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CHAPTER 3

World War II Inflation, September 1939–August 1948

THE OUTBREAK of war in Europe in September 1939 ushered in a period of inflation comparable to the inflations which accompanied the Civil War and World War I, though more protracted than either. By the postwar price peak nine years later (August 1948), wholesale prices had more than doubled, the implicit price deflator had somewhat less than doubled, the stock of money had nearly tripled, and money income had multiplied more than two-and-a-half-fold (see Chart 45). As this comparison indicates, velocity on net fell over the period. After an initial rise to 1942, it fell sharply to 1946 and then rose mildly to 1948. According to annual data, wholesale prices rose at the average rate of 8.2 per cent per year; the implicit price deflator, 6.5 per cent per year; the stock of money, 12.3 per cent per year; money income, 10.7 per cent per year; real income, 4.2 per cent per year; and velocity fell at the average rate of 1.7 per cent per year.[1] Substantial though these rates of change are, the rate of rise in the money stock was slightly lower than in World War I and about half the rate in the Civil War; the rate of rise in prices was less than three-fifths the rate in World War I and only one-third that in the Civil War.[2]

As in World War I, wholesale prices jumped on the outbreak of war, then stayed roughly constant for about a year before resuming their

[1] Paralleling World War I figures, our income figures for 1942–45 are modifications of Kuznets' estimates on the basis of Kendrick's "national security version" of net national product (see Chap. 5, footnote 16).

[2] For prices and money stock, the comparison between the three wars is as follows:

	World War II	*World War I*	*Civil War*
Start of war	Sept. 1939–[a]	July 1914–[b]	April 1861–
Price peak	Aug. 1948	May 1920	Jan. 1865
	RATE OF RISE, PER CENT PER YEAR		
Money stock	12.1	12.9	24.0[c]
Wholesale prices	8.7	15.3	24.5

[a] Measured from Aug. 1939, see Table 23.

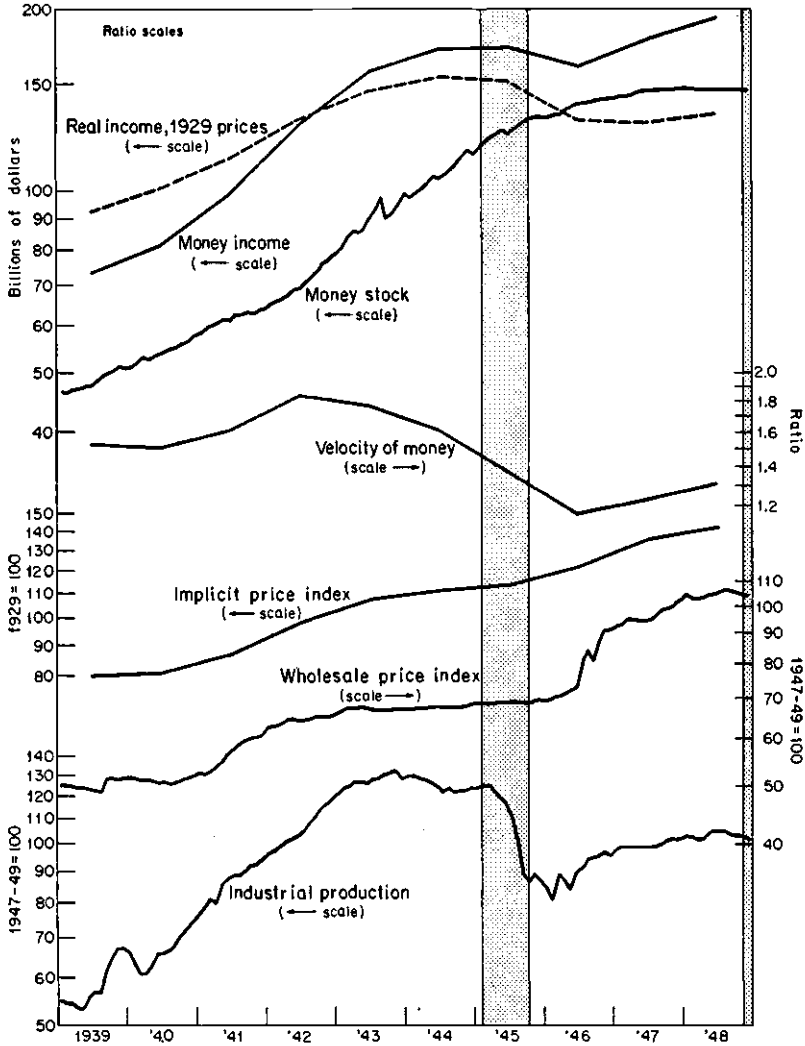
[b] Measured from June 1914, see Table 16.

[c] From June 1861 through fiscal year ending June 1865. Data for those years are from Milton Friedman, "Price, Income, and Monetary Changes in Three Wartime Periods," *American Economic Review*, May 1952, p. 624.

These figures for World War II differ from those given in the text, because they are derived from monthly rather than annual data.

CHART 45

Money Stock, Income, Prices, and Velocity, and Industrial Production, in Reference Cycle Expansions and Contractions, 1939–48



NOTE: Shaded areas represent business contractions; unshaded areas, business expansions.
SOURCE: Industrial production, same as for Chart 16. Other data, same as for Chart 62.

upward movement. As in World War I also, prices rose more rapidly before and after involvement than during the United States' active participation in the war, at least as judged from the available indexes. Again as in World War I, the sources of the rise in the stock of money were quite different in the three periods just distinguished: the period of U.S. neutrality, the period of our active participation in the war, and the postwar period. Table 23 records the changes in prices and the stock of money during those periods and the factors accounting for the changes in the stock of money.

1. *U.S. Neutrality, September 1939–November 1941*

Politically, the period of U.S. neutrality was clearly demarcated. Economically, it was not. During its early months—the so-called "phony war" period—the war had little impact on the U.S. economy. After a brief speculative movement in the final quarter of 1939, production, employment, and personal income in general declined until May 1940. The Nazi attack on the Low Countries and the subsequent fall of France brought a dramatic reversal. Britain and her remaining allies started placing large-scale orders for war material in the United States. As we saw earlier, there was a sharp increase in mid-1940 in the rate of flow of gold to the United States, as gold was shipped to pay for war material. The United States simultaneously embarked on a greatly expanded defense program. Those developments spurred a rapid expansion in industrial production, employment, and personal income. Because of the large absolute amount of unemployment and unused industrial capacity, wholesale prices at first remained stable, starting to rise only in the fall of 1940. Economically, therefore, the beginning of the war for the United States as a neutral might better be dated in the month when its effects first began to be felt—say, May 1940.

To mark the close of that phase and the active involvement of the United States in the war, the month when lend-lease began, March 1941, is probably a better date than early December when war was declared against Germany and Japan. Before lend-lease, Britain paid for war purchases by transferring over $2 billion in gold, drawing down British dollar balances by $235 million, and selling $335 million in U.S. securities —the last two requisitioned in large part by the British government from British subjects.[3] Thereafter, the U.S. government paid for much of the war material, nominally in return for services rendered in exchange to the United States. Lend-lease, under which some $50 billion was spent by the end of the war, was the counterpart in World War II of U.S.

[3] See *International Transactions of the United States During the War, 1940–1945,* Economic Series No. 65, Office of Business Economics, Dept. of Commerce, 1948, pp. 112–115. The figures cited cover the period Sept. 1939–Dec. 1940.

TABLE 23

CHANGES IN PRICES AND IN STOCK OF MONEY, AND SOURCE OF CHANGES IN STOCK OF MONEY, DURING THREE SEGMENTS OF THE PERIOD AUGUST 1939–AUGUST 1948

	SEGMENT					
	U.S. Neutrality Aug. 1939 Through Nov. 1941	*War or Wartime Deficits* Nov. 1941 Through Aug. 1945	Nov. 1941 Through Jan. 1946	*To Postwar Price Peak* Aug. 1945 Through Aug. 1948	Jan. 1946 Through Aug. 1948	*Period as a Whole* Aug. 1939 Through Aug. 1948
Number of months	27	45	50	36	31	108
Percentage change in:						
1. Wholesale prices	23	14	16	55	53	118
2. Stock of money	29	102	107	14	11	197
3. High-powered money	29	80	83	7	5	149
Per cent change per year in:						
4. Wholesale prices	9	4	4	15	16	9
5. Stock of money	11	19	18	4	4	12
6. High-powered money	11	16	15	2	2	10
Fraction of change in stock of money (total change = 1.00) attributable to change in:						
7. High-powered money	0.99	0.84	0.83	0.53	0.49	0.84
8. Ratio of commercial bank deposits to vault cash plus deposits at Federal Reserve Banks	0.16	0.39	0.38	0.01	−0.02	0.31
9. Ratio of commercial bank deposits to currency held by the public	−0.15	−0.15	−0.14	0.46	0.52	−0.09
10. Interaction of ratios	−0.01	−0.07	−0.07	0	0	−0.05

Fraction of change in high-powered money (total change = 1.00) consisting of change in:						
11. Monetary gold stock	1.15	−0.14	−0.14	1.15	1.58	0.26
12. F.R. claims on the public and banks	0.02	0.04	0.03	0	0.03	0.03
13. Other physical assets and fiat of monetary authorities	−0.17	1.10	1.11	−0.15	−0.61	0.71

NOTE: Because of rounding, components may not always add to 1.00.

SOURCE, BY LINE

1, 4. *Continuation of Historical Statistics*, pp. 47, 78.

2–3, 5–13. Same as for corresponding lines of Table 10, except that original data for lines 11–12 from 1942 on are from *Federal Reserve Bulletin*. Result in lines 11–13 is the same whether or not the gold stock is adjusted approximately to cost by subtracting the cumulated devaluation profit.

loans to its allies in World War I. Within a month after the enactment of lend-lease, the rapid rise in the gold stock that began in 1938 and accelerated after the fall of France came to an end.

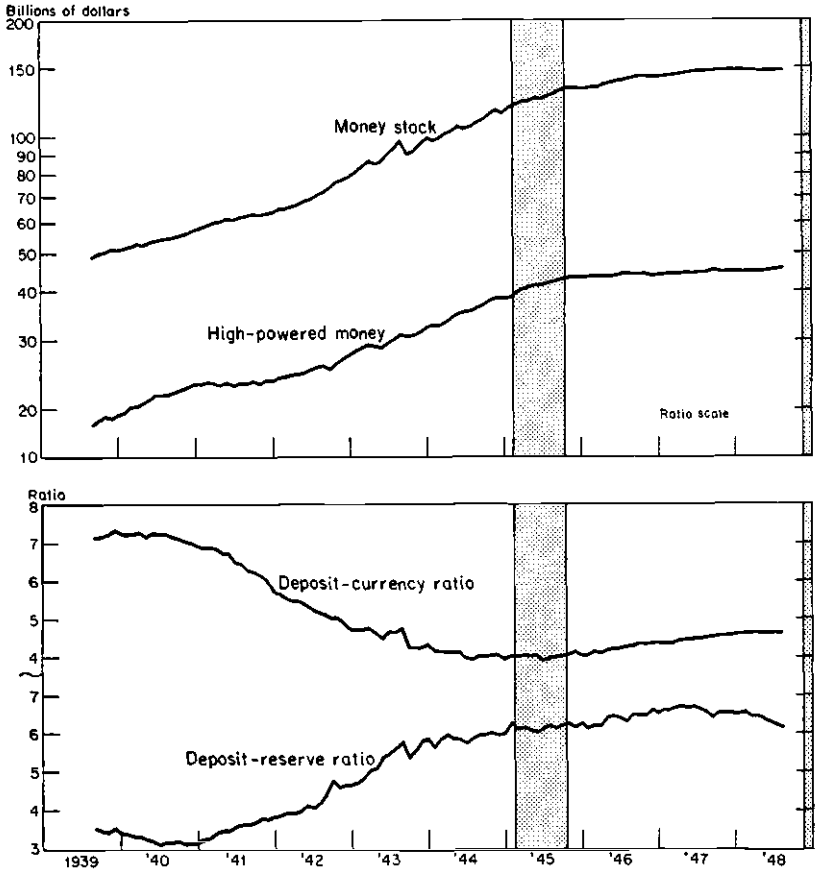
Whichever pair of dates is used—whether August 1939, just before the outbreak of war in Europe, through November 1941, just before Pearl Harbor (the dates used in Table .23) or those just suggested of May 1940 through March 1941—the growth of the money stock during the period of U.S. neutrality was attributable entirely to the concomitant growth of the gold stock (see Table 23, lines 7 and 11, for the first pair of dates). The gold stock played the same role between those dates as it did during the period of neutrality in World War I, when about 80 per cent of the increase in the stock of money was attributable to the increase in the gold stock. During the neutrality period in World War II, the stock of money grew by 29 per cent, high-powered money by the same percentage, and the increase in high-powered money was less than in the gold stock, the difference being absorbed by a decline in the sum of Federal Reserve Bank private claims and the fiat of the monetary authorities.

A rise in the ratio of commercial bank deposits to reserves, as banks reduced their excess reserves, tended to increase the money stock but was about offset by a concomitant decline in the ratio of deposits to currency (Chart 46 and Table 23). These deposit ratios were to continue to move in opposite directions throughout the war, just as they had during most of World War I.

