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The Classical Gold Standard: Some Lessons for Today

MICHAEL DAVID BORDO

THE widespread dissatisfaction with almost two decades of worldwide inflation has prompted interest in a return to some form of a gold standard.[1] Some crucial questions must be answered, however, before such interest can be taken seriously. Two questions immediately come to mind: How did the actual gold standard operate? What was its record for providing stable prices and overall economic stability?

This article attempts to answer these two questions. It focuses primarily on what is commonly referred to as the "Classical Gold Standard," which prevailed in its most pristine form between 1880 and 1914.[2]

The first section discusses some fundamentals of the gold standard. This is followed by a discussion of the "Managed Gold Standard" which characterized much of the pre-World War I period. Following that is a brief narration of the history of the gold standard. Next, some empirical evidence is presented on the performance of the economies of the United States and the United Kingdom under the gold standard. Finally, the case for a return to the gold standard is examined.

The evidence presented in this article suggests that, in several respects, economic performance in the United States and the United Kingdom was superior under the classical gold standard to that of the subsequent period of managed fiduciary money.[3] In particular, both the price level and real economic activity were more stable in the pre-World War I gold standard era than in the subsequent six-and-one-half decades. Much of the relatively poor performance of the post-World War I period, however, occurred in the interwar period, a period characterized by deflation, real output instability and high unemployment.

WHAT WAS THE GOLD STANDARD?

The gold standard essentially was a commitment by participating countries to fix the prices of their domestic currencies in terms of a specified amount of gold. The countries maintained these fixed prices by being willing to buy or sell gold to anyone at that price. Thus, for example, from 1821 to 1914, Great Britain maintained a fixed price of gold at £3, 17s, 10 1/2d; the United States, over the 1834-1933 period, maintained the price of gold at $20.67 per ounce (with the exception of the Greenback era from 1861 to 1878).

Why Gold?

Gold has the desirable properties of money that early writers in economics have stressed. It is durable, easily recognizable, storable, portable, divisible and easily standardized. Especially important, changes in its stock are limited, at least in the short run, by high costs of production, making it costly for governments

The author, professor of economics at the University of South Carolina, Columbia, is a Visiting Scholar at the Federal Reserve Bank of St. Louis.

[1]Indeed, the recently appointed federal Gold Commission has been established to consider the case for a greater role for gold in the U.S. monetary system. For a recent discourse on the case for a return by the United States to some form of the gold standard, see Robert M. Bleiberg and James Grant, "For Real Money: The Dollar Should be as Good as Gold," editorial commentary, *Barron's*, June 15, 1981.

[2]However, aspects of the gold standard persisted in various forms until the 1971 breakdown of the Bretton Woods System.

[3]"Managed fiduciary money" means a monetary standard under which the government is not committed to maintain a fixed price of gold. The United States had such a standard from 1861 to 1878, and has been on one since 1971. Under such a standard, monetary authorities have complete control over the domestic money supply. An alternative situation, often characterized as "managed" money, occurs when monetary authorities, though committed to maintaining a fixed price of gold, engage in a systematic policy of sterilizing (or neutralizing) the influence of gold flows on the domestic money supply by using offsetting open market operations. Although the United States was still on the gold standard, the period from 1914 to 1933 in U.S. monetary history can thus be viewed as a period of "managed" money because of the frequent sterilizing activity of the Federal Reserve System. See Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States 1867-1960* (Princeton University Press, 1963).

to manipulate.[4] Because of these physical attributes, it emerged as one of the earliest forms of money.

More important, gold was a *commodity* money, and a commodity money standard, regardless of the commodity involved, has a very desirable property: it ensures through the operation of the competitive market a tendency toward *long-run* price stability.[5] Under a commodity money standard, the purchasing power of a unit of commodity money, or what it will buy in terms of all other goods and services, will always tend toward equality with its long-run cost of production.

The Gold Standard and a Closed Economy

Consider first the example of a closed economy — one that does not trade with any other country — that produces gold and uses only gold coins as money. In this country, the government is commited to purchase gold from the public on demand at a fixed price and to convert it into gold coin. Similarly, the government will sell gold to the public at the fixed price.[6] The price level (the average of the prices of all goods and services produced in the country) will be determined by the equality of the quantity of gold coins demanded and supplied.

