governments and commercial bank issues of notes and deposits, with gold reserves of the government and banks equal to a fraction only of their monetary liabilities. The incentive to limit the size of the fraction of gold reserves was strengthened during trend periods when the supply of gold did not keep pace with the demand for it for monetary and nonmonetary uses.

Fractional gold reserves were held as an earnest of the issuers' readiness to convert nongold money into gold at the pleasure of the holder, at a fixed price of gold, not a changing market price of gold. In this system, domestic disturbances, such as banking panics, could affect the size of the country's gold reserves. Public alarm about the adequacy of the gold reserve ratio could trigger an internal drain of gold, when holders chose to shift from bank notes or bank deposits to gold. In the aftermath of such episodes, an increase in the gold reserve ratio was produced usually by a contraction of the issuers' monetary liabilities.

A fractional reserve gold standard accentuated the effects of gold flows on the quantity of money. A one-dollar gold inflow, depending on the size of the reserve ratio, might increase the domestic quantity of money as much as $8 or $10; a one-dollar gold outflow might reduce the quantity of domestic money by as much as $8 or $10, with parallel effects on domestic spending and prices.

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*Congressman Henry S. Reuss -- Why does the Commission Report treat this eccentric idea with such mild and noncommital language?

However, as noted above, international capital flows alleviated to some extent either the size of gold flows or their consequences. Short-term capital flows served to reduce and smooth the immediate flows of gold that would otherwise have been required to settle payments imbalances. Long-term capital flows enabled developing countries to borrow real resources from developed countries by running a persistent excess of imports of goods and services over exports of goods and services without entailing gold flows. In the event of a rise in the domestic quantity of money, in the short-run, interest rates would tend to decline, inducing investors to shift funds to foreign money markets. The size of the change in export prices relative to import prices that would otherwise have occurred would be reduced by the resulting gold outflow.

In a fractional-reserve banking system and a gold standard with a national money unit, domestic and international convertibility of claims on the monetary authorities was the mechanism to insure that nongold money growth was held in check.

3a. Gold standard with a central bank holding gold reserves only

Central banks in Europe predated the gold standard. Their behavior did not always serve the discipline the gold standard imposes. They did not necessarily respond to a loss of gold due to balance of payments deficits by actions to reduce the domestic quantity of money outstanding, or to a gain of gold due to balance of payments surpluses by actions to increase the domestic quantity of money outstanding.

Scholars continue to debate the extent to which such behavior by the Bank of England and other central banks characterized the period before 1914. After World War I, the issue is not in doubt: central banks, including the Federal Reserve System, frequently chose not to permit gold flows either to expand or contract the domestic quantity of money, or to do so to a lesser degree than full adjustment would have required. The gold standard was not automatic but managed.

3b. Gold standard with a central bank holding mainly foreign exchange reserves

Central banks also learned to economize on gold holdings by using other currencies as reserve assets, principally sterling before 1914, increasingly dollars thereafter. A country that held all or a large part of its monetary reserves in the form of foreign exchange, that is, claims on a country

that is on a gold standard, was said to be on a gold exchange standard. Gold holdings are non-earning assets. For that reason the gold exchange standard has appeal since foreign exchange, in the form of deposits at foreign banks or foreign treasury bills, provides earning assets. Of course, a country holding foreign exchange reserves in a currency that devalues sustains losses.[4]

The gold standard before World War I was often described as a sterling/gold exchange system and, under the Bretton Woods system after World War II, as a dollar/gold exchange system. Both were fixed exchange rate systems in conception, but the Bretton Woods system became an adjustable pegged exchange rate system.

The par value of each national currency was expressed either in terms of gold or in terms of the U.S. dollar of 13.71 grains of fine gold, each established in agreement with the International Monetary Fund. Members of the IMF were responsible for maintaining the par value of their currencies, with the United States alone undertaking the free purchase and sale of gold at the fixed price of $35 per ounce. Other countries bought and sold their currencies for dollars to maintain their par values within agreed limits. Settlement of international payments imbalances took place mainly by transfers of reserve assets in the chief money markets.

Convertibility of many European currencies was first achieved under the Bretton Woods system in 1958. For only a few years thereafter can the system be said to have performed fairly effectively. From the mid-1960s on, it was characterized by repeated foreign exchange crises as market participants anticipated that existing par values were unsustainable and shifted funds from a weak currency to a strong currency, exacerbating the external position for both currencies. Countries with undervalued currencies resisted revaluation and countries with overvalued currencies resisted devaluation.

The system of fixed but adjustable pegged exchange rates collapsed under the pressure of persistent deficits in the reserve center country's balance of payments and undervalued currencies in surplus countries. The U.S. money supply grew at rates independent of the country's balance of payments position, contrary to the case under an international gold standard. Dollar reserve accumulations abroad, unless sterilized by monetary authorities, expanded the monetary bases of our trading partners. According to them, the United States exported inflation to the rest of the world through its balance of payments deficits.

4. Gold standard with convertibility of nongold money into gold coin or gold bars

In the gold coin standard with a national money unit and nongold substitutes, such as existed in a number of countries before 1914, gold coin circulated -- usually a minor fraction of aggregate domestic money -- and nongold money was redeemable in coin. Again, as a way of economizing on the use of gold, many countries ceased to coin gold after 1914 (the United States, not until 1933). Thus free coinage, circulation of gold coins, and the legal tender status of gold coins terminated. The aim was to concentrate all of a country's gold holdings into reserves available for international payments. Nongold money became convertible into heavy gold bars. Such a gold standard is known as a gold bullion standard.

5. Gold standard with classes of holders for whom nongold money is convertible

Under a gold coin standard with a national money unit and nongold substitutes, all holders of nongold money -- domestic and foreign -- could convert it into gold coin. Under a gold bullion standard, convertibility could exist for both classes of holders. Under the Bretton Woods dollar/gold exchange standard, convertibility in the United States was limited to foreign official institution dollar assets. Foreign institutions willingly held dollars for the purpose of intervention so long as they were confident that they could obtain gold from the United States for dollars at their initiative. A gentleman's agreement among central banks in certain industrial countries not to present dollar balances for convertibility into gold for a time staved off the denouement. The chronic deficits in the U.S. balance of payments and the unwanted accumulations of dollars by foreigners which threatened to drain all U.S. gold finally led to formal inconvertibility for all holders in 1971.

B. Variants of Other Commodity Standards

Economists have long argued that a commodity standard with a bundle of commodities is superior to a single commodity standard like the gold standard.[5] The reason is that such a scheme could mitigate the price level instability produced by basing the standard on one commodity like gold, because of unexpected changes in its demand and supply. Technologically induced changes in relative costs of production of some of the bundle would be offset in the rest of the bundle.

The usual prescription for the bundle of commodities is that it would include standardized staples like metals and manufactured commodities that are traded in broad markets.

The precise composition varies with the author of the plan for a commodity standard. In support of such a standard, it has been argued that possible monetization of the bundle of commodities would provide producers with a floor to their incomes, while convertibility into currency would impose a ceiling on the market prices of the bundle.

If nonmonetary stocks of the commodities available for use as monetary stocks were small, the quantity of money would change primarily through additional current output or withdrawals for current use. Since the commodity industries represented in the bundle would have a fairly elastic current output, any decline in other prices would induce a substantial increase in their output, adding to the stock of money and current income. Opposite effects would occur with any rise in other prices. Changes in the quantity of money would affect the volume of real assets held by the public and the fraction of total assets held as money, causing the community to alter their expenditures in a countercyclical fashion. Thus, commodity currency could have substantial countercyclical effects.

Plans for a commodity standard differ on the role of government and the provision for a reserve. The government's role could be limited to the announcement that the monetary unit is defined as specified amounts of each of the bundle of commodities. The private sector would then issue financial instruments denominated in the unit. The government would have no role as an issuer of currency. Some plans envisage no government reserves of the bundle of commodities. Instead, the private sector would hold reserves in order to redeem the financial instruments -- say, warehouse receipts for the bundle -- issued by it. Storage costs presumably would be passed on in some form to the public. Again, fractional reserve holding might well be development of a commodity standard, given the incentive to reduce resource costs of holding 100% reserves.

Private individuals would use the warehouse receipts to obtain from the issuers commodities covered by the standard and sell to the issuers for warehouse receipts commodities covered by the standard. A deflationary tendency would encourage production of the commodity bundle that would be exchanged for newly issued warehouse receipts at the fixed price, thus countering the initial tendency. An inflationary tendency would lead private individuals to redeem the warehouse receipts in commodity bundles, thus countering that tendency. In this way, self-interested actions by individuals in the economy would maintain the stability of the price level and so preclude deviations in the price level over the long run.

If a commodity standard were adopted internationally, it could provide an international currency with fixed exchange rates.

C. Paper Standards

Under a paper money standard, it is essential to anchor the system to a nominal fiat reserve -- what economists call "outside" money, provided by a central bank, another governmental agency or even a nongovernmental agency. In our paper money system, the monetary base of the Federal Reserve System serves as outside money. First, we examine current monetary arrangements and then, by contrast, arrangements that would prevail under a radical restructuring of the monetary system.

1. Current Monetary Arrangements

Our current monetary arrangements rely on the discretion of the Board of Governors of the Federal Reserve System. To insulate the Board from short-run political pressures, safeguards are provided by the staggered 14-year terms of the governors, the decentralization and somewhat autonomous regional Reserve Banks, and the independence from Congressional appropriations. Congress has no direct supervisory authority over either the Board or the Reserve Banks, although the chairman and other members of the Board testify frequently before various Congressional committees. Twice a year, as required by the Full Employment and Balanced Growth Act of 1978, the Board submits a written report to Congress on the state of the economy and the course of monetary policy and consults with the Congress on its report.

It is the responsibility of the Federal Reserve Banks to provide without limit the amount of paper currency that the public demands. A limit on the quantity of paper money that the Federal Reserve could issue existed before 1968 when it was required by law to keep a 25 percent gold backing for each dollar it issued. Instead of controlling the amount of currency in circulation -- it now constitutes about one-fourth of the money supply aggregate M1, defined as the sum of currency, travelers checks, and all transaction deposits -- the Federal Reserve attempts to control the money supply.

Although reserve requirements on transaction deposits provide an essential institutional setting, the most important discretionary tool the Federal Reserve possesses for monetary control is its portfolio of government securities. It is through increasing and decreasing its holdings of government securities that the Federal Reserve is able to effect changes in the reserve positions of banks and other depository institutions. When the Federal Reserve buys government securities, it pays for them by adding to the reserves of depository institutions. Federal Reserve sales of government securities reduce reserves. Institutions expand their lending activities, and hence increase transaction deposits, when their reserves increase. The opposite effects occur when

their reserves decrease. Changes in its portfolio thus enable the Federal Reserve to control, over a period long enough for the depository institutions to react, the amount of transactions deposits they create.

Currently, the dollar's foreign exchange value is determined by changing supply and demand in the foreign exchange market, whether because flows of goods and services to and from other countries vary, or because of long-term or short-term capital movements, changes in relative interest rates or expected price behavior, or of interventions by monetary authorities to influence the foreign exchange rate of their currencies vis-a-vis the dollar.

2. Proposals for Significant Change*

Proposals for significant change in current monetary arrangements, while maintaining a paper standard, derive from concern over the record of monetary instability associated with the operation of paper money standards. Proposals for reform range from the introduction of 100% reserve requirements for banks of issue, to rules limiting the discretion of the Federal Reserve System in creating reserves for the banking system, to proposals by F.A. Hayek and others calling for the free private production of money and currency competition among issuers of money.[6] Advocates of basing monetary policy on a rule, such as requiring the Federal Reserve to increase the money supply at a fixed rate over time, contend that such a policy would promote price stability and dampen cyclical changes in the economy. For them, discretion is politically dangerous and economically objectionable.

Suggestions for improving the performance of our paper standard include introducing 100% reserve requirements for banks, payment of interest on bank reserves, and payment of interest on demand deposits. The advantage of a 100% reserve requirement is that it would reduce monetary instability by eliminating fluctuations in the banks' reserve-deposit ratio and the public's currency-deposit ratio that currently introduce some slippage between the Federal Reserve's provision of reserves and the change in deposits the banks create. By paying a market rate of interest to banks on their reserves, the incentive to evade the requirement would be largely eliminated. Moreover, by paying interest on demand deposits, individuals would hold the optimum quantity of money in their

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*Congressman Henry S. Reuss -- The final draft circulated to Commission members for comment referred to these proposals, more honestly, as "radical proposals."

circumstances. If interest is not paid on deposits, individuals must take into account the return they could earn on interest-bearing assets, reducing cash holdings by employing, say, more bookkeeping services to compensate for the loss of not holding the alternative asset. Since money is costless to produce, holding smaller than optimum balances is a wasteful use of real resources.

In the schemes for free competition in money, private issuers would be free to produce as much of their money as they wished and users of money would be free to choose whichever currency suited them best, presumably one with stable buying power. Currency competition would be compatible with any exchange rate regime, either flexible or fixed.

One such proposal urges the United States to adopt parallel currencies: dollars and gold. The supply of dollars and hence the price level in terms of dollars would be determined by the Federal Reserve (by discretionary monetary policy), the supply of gold used as money and hence the price level in terms of gold by the free market. The relative price of the two currencies (their exchange rates) would vary depending on conditions in the gold market, the monetary policy actions taken by the Federal Reserve, and the public's taste for the two currencies. According to this scheme, were the cross-elasticity of demand between the two currencies high, then a fall in the price of the dollar (that is, an increase in the expected rate of change of the gold price) would lead to a massive shift out of dollars into gold. In some respects, the experience of California in the greenback period (1862-78) was an example of this scheme: gold and greenbacks circulated freely at flexible rates and were both used as exchange media. In addition, proponents of such a scheme argue that shifts from gold to dollars and from dollars to gold would act as a signal to the Federal Reserve to intervene, decreasing monetary growth when the public shifted away from dollars into gold, and increasing monetary growth when the public shifted away from gold into dollars.[7] The advocates of free currency competition regard it as needed to achieve price level stability, as leading to optimum currency areas, and eventually to currency unification, as users of money choose the most useful money.[8]

II. Strengths and Weaknesses of Alternative Standards

We prefix an evaluation of the strengths and weaknesses of the three types of monetary standards we have described by the tabular presentation in Table 3-1. It lists seven criteria of desirable attributes of a monetary standard:

a. flexibility, that is, the ability to accommodate real economic growth as well as financial innovation

b. resistance to domestic and foreign shocks both of a monetary and nonmonetary character

c. freedom from political manipulation

d. magnitude of associated resource costs

e. provision of long-run price predictability, in the sense of mean reversion of the price level, that is, the price level would ultimately return to its initial value

f. provision of long-run price stability, in the sense that the price level would neither rise nor fall over substantial periods

g. provision of short-run economic stability, that is, stability of prices and real output

A check in a column of the table indicates that the standard satisfies the criterion, an x indicates that it does not, and a question mark indicates that the effects are uncertain.*

A. Gold Standard Variants

1. The pure gold coin standard: a 100% gold coin standard (a) with national money and (b) without national money

Since we have no empirical basis on which to form a judgment with respect to the qualities of a 100% gold standard with or without a national money unit, our evaluation is based on theoretical considerations.

Both standards, in common with all commodity standards, would be free from political manipulation but, on the other hand, would exhibit a number of negative features. These include high real resource costs of their establishment and operation; inability to accommodate real growth if technological progress in gold mining and new mine discoveries do not keep pace with the growth of the rest of the economy; long-term inflationary or deflationary movements of the price level, depending on the rate of growth of the monetary gold stock relative to the demand for gold; susceptibility to shocks

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*Congressman Henry S. Reuss -- I do not endorse the unfavorable comparison made here of current monetary arrangements with radical alternatives, gold-based and otherwise. Our economic difficulties stem from a range of policy and structural defects which would exist under any monetary standard.

Table 3-1

Criteria for Evaluating Alternative Monetary Standard[a]

Monetary Standard	Flexibility	Resistance to Shocks	Freedom from Manipulation	Low Resource Costs	Long-run Price Predictability	Long-run Price Stability	Short-run Economic Stability
A. Gold							
1. Pure variants	X	X	✓	X	✓	?	X
2. Classical variants	X	X	X	[b]	✓	?	X
B. Commodity	✓	X	✓	X	✓	✓	?
C. Paper							
1. Current	✓	✓	X	✓	X	X	?
2. Competing monies variant	?	✓	✓	✓	?	?	?

[a] Check means standard satisfies condition, X means it does not; question mark indicates effects are uncertain

[b] Resource costs were reduced in variants of the classical gold standard, particularly so for countries on the gold exchange standard

from both home and foreign changing conditions of supply and demand, each of which in turn could produce short-term economic instability.

If the standard with or without a national money unit literally were limited to or based on the existing gold stock in a country plus annual additions from gold output, long-term inflationary or deflationary movements of the price level would be possible, depending on the rate of growth of the monetary gold stock relative to the demand for gold. These movements impose costs on the economy. It matters little if a loan contract is denominated in a weight of gold rather than a nominal dollar amount if the conditions ruling when the contract is entered into have changed when the terms of the contract have to be fulfilled. Lenders or borrowers can be harmed, depending on whether inflationary or deflationary forces prevail. Foresight with respect to future long-term changes in demand for or supply of gold exceeds investor capacity to encompass in a loan contract. This aspect of a gold standard cannot be neglected.

One other aspect of a gold standard with or without national money is that the traditional view that gold production varies positively in response to changes in its real price does not appear to be true currently[9] (see Chapter 4). On the supply side, South African mines produce less when the price is high because they can work poorer ores, and currently an increase in the real price of gold does not shift gold from nonmonetary to monetary stocks. If the price of gold were fixed and inflationary expectations vanished, it is conceivable, however, that the responses on the supply and demand sides might change.

Another feature of the two theoretical variants invites comment -- the feature that allows for possible introduction by the market of fiduciary monies by issuers who promise to pay gold by weight or in coin of the realm on redemption. If such monies were not always redeemable, as the issuer promised, it is likely that government would become involved in the money creation process if only to enforce contracts and to prevent fraud. Moreover, when an issuer fails to fulfill his promise to those who entered into a contract with him, third-party effects also occur -- the holder of the monies will default on payments owed by him to third parties. For this reason, government is likely to be drawn into the money creation process in order to set limits on the size of the fiduciary issue and otherwise regulate promises to pay gold. The rationale for a gold standard without national money as free from government intervention is weakened by the feature in question. It undermines the case for a 100% gold coin standard.

This feature also has a bearing on the claim made that high resource costs are a positive value of gold standards.

If this were so, they should not occasion the introduction of substitutes for gold in circulation and in reserves. To suggest that markets might introduce such substitutes in the idealized gold standards belies the claim made for the beneficence of high resource costs. The market will seek means to achieve at lower resource costs what the gold standard is designed to achieve at much higher resource costs.

2. Variants of the classical gold standard

We can summarize the strengths of the gold standard variants of historic experience, and we can then inquire why, given these advantages, the United States and the rest of the world retreated from them.

We note the following advantages conferred by a gold standard. One: A gold standard promotes long-term domestic and international price predictability. This condition provides incentives to private market agents to make long-term contracts which are vital for the efficient operation of a market economy. In addition, such long-term price predictability minimizes confusion between relative and price level movements, so that economic agents do not experience false signals with regard to real economic decisions. Two: Government intervention in the determination of the price level and overall level of economic activity is limited under a fully functioning gold standard. Three: Fixed exchange rates create the efficiencies of a stable international money that integrates the world's commodity and capital markets.

The short explanation of the world's retreat from a gold standard, given its advantages, is that, whether advisedly or not, the world came to prize goals other than those of the gold standard. All gold standard countries confront destabilizing conditions on the supply side, due to gold discoveries, and on the demand side, due to the spread of the gold standard when additional countries adopt it. Improving the real performance of the economy was given pride of place. To achieve the improvement, the task was assigned to government management of monetary and fiscal policy, rather than to private sector initiatives. Only the role of fixed exchange rates carried over to the postwar world but fundamentally divorced from the gold standard restraints. Under Bretton Woods, there was no provision that the internal supply of a country's currency was to be governed by its gold holdings, as was the case under the gold standard, nor was there a requirement that a country had to undergo deflation or inflation domestically to balance its external accounts. This dilution of gold standard discipline is an example of its institutional vulnerability. The gold standard was abandoned for shorter or longer periods whenever adherence to it was deemed costly.

The goal of stabilizing the real performance of the economy in the postwar period seemed incompatible with the gold standard. A fully functioning gold standard requires short-term adjustment of the domestic economy to correct balance of payments disequilibria. Such adjustments entail short-term price instability and short-term output instability, which means fluctuating employment. In addition, fixed exchange rates transmit real disturbances in one country to the rest of the world. A timely example is the size of adjustment costs that would have occurred, had the world been on fixed exchange rates from 1974 on. The increase in the price of oil led to a redistribution of international monetary reserves from oil-importing to oil-producing nations. Under fixed exchange rates, the domestic price level in oil-importing countries would have been subject to a massive deflation. More generally, under fixed exchange rates, a boom in one country will lead to an increase in demand by its residents for goods and services in the rest of the world. The opposite will happen in the case of a recession.

For these reasons the value of external stability in maintaining a fixed rate of exchange between the domestic money and foreign monies came to be regarded as purchased at the cost of instability in the domestic money supply, domestic spending, prices and employment. The simple rule for governments to maintain a fixed price of gold was overthrown in the 1970s, but the seeds of the downfall of that rule were sown earlier in postwar years as country after country opted for monetary independence, full employment and economic growth. Countries rejected the restraints that the operation of a fixed exchange rate imposed on the pursuit of these widely supported national objectives. In the United States, where the share of international trade was a minor factor in aggregate national income, the view prevailed that the domestic economy should not be hostage to the balance of payments. Maintenance of the price of gold was not an objective of either the Employment Act of 1946 or the Humphrey-Hawkins Full Employment and Balanced Growth Act of 1978.

B. Variants of Other Commodity Standards

The proposed commodity standards have no empirical counterparts, so we compare their strengths and weaknesses with the gold standard and paper money standards.

Technically, commodity standards appear to be superior to a gold standard because nonmonetary production of commodities that might be included in the bundle is a larger fraction of aggregate output than is nonmonetary production of gold. The broader base might therefore provide a more stable price level under a commodity standard, but it is not obvious that that would be the case. Had prices of commodities been expressed in terms of a currency unit consisting of a bundle of commodities rather than in terms of gold, the general price level probably would have fluctuated as much as it actually did, say, from 1800 to 1950. In addition, changes in the relative cost of the commodities in the bundle, just as changes in the cost of gold, would contribute to price

instability. Commodity currency, however, would offer greater countercyclical effects on income and thus on the money supply than would a gold-based currency.

In other respects, the two standards are similar under 100% reserve or fractional reserve arrangements and both can serve as international currencies. The one respect in which a gold standard is superior to commodity standards is that gold commands clearly broad support by many people and European central bank governors as the most trusted money. Commodity standards have no such emotional appeal. Holding stocks of gold may be acceptable to the public. Holding stocks of useful goods would probably not be understood or countenanced.

To the extent that a commodity standard with 100% reserves operated in a fully automatic fashion, it would be preferable to a paper money standard with discretionary control of the money supply.[10] The commodity standard would be separate from the government budget and less subject to overissue. However, it would still be subject to instability reflecting changing relative prices and the risk of deliberate manipulation by countries having monopoly power over one or more commodities in the bundle. For example, if one of the countries on a commodity standard failed to adhere to it, say, by impeding the free movement of the commodities in the bundle among the countries adhering to the standard, the policies of the destabilizing country would have damaging effects on the others. Restrictions on international trade would likely be introduced generally. In addition, if a significant change occurred in either the supply of or demand for one commodity in the bundle which is produced primarily in one country, that could lead to instability, were that country to exercise its monopoly power.

With fractional reserves, there is no clear advantage of a commodity standard over a paper money standard unless adherence to rules were scrupulously observed under the former but not the latter standard. Under the commodity standard, shifts from monetary to nonmonetary stocks of commodities in the bundle change the supply of money. It is an advantage that no such shifts occur under a paper money standard.

The final assessment is that commodity standards are more complex and entail greater resource costs than would exist under a properly managed paper standard.

C. Paper Standards

Paper money is valued only because others will accept it in exchange for valuable goods and services, and not because of any intrinsic value.* The chief advantage of all paper standards,

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*Congressman Henry S. Reuss -- The concept of "intrinsic value" is nonsensical. Paper money is valued because it represents a convenient and reliable store of value and liquidity, and it retains that value so long as the society and government which support it command the confidence of their citizenry.

including the present one, is that they exact minimum costs in the form of resources used to produce the money supply, and they are sufficiently flexible to accommodate economic growth. Moreover, if accompanied by flexible exchange rates, they can insulate the economy from external shocks.