In the World War I neutrality period, the Federal Reserve System had been powerless to offset the effects of the gold inflow, since it possessed no earning assets to sell. In the World War II period, the Federal Reserve was in a much stronger technical position. It had a portfolio of over $2 billion of government securities which it could have sold at will. True, even the sale of its whole portfolio would have offset less than half the gold inflow from August 1939 to November 1941. However, the Treasury could have offset the rest—or indeed the whole or more than the whole—of the gold inflow by sterilization operations like those it had conducted in late 1936 and early 1937, when it sold securities and used the proceeds to pay for gold rather than printing gold certificates to do so. Between them, therefore, the Treasury and the Federal Reserve were technically in a position to control the changes in high-powered money (see Chart 47 for the breakdown of high-powered money, by assets and liabilities of the monetary authorities).

The behavior of prices gave reason to be concerned with the growth of the money stock. From August 1939 to November 1941, wholesale prices rose 23 per cent, or at the rate of 9 per cent per year and, as we have seen, nearly the whole of the increase occurred in the final fifteen months of

CHART 46
The Stock of Money and Its Proximate Determinants, Monthly, August 1939–August 1948



NOTE: Shaded areas represent business contractions; unshaded areas, business expansions.
SOURCE: Tables A-1 (col. 8) and B-3.

the period, when wholesale prices rose nearly 20 per cent and the stock of money over 16 per cent. Yet, as is clear from Chart 49, below, the Federal Reserve engaged in no extensive open market operations. In the three weeks after the outbreak of war in September 1939, it purchased some $400 million of government securities to offset a sharp drop in the prices of U.S. government bonds.[4] These were sold off in the next few

[4] These operations were regarded by the Board as a departure from past practice,

months so that, by the turn of the year, the System's holdings of government securities were at their prewar level. Further sales of about $300 million were made from June to December 1940; thereafter, the System's holdings of government securities were kept rigid until the United States entered the war. The System thus largely continued the policy with respect to open market operations and gold inflows that it had followed since 1933.

During the period of neutrality, the Treasury, like the Reserve System, undertook no operations to offset the gold inflow. Its weekly balances in cash and Federal Reserve deposits fluctuated considerably, from a minimum of about $2.4 billion to a maximum of about $3.4 billion. The billion-dollar range was nearly half again as wide as the range in Federal Reserve credit outstanding, so that Treasury operations were a more important factor affecting the money stock than Federal Reserve open market operations. But the fluctuations in Treasury balances were not undertaken for reasons of monetary policy and show no systematic connection with monetary factors. They were simply a largely unintended result of fluctuations in expenditures and tax receipts and of the flotation and retirement of securities.

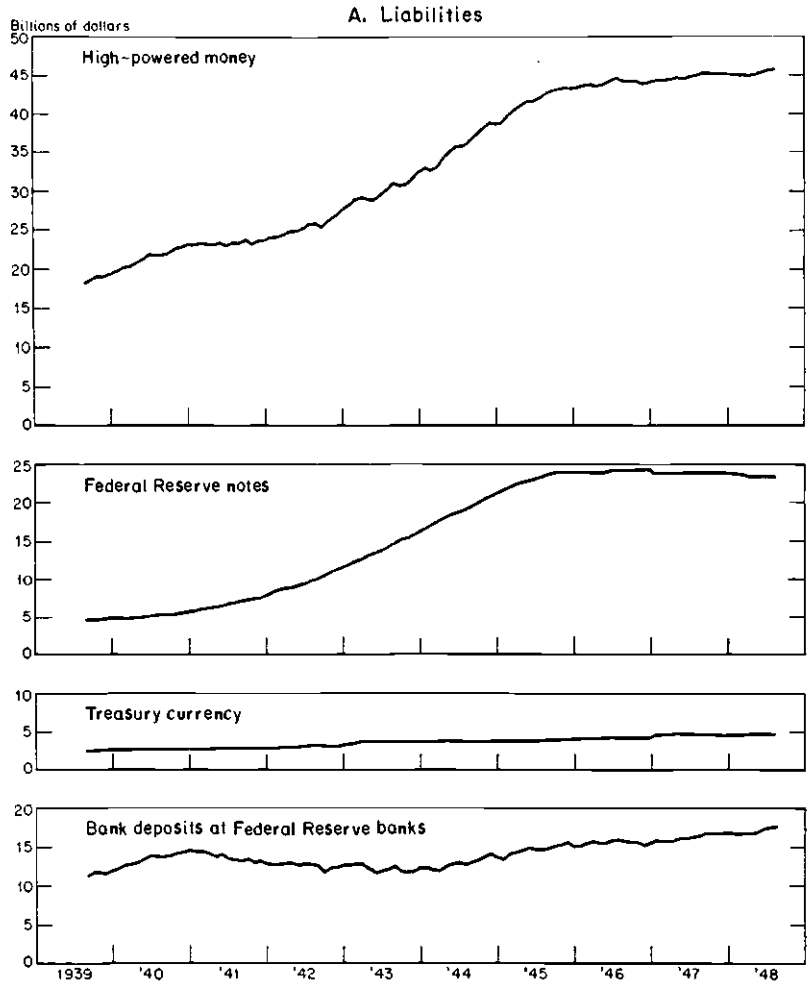
In response to the rapid rise in prices and the stock of money, the Federal Reserve took two actions in addition to the open market sales in the latter half of 1940. Both were taken near the end of the period of neutrality and both, in line with the general policy of the thirties, involved use of new instruments of control.

On September 1, 1941, under authority of the President's executive order of August 9, 1941, the Board imposed controls on consumer credit, prescribing in Regulation W minimum down payments and maximum maturities applicable to consumer credit extended through instalment sales of certain listed articles. Because consumer durable goods shortly

since their object was not to affect the volume of member bank reserves and indebtedness. The operations were justified on two grounds: (1) their influence directly on the prices and yields of government obligations and indirectly on the prices and yields of corporate bonds, and hence on general economic recovery; (2) the importance of safeguarding the enlarged member bank portfolio of government securities from "unnecessarily wide and violent fluctuations in price" (Board of Governors of the Federal Reserve System, *Annual Report,* 1939, pp. 5–6). The first reference to maintaining "orderly market conditions" was made in the *Annual Report*, 1937, pp. 6–7, concerning Federal Reserve purchases in Apr. 1937, though, as pointed out in Chap. 9, concern with maintaining an "orderly market" dated from not later than 1935. Two important differences between the early enunciation of the policy of maintaining an orderly market for government securities and its later wartime character are evident: (1) in 1939, the professed aims were to protect member bank portfolios, not Treasury interests as a borrower, and to assure an orderly capital market as a condition of general economic recovery; (2) in 1939, a rigid system of support prices was not yet contemplated, but only the degree of support that would prevent wide fluctuations in the prices of government securities.

CHART 47

High-Powered Money, by Assets and Liabilities of the Treasury and Federal Reserve Banks, 1939–48

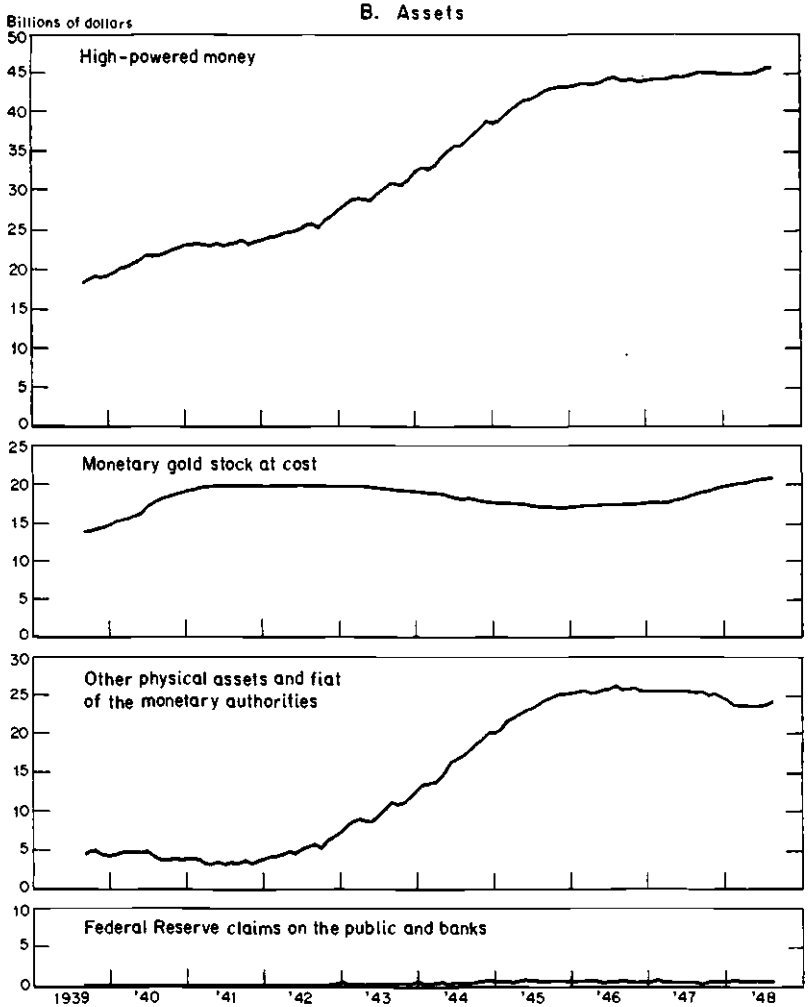


NOTE: Federal Reserve notes and Treasury currency are outside the Treasury and Federal Reserve Banks. Between $40 million and $65 million of gold certificates recalled but not turned in are included in high-powered money but not shown in its components viewed as liabilities.

SOURCE: Chart 39 was extended, using *Federal Reserve Bulletin* for Federal Reserve credit outstanding and monetary gold stock, and *Annual Report* of the Secretary of the Treasury, 1942–49, for the devaluation profit.

CHART 47 (Concluded)

B. Assets



became unavailable for the duration of the war, the volume of consumer credit fell rapidly after Pearl Harbor. Consumer credit control was, in consequence, of little significance during the war. It is worth note, first, because it represented an extension to a new area of the principle, initially applied to security loans, of controlling specific types of credit, and second, because it was destined to play a somewhat more important role after the war.

The Board's other measure was to raise reserve requirements on November 1, 1941, to the maximum limit permitted by law, thereby rescinding the reduction made in April 1938. That measure converted $1.2 billion of the then extant $4.7 billion of excess reserves into required reserves.[5] A sign of the changed attitudes of banks is that they made no attempt to rebuild their excess reserves, as they had after the reserve increases of 1936 and 1937, but rather proceeded to continue to reduce their remaining excess reserves. The effect of the reserve requirement increase shows up only in a slackened rate of rise of the deposit-reserve ratio from October—immediately following the announcement on September 23 of the forthcoming rise—to roughly April 1942, when the Federal Reserve announced that it would peg the rate on Treasury bills. The ratio then started to rise at an even faster rate than before the reserve requirement increase. It is ironic that the increase, presumably intended to "tighten" monetary conditions and to restrain the expansion of bank liabilities, did so only to a minor extent, whereas the earlier increase, intended as a precautionary move and designed to have no immediate impact, had exercised a sharp restraining influence.

2. *Period of Wartime Deficits, December 1941–January 1946*

The expanded defense program initiated in 1940 and lend-lease initiated in early 1941 produced a substantial increase in government expenditures. These were offset for a time by a rise in tax rates and tax revenues. By early 1941, however, the deficit had begun to rise sharply. For calendar 1941, cash operating outgo exceeded cash operating income by $10 billion or nearly half of total expenditures.[6] Pearl Harbor brought a sharp intensification of these tendencies. Government expenditures nearly tripled from calendar 1941 to calendar 1942, and rose a further 50 per cent from 1942 to 1943, reaching a peak of nearly $95 billion in 1944. Tax re-

[5] Concern over the volume of excess reserves was expressed in a special report to the Congress dated Dec. 31, 1940, made jointly by the Board of Governors, the presidents of the Federal Reserve Banks, and the Federal Advisory Council (*Federal Reserve Bulletin*, Jan. 1941, pp. 1–2). Among other points in the program it presented, the report requested the Congress to increase the minimum statutory reserve requirements to the maximum defined in the Banking Act of 1935 and to permit the Federal Open Market Committee (not the Board of Governors) to increase requirements to double the new minimum.

The reader is reminded that, for the period after 1940, we have not had access to internal documents of the Federal Reserve System like those in the Harrison Papers, or to an insider's running account like the Hamlin Diary. Hence, our discussion of Federal Reserve policy is less informed in detail than for earlier years and it is not as well documented. The Reserve System could perform a service to students of the period by making such documents available.

[6] The cash deficit or surplus differs from the budget deficit or surplus in consolidating the accounts of the social security and other trust funds with those of other government agencies. It therefore gives a more satisfactory index for our purposes of the impact of government operations on the rest of the economy.

ceipts also rose but more slowly and in no greater ratio. As a result, the cash deficit rose to levels without precedent, either in absolute amount or as a percentage of national income: to nearly $40 billion in calendar 1942, over $50 billion in 1943, over $45 billion in 1944, and over $35 billion in 1945—sums averaging nearly 30 per cent of the contemporary net national product. Government expenditures fell rapidly after the end of hostilities while tax revenues remained high. As in World War I, within six months after the end of the war the government was taking in more than it was paying out, so that the period of wartime deficits came to an end about January 1946.

As in World War I, those changes involved a continuation and intensification of trends already in process. The transfer of economic resources from peace to war production had been going on apace since early 1940. On the physical side, intensification of trends was undoubtedly much sharper in World War II than in World War I. The period of neutrality was longer in World War I than in World War II and that of active hostilities shorter; and World War II saw a far more complete conversion to a "total war" economy than World War I did. On the financial side, the situation was reversed. Thanks to lend-lease, active war meant less of a change in the source of finance for war activity in World War II than it had in World War I.