The supply of gold coins is determined by the supply of gold in the economy and by the amount of gold used for nonmonetary purposes. The supply of gold in the long run is determined by the opportunity cost of producing gold — the cost in terms of foregone labor, capital and other factors engaged in producing an additional unit of gold. The fraction of gold devoted to nonmonetary uses is determined by the purchasing power of gold in terms of all other commodities. The demand for gold coins is determined by the community's wealth, tastes and the opportunity cost of holding money relative to other assets (the interest rate).

In the long run, competition in the gold-producing industry ensures that the purchasing power of gold money in terms of all other goods will equal the opportunity cost of producing an additional unit of gold money.

To see how this works, consider what happens when a technological advance improves productivity in the non-gold-producing sectors of the economy. This improvement leads to a rise in real economic activity, an increase in the demand for money (gold coins) and, with an initially given stock of money, a fall in the price level (a rise in the purchasing power of gold money). The fall in the price level means that gold producers will be earning economic profits. These profits will encourage existing owners to increase production and new entrepreneurs to enter the industry, resulting in an increase in gold production.[7] At the same time, people will take gold previously used for nonmonetary purposes and convert it to monetary uses (e.g., they will sell gold jewelry to the government and have it coined). These forces will increase the gold coin supply, reversing the initial decline in the price level.[8]

In a similar manner, increases in the price level, caused, for example, by a gold discovery which increases the stock of gold and the supply of gold coins, will, by reducing the purchasing power of gold money, cause the community to shift gold from monetary to nonmonetary uses, and will eventually reduce production in the gold-producing industries. Both factors will tend to reduce the gold money supply and reverse the initial rise in the price level. Thus, under a gold standard, one would expect to observe long-run price level stability, though it may take several years for a declining or rising price level to be reversed.[9]

The Gold Standard and Open Economies

If, instead of a closed economy, we have a world in which a number of countries are on a gold coin

[4]Of course, in earlier times, governments have manipulated gold by debasement, clipping, etc. Such practices, however, were the exception. See Anna J. Schwartz, "Secular Price Change in Historical Perspective," *Journal of Money, Credit and Banking* (February 1973, Part 2), pp. 243-69.

[5]For a lucid discussion of the theory of commodity money, see Milton Friedman, "Commodity-Reserve Currency" in Milton Friedman, *Essays in Positive Economics* (University of Chicago Press, 1953).

[6]In actuality the buying and selling prices will differ, reflecting the cost of certifying and minting coins. This difference is referred to as brassage.

[7]In addition, exploration for new sources of gold and attempts to more efficiently mine existing sources will result.

[8]Also, rising prices will be accompanied by rising wages and other costs, making gold mining a less profitable activity. This analysis assumes constant costs; with increasing costs the purchasing power of gold will be higher and the price level lower.

[9]This analysis is static. In a dynamic context, growing real output will produce a tendency towards secular deflation unless gold output expands at the same rate as real economic activity. This will happen if the rate of technological advance is the same in the gold-producing sectors of the economy as in the rest of the economy or if the opening of new mines proceeds apace with real growth. In a world characterized by purely stochastic events such as major gold discoveries, the price level will diverge from its long-run trend for a very long time, giving the appearance of long-run price instability. However, to the extent that gold discoveries are not random events but occur in response to rises in the purchasing power of gold, these extended periods of inflation and deflation are part of the equilibrating process of a commodity standard.

standard, a mechanism is introduced that ensures uniform price movements across these countries.