1. Current Monetary Arrangements

For some observers, the discretionary character of the paper standard is an advantage. Monetary authorities have a choice of policy goals and are free to determine how to use their powers to attain them. As problems change, their goals may change.

Other observers view the historical record of our fractional reserve managed paper money system as one of considerable instability both in the short run and the long run and have advocated a number of proposals designed to reduce:

> instability associated with fractional reserve banking (100% reserve proposal);
>
> instability associated with discretionary policy (monetary growth rules);and
>
> inefficiencies associated with the costlessness of producing paper money balances (paying interest on bank demand deposits).

2. Proposals for Competing Monies

Finally, we evaluate the case for competing monies. Its principal appeal lies in its reliance on the impersonal forces of the market rather than the monopoly power of government. However, unless brand names can be attached to competing private monies, that is, unless the public can be guaranteed that private money issuers will not overissue for private gain, it seems likely that government regulation will be necessary.[11]

With respect to the proposal for a parallel currency, the extent to which it would contribute to price stability depends on the reason shifts would occur between dollars and gold. If a shift occurred because of overissue of dollars, Federal Reserve actions to reduce the money supply would be desirable. However, if a shift reflected a change in the public's taste for gold and dollars unrelated to price behavior, or to a shock in the gold market, then such actions would be undesirable. The question then arises, how would the Federal Reserve know the source of a shift?

U.S. experience under the greenback standard is not comparable to the proposal for a parallel currency. In the greenback era, the price of gold was fixed by Great Britain. What varied was the dollar price of gold, reflecting a changing value of the dollar. The country had a dual currency system because dollars were used for domestic purposes, gold for international transactions (with the

exception of California, where gold was also used for domestic transactions). The fact that the rest of the world was on a gold standard maintained by the British ensured that the U.S. arrangement would be temporary, lasting only until the U.S. price level in terms of dollars fell enough to make resumption of payments in gold possible at the prewar parity. Hence market participants' relative holdings of gold and dollars would reflect expectations on the timing and pattern of resumption rather than the free market factors stressed by proponents of this proposal.

Finally, the optimum currency area (the maximum geographical area over which one money can provide price stability) may be so great that only the governments of very large economies can effectively provide the money supply.[12] Even those sympathetic to the proposed change may conclude that currency competition will ultimately self-destruct, since one currency will outcompete all others. The money industry is a declining cost industry that is a natural monopoly, which at some stage would be nationalized.[13]

III. Conclusion

Each of the standards has advantages and disadvantages. Existing and historical standards were adopted (evolved) as a response to different economic and social priorities of the period as well as in response to the purely economic considerations of the resource costs involved. Thus the classical gold standard prevailed in a world characterized by free markets, free mobility of labor and capital, and distrust of government intervention in business affairs. In that environment, in which national economic growth and high employment were not given the weight assigned to them today, the automatic working of the gold standard was preferred to the "evils of managed money." Hence it is difficult to make the case for one standard over another divorced from the prevailing concerns of the time. Nevertheless, on the grounds of the criteria listed in this chapter, the gold standard may not be the standard best suited to current problems, as is reflected in the recommendations advanced by the Commission.*

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*Congressman Henry S. Reuss -- Amen.

Notes to Chapter 3

1. The great English economist Alfred Marshall also proposed a combination of silver and gold that he designated symmetalism. He argued that a bimetallic standard would inevitably degenerate into a single standard of either gold or silver, one metal tending to drive the other out of circulation. Symmetalism was a plan to make a composite bar of fixed proportions of gold of given weight with a weight of silver, say, twenty times greater, the government undertaking to buy or sell on demand the composite bar for a fixed amount of currency. Neither metal separately would be convertible into currency at a fixed rate nor would currency be convertible at a fixed rate into either metal. See Memorials of Alfred Marshall, ed. A.C. Pigou, Macmillan: London, 1925, pp.204-06.

2. This assumes that it is costless to shift from nonmonetary to monetary use of gold. The cost was either borne by the Mint or paid by the public when gold coins circulated in the past.

3. See, for example, D.N. McCloskey and J.R. Zecher, "How the Gold Standard Worked, 1880-1913," in J.A. Frenkel and H.G. Johnson, eds., The Monetary Approach to the Balance of Payments, Toronto: University of Toronto Press, 1976.

4. As happened when sterling was devalued in 1949 and 1967.

5. A survey of the pre-1950 literature on commodity standards may be found in Milton Friedman, "Commodity-Reserve Currency," in his Essays in Positive Economics, Chicago: University of Chicago Press, 1953, pp. 204-50. See also Robert Hall, "The Government and the Monetary Unit," unpublished paper #159 of the National Bureau of Economic Research Inflation Project.

6. See his Choice in Currency, A Way to Stop Inflation, The Institute of Economic Affairs, Occasional Paper 48, London, February 1976; Denationalisation of Money, An Analysis of the Theory and Practice of Concurrent Currencies, The Institute of Economic Affairs, Hobart Paper Special, No. 70, London, October 1976.

7. See Joe Cobb, U.S. Choice in Currency Commission, "Rahn Proposal for Capital Gains Treatment of Gold Coins," (February 10, 1982).

8. There is some historical precedent for competing monies. Such a system was quite successful in late eighteenth and early nineteenth century Scotland and in the antebellum United States (except for wildcat banks). See Lawrence White, "Free Banking in Scotland Prior to 1844," Unpublished Ph.D. dissertation (November 1981), and Hugh Rockoff, "The Free Banking Era: A Re-examination," Journal of Money, Credit and Banking 6 (May 1974): 141-68.

9. This discussion does not incorporate gold producers' expectations about movements of the gold prices, nor does it incorporate asset-holders' expectations. For a discussion of the traditional

view, see Jurg Niehans, The Theory of Money (Johns Hopkins University Press, 1978), pp. 140-58; and Robert J. Barro, "Money and the Price Level under the Gold Standard," Economic Journal 89 (March 1979): 13-33.

10. This assumes, however, that the government does not have better access to superior information than the public has.

11. See Benjamin Klein, "The Competitive Supply of Money," Journal of Money, Credit and Banking 6 (November 1974): 423-53.

12. Indeed, many countries in Latin America and the Caribbean have tied their currency units to the dollar. See Michael Connolly, "Optimum Currency Pegs for Latin America," Journal of Money, Credit and Banking 14 (Forthcoming).

13. See Roland Vaubel, "Free Currency Competition," Weltwirtschaftliches Archiv 113, 1977, no. 3, pp. 435-61.

Chapter 4

Existing Gold Arrangements and Proposals for Change

We begin this chapter with a review of the prevailing set of gold arrangements in the United States. They serve as a benchmark from which we evaluate proposals for change suggested by members of the Commission, witnesses who testified at the hearings we conducted, and interested citizens. A Staff Appendix reports findings on the operation of the gold market as it functioned when the price of gold was pegged by governments and as it has functioned since 1968 when the price of gold was freed to fluctuate in response to changes in demand and supply. The Appendix includes a discussion of the allocation of the stock of gold between monetary and nonmonetary uses, the determinants of demand and supply, and approaches to the determination of the equilibrium price of gold. The Appendix also presents the record of gold production over past centuries and its relation to trend movements in commodity prices. The chapter concludes with a statistical compendium of time series relating to world and U.S. output and stocks of gold, industrial and investment demand for gold, and the changing nominal and real price of gold.

I. Existing Gold Arrangements

We distinguish the effects of current gold arrangements on operations of the Treasury Department, the Federal Reserve System, and private citizens, and on the conduct of international transactions.

Treasury

The Treasury Department holds most of the United States' monetary gold stock in depositories located in Fort Knox, Kentucky and West Point, New York; U.S. Assay Offices in New York and San Francisco; and the Denver and Philadelphia Mints. The Federal Reserve Bank of New York is custodian of the remainder of the gold stock. In total, the stock amounts to 264 million ounces. The Treasury values the stock at $42.22 per ounce, the last official price set in 1973. No official price exists today. The Treasury could choose to revalue the gold stock, for example, at changing market prices without legislative approval, but such action would have no economic consequences, because, as noted below, the Treasury's gold-certificate issue is limited by law.

The Secretary of the Treasury is authorized by 31 U.S.C. Sec. 405b and 449 to issue gold certificates against any gold held by the Treasury. Public Law 94-564, Sec. 8, retains, as the legal value at which gold certificates may be issued, the last par value of the dollar of $42.22 per fine troy ounce. Gold certificates have been issued to the Federal Reserve System, pursuant to the foregoing authority, to the full extent of the gold held by the Treasury.

The Treasury currently mints no U.S. gold coins. Indeed, 31 U.S.C. Sec. 315b prohibits the minting of U.S. gold coins for domestic circulation. However, Public Law 95-630 provides that the Treasury during each of five calendar years shall strike and sell to the general public gold medallions containing not less than one million ounces of gold. The medallions are to be sold at prices covering the market value of the gold content plus all costs. The first sales of medallions were made in July 1980.

Currently, the Treasury has no policy of actively buying or selling gold, but the Secretary of the Treasury has the authority, pursuant to 31 U.S.C. 733 and 734, to sell gold, and with the approval of the President, to purchase gold, at home or abroad, in such amounts and manner and at such rates as he deems to be in the public interest. The Secretary of the Treasury, with the approval of the President, also is authorized to deal in gold and foreign exchange for the account of the Exchange Stabilization Fund (ESF) that was created by section 10 of the Gold Reserve Act of 1934 (31 U.S.C. 822a), in accordance with the terms of that provision of law, as amended. ESF assets have not, however, included gold since December 1974. The stabilization fund currently has appropriated capital of $200 million.

Federal Reserve System

Currently, gold serves neither as currency nor as backing for U.S. currency. Pulic Law 90-269 amended the Federal Reserve Act so as to eliminate the requirement that the Federal Reserve Banks maintain reserves in gold certificates of not less than 25 percent against Federal Reserve notes in circulation. In addition, this Act eliminated the gold reserve requirement for U.S. notes and Treasury notes of 1890. Reserves now consist of the accounts of depository institutions at Federal Reserve Banks and their holdings of vault cash.

The Federal Reserve System holds as an asset gold certificates issued by the Treasury against its gold holdings valued at $42.22 per fine troy ounce of gold. The certificates are a liability of the United States Treasury and as such represent a Federal Reserve claim on the Treasury.

Private Citizens

In December 1973, U.S. citizens were permitted to own

gold coins minted up to 1959 (before that date, up to 1934), and as of December 31, 1974, to own bullion gold. As of the latter date, they have been free to purchase, hold, sell or otherwise deal in gold in the United States and to hold gold certificates. They are also free to manufacture and sell gold medallions and "coins." Private citizens are free to include gold clauses in private contracts entered into on or after October 28, 1977, the date of enactment of P.L. 95-147. Sec. 4(c) of that provision of law continued in effect, however, the Gold Clause Resolution of June 5, 1933, as to obligations entered into prior to October 28, 1977. That Resolution made unenforceable, at other than their dollar face value, gold clauses in obligations.

International Transactions

The United States is barred, by its obligations under the Articles of Agreement of the International Monetary Fund, accepted by the United States (pursuant to section 24 of the Bretton Woods Agreement Act, as amended) from adopting an exchange arrangement by which the external value of the dollar is established and maintained in terms of gold. Accordingly, gold does not determine the value of the dollar in terms of other currencies, and it does not serve as an international means of payment.

II. Proposed Changes in Gold Arrangements

We classify the changes in current gold arrangements that have been proposed and brought to our attention in five groups:

A. A domestic gold standard with a fixed price of gold

B. An international gold standard with a fixed price of gold

C. Increased use of gold in domestic Federal Reserve and Treasury operations, but not a return to a gold standard

D. Increased use of gold in international monetary arrangements, but not a return to a gold standard

E. Decreased role of gold as a potential policy instrument.

We examine the main elements of the proposed changes and evaluate the advantages or disadvantages of each group.

A. A domestic gold standard with a fixed price of gold*

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*Congressman Henry S. Reuss -- This section completely misstates the issue. The major difficulties with a domestic gold standard are, first, that it would place control of U.S. monetary policy in the unfriendly hands of the Soviet Union and South Africa and, second, that it would contribute nothing to the control of inflation. The technical issues mentioned below, though insoluble, are secondary.

Proposals

To achieve long-run price stability,* advocates of a restoration of a domestic gold standard recommend that the Government establish a new official fixed price of gold (that is, define the weight of gold in a dollar) and maintain it by buying and selling gold freely at that price. The Government would also determine a ratio, or upper and lower bounds of a ratio, between the monetary gold stock and Federal Reserve note circulation, or the monetary base, that the Federal Reserve System would be required to observe, reducing its monetary liabilities when the reserve ratio declined, expanding them when it rose. Legal tender gold coins, denominated in dollars, would be issued to serve as hand-to-hand currency and as legal reserves for commercial and other bank deposits. No restrictions would apply to ownership of gold coin or bullion. Nongold currency would be convertible into gold on demand by holders.

To implement a restoration of a domestic gold standard in the United States requires the solution of a series of interlocking problems.

Evaluation

1. The basic problem has been designated the re-entry problem: how to determine the "right" fixed price at which to resume. In the past, when a country reinstituted the gold standard, there was an old official price that was once again restored or that served as the base for revaluation or devaluation. There is no comparable old price today. The last official price of an ounce of gold, $42.22, is so out of line with current market prices that it provides no guidance. The risk involved in choosing the wrong price is great. An incorrect price might lead to a huge inflow of gold and inflation if it were too high, a huge outflow and economic contraction if it were too low.

At least three concrete proposals to solve the re-entry problem exist:

(a) Arthur Laffer proposes that an announcement be made by the Government that some months hence a dollar unit of the monetary base of the Federal Reserve System will be linked to a fixed quantity of gold at that day's average transaction price in the London gold market.[1] That would become the official price of gold in terms of dollars henceforth. If it turns out that the price so chosen is too high or too low, the proposal goes on to recommend suspension of convertibility. The procedure is then repeated, with a new announcement that convertibility will be reinstated at a future date at the

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*Congressman Henry S. Reuss -- Whether this is the unsullied motive of every speculator who has flocked to the gold standard is open to question.

price then prevailing in the market. The proposal opens up the possibility for instability as speculators bid up the price of gold before the end of the first announcement period. Then if convertibility is suspended because the price turns out to be too high, speculators will unload gold and the price of gold might fall too low before the end of the second announcement period. Moreover, prospects for suspension of convertibility would introduce instability and undermine confidence in the system.

A conjecture on how gold holders might react to the announcement by the United States that it will go back to the gold standard at a future date indicates possibly conflicting market reactions.

The prospect of a fixed price for gold might signify, to those who hold gold in the expectation that it will appreciate, the urgency of selling gold even before the price is fixed, if they foresee a low fixing price. That might lead to a reduction in the market price at the time of fixing. Further sales by such holders once the price had been fixed, if the belief were to prevail that the price would be maintained indefinitely, would compel the United States to buy gold to prevent a decline in the fixed price. If such sales by those holding gold in the expectation that it would appreciate did not take place, once the intention to fix the price of gold had been announced, it would suggest market skepticism that the price, when picked, would be "right."

On the other hand, the prospect of a fixed price of gold for those who hold it to diversify their portfolios and as a hedge against contingencies might encourage them to increase their holdings in the belief that the price would be maintained.

(b) An alternative proposal to determine the re-entry price has been made by Robert Aliber.[2] Start with the price of gold, when price stability was last known in the United States, say, 1961. Adjust the dollar price of gold in 1961, $35 per ounce, by the decline in the purchasing power of the dollar in the two subsequent decades. In addition, adjust for changes in the real (relative) price of gold that have occurred since 1961. The proposal, however, is defective as a way of determining the appropriate re-entry price. It ignores the parameters of the gold demand and supply functions, which would need to be estimated before a return to a gold standard were contemplated.

(c) One approach to the problem of the price at which to reinstitute the gold standard seizes on the opportunity the selection offers to adopt simultaneously a 100% gold reserve against the money supply. The price of an ounce of gold is to be determined, under this scheme, by dividing a money aggregate, such as the M1 measure of the U.S. money supply, by the number of ounces of gold held by the Treasury. One such calculation yielded a price of $1500 per ounce. A variant of this approach divides the world dollar GNP by the world stock of monetary gold, yielding a price of $3500 per ounce. We set aside questions about justification

for the proposed approach, and comment only on the inescapable consequence of adopting either variant. It is clear that a massive inflation would result as the price level adjusted to the higher price of gold.

2. Even if the fixed price turned out to be "right," a second problem is that a return to a gold standard must be accompanied by a strategy to assure adequate monetary growth. That would depend on an adequate supply of gold. World gold reserves above and below ground may seem more than adequate, quoted in billions of ounces, but the flow supply cannot be ignored. The evidence is that gold production responds sluggishly to changes in market price and, since the 1960s, has responded perversely (see the Staff Appendix below). Some observers regard the fact that the bulk of current world gold output is produced by South Africa and the Soviet Union as a harbinger of instability in future gold output.

3. A third problem is the potential for shocks in the gold market at home or abroad. On the demand side, they might arise from changes in the demand for gold for hoarding, and on the supply side, from gold discoveries. Such potential shocks would make it difficult for one country alone to return to the gold standard because it would bear unilaterally the adjustment costs imposed by the shocks.

In the discussion of the gold market in the Appendix, possible solutions to some of the foregoing problems are examined. Additional problems, however, affect the feasibility of a return to a gold standard.

4. Under a domestic gold standard with convertibility between gold and the dollar available only to residents of the United States, the problem of how to enforce the limitation of convertibility appears intractable. Residents might be required to declare under oath that they were acting for themselves or for other residents, but not for foreigners, when demanding gold or supplying gold at the gold window. Alternatively, gold imports and exports might be embargoed. Opportunities for profitable violation would arise with discrepancies between the U.S. fixed price and the world market price of gold. In both cases, an enforcement army of inspectors would appear to be needed.

5. A fifth problem concerns international aspects of a unilateral return to a gold standard by the United States. The objective would be to preserve flexible exchange rates while domestic monetary growth would be constrained by a gold reserve requirement. However, it is not obvious how this arrangement would function. Under such an arrangement, a shift from a foreign currency into gold by an American investor would impose the whole burden of adjustment on the foreign currency-dollar exchange rate, since the dollar price of gold would not change. Assuming significant portfolio shifts by Americans between foreign currencies and gold, and all other things

equal, exchange rates would tend to become more variable than they are under the present floating system. In addition, the reduction in the gold reserve would lead to a contraction of the monetary base. The rest of the world, of course, could peg to the dollar, as some countries do now. Could foreign countries obtain gold from or sell gold to the United States? How would such gold transactions affect domestic monetary policy?

6. Advocates of the gold standard claim that its restoration -- and possibly even the announcement of a decision to restore it -- would immediately reduce both the inflation rate and the level of interest rates, and would eliminate inflationary expectations. No transitional costs are mentioned. However, contracts in the credit and labor markets and final products markets reflect the existing inflationary cost and price structure. Advocates do not explain how the adjustment of the existing cost and price structure to what they describe as a new noninflationary gold standard can be achieved without bankruptcy and loss of employment. It is this consideration that motivates some who argue that it is premature to advocate a return to the gold standard before price stability has been attained.*

B. An international gold standard with a fixed price of gold

Proposals

Under this proposal, the United States would maintain fixed exchange rates with other countries based on the fixed price of gold it chose and the definition of the gold content of the dollar and other national money units. Such a standard could be achieved either by international agreement or by evolution -- the United States could be the first to reinstitute the fixed price of gold and other countries, persuaded by U.S. success in stabilizing the domestic price level, might follow suit. International payments imbalances would be settled by gold flows or by flows of dollars or dollar assets convertible into gold at the fixed price. The monetary base and the money supply would vary with gold flows.

Problems in implementing an international gold standard in some respects are similar to those presented in implementing a domestic gold standard.

Evaluation

1. The key problem again is choosing the right price for gold at which to fix the exchange rate.** In 1925, Great

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*Congressman Henry S. Reuss -- In other words, this claim by the gold bloc is completely unfounded.

**Congressman Henry S. Reuss -- This problem, though virtually insoluble, is not the key problem. The key problem is that the gold standard would not work and could not be sustained if even technical issues of implementation could be resolved.

Britain returned to the gold standard at an unrealistically high gold price for the pound. In 1947, it repeated that mistake. In the first instance, it struggled for six years in a vain attempt to deflate the economy to make the gold price viable in the face of gold outflows. The pound was then freed to float. In the second instance, it gave up the attempt after two years and devalued. In 1928, France returned to the gold standard at an unrealistically low gold price for the franc. Gold inflows into France (and U.S. sterilization of its gold inflow) destabilized the system.

2. The preceding examples indicate a problem that could arise were the United States to choose the gold price for the dollar independent of other countries' decisions. As in the British-French exchange rate decisions in the 1920s, unilateral actions could produce unsustainable relationships.

3. A multilateral return to the gold standard would require international agreement and amendment of the IMF rules. Yet there is no evidence that our trading partners have an interest in re-instating the gold standard. The views they have expressed, in fact, are negative with respect to the desirability or feasibility of a return to the gold standard.

4. All the problems associated with fixed exchange rates would have to be dealt with again. Is the United States, with a relatively closed economy, well advised to seek fixed exchange rates that throw the whole burden for adjusting international payments imbalances on the domestic money supply, incomes, and employment?

5. Assuming that the profits of gold revaluation could be sterilized in the United States, would that also be true of the rest of the world? If not, would the United States not be open to the transmission of inflation from foreign economies that chose to monetize the profits of revaluation?

6. Restoring an international gold standard implies restoring convertibility to dollar claims of foreign governments and central banks, not to mention private institutions and individuals. Such claims could be exercised and affect the monetary base with no relation to ongoing balance of payments flows.

C. Increased use of gold in Federal Reserve and Treasury operations, but not a return to a gold standard.

Proposals

Two types of changes in gold arrangements, considered in this group, both based on a variable price of gold, differ in their advocates' view of discretionary Federal Reserve policymaking. One type would reduce or even eliminate the Federal Reserve's discretion. The other type would enhance it. Neither type involves a return to a gold standard but either, if adopted, would make a significant change in current gold arrangments.

Three proposals of the first type differ broadly in content. One proposal is that gold coins, by weight, be issued and allowed to circulate as a parallel currency, their price to be determined by market forces. Some proponents have urged Treasury issue of official coins; others have promoted issues by private mints. Some favor exemption of the coins from capital gains and sales taxes. The underlying conception is that paper money holders could exercise the option to convert paper to gold coins and the pace of such conversions would be a signal to the Federal Reserve whether its policies were overly expansionary. Exemption from capital gains taxes would, however, make the coins differentially attractive and confuse the "signals" given to the Federal Reserve.

Another proposal advocates Treasury issue of gold-backed notes or bonds. The argument supporting the proposal is that the more stable purchasing power of gold than of the dollar would permit the market yield on such gold-backed issues to be lower than current market yields on dollar notes or bonds. Thus, using these instruments would hold the national debt below what it would otherwise be, and restrain the incentive for monetary and fiscal authorities to use the inflation tax as a way of reducing deficits. Moreover, gold-backed bonds, by competing with dollar-backed bonds, would limit the Federal Reserve's ability to use open market operations to expand the money supply. Proposals differ with respect to the redemption of the issue: some specify redemption at the price of gold at date of issue, others at date of redemption, others offer the option of redemption in dollars rather than gold. Some propose a coupon of 2 or 3 percent; others a coupon of 8 percent -- still much lower than current yields on Treasury dollar issues.

The third proposal to limit Federal Reserve discretion is based on a different approach. It would limit the growth in M1 by tying the maximum allowable growth of currency in every 12-month period to the increase in that period in the value of the Federal Reserve's gold certificates. The value of the gold certificates presently is established by statute of the last official price of gold which, as noted in section I above, was $42.22 an ounce. The proposal is that the official price would be increased percentagewise in each period by enough (1) to offset a predetermined increase in the certificate requirement, starting at 9 percent in 1981, plus (2) the maximum desired growth in M1 beginning in 1982, plus (3) an adjustment for changes in the ratio of checking deposits to currency. The proposal recommends a 33 percent yearly increase in the certificate requirement as from 9 to 12 percent, 12 to 16 percent, and so on. The purpose of the increase is to raise the official price at which gold certificates can be issued to the market price of gold in about eight years. Capital gains accruing to the Treasury from raising the price would be used to retire Federal Reserve holdings of Treasury debt, leaving the monetary base unchanged by the action. Gold coins would not be convertible at fixed prices, but they

could circulate as coins by weight, as under the preceding proposal.

A proposal of the second type would allow the price of gold to fluctuate with market forces but would establish upper and lower bounds to the ratio between the value of the gold stock and the monetary base (the gold cover). If the gold cover reached either the upper or lower limit, the Federal Reserve would intervene by conducting open market operations either in gold or government securities. The proposal assumes flexible foreign exchange rates for the dollar.