PRICE MOVEMENTS

As in World War I, also, our entry into active war was rather surprisingly accompanied by a slowing down of the rate of rise in the available price indexes, while the termination of wartime deficits was accompanied by a sharp speeding up. As Table 23 shows, the wholesale price index rose at the rate of 4 per cent a year during the period of wartime deficits, compared with 9 per cent in the prior period and 16 per cent in the succeeding period. These figures are less reliable indicators of the behavior of prices in World War II than the corresponding figures are for World War I. General price control was instituted in early 1942 and suspended in mid-1946. During the period of price control, there was a strong tendency for price increases to take a concealed form, such as a change in quality or in the services rendered along with the sale of a commodity or the elimination of discounts on sales or the concentration of production on lines that happened to have relatively favorable price ceilings. Moreover, where price control was effective, "shortages" developed, in some cases—such as gasoline, meats, and a few other foods—accompanied by explicit government rationing. The resulting pressure on consumers to substitute less desirable but available qualities and items for more desirable but unavailable qualities and items was equivalent to a price increase not recorded in the indexes. Finally, there was un-

doubtedly much legal avoidance and illegal evasion of the price controls through a variety of devices of which the explicit "black market" was perhaps the least important. The result was that "prices," in any economically meaningful sense, rose by decidedly more than the "price index" during the period of price control. The jump in the price index on the elimination of price control in 1946 did not involve any corresponding jump in "prices"; rather, it reflected largely the unveiling of price increases that had occurred earlier. Allowance for the defects in the price index as a measure of price change would undoubtedly yield a decidedly higher rate of price rise during the war and a decidedly lower rate after the war than those recorded in Table 23, and hence a substantially smaller difference between the rate of price rise during the war and before and after. It seems unlikely, however, that allowance for these defects would reverse the qualitative conclusion that prices rose more slowly during the war than before or after.

In World War I, differences in the rate of price change were accompanied by corresponding differences in the rate of change of the stock of money: the stock of money also rose less rapidly during the war than before or after. In World War II, the reverse occurred: the stock of money rose much more rapidly during the war than before or after. This is the counterpart of the decline in velocity, 1942–46, and its subsequent rise—just the opposite of the behavior of velocity in 1917–18 and after.

BEHAVIOR OF VELOCITY

It is by no means clear what factors explain the behavior of velocity in World War II. Velocity rose by a fifth from 1940 to 1942—or slightly less than from 1915 to 1918—then declined by over a third to 1946. From 1946 to 1948 it rose by 13 per cent, to a level still much lower than in 1939 (see Chart 45). Quarterly data on national income and monthly data on personal income suggest that velocity reached its peak in the fourth quarter of 1942 and its trough in the final quarter of 1945 or the first quarter of 1946.

The initial rise in velocity is not surprising. Velocity, as measured, generally rises during economic expansions and falls during economic contractions. The expansion from 1940 to 1942 was vigorous and after mid-1940 was accompanied by sharp price increases which might be expected to discourage the holding of assets in the form of money.

What needs explanation is the decline in velocity after 1942. Price control inhibited increases in prices after early 1942 and kept many increases that did occur from showing up in the price index. It might be argued that the cessation of the rise in the index removed the incentive, provided by the prior price increase, to economize on the holding of money. But even if it were granted that the price index properly recorded

the price movements that determined the amount of money balances the community desired to hold relative to its income, the cessation of the price rise could hardly account for more than a return of velocity to, say, the 1940 level. It could not account for the fall of velocity well below that level. Even to regard it as responsible for reducing velocity to the 1940 level would grossly overestimate its effect, since that would assume full adjustment of velocity to the prior rate of rise of prices, whereas the evidence of earlier chapters suggests that the adjustment of velocity to changes in the rate of change in prices is slow and tardy.

It seems likely that any direct effect of price control was less important than the unavailability to consumers of automobiles and other consumer durable goods, after wartime cessation of their production in 1942,[7] and than the restrictions imposed on construction and on private capital formation. Both consumers and business enterprises were prevented from using their funds to purchase kinds of goods they regard as increasing their wealth, which ordinarily absorb a large fraction of increases in income and an especially large fraction of transitory increases. The blocking of these channels of spending induced consumers and business enterprises to increase the stock of other assets—in particular, as it turned out, money and government securities—to a much higher level than otherwise, relative to income.

The counterpart on income account of the accumulation of liquid assets was an unprecedentedly high level of personal saving. Personal saving would have been large in any event because of the abnormally high level of income associated with full employment and the war boom. But saving was much larger than can readily be accounted for by income alone. One important reason is that consumers accumulated in the form of liquid assets funds that they would otherwise have spent or have tried to spend on automobiles, other durable goods, and residential construction. The recurrent bond campaigns with their appeal to patriotism may have contributed also to the high rate of saving, but we are inclined to be skeptical that they had much effect on the amount of saving. If they had any effect, it was probably on the form in which savings were held—more in government securities relative to other assets. Insofar as one of the alternatives was money, the bond campaigns tended to make the decline in velocity less than it otherwise would have been.[8]

[7] Limitation (L-) orders were first issued in the summer of 1941 by the Supply, Priority, and Allocations Board, a predecessor of the War Production Board, restricting the output of finished products and eventually prohibiting production for civilian use of automobiles, trucks, refrigerators, washing machines, electric appliances, etc. Prohibition of nonmilitary automobile production took effect Feb. 1, 1942, and of many other consumer durables by Sept. 1942.

[8] To avoid misunderstanding, it should perhaps be noted that the statements in the text are not intended to be a full analysis of the factors accounting for the high level of wartime savings. Numerous other factors doubtless played a role. See "A

Both money and government securities, of course, were fixed in value in nominal terms and so would have been poor forms in which to hold wealth if their holders had expected them to depreciate sharply in their command over real goods. Two points are relevant in this connection. First, the assets were being held to exercise command at a later time over particular kinds of goods—on the interpretation suggested above, especially over durable goods not currently available. It was entirely reasonable for the public to expect the prices of these goods to decline—in a formal sense, they had to, since their current prices were effectively infinite. And that expectation was reinforced by the sharp rise in the price of second-hand items of this kind. With respect to these goods, money holdings could be expected to be worth more after the war. Second, almost certainly the most widely-held expectation at the time was that prices would go down after the war—if this expectation seems unreasonable to us, it is only by hindsight. Memory of the sharp price decline after World War I was reinforced by the climate of opinion formed by the depressed 1930's and both were further strengthened by much-publicized predictions of "experts" that war's end would be followed by a major economic collapse.

These expectations about the postwar period were important not only because of their implications for the form in which savings were held but also because expectations of great instability in the near future enhanced the importance attached to accumulating money and other liquid assets. The expected price change meant that those assets would yield more than they would otherwise; the expected instability, that they were more desirable for any given yield. Both, therefore, worked in the direction of reducing velocity and hence also the price rise associated with any given increase in the stock of money. (See Chapter 12 for a fuller analysis of velocity and of the role of expectations about the degree of future economic instability.)

World War I differed markedly from World War II with respect to both the availability of goods and expectations about the postwar behavior of prices and income. "Shortages" and "controls" in World War I were nowhere nearly so sweeping as in World War II, and no major branch of civilian production suspended output entirely. World War I came after nearly two decades of generally rising prices, when the climate of opinion was characterized by belief in unlimited future potentialities rather than by fear of secular stagnation.

Once the war was over in 1945 and durable goods gradually became

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National Survey of Liquid Assets Distribution According to Income," *Federal Reserve Bulletin*, July 1946, pp. 716–722; Michael Sapir, "Review of Economic Forecasts for the Transition Period," *Studies in Income and Wealth*, Vol. 11, New York, National Bureau of Economic Research, 1949, pp. 312–314; Lenore A. Epstein, "Consumers' Taxable Assets," *ibid.*, Vol. 12, 1950, pp. 440–453.

available again, holders of the accumulated assets tried to use them to purchase such goods. The attempt to use the accumulated assets tended to raise prices and incomes and to reduce the ratio of such assets to income. It is therefore entirely consistent with the preceding analysis that velocity should have started to rise in early 1946. What is perhaps surprising is that initially it rose so little and then subsequently rose for so long a period, but these puzzles we shall leave for later (section 3, below, and Chapter 12).

The decline in velocity and of course also the accompanying rise in output explain why prices rose so much more slowly than the stock of money during the period of wartime deficits. We turn now to the factors accounting for the rise in the stock of money.

PROXIMATE DETERMINANTS OF THE RISE IN THE MONEY STOCK

As Table 23 shows, the rise in the stock of money during the war was predominantly accounted for—in an arithmetic sense—by the concurrent rise in high-powered money, just as it had been in the period of neutrality. But, precisely paralleling World War I, there was a major difference in the source of the rise in high-powered money. In both war periods, Federal Reserve credit outstanding rather than gold accounted for the rise in high-powered money. The Federal Reserve System again became essentially the bond-selling window of the Treasury and used its monetary powers almost entirely for that purpose.

The Reserve System performed the same role somewhat differently in the two wars. In World War I, the System increased its private claims by discounting member bank bills mostly secured by government obligations; its own holdings of government securities were small throughout. In World War II, discounts were small throughout, and the Federal Reserve increased its credit outstanding by buying government securities. In our terminology, there was an increase in the fiat of the monetary authorities. The common effect was an increase in high-powered money which was distributed between currency and bank reserves—about equally in World War I, about six-sevenths to currency, one-seventh to reserves in World War II. The increment in bank reserves, of course, permitted a multiple expansion of bank deposits. The corresponding growth of commercial bank assets largely took the form of an increase in loans in World War I; of an increase in holdings of government securities in World War II.[9] But again the difference was largely formal. Perhaps half the World War I increase in loans to customers was secured by government obligations; in World War II, the banks purchased the securities directly. Dissatis-

[9] From June 1941 to June 1945, the increase in commercial bank holdings of U.S. government obligations was $64 billion, or 90 per cent of the increase in commercial bank assets over the period. From June 1917 to June 1919 the increase in total loans extended by commercial banks was $4.2 billion, or 44 per cent of the increase in commercial bank assets over the period.

faction with World War I experience led to a shunning of the earlier forms. Similar political and economic pressures led to the adoption of the same substance. Some idea of the magnitudes of those operations is given by the following figures: from November 1941 to January 1946, the government debt outside the U.S. government and the Federal Reserve System grew by $178 billion, of which some $69 billion was acquired by commercial banks; currency held by the public grew by $17 billion; commercial bank deposits, by $52 billion; and Federal Reserve credit outstanding, by $22 billion.

In April 1942, the Federal Open Market Committee announced that it would keep the rate on Treasury bills,[10] mostly 90-day maturities, fixed at ⅜ of one per cent per year by buying or selling any amount offered or demanded at that rate.[11] That rate was kept fixed until the middle of 1947. No such rigid commitment was made for other government securities but an effective pattern was established for them as well—ranging from roughly ⅞ of one per cent for certificates to 0.9 per cent for 13-month notes, 1.5 per cent for 4½-year notes, and 2.5 per cent for long-term bonds.[12] The System bought whatever amount of these securities was

[10] Treasury bills are obligations issued on a discount basis with varying maturities up to 12 months. During the war they were issued weekly, usually for a term of 3 months in denominations from $1,000 to $1,000,000 at maturity.

[11] On Aug. 7, 1942, the Federal Open Market Committee directed the Federal Reserve Banks to give the seller a repurchase option at the same rate for an equal amount of bills of the same maturity, and extended the privilege of sale and repurchase to dealers in securities, corporations, and other holders of liquid funds.

[12] Certificates of indebtedness are Treasury obligations limited by law to a maturity of one year. They are sold at par plus any accrued interest, and interest on them is paid at the time of their maturity. They were offered by the Treasury in Apr. 1942 for the first time since 1934. The term of issue during the period of war deficits was usually 11 to 12 months. As many as ten issues a year were offered, usually as of the first of the month, in denominations from $1,000 to $1,000,000, at a rate, from Nov. 1942 on, of ⅞ of one per cent. Maturing issues were usually refunded into new issues of certificates of indebtedness or occasionally into 13-month notes to prevent two issues from maturing on the same date.

Treasury notes are obligations with maturity of more than one year and not over 5 years. They are sold at par plus any accrued interest. Interest rates on them during the war ranged from about 0.90 per cent on 13-month maturities to 1.25 per cent on those maturing in about 3 years, and to 1.5 per cent on those maturing in 4½ years. During the period of war deficits there were seven issues of Treasury notes exclusive of 13-month notes, which the market treats like certificates.

Treasury marketable bonds have maturities of more than 5 years. Maturities of most bonds offered during the war ranged from 10 to 25 years. They were sold at par plus any accrued interest, the interest rate varying with their maturity as shown in the tabulation.

Maturity of Bonds	*Callable by Treasury* (years)	*Coupon Rate* (per cent)
10	8	2
15	12	2¼
25	20	2½

necessary to prevent their yields from rising but did not commit itself to sell them freely in order to prevent yields from falling. The relatively fixed pattern of rates on government securities was the counterpart in World War II of the relatively fixed discount rate in World War I.