Consider, for example, two countries that were on the gold standard, the United States and the United Kingdom. As mentioned above, each country fixed the price of its currency in terms of gold — the United States fixed the price of one ounce of gold at $20.67, while the United Kingdom set it at £3, 17s, 10 1/2d. Thus, the dollar/pound exchange rate was perfectly determined. The fixed exchange rate of $4.867 per pound was referred to as the *par* exchange rate.[10]

Under the gold standard fixed exchange rate system, disturbances in the price level in one country would be wholly or in part offset by an automatic balance-of-payments adjustment mechanism called the *price-specie-flow* mechanism. Consider again the example where a technical advance in the United States lowers the U.S. price level. The fall in U.S. prices will result in lower prices of U.S. exports, which will decline relative to the prices of imports, determined largely by prices in the rest of the world. This change in terms of trade (the ratio of export prices to import prices) will cause foreigners to demand more U.S. exports, and U.S. residents to demand fewer imports. A U.S. balance-of-payments surplus will be created, causing gold to flow into the United States from the United Kingdom.[11] The gold inflow will increase the U.S. money supply, reversing the initial fall in prices. At the same time, in the United Kingdom, the gold outflow will reduce the U.K. money supply, thus reducing its price level. In final equilibrium, price levels in both countries will be somewhat lower than they were prior to the technical advance in the United States. Thus, the operation of the price-specie-flow mechanism served to keep prices in line across the world.[12]

In sum, the gold standard as a commodity money standard provided a mechanism to ensure long-run price level stability both for individual countries and groups of countries. Each country had only to maintain a fixed price of gold.

THE MANAGED GOLD STANDARD

The simple model of the gold standard just described was seldom followed in practice. The pure gold coin standard had two features that caused most countries to modify its operation: (1) very high resource costs were required to maintain a full commodity money standard and (2) strict adherence to the "iron discipline" of the gold standard required each country to subsume its internal balance (domestic price and real output stability) to its external balance (balance-of-payments equilibrium). Thus, if a country was running a balance-of-payments deficit, the "rules of the game" required it to deflate the economy until "purchasing power parity" was restored at the par exchange rate.[13] Such deflation leads to a reduction in real output and employment. Consequently, a meaningful discussion of how the gold standard actually operated before World War I requires a discussion of the ways in which nations modified the gold standard to economize on gold and to shield domestic economic activity from external disturbances.

The Use of Fiduciary Money

As mentioned above, high resource costs are required to maintain a full commodity money standard. Discovering, mining and minting gold are costly activities.[14] Consequently, as nations developed, they evolved substitutes for pure commodity money. These substitutes encompassed both government-provided paper money (referred to as fiat money) and privately

[10]The U.K. definition of an ounce of gold was 11/12 of the U.S. definition. Actually, under the gold standard, the exchange rate was never exactly fixed. It varied within a range bounded by the gold points – the costs of transporting gold between the United States and the United Kingdom. Thus, if Americans reduced their demand for British goods and hence for pounds to pay for them, the dollar price of the pound would decline. When the dollar price of the pound declined to, say, $4.80, it would pay to melt down English gold sovereigns into bullion, ship the bullion to the United States and convert it into U.S. gold coins.

[11]In this simple example, the increased British demand for U.S. goods lowers the pound to the gold export point. As a consequence, British importers convert pounds into bullion and ship them to the United States, converting them to U.S. gold dollars to pay for the American goods.

[12]An alternative to the balance-of-payments adjustment mechanism described above is called the Monetary Approach to the Balance of Payments. See Harry G. Johnson, "The Monetary Approach to Balance of Payments Theory" in Jacob A. Frenkel and Harry G. Johnson, eds., *The Monetary Approach to the Balance of Payments* (Allen and Unwin, 1976). According to this approach, through the process of arbitrage – the buying and selling of similar commodities in different markets – the prices of all internationally traded goods, exports, imports and close substitutes, will be the same around the world expressed in similar currency units. Moreover, the prices of domestic goods and services (non-traded goods) will be kept in line with prices of internationally traded goods by domestic arbitrage. Hence, instead of U.S. prices falling first in response to an excess demand for money, and the terms of trade subsequently changing, the excess demand for money will be satisfied directly by the import of gold (through a balance-of-payments surplus) with no change in the terms of trade.

[13]Purchasing power parity is the ratio of the domestic country's price level (value of money) to that of its principal trading partners.

[14]Friedman estimated the cost of maintaining a full gold coin standard for the United States in 1960 to be more than 2½ percent of GNP. See Milton Friedman, *A Program for Monetary Stability* (Fordham University Press, 1959).

produced fiduciary money (bank notes and bank deposits). As long as governments maintained a fixed ratio of their notes to gold, and commercial banks kept a fixed ratio of their liabilities to gold (or to government notes and gold), a gold standard could still be sustained. This type of standard prevailed throughout the world before World War I.