Evaluation

1. The issue of gold coins by weight probably would have only marginal consequences for Federal Reserve operations. Whether gold coins are successfully used as money will depend on the market test. Given the past variability in the price of gold, the short-run variability of goods priced in terms of gold coins may be much larger than that of goods priced in terms of dollars. That would make the use of gold coins as a medium of exchange unlikely.

No limit is proposed on Treasury issue of the gold coins. The possibility therefore exists that the Treasury's gold stock might be transferred to the public in this manner, should their unlimited use spread. It is assumed that only U.S. residents will acquire the coins in small quantities. But what if foreign sources ordered large quantities on a given day? Such an order, placed in the gold market, would raise the price. That consequence will not follow at the Treasury sales window.

If no quantity limit is imposed on the issue of gold coins by the Treasury, setting a seignorage fee well in excess of the cost of minting would limit sales by reason of the high price. One suggestion along these lines is that the Treasury issue a one-ounce $1000 legal tender coin. If as many as 25 million of such coins were issued, they would earn the Treasury approximately $15 billion in seignorage at current market prices. The payment in dollars for the coins would reduce the money supply as currently measured, provided the Treasury refrained from adding the seignorage to its general funds and the Federal Reserve took no offsetting action. It is alledged that a $1000 one-ounce coin would fluctuate less in value than a bullion coin would, and that holders could use it in transactions or to diversify their portfolios.*

Some proponents of an issue of gold coins believe that legal tender status would enhance the monetary attributes of the coins, but others object to the compulsory aspect of

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*Mr. Herbert J. Coyne -- The coin should have a face value of $100.00 or $200.00 or else denominated by fine weight of gold. In addition, because selling the coin in the manner proposed above would result in the depletion of U.S. gold reserves, it should be specified that gold used for coin mintage should be covered by bullion purchases in the market.

legal tender status with respect to the payment of taxes.

The exemption of gold coins from capital gains and sales taxes, when other forms of gold holding were not so favored, would encourage a shift in composition of portfolios that includes gold to coins, and the addition of gold coins to some portfolios that had not previously included gold.*

2. The problem raised by an issue of gold backed-notes or bonds is that it offers gold holders an opportunity to acquire gold without incurring the cost of storage and insurance. A Treasury issue of gold-backed bonds, paying a low rate of interest, would permit speculation on gold with the additional inducement of the coupon. The purchase of such an instrument would indicate an expectation that the market price of gold would rise. The Treasury would be betting against the market, with the possibility of Treasury losses.

However, the existence and growing use of a futures market serve to make many of the foregoing problems inconsequential. Gold can now be held under futures contracts without explicit storage and insurance costs. Such costs are implicit in the price at which gold is bought forward. Such costs would also be implicit in gold-backed Treaury securities. Speculation in gold is permitted and will continue to be permitted whether or not gold-backed securities are issued. A coupon on a gold-backed bond would only mean that it would sell at a higher price than a zero-coupon gold-backed bond or another non-interest bearing way of holding gold. There would therefore be no net inducement to speculate on Treasury gold-backed securities.

3. The proposal to link the growth of currency issues. to the predetermined change per year in the price of gold is a monetary growth rule in disguise. The same objective could be accomplished without the use of gold.**

4. The problem with the proposal to use the price of gold as an indicator for discretionary monetary policy is that it fails to distinguish the source of movements in the price of gold. Movements in the price of gold might reflect market reactions to monetary policy, but equally they might reflect changing real forces in the gold market.

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* Congressman Henry S. Reuss -- This shift would come at the expense of common stocks and other productive capital investments which the Nation requires.

**Congressman Henry S. Reuss -- This is true. Also, all the objections to money growth rules which years of experience in the United States and United Kingdeom have taught us would apply.

An argument made for open market operations in gold is that it offers the central bank the option of using an instrument that will have its initial impact on the price of gold rather than on interest rates. Thus, if the central bank were concerned about producing a change in interest rates, yet desired to affect the growth rate of the money supply, it could conduct appropriate gold operations, in preference to operations in government securities. The duration of the differential effect on interest rates of gold rather than government securities operations is not addressed by the argument. It seems dubious that the differential effect, assuming it can be detected, will persist for longer than the briefest interval -- say, a day.* Gold operations, like government securities operations, affect bank reserves. It is the banks' response to the change in their reserves that affects credit markets.

In addition, open market operations in gold would not be as effective as those in government securities because gold is not as close a substitute as government securities are for financial assets financing real production and consumption.

D. Increased use of gold in international monetary arrangements, but not a return to a gold standard

Proposals

The proposals considered here do not involve a major change in existing monetary arrangements.

One proposal advocates revaluing the U.S. monetary gold stock at prices closer to current market prices and using the gold stock for intervention purposes in the foreign exchange market and to settle international payments imbalances.

A proposal of a different sort would be to initiate action aimed at a renewed restitution to member countries of their IMF gold contributions.

Evaluation

No revaluation of the gold stock is needed to permit sales of U.S. gold for foreign currencies. Given current

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*Mr. Herbert J. Coyne -- Without further study, it is inappropriate for the judgment to be made that the differential effect of using gold for open market operations would only persist for one day. I believe this as yet unexplored technique could have a much more significant differential effect and be a useful addition to the Federal Reserve's operational instruments.

foreign-exchange-market practices, it is difficult to envisage the mechanics of such an operation. A proposal to use gold for settlement purposes in a floating-exchange rate system is also inappropriate.

A variant proposal is that agreements with foreign central banks be negotiated to accept gold at a market-related price.* However, foreign governments and the U.S. Treasury can already buy and sell gold at market-related prices, either in the market or bilaterally. It is therefore unclear what is to be negotiated.

The proposal to use gold as an intervention vehicle endorses intervention when such a policy may not be in the national interest. If intervention is a policy of choice, gold is clearly not needed to achieve it.

To institute restitution of IMF gold to member countries in proportion to their quotas would require a high majority vote of the IMF membership. If gold is regarded as a valuable asset to be held against emergencies by the United States, the same consideration should apply to the international gold reserve.

E. Decreased role of gold as a potential policy instrument

There is essentially only one proposal in this group, namely the Treasury should sell the gold stock over a period of years and use the proceeds either to retire Federal debt, reduce taxes, or finance the current deficit. A program of auction sales could be directed to such a goal, but it would require avoidance of speculation by the market on the timing and magnitude of gold sales. However, such sales would reduce insurance against contingencies. The existence of a monetary gold stock leaves open the possiblity of a return to some form of a gold standard, were the monetary and fiscal authorities to engage in massive overissue. The gold stock serves as a reminder to the authorities that there is an option other than money creation at their discretion. In addition, the possibility of a future return to a gold standard probably has psychological value to some citizens.

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*Herbert J. Coyne -- The idea is not clearly presented or examined here. The purpose of an official agreement between central banks on gold transactions would be to facilitate the use of gold reserves by central banks and international monetary authorities at a market-related price to settle balance of payments surpluses or deficits. Gold could be exchanged for foreign currencies when countries are experiencing deficits or surplus currencies exchanged for gold.

It should be noted that gold is currently used for this purpose by various central banks. An international code of conduct would only formalize these ongoing transactions.

Notes to Chapter 4

1. Arthur B. Laffer, Reinstatement of the Dollar: The Blueprint (A.B. Laffer Associates, February 29, 1980).

2. See note 18 of the Appendix to this chapter.

Staff Appendix: The Gold Market

This Appendix is organized as follows:

A. Introduction
B. History of the gold market before 1968
C. Changes in location and operation of gold markets since 1968
D. Components of the demand for gold
E. Components of the supply of gold
F. Approaches to determination of equilibrium price of gold
G. Record of gold production in past centuries and its relation to trend movements in commodity prices
H. Summary

A. Introduction

Gold is a commodity. Like any other commodity, it will be produced only if the price at which it can be sold will exceed the costs of production, including the return on capital investment, wage costs, and prices of other inputs.

In the private market that has operated since 1968, the price of gold fluctuates, like the prices of other world-traded commmodities, to balance supply and demand. In the short run, the price may be volatile. In the long run, the price must be high enough to yield a return to producers that is competitive with other uses of their capital. Similarly, no commercial user will buy gold unless its price is competitive with that of substitutes and the product in which it is embedded can be sold at a profit. Investors will choose to hold gold only if it is expected to yield a return measured in purchasing power that is equal at the margin to the expected real return on other investment opportunities.

B. History of the gold market before 1968

Over the centuries, gold mined in many countries around the world has found its way to central distribution points where users have been able to acquire it. The distribution centers until 1968 were usually dominated by governments but private sector demand was accommodated in those markets from new output, recycled material, or from existing official stocks.

In the United States, the main government institutions

dealing with the gold market have been the mints and assay offices, which purchased newly mined gold, assayed it and imports of foreign gold, and sold gold on demand to domestic or foreign buyers before 1933. In addition, private gold refiners and processors converted gold material into gold bars or processed gold for the trade. There were no significant direct dealings between gold producers and industrial users. Before 1933, commercial banks and Federal Reserve Banks were also gold buyers and sellers. Thereafter, purchase of gold was confined to government agencies other than the Federal Reserve. Beginning in 1933, the Treasury Department or refiners licensed by it sold bar gold or refined gold to licensed users.

The world's principal gold market before World War I was in London.[1] Four bullion brokers were in business there long before the adoption of the international gold standard. One of them, N.M. Rothschild and Son, was agent for many South African gold mines, having earlier financed the industry. Once a week the brokers met to fix the price of gold and silver. The adoption of the gold standard restricted their business, since the Bank of England's (more or less) fixed buying and selling prices of gold limited fluctuations in the price. Nevertheless, the brokers continued to "fix" the price and arrange the matching of bids and offers. A fifth bullion broker began operations in 1853.

During World War I, there was no international gold market. European continental gold, Australian gold, and United States gold were all embargoed. All gold from the Union of South Africa had to be sold to the Bank of England at the statutory price. Purchasers of gold did not have access to the world's supplies but were limited to supplies available in their own countries.

From 1919 until Britain's return to the gold standard in 1925, the brokers once more resumed the distribution of newly mined gold. During this period, licenses were required for the export from London of newly produced South African gold, and South African gold was sold to the highest bidder through London agents. The demand was channeled through bids the bullion brokers made on behalf of clients, with no upper limit to the price until April 1925.

In 1925, South African gold shipments to London were temporarily suspended when the mines began to bring their output to the Pretoria mint for coinage, a more profitable course for them than sending it to London. To allow the London bullion market to function as the distributor of South African gold throughout the world, the South African Reserve Bank undertook to buy gold from the producers and sell it in London through N.M. Rothschild as their agents. The Reserve Bank thus became the principal buyer of gold produced in South Africa.

The relative importance of the London bullion market in the world distribution of gold declined in the interwar period. Before World War I, the gold was distributed to new and rapidly developing countries because of their regular borrowings in London. After the war, the burden of satisfying international demands for gold was shared with the London bullion market by the American banking system. From the time Britain left gold in 1931 until World War II, the bullion brokers operated as they had from 1919 to 1925. World War II closed the London gold market again.

After the war, South African and other Commonwealth gold producers began selling gold on other free markets, notably in Zurich, either for dollars or transferable sterling, and at premium prices in excess of the $35 per ounce price of gold that the Bretton Woods Conference had adopted as the par value. Other centers thus gained business mainly of private transactors at London's expense. The Bank of England argued that opening the London gold market would secure a larger share of new gold for central banks. Accordingly, the London gold market was reopened in 1954. By 1956, 85 percent of the new gold coming on the gold market was handled there.

The London market was the only two-way free market for gold of any size in the world economy, serving as a market not only for suppliers but for users as well. This distinguished it from markets elsewhere, such as Hong Kong, Macao, Beirut, Bombay, where local demands for gold predominated.

The market in Paris, in contrast to London, was a monopoly of the Banque de France, which sold gold when it was profitable to do so. France prohibits the import and export of gold by its inhabitants, so the market is local.

Rivaling London were the markets in Switzerland (Geneva and principally Zurich). Since the Swiss constitution required the central bank to maintain a certain level of gold reserves, the Swiss National Bank therefore tended to be a buyer rather than a market manager like the Bank of England or the Banque de France. In addition, commercial banks and Swiss nationals also held gold in their portfolios. Swiss laws permitted foreigners to trade freely and openly in gold without fear of disclosure. Zurich was largely a secondary market trading private customers' gold. What the Swiss market lacked was a major international foreign currency market comparable to London's. The relevance of the exchange market to the gold market was that arbitrage between the gold and foreign exchange market was thereby encouraged.

The preeminent role of the London gold market until 1968 was further confirmed by the Gold Pool arrangement instituted in 1961, for which the Bank of England acted as

agent for eight major countries to stabilize gold prices in the London market at the official price. With prices stabilized there through purchases and sales by the gold pool, it was unnecessary to intervene in other gold markets.

C. Changes in location and operation of gold markets since 1968

After March 17, 1968, when the governments that had constituted the London Gold Pool agreed to terminate all gold dealings with the private market either as buyer or seller, the U.S. Treasury amended existing gold regulations to permit domestic producers to sell and export gold freely to foreign buyers as well as to authorized domestic users. Authorized domestic users were permitted to import gold or purchase it from domestic producers within the limits of their licenses. Private traders in gold could apply for licenses to acquire gold in any market for sale to U.S. industrial users, but all transactions with foreign monetary authorities were prohibited.[2]

With the demise of the Gold Pool, the London gold market remained closed from March 18 until April 1 "in deference to the strongly held views of some signatories of the Washington agreement [to establish the two-tier market] that the inauguration of the two-tier gold system would otherwise be prejudiced."[3] Until March 17, South African gold had been sold in London directly to the Bank of England or through the London bullion brokers under the Bank's supervision. During the two weeks that the London gold market was closed, three Swiss banks formed a pool to buy from the South African Reserve Bank and sell all South African gold output at negotiated prices. Title to the gold was transfered to the Swiss banks but delivery of the gold continued to be made in London. Zurich thus became a primary market.

On April 1, 1968, the London gold market was reopened. Two fixings daily at 10:30 a.m. and 3 p.m. (instead of a morning fixing only) were instituted and spot prices were fixed in U.S. dollars instead of sterling as before. In 1972, the South Africans resumed sales of part of their gold output to London dealers, dividing it between the Swiss pool banks and the London dealers. (The sale of South African krugerrands is conducted in a market separate from the bullion market.) Soviet gold is usually sold in the Zurich market through the local Soviet bank.

Other gold markets that were once prominent, like Beirut, have declined and been supplanted by new markets (Bahrain and Dubai) in the Persian Gulf. The Middle East obtains some of its gold in Zurich in addition to the Persian Gulf sources. Hong Kong and Singapore are the significant centers for gold purchases in the Far East.

The gold markets so far discussed have been spot markets where transfers of physical gold have taken place. New types of gold markets have recently emerged, in which trading in gold futures contracts proceeds much as futures trading in other commodities.

Initially established in Winnipeg in 1972, gold futures contracts developed spectacular growth when such trading was approved on U.S. commodity exchanges in 1974 by the Commodity Futures Trading Commission. From 7,000 contracts in 1974, the number grew to 11 million in 1980. Of the five commodity exchanges, the New York Commodity Futures Exchange (COMEX) and the International Monetary Market (IMM) are the industry leaders. The main explanation for the success of the futures market is that gold futures contracts provide a hedge against price risk for producers and industrial users.

A movement toward a world market for trading futures is under way, to provide a 24-hour-a-day spot and futures gold price reading. An exchange trading gold futures denominated in British pounds sterling is scheduled, as of this writing, to begin operations in April 1982; a Tokyo exchange was scheduled to open in March 1982. Futures trading in Singapore and Hong Kong dates from 1980. A market in futures is also open in Sydney, Australia. However, the volume in New York and Chicago far surpasses that in other locations. An international continuous market is envisaged, since trading hours in New York and Chicago are midnight hours in Hong Kong and Singapore, while London's business day is about to end before trading begins in North America.

Futures are contracts for delivery of a commodity at a specified time, price and place. Options confer the right, but not the obligation, to buy or sell commodities or commodity futures or other instruments. Since April 1981, the European Options Exchange of Amsterdam has listed gold options. The Montreal Stock Exchange established a joint gold options market with the European Options Exchange in February 1982.

D. Components of the demand for gold

1a. Three Categories of Demand

In principal, the demand for gold may be classified in three broad categories, which are not, however, easily distinguishable in practice: (1) the nonmonetary demand for industrial fabrication; (2) the monetary demand for reserves by commercial or central banks and, when coins circulated for transactions use before 1933 in the United States, for coin by the private sector; (3) investment demand by the private sector.

Demand for gold for industrial fabrication comprises a variety of uses. The principal one through the ages has been the manufacture of jewelry. Of long-standing also has been the use of gold in dentistry. The decorative arts also have a long history of the application of gold in techniques that were known to ancient civilizations. Gold leaf, laminated gold, gilding, gold plating and vermeil have made use of gold. The current industrial uses of gold include electronics, rayon and synthetic thread production, window glass using gold, alloys for brazing and soldering, catalysts, television selector production, and medical use (gold therapy of rheumatoid arthritis). Two other uses of gold -- in medals, medallions, and facsimilies of official, i.e., fake coins as well as official coins, are sometimes included in industrial demand and sometimes in investment demand. Investment demand is estimated as the residual obtained by subtracting total enumerated consumption from total supply.

One problem with the classification scheme is that jewelry is included in industrial demand, yet for many holders, especially those in developing countries, jewelry represents a form of investment. Even if impeccable data on the components of the demand for gold were available and, as will presently be shown, that is not the case, the mixed industrial-investment characteristic of the jewelry component complicates the interpretation of the quantitative importance of the determinants of industrial demand for gold.

A special feature of the gold market is that there is a vast stock of gold from past production, the cumulative total currently estimated at between 2.8 and at least 3 billion ounces, of which 300 million ounces may have been lost through the ages. The above-ground stocks of gold have accumulated over the centuries since gold is virtually indestructible. Of these stocks, the largest fraction is held by governments. The balance is held by commercial and industrial users, by investors, and as decorative, religious, and collectors (museum) items. In the main, transfers from existing investment stocks to industrial users have been limited. Recycled scrap gold and the annual flow of gold output to the market tend to be the main sources to satisfy the demand of industrial users.

1b. Statistics on Demand for Gold, by Categories

The reported statistics for each of the three categories of demand for gold are estimates. Even for the second category, for which records of the banks and the mints exist, the sources of the statistics are not in full agreement. For the first category -- industrial demand -- the degree of estimation is greater and, in any one source, coverage

may vary from year to year. Again, the estimates shown in different sources are not in full agreement. Given the margin of error associated with the estimates of the first two categories, the residual investment demand obviously cannot be estimated with any greater accuracy.

2a. Estimates of World Demand for Gold, by Categories

One estimate over extended periods from 1835 to 1952 allocates the distribution of gold output among monetary demand, the industrial arts, and absorption by India, China, and Egypt. The percentages of output are as follows:[4]

Period	Monetary	Industrial	Eastern Absorption
1835-1889	50	35	15
1890-1929	58	24	18
1930-1952	90	11	-1

The significance of the separate classification of Eastern absorption (absorption of gold by India and, of lesser significance, Egypt and China) was that in the nineteenth and early twentieth centuries, the Indian masses invested much of their accumulated savings by purchasing precious metals, usually in fabricated form. When the price of gold rose after 1933, they sold off large quantities of their gold. Indian bullion dealers melted their clients' gold trinkets, and sent them to the Mint in Bombay to be refined, assayed and molded into bars, which were exported. Silver has since supplemented gold in Eastern absorption.

Beginning in 1893, the Director of the U.S. Bureau of the Mint presented annual estimates of world consumption of gold in the arts and industries. These estimates were obtained by correspondence with the leading countries of the world, and initially showed consumption of gold in British India separately. Because of incomplete coverage, the estimates are clearly not comprehensive for the world.

The League of Nations gave annual estimates from 1915 of the change in central bank reserves (omitting 1918-22, when Russia's reserve was not reported) and industrial consumption, annually, 1922-38. For 1931-38, the amounts of gold released by the East are given. During the 1920s, the monetary demand averaged twice the industrial demand (with the exception of 1925) and during the 1930s, industrial demand dwindled and monetary demand absorbed nearly all annual output plus the release of Eastern gold.[5] Since 1950, more reliable estimates have become available. Only in 1954-55 and 1957-58, did the gold purchases by official Western monetary authorities top one-half of the annual supply of gold. In the 1960s, in 3 years, there were no official purchases, with a low of under 7 percent of total supply and a high of 42 percent. In only 2 years of the 1970s were there any official purchases, ranging only from 10 to

under 15 percent of the total supply. The world monetary gold stock peaked at about 1.2 billion ounces in the 1960s. Although the gold reserves of central banks of industrial countries has fallen since then, as monetary authorities reduced official reserves, for the world as a whole, the monetary gold stock was only marginally lower in 1980.

Industrial including jewelry demand for gold, which has been negligible until the 1950s, then rose progressively as the real price declined. By the late 1960s, industrial demand equaled total gold output.

Industrial demand absorbed 92 percent of the supply in 1971 -- the peak year for industrial demand since 1950 -- and fell as low as 38 percent in one year only -- 1974. In 9 years, industrial demand accounted for between 40 and 50 percent of the annual supply; in 7 years, for between 50 and 60 percent; in 6 years for between 60 and 70 percent; in 4 years for between 70 and 80 percent; in 3 years for between 80 and 90 percent.

Coin, medallion, and net private bullion purchases first became significant as a percent of total supply in 1967-68, then dwindled in 1969-72. Since then, they have ranged from 20 to 62 percent of annual total gold supply.

2b. Estimates of Demand for Gold in the United States, by Categories

The Director of the Bureau of the Mint gave annual estimates in dollar amounts of the absorption of gold by U.S. industrial users from 1880 through 1967; since then, the estimates are in troy ounces. We give the series in troy ounces throughout in the Statistical Compendium. We express the annual industrial consumption and the change in the U.S. monetary gold stock (gold and bullion held by the Treasury and commercial banks and the public before 1914 through 1933; from 1914 through 1933, held also by the Federal Reserve Banks), each as a percent of U.S. annual gold production. We also give the annual net gold export or import data.

3. Determinants of World Demand for Gold: Industrial Demand

Table 4-1 shows annual estimates of the components of world gold demand from 1950 to 1980, in millions of troy ounces. Before the price of gold in the private gold market was freed to deviate from the official price in 1968, estimates of the breakdown of industrial and jewelry demand are not available: only a combined aggregate estimate exists. The table otherwise shows only net purchases in each category listed. Blanks in a column indicate that there were net sales in those years that added to supply and hence are included in the companion table for the annual world gold supply.

What factors determine the world demand for gold? First, we consider industrial demand, and then asset demand. Of two

Table 4-1

Components of Annual World Gold Demand, 1950-1980
(million of fine troy ounces)

Year	Source of Demand	Industrial Demand: Electronics (1)	Industrial Demand: Dentistry (2)	Industrial Demand: Other (3)	Jewelry Demand: Developed Countries (4)	Jewelry Demand: Developing Countries (5)	Jewelry and Industrial Demand (1)+(2)+(3)+(4)+(5) (6)	Coin and Medallions[a] (7)	Net Private Bullion Purchases (8)	Net Purchases by: Centrally Planned Economies (9)	Net Purchases by: Offical Western Agencies (10)	Total Demand (6)+(7)+(8)+(9)+(10) (11)
1950							12.0		3.1		9.2	24.3
1951							13.0		3.2		7.5	23.7
1952							13.0		4.7		6.5	24.2
1953							12.5		1.0		12.9	26.4
1954							13.0				19.1	32.1
1955							13.5				19.0	32.5
1956							15.0		3.2		13.9	32.1
1957							17.0				19.7	36.7
1958							19.0				19.4	38.4
1959							22.0				21.5	43.5
1960							25.0		5.8		8.4	39.2
1961							28.0				17.2	45.2
1962							30.0		2.5		10.5	43.0
1963							32.5				23.4	55.9
1964							34.5				20.2	54.7
1965							36.0		10.1		6.3	52.4
1966							37.5		2.6	2.1		42.2
1967							38.0		46.9	0.1		85.0
1968		2.6	2.0	1.9		29.3	35.8	3.5	19.8	0.9		60.0
1969		3.2	1.9	2.0		29.2	36.3	2.3		0.5	2.9	42.0
1970		3.0	1.9	2.0		34.2	41.1	3.2		0.1	7.6	52.0
1971		2.8	2.0	2.2	17.8	16.3	41.3	3.4				44.7
1972		3.4	2.1	2.4	22.6	9.4	39.9	3.3			4.9	48.1
1973		4.1	2.1	2.3	13.8	2.9	25.2	2.4	17.2			44.8
1974		3.0	1.8	2.2	8.9		15.9	9.5	16.8			42.2
1975		2.2	2.0	1.9	10.2	6.6	22.9	8.7	4.4			36.0
1976		2.4	2.5	2.1	15.1	14.9	37.0	7.5	1.9			46.4
1977		2.5	2.6	2.1	17.4	14.9	39.5	6.2	6.9			52.6
1978		2.8	2.9	2.5	19.0	13.3	40.5	10.8	4.8			56.1
1979		3.0	2.8	2.4	17.7	6.0	31.9	10.4	12.8			55.1
1980		2.6	2.0	2.1	8.7		15.4	6.2	9.4		7.4	38.4

Source, by Column; A. J. Aron & Company, Statistical Handbook for the Symposium on Gold (October 1981)
B. J. Aron & Company, Gold Statistics and Analysis (November 1978)
C. Consolidated Gold Fields Limited, Gold 1979 (June 1979)

(1)-(5), 1968-70: Source C, p. 16 (converted from metric tons to fine ounces).
1971-72: Source B, p. 36.
1973-80: Source A, p. 13.