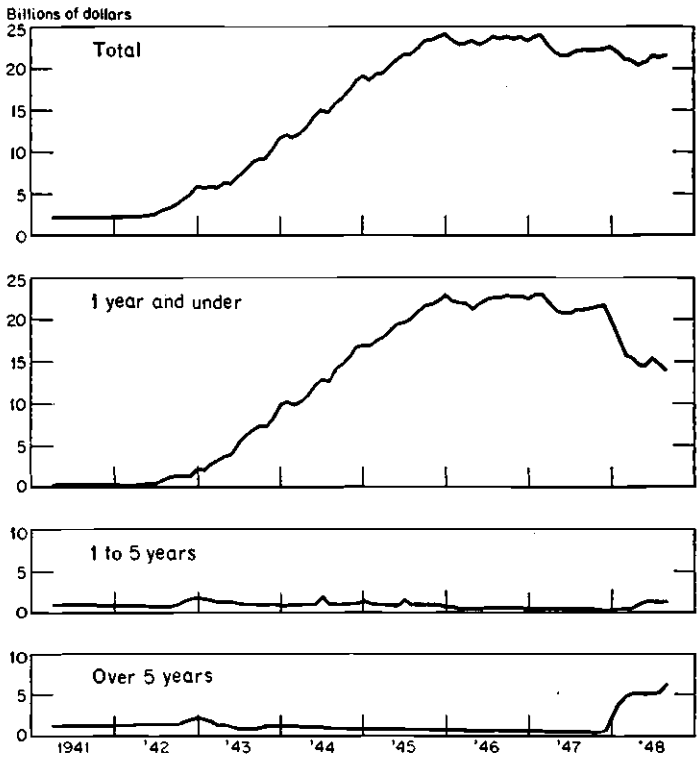
The support program converted all securities into the equivalent of money. Since the pattern of rates was carried over from the late thirties and reflected an abnormally high valuation of liquidity, the Reserve Banks tended to acquire bills and, to a smaller extent, certificates and, to a still smaller extent, notes, rather than bonds; and banks to acquire bonds, notes, and certificates, rather than bills. So long as the bill rate was kept absolutely fixed, the pattern of rates for other issues could be maintained only if (1) the Treasury adjusted its issues to provide only the relatively small amount of bills holders desired at those rates; or (2) the Federal Reserve System changed the initial composition of debt instruments issued by the Treasury to the composition holders desired, by buying bills and other securities as they approached a comparable maturity, and by selling bonds. The Treasury was not averse to a decline in long rates and, as the System's bond portfolio declined (by the end of the war, bonds constituted only $1 billion of the System's total government security holdings of $23 billion; see Chart 48), attempts by other holders to get out of short-term securities and into long-term—"playing the pattern of rates," as it was termed—produced a decline in yields on long-term securities beginning in 1944.

In late 1942, the discount rate was lowered to ½ of one per cent on advances secured by short-term government securities (Chart 49). However, that change was of little significance since, if banks held such securities, it was generally cheaper for them to acquire any needed reserves by selling bills yielding ⅜ of one per cent rather than by using them as collateral to borrow at ½ of one per cent. In 1942 also, the System lowered reserve requirements for central reserve city banks.[13]

With government security prices supported, there was no incentive for banks to hold excess reserves. They could satisfy liquidity needs instead by holding income-yielding securities. The reduction in excess reserves, together with the reduction just noted in required reserves, produced a continued increase in the ratio of bank deposits to bank reserves, from not quite 4 to 1 in November 1941 to over 6 to 1 by January 1946. Had there been no change in the deposit-currency ratio, the increase in the deposit-reserve ratio would have made the percentage increase in the stock of money about 1¾ times the percentage increase in high-powered

[13] The initial grant of authority in the Banking Act of 1935 to vary reserve requirements specified a uniform increase or decrease for all central reserve and reserve city banks and a uniform increase or decrease for all country banks. The authority to vary requirements for the central reserve city class separately was granted in July 1942.

CHART 48
Government Securities Held by Federal Reserve Banks, March 1941–August 1948



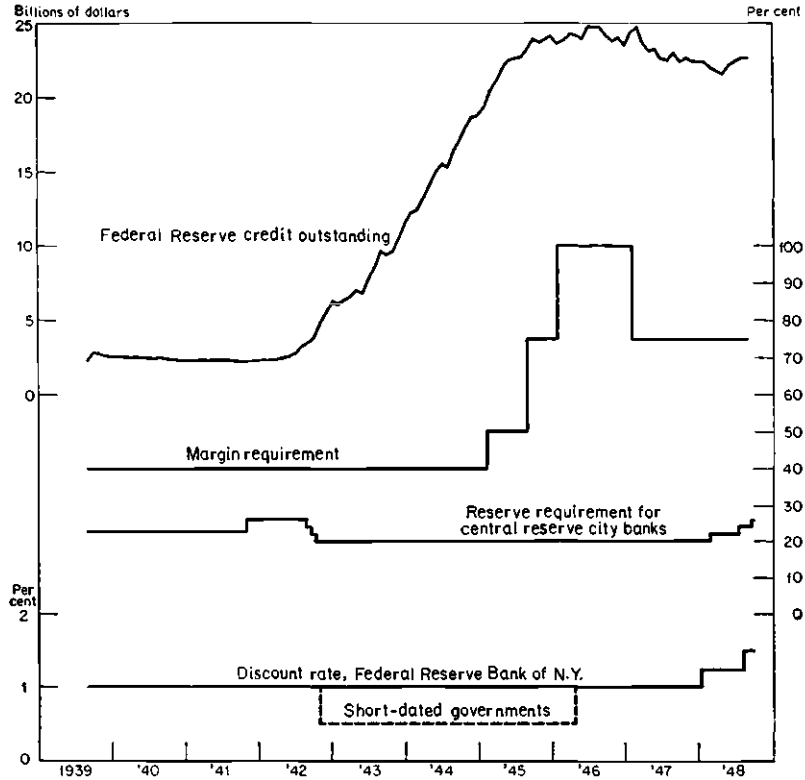
SOURCE: *Federal Reserve Bulletin.*

money. However, about half the excess of that 1¾ over unity was offset by a continued decline in the deposit-currency ratio from 6 to 1 in November 1941 to 4 to 1 in January 1946. In his detailed analysis of the deposit-currency ratio, Cagan has attributed its decline during the war in part to increased use of currency in preference to deposits as a means of avoiding increased income tax levies, in part to black market activities, expansion of the armed forces, and greater mobility of the civilian population.[14]

The direction of movement of both deposit ratios was the same in

[14] See Phillip Cagan's forthcoming volume on determinants and effects of changes in the U.S. money stock, 1875–1955, a National Bureau study.

CHART 49
Use of Tools by Federal Reserve System, August 1939–August 1948



NOTE: Short-dated government securities, for which discount rate is shown, are due or callable in one year or less.

SOURCE: Same as for Chart 41, except that *FRB* is source for 1942–48 data.

World War II as in World War I. However, the relative importance of the changes differed sharply. In World War I, the decline in the deposit-currency ratio was some two to three times as important in its effect on the stock of money as the rise in the deposit-reserve ratio; in World War II, the relative importance was reversed.

The bond drives of World War II placed much emphasis on avoiding the sale of securities to commercial banks on the ground that purchases by banks were "inflationary" in a sense in which purchases by others were not. Certain issues were made ineligible for bank purchase and attempts were made to "tailor" other issues to particular classes of pur-

chasers. At the same time, however, contradictory policies were also followed. The Federal Reserve System encouraged banks to purchase government securities by assurance that it would make reserves available. As stated in its 1942 *Annual Report*, " . . . the Federal Reserve authorities endeavored to induce banks to make more complete use of their existing reserves and also supplied them with such reserve funds as they needed from time to time to purchase the Government securities offered to them."[15] The Treasury, moreover, offered a large percentage of its securities at rates unattractive to nonbank investors.[16]

The attempts to avoid sales to commercial banks—which, partly because of the contradictory policies followed, did not succeed—rested on a misconception based on a failure to distinguish between sales to Reserve Banks and sales to commercial banks. Sales to Reserve Banks created high-powered money. For given deposit-reserve and deposit-currency ratios, each additional dollar of high-powered money meant an increment of several additional dollars of money—the famous multiple expansion. However, for a given level of high-powered money, the identity of the purchasers of securities and, in particular, their identity as commercial banks or others could affect the stock of money only if it affected one of the deposit ratios, and it is hard to see why it should have any appreciable effect on either.[17]

Still more basically, it is necessary to distinguish here, as it was in earlier chapters, between the arithmetic of changes in the money supply, just outlined, and the economics of the changes. Given the monetary policy of supporting a nearly fixed pattern of rates on government securities, the Federal Reserve System had no effective control over the quantity of high-powered money. It had to create whatever quantity was necessary to keep rates at that level. Though it is convenient to describe the process as running from an increase in high-powered money to an increase in the stock of money through deposit-currency and deposit-reserve ratios, the chain of influence in fact ran in the opposite direction —from the increase in the stock of money consistent with the specified pattern of rates and other economic conditions to the increment in high-powered money required to produce that increase. It is an elementary economic truism, applicable to the money market as elsewhere, that one cannot simultaneously control both the price and the quantity of a good without some explicit rationing mechanism. If the price is fixed, the

[15] Board of Governors of the Federal Reserve System, *Annual Report*, 1942, p. 9.

[16] See Clark Warburton, "Monetary Policy in the United States in World War II," *American Journal of Economics and Sociology*, Apr. 1945, pp. 377–389; *idem*, "A Hedge Against Inflation," *Political Science Quarterly*, Mar. 1952, pp. 5–8.

[17] See Friedman, *A Program for Monetary Stability*, New York, Fordham University Press, 1960, pp. 53–55 and 107, footnote 1, for further discussion of the monetary effects of sales of government securities to commercial banks.

quantity must be permitted to be whatever is consistent with that price, and conversely.

Success in avoiding sales to commercial banks could have been achieved by making the securities more attractive to nonbank purchasers by offering them higher returns. That would have involved a change in the pattern of rates pegged and could therefore have had a significant influence. A smaller increase in the total stock of money, and hence in high-powered money, would have been necessary to support the alternative higher pattern of rates than the actual pattern, since the higher rates would have made holding bonds more attractive relative to holding money. One consequence would also have been a higher velocity.

BASIC DETERMINANTS OF THE RISE IN THE MONEY STOCK

Given the pattern of rates supported, what determined the amount of increase in the stock of money? It is difficult enough to answer the question in abstract terms. It is far more difficult to fill in the details or to explain why the magnitudes involved were what they were, and we shall not attempt to do so at all exhaustively. For our purposes, we may regard the physical quantity of resources to be used by government as fixed by other considerations—though, of course, still more basically, the quantity might well have been revised, if it had been associated with a very different level of inflationary pressure. The quantity of resources used by government had to be matched by a corresponding release of resources by the members of the community. They received incomes corresponding to essentially the whole of resources employed, and they had to be persuaded or induced or forced to refrain from exercising command over a fraction of those resources corresponding to the fraction employed by the government. The financial counterpart of the release of resources was the payment of taxes, or the accumulation of claims against the government in the form of either interest-bearing government securities or noninterest-bearing debt of the government, the three together being equal over any period to the expenditures of the government. The increase in the stock of money had to be whatever was necessary to render the sum of the three items equal to the expenditures of the government. Part of the increase in the stock of money took the form of government issue of money, part took the form of whatever increase in privately created money (in that period, bank deposits not matched by an increment in reserves) was necessary to provide the public with the ratio of deposits to currency it desired and the banks with the ratio of deposits to reserves they desired.

It should be emphasized that all these items were being simultaneously determined. What we have taken as fixed was the physical quantity of resources to be used by government, not government expenditures. If

prices (needless to say, as "correctly" measured, not as recorded in a necessarily imperfect index number) were constant during the process, any issue of money would correspond to "voluntary saving." It would mean that the public wished to add that amount to its real assets in the form of the noninterest-bearing obligations we call money.[18] And conversely, prices could remain constant only if the public did wish to add to its real assets in the form of interest- and noninterest-bearing obligations an amount equal to the excess of government expenditures at those prices over tax receipts at those prices. If prices rose during the process, the issue of money would correspond partly to "voluntary saving"—insofar as the real and not only the nominal value of the money stock rose—and partly to a tax on money balances. The nominal increment in the money stock required to keep its real value unchanged can be regarded as vouchers recording the payment of this tax on money balances.[19] In any event, the government could acquire real resources only through either taxation—consisting in part of explicit taxes, in part of an implicit tax on money balances—or borrowing, consisting in part of borrowing in a noninterest-bearing form. The distribution between taxes and borrowing was determined in part by the level of taxes imposed by legislation, in part by the preferences of the public with respect to "voluntary saving."[20]

The major government actions affecting the amount by which the money stock increased were therefore the decisions about how much real resources to devote to the war effort, the level of tax rates enacted, measures affecting voluntary saving, and measures affecting the fraction of their savings individuals wished to use to add to their holdings of money. For the period of war or wartime deficits, over 45 per cent of total federal expenditures were financed by explicit taxes. This was an impressive performance in comparison with that in World War I, but it left a much larger deficit compared with national income because of the

[18] Insofar as the issue of money was in the form of privately created money, the government was in essence sharing its monopoly of the issuance of noninterest-bearing securities with the commercial banks. From the government's point of view, it issued interest-bearing obligations corresponding to that part of the hypothetical "voluntary saving."

[19] Insofar as the issue of money was in the form of privately issued money, the government was in effect sharing the proceeds of the tax on money balances with commercial banks (see Friedman, "Price, Income, and Monetary Changes," pp. 619–625).