One aspect of this "mixed" gold standard system was that one unit of a country's gold reserves could support a multiple number of units of domestic money (e.g., the U.S. ratio of money to the monetary gold stock was 8.5 in the 1880-1913 period). This meant that in the short run gold flows had powerful effects on the domestic money supply, spending and prices.[15]

International Capital Flows

So far, the discussion abstracts from the role of capital flows between countries. In the pre-World War I gold standard era, most international trade was financed by credit, the issuing of short-term claims in the London money market.[16] In addition, economic projects in the less-developed economies were generally financed by long-term loans from investors in England, France and other advanced countries.[17] The influence of these capital flows significantly reduced the burden of gold flows in the adjustment mechanism.

Consider the example of a gold discovery in a particular country. The discovery would lead to a rise in the domestic money supply, which both raises domestic price levels and reduces domestic interest rates in the short run.[18] The reduction in domestic interest rates relative to interest rates in other countries would induce investors to shift their funds to foreign money markets. This produces a gold outflow, thereby reducing the amount of adjustment required through changes in the terms of trade. Also, to the extent that short-term capital serves as a substitute for gold as an international reserve asset, and domestic financial intermediaries hold balances with correspondents abroad, smaller gold flows would be required to settle international payments imbalances.

Finally, consider the role of long-term capital movements. In the pre-World War I era, the real rate of return on capital was higher in developing countries such as the United States, Canada and Australia than in European countries such as the United Kingdom and France. As a consequence, British investors, for example, invested heavily in American industries and utilities by purchasing long-term securities. The demand by British investors for American securities (other things equal) created an excess demand for dollars at the par exchange rate (or equivalently an excess supply of pounds). The resulting gold inflow into the United States raised the U.S. money supply, leading to a rise in the U.S. price level. The resultant rise in export prices relative to import prices led to an increased demand by U.S. residents for imports (primarily manufactured goods from the United Kingdom). Thus, the transfer of capital resulted in a transfer of real resources from the United Kingdom to the United States. Indeed, in the pre-World War I era, it was normal for a developing country such as the United States to run a persistent balance-of-payments deficit on current account (imports of goods and services exceeding exports of goods and services), financed primarily by long-term capital inflows.

The Role of Central Banks in the Gold Standard

Under a strict gold standard, there is no need for a central bank. What is required is a governmental authority to maintain the fixed domestic currency price of gold by buying and selling gold freely.[19] Indeed, many countries on the gold standard prior to World War I (e.g., the United States and Canada) did not have central banks. Most European countries, on the other hand, have had central banks that predated the gold standard. These institutions, in most cases, had evolved from large commercial banks that served as bankers to the government (e.g., the Bank of England, founded in 1697) into institutions serving as lenders of last resort to the banking community.

Under the classical gold standard, central banks were supposed to follow the rules of the game — to speed up the adjustment of the domestic money supply and price level to external gold flows. The classical model of central bank behavior was the Bank of England, which played by the rules over much of the

[15] It also meant that changes in the composition of the money supply between high-powered money (gold coins and government paper) and bank-provided money (notes and deposits) could be a source of monetary instability.

[16] See Arthur I. Bloomfield, *Short-Term Capital Movements Under the Pre-1914 Gold Standard*, Princeton Studies in International Finance No. 11 (Princeton University, 1963).

[17] See Arthur I. Bloomfield, *Patterns of Fluctuation in International Investment before 1914*, Princeton Studies in International Finance No. 21 (Princeton University, 1968).

[18] This is the so-called liquidity effect. To induce the community to hold a larger fraction of its wealth in the form of money rather than interest-bearing securities, the price of securities must rise (the interest rate must fall).

[19] However, a substantial gold reserve is required to do this effectively.