(6)-(10): Source A, p.13.

Note: Arithmetic errors in Source A, p.13, have been corrected.
Data revisions in early 1982 became available to us too late for use in the econometric analysis based on this table. A revised version of Table 4-1 appears in the Statistical Compendium.

possible approaches, one analyzes the disaggregated data, the other, the aggregate data. The disaggregated approach estimates demand functions for each of the components of industrial demand and, in addition, breaks it down by regions of the world. The advantage of this approach is that it can isolate the possible influence of changes in the composition of demand which may affect aggregate demand. One example is the growth of gold use in electronics and relative decline in its use in dentistry. Another is the higher income elasticity in developing countries than in developed countries. The chief disadvantage of the disaggregated approach is the existence of measurement problems with respect to some of the components.

The alternative approach, summing all possible industrial uses of gold, isolates the key economic determinants of the demand. These include the real price of gold (the market price deflated by a worldwide price index), the real price of close substitutes (for example, silver), and world real income. The effects of the real price of gold on the quantity demanded would be expected to be negative -- a higher real price would reduce the quantity demanded, other things equal. The effect of the real price of close substitutes on the quantity of gold demanded would be expected to be positive -- a higher real price of a close substitute would increase the quantity of gold demanded, a lower real price of a close substitute would reduce the quantity of gold demanded. Likewise, world real income would be expected to exert a positive effect on the quantity of gold demanded.

An econometric estimate of aggregate world industrial demand for gold for 1950-80 reveals both real income and the real price of gold to be the key statistically significant determinants of demand, with signs in accordance with theoretical expectations (see Appendix Table 4-A1, part 1). However, the real price of silver as a measure of close substitutes for gold was found to be statistically insignificant. We used U.S. real income as a proxy for world real income, in the absence of a world real income series before 1960. In the regressions, the income effect overpowers the price effect. Continued growth of real income at the rate of 3 to 4 percent per year would be associated, other things equal, with a 5 to 7 percent increase in the demand for gold for industrial purposes. In addition, a one percent rise in the real price of gold would lead to a three-quarters of 1 percent decline in the quantity demanded.

We also estimated aggregate world industrial demand for gold over the period 1969-80, using two measures of world real income, in addition to U.S. real income (see Appendix Table 4-A1, part 2). The results, using all three measures of income, are similar. Both income and price elasticities are higher than over the longer period, suggesting that continued growth of real income at the rate of 3 to 4 percent per year would be associated, other things equal, with a 9 to 12 percent increase in the demand for gold for industrial purposes,[6] while a one percent rise in

the real price of gold would lead to a corresponding decline in the quantity demanded.[7] We caution again that the results may be contaminated by the presence of investment motives for absorbing gold in the data for industrial demand.

4. Determinants of World Demand for Gold: Asset Demand

Asset demand for gold by the private sector is motivated by regard for gold as a hedge against inflation and against political uncertainty. To be an effective hedge against inflation, gold must appreciate over the period during which it is held at a rate at least as great as the sum of the real rate of interest and the rate of inflation. If the real rate of interest rises, other things equal, holders will tend to divest themselves of gold. If the expected rate of inflation rises, other things equal, investors will wish to increase their holdings of gold as an asset. If the market rate of interest rises, the demand for gold will rise only commensurate with the extent to which inflationary expectations are fully incorporated in the nominal interest rate.

In the case of an increase in political uncertainty, other things equal, the demand for gold should rise.

The determinants of the world net asset demand for gold (private purchases less sales of gold)[8] should depend positively on the world's wealth or real income, negatively on the real rate of interest, and positively on expectations of inflation. In regressions using annual data over the period 1969 to 1980, we found limited support in most cases for our theoretical specification. Only one regression confirmed expectations [Appendix Table 4-A2, eq. (8)]. In that regresion, the real rate of interest, measured by the Eurodollar rate minus the rate of change of the world consumer price index; the actual rate of inflation, based on the latter series; and world real income, all had the postulated signs and were statistically significant. Moreover, these variables explained over 80 percent of the variation in net asset demand. Other equations, also reported in Appendix Table 4-A2, using other measures of the variables, were less successful.

A quarterly estimate of the asset demand from 1968 II through 1974 IV reported in the literature explained much of the variation of that series.[9]

E. Components of the Supply of Gold

1. Gold Production

Gold was mined in ancient times, but the earliest quantitative estimates available of gold output date from the discovery of America. Between 1493 and 1980, the estimates of gold mined ranges between 2.8 and at least 3 billion

ounces, about two-thirds of which was mined in the past 50 years.

Between 1493 and 1848, the year of the California gold discoveries, total gold mined is estimated at in the range of less than 40 million to less than 150 million ounces, of which the United States produced less than 2 million ounces. Most of the gold produced by that date was held by individuals as jewelry or coins, not in government monetary reserves. The world monetary gold stock in 1848 was about 50 million ounces.

From 1850 to 1933, total gold mined is estimated at 900 million ounces, of which the United States produced one-third. Most of this output was coined, 350 million ounces by Great Britain, 220 million ounces by the United States, 150 million ounces by the rest of the world, the total not necessarily in circulation. By 1933 the world monetary gold stock amounted to 580 million ounces, having increased at a considerably faster rate than total gold mined.

Except in the decades of the 1870s, 1880s, and 1920s, until 1933 the official price of gold was generally at a premium over production costs encouraging an expansion of gold output and discouraging commercial use. The increase in the official price of gold in 1934 accounted for the huge rise in gold output thereafter until the 1960s, when the decline in the real price of gold eroded the incentive to increase output.

World gold production peaked in 1970. Until recent decades, in the short run, a rise in the real price of gold would lead to an increase in output and ultimately to the possibility of gold discoveries. The reversal of the foregoing relationship in recent years is attributable to two factors. Before World War I, gold mining was an extensive industry, which means that exhaustion of easily minable gold led to a shift to new sites. Gold mining subsequently became more intensive, involving large amounts of fixed capital, so that a change in output reflected shifts among grades of ore at a given site. In addition to the change in the nature of the process of gold mining, institutional change also played a role in producing a difference between pre-World War I and more recent gold mining. That institutional change was the subsidization by governments of gold-producing countries of the mining of lower-grade ore. Because of the structural and policy changes, the relation of the real price of gold and gold output has been reversed. This may account for the decline in world gold production since 1970. The decline may also be responding to the earlier decline in the real price of gold and the depletion of existing reserves.

2. Changes in the Major Producing Areas

Fewer than a dozen countries have accounted for the bulk of the

gold mined in each century for which estimates exist. South America's share of total world gold output rose from 36 percent in the 16th century to a peak of 80 percent in the 18th century, and then rapidly dwindled in the 19th and 20th centuries; currently it amounts to about 2 percent of total output. The output of European gold mines declined from 21 percent of the world output in the 16th century to 6 percent in the first decade of the 19th century. A major discovery in Russia in 1814 restored the share of Europe's output by 1840 to the level in the 16th century, following which the relative importance of the continent's contribution declined to 1 percent by 1925. Soviet output since then has accounted for a rise in the continent's contribution to 21 percent in 1980. U.S. discoveries in 1848, and Australian discoveries in 1851 raised the combined shares of the two areas to 80 percent of total world output by 1855, with a gradual decline thereafter to 56 percent by 1895. A major discovery in Canada in 1896 restored the North American plus Australian share of the total to 58 percent in 1905. The decline in the following decades reduced the combined share to less than 10 percent in 1980. Gold output of South Africa made a significant contribution from the beginning of the 20th century, rising consistently except in the decade of the 1930s until it accounted for two-thirds of total output by 1970. Since then it has declined to about 55 percent in 1980.

There are thus fluctuations not only in the average annual aggregate output of gold but also in the geographical sources of increments to the gold stock.

The current nine leading gold-producing countries accounting for 91.4 percent of total gold output in 1980, and their shares were as follows:

Country	Share of Total Gold Output in 1980 (in percent)
Republic of South Africa	55.6
U.S.S.R.	21.3
Canada	4.1
Brazil	2.8
U.S.A.	2.4
Philippines	1.8
Australia	1.4
Ghana	1.0
Zimbabwe	0.9

Note: Revised figures for 1980 lower the percentage for South Africa to 51.7 and raise the U.S.S.R. percentage to 23.8.

The Republic of South Africa and the U.S.S.R., the major gold producing countries, are regarded by some observers as politically unreliable sources of gold.

U.S. new gold output declined from 1.7 million ounces in 1970 to 0.95 million ounces in 1980. Supply to consumers and investors was

supplemented in that year by private refiners' recovery of secondary gold from scrap, amounting to 2.2 million ounces, and by commercial imports, amounting to 4.5 million ounces.

3. World Gold Reserves

As with any exhaustible resource, the estimate of underground gold reserves is based on current economic minability. Other idenfified deposits that are known are not currently economic to mine. It is also always possible that undiscovered gold may remain to be found.

The best estimate of unmined economically minable world gold reserves is that it approximates 1 billion ounces -- compared to 1.8 billion ounces that have been mined over the past 50 years. Half of the 1 billion ounces is in South Africa, half of the other half in the U.S.S.R. Other identified unmined deposits not economically minable currently total about 0.9 billion ounces. These estimates are subject to upward revision. It may be that the rise in the price of gold since 1973 has not yet been reflected in the calculation of demonstrated and inferred reserves, which depend on detailed information about hundreds of deposits.

Since South African reserves are so large a fraction of total world reserves, it is important to examine key aspects of the estimation of that country's reserves. In 1970, it was widely believed that its gold mining industry could not survive, given rising costs of production and a falling real price of gold. Since then, the increase in the price of gold led by 1980 to a ten-fold increase in capital spending on producing mines plus additional amounts for the development of new mines not yet in production. While milling capacity of the industry expanded over the decade, there was no corresponding increase in the output of gold. In fact, annual output fell steadily from 32.1 million ounces to 21.7 million ounces. The reason is that the average grade of ore milled by gold mines fell from 13.3 grams per ton in 1970 to 7.3 grams per ton in 1980. There is little expectation that the level of production will rise in the 1980s, barring a dramatic change in the relationship between the price of gold and costs of production. The rise in costs has been associated with a substantial increase in the industry's wage bill and improvements in the living quarters for black workers, which are planned to continue. High capital costs also confront the industry. They deter expansion of existing mines mining lower grade ore, and also the reopening of mines that were uneconomic when the gold price was fixed.

Gold mining in South Africa is a labor-intensive industry. Mechanization of the gold fields is impractical because of the depth at which mining has to be carried out, the hardness of the rock that has to be excavated to develop access tunnels, the high temperatures of the rock, and the narrowness of the orebody. Most of the people employed are black workers whose families remain in tribal homelands. Movement of blacks into skilled work is opposed by many white trade union members, posing an obvious labor problem for the industry.

The calculation of South African ore reserves depends critically on the concept of pay limit, which is the minimum quantity of metal in the mineralized rock sufficient to yield the revenue to cover costs of mining, processing, and marketing gold. The reserves usually include ore available for extraction within a year. All gold mines in South Africa lease mines from the State subject to the restriction that the company must mine to the average value of its published ore reserves. When the price of gold was fixed, the pay limit rose as mining costs increased; since the 1970s, the pay limit has declined when the price of gold has risen and risen when it declined. In some mines, a relatively minor change in the pay limit can make significant tonnages of low grade ore payable or unpayable, with large effects on the total ore reserve. Whereas pay limits formerly were reviewed once or twice a year, the practice now is to review them monthly. The objective is to limit the number of places that have to be stopped before they have been worked out, so that grade control can be achieved as working places are exhausted.

Projections by industry sources of South African gold output, assuming a current gold price of $305 rising to $407 by 1984, then rising at the same rate as costs until 2000, or alternatively, a current price of $450, rising to $554 in 1984 and then remaining constant in real terms until 2000, are broadly similar: annual gold output totals 22.5 million ounces until 1987 and then gradually declines to 11.25 million ounces by 2000.

One other determinant of South African gold output must be mentioned. A state assistance program was introduced in 1968 to subsidize gold mines that were no longer profitable, thus enabling marginal mines to remain in operation. If the price of gold should decline, the amount of state assistance, which was negligible in 1980, could again rise. The State's motive in providing assistance was to obtain foreign exchange from sales of gold output and incidentally to avoid capital costs of re-opening mines at a later date when their operation might again become economic.

While information relating to South African gold mining is very fully reported, figures neither for annual output nor for reserves of gold are published by the U.S.S.R. Publication of statistics of gold output was prohibited by the Soviet government in 1926, data about geological deposits were discontinued in 1934, and the gold reserves of the State Bank have been secret since 1935. A series of Western estimates, using a variety of methodologies, have been subject to substantial revision from time to time.

An early estimate was based on an announcement in a Five Year Plan that prospecting had raised known deposits from 79.4 million ounces in 1926 to 111.5 million ounces in 1934. The Gold Mining Administration Director at that time predicted that Soviet gold production would surpass that of the South African Rand (the principal South African mining district) and lead the world. The prediction was empty but encouraged Western estimates of Soviet output of 18.3 million ounces and monetary reserves ranging as large as 272 million ounces.

A 1960 revision by the CIA of those estimates, as reported by Consolidated Gold Fields Ltd., reduced the estimate of annual output to a range of 4.3 million ounces to 4.9 million ounces and of monetary reserves to 56 million ounces. Western observers thereafter used the CIA figures which were reputedly based on a Party document a Soviet defector provided.

Consolidated Gold Fields Ltd. made an effort subsequently to produce its own estimates, initially by translating and collating Soviet press reports and technical papers available in the West. The Soviet sources gave percentage estimates of the extent to which targets had been met in individual gold producing areas and the rate of growth of output and additions to ore reserves. No targets or production figures were given by the sources. In 1974, the company adopted a different approach to estimating Soviet gold production, based on information about the type and size of equipment and processes that were being used in mining and extracting gold. Relying on comparison with similar workings elsewhere, the gold content of the material treated was estimated from the nature of each operation and the numbers, types and sizes of machines being used. Between the first and second study, substantial upward revision of the estimates resulted from a re-examination of publications on reef mining. More attention had been placed on alluvial mining in the company's first study because the Soviet press and radio publicized developments there rather than in reef mining, which presumably contributed more to aggregate gold output than previously had been assumed. The second approach yielded an overestimate because it assumed that Soviet production was as efficient as in the West.

Currently, Consolidated Gold Fields Ltd. has under way a third study using satellite photographs in addition to the earlier techniques. At this stage, the company estimates that Soviet annual output is in the range of 9 to 11 million ounces. A revision of estimated Soviet Soviet output has raised the annual figures the company reports. The estimate it gives for 1980 is 10 million ounces. The company assumes that sales to the West by the communist bloc of 12.9 to 13.2 million ounces per year in 1976-78 required drawing down stocks. Communist bloc sales include, in addition to sales by the Soviets, smaller amounts by the People's Republic of China and North Korea. The decline in sales to the West by the bloc in 1978-80 was attributed to the availability of an alternative source of foreign exchange -- oil and gas sales -- as well as the availability of commercial and official credit from the West, which reduced the need to market gold abroad. Increased gold sales since reportedly reflect an increase in demand for foreign exchange which the alternative sources have not supplied.

What is currently known or assumed about world gold reserves therefore suggests that gold output until the end of the century will at best offset some portion of the declining trend that existed from 1970 to 1975.

4. Components of the World Gold Supply

The supply of gold does not depend solely on new gold mined, although for the world as a whole the production of market economies is the principal component. Most gold producers in this sector sell all their annual output, but some may market more or less than current output. South Africa was reluctant to sell its output in 1976-77 when the price of gold declined, although it had a large balance of payments deficit. Instead of selling gold, it arranged a swap of 8.0 million ounces or so of gold for foreign currency, with the option to repurchase the gold at the swap price plus interest. In 1979, it exercised the option and bought 3.9 million ounces of the swap total, selling most of it at the then higher prices, and adding the remainder to its gold reserves. In other years since 1960, South African gold sales have been more or less than current output, depending on the market price of gold, the price of diamonds and other minerals the country exports, and its balance of payments.

Canada has sold gold on occasion in excess of current output to reduce the size of its gold reserves. Australia from time to time requires producers to sell part or all of their output to the central bank. On the whole, gold production in market economies flows to supply the markets of the world.

The supply components other than the output of market economies are intermittent, fluctuating from year to year when present, and absent altogether in other years. These components include:

a) the flow from centrally planned economies;

b) sales by official monetary institutions;

c) sales of private jewelry hoards by residents of developing countries; and

d) sales of private bullion hoards.

a) As noted, the flow of gold to the market from the communist bloc has fluctuated with its need for foreign exchange. There were no sales in the five years 1966-70, when the bloc was a net purchaser. Sales are estimated to have ranged from 13 million ounces per year in 1976-78, as noted above, to 1.7 million ounces in 1971. The bloc is believed to have sold 2.9 million ounces in 1980, and an estimated 7.2 or more million ounces in 1981.

b) Net sales by official institutions since 1950 were limited to the years 1966-68, 1971, 1973-79. They ranged in size from 0.2 million ounces in 1973 to 45.1 million ounces in 1967.

c) Jewelry sales by residents of developing countries amounted to 1.7 million ounces in 1974 and 4.2 million ounces in 1980. In other years since 1950, developing countries absorbed gold jewelry.

d) Dishoarding of private bullion holdings since 1950 contributed to the supply of gold only in the years 1969-72, when it ranged from 0.1 million ounces to 11.0 million ounces.

Table 4-2 lists the components of the world gold supply annually from 1950 to 1980 and compares the total with the corresponding annual world output. The movements in supply are more erratic than those in gold output.

5. Determinants of Market Economy Gold Production

An econometric estimate of the determinants of the gold production of market economies for 1950-80 was obtained by a regression on current and lagged values of gold and a time trend as a proxy for technical progress.[10] As expected, the real price affects market economy production negatively and with a one-year lag.[11] In addition, regressions covering the period 1969-80 gave results similar to those for the longer period.[12] All the results are reported in Appendix Table 4-A3.

F. Determining the equilibrium price of gold

Except during periods when the U.S. did not adhere to the gold standard, the price of gold has been fixed by the government. The most recent such period of non-adherence may be dated from 1968, when the two-tier gold market came into being, with the termination of the London Gold Pool's efforts to hold the price of gold in private transactions at the official price. Since then, it may be said that the price of gold at any moment is determined in a free market by the interaction of total demand for and supply of gold.

Because gold is held for asset as well as industrial purposes, and because the existing stock of gold is very large relative to changes in the stock, it is important to distinguish between the stock and the flow markets for gold. It has been generally agreed that, in the case of the gold market, in the short run at least, conditions in the stock (asset) market dominate those in the flow market. Thus the determinants of net asset demand would be the key factors affecting the price in the absence of any significant sales from official sources or from the communist bloc. Indeed, evidence by Peter Abken,[13] the International Gold Corporation (see note 7), and Otani and Lipschitz (see note 7) suggests that monthly and quarterly variations in the price of gold are largely explained by conditions in the asset market. However, in the long run, conditions in the market for current gold output are the key determinants of the price.[14] In addition to the determinants of industrial demand, the key consideration of the flow supply side is market production of gold. Evidence that it responds negatively to variations in the real price of gold has just been discussed. This relationship reflects the special conditions in the South African gold industry. However, international production has expanded in the past as a result of technological innovation and new discoveries.

Table 4-2

Annual World Gold Supply and Gold Output, 1950-1980
(millions of fine troy ounces)

Source of Supply / Year	Production in Market Economies (1)	Flow from Centrally Planned Economies (2)	Net Official Sales (3)	Jewelry Sales by Developing Countries (4)	Dishoarding of Private Bullion Holdings (5)	Annual Total Supply (1)+(2)+(3) +(4)+(5) (6)	Annual World Output (7)
1950	24.3					24.3	28.3
1951	23.7					23.7	27.4
1952	24.2					24.2	27.9
1953	24.2	2.2				26.4	27.8
1954	25.5	2.2			4.4	32.1	29.1
1955	26.8	2.2			3.5	32.5	30.4
1956	27.8	4.3				32.1	31.5
1957	29.0	7.4			0.3	36.7	32.6
1958	29.9	6.3			2.2	38.4	33.7
1959	32.1	8.6			2.8	43.5	36.2
1960	33.5	5.7				39.2	37.8
1961	34.7	8.6			1.9	45.2	39.3
1962	37.3	5.7				43.0	41.7
1963	38.6	15.7			1.6	55.9	43.3
1964	40.0	12.9			1.8	54.7	44.9
1965	41.0	11.4				52.4	46.5
1966	41.0		1.2			42.2	46.9
1967	39.9		45.1			85.0	46.0
1968	40.1		19.9			60.0	46.5
1969	40.3				1.7	42.0	47.1
1970	40.9				11.1	52.0	48.1
1971	39.7	1.7	3.1		0.2	44.7	47.1
1972	37.8	6.8			3.5	48.1	45.9
1973	35.8	8.8	0.2			44.8	44.1
1974	32.8	7.1	0.6	1.7		42.2	41.5
1975	30.9	4.8	0.3			36.0	39.5
1976	31.3	13.2	1.9			46.4	40.6
1977	31.1	12.9	8.6			52.6	40.7
1978	31.3	13.2	11.6			56.1	41.2
1979	31.2	6.4	17.5			55.1	42.8
1980	30.7	2.9		4.8		38.4	42.6

Source, by Column: J. Aron & Company, Statistical Handbook for the Symposium on Gold (October 1981)
(1)-(3) and (5): p.13.
(4): p.33.
(7): p.19.

Note: An updated version of this table appears in the Statistical Compendium.

If the equations for the industrial demand for gold and for the gold output of market economies are solved for the real price of gold, this yields a reduced-form equation,[15] where the real price of gold is determined by the exogenous (independent) variables of the flow demand and supply equations: world real income, the time trend as a proxy for technical advance, the real price of silver, and the real price of gold lagged by one year. Such a reduced-form equation explains up to 93 percent of the annual variation in the real price of gold. Adding a market interest rate and, in turn, the annual percentage change in the price level or, lagged money growth as a proxy for price expectations, to account for factors affecting the net asset demand for gold, adds 4 percent to the explanation of price variations[16] (see Appendix Table 4-A4.)[17]

One way to arrive at an equilibrium price of gold is to follow the approach of Robert Aliber.[18] He takes the price of $35 per ounce in 1961, a year when the United States had virtual price stability, as an initial equilibrium price. Assuming no other factors affected the real price, the nominal price of gold should have increased to the same extent as the increase in the U.S. price level since 1961 plus a return equal to the real rate of interest. The U.S. CPI tripled between 1961 and 1980, hence the nominal price of gold should have been $105 in 1980. Using the world CPI change, the price should have been $155.[19]

However, as the discussion above indicates, other factors would have affected the real price of gold in addition to the increase in the general price level. If world real income elasticity of demand for gold is taken to be 1.85 (based on the results for 1950-80 reported in Appendix Table 4-A1 Part 1), and the increase in world income approximated 83 percent (based on an index of world real GNP), the demand for gold would have increased by 154 percent over the period 1961-80.[20] Over the same period, the total world gold stock increased by 35 percent.[21] Thus the excess demand for gold amounted to about 120 percent. If we take the price elasticity of demand for gold to be -1[22], and price elasticity of supply to be close to zero,[23] then the real price would have increased (other things equal) by about 120 percent since 1961. On this calculation, the equilibrium price of gold in 1980 would have been between $230 and $340.[24] This exercise assumes that factors affecting the net asset demand for gold are transitory, and would vanish once price stability under a gold standard is restored.