[20] For a fuller analysis, see Friedman, "Discussion of the Inflationary Gap," in *Essays in Positive Economics*, University of Chicago Press, 1955, pp. 251–262; also Martin Bailey, "The Welfare Cost of Inflationary Finance," *Journal of Political Economy*, Apr. 1956, pp. 93–110; Armen A. Alchian and Reuben A. Kessel, "Redistribution of Wealth through Inflation," *Science*, Sept. 4, 1959, pp. 537–539; Ralph Turvey, "Inflation as a Tax in World War II," *Journal of Political Economy*, Feb. 1961, pp. 72–73; and Friedman, "Price, Income, and Monetary Changes," *loc. cit.* See also above, Chap. 2, footnote 64, and Chap. 5, footnote 35.

larger magnitude of the war effort. We have already noted that the cessation of production of certain durable goods had the effect of raising voluntary saving. The rationing of other goods and the limited availability of still others may have had a similar effect. Aside from government measures, the widespread fear of a postwar depression worked in the same direction. The pattern of interest rates fixed on government obligations also affected the level of voluntary saving—a higher level of interest rates would have given a greater inducement to save, a lower level, a lesser inducement—but probably had its main effect on the form savings took. It seems not unlikely that the much higher level of rates paid on government securities in World War I than in World War II is one reason the nonbank public increased its holdings of government securities by about three dollars for every one dollar increase in its money stock in World War I and by only half that amount in World War II.

By comparison with World War I, the impressive difference is that despite a much larger war effort, longer continued deficits, and larger deficits relative to national income, prices rose more slowly during World War II than during World War I, both during the whole of the period from the start of the war to the postwar price peak, and apparently also during the period of wartime deficits. There appear to be two main reasons for the difference, neither having much to do with the design of government policy. The first is the much greater increase in willingness to save in World War II, the monetary counterpart of which was the decline in velocity during the war, discussed above. The second is that the tax on money balances implicit in inflationary money creation was a much more productive tax in World War II than in World War I, because of the lower velocity prevailing during World War II than during World War I (Table 24, line 3). Money balances averaged 45 per cent of one year's national income in 1914–20, 69 per cent in 1939–48. A 1 per cent tax on money balances—if we ignore the reflex influence of the tax on the amount of money balances held—therefore yielded 0.45 per cent of a year's national income in World War I, 0.69 per cent, or about 1½ times as much, in World War II.

This is the computation needed to judge the importance of the increase in the public's money stock. An additional problem is the fraction of the increase in the money stock created directly by the government and the fraction created by the banks or, to put it differently, the sharing of the tax yield between the government and the banks. The implicit sharing arrangement determines how much money the government can issue per dollar increase in the total money stock; or, alternatively, how much of its deficit it can finance by issuing money, how much by bonds, and how much of the bonds directly or indirectly must go to banks. In this respect, too, there was a substantial difference between the wars. In the World

War I inflation (1914–20), the total money stock increased $6.92 for every dollar of government-created money (high-powered money minus the gold stock), in the World War II inflation (1939–48), $4.74. The main reason for the difference was the change in the ratio of deposits to reserves. During the World War I inflation, banks added $14.16 to their deposits for every dollar increase in reserves; during the World War II

TABLE 24
COMPARISON OF MONEY CREATION IN TWO WORLD WAR PERIODS OF INFLATION

	Period of Inflation	
	World War I 1914–20	World War II 1939–48
Money created by government as a fraction of average annual net national product		
1. Total	0.050	0.146
2. Per year	0.008	0.016
Average velocity		
3. Average NNP ÷ average stock of money	2.205	1.445
Money created by government as a fraction of average stock of money		
4. Total	0.110	0.211
5. Per year	0.018	0.023
Expansion ratio of monetary system		
6. Increase in high-powered money per dollar increase in government-created money	1.377	1.357
7. Increase in stock of money per dollar increase in high-powered money	5.027	3.492
Increase in stock of money as a fraction of average stock		
8. Total	0.762	0.998
9. Per year	0.127	0.111
Increase in stock of money as a fraction of average annual NNP		
10. Total	0.346	0.690
11. Per year	0.058	0.077

NOTE: Figures for money stock, high-powered money, and gold stock are annual averages centered on June 30. Averages for each war period weight the initial and terminal years each as one-half year.

Government-created money equals high-powered money minus the gold stock.

inflation, $10.47. A subsidiary reason was a change in the relation between deposit and currency expansion—in World War I, the public added $6.91 to its deposits per dollar increase in currency; in World War II only $3.89.

For the war inflations as a whole, the effects of these differences are summarized in Table 24. As this table shows, the combined effect of the changes in the level of velocity and in the expansion ratio of the monetary system was that the government was able to acquire twice as large a fraction of average annual income (1.6 instead of 0.8 per cent, line 2)

by direct money creation, yet produce only seven-eighths as large an increase in the total money stock per year (11.1 per cent instead of 12.7 per cent, line 9). This smaller increase in the total money stock was in its turn equivalent to a decidedly larger fraction of average annual income (7.7 per cent instead of 5.8 per cent, line 11) so that both directly and indirectly money creation was a more effective device for acquiring resources for government purposes.

In terms of federal government expenditures during the period of wartime deficits, 48 per cent was financed by explicit taxes; 7 per cent by direct government money creation; 14 per cent by private money issue, which can be regarded as the indirect effect of government money creation but had as its nominal counterpart interest-bearing rather than noninterest-bearing government debt; and 31 per cent by interest-bearing government securities not matched by money creation. If the wholesale price index is regarded as correctly measuring the price changes during the war, then about one-fifth of the money creation can be regarded as a tax on money balances, four-fifths as voluntary saving embodied in the form of noninterest-bearing monetary assets.[21] This would mean that, in all, slightly over half of expenditures was financed by taxes, and that about one-tenth of the taxes took the form of a tax on money balances. The defects of the price index mean that these figures probably underestimate the importance of taxes as a fraction of expenditures and of the tax on money balances as a fraction of total taxes.

EFFECT OF WAR LOAN DRIVES

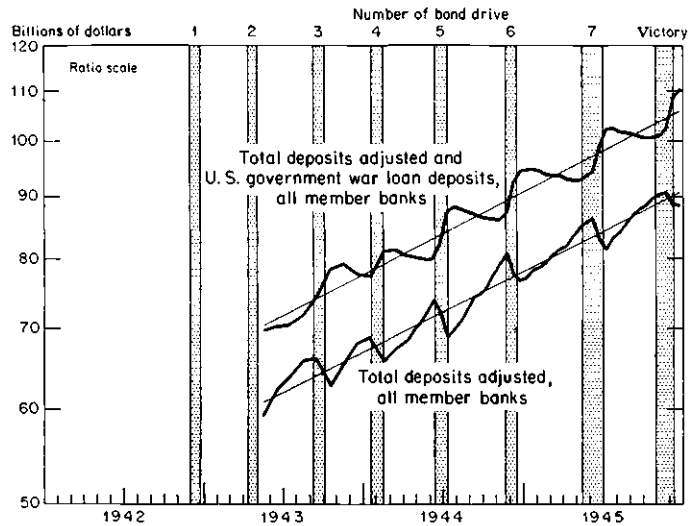
One detail of the behavior of the money stock merits attention before we leave the period. In Chart 46 it will be noted that the money stock behaved in a much more irregular fashion during 1943, in particular, but also in 1944 and 1945, than it did before or after. The reason was the flotation of government securities through a series of bond drives—seven War Loan drives and a concluding Victory Loan—about five months apart, November 1942–December 1945. As it happened, three of the bond drives came in the final months of the year and two in the middle,

[21] Wholesale prices rose 14 per cent from Dec. 1941 to Dec. 1945 (roughly the initial and terminal dates of the calendar years included in our estimate of federal government expenditures during the period of wartime deficits). The nominal amount of money that would have been required to keep money balances at their initial real level was 13 per cent of the actual increase from Dec. 1941 to Dec. 1945. The amount that would have been required to maintain money balances at their terminal real level was 24 per cent of the actual increase. The correct figure, assuming the price rise to be correct, is between these two, and we have approximated it as 20 per cent.

For simplicity, we have combined direct and indirect money creation, and have neglected the assignment of part of what we have called the tax proceeds to the commercial banks. For a more refined analysis, see Ralph Turvey, "Inflation as a Tax in World War II," *Journal of Political Economy*, Feb. 1961, pp. 72–73.

CHART 50

Member Bank Deposits During War Bond Drives, With and Without U.S. Government War Loan Deposits, Monthly and Semimonthly Averages, Unadjusted for Seasonal Changes, 1942–45



NOTE: Shaded areas represent periods of bond drives.

SOURCE: Data are monthly or semimonthly averages of daily figures, seasonally unadjusted, from *FRB*. Total deposits adjusted are demand deposits adjusted plus time deposits. Dates of bond drives, from *Annual Report* of the Secretary of the Treasury, 1946, p. 507.

which meant that they had some of the repetitive effects characteristic of a seasonal movement. As a result, their effects have been to some extent eliminated from the seasonally adjusted series plotted in Chart 46. That is mainly why the irregularity produced by the bond drives in our money series is much greater for 1943 than for 1944 and 1945.

Chart 50 is designed to enable us to study in some detail the effects of the bond drives. It is restricted to deposits, since the bond drives had no noticeable effects on currency, and to member banks only, because for that period we have monthly or semimonthly averages of daily figures for them but not for all commercial banks. It plots figures unadjusted for seasonal variations to avoid inadvertent elimination of any bond drive effects. The bottom line in the chart is for demand and time deposits owned by the public and thus excludes U.S. government deposits. The top line is the same total plus U.S. government deposits. The shaded areas in the chart are the periods of the bond drives.

On the occasion of each bond drive, purchasers of securities trans-

ferred deposits to war loan accounts maintained by the Treasury at commercial banks. As the government transferred its deposits from war loan accounts to Federal Reserve Banks, and thence to the public to pay for its expenditures, government deposits were transferred back to private accounts. This process is clearly marked in the chart. On the occasion of each bond drive, the upper line rises and the lower falls. Between drives, the reverse occurs.

After April 1943, the war loan accounts maintained by the Treasury were exempt from reserve requirements, so any transfer of funds to those accounts in the first instance reduced required reserves. If reserves held had risen steadily and if banks had taken full advantage of the released reserves, so that required reserves had risen during bond drives as they did between drives, the banks could have kept the lower line in Chart 50 free from any effects of the bond drives. On the occasion of each drive, they could have expanded their total earning assets to the amount of the deposits transferred to war loan accounts and subsequently could have reduced their earning assets as the war loan accounts were reduced. Under these hypothetical circumstances, our money stock figures, like the lower line of the chart, would have been unaffected by the bond drives. The whole of the effect would have been recorded in the upper line.

Conversely, if reserves held had risen steadily and if banks had taken no advantage of the reserves released by the transfer of deposits, so that required reserves had fallen during bond drives and risen between drives, the banks could have kept the upper line of Chart 50 free from any effects of the bond drives; the full effect would have been recorded in the lower line.

The actual situation was roughly midway between these extremes, as can be seen by noting that the fluctuations about the straight lines we have drawn to indicate the trends in the two series are not much different in amplitude for the upper than for the lower series.

There are three reasons the actual situation did not correspond to the first extreme. (1) The actual behavior of reserves was not that assumed above. During some of the drives, specifically the second through the fifth (April to May 1943–July to August 1944), the Reserve System offset some of the effect of the transfer of deposits by reducing its credit outstanding. To some extent, therefore, the declines in the lower line of Chart 50 reflect changes in available reserves. (2) The full use of the released reserves would have involved substantial transaction costs, since it implied first acquiring and then disposing of assets as government war loan accounts first increased and then decreased. (3) No doubt, it took time for banks to realize the possibilities of taking measures to increase deposits in advance or coincidentally with the drive itself, rather than subsequently when its effect was manifest in excess reserves. As time

went on, the banks adjusted more fully to the bond drives. Visual evidence is provided by the chart, in which the fluctuations of the upper curve about its straight-line trend become wider, if anything, in amplitude, whereas fluctuations of the lower curve become a trifle narrower. And some rough calculations confirm this visual impression.[22]

3. *From the End of the War to the Price Peak, August 1945–August 1948*

Economic activity reached its wartime peak early in 1945 when it became clear that the end of the war was approaching. The National Bureau dates the reference peak in February 1945. Demobilization began after V-E Day (May 8, 1945), continued at an accelerated pace after V-J Day (September 2, 1945), and was accompanied by a sharp decrease in government expenditures and a rapid decline in industrial production. Nevertheless, the contraction was brief and relatively mild and the heavy unemployment that was widely feared did not develop. The trough, which the National Bureau dates in October 1945, was followed by a vigorous expansion. A decline in government purchases of goods and services from $83 billion in 1945 to $30 billion in 1946 was offset by rapid conversion from wartime to peacetime production. Seasonally adjusted unemployment in 1945 never reached 2.5 million and remained below that level thereafter until beyond the end of the expansion in November 1948.

After a brief pause in the third quarter of 1945, the wholesale price index continued rising and, as we have already noted, jumped sharply in mid-1946 when price control was dropped. The 16.4 per cent per year rate of rise in the wholesale price index from January 1946 to August

[22] For example, the ratio of the rise in the upper curve to the decline in the lower curve during the successive bond drives is shown in the tabulation.

Bond Drive	*Ratio of Rise in Upper Curve to Decline in Lower Curve*
3	1.30
4	1.28
5	1.46
6	1.68
7	1.55
8	3.51

For a more sophisticated calculation, allowance should be made for point 1 in the text. Such a more sophisticated calculation and, in general, a more detailed study of the effects of the bond drives than we have made would be of considerable interest. It might, for example, provide additional evidence on the time required for adjustment by the banking system to changes in circumstances.