1870-1914 period.[20] Whenever Great Britain faced a balance-of-payments deficit and the Bank of England saw its gold reserves declining, it raised "bank rate," the rate of interest at which it was willing to discount money market paper. By causing other interest rates to rise, the rise in bank rate was supposed to produce a reduction in holdings of inventories and a curtailment of other investment expenditures. The reduction in investment expenditures would then lead to a reduction in overall domestic spending and a fall in the price level. At the same time, the rise in bank rate would stem any short-term capital outflow and attract short-term funds from abroad.

For most other countries on the gold standard, there is evidence that interest rates were never allowed to rise enough to contract the domestic price level — that these countries did not follow the rules of the game.[21] Also, many countries frequently followed policies of sterilizing gold flows — attempting to neutralize the effects of gold flows on the domestic money supply by open market purchases or sales of domestic securities.[22]

Reserve Currencies and the Role of Sterling

An important addition to the gold standard story is the role of key currencies.[23] Many countries under the pre-World War I gold standard held their international reserves in gold and in the currencies of several major countries. The center of the international payments mechanism was England, with the Bank of England maintaining its international reserves primarily in gold. Most other countries kept reserves in the form of gold and sterling assets. Between 1900 and 1914, two other major European capitals also served as reserve centers — Paris and Berlin, each of which held reserves in gold, sterling and the other country's currency. Finally, a number of smaller European countries held reserves in the form of francs and marks.

In addition, an elaborate network of short-term financial arrangements developed between private financial institutions centered in the London money market. This network of reserve currencies and short-term international finance had two important results. First, England (the Bank of England) could act as an umpire (or manager) of the world gold standard system without having to hold excessive gold reserves.[24] By altering its bank rate, the Bank of England caused repercussions around the world.[25]

Second, much of the balance-of-payments adjustment mechanism in the pre-World War I period did not require actual gold flows. Instead, the adjustment consisted primarily of transfers of sterling and other currency balances in the London, Paris, Berlin and New York money markets.[26] In addition, short-term capital flows accommodated the balance-of-payments adjustment mechanism in this period.[27] Indeed, the pre-World War I gold standard has often been described as a sterling standard.[28]

In sum, the gold standard that emerged before World War I was very different from the pure gold coin standard outlined earlier. Unlike the pure gold coin standard, countries economized on the use of gold both in their domestic money supplies and as a means of settling international payments imbalances. In addition, to avoid the iron discipline of the gold standard, central banks in some countries did not follow the rules of the game, and some countries even

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[20]However, most other central banks apparently did not. See Arthur I. Bloomfield, *Monetary Policy under the International Gold Standard: 1880-1914* (Federal Reserve Bank of New York, 1959).

[21]Noted examples are France and Belgium. See P. B. Whale, "The Working of the Pre-War Gold Standard," *Economica* (February 1937), pp. 18-32, and Bloomfield, *Monetary Policy under the International Gold Standard.*

[22]Usually, gold outflows were offset by open market purchases of domestic securities. For the U.S. experience, see Friedman and Schwartz, *A Monetary History of the United States.* For other countries see Bloomfield, *Monetary Policy under the International Gold Standard.* Such behavior could not persist, however, if a country wished to maintain its link with gold, because if the disequilibrium producing the gold flow were permanent (e.g., the domestic price level were higher than world prices), then gold outflows would continue until all of the country's gold reserves were exhausted. (In the case of an inflow, it would continue until the monetary base consisted entirely of gold.)

[23]Much of this discussion derives from Peter H. Lindert, *Key Currencies and Gold, 1900-1913,* Princeton Studies in International Finance No. 24 (Princeton University, 1969).

[24]Indeed, England's total gold reserves in 1913 only accounted for 9.5 percent of the world's monetary gold stock while the Bank of England's holdings accounted for 3.6 percent. See John Maynard Keynes, *A Treatise on Money: 2, The Applied Theory of Money,* in Elizabeth Johnson and Donald Moggridge, eds., *The Collected Writings of John Maynard Keynes,* vol. VI (Macmillan, 1971).

[25]It likely caused monetary crises in the United States in the 1838-43 period and 1873. See Peter Temin, The *Jacksonian Economy* (W. W. Norton, 1969) and Friedman and Schwartz, *A Monetary History of the United States.*

[26]Also in the period after 1900, instead of gold actually being transported between centers, the practice of "earmarking" gold holdings in major centers gained importance.