Assume that at a price per ounce of gold, within the calculated range of $230 to $340, the gold standard was restored. In the current free market, a monetary demand essentially does not exist. The price calculation reported here was based on equating the nonmonetary demand for and the supply of gold. Under a gold standard, the government sets the price and must satisfy all demands for gold at that price. Under a reinstituted gold standard, a monetary demand for gold would recur. Only after the monetary demand for gold had been accommodated, would the nonmonetary demand for gold be satisfied. Thus the asset demand relationship in the foregoing econometric exercise would no

longer be relevant. The supply equation, however, would presumably be unaffected by a return to the gold standard. The question then resolves itself into the adequacy of the supply relative to the putative prospective monetary and nonmonetary demand for gold.[25]

G. Record of gold production in past centuries and its relation to trend movements in commodity prices

The rate of growth of world gold output over the centuries has waxed and waned. Chart 4-1 plots world yearly output of gold from 1800 to 1980. Table 4-3 compares average annual rates of growth of world output of gold (in millions of fine ounces), for subperiods since 1849, with corresponding average annual rates of change of available measures of the U.S. price level.

The table leaves no doubt that gold production has not increased at a constant annual rate from subperiod to subperiod. Averaging over periods of high and low growth rates of gold production obviously yields a smoother picture. Similarly, averaging over periods of a falling price level matching low growth rates of gold production and periods of a rising price level matching periods of high rates of gold production yields a smoother picture of price change. But for contemporaries each period was distinct and exacted first the costs of deflation and then the costs of inflation. The growth rate of gold output has not been stable over time.

Three subperiods since 1934 invite comment. Annual rates of growth of gold output more than doubled in the closing years of the interwar period, 1934-40. The doubling was a response to the sharp increase in the profitability of gold mining that the U.S. increase in the official price from $20.67 to $35 an ounce produced. At first glance, the 0.66 average annual rate of increase in the U.S. price level from 1934 to 1940 may not appear to reflect the surge in gold output. However, a comparison of the change in the average annual rate of increase in the U.S. price level from the 1920-33 to the 1934-40 subperiod (+4.6 percent per year) with the corresponding change in the rate of change of gold output (+3.6 percent per year) shows a close relationship between the two variables. After 1950, the rate of change of the U.S. price level in the two subperiods that are distinguished no longer tracks the rate of change of gold output. Post-World War II inflation experience was fueled by means other than rising gold output, which accounted for inflations before 1914 that were clearly less virulent than the postwar episode.

H. Summary

The rate of growth of gold output is not constant over time. After World War II, output grew at about 3 percent per year until 1970, and has since declined at about 1.5 percent per year. The most important gold producer among market economies is South Africa. Factors that would operate to continue the downward trend in South African output include a government mandated shift to lower-grade ores

CHART 4-1

WORLD GOLD PRODUCTION 1800 - 1980

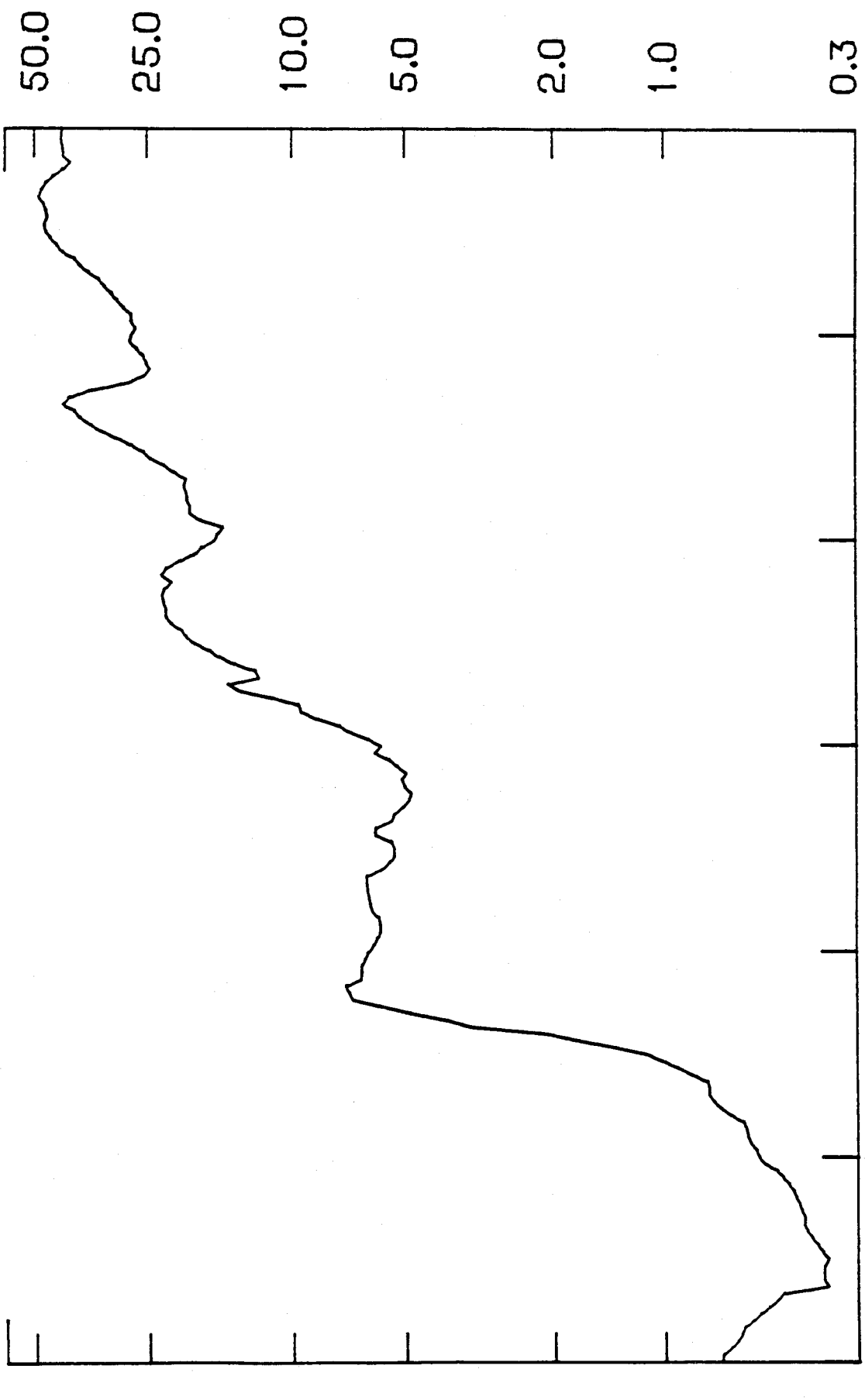

Table 4-3

Comparison of Average Annual Rates of Change of World Gold Output and of Various Measures of the U.S. Price Level, by Subperiods, 1849-1980

World Gold Output		U.S. Price Level		
Period	Average Annual Rates of Change (in percent)	Period	Average Annual Rates of Change (in percent)	
1849-1870	6.2	1849-1870	2.37	Wholesale Prices
1871-1889	-0.3	1869-1896	-2.11	(NNP price deflator)
1890-1913	6.0	1896-1913	1.97	"
1920-1933	3.4	1920-1933	-3.90	"
1934-1940	7.0	1934-1940	0.66	"
1950-1968	2.7	1950-1968	2.64	(GNP price deflator)
1969-1980	-1.6	1969-1980	6.50	"

Source: For gold output, see the Statistical Compendium, Table 1, below.

For wholesale prices, 1849-70, see U.S. Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part 1, Series F-2, pp. 202-203.

For the deflator implicit in net national product, 1869-1940, see M. Friedman and A.J. Schwartz, Monetary Trends in the United States and United Kingdom, 1867-1975, Ch. 4, appendix of basic annual data (in press).

For the deflator implicit in GNP, 1950-80, see Economic Report of the President (transmitted to the Congress February 1982), Table B-3, p. 236.

Note: Rates of change assume continuous compounding, that is, they are the difference between the natural logarithms of the variable at the terminal and initial dates divided by the number of years separating those dates.

when the average gold price rises, inflation effects on labor and capital costs, shortages of skilled labor and labor unrest, as well as the high costs associated with deep mining. Offsetting these factors are the possibility of discovery of new gold fields and uranium revenues, since the mineral is found in one-sixth of South African gold mines. Gold output in the United States and Canada, including by-product gold production mainly from copper mining, has also displayed a negative postwar trend, although a rise in gold prices has encouraged reopening of mines and exploration. Brazil has become a recent gold producer, although its output is not consequential. Among Communist countries, the U.S.S.R. is the leader, estimated to produce about one-fifth of the world's output, although its sales are not geared to production but to balance of payments needs. For the long run, little increase in annual world gold production is in prospect.

Advocates of a return to the gold standard tend to dismiss concern with the prospective rate of growth of world gold output. Yet the amount of gold available for annual additions to the stock of monetary gold is a crucial factor in determining the trend of the price level under a gold standard. If the annual rate at which the monetary gold stock increases is below the rate of population growth and real income growth, the consequence is a declining trend in the price level.

This conclusion follows from extensive studies of the per capita demand for money that have shown it to be determined by per capita real income and an interest rate representing the yield on an asset alternative to holding money. If the supply of monetary reserves will not match the growth in demand for money, the price level will fall. It was not by coincidence that the negative rate of gold output growth from 1871 to 1889 was associated with a declining price level in the United States and worldwide until 1896. The decline in the price level was the consequence of the decline in the rate of gold output growth concomitant with a rising world demand for gold. Similarly, the decline in the price level during the 1920s was a consequence of the fall in the rate of gold output during that decade. In each case, the declining rate of gold output was a response to an earlier decline in the real price of gold.

A declining trend in prices may seem a desirable development after decades of a rising price level. However, such a change would impose two kinds of adjustment costs upon the economy: (1) transition costs in moving from an inflationary to a deflationary environment; (2) continuing costs of a deflation, assuming continuance of a gold standard. The costs might be regarded as tolerable if they affected all markets proportionally, so borrowers and lenders, workers and employers, retired and active labor force participants, urban and rural families, were all equally burdened. No more than the costs of inflation, however, will the costs of deflation be so distributed.

Notes to Chapter 4

1. W.A. Brown, Jr., The International Gold Standard Reinterpreted, NBER, 1940, 2 vols., pp. 627-37.

2. Annual Report of the Secretary of the Treasury 1968, pp. 467-70.

3. Bank of England, Quarterly Bulletin, June 1968, p. 109.

4. W.J. Buisschau, "Some Notes on Gold Production and Stocks," in National Industrial Conference Board Special Studies no. 43, Shall We Return to a Gold Standard - Now? 1954, p. 163.

5. International Currency Experience: Lessons of the Inter-War Period, League of Nations, 1944, p. 233. Where they overlap, the League of Nations annual estimates do not agree with the annual estimates in the source cited in note 4 for the period 1930-1952. In many years, the sum of the change in central bank reserves and industrial consumption does not equal the gold supply.

6. U.S. real income grew at an average annual rate of 2.74 percent from 1969 to 1980; real income of 7 industrial countries increased at an average annual rate of 3.22 percent, and world real income by an average rate of 3.76 percent. For sources, see Table 4A1, part 2.

7. The estimates of the determinants of industrial demand for gold reported here were obtained from ordinary least squares regressions. We also used the two-stage least squares procedure, as a check on possible identification problems, and the results were not significantly different from those for OLS regressions. A recent study using annual data over the period 1970-80 reported the real price elasticity as -1.2 and the real income elasticity as 2.9 (International Gold Corporation Limited, A Gold Pricing Model (August 1981: p. 5.) The results are similar to those reported in our Appendix Table 4-A2. A quarterly study of the period 1968-74 reported a price elasticity of -0.7 and an income elasticity of 0.6 (L. Lipschitz and I. Otani, "A Simple Model of the Private Gold Market, 1968-74: An Exploratory Econometric Exercise," IMF Staff Papers 24 (March 1977): pp. 32-63.)

8. We added the constant $20 billion (the amount required to make negative changes positive) to the net asset demand series to allow us to make the log transformation. This procedure does not introduce significant bias in our estimates. Net asset demand is defined as Table 4-1, col. 8, minus Table 4-2, col. 5, for a definition excluding coins and medallions. Including coins and medallions, the definition is the sum of Table 4-1, cols. 7 and 8, minus Table 4-2, col. 5. Regression results including coins and medallions were superior to those excluding them. Our net asset demand equation is a reduced form that we believe captures

the essential factors that determine the flow net asset demand for gold.

9. Lipschitz and Otani (note 7, above) found hoarding demand for gold to be significant functions of Eurodollar and Euromark interest rates, expected inflation, and wealth over the period 1968-74.

10. The results were similar for the period 1951-80, using the world CPI as the deflator (available only since 1950); for 1950-80, we used the U.S. wholesale price index as the deflator. See Appendix Table A3.

11. The real price lagged two and three years did not improve the results nor did omitting the time trend (Appendix Table A3). One possible explanation for the negative coefficient on the real price is that it reflects producers' expectations about the behavior of the future price of gold. When gold prices are high, they may be expected to decline, so producers reduce output in anticipation of the price decline. See Stephen W. Salant, "The Vulnerability of Price Stabilization Schemes to Speculative Attack," Journal of Political Economy (forthcoming).

12. The estimate of price elasticity of gold output reported by Lipschitz and Otani for the period 1968-74 is -0.11, similar to our result.

13. "The Economics of Gold Price Movements," Federal Reserve Bank of Richmond, Economic Review (March/April 1980): pp.3-13.

14. However, this statement neglects the condition for the optimal depletion of an exhaustible resource. In that case, in a competitive market, Notelling's rule that the price of the resource should rise by the market rate of interest would be of paramount importance. See Stephen W. Salant and Dale W. Henderson, "Market Anticipations of Government Policies and the Price of Gold," Journal of Political Economy 86 (August 1978): pp. 627-48.

15. An equation system is said to be complete when it has as many endogenous (dependent) variables as equations (in our example, two: one for the demand for gold, the other for the supply of gold), and when it can be solved for these variables. The solution is called the reduced form of the system. The reduced form is convenient for calculating the effect of a change in exogenous (independent) variables on an endogenous variable.

16. In the equations in Appendix Table A4, we deflate the prices of gold and silver by the U.S. and world CPI. To be consistent, we use the two series as measures of price change. Results were similar in regressions using the U.S. wholesale price index as the measure of annual price change.

17. The study by the International Gold Corporation (see note 7, above), using monthly data, explains most of the variation in the

price of gold with measures of the real rate of interest, lagged world money growth, and a measure of world political tension. However, the reported results do not include Durbin-Watson statistics, suggesting that they may be marred by autocorrelation, as are many of those reported here.

18. See his statement before the Commission, November 12, 1981. For a more comprehensive treatment of his approach, see his paper, "Inflationary Expectations and the Price of Gold," presented to the World Conference on Gold, Rome, February 5, 1982.

19. The world CPI, available in IMF, IFS Yearbook, increased 4.4 times over 1961-80.

20. If we use the income elasticities of the past decade, reported in Appendix Table A1, part 2, and those reported in the International Gold Corporation study (an average of 3.22 in Table A1, part 2, and 2.9 in the latter study), the income elasticity would be closer to 3. Such an estimate would raise the increase in gold demand to 213 percent.

21. Based on U.S. data.

22. Based on the results shown in the Appendix tables and other sources cited.

23. The assumption here is that the price elasticity in the gold output equations in Appendix Table A3 can be taken as a proxy for the price elasticity of the short-run supply curve.

24. Using the income elasticity from the recent period would raise the price to $330 and $490. The higher income elasticity estimates, however, must be viewed with caution. Some of the net asset demand for gold that has emerged since 1969 may be captured by the income effect.

25. On the importance of knowing not only the parameters of the nonmonetary demand for gold but also of the money-market monetary demand for gold, in evaluating the outcome of a return to the gold standard, see Robert P. Flood and Peter M. Garber, "Gold Monetization and Gold Discipline," Board of Governors of the Federal Reserve System, International Finance Discussion Papers, Number 190 (September 1981).

For an analysis of the same issues from an alternative approach, see William Fellner, "Gold and the Uneasy Case for Responsibly Managed Fiat Money, in Essays in Contemporary Economic Problems: Demand, Productivity, and Population, 1981-1982 edition, ed. William Fellner, American Enterprise Institute, pp. 97-121.

Appendix Table 4-A1, Part 1

Annual World Industrial Demand for Gold, 1950-1980

$$\log Q^{D}_{ind} = B_0 + B_1 \log \left(\frac{P_g}{P}\right) + B_2 \log \left(\frac{P_s}{P}\right) + B_3 \log y + e$$

Equation No. (Technique)	Constant (B_0)	Coefficients of Independent Variables (t-values in parentheses) Real Price of Gold (B_1) WPI	Real Price of Gold (B_1) CPI	Real Price of Silver (B_2) WPI	Real Price of Silver (B_2) CPI	Real Income (B_3) U.S.	$\bar{R}^2$	SEE	DW	ρ
1. (C-O)	-22.478 (-6.187)*	-0.779 (-5.075)*		-0.273 (1.863)		2.317 (7.950)*	.945	.101	1.714	.715
2. (C-O)	-11.307 (-3.464)*		-0.714 (-3.605)		-0.122 (-0.570)	1.399 (5.639)*	.895	.140	1.937	.563

*Statistically significant at the 5 percent level.

Technique: C-O = Cochrane Orcutt

Sources: Industrial demand ($\log Q^{D}_{ind}$): Table 4-1.

Price of gold ($\log P_g$): London Price and J. Aron.
Price of silver ($\log P_s$): London Price and J. Aron.
Wholesale price index (WPI): U.S. Bureau of Labor Statistics.
Consumer price index (CPI): World price index (IMF).
Real income (U.S.): Department of Commerce, Bureau of Economic Analysis.

Note: See Chapter 1, note 4, for definitions of statistical measures.

Appendix Table 4-A1, Part 2

Annual World Industrial Demand for Gold, 1969-1980

$$\log Q^{D}_{ind} = B_0 + B_1 \log \left(\frac{P_g}{P}\right) + B_2 \log \left(\frac{P_s}{P}\right) + B_3 \log y + e$$

Equation No. (Technique)	Coefficients of Independent Variables (t-values in parentheses)											
	Constant (B_0)	Real Price of Gold (B_1)		Real Price of Silver (B_2)		Real Income (B_3)			$\bar{R}^2$	SEE	DW	ρ
		WPI	CPI	WPI	CPI	7 Major Industrial Countries	World	U.S.				
1. (OLS)	-11.319 (-4.095)*	-1.495 (-5.876)*		0.228 (1.013)		4.518 (6.261)			.941	.125	2.32	
2. (OLS)	-8.268 (-3.243)*	-1.462 (-5.294)*		0.216 (0.880)			3.855 (5.625)*		.862	.136	2.09	
3. (C-O)	-41.636 (-8.655)*	-1.053 (-7.266)*		-0.009 (-0.557)				3.895 (9.927)*	.929	.101	2.56	-0.39
4. (OLS)	-7.857 (-3.634)*		-1.301 (-5.534)*		0.086 (0.415)	3.590 (6.350)*			.906	.113	2.23	
5. (OLS)	-5.510 (-2.775)*		-1.268 (-5.030)*		0.066 (0.296)		3.074 (5.783)*		.890	.122.	2.05	
6. (C-O)	-32.494 (-8.593)*		-0.969 (-7.478)*		-0.125 (-0.859)			3.142 (10.199)*	.941	.093	2.63	-0.42

* Statistically significant at the 5 percent level.

Technique: OLS = Ordinary least squares

C-O = Cochrane Orcutt

Sources: Industrial demand ($\log Q^{D}_{ind}$): Table 4-1.

Price of gold ($\log P_g$): London Price and J. Aron.

Price of silver ($\log P_s$): London Price and J. Aron.

Wholesale price index (WPI): U.S. Bureau of Labor Statistics.

Consumer price index (CPI): World price index (IMF).

Real income (7 major industrial countries): Citibank, based on GDP of U.S.A., Canada, U.K., Japan, France, Germany, Italy.

Real income (world): IMF.

Real income (U.S.): Department of Commerce, Bureau of Economic Analysis.

Appendix Table 4-A2

Annual World Net Asset Demand for Gold, 1969-1980

$$\log NA^D = B_0 + B_1 \log R + B_2 \log (R - \hat{P}) + B_3 \log (R - \hat{P}^*) + B_4 \hat{P} + B_5 \hat{P}^* + B_6 \hat{\bar{M}}_{t-1} + B_7 \log y + e$$

Coefficients of Independent Variables
(t-values in parentheses)

Equation No. (Technique)	Constant (B_0)	Nominal Interest Rate (B_1)		Real Interest Rate (B_2)		Expected Real Interest Rate (B_3)		Actual Rate of Price Change (B_4)		Expected Rate of Price Change (B_5)		Lagged Long-Term Monetary Growth Rate (B_6)	Industrial Real Income (B_7)	R^2	SEE	DW	ρ
		90-day Treasury bill rate	Euro-dollar rate	90-day Treasury bill rate	Euro-dollar rate	90-day Treasury bill rate	Euro-dollar rate	U.S. CPI	World CPI	U.S. CPI	World CPI						
1.	-5.249	-0.281						0.0496					1.893	.372	.302	1.89	
(OLS)	(-1.102)	(-0.465)						(0.666)					(1.810)				
2.	-2.577		-0.025						0.053				1.183	.463	.279	2.18	
(OLS)	(-0.545)		(-0.085)						(1.336)				(1.103)				
3.	-5.523	-0.088								-0.052			1.871	.472	.277	1.73	
(OLS)	(-1.468)	(-0.262)								(1.428)			(2.129)*				
4.	-2.906		0.127								0.085		1.115	.674	.218	2.37	
(OLS)	(-0.978)		(0.568)								(2.845)*		(1.595)				
5.	-6.652	-0.082										7.450	2.097	.349	.307	1.82	
(OLS)	(-1.606)	(-0.165)										(0.372)	(2.103)*				
6.	-6.623		0.023									4.394	2.086	.347	.308	1.75	
(OLS)	(-1.542)		(0.049)									(0.206)	(2.043)*				
7.	-5.568			0.055				0.190					1.898	.363	.304	1.87	
(OLS)	(-1.180)			(0.297)				(0.427)					(1.792)*				
8.	-1.372				-0.190				0.061				0.892	.804	.171	1.90	-0.57
(C-O)	(-0.654)				(-3.488)*				(3.478)*				(1.866)*				
9.	-7.404					-0.127				0.032			2.274	.488	.223	1.79	
(OLS)	(-1.411)					(-0.564)				(0.719)			(1.919)*				
10.	-2.434						0.063				0.098		1.041	.667	.220	2.41	
(OLS)	(-0.689)						(0.396)				(2.157)*		(1.246)				
11.	-8.955					-0.377						20.278	2.407	.570	.250	2.37	
(OLS)	(-2.572)*					(-2.039)*						(1.464)	(2.939)*				
12.	-5.442						-0.271					17.099	1.697	.561	.251	2.30	
(OLS)	(-1.599)						(2.00)*					(1.294)	(2.047)*				

Notes to Appendix Table 4-A2

* Statistically significant at the 5 percent level.
Technique: OLS = Ordinary least squares
C-O = Cochrane Orcutt

Expected U.S. annual rate of price change $(\hat{P})^*$ was obtained by regressing the rate of change in U.S. CPI on a measure of the long-term rate of change of money -- a 3-year moving average of M1B -- lagged one year $(\hat{\bar{M}}_{t-1})$:

$$(1.)\ \hat{P}^* = \underset{(-4.2)^*}{-0.125} + \underset{(1.94)^*}{3.30}\ \hat{\bar{M}}_{t-1}$$

$\bar{R}^2 = .875$
SEE = .010
D.W. = 1.80
$\rho = 0.363$

Expected world annual rate of price change was obtained by regressing the rate of change in world CPI on the U.S. money variable, as in equation (1) above:

$$(2.)\ \hat{P}^* = \underset{(-0.81)}{0.043} + \underset{(3.17)^*}{2.483}\ \hat{\bar{M}}_{t-1}$$

$\bar{R}^2 = .755$
SEE = .016
D.W. = 1.68
$\rho = 0.677$

For industrial countries covered by real income measure, see Table 4-A1, part 2.

Appendix Table 4-A3, Part 1

Annual Market Economy Gold Production, 1950-1980

$$\log Q^S = B_0 + B_1 \log \left(\frac{P_g}{P}\right)(t) + B_2 \log \left(\frac{P_g}{P}\right)(t-1) + B_3 \text{ Time} + e$$

Equation No. (Technique)	Constant (B_0)	Coefficients of Independent Variables (t values in parentheses)			R^2	SEE	DW	ρ
		Real price of Gold (B_1) U.S. WPI	Real Price of Gold Lagged (B_2) U.S. WPI	(B_3) Time				
1. (C-0)	4.285 (13.498)*	-0.074 (-1.886)**		-0.011 (-0.934)	.964	.033	0.65	0.936
2. (C-0)	4.406 (14.004)*		-0.104 (-2.369)*	-0.012 (-1.024)	.967	.032	0.841	0.937
3. (C-0)	4.427 (12.853)*	-0.036 (-0.794)	-0.081 (-1.569)	-0.010 (-0.740)	.966	.032	0.760	0.940
4. (C-0)	4.038 (23.077)*	-0.094 (-2.880)*			.964	.033	0.645	0.933
5. (C-0)	4.148 (22.013)*		-0.126 (-3.258)*		.966	.032	0.856	0.934
6. (C-0)	4.203 (21.719)*	-0.047 (-1.129)	-0.089 (-1.750)**		.967	.032	0.741	0.935

Sources: Market economy gold production (Q^S): Table 4-2, col. 1.
See notes to Appendix Table 4-A1 for sources of other data.
* Statistically significant at 5 percent level.
** Statistically significant at 10 percent level.