We are indebted to George Morrison for pointing out to us that the use of seasonally adjusted figures in an earlier version had led us to erroneous conclusions about the reactions of banks to the bond drives.

1948 overstates substantially the rate of rise in prices during the period. Nonetheless, there was clearly a price rise of considerable magnitude. The rise in prices and in income reflected mostly the rise in velocity referred to earlier, rather than a growth of the money stock. The money stock grew only 14 per cent from the end of the war to August 1948 and only 11 per cent, or at the rate of only a little over 4 per cent per year, from January 1946 to August 1948.[23]

The rise in the money stock itself from January 1946 to August 1948 was attributable, in an arithmetic sense, mostly to growth of high-powered money. In sharp contrast with the corresponding period after World War I (when the gold stock fell and the increase in high-powered money came from a rapid expansion in Federal Reserve claims on the public and the banks), this time the increase in high-powered money was produced by a rise in the gold stock, about a third of which was offset by a decline in the fiat of the monetary authorities (see Tables 23 and 10). The gold inflow occurred despite U.S. participation in UNRRA —which was authorized even before the termination of lend-lease—the subsequent loan to Britain, and the Marshall Plan. Though these unilateral transfers satisfied many of the pressing demands of war-devastated countries, the residual demands, as well as the demands of neutral countries desiring goods not available during the war, led to a gold inflow.

A rise in the ratio of deposits to currency was as important as the increase in high-powered money in accounting for the increase in the stock of money. With the end of the war, the wartime factors affecting the demand for currency lost their influence, and the public increased its deposits relative to currency holdings. However, a minor part of the rise in the deposit-currency ratio was offset by a slight decline in the deposit-reserve ratio.

This description of postwar monetary changes needs to be supplemented by some account of events within the period. The slight decline in the deposit-reserve ratio was the net result of a rise from January 1946 to May 1947, which was more than offset by the subsequent decline to August 1948. A shift of deposits away from reserve and central reserve city banks, with higher reserve requirements, toward country banks mainly accounted for the movement in the deposit-reserve ratio from

[23] The coverage of the money stock series in 1948 is not strictly comparable to that of the series in 1945 and 1946 (see Appendix A). Currency held by the public in 1948 includes vault cash in banks in territories and the possessions, as well as in U.S. mutual savings banks; such vault cash is excluded in the earlier years. Likewise, demand balances of mutual savings banks at U.S. commercial banks are included in adjusted deposits in 1948, excluded in the earlier years. The percentage change figures in the text would not, however, be altered by revision of the 1945–46 money stock estimates to make them comparable to the later one. The excluded items totaled $165–$170 million in 1945–46, or slightly more than one-tenth of 1 per cent of the money stock excluding them.

August 1945 to April 1947; we do not know what accounts for the initial fall thereafter, but the noticeable acceleration of the fall after February 1948 clearly reflects three increases in reserve requirements imposed over the following seven months.

The expansion in high-powered money was concentrated within the 11 months from August 1945 to July 1946 ($1.9 billion) and the 15 months from May 1947 to August 1948 ($1.1 billion; see Chart 46). High-powered money was $3.1 billion higher at the end of August 1948 than at the end of August 1945, but only $1.2 billion higher than at the end of July 1946. From July 1946 to May 1947, the decline in the fiat of the monetary authorities just about offset the rise in the gold stock, so that high-powered money was roughly unchanged (see Chart 47B).

The initial and terminal expansions in high-powered money played quite different monetary roles. The first was a source of monetary expansion. The second was not; it was rather a reaction to other monetary measures.

Most of the terminal $1.1 billion increase in high-powered money from May 1947 to August 1948 was a reaction to changes in reserve requirements (Chart 49). Reserve requirements for member banks in central reserve cities were raised $1 billion by an increase of 4 points in the percentage they were required to maintain against demand deposits. The increase was imposed in two equal steps on February 27 and June 11, 1948. To acquire the added reserves, banks sold government securities which, under the support program, the Reserve System was committed to buy. Those security purchases thereby added to Reserve credit outstanding. (In September, a third increase affecting all member banks, and time as well as demand deposits, raised reserve requirements a further $2 billion. As a result, member banks sold government securities to the Federal Reserve, and Reserve Bank credit showed another increase—see the next chapter.)

In contrast, the initial increase in high-powered money from August 1945 to July 1946 provided the banks with a net addition to their reserves in excess of requirements. The money stock rose vigorously, by $11.1 billion, as compared with $5.3 billion in the period of stationary high-powered money from July 1946 to May 1947 and $1.8 billion in the terminal period of increase in high-powered money.[24] The money stock therefore grew decidedly more in the first 11 months of the three-year period than in the next 25 months. The money stock reached an absolute peak in January 1948 and declined mildly for the next 12 months, foreshadowing the approaching price peak and the recession of 1948 to 1949. This is another example of the previously observed tendency of monetary changes to precede changes in economic conditions.

[24] See footnote 23, above.

The foremost monetary puzzle of the immediate postwar period is why the money stock did not grow at a very much more rapid pace. The sharp difference from its behavior after World War I, when the most rapid rate of increase in the stock of money came after the end of the wartime deficits, does not reflect any fundamental difference in monetary policy. After both wars, the Reserve System continued the wartime policy of providing all the high-powered money demanded at a fixed rate: in World War I, through maintaining an unchanged discount rate; in World War II, through supporting the price of government securities at unchanged levels. And the reversal of the gold flows, from an outflow after World War I to an inflow after World War II, should have fostered a more rapid rate of monetary expansion after the later war.

Federal Reserve pronouncements were full of expressions of concern about the inflationary danger of the large stock of money, and about the necessity to avoid further expansion. Yet, until the middle of 1947, action was limited to requests for additional powers;[25] changes in discount rates which were of no significance (because the System continued its wartime support of the bill rate at ⅜ of 1 per cent and the certificate rate at ⅞ of 1 per cent, so that it continued to be cheaper for banks to meet reserve needs by selling such securities of which they held substantial amounts rather than by discounting);[26] and an increase in margin requirements on security purchases to 100 per cent in January 1946 followed by a reduction to 75 per cent in February 1947 (see Chart 49). Consumer credit controls were continued until November 1, 1947, when the Congress terminated the authority of the Board of Governors to regulate such credit. With the expansion of production of consumer durable goods, the controls became relevant as they had not been during the war. They may have limited the growth of this type of credit some-

[25] The Board of Governors suggested (*Annual Report*, 1945, pp. 7–8) that three additional powers be granted the System:

1. To limit the amount of long-term securities which any commercial bank could hold in relation to its net demand deposits
2. To require all commercial banks to maintain secondary reserves of Treasury bills and certificates in addition to their high-powered money reserves against net demand deposits
3. To raise reserve requirements, within some specified limit, against net demand deposits of any commercial bank

[26] By the end of Apr. 1946, the preferential discount rate of 1 per cent on advances to nonmember banks secured by direct obligations of the U.S. was eliminated at all Reserve Banks. Thereafter the rate in effect on loans to individuals, partnerships, and corporations (the rate ranged from 2½ to 2¾ per cent by the end of 1948) applied to advances to nonmember banks. In Apr. and May 1946 all the Reserve Banks discontinued the preferential discount rate of 0.5 per cent on advances to member banks secured by government obligations maturing or callable within a year, and the prevailing discount rate of 1 per cent became applicable to advances secured by all maturities of government obligations.

what but it is doubtful that they could have been a major factor affecting the growth of the money stock as a whole.

Yet from mid-1946 on, the rate of growth of the money stock fell sharply. The announced readiness of the Federal Reserve Banks to support the price of government securities led to no extensive monetization of the debt; on the contrary, Federal Reserve credit outstanding remained roughly constant during 1946 and then fell sharply in the spring of 1947. Yields on long-term government debt were below support levels throughout 1946 and the first part of 1947, so that the System could have sold long-term securities without violating its support policy. It did not do so, however, and indeed could not have gone far on its own in this direction, since it held less than $1 billion of such securities. Its holdings were in bills and certificates, and there was little demand for these at the support rates (see Chart 48).

During the war, the 2½ per cent interest rate on long-term securities which the Federal Reserve was committed to protect was below the level consistent with no change in the stock of money and required for its maintenance the continuous creation of high-powered money—as was the 3 to 4 per cent discount rate in the active phase of World War I, and the same or a higher rate for some eighteen months thereafter. By contrast, less than a year after the active phase of World War II, the same 2½ per cent rate was *above* the level consistent with no change in the stock of money and would have required for its rigid maintenance the destruction of high-powered money.

During the immediate postwar period and for some time thereafter, the Federal Reserve System did not question, at least officially, the desirability of supporting the price of government obligations.[27] But it did favor raising the bill and certificate support rates. On July 10, 1947, the posted ⅜ of 1 per cent buying rate on Treasury bills and the repurchase option granted to sellers of bills were terminated, though the pegged rate of ⅞ of 1 per cent on certificates was maintained. It has been reported that the Treasury, which had been reluctant to see any change in the pattern of rates, consented to the rise in the interest costs on its short-term debt because of the offset created by the adoption on April 23, 1947, by the Federal Reserve System of a policy of paying into the Treasury approximately 90 per cent of the net earnings of the Federal Reserve Banks.[28]

[27] See statements in *Annual Report*, 1945, p. 7; 1946, p. 6; 1947, p. 8; 1948, pp. 2, 4, 20; 1949, pp. 7–8; 1950, p. 2; 1951, pp. 3, 4, 95, 98.

[28] This was accomplished under the authority granted to the Board (sect. 16 of the Federal Reserve Act) to levy an interest charge on Federal Reserve notes not covered by gold certificates. Before 1933, each Federal Reserve Bank had to pay a franchise tax to the government equal to 90 per cent of its net earnings, after it had accumulated a surplus equal to its capital. That provision was repealed by

On August 8, 1947, the Federal Open Market Committee took the next step in the program of raising the support rates somewhat, by discontinuing the ⅞ per cent buying rate on certificates. The Treasury progressively raised the rate on newly issued certificates until it reached 1⅛ per cent in December 1947. At the same time, the bill rate moved up to 1 per cent. Not until the fourth quarter of 1948, after the price peak, did the Treasury increase the certificate rate to 1¼ per cent and the rate on bills to about 1⅛ per cent.

In addition to these measures, the Treasury changed the composition of the debt by increasing the amount of long-term debt relative to short, thereby achieving the same effect as the Federal Reserve could have by selling long-term securities and buying short-term, if it had had the long-term securities to sell.[29] Yields firmed, rising from 2.26 per cent in mid-October 1947 to 2.37 in mid-November. At that point the Federal Reserve and Treasury stepped in to prevent a further increase in yields, which is to say, decline in the price of bonds. The System bought $2 billion in government bonds in November and December, and Treasury investment accounts bought over $900 million. On December 24, the Federal Open Market Committee established a new lower support level for the price of government bonds and yields rose to 2.45 per cent. This was the level at which prices of long-term governments were maintained through 1948, the System buying an additional $3 billion through March 1948.

The sharp narrowing of the differential between short and long rates as a result of the rise in the rates on bills and certificates made short-term securities relatively more attractive to holders, led them to shift the composition of their portfolios, and thereby produced a reverse shift in the

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the amendment to the Federal Reserve Act, contained in the Banking Act of 1933, providing for the establishment of the FDIC. The Congress required each Reserve Bank to subscribe to the capital stock of the FDIC an amount equal to one-half of its surplus on Jan. 1, 1933. Because of the reduction in their surplus as a result of the subscription, the Reserve Banks were relieved of the franchise tax. Earnings over the period ending 1944 were sufficient to restore the surplus only to less than 75 per cent of the Banks' subscribed capital. In 1945 and 1946, however, earnings were large enough to increase the surplus above the combined capital of the Banks.

The relationship between the action on earnings and the elimination of the posted ⅜ of 1 per cent buying rate is implied in the record of the Federal Open Market Committee, which reports discussions with representatives of the Treasury including those items on the agenda (Board of Governors of the Federal Reserve System, *Annual Report*, 1947, pp. 90–92). See *Commercial and Financial Chronicle*, July 10, 1947, p. 20 (124), for the suggestion that the transfer of Federal Reserve earnings to the Treasury was the *quid pro quo* for Treasury acquiescence in the rise in interest costs.

[29] From Apr. to Oct. 1947, the Treasury sold $1.8 billion of bonds held in its own investment accounts, and in Oct. issued a new nonmarketable 2½ per cent bond.

Federal Reserve System's portfolio (Chart 48). That shift rather than any net monetization of debt accounted for the Federal Reserve purchases just listed. The purchase of $5 billion of bonds from November 1947 through March 1948 was accompanied by a reduction of some $6 billion in the System's holdings of short-term government securities, so that Federal Reserve credit outstanding was more than $1 billion lower at the end of March 1948 than at the end of October 1947. The announced pattern of rates taken as a whole, therefore, continued to be above rather than below the level consistent with no change in the money stock. Since the pattern was then made effective, whereas before that actual rates had been below the announced rates, monetary contraction was, as we have seen, actually produced during calendar 1948.

The situation was not recognized at the time. Concern continued to focus on inflation even though, in retrospect, it is clear inflationary pressure was rapidly waning and the seeds of a contraction were being sown. In November 1947, the System tried its by now almost traditional confession of impotence—resort to moral suasion. A joint statement by bank supervisory authorities was issued to banks urging them to avoid making nonessential loans. In January 1948, discount rates at all Reserve Banks were raised to 1.25 per cent, and in August, to 1.5 per cent but, since in both cases market yields on bills and certificates were lower, neither rate was effective. More significantly, as already noted, reserve requirements were raised. Since country and reserve city bank requirements were at their prior legal maximums, the final rise—which occurred in September 1948, a month after the price peak—was applicable to all banks only because an act of Congress passed in the preceding month had authorized a temporary increase in the legal maximums, which were to revert to their former level in June 1949.[80] In August 1948, Congress also restored Federal Reserve control over consumer credit until June 1949, when control was once again permitted to terminate.