[27]See Bloomfield, *Short-Term Capital Movements.*

[28]See Melchior Palyi, *The Twilight of Gold, 1914 to 1936: Myths and Realities* (Henry Regnery Co., 1972) and David Williams, "The Evolution of the Sterling System" in C. R. Whittlesey and J. S. G. Wilson, eds., *Essays in Money and Banking in Honour of R. S. Sayers* (Clarendon Press, 1968).

abandoned the gold standard periodically.[29] The final modification to the pure gold standard was the key role played by the Bank of England as umpire to the system. The result was a "managed gold standard," not the pure gold coin standard often extolled as the best example of a commodity money system.

CHRONOLOGY OF THE GOLD STANDARD: 1821-1971

This section briefly sketches the chronology of the gold standard from the end of the Napoleonic Wars to the collapse of Bretton Woods.

The Classical Gold Standard: 1821-1914

In the 18th century, England and most other countries were on a bimetallic standard based primarily on silver.[30] When Great Britain restored specie payments in 1821 after the Napoleonic War inflation episode, the gold standard was restored. From 1821 to 1880, the gold standard steadily expanded as more and more countries ceased using silver.[31] By 1880, the majority of countries in the world were on some form of a gold standard.

The period from 1880 to 1914, known as the heyday of the gold standard, was a remarkable period in world economic history. It was characterized by rapid economic growth, the free flow of labor and capital across political borders, virtually free trade and, in general, world peace. These external conditions, coupled with the elaborate financial network centered in London and the role of the Bank of England as umpire to the system, are believed to be the *sine qua non* of the effective operation of the gold standard.[32]

[29]Argentina and other Latin American countries, for example. See Alec George Ford, *The Gold Standard, 1880-1914, Britain and Argentina* (Clarendon Press, 1962).

[30]Under a bimetallic standard, each of two precious metals, gold and silver, serves as legal tender, and the two metals are kept by the mint in a fixed proportion to each other. The relationship between the official exchange rate of gold for silver and the market rate will determine whether either one or both metals is used as money. For example in 1834, the United States raised the mint ratio of silver to gold from 15:1 to 16:1, hence valuing silver slightly lower relative to gold than the world market. As a result, little silver was offered for coinage and the United States was in effect on the gold standard. See Leland B. Yeager, *International Monetary Relations: Theory, History and Policy*, 2nd ed. (Harper and Row, 1976), p. 296.

[31]The switch from silver to gold reflected both changes in the relative supplies of the two precious metals resulting from the gold discoveries of the 1840s and '50s and a growing preference for the more precious metal as world real income rose.

[32]See Palyi, *The Twilight of Gold* and Yeager, *International Monetary Relations.*

The Gold Exchange Standard: 1925-31

The gold standard broke down during World War I,[33] was succeeded by a period of "managed fiduciary money," and was briefly reinstated from 1925 to 1931 as the Gold Exchange Standard. Under the Gold Exchange Standard, countries could hold both gold and dollars or pounds as reserves, except for the United States and the United Kingdom, which held reserves only in gold. In addition, most countries engaged in active sterilization policies to protect their domestic money supplies from gold flows.

The Gold Exchange Standard broke down in 1931 following Britain's departure from gold in the face of massive gold and capital flows and was again succeeded by managed fiduciary money.

The Bretton Woods System: 1946-71

The Bretton Woods System was an attempt to return to a modified gold standard using the U.S. dollar as the world's key reserve currency. All other countries — except for the sterling bloc — settled their international balances in dollars. The United States fixed the price of gold at $35.00 per ounce, maintained substantial gold reserves, and settled external accounts with gold bullion payments and receipts.