Appendix Table 4-A3, Part 2

Annual Market Economy Gold Production, 1951-1980

$$\log Q^S = B_0 + B_1 \log \left(\frac{P_g}{P}\right)(t) + B_2 \log \left(\frac{P_g}{P}\right)(t-1) + B_3 \text{ Time} + e$$

Equation No. (Technique)	Constant (B_0)	Coefficients of Independent Variables (t values in parentheses)								
		Real Price of Gold (B_1)		Real Price of Gold Lagged (B_2)		(B_3)				
		U.S. WPI	World CPI	U.S. WPI	World CPI	Time	R^2	SEE	DW	ρ
1. (C-O)	4.359 (18.407)*	-0.077 (-2.193)*				-0.014 (-1.466)	.968	.030	0.711	0.923
1a. (C-O)	4.325 (17.630)*		-0.036 (-1.200)			-0.020 (-2.149)*	.964	.032	0.853	0.923
2. (C-O)	4.425 (19.139)*			-0.101 (-2.504)*		-0.014 (-1.560)	.969	.029	0.962	0.923
2a. (C-O)	4.446 (17.849)*				-0.064 (-2.046)*	-0.021 (-2.269)*	.967	.030	0.908	0.930
3. (C-O)	4.392 (19.529)*	-0.045 (-1.095)		-0.073 (-1.541)		-0.010 (-1.063)	.965	.029	0.827	0.921
3a. (C-O)	4.417 (18.162)*		-0.022 (-0.750)		-0.059 (-1.779)**	-0.017 (-1.796)**	.967	.030	0.876	0.924
4. (C-O)	4.064 (27.558)*	-0.104 (-3.503)*					.966	.030	0.658	0.909
4a. (C-O)	3.874 (27.394)*		-0.065 (-2.252)*				.959	.034	0.843	0.907
5. (C-O)	4.152 (25.414)*			-0.131 (-3.669)*			.967	.030	0.964	0.911
5a. (C-O)	3.959 (27.365)*				-0.090 (-2.824)		.962	.032	0.871	0.909
6. (C-O)	4.208 (25.767)*	-0.058 (-1.514)		-0.083 (-1.777)**			.969	.029	0.790	0.911
6a. (C-O)	4.068 (25.207)*		-0.092 (-1.419)		-0.072 (-2.133)*		.963	.032	0.828	0.909

Source: See notes to Appendix Table 4-A3, Part 1.

Appendix Table 4-A3, Part 3

Annual Market Economy Gold Production, 1969-1980

$$\log Q^S = B_0 + B_1 \log \left(\frac{P_g}{P}\right) (t) + B_2 \log \left(\frac{P_g}{P}\right) (t-1) + B_3 \text{ Time} + e$$

Equation No. (Technique)	Constant (B_0)	Coefficients of Independent Variables (t values in parentheses)								
		Real Price of Gold (B_1)		Real Price of Gold Lagged (B_2)		(B_3)				
		U.S. WPI	World CPI	U.S. WPI	World CPI	Time	R^2	SEE	DW	ρ
1. (C-O)	3.565 (11.374)*	-0.064 (-1.517)				0.010 (0.388)	.920	.031	0.706	0.872
1a. (C-O)	3.568 (11.511)*		-0.062 (-1.609)			0.088 (0.329)	.922	.031	0.718	0.872
2. (C-O)	3.787 (15.548)*			-0.094 (-2.227)*		0.004 (0.209)	.937	.028	1.520	0.850
2a. (C-O)	3.786 (16.240)*				-0.088 (-2.288)*	0.0001 (0.020)	.938	.028	1.510	0.847
3. (C-O)	3.730 (13.083)*	-0.030 (-0.675)		-0.078 (-1.578)		0.014 (0.569)	.932	.029	1.240	0.866
3a. (C-O)	3.722 (13.279)*		-0.030 (-0.718)		-0.071 (-1.580)	0.010 (0.438)	.934	.028	1.240	0.866
4. (C-O)	3.683 (19.812)*	-0.057 (1.707)					.927	.030	0.704	0.852
4a. (C-O)	3.666 (21.077)*		-0.057 (-1.788)				.930	.029	0.714	0.857
5. (C-O)	3.836 (21.701)*			-0.093 (-2.572)*			.943	.026	1.480	0.835
5a. (C-O)	3.791 (23.368)*				-0.088 (-2.606)*		.945	.026	1.510	0.845
6. (C-O)	3.729 (13.083)*	-0.030 (-0.675)		-0.078 (-1.578)		0.014 (0.569)	.932	.029	1.240	0.865
6a. (C-O)	3.837 (21.441)*		-0.024 (-0.658)		-0.071 (-1.663)		.941	.027	1.210	0.841

Source: See notes to Appendix Table 4-A3, Part 1.

Appendix Table 4-A4

Reduced-Form Equations for the Annual Real Price of Gold, 1969-1980

$$\log \frac{P_g}{P} = B_0 + B_1 \log y + B_2 \frac{P_s}{P} + B_3 \log \frac{P_g}{P}\,(t-1) + B_4\ \text{Time} + B_5 \log R + B_6 \hat{P} + B_7 \hat{\frac{M}{M}} + e$$

Equation No. (Technique)	Coefficients of Independent Variable (t-values in parentheses) Constant (B_0)	7 Industrial Countries Real Income (B_1)	Real Price of Silver (B_2)	Real Price of Gold Lagged (B_3)	Time (B_4)	Nominal Interest Rate: 90-Day Treasury Bill Rate (B_5)	Nominal Interest Rate: Euro-dollar rate (B_5)	Rate of Price Change: U.S. CPI (B_6)	Rate of Price Change: World CPI (B_6)	Long-term Monetary Growth Rate (B_7)	R^2	SEE	DW	ρ
1. (C-O)	-5.881 (-0.445)	1.920 (0.640)	0.841[a] (3.912)*		-0.026 (-0.234)						.930	.169	1.84	0.169
2. (C-O)	-7.480 (-0.578)	2.433 (0.832)	0.790[b] (3.970)*		-0.046 (-0.440)						.902	.164	1.86	0.318
3. (C-O)	-32.428 (-2.244)	7.921 (2.415)*	0.700[a] (3.573)*	0.512[a] (1.848)	-0.262 (-2.052)**						.931	.167	-0.27[h]	-0.180
4. (C-O)	-34.090 (-2.702)*	8.081 (2.924)*	0.630[b] (3.555)*	0.481[b] (2.100)**	-0.259 (-2.566)*						.914	.154	-0.29[h]	-0.330
5. (C-O)	-43.501 (-6.194)*	10.550 (6.244)*	0.700[a] (2.203)**	0.250[a] (1.569)	-0.334 (-4.653)*	-0.864 (-3.339)*		11.365 (2.872)*			.974	.103	-2.33[h]	-0.739
6. (C-O)	-23.211 (-1.410)	6.068 (1.683)	0.769[b] (1.616)	-0.076[b] (-0.185)	-0.184 (-1.306)		-0.215 (-0.569)		5.671 (1.299)		.920	.148	-2.68[h]	-0.541
7. (C-O)	-40.024 (-4.494)*	9.334 (4.107)*	0.522[a] (1.120)	0.531[a] (2.828)*	-0.293 (-2.965)*	-0.384 (-1.169)				22.297 (2.088)**	.964	.122	-2.34	-0.652
8. (C-O)	-35.897 (-4.307)	8.415 (4.426)*	0.431b (1.037)	0.403[b] (1.941)**	-0.261 (-3.473)*		-0.328 (-1.209)			24.226 (2.368)**	.951	.116	-2.73	-0.667

[a] Deflated by the U.S. consumer price index.

[b] Deflated by the world consumer price index.

[h] Durbin-Watson h statistic, a measure of autocorrelation in the presence of a lagged dependent variable. A value less than one indicates the presence of autocorrelation.

Source: See Appendix Tables 4-A1 to 4-A3.

* Statistically significant at the 5 percent level.

** Statistically significant at the 10 percent level.

S T A T I S T I C A L C O M P E N D I U M

STATISTICAL TABLES RELATING TO GOLD PRODUCTION, STOCKS, SUPPLY AND DEMAND, AND THE NOMINAL AND REAL PRICE OF GOLD

CONTENTS

GOLD PRODUCTION

Table SC-1

Geographical Sources of World Gold Output, by Regions, Subperiods, 1493-1980
(in percent)

Period	Europe	North America	South America	Africa	Asia	Australia and New Zealand	Other
1493-1600	20.7	3.4	35.7	35.5	-	-	4.7
1601-1700	11.1	4.3	61.7	22.3	-	-	0.6
1701-1800	5.8	5.0	80.0	8.9	-	-	0.3
1801-1850	33.9	21.2	38.3	5.3	-	-	1.3
1851-1900	16.7	36.1	5.6	7.1	3.1	31.2	0.3
1901-1925	5.4	28.2	3.2	42.5	6.8	13.1	0.8
1926-1950	13.3	24.7	3.9	49.6	6.4	2.1	0.0
1951-1980	14.8	12.9	2.1	63.4	3.1	2.2	1.5

Source: See notes to Table SC-2.

Table SC-2
Annual Estimates of World Gold Production, 1800-1980
(millions of fine ounces)

1800	0.701	1840	0.750
1801	0.700	1841	0.768
1802	0.662	1842	0.840
1803	0.638	1843	0.924
1804	0.620	1844	1.022
1805	0.609	1845	1.132
1806	0.578	1846	1.395
1807	0.551	1847	1.714
1808	0.521	1848	2.097
1809	0.496	1849	3.315
1810	0.476	1850	3.910
1811	0.356	1851	4.886
1812	0.369	1852	5.851
1813	0.371	1853	6.965
1814	0.368	1854	7.118
1815	0.361	1855	7.269
1816	0.374	1856	6.581
1817	0.385	1857	6.576
1818	0.399	1858	6.572
1819	0.411	1859	6.437
1820	0.419	1860	6.305
1821	0.417	1861	6.103
1822	0.424	1862	5.968
1823	0.432	1863	5.835
1824	0.439	1864	5.876
1825	0.447	1865	5.916
1826	0.462	1866	6.151
1827	0.478	1867	6.225
1828	0.494	1868	6.300
1829	0.537	1869	6.342
1830	0.556	1870	6.384
1831	0.566	1871	6.391
1832	0.586	1872	5.798
1833	0.597	1873	5.504
1834	0.600	1874	5.360
1835	0.612	1875	5.341
1836	0.660	1876	5.430
1837	0.704	1877	6.001
1838	0.736	1878	5.987
1839	0.758	1879	5.416

Table SC-2 (concluded)

1880	5.349	1930	20.836
1881	5.064	1931	22.330
1882	4.886	1932	24.151
1883	4.746	1933	25.367
1884	5.015	1934	27.372
1885	5.102	1935	29.999
1886	4.945	1936	32.931
1887	5.256	1937	35.118
1888	5.509	1938	37.703
1889	6.048	1939	38.929
1890	5.815	1940	41.770
1891	6.300	1941	40.119
1892	7.060	1942	35.209
1893	7.544	1943	28.052
1894	8.657	1944	25.410
1895	9.578	1945	24.378
1896	9.717	1946	24.902
1897	11.397	1947	25.401
1898	13.921	1948	26.399
1899	15.073	1949	27.563
1900	12.421	1950	27.237
1901	12.692	1951	26.583
1902	14.494	1952	27.335
1903	15.934	1953	27.287
1904	16.902	1954	28.653
1905	18.488	1955	29.901
1906	19.534	1956	30.974
1907	20.040	1957	32.354
1908	21.484	1958	33.416
1909	22.094	1959	35.832
1910	22.147	1960	37.549
1911	22.467	1961	38.984
1912	22.670	1962	41.860
1913	22.307	1963	43.432
1914	21.320	1964	45.171
1915	22.718	1965	46.525
1916	22.035	1966	46.900
1917	20.297	1967	45.999
1918	18.568	1968	46.465
1919	17.667	1969	47.070
1920	16.335	1970	48.590
1921	16.004	1971	47.595
1922	15.467	1972	46.305
1923	17.802	1973	44.507
1924	19.033	1974	41.949
1925	19.026	1975	39.946
1926	19.349	1976	41.774
1927	19.398	1977	41.941
1928	19.756	1978	42.300
1929	19.500	1979	42.253
		1980	41.948

Table SC-2

Sources: 1800-1925: Congressional Record - Senate, July 4, 1952, pp. 9338-39. The source gives annual estimates beginning 1871. For the century, 1701-1800, for decades, 1801-50, and for quinquennia, 1851-70, estimates of aggregate output for each period are given. We interpolated along a logarithmic straight line between the mean value for each period centered at the midpoint: 1750-1805; 1806-1815; 1816-1825; 1826-1835; 1836-1845; 1846-1852; 1852.5-1857.5; 1857.5-1862.5; 1862.5-1867.5; 1867.5-1870. If the sum of the interpolated figures did not equal the reported estimated total, we distributed the difference yearly over each time span.

1926-49: Annual Reports of the Director of the Mint.

1950-80: J. Aron & Company, Gold Statistics and Analysis (December 1981-January 1982), p. 21.

Note: Before 1850 and for less developed countries, the estimates are subject to substantial measurement error. For example, for Chile, the identical total output -- 385,809 fine ounces -- is given for the 1821-30 and 1831-40 decades. In addition, in some countries, to avoid government taxes or regulation, gold was probably sold without proper accounting of the output.

Table SC-3

Concentration of World Gold Production Among Top Four Producing Countries, by Decades, 1801-1980

Decade	Average Annual World Gold Production (millions of fine ounces)	Top Four Countries[a]	Percent of Total World Output Produced by:											
			Brazil	Chile	Colombia	Mexico	Austria-Hungary	Russia	U.S.A.	Australia	New Zealand	China	Canada	South Africa
1801-10	0.585	71.9	20.6	17.1	24.5	9.7								
11-20	0.382	66.0	14.8	16.9	25.3	9.0								
21-30	0.469	68.4	15.1	8.2	22.0			23.2						
31-40	0.657	73.3	14.7		16.2		8.0	34.5						
41-50	1.712	83.4	4.5		6.4			42.3	30.2					
51-60	6.456	93.7			1.7			12.8	41.3	37.9				
61-70	6.110	90.8						14.2	37.5	30.3	8.3			
71-80	5.650	87.6						21.5	33.8	25.8	6.5			
81-90	5.239	78.4						20.7	30.2	22.6		4.8		
91-1900	10.161	61.1						11.6	24.4	21.3			3.7	
1901-10	18.381	74.1						6.8	23.0	18.2				26.0
11-20	20.639	74.7						4.7	19.2	8.5				42.2
21-30	20.554	68.0							10.9	2.9			7.9	46.3
31-40	31.567	73.5						12.9	11.5				12.1	37.0
41-50	28.576	76.2						12.1	7.6				13.1	43.4
51-60	31.441	80.7						11.5	5.8				14.1	49.3
61-70	45.030	88.0						12.1	3.6				7.6	64.7
71-80	42.592	85.6						20.5	2.7				4.2	58.2

[a]Total may not add to sum of four country figures because of rounding differences.

Source: See Table SC-2.

Note: A table for 1801-1930, similar to this one, is given in Hugh Rockoff, "Some Evidence on the Real Price of Gold, Its Cost of Production, and Commodity Prices," presented at a National Bureau of Economic Research conference on the classical gold standard, March 1982. According to Rockoff, gold supply has been potentially vulnerable to political shocks because of the concentration of output. Government policies, or struggles for power, which influenced supply in one country, could influence the world's supply.

Table SC-4

Share of World Gold Output of Nine Leading Producing Countries

Annually, 1968-1980
(in percent)

	South Africa	U.S.S.R.	Canada	U.S.A.	Australia	Ghana	Philippines	Rhodesia-Zimbabwe	Brazil	Sum of 9 Countries
1968	67.5	12.8	5.8	3.2	1.7	1.6	1.1	1.1	0.4	95.2
1969	67.1	13.4	5.5	3.7	1.6	1.5	1.2	1.0	0.4	95.4
1970	67.7	13.7	5.1	3.7	1.3	1.5	1.3	1.0	0.4	95.6
1971	67.5	14.4	4.8	3.2	1.4	1.5	1.4	1.1	0.3	95.7
1972	65.2	15.4	4.6	3.2	1.7	1.6	1.3	1.1	0.4	94.7
1973	63.5	16.4	4.5	2.7	1.3	1.7	1.3	1.9	0.5	93.8
1974	60.8	18.2	4.2	2.8	1.3	1.5	1.3	2.0	0.5	92.6
1975	59.6	19.5	4.3	2.7	1.4	1.4	1.3	1.6	0.4	92.2
1976	58.5	19.6	4.3	2.7	1.3	1.4	1.3	1.5	0.6	92.1
1977	57.5	20.1	4.4	2.8	1.6	1.2	1.4	1.5	0.7	91.3
1978	58.0	20.5	4.4	2.6	1.7	1.0	1.5	1.4	0.8	91.9
1979	58.0	20.9	4.0	2.4	1.5	1.2	1.4	1.0	0.9	91.4
1980	55.6	21.3	4.1	2.4	1.4	1.0	1.8	0.9	2.8	91.4

Detail may not add to total because of rounding differences.

Source: Consolidated Gold Fields Limited, Gold, 1979, 1980, and 1981 editions, Table 2, output of non communist countries, converted from metric tons to ounces; J. Aron, Symposium on Gold (September 1981), p. 19, for Soviet Union output in ounces.

Table SC-5

Annual Estimates of U.S. Gold Production, 1835-1980
(thousands of fine ounces)

1835	39	1880	1,472
1836	26	1881	1,679
1837	16	1882	1,572
1838	24	1883	1,451
1839	23	1884	1,490
		1885	1,538
1840	24	1886	1,687
1841	30	1887	1,603
1842	43	1888	1,604
1843	58	1889	1,595
1844	55		
1845	49	1890	1,598
1846	55	1891	1,605
1847	43	1892	1,597
1848	484	1893	1,739
1849	1,935	1894	1,911
		1895	2,255
1850	2,419	1896	2,568
1851	2,661	1897	2,775
1852	2,903	1898	3,118
1853	3,144	1899	3,437
1854	2,903		
1855	2,661	1900	3,830
1856	2,661	1901	3,806
1857	2,661	1902	3,870
1858	2,419	1903	3,560
1859	2,419	1904	3,892
		1905	4,266
1860	2,225	1906	4,565
1861	2,080	1907	4,372
1862	1,896	1908	4,561
1863	1,935	1909	4,810
1864	2,230		
1865	2,575	1910	4,650
1866	2,588	1911	4,678
1867	2,502	1912	4,498
1868	2,322	1913	4,266
1869	2,395	1914	4,520
		1915	4,824
1870	2,419	1916	4,406
1871	2,104	1917	3,981
1872	1,742	1918	3,258
1873	1,742	1919	2,878
1874	1,620		
1875	1,619	1920	2,414
1876	1,932	1921	2,361
1877	2,269	1922	2,289
1878	2,477	1923	2,426
1879	1,882	1924	2,446
		1925	2,320
		1926	2,239

Table SC-5 (concluded)

1927	2,117	1954	1,837
1928	2,145	1955	1,880
1929	2,057	1956	1,827
		1957	1,794
1930	2,100	1958	1,739
1931	2,214	1959	1,603
1932	2,219		
1933	2,277	1960	1,667
1934	2,742	1961	1,548
1935	3,163	1962	1,543
1936	3,760	1963	1,454
1937	4,112	1964	1,456
1938	4,245	1965	1,705
1939	4,621	1966	1,803
		1967	1,584
1940	4,863	1968	1,478
1941	4,832	1969	1,733
1942	4,583		
1943	1,381	1970	1,747
1944	1,022	1971	1,495
1945	195	1972	1,450
1946	1,462	1973	1,176
1947	2,165	1974	1,127
1948	2,025	1975	1,052
1949	1,922	1976	1,048
		1977	1,100
1950	2,394	1978	999
1951	1,981	1979	970
1952	1,893		
1953	1,958	1980	951

Sources

1835-1844: U.S. Bureau of Mines, Economic Paper No. 6, R. H. Ridgway, "Summarized Data of Gold Production," 1929, p. 14.

1845-1870: Annual Report of the Director of the Mint, 1907, p. 13.

This source shows total gold output from 1792 to 1834 as 677,000 fine ounces and from 1834 to 1844 as 363,000 fine ounces.

1871-1925: Congressional Record, July 4, 1952, p. 9338.

1926-1949: Annual Reports of the Director of the Mint, various issues.

1950-1980: J. Aron and Company, Symposium on Gold, 1981, p. 19.

GOLD STOCKS

Table SC-6
Annual Estimates of the World's Total Gold Stock, 1800-1980
(millions of fine ounces)

1800	113.02	1840	133.94
1801	113.72	1841	134.71
1802	114.39	1842	135.55
1803	115.02	1843	136.47
1804	115.64	1844	137.50
1805	116.25	1845	138.63
1806	116.83	1846	140.02
1807	117.38	1847	141.74
1808	117.90	1848	143.83
1809	118.40	1849	147.15
1810	118.87	1850	151.06
1811	119.23	1851	155.95
1812	119.60	1852	161.80
1813	119.97	1853	168.76
1814	120.34	1854	175.88
1815	120.70	1855	183.15
1816	121.07	1856	189.73
1817	121.46	1857	196.30
1818	121.86	1858	202.88
1819	122.27	1859	209.31
1820	122.69	1860	215.62
1821	123.11	1861	221.72
1822	123.53	1862	227.69
1823	123.96	1863	233.52
1824	124.40	1864	239.40
1825	124.85	1865	245.32
1826	125.31	1866	251.47
1827	125.79	1867	257.69
1828	126.28	1868	263.99
1829	126.82	1869	270.33
1830	127.37	1870	276.72
1831	127.94	1871	283.11
1832	128.53	1872	288.91
1833	129.12	1873	294.41
1834	129.72	1874	299.77
1835	130.33	1875	305.11
1836	130.99	1876	310.54
1837	131.70	1877	316.54
1838	132.43	1878	322.53
1839	133.19	1879	327.95

Table SC-6 (concluded)

1880	333.30	1930	1,064.46
1881	338.36	1931	1,086.79
1882	343.25	1932	1,110.94
1883	347.99	1933	1,136.31
1884	353.01	1934	1,163.68
1885	358.11	1935	1,193.68
1886	363.05	1936	1,226.61
1887	368.31	1937	1,261.73
1888	373.82	1938	1,299.43
1889	379.87	1939	1,338.36
1890	385.68	1940	1,380.13
1891	391.98	1941	1,420.25
1892	399.04	1942	1,455.46
1893	406.59	1943	1,483.51
1894	415.24	1944	1,508.92
1895	424.76	1945	1,533.30
1896	434.48	1946	1,558.20
1897	445.87	1947	1,583.60
1898	459.80	1948	1,610.00
1899	474.87	1949	1,637.57
1900	487.29	1950	1,665.82
1901	499.98	1951	1,693.20
1902	514.48	1952	1,721.11
1903	530.41	1953	1,748.88
1904	547.31	1954	1,778.01
1905	565.80	1955	1,808.45
1906	585.33	1956	1,839.91
1907	605.37	1957	1,872.55
1908	626.86	1958	1,906.23
1909	649.76	1959	1,942.43
1910	671.91	1960	1,980.24
1911	694.38	1961	2,019.53
1912	717.05	1962	2,061.20
1913	739.35	1963	2,104.47
1914	760.67	1964	2,149.36
1915	783.39	1965	2,195.89
1916	805.43	1966	2,242.79
1917	825.72	1967	2,288.79
1918	844.29	1968	2,335.33
1919	861.96	1969	2,382.40
1920	878.29	1970	2,430.54
1921	894.30	1971	2,477.68
1922	909.76	1972	2,523.54
1923	927.57	1973	2,567.59
1924	946.60	1974	2,609.09
1925	965.62	1975	2,648.59
1926	984.97	1976	2,689.19
1927	1,004.37	1977	2,729.88
1928	1,024.13	1978	2,771.13
1929	1,043.63	1979	2,813.89
		1980	2,856.46

Table SC - 6

Source: Figure for 1800 is cumulated total of world gold production, 1493-1800 in Congressional Record - Senate, July 4, 1952, p. 9338. Thereafter, cumulated annual additions from Table SC - 2.