A counterpart of the relatively small rise in the money stock during the period from 1946 to 1948 was the relatively small rise in velocity. As we have seen, velocity fell by more than a third between 1942 and 1946. The rise from 1946 to 1948 offset less than a quarter of this decline, leaving velocity in 1948 at less than three-quarters its level in 1942 and at only seven-eighths its level in 1939, which itself was low by historical standards. Yet one might have expected both the attempt to "use" the wartime accumulation of liquid assets and the rising prices that rendered it costly to hold money balances to produce a sharp rise in velocity, which

[80] The new maximums against net demand deposits were 30 per cent at central reserve city banks, 24 per cent at reserve city banks, and 18 per cent at country banks, and against time deposits, 7½ per cent at all banks. The requirement imposed in September was 26, 22, 16, and 7½ per cent, respectively.

would, of course, have further intensified the price rise. To put the matter in terms of liquid asset holdings: in 1939, the year the war broke out in Europe, the public held money balances amounting to about 8 months' income, and mutual and postal savings deposits plus savings and loan association shares plus government securities amounting to an additional 5 months' income; so the total of those liquid assets amounted to 13 months' income. By 1946, money balances amounted to over 10 months of a much higher income and the broader total of liquid assets to 21 months' income. In the next two years, the public—despite its pent-up demand for goods unavailable earlier and despite vigorous economic expansion—reduced those balances only moderately: money to 9 months' income, about half-way between the prewar and immediate postwar levels; and the broader total of liquid assets to 18 months' income, or only three-eighths of the way back to the prewar level.

The connection between the changes in velocity and the public's willingness to hold liquid assets fixed in nominal amount perhaps helps to make clear why the low rate of increase in the money stock and the small rise in velocity are different aspects of essentially the same phenomenon. Both reflect a willingness on the part of the public to hold relatively large amounts of money and government securities at fairly low rates of interest. Paradoxical though it may seem, the low rate of increase in the money stock reflected the public's willingness to hold much money, as part of its willingness to hold much of its assets in liquid form. Had the public desired to dispose of more of its liquid assets, the attempt to do so would have tended to drive down prices of government securities and raise their yields, which, in turn, would have led the Federal Reserve, in pursuance of its support program, to buy government securities, thereby raising high-powered money and the total stock of money.

How was it that an interest rate of 2½ per cent on long-term government securities was above the level consistent with a stable money stock in a period of expansion and rising prices; or, equivalently, that at this rate, the public was willing to hold an abnormally high quantity of nominal dollar assets relative to its income?

One factor was the large surplus of the government in the calendar years 1946 through 1948: in 1946, which was a transitional year with respect to the money stock as well, the cash surplus was a nominal $0.04 billion; in 1947, $5.7 billion; and in 1948, $8.0 billion. The effect of the associated debt requirement on the technical monetary position has already been taken into account implicitly in our discussion of the arithmetic of the change in the money stock.[31] In any event, given the support policy of the

[31] In 1946, the Treasury used its unusually large General Fund balance, derived from overborrowing in the Victory Loan, to retire debt. That was a bookkeeping operation involving the simultaneous reduction of deposits in war loan accounts

Reserve System, the money stock during that period, as during the war, had to be whatever was consistent with the supported pattern of rates, and one or another of the proximate determinants—in practice primarily high-powered money—had to adapt to produce that stock. Hence, the important effects of the surplus are to be found elsewhere. Just as, during the war, any excess of federal expenditures over tax receipts had to be matched by an accumulation of government obligations—noninterest-bearing or interest-bearing—by the public at large, so after the war, an excess of federal receipts had to be matched by a reduction of government obligations. Put differently, during the war, the federal government spent more than it received in taxes, so the members of the public had to spend less than they received as income. The rise in prices was one factor inducing them to do so, and the rise in the stock of money was one form in which they accumulated their unspent receipts. After the war, the federal government took in more in taxes than it spent, so the members of the public had to spend more than they received as income. The failure of prices to rise more than they did was necessary to

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requiring no reserves—a debt of the banks to the government—and of securities held by the banks—a debt of the government to the banks. (The exemption of war loan accounts from member bank reserve requirements expired on June 30, 1947, as a result of the Presidential proclamation, issued Dec. 31, 1946, terminating the period of hostilities of World War II.)

There has been much discussion of the monetary impact of the use of surplus revenues to retire debt, particularly of the effect of retiring debt held by different holders. This was a continuation of the wartime confusion assigning special importance to commercial bank-held debt. *Other things being the same,* retirement of Federal Reserve-held debt through the transfer of Treasury deposits at commercial banks involved a reduction in high-powered money, and therefore a contracting influence on the money stock. Retirement of debt held by commercial banks through the transfer of Treasury deposits at commercial banks requiring reserves involved initially a reduction of the same amount in deposits requiring reserves and in bank assets in the form of government securities. Given fractional reserves, the retirement released excess reserves that would tend to be used to restore the initial level of deposits and assets, and so it was neutral in its monetary effects. Retirement of nonbank-held debt with Treasury deposits requiring reserves involved simply a transfer of ownership of deposits with no direct effects on either deposits or reserves.

But other things were not the same. Given the support program, both the amount and distribution of the debt were effectively determined by the holders. Both had to be whatever was required to make the pattern of rates conform to the one being supported. For example, if the Treasury used the surplus to retire long-term securities held by the public, when, at the fixed rates, the public wished to retain the long terms and dispose of its short terms, the result would be a tendency of short-term rates to rise and long-term rates to fall. This would lead in turn to sales of long terms and purchases of short terms by the Federal Reserve in order to maintain the rate pattern, so leading to precisely the same result as if the Treasury had initially retired short-term securities. And similarly for any other pattern of Treasury operations and public preferences. Treasury operations only determined whether a particular holder acquired his securities from or disposed of them to the Treasury or the Federal Reserve or other holders.

induce them to do so, while the slow rise in the stock of money reflected the effect of the excess spending by the public.

Had the federal government not run a surplus, the public, with its accumulated liquid assets and pent-up demand, would have *tried* to spend more in the postwar period than it received—an impossibility, since one man's expenditures are another's receipts. The process of trying, however, would have tended to raise prices and incomes and so would have reduced the level of liquid assets relative to income by this inflationary route. Moreover, the process would doubtless have tended to raise interest rates and so would have produced a monetization of the debt and a still larger rise in prices. As it was, the federal surplus enabled some reduction of liquid assets relative to income to be achieved without inflation. To put the matter still differently: in terms of the market for loanable funds, the Treasury surplus constituted an increase in the supply of loanable funds and thereby reduced the interest rate that would clear the market at any given price level, just as the Treasury deficit during the war constituted an increase in the demand for loanable funds and so tended to raise the interest rate. The shift in the direction of the Treasury's influence helps explain why roughly the same level of supported interest rates was below the level consistent with no change in the money stock during the war, and above that level after 1946 or 1947.

The Treasury surplus explains how the public could reduce the ratio of its money and its liquid assets relative to its income, to a limited extent, without producing either inflationary pressure on prices or monetary expansion under the support program. It does not explain why the public sought to reduce the ratios only slightly more than by that limited extent. It is here that the second factor we believe to be important enters. That factor was a continued fear of a major contraction and a continued belief that prices were destined to fall. A rise in prices can have diametrically opposite effects on desired money balances depending on its effect on expectations. If it is interpreted as the harbinger of further rises, it raises the anticipated cost of holding money and leads people to desire lower balances relative to income than they otherwise would. In our view, that was the effect of price rises in 1950 and again in 1955 to 1957. On the other hand, if a rise in prices is interpreted as a temporary rise due to be reversed, as a harbinger of a likely subsequent decline, it lowers the anticipated cost of holding money and leads people to desire higher balances relative to income than they otherwise would. In our view, that was the effect of the price rises in 1946 to 1948. An important piece of evidence in support of this view is the behavior of yields on common stocks by comparison with bond yields. A shift in widely-held expectations toward a belief that prices are destined to rise more rapidly will tend to produce a *fall* in stock yields relative to bond yields because of the hedge

which stocks provide against inflation. That was precisely what happened from 1950 to 1951 and again from 1955 to 1957. A shift in widely-held expectations toward a belief that prices are destined to fall instead of rise or to fall more sharply will tend to have the opposite effect—which is precisely what happened from 1946 to 1948.[32]

Despite the extent to which the public and government officials were exercised about inflation, the public acted from 1946 to 1948 as if it expected deflation. There is no real conflict. The major source of concern about inflation at that time was not the evils of inflation per se—though no doubt these played a role—but the widespread belief that what goes up must come down and that the higher the price rise now the larger the subsequent price fall. In our view, this fear or expectation of a subsequent contraction and price decline reconciled the public to only a mild reduction in its liquid asset holdings relative to its income and induced it to hold larger real money balances than it otherwise would have been willing to. In this way, it made the postwar rise more moderate. The situation at the close of the two world wars was therefore quite different. The situation after World War II, unlike that after World War I, as noted, was one of widespread expectation of a price decline.

To avoid misunderstanding: our belief that the most puzzling feature of experience during the early postwar years is why, *given the monetary*

[32] We are indebted to David Meiselman for calling this piece of evidence to our attention. The data follow.

Quarter	*Yield on Baa Corporate Bonds*	*Yield on 125 Industrial Common Stocks*		*Corporate Bond Yield Minus Yield on 125 Industrial Common Stocks*	
		Dividend	Earnings	Dividend	Earnings
		FALLING PRICE EXPECTATIONS			
I 1946	2.97	3.46	2.64	−0.49	0.33
IV 1948	3.52	6.56	15.18	−3.04	−11.66
		RISING PRICE EXPECTATIONS			
III 1950	3.25	6.49	15.93	−3.24	−12.68
III 1951	3.50	6.13	8.75	−2.63	−5.25
I 1955	3.47	4.14	8.25	−0.67	−4.78
IV 1957	5.04	4.46	6.78	0.58	−1.74

SOURCE: Bond and dividend yields are quarterly averages of monthly data; no seasonal movement was discernible. Earnings yield is earnings per share divided by a quarterly average of price per share and adjusted for seasonal by us. Data are from *Business Statistics;* primary source is Moody's Investors Service.

To make the risk roughly alike as between bonds and stocks, we used Baa bonds. The use of Aaa bonds would not, however, alter the direction of change in the yield differences for the three periods. Aaa bond yield minus dividend yield is −0.96, −3.74; −3.86, −3.24; −1.16, −0.46 (next to the last col.). Aaa bond yield minus earnings yield is −0.14, −12.36; −13.30, −5.86; −5.27, −2.78 (last col.).

policies followed, prices and the money stock rose so little does not imply either approval of those policies or belief that a higher rise in prices and the money stock would have been desirable. The relatively small rise in the money stock was not a product of monetary policy designed to achieve that result but, on the contrary, the policy followed involved surrender of any possibility of explicitly controlling the money stock. The relatively small rise was a product primarily of Treasury surpluses and of widespread expectations that a severe price decline was in the offing. Those expectations were partly a product of the severe 1929–33 contraction, which fostered a belief that severe contractions were the peacetime danger if not indeed the norm; and partly a product of the 1920–21 price collapse, which fostered a belief that major wars were followed by deflation and depression. Of course, had those factors not made the monetary policy actually followed consistent with a small rise in the money stock, the policy might have been changed, as it was subsequently under the impact of the Korean War experience.

In retrospect, an even lower rate of increase in prices and the money stock would have been preferable during 1946 and 1947. A different monetary policy permitting or forcing a rise in the interest rates on government securities could have contributed to this result, though whether without an overreaction like that of 1920 is harder to say. Hindsight is far better than foresight, and the possibility of understanding the course of events after the fact is no evidence that authorities at the time could have produced precisely the "right" pattern of changes in the money stock.