Table SC-7

World Monetary and Nonmonetary Gold Stock,[a]

Annually, 1807-1914
(millions of fine ounces)

End of Year	World Gold Stock		End of Year	World Gold Stock		End of Year	World Gold Stock	
	Monetary	Nonmonetary		Monetary	Nonmonetary		Monetary	Nonmonetary
1807	37.84	79.54	1845	48.00	90.63	1883	155.37	192.62
1808	38.12	79.78	1846	48.48	91.54	1884	156.55	196.46
1809	38.40	80.00	1847	48.95	92.79	1885	158.44	199.67
			1848	49.66	94.17	1886	161.04	202.02
1810	38.69	80.18	1849	52.02	95.13	1887	162.93	205.38
1811	38.99	80.24				1888	165.77	208.05
1812	39.28	80.32	1850	54.39	96.67	1889	168.13	211.74
1813	39.59	80.38	1851	57.46	98.49			
1814	39.87	80.47	1852	63.38	98.42	1890	170.26	215.42
1815	40.18	80.52	1853	69.52	99.24	1891	173.34	218.64
1816	40.48	80.59	1854	74.73	101.15	1892	178.07	220.97
1817	40.79	80.67	1855	79.93	103.22	1893	183.03	223.56
1818	41.10	80.76	1856	85.37	104.36	1894	189.65	225.59
1819	41.41	80.86	1857	90.33	105.97	1895	195.57	229.19
			1858	94.83	108.05	1896	201.48	233.00
1820	41.71	80.98	1859	98.61	110.70	1897	208.57	237.31
1821	42.05	81.06				1898	217.79	242.01
1822	42.35	81.18	1860	102.39	113.23	1899	226.54	248.33
1823	42.66	81.30	1861	105.70	116.02			
1824	42.99	81.41	1862	108.54	119.15	1900	233.88	253.41
1825	43.33	81.52	1863	110.67	122.85	1901	241.68	258.30
1826	43.65	81.66	1864	112.56	126.84	1902	249.72	264.76
1827	43.98	81.81	1865	115.87	129.45	1903	258.47	271.94
1828	44.32	81.96	1866	119.66	131.81	1904	267.69	279.62
1829	44.65	82.17	1867	122.73	134.96	1905	280.93	284.87
			1868	125.57	138.42	1906	291.10	294.24
1830	44.98	82.39	1869	128.41	141.92	1907	302.22	303.16
1831	45.31	82.72				1908	318.30	308.56
1832	45.66	82.87	1870	131.48	145.24	1909	331.07	317.88
1833	45.99	83.13	1871	134.32	148.79			
1834	46.35	83.37	1872	136.45	152.46	1910	341.95	329.15
1835	46.35	83.98	1873	138.58	155.83	1911	352.11	341.46
1836	46.35	84.64	1874	140.47	159.30	1912	361.34	354.90
1837	46.35	85.35	1875	140.12	164.99	1913	373.40	342.84
1838	46.35	86.08	1876	144.25	166.29	1914	389.48	370.38
1839	46.35	86.84	1877	146.85	169.69			
			1878	149.93	172.60			
1840	46.59	87.35	1879	151.11	176.84			
1841	46.82	87.89						
1842	47.06	88.49	1880	152.05	181.25			
1843	47.30	89.17	1881	153.47	184.89			
1844	47.53	89.97	1882	154.42	188.83			

[a] Monetary gold stock includes both official gold reserves and bank and nonbank holdings of gold coin.

Source: League of Nations, Interim Report of the Gold Delegation of the Financial Committee (Geneva, 1930), Table B, pp. 82-84 (converted from £'s to ounces by dividing by 84/11.5 shillings per fine ounce).

Table SC-8

Estimated Gold Holdings of Central Banks and Governments, Annually, 1913-1980
(millions of fine ounces)

End of Year	Gold Held by Central Banks and Governments incl. International Organizations		End of Year	Gold Held by Central Banks and Governments incl. International Organizations	
	F.R. estimates (1)	IMF estimates (2)		F.R. estimates (1)	IMF estimates (2)
1913	222.0		1950	1,008.7	996.2
1914	258.6		1951	1,016.1	1,004.4
1915	302.0		1952	1,022.7	1,012.3
1916	320.8		1953	1,035.7	1,024.4
1917	345.8		1954	1,054.7	1,043.5
1918	329.8		1955	1,073.9	1,062.0
1919	329.2		1956	1,087.9	1,082.8
			1957	1,107.6	1,101.0
1920	351.0		1958	1,126.9	1,121.3
1921	389.2		1959	1,148.4	1,148.8
1922	407.2				
1923	418.6		1960	1,158.1	1,154.5
1924	434.3		1961	1,174.9	1,171.5
1925	435.3		1962	1,185.0	1,183.1
1926	446.7		1963	1,208.6	1,216.4
1927	464.1		1964	1,229.0	1,226.8
1928	486.6		1965	1,235.1	1,248.8
1929	500.1		1966	1,234.9	1,242.9
			1967	1,188.6	1,204.2
1930	529.5		1968	1,168.9	1,173.6
1931	547.9		1969	1,171.7	1,180.3
1932	577.3				
1933	580.8		1970	1,179.3	1,183.1
1934	624.6		1971		1,172.6
1935	619.7		1972		1,178.3
1936	637.7		1973		1,179.5
1937	666.5		1974		1,178.2
1938	714.9		1975		1,177.0
1939	720.8		1976		1,167.0
			1977		1,158.0
1940	813.8		1978		1,150.1
1941	834.4		1979		1,130.9
1942					
1943			1980		1,134.5
1944					
1945	951.0				
1946	960.5				
1947	973.7				
1948	986.4	970.0			
1949	999.4	984.7			

Notes to Table SC-8

Sources:

Col. 1: Banking and Monetary Statistics, 1914-1941, Board of Governors of the Federal Reserve System pp. 544-48; Banking and Monetary Statistics, 1941-1970, Board of Governors of the Federal Reserve System, pp. 913-22. Dollar figures in the source converted to ounces. For 1934-41, only individual country figures are given (see below). Total figures are ours.
Notes in the source on the series for 1913-41 follow.

"The figures represent physical gold, in the form of coin or bullion, held either at home or abroad by central banks and governments. They do not include gold in circulation or in hoards -- that is, gold held by ordinary commercial banks, business concerns, and private individuals. The principal reason for excluding such gold is that satisfactory figures are not available; but it is also considered that gold in the hands of central authorities represents in general the effective gold reserves of the world and should be stated separately, even if accurate figures for other types of gold holdings could be shown. Where countries have not had institutions performing all the recognized central banking functions during the entire period covered by the tables, the gold reserves of government-owned banks or of banks having issue privileges in the countries concerned have been shown in the tables in order to make the compilation as representative as possible. Hence the institutions....are not all central banks in the strict sense.

"Total figures for the gold reserves of central banks and governments are not shown ... after January 1934. Those that are shown are incomplete and not fully comparable. On particular report dates gold reserves may have existed for some countries not included in the table for that date, or there may have been unreported holdings in countries for which figures are included.

"In recent years, the compilation of comprehensive figures for official gold holdings has become increasingly difficult. there has been a tendency toward official secrecy regarding gold reserves which was strengthened by the outbreak of war. One important gold-holding country, the U.S.S.R., has not disclosed its holdings since September 1935, while the last report for Italy was on December 31, 1940, and for Japan on march 22, 1941. In addition, during the war period a number of smaller central banks in countries occupied by the enemy have gone into liquidation or have ceased reporting.

"Further, many central banks have reported figures which fail to disclose the full extent of their countries' official gold reserves. In some cases, notably that of Germany in recent years, the central bank shows only part of its gold holdings as a separate item. In other countries gold has been transferred to - or has been independently accumulated by - special government agencies, the existence of which is known but which operate in a greater or less degree of secrecy. These government funds, created in most cases for the purpose of stabilizing the exchange value of their respective currencies, were initiated on a large scale with the establish-

Notes to Table SC-8 (continued)

ment of the British Exchange Equalization Account in 1932, and have reached their greatest development in this agency, which since September 1939 has held virtually the whole of the United Kingdom's gold reserves.

"Since 1932, when the British Account was established and when regular reports ceased on the large Russian gold holdings, and especially since September 1935, when all Russian reports were discontinued, aggregates of the regularly reported figures have become progressively less representative of the total central gold reserves of the world. Such situations have generally been met in the past by carrying reported figures forward from month to month, in cases considered appropriate, to fill gaps in the statistics for individual countries. Additional defects which have developed in the reported figures during 1940 and 1941 have prompted the decision to omit total figures for recent years from the present tables; for the sake of convenience in presenting the tables, this has been done beginning with February 1934. As a corollary, the practice of covering gaps between reports by carrying forward from month to month the last reported figure for individual countries was discontinued at the same time.

"Many government funds have never reported their gold holdings, but in recent years the three leading exchange funds - the British Exchange Equalization Account, the United States Exchange Stabilization Fund (Special A/c No. 1), and the French Exchange Stabilization Fund - have rendered certain reports on a delayed basis; the French fund reported monthly, and the others at quarterly or semiannual intervals. The British and French funds discontinued this practice following the outbreak of war in September 1939, although three special reports on British gold holdings have been published during the war period by the United States Treasury in connection with Congressional hearings on Lend-Lease legislation.... None of this information has been incorporated in [the table].

"Further light has been cast from time to time upon the operations of certain exchange funds by announcements of gold transfers between them and their respective central banks; such transfers usually are reflected in abrupt changes in the reported figures for the countries concerned....

...."In the case of most of the countries included .... the year end figures are as of December 31 during the entire period. There [are].... exceptions to this rule, most of which are due to the practice of some central banking institutions of consistently reporting on the same day of the week, with the result that the calendar date of their year end report differs from one year to the next, and falls on December 31 only by chance.

"Scope and sources of data for individual countries.... Under war conditions, some difficulty has been experienced in obtaining direct reports on gold reserves, especially from certain European countries. In a few cases where the source of the figures is given as 'current balance sheet,' the information has actually been drawn from reliable indirect reports on balance sheets, such as those published by the League of Nations, the Bank for International Settlements, and the Swiss National Bank."

Notes to Table SC-8 (concluded)

Notes in the source on the series for 1945-70 follow:

"[The] table... shows quarterly data for gold reserves of 60 countries and one international and two regional organizations, as well as world totals. During World War II it was difficult to obtain reliable information on gold reserves, since many countries did not disclose their official holdings and a number of others reported figures that failed to disclose the full extent of their holdings. Therefore, no attempt has been made to show holdings before December 1945.

"In most foreign countries the central bank or bank of issue holds the country's gold reserves, but in several both the central bank and an exchange stabilization fund or similar governmental authority hold the reserves. In others - Canada and the United Kingdom, for example - such authorities hold all of the gold reserves.

"The source of the gold reserve figures for most countries and for the Bank for International Settlements (BIS) has been either the balance sheet or the statistical bulletin of the central bank. Figures for the IMF and several countries have been obtained from the Fund's monthly bulletin, International Financial Statistics. Although most figures given are [illegible] the end of the month, figures for several countries, particularly Asian countries that do not issue end-of-month reports, refer to the last report date of the month.

"Gold reserves have been reported in three ways - in the currency of the country, in weight units, or in U.S. dollars. Reserves reported in foreign currencies have been converted into dollars at rates that result in a valuation of $35 per fine ounce, the rate that was in effect during the period covered by this section. Where gold reserves have been reported in weight units, the conversions have been made at the rate of $35 per fine ounce.

"The figures for estimated world gold reserves represent reported holdings of central banks and governments and of regional and international organizations; unpublished holdings of various central banks and governments; and estimated official holdings of countries from which no reports have been received. The figures do not include amounts for the U.S.S.R., other Eastern European countries, and the People's Republic of China.

"The figures for the most part represent physical gold, in the form of coin or bullion, held either at home or abroad. A number of countries have gold deposited with the BIS, and they include these deposits as part of their gold reserves. To avoid overstating world reserves, therefore, the figures included in Table 14.3 for the BIS represent the Bank's gold assets net of gold deposit liabilities."

Column 2: IMF, International Financial Statistics data tape. Differences between columns 1 and 2 appear to reflect differences in coverage of small countries as well as of estimates of their gold holdings.

Table SC-9

U.S. Monetary Gold Stock, Annually, 1860-1914
(millions of fine ounces)

June 30	U.S. Monetary Gold Stock: Outside Treasury including Gold Certificates (1)	U.S. Monetary Gold Stock: in Treasury excluding Cover for Gold Certificates (2)	U.S. Monetary Gold Stock: in and Outside Treasury (3)	Dec. 31	U.S. Monetary Gold Stock: Outside Treasury including Gold Certificates (1)	U.S. Monetary Gold Stock: in Treasury excluding Cover for Gold Certificates (2)	U.S. Monetary Gold Stock: in and Outside Treasury (3)
1860	10.03	0.32	10.35	1890	26.85	7.21	34.06
1861	12.89	0.15	13.06	1891	26.90	6.33	33.23
1862	n.a.	n.a.	13.69	1892	26.84	5.87	31.51
1863	n.a.	n.a.	12.58	1893	28.35	3.91	32.26
1864	9.92	0.80	9.82	1894	26.07	4.17	30.24
1865	7.19	1.95	9.14	1895	25.87	3.06	28.93
1866	5.82	2.26	8.08	1896	26.88	6.64	33.52
1867	4.43	4.57	9.00	1897	28.26	7.78	36.04
1868	3.94	3.80	7.74	1898	34.01	11.93	45.94
1869	4.46	3.91	8.37	1899	37.69	11.46	49.15
1870	5.48	3.69	9.17	1900	41.70	11.93	53.63
1871	4.36	3.55	7.91	1901	44.19	12.71	56.90
1872	4.98	2.18	7.16	1902	47.22	13.10	60.32
1873	4.69	1.84	6.53	1903	50.75	12.85	63.60
1874	4.74	2.39	7.13	1904	54.01	11.11	65.12
1875	3.97	1.89	5.86	1905	54.92	13.78	68.70
1876	4.79	1.50	6.29	1906	61.59	15.19	76.78
1877	5.34	2.76	8.10	1907	65.57	12.06	77.63
1878	5.30	5.01	10.31	1908	68.75	11.26	80.01
				1909	67.54	11.71	79.25
Dec. 31				1910	70.38	12.29	82.67
1878	5.69	5.52	11.21	1911	73.59	13.35	86.94
1879	9.21	7.07	16.28	1912	76.38	14.50	90.88
1880	13.83	7.27	21.10	1913	80.07	12.70	92.77
1881	17.15	8.10	25.25	1914	75.11	12.75	87.86[a]
1882	18.99	6.39	25.38				
1883	19.87	7.52	27.39				
1884	21.02	6.85	27.87				
1885	22.50	7.16	29.66				
1886	22.71	8.27	30.98				
1887	24.00	10.09	34.09				
1888	24.23	9.86	34.09				
1889	24.13	9.23	33.36				

Notes to Table SC-9

Note: Dollar figures in sources have been converted to millions of fine ounces of gold.

[a]The dollar figure for which the ounce equivalent is shown is $1,815,976,319. The dollar for 1914 in Table SC-10 is $1,526 million. The major reason for the difference is that $287 million was deducted by the Federal in each year 1914-33 because that amount was not turned into the Treasury in 1934, when gold holdings outside the Treasury was prohibited. The gold that was not returned was assumed to be lost gold. Even if $287 million is added to the $1,526, there remains a discrepancy of approximately $3 million between the Federal Reserve figure reported in Table SC-10 and the Treasury figure shown here. The Treasury ounce estimate is about 145 thousand higher than the Federal Reserve with the assumed lost gold restored to the stock estimates.

(1) June 1860-June 1878: Annual Report of the Secretary of the Treasury on the State of the Finances (A.R. Treasury), 1928, p. 554.
Dec. 1878-Dec. 1879: A.R. Treasury, 1898, pp. 124-27 and 131-33.
Dec. 1898-Dec. 1902: A.R. Treasury, 1903, pp. 206 and 212.
Dec. 1903-Dec. 1908: A.R. Treasury, 1909, pp. 189-93, 205-08.
Dec. 1909: A.R. Treasury, 1910, pp. 184 and 192.
Dec. 1910-Dec. 1914: A.R. Treasury, 1915, pp. 303-06 and 316-18.

(2) June 1860-June 1878: Col. 3 minus Col. 1.
Dec. 1878-Dec. 1897: A.R. Treasury, 1898, pp. 59-61 ("Net gold in Treasury").
Dec. 1898-Dec. 1902: A.R. Treasury, 1903, p. 173.
Dec. 1903-Dec. 1908: A.R. Treasury, 1909, pp. 189-93, 205-08.
Dec. 1909: A.R. Treasury, 1910, pp. 184 and 192.
Dec. 1910-Dec. 1914: A.R. Treasury, 1915, pp. 302-06 and 316-18.

(3) June 1860-June 1878: A.R. Treasury, 1928, p. 552.
Dec. 1878-Dec. 1897: A.R. Treasury, 1898, pp. 109-11.
Dec. 1895-Dec. 1902: A.R. Treasury, 1903, pp. 216 and 220.
Dec. 1903-Dec. 1908: A.R. Treasury, 1909, pp. 189-93, 205-08.
Dec. 1909: A.R. Treasury, 1910, pp. 184 and 192.
Dec. 1910-Dec. 1914: A.R. Treasury, 1915, pp. 302-06 and 316-18.

Table SC-10

U.S. Monetary Gold Stock, Annually, 1914-1980
(millions of fine ounces)

End of Year	U.S. Monetary Gold Stock: outside Treasury and Federal Reserve Banks including gold certificates in circulation (1)	U.S. Monetary Gold Stock: in Treasury and Federal Reseve Banks excluding (2)	U.S. Monetary Gold Stock: inside and outside Treasury and Federal Reserve Banks (3)	End of Year	U.S. Monetary Gold Stock: outside Treasury and Federal Reserve Banks including gold certificates in circulation (1)	U.S. Monetary Gold Stock: in Treasury and Federal Reserve Banks excluding (2)	U.S. Monetary Gold Stock: inside and outside Treasury and Federal Reserve Banks (3)
1914	49.42	24.41	73.83	1950			652.00
1915	61.35	36.62	97.97	1951			653.51
1916	76.14	47.52	123.66	1952			664.34
1917	50.02	88.73	138.75	1953			631.17
1918	29.90	109.09	138.99	1954			622.66
1919	22.99	107.97	130.96	1955			621.51
1920	19.68	107.99	127.67	1956			630.23
1921	15.90	147.28	163.18	1957			653.06
1922	21.26	154.94	176.20	1958			588.06
1923	34.22	157.22	191.44	1959			557.34
1924	53.15	150.62	203.77	1960			508.69
1925	59.98	138.96	198.94	1961			484.20
1926	58.71	144.72	203.43	1962			458.27
1927	57.51	140.46	197.97	1963			445.60
1928	53.16	133.29	186.45	1964			442.03
1929	47.25	146.12	193.37	1965			394.46
1930	58.00	150.32	208.32	1966			378.14
1931	48.31	153.58	201.89	1967			344.71
1932	37.85	166.60	204.45	1968			311.20
1933	11.51	183.79	195.30	1969			338.83
1934			235.37	1970			316.34
1935			289.29	1971			291.60
1936			321.64	1972			275.97
1937			364.58	1973			275.97
1938			414.62	1974			275.97
1939			504.10	1975			274.71
1940			628.41	1976			274.68
1941			650.34	1977			277.55
1942			649.69	1978			276.41
1943			628.03	1979			264.60
1944			589.46	1980			264.32
1945			573.80				
1946			591.60				
1947			653.37				
1948			697.11				
1949			701.80				

Notes to Table SC-10

Dollar figures in sources converted to ounces. For the discontinuity between the 1914 figure in col. 3 in this table and the corresponding figure in Table SC-9, see note a in the notes to the latter table. Only col. 3 is shown here from 1934 on, when gold was transferred to the Treasury by former holders.

Although the right to hold gold was restored to U.S. residents beginning 1975, no record is available of the amounts held outside the Treasury.

Source, by Column:

1. Banking and Monetary Statistics, 1914-1941, Board of Governors of the Federal Reserve System, pp. 409-12, sums of gold coin and gold certificates

2. Ibid., p. 536, less cover for gold certificates includes col. 1

3. 1914-41: Ibid., p. 544
   1942-70: Banking and Monetary Statistics, 1941-1970, Board of Governors of the Federal Reserve System, p. 899
   1971-80: IMF, International Financial Statistics data tape

GOLD SUPPLY AND DEMAND

Table SC - 11

Two Estimates of World Gold Supply; Change in Official Gold Reserves; and Gold Absorption in Manufactures and the Arts, Annually 1914-1938, 1930-1952
(millions of fine ounces)

PART 1

Calendar Year	World Output (1)	Eastern Absorption (-) or Dishoarding (+) (2)	Change in Official Gold Reserves (3)	Industrial Consumption: Absorption (-) or Release (+) (4)
1914	21.67			
15	22.84		+43.35	
16	22.01		+18.82	
17	20.37		+25.01	
18	18.58			
19	17.32			
1920	16.11			
21	15.97			
22	15.48			7.55
23	17.85		+11.32	7.40
24	18.63		+15.72	7.06
25	18.58		+ 1.02	7.35
26	19.11		+11.42	6.87
27	19.06		+17.42	6.00
28	18.87		+22.45	5.76
29	19.21		+13.50	
1930	20.90		+29.41	4.93
31	22.30	7.06	+18.34	3.05
32	24.09	10.84	+29.51	1.74
33	25.40	7.35	+ 2.08	1.94
34	27.58	7.35	+51.96	1.09
35	30.24	4.93	- 2.90	2.37
36	33.28	3.93	+34.35	2.23
37	35.32	1.94	+38.70	2.27
38	37.74	1.64	+43.54	1.45

PART 2

1930	20.9	-3.1	15.4	-2.4
31	22.4	7.2	28.6	-1.0
32	24.3	11.7	38.0	2.0
33	25.3	7.4	34.7	2.0
34	27.3	7.2	36.5	2.0
35	29.6	5.0	35.6	1.0
36	33.1	3.6	36.7	0
37	35.0	1.9	36.9	0
38	37.4	1.7	39.1	0
39	38.1	2.3	40.4	0

PART 2 (continued)

Calendar Year	World Output (1)	Eastern Absorption (-) or Dishoarding (+) (2)	Change in Official Gold Reserves (3)	Industrial Consumption: Absorption (-) or Release (+) (4)
1940	40.1	2.2	41.3	-1.0
41	39.3	0.1	37.4	-2.0
42	34.4	-0.9	30.8	-2.7
43	26.7	-1.6	20.7	-4.4
44	24.3	-2.2	16.7	-5.4
45	23.2	-3.0	13.9	-6.3
46	23.5	-3.5	8.5	-11.5
47	24.0	-4.5	5.0	-14.5
48	25.0	-5.5	5.9	-13.6
49	25.9	-4.5	5.8	-15.6
1950	26.6	-4.2	8.6	-13.8
51	26.0	-6.0	12.8	- 7.2
52	26.4	-6.0	9.2	-11.2

Table SC - 11

Note: For Parts 1 and 2, dollar figures in the sources have been converted to ounces.

Part 1

Source: International Currency Experience, League of Nations, 1944, p. 233. Notes to the table in the source cite the U.S. Bureau of the Mint for col. 1 (including U.S.S.R. output) and col.4 (including not only new gold but scrap and coin used in the arts); Baull for International Settlements for col.2; Federal Reserve Bulletin, September 1940, for trhe levels from which col.3 is computed (no change in computed for 1918-22 because U.S.S.R.'s reserves are not reported).

Part 2

Source: W.J. Busschau, "Some Notes on Gold Production and Stocks" in National Industrial Conference Board Special Studies no. 43, Shall We Return to a Gold Standard - Now? 1954, pp. 164-65. The source cites Union Corporation annual reports as the compiler of the monetary gold stock in col. 3. Industrial consumption is described as including a "quantity of gold hoarded in various parts of the world in processed or semiprocessed form, of which in 1951 between 7 million and 8 million and in 1952 slightly more than 4 million are estimated to have been held for hoarding in various parts of the Western World."

Table SC - 12

Components of Annual World Gold Demand, 1950-1980
(million of fine troy ounces)

Year \ Source of Demand	Industrial Demand: Electronics (1)	Industrial Demand: Dentistry (2)	Industrial Demand: Other (3)	Jewelry Demand: Developed Countries (4)	Jewelry Demand: Developing Countries (5)	Jewelry and Industrial Demand (1)+(2)+(3)+(4)+(5) (6)	Coin and Medallions[a] (7)	Net Private Bullion Purchases (8)	Net Purchases by: Centrally Planned Economies (9)	Net Purchases by: Offical Western Agencies (10)	Total Demand (6)+(7)+(8)+(9)+(10) (11)
1950						12.0		3.1		9.2	24.3
1951						13.0		3.2		7.5	23.7
1952						13.0		4.7		6.5	24.2
1953						12.5		1.0		12.9	26.4
1954						13.0				19.1	32.1
1955						13.5				19.0	32.5
1956						15.0		3.2		13.9	32.1
1957						17.0				19.7	36.7
1958						19.0				19.4	38.4
1959						22.0				21.5	43.5
1960						25.0		5.8		8.4	39.2
1961						28.0				17.2	45.2
1962						30.0		2.5		10.5	43.0
1963						32.5				23.4	55.9
1964						34.5				20.2	54.7
1965						36.0		10.1		6.3	52.4
1966						37.5		2.6	2.1		42.2
1967						38.0		46.8	0.1		84.9
1968	2.6	2.0	1.9	29.3		35.8	3.5	19.7	0.9		59.9
1969	3.2	1.9	2.0	29.2		36.3	2.3		0.5	2.9	42.0
1970	3.0	1.9	2.0	34.2		41.1	3.2		0.1	7.6	52.0
1971	2.8	2.0	2.2	17.8	16.3	41.3	3.4				44.7
1972	3.4	2.1	2.4	22.6	9.4	39.9	3.3			4.9	48.1
1973	4.1	2.1	2.3	13.8	2.9	25.2	2.4	17.2			44.8
1974	3.0	1.8	2.2	8.9		14.2	9.4	16.9			40.5
1975	2.2	2.0	1.9	10.2	6.6	22.9	8.8	4.3			36.0
1976	2.4	2.5	2.1	15.1	14.9	37.0	7.5	1.8			46.3
1977	2.5	2.6	2.1	17.4	14.9	39.5	6.2	6.9			52.6
1978	2.8	2.9	2.5	19.0	13.3	40.5	10.8	4.7			56.0
1979	3.0	2.8	2.4	17.7	6.0	31.9	10.4	12.3			54.6
1980	2.6	2.0	2.1	8.7		10.6	6.3	8.8		7.4	33.1

Source, by Column; A. J. Aron & Company, Gold Statistics and Analysis (December 1981/January 1982)
B. J. Aron & Company, Gold Statistics and Analysis (November 1978)
C. Consolidated Gold Fields Limited, Gold 1979 (June 1979)

(1)-(5), 1968-70: Source C, p. 16 (converted from metric tons to fine ounces).
1971-72: Source B, p. 36.
1973-80: Source A, p. 13.

(6)-(10): Source A, p.11.

Note: This table shows the latest revisions of data given in Table 4-1, not available to us in time to base the econometric work we report on the revisions.

Table SC - 13

Annual World Gold Supply and Gold Output, 1950-1980
(millions of fine troy ounces)

Source of Supply / Year	Production in Market Economies (1)	Flow from Centrally Planned Economies (2)	Net Official Sales (3)	Jewelry Sales by Developing Countries (4)	Dishoarding of Private Bullion Holdings (5)	Annual Total Supply (1)+(2)+(3) +(4)+(5) (6)	Annual World Output (7)
1950	24.3					24.3	27.2
1951	23.7					23.7	26.6
1952	24.2					24.2	27.3
1953	24.2	2.2				26.4	27.3
1954	25.5	2.2			4.4	32.1	28.7
1955	26.8	2.2			3.5	32.5	29.9
1956	27.8	4.3				32.1	31.0
1957	29.0	7.4			0.3	36.7	32.4
1958	29.9	6.3			2.2	38.4	33.4
1959	32.1	8.6			2.8	43.5	35.8
1960	33.5	5.7				39.2	37.5
1961	34.7	8.6			1.9	45.2	39.0
1962	37.3	5.7				43.0	41.9
1963	38.6	15.7			1.6	55.9	43.4
1964	40.0	12.9			1.8	54.7	45.2
1965	41.0	11.4				52.4	46.5
1966	41.0		1.2			42.2	46.9
1967	39.8		45.1			84.9	46.0
1968	40.0		19.9			59.9	46.5
1969	40.3				1.7	42.0	47.1
1970	40.9				11.1	52.0	48.6
1971	39.7	1.7	3.1		0.2	44.7	47.6
1972	37.8	6.8			3.5	48.1	46.3
1973	35.8	8.8	0.2			44.8	44.5
1974	32.8	7.1	0.6	1.7		42.2	41.9
1975	30.9	4.8	0.3			36.0	39.9
1976	31.2	13.2	1.9			46.3	41.8
1977	31.0	12.9	8.7			52.6	41.9
1978	31.1	13.2	11.7			56.0	42.3
1979	30.7	6.4	17.5			54.6	42.3
1980	30.2	2.9		4.8		37.9	41.9

Source, by Column: J. Aron & Company, Gold Statistics and Analysis (December 1981/January 1982)
(1)-(3) and (5): p.11.
(4): p.36.
(7): p.22.

Note: This table shows the latest revisions of data given in Table 4-2.

Table SC - 14

U.S. Excess of Gold Exports or Imports; Change in U.S. Monetary Gold Stock, and Gold Used in U.S. Manufactures and Arts
Annually, 1880-1980
(millions of fine troy ounces)

Fiscal years ending June 30	Excess of Gold Exports(+) or Imports (-) (1)	Calendar Years	Change in U.S. Monetary Gold Stock (2)	Gold Used in U.S. Manufactures and Arts (3)
1880	- 3.7	1880	4.8	0.5
81	- 4.7	81	4.1	0.5
82	- 0.1	82	0.1	0.5
83	- 0.3	83	2.0	0.7
84	- 0.9	84	0.5	0.7
85	- 0.9	85	1.8	0.6
86	+ 1.1	86	1.3	0.7
87	- 1.6	87	3.1	0.7
88	- 1.3	88	---	0.8
89	+ 2.4	89	- 0.8	0.8
1890	+ 0.2	1890	0.8	0.9
91	+ 3.3	91	- 0.8	1.0
92	0	92	- 1.7	0.9
93	+ 4.2	93	0.8	0.7
94	+ 0.2	94	- 2.0	0.6
95	+ 1.5	95	- 1.3	0.7
96	+ 3.8	96	4.6	0.6
97	- 2.2	97	2.5	0.7
98	- 5.1	98	9.9	0.8
99	- 2.5	99	3.2	1.0
1900	+ 0.1	1900	4.5	1.1
01	- 0.6	01	3.3	1.1
02	- 0.1	02	3.4	1.3
03	+ 0.1	03	3.3	1.4
04	- 0.9	04	1.5	1.4
05	+ 1.9	05	3.6	1.6
06	- 2.8	06	8.1	1.9
07	- 3.1	07	0.8	2.0
08	- 3.7	08	2.4	1.5
09	+ 2.3	09	- 0.8	1.8
1910	+ 3.7	1910	3.4	2.0
11	- 2.5	11	4.3	2.0
12	+ 0.4	12	3.9	2.1
13	+ 0.4	13	1.9	2.2
14	+ 2.2	14	- 4.9	1.7
15	- 1.3	15	24.1	1.7
July 1 - Dec.31,1915	-13.7			

Table SC - 14 (continued)

Calendar Years	Excess of Gold Exports(+) or Imports (-) (1)	Change in U.S. Monetary Gold Stock (2)	Gold Used in U.S. Manufactures and Arts (3)
1916	-25.6	25.7	2.4
17	- 8.7	15.1	2.4
18	- 1.0	0.2	2.6
19	+14.1	- 8.0	3.7
1920	- 4.6	- 3.3	3.9
21	-32.3	35.5	2.3
22	-11.5	13.0	2.7
23	-14.2	15.2	3.2
24	-12.5	12.4	3.1
25	+ 6.5	- 4.8	3.0
26	- 4.7	4.5	3.0
27	- 0.3	- 5.5	2.7
28	+19.0	-11.5	2.7
29	- 8.5	6.9	2.7
1930	-13.5	15.0	2.1
31	- 7.0	- 6.5	1.4
32	+21.6	2.6	1.0
33	+ 8.4	- 9.2	0.8
34	-33.4	120.1	0.4
35	-49.7	53.9	0.7
36	-31.9	32.4	0.9
37	-45.3	42.9	1.1
38	-56.4	50.0	0.9
39	-102.1	89.5	1.1
1940	-135.5	124.3	1.2
41	-28.1	21.9	1.9
42	- 9.0	- 0.6	2.2
43	- 2.0	-21.7	2.8
44	-24.1	-38.6	3.5
45	+ 3.0	-15.7	4.0
46	- 6.1	17.8	5.7
47	-56.2	61.8	2.8
48	-48.0	43.7	2.6
49	-19.6	4.7	4.3
1950	+10.6	-49.8	3.8
51	+15.7	1.5	3.0
52	-79.5	10.8	3.6
53	- 0.1	33.2	3.5
54	- 0.5	- 8.5	2.2
55	- 2.8	- 1.2	2.0
56	- 3.0	8.7	2.2
57	- 3.0	22.8	2.2
58	- 7.4	-65.0	2.6
59	- 8.6	-30.7	3.2

Table SC-14 (concl.)

Calendar Years	Excess of Gold Exports(+) or Imports (-) (1)	Change in U.S. Monetary Gold Stock (2)	Gold Used in U.S. Manufactures and Arts (3)
1960	- 9.5	-48.6	3.7
61	+20.5	-24.5	3.9
62	+ 6.6	-25.4	4.5
63	+ 4.6	-13.2	4.3
64	+10.9	- 3.6	5.9
65	+33.8	-47.6	6.6
66	+11.9	-16.3	7.8
67	+27.8	-33.4	6.5
68	+17.5	-33.5	6.6
69	- 6.4	27.6	7.1
1970	- 5.6	-22.5	6.0
71	- 5.0	-24.7	6.9
72	- 5.7	-15.6	7.3
73	- 5.0	0	6.7
74	- 7.3	0	4.7
75	- 2.2	- 1.3	4.0
76	- 6.0	--	4.6
77	- 9.5	2.9	4.9
78	- 8.6	- 1.1	4.7
79	+ 4.8	-11.8	4.7
80	- 5.6	--	3.2

Note: -- indicates less than 50,000 ounces.

Table SC - 14

Source by Column

(1) 1880 - 1970: Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part 2, Washington, D.C., 1975 Series 197 and 198, pp. 884-85, converted from dollars to ounces. A note in the source states that prior to 1895, figures relate to coin and bullion only, thereafter to ore also. 1971-1980: U.S. Treasury and Department of Commerce.

(2) First differences of col. 3, Tables SC - 9 and SC - 10.

(3) Annual Reports of the Director of the Bureau of the Mint. Dollar amounts before 1967 converted to ounces.

Table SC-15

Change in U.S. Monetary Gold Stock and Gold Used in U.S. Manufactures and Arts as Percent of U.S. Gold Output, Annually, 1880-1980

Calendar Years	Change in Gold Stock (1)	Gold Used in Manufactures as percent of U.S. gold output (2)
1880	327.5	33.2
81	246.8	30.4
82	8.7	32.4
83	138.2	51.5
84	32.5	47.1
85	116.0	37.2
86	78.7	41.7
87	194.0	44.7
88	- 0.3	49.8
89	-45.7	50.7
1890	44.4	53.7
91	-51.4	59.3
92	-107.6	58.5
93	43.3	43.0
94	-105.8	32.0
95	- 58.3	33.1
96	179.0	25.2
97	90.8	24.2
98	317.3	24.2
99	93.6	27.9
1900	116.9	28.0
01	86.0	29.1
02	88.4	34.6
03	92.1	39.5
04	38.9	35.6
05	83.9	37.7
06	192.8	41.5
07	19.4	45.1
08	52.4	33.4
09	- 1.3	37.9
1910	73.6	43.5
11	91.2	42.2
12	87.7	47.3
13	44.1	52.0
14	-107.3	38.7
15	500.5	36.2
16	582.7	54.9
17	379.4	61.3
18	7.3	78.7
19	-278.7	128.0

Table SC-15 (cont.)

Calendar Years	Change in Gold Stock (1)	Gold Used in Manufactures as percent of U.S. gold output (2)
1920	-137.1	159.8
21	1505.3	99.3
22	567.5	119.7
23	628.4	133.4
24	505.6	128.2
25	-208.8	127.7
26	200.1	136.1
27	-257.8	129.9
28	-536.6	127.6
29	335.1	132.8
1930	713.2	98.3
31	-291.5	63.7
32	115.3	43.8
33	-404.5	36.1
34	4379.0	14.8
35	1704.7	23.4
36	860.6	25.1
37	1044.0	27.5
38	1178.9	20.3
39	1936.5	24.0
1940	2556.4	24.2
41	453.4	40.2
42	-18.1	60.4
43	-1568.4	200.4
44	-3774.0	343.8
45	-8030.7	2050.3
46	1217.5	390.2
47	2853.1	129.5
48	2160.0	127.2
49	244.0	221.4
1950	-2080.2	160.6
51	76.2	151.4
52	572.1	192.0
53	-1694.1	178.6
54	-463.3	121.7
55	-61.2	104.5
56	477.3	119.6
57	1272.6	125.0
58	-3737.8	149.7
59	-1916.4	198.1
1960	-2918.4	222.0
61	-1582.0	252.8
62	-1648.1	290.7
63	-905.8	292.5
64	-245.2	404.3
65	-2790.0	384.2

Table SC-15 (concl.)

Calendar Years	Change in Gold Stock (1)	Gold Used in Manufactures as percent of U.S. gold output (2)
66	-905.2	431.2
67	-2110.5	408.3
68	-2267.3	446.8
69	1594.3	410.2
1970	-1287.3	341.9
71	-1654.8	463.7
72	-1077.9	502.4
73	0	572.2
74	0	412.7
75	-119.8	379.6
76	- 2.9	443.5
77	260.9	441.7
78	-114.1	474.3
79	-1217.5	481.6
1980	- 2.1	338.1

NOMINAL AND REAL PRICE OF GOLD

Table SC-16

Official or Market Price of Gold per Ounce in Nominal U.S. Dollars and in 1967 U.S. Dollars, Annually, 1800-1980

	Price of Gold Per Ounce in U.S. Dollars (1)	Wholesale Price Index 1967 = 100 (2)	Real Price of Gold (1) ÷ (2) (3)
	Official Price		
1800	19.39	45.6	42.52
1801	"	50.2	38.63
1802	"	41.4	46.84
1803	"	41.7	46.50
1804	"	44.6	43.48
1805	"	49.9	38.86
1806	"	47.4	40.91
1807	"	46.0	42.15
1808	"	40.7	47.64
1809	"	46.0	42.15
1810	"	46.3	41.88
1811	"	44.6	43.48
1812	"	46.3	41.88
1813	"	57.3	33.84
1814	"	64.4	30.11
1815	"	60.1	32.26
1816	"	53.4	36.31
1817	"	53.4	36.31
1818	"	52.0	37.29
1819	"	44.2	43.87
1820	"	37.5	51.71
1821	"	37.5	51.71
1822	"	37.5	51.71
1823	"	36.4	53.27
1824	"	34.7	55.88
1825	"	36.4	53.27
1826	"	35.0	55.40
1827	"	34.7	55.88
1828	"	34.3	56.53
1829	"	34.0	57.03
1830	"	32.2	60.22

(continued)

Table SC-16 continued)

	Price of Gold Per Ounce in U.S. Dollars (1)	Wholesale Price Index 1967 = 100 (2)	Real Price of Gold (1) ÷ (2) (3)
1831	19.29	33.2	60.22
1832	"	33.6	57.71
1833	"	33.6	57.71
1834	20.05	31.8	63.05
1835	20.69	35.4	58.45
1836	"	40.3	51.34
1837	20.67	40.7	50.79
1838	"	38.9	53.14
1839	"	39.6	52.20
1840	"	33.6	61.52
1841	"	32.5	63.60
1842	"	29.0	71.28
1843	"	26.5	78.00
1844	"	27.2	75.99
1845	"	29.4	70.31
1846	"	29.4	70.31
1847	"	31.8	65.00
1848	"	29.0	71.28
1849	"	29.0	71.28
1850	"	29.7	65.60
1851	"	29.4	70.31
1852	"	31.1	66.46
1853	"	34.3	60.26
1854	"	38.2	54.11
1855	"	36.2	57.10
1856	"	37.1	55.71
1857	"	39.3	52.60
1858	"	32.9	62.83
1859	"	34.0	60.79
1860	"	32.9	62.83
1861	"	31.5	65.62
	Market Price		
1862	23.42	36.8	63.64
1863	30.01	47.0	63.85
1864	41.96	68.3	61.43
1865	32.45	65.4	49.62
1866	29.12	61.5	47.35
1867	28.57	57.3	49.86
1868	28.88	55.9	51.66
1869	27.49	53.4	51.48
1870	23.75	47.7	49.79

(continued)

Table SC-16 (continued)

	Price of Gold Per Ounce in U.S. Dollars (1)	Wholesale Price Index 1967 = 100 (2)	Real Price of Gold (1) ÷ (2) (3)
1871	23.09	46.0	50.20
1872	23.23	48.1	48.30
1873	23.52	47.0	50.04
1874	22.99	44.6	51.55
1875	23.75	41.7	56.95
1876	23.05	38.9	59.25
1877	21.66	37.5	57.76
1878	20.84	32.2	64.72
	Official Price		
1879	20.67	31.8	65.00
1880	"	35.4	58.39
1881	"	36.4	56.79
1882	"	38.2	54.11
1883	"	35.7	57.90
1884	"	32.9	62.83
1885	"	30.1	68.67
1886	"	29.0	71.28
1887	"	30.1	68.67
1888	"	30.4	67.99
1889	"	28.6	72.27
1890	"	29.0	71.28
1891	"	28.8	71.77
1892	"	26.9	76.84
1893	"	27.6	74.89
1894	"	24.7	83.68
1895	"	25.2	82.02
1896	"	24.0	86.13
1897	"	24.0	86.13
1898	"	25.0	82.68
1899	"	26.9	76.84
1900	"	28.9	71.52
1901	"	28.5	72.53
1902	"	30.4	67.99
1903	"	30.8	67.11
1904	"	30.8	67.11
1905	"	31.0	66.68
1906	"	31.9	64.80
1907	"	33.6	61.52
1908	"	32.5	63.60
1909	"	34.9	59.23
1910	"	36.3	56.94

(continued)

Table SC-16 (continued)

	Price of Gold Per Ounce in U.S. Dollars (1)	Wholesale Price Index 1967 = 100 (2)	Real Price of Gold (1) ÷ (2) (3)
1911	20.67	33.5	61.70
1912	"	37.7	57.90
1913	"	36.0	57.42
1914	"	35.1	58.89
1915	"	35.9	57.58
1916	"	44.1	46.87
1917	"	60.6	34.11
1918	"	67.8	30.49
1919	"	71.5	28.91
1920	"	79.7	25.93
1921	"	50.4	41.01
1922	"	49.9	41.42
1923	"	51.9	39.83
1924	"	50.6	40.85
1925	"	53.4	38.71
1926	"	51.6	40.06
1927	"	49.3	41.93
1928	"	50.0	41.34
1929	"	49.1	42.10
1930	"	44.6	46.35
1931	"	37.6	54.97
1932	"	33.6	61.52
	Average of Market and Official Prices		
1933	26.44	34.0	77.76
1934	34.94	38.6	90.52
	Official Price		
1935	35.00	41.3	84.75
1936	"	41.7	83.93
1937	"	44.5	78.65
1938	"	40.5	86.42
1939	"	39.8	87.94
1940	"	40.5	86.42
1941	"	45.1	77.61
1942	"	50.9	68.76
1943	"	53.6	65.30
1944	"	53.6	65.30
1945	"	54.6	64.10
1946	"	62.3	56.18
1947	"	76.5	45.75
1948	"	82.8	42.27
1949	"	78.7	44.47
1950	"	81.8	42.79

(continued)

Table SC-16 (concluded)

	Price of Gold Per Ounce in U.S. Dollars (1)	Wholesale Price Index 1967 = 100 (2)	Real Price of Gold (1) ÷ (2) (3)
1951	35.00	91.1	38.42
1952	"	88.6	39.50
1953	"	87.4	40.05
1954	"	87.6	39.95
1955	"	87.8	39.86
1956	"	90.7	38.59
1957	"	93.3	37.51
1958	"	94.6	37.00
1959	"	94.8	36.92
1960	"	94.9	36.88
1961	"	94.5	37.04
1962	"	94.8	36.92
1963	"	94.5	37.04
1964	"	94.7	36.96
1965	"	96.6	36.23
1966	"	99.8	35.07
1967	"	100.0	35.00
	Average of Official and Market Prices		
1968	38.64	102.5	37.70
	Market Price		
1969	41.12	106.5	38.61
1970	35.94	110.4	32.55
1971	40.81	113.9	35.83
1972	58.16	119.1	48.83
1973	97.32	134.7	72.25
1974	159.26	160.1	99.48
1975	160.90	174.9	92.00
1976	124.84	183.0	68.22
1977	148.11	194.2	76.27
1978	193.36	209.3	92.38
1979	307.82	235.6	130.65
1980	613.67	268.6	228.44

Source, by Column

1. 1800-1833: Coinage Act of April 2, 1792, which set weight of gold dollar at 24.75 grains of fine gold. 480/24.75 equals $19.39 per ounce.

1834-1836: Coinage Act of June 28, 1834, which set weight of gold dollar at 23.2 grains of fine gold. 480/23.2 equals $20.69 per ounce. For 1834, average of $19.39 for the first half of 1834 and of $20.69 for the second half of the year is $20.05.

1837-1861; 1870-1932: Coinage Act of January 18, 1837, which set weight of gold dollar at 23.22 grains of fine gold. 480/23.22 equals $20.67 per ounce.

1862-1878: $20.67 times the premium on gold, in Wesley C. Mitchell, Gold, Prices, and Wages Under the Greenback Standard, University of California Press, 1908, p. 310.

1933: Average of monthly figures in G.F. Warren and F.A. Pearson, World Prices and the Building Industry, John Wiley, 1937, p. 179.

1934-1967: For 1934, average of January figure in source for 1933 and of $35 for other months, the price derived from the Gold Reserve Act of January 31, 1934, which set weight of gold dollar at 13.71 grains of fine gold.

1968-1979: Annual averages of monthly figures in J. Aron & Company, Gold Statistics and Analysis, December 1979-January 1980, p. 76. For 1968-1969, the prices quoted are averages of the A.M. and P.M. London price fixings; for 1970-1974, P.M. fixings only; for 1975-1979, spot COMEX prices.

1980: Annual average of daily figures in Data Resources Incorporated datatape. The prices quoted are P.M. London price fixings.

Source (continued)

2. 1800-1899: U.S. Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part 1, Series E-52, pp. 202-203, shifted from 1910-14 to 1967 base.

1800-1960: ibid., Series E-23, p. 199.

1971-1979: U.S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics, December 1980, Bulletin 2070, Table 140, p. 334.

1980: Survey of Current Business, August 1981, p. S-7, producer prices, all commodities.

Table SC - 17

London Prices of Gold, Monthly, 1968 - 1981

(dollars per fine troy ounce)

	1968	1969	1970	1971	1972	1973	1974
January	35.200	42.300	34.942	37.874	45.751	65.139	129.191
February	35.200	42.600	34.994	38.744	48.263	74.198	150.233
March	35.200	43.200	35.086	38.871	48.327	84.372	168.421
April	37.900	43.300	35.619	39.014	49.030	90.496	172.235
May	40.700	43.460	35.950	40.516	54.618	101.959	163.268
June	41.100	41.435	35.435	40.102	62.092	120.119	154.100
July	39.500	41.759	35.321	40.952	65.665	120.166	142.978
August	39.200	41.088	35.380	42.728	67.034	106.761	154.638
September	40.200	40.873	36.193	42.022	65.465	102.970	151.762
October	39.200	40.441	37.518	42.504	64.864	100.077	158.776
November	39.800	37.404	37.440	42.858	62.912	94.916	181.655
December	41.100	35.170	37.435	43.484	63.909	106.719	183.850

	1975	1976	1977	1978	1979	1980	1981
January	176.268	131.488	132.264	173.179	227.270	675.309	557.388
February	179.590	131.070	136.299	178.155	245.670	665.321	499.763
March	178.158	132.578	148.228	183.662	242.048	553.581	498.761
April	169.843	127.940	149.166	175.275	239.161	517.410	495.800
May	167.390	126.935	146.605	176.307	257.617	513.820	479.697
June	164.238	125.709	140.778	183.752	279.067	600.717	464.761
July	165.165	117.755	143.393	188.726	294.736	644.283	409.284
August	162.998	109.929	144.950	206.300	300.818	627.148	410.158
September	144.593	114.145	149.524	212.076	355.115	673.625	443.580
October	142.757	116.143	158.860	227.393	391.657	661.148	437.755
November	142.565	130.464	162.100	206.073	391.993	623.463	413.369
December	139.303	133.878	160.450	207.834	455.084	594.921	---

Source: J. Aron & Company, Gold Statistics and Analysis (Dec. 1981/Jan. 1982), p. 81.

Note: Average afternoon prices set by London bullion dealers.