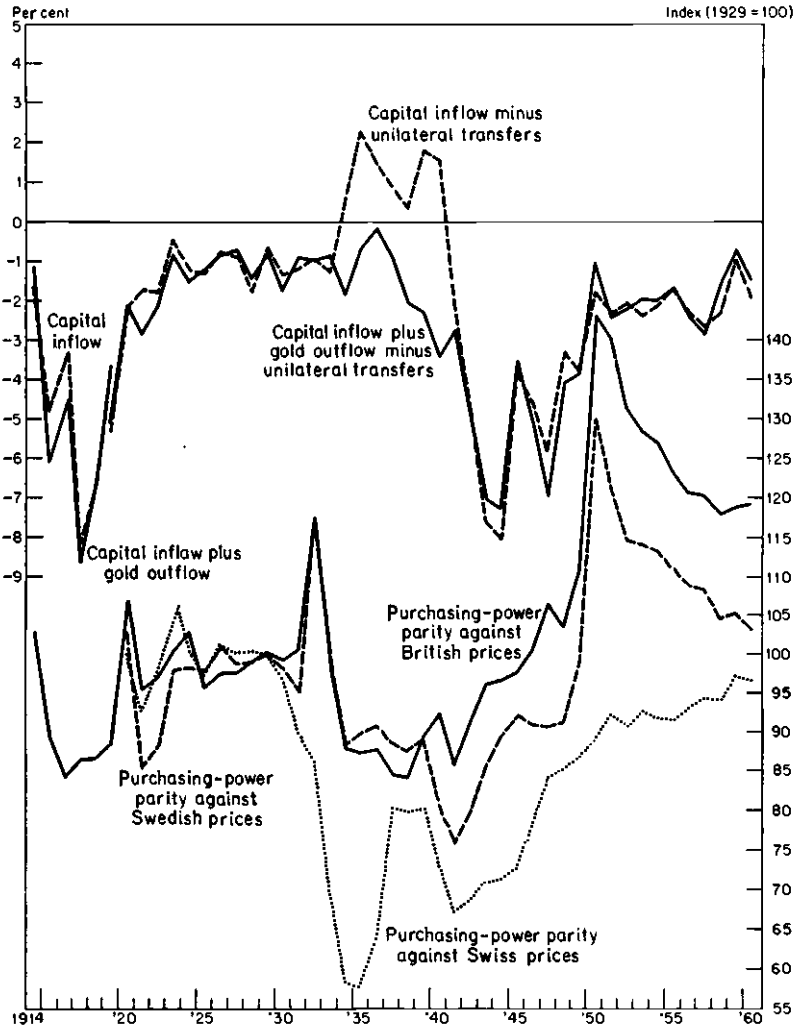
4. *The Balance of Payments*

World War II, like World War I, was characterized by levels of capital export (in World War II, including unilateral transfers) unmatched in any peacetime periods either in absolute magnitude or as percentages of national income. The pattern of the capital exports is fairly similar in the two wars (see Chart 51). A very sharp increase from 1914 to 1917 matches an even sharper increase from 1940 to 1944 (these appear as decreases in the chart, which plots capital inflows and hence shows outflows as a negative item). There was then a four-year decline in the World War I period, a one-year decline in World War II. The extension of aid in one form or another to the war-devastated countries of the world after the second war resulted in an increase for two years followed by a three-year fall to a level around which capital exports fluctuated for some years thereafter. After World War I, the decline which began in 1918 continued through 1923, with capital exports subsequently varying around a rather constant level until 1933.

The peak level of capital exports, expressed as a fraction of net national

CHART 51

U.S. Net International Capital Movement as a Ratio to National Income, and Purchasing-Power Parity, 1914–60



NOTE: Capital inflow, minus unilateral transfers, is plotted as plus. Gold outflow is plotted as plus.

SOURCE: Table A-4.

product, was about the same in World War II as in World War I—8.0 per cent in 1944 compared to 8.2 per cent in 1917—but the period of abnormally high capital exports was somewhat more prolonged in the later period, nine years compared to six. The similarity in level of peak capital exports is surprising in view of the greater war effort involved in World War II; the difference in the length of the period of abnormally high capital exports reflects the longer duration of the second war.

After both wars, the new level attained when capital exports had receded was higher than the prevailing level under earlier peacetime conditions. From 1907 to 1914, the United States was in approximate balance, neither importing nor exporting capital; from 1923 to 1932, the United States exported capital on balance at the rate of about 1 per cent of net national product; and from 1950 to 1960, at about 2 per cent of net national product. The source of the shift was, however, different in the two postwar periods. The higher level of capital exports plus unilateral transfers after the first World War reflected private foreign lending; the higher level after the second World War reflected government loans and grants—the British loan, Marshall Plan, and other foreign aid expenditures, and loans through the Export-Import Bank, the World Bank, and other similar agencies.

The exchange rate between the dollar and the pound sterling behaved in one respect quite differently in World War II than it did in World War I. In World War I, the pound appreciated sharply on the outbreak of war, only subsequently returning to its prewar parity and being pegged during the rest of the war at near its prewar parity; in the second war, the pound depreciated sharply on the outbreak of the war. From the time Britain left gold in 1931, the pound had no official parity. It first depreciated sharply to a monthly low of $3.28 at the end of 1932, then apreciated to a high of $5.15 in early 1934 after the United States revalued gold. From 1934 to mid-1938, the pound fluctuated around a level slightly below $5.00. Munich and the stepped-up capital outflow from Europe brought a decline to slightly over $4.60 in August 1939. On the outbreak of the war, the pound fell precipitously, first, to under $4.00, then, to as low as $3.27 after the fall of France.

From that point on, the World War I pattern was repeated. Britain fixed the pound officially at $4.035, imposed exchange controls much more extensive and detailed than in World War I, and requisitioned foreign securities and exchange holdings of British nationals. The official rate was made effective by the autumn of 1940 and maintained thereafter. After lend-lease was enacted in 1941, most of the current pressure on the pound was removed, just as it was in World War I after the United States entered the war and assumed responsibility for financing the dollar purchases of its allies.

Whereas the curve in Chart 51 recording capital exports shows the same pattern in the two wars, the curve recording relative prices in the United States and in Britain, adjusted for changes in exchange rates, does not. In World War I, U.S. prices fell sharply relative to British prices along with the sharp increase in U.S. capital exports, and the price ratio rose along with the decrease in capital exports. As we saw in Chapter 5, the relationship between price movements and capital movements in World War I seemed roughly in line with the relationships displayed in the prewar period. In World War II, the price curve in the figure displays almost the reverse relationship; it rises markedly from 1941 to 1947, with no clear response to rises or falls in capital exports.

What explains this failure of the capital movements to be reflected in relative prices, as they had been in general throughout the preceding 70 years? One factor which immediately suggests itself is the system of exchange controls which Britain adopted in World War II, much more extensive than that in World War I. However, this factor works in the wrong direction. As we pointed out in Chapter 5, the effect of foreign exchange controls was to enable Britain, for any given exchange rate, to maintain a higher price level at home than she otherwise could or, alternatively, for given price levels at home and abroad, to maintain a higher dollar price of the pound sterling than she otherwise could. But either alternative means that foreign exchange controls would make the price ratio plotted in Chart 51 lower than otherwise, since this ratio is adjusted for the exchange rate. Yet the puzzle is why this ratio is so high. Foreign exchange controls could provide an explanation only if the United States had imposed such controls to a very much greater extent than in World War I, but it did not.

The only explanation we can offer is that the abnormal behavior of the price ratio reflects not exchange controls but internal price controls, which made the price-index numbers used to compute the ratio seriously defective as measures of "prices" in some more meaningful sense. Price control and rationing were far more extensive in Britain than in the United States, and hence the British index number might be expected to deviate even more from an ideal measure of prices than the U.S. index number.[33]

[33] In judging the relationship between price and capital movements in Chart 51, it should be noted that the capital movement figures have had a secular downward trend relative to the price ratio ever since the beginning of the series in 1871. This means that a given level of capital imports into the United States has tended to be consistent over time with an ever higher price level in the U.S. relative to Britain; or, alternatively, that a given ratio of prices has been consistent with an ever lower level of capital imports (or higher level of capital exports). The obvious explanation of this result is a growing comparative advantage of the United States relative to Britain, a consequence that might be expected to follow from a more rapid rate of technological growth and capital accumulation in the U.S. Such a growing comparative advantage was one of the most popular

Some evidence bearing on this explanation is furnished by the comparisons with Swiss and Swedish prices plotted in Chart 51. Though prices were controlled in Switzerland and Sweden to a considerable extent during the war, the controls were less extensive than those in Britain or the United States. In addition, both countries were probably subject to less inflationary pressure. A comparison of U.S. prices with Swiss and Swedish prices should therefore, if anything, be biased by price control in the opposite direction from the comparison of U.S. with British prices.[84]

As we saw in Table 20, British depreciation in 1931 produced a sharp dispersion in the international structure of prices, largely eliminated by the 1936 devaluations of the gold-bloc countries. Just before the war, from 1937 to 1939, the curves for the British, Swedish, and Swiss price ratios were closer together than they had been since 1930, so those years provide a fairly uniform starting point. The only other official change in exchange rates in years close to the war years is the appreciation of the Swedish krona by about 16 per cent in the summer of 1946, which accounts for the decline in the Swedish curve in that year.

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explanations adduced for the alleged "dollar shortage" after the war (see John R. Hicks, "An Inaugural Lecture," *Oxford Economic Papers*, June 1953, pp. 121–135).

[84] A recent study of Swedish experience during World War II provides Swedish monetary and price data for a comparison with wartime changes in similar U.S. data.

Percentage change, II 1939–II 1945, in:	*Sweden*	*United States*
1. Currency plus adjusted demand deposits	110	203
2. Money stock (item 1, plus time deposits in commercial banks)	93	163
3. Consumer price index	49	30
4. Wholesale price index	80	39

The much smaller rise in Swedish than in U.S. monetary magnitudes suggests lesser inflationary pressure in Sweden, though, for two reasons, it is not decisive evidence. (1) The wartime disruptions of trade probably had a more serious effect on the productive potential of Sweden than of the United States. (2) Sweden had a smaller fraction of its productive potential unemployed in 1939 than did the United States.

The much larger rise in Swedish than U.S. price index numbers, despite the smaller rise in monetary magnitudes, seems reasonably clear evidence of a lesser suppression of price rises by price control. However, from the third quarter of 1942 to the second quarter of 1945, a period in which price controls tightened, there was no rise in Swedish prices, yet monetary totals rose a further 30 per cent. Perhaps that is why the discrepancy between the price ratios of U.S. against British and Swedish prices narrows after 1942, whereas the discrepancy between the price ratios of U.S. against British and Swiss prices continues to widen to 1945.

For Swedish figures, see Daniel J. Edwards, "Process of Economic Adaptation in a World War II-Neutral Country: A Case Study of Sweden," unpublished Ph.D. dissertation, University of Virginia, 1961, pp. 144–145, 163–164. We are indebted to Edwards for making his dissertation available to us.

For the war years proper, the Swiss and Swedish comparisons both yield results to be expected from the earlier relationships between capital movements and unilateral transfers, on the one hand, and relative prices, on the other. U.S. prices fell relative to prices in both countries from 1939 to 1941, rose from then to 1950 for Swedish prices, to 1951 for Swiss prices. The initial fall roughly coincides with a period when U.S. capital exports and transfers were increasing, and the subsequent rise with a period of generally declining U.S. capital exports and transfers. Moreover, the magnitude of the fall and of the rise in U.S. purchasing-power parity bore roughly the same relation to the magnitude of the changes in capital exports and transfers as it did in earlier periods.[35]

[35] Disruptions of transportation and financial arrangements were so great during World War II that it may seem pointless to seek to find a continuation of peacetime relations between capital movements and relative prices. And, of course, it is not impossible that these relations might be so thoroughly distorted by the wartime effects as to alter fundamentally the peacetime relations. However, our experience in World War I, when the relationships were little affected, should give pause.

Wartime or peacetime, any discrepancy between the amount of foreign currency Americans want to acquire to spend or invest or give away or hold and the amount non-Americans want to give up to acquire dollars for corresponding purposes will have to be eliminated, since ex post the sums acquired and disposed of are equal. The differences between wartime and peacetime are two: (1) the amounts that the parties desire to acquire or dispose of are altered (demand and supply curves for foreign exchange are shifted); (2) direct controls are used much more extensively to eliminate ex ante discrepancies. Regarding (1), it is not clear what the net effect of the shifts is. One might expect that for neutral nations both demand for and supply of foreign exchange would have been reduced by the increased hazards of trade (which, as it were, increased the average price of imports and simultaneously reduced the average proceeds from exports). Regarding (2), if the exchange rates prevailing could be maintained without extensive controls, it must have been because relative prices adjusted for exchange rates were not far out of line with those required to maintain equilibrium.

What was the mechanism that maintained the relationship between relative prices and capital outflows? Part of the answer may be that during World War II capital outflows adjusted to relative prices to a greater extent than they had during peacetime. Suppose, for example, citizens of a neutral country were tending to accumulate dollar balances. In peacetime, the attempt to dispose of these actual or potential balances would set in motion forces bringing relative prices, adjusted for exchange rates, into line with desired capital movements. In wartime, this attempt may have been short-circuited, partly because neutrals might have been willing to hold more dollar balances, just as U.S. citizens were, in anticipation of being able to acquire, after the war, goods currently unavailable; partly because foreign-exchange controls by either the neutral nation or the U.S. might freeze the balances temporarily. In either case, the accumulation of dollar balances, whether desired or undesired, would constitute a capital inflow offsetting the autonomous U.S. capital outflows to its allies. But insofar as that occurred, it meant the capital outflow was adjusting to relative prices, since high relative prices in the U.S. would tend toward a large offsetting capital inflow, low relative prices, toward a small offsetting inflow.

But this is only part of the story. As neutrals accumulated dollar balances in excess of desired amounts, they sought to acquire local currency, and government agencies fixing exchange rates were required to provide them with such currency,

These comparisons with Swiss and Swedish prices therefore offer some support for the hypothesis that internal price controls and consequent defects in price index numbers account for the failure of the British price ratio to show the same relation to price movements during and after World War II as it had earlier.[36]

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thus producing the kinds of effects internally that gold flows would have produced. The mechanism was essentially the same as that during peacetime.

Finally, changes in exchange rates were always waiting in the wings if needed. As already noted, insofar as they were not needed, it meant that the prior adjustment mechanisms were adequate.

[36] A more decisive test of this hypothesis would require computation of the Swiss and Swedish price ratios for a longer period, and an examination for the earlier periods of the quantitative relation between movements in capital and in such alternative price ratios.

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Milton Friedman, winner of the 1976 Nobel Prize, is the author of *Capitalism and Freedom* (Chicago) and the co-author of *Free to Choose* (Harcourt). Anna Jacobson Schwartz is a member of the Senior Research Staff, National Bureau of Economic Research.

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