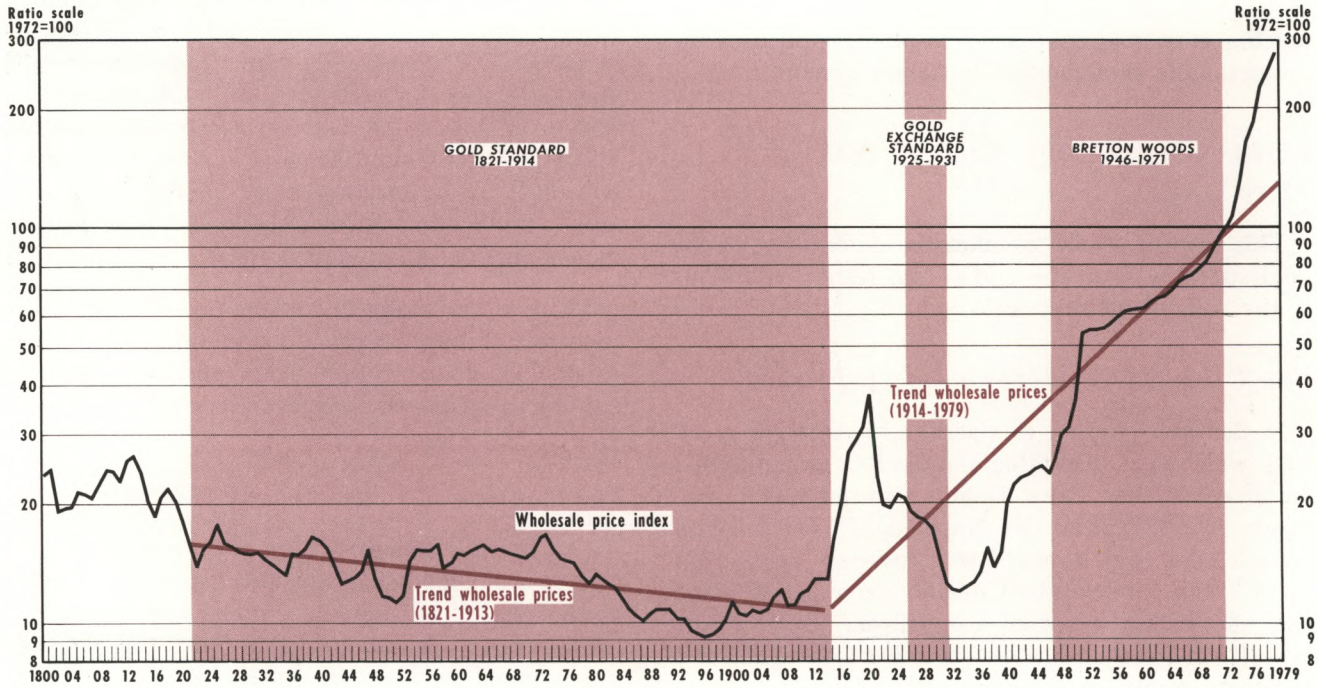
In the post-World War II period, persistent U.S. balance-of-payments deficits helped finance the recovery of world trade from the aftermath of depression and war. However, the steady growth in the use of U.S. dollars as international reserves and persistent U.S. deficits steadily reduced U.S. gold reserves and the gold reserve ratio, reducing public confidence in the ultimate ability of the United States to redeem its currency in gold.[34] This "confidence problem" coupled with many nations' aversion to paying both seigniorage and an "inflation tax" to the United States in the post-1965 period, led to the ultimate breakdown of the Bretton Woods system in 1971.[35] The U.S. decision in 1971 to abandon pegging the price of gold was the final demise of the gold standard.

[33]The United States alone remained on the gold standard, except for a brief embargo on gold exports from 1917 to 1919.

[34]See H. G. Johnson, "Theoretical Problems of the International Monetary System," in R. N. Cooper, ed., *International Finance* (Penguin Books, 1971), pp. 304-34.

[35]Seigniorage here refers to the return earned by the U.S. monetary authorities on the issue of outstanding paper money liabilities. It is measured by the interest foregone by foreign holders of U.S. money balances. The "inflation tax" refers to the depreciation in real purchasing power of outstanding money balances.

Chart 1
Wholesale Price Index, United Kingdom



THE RECORD OF THE GOLD STANDARD

This section briefly examines the stability of the price level and real output for the United Kingdom and the United States under both the gold and managed fiduciary money standards. Charts 1 and 2 portray the behavior of the wholesale price index from 1800 to 1979 for both countries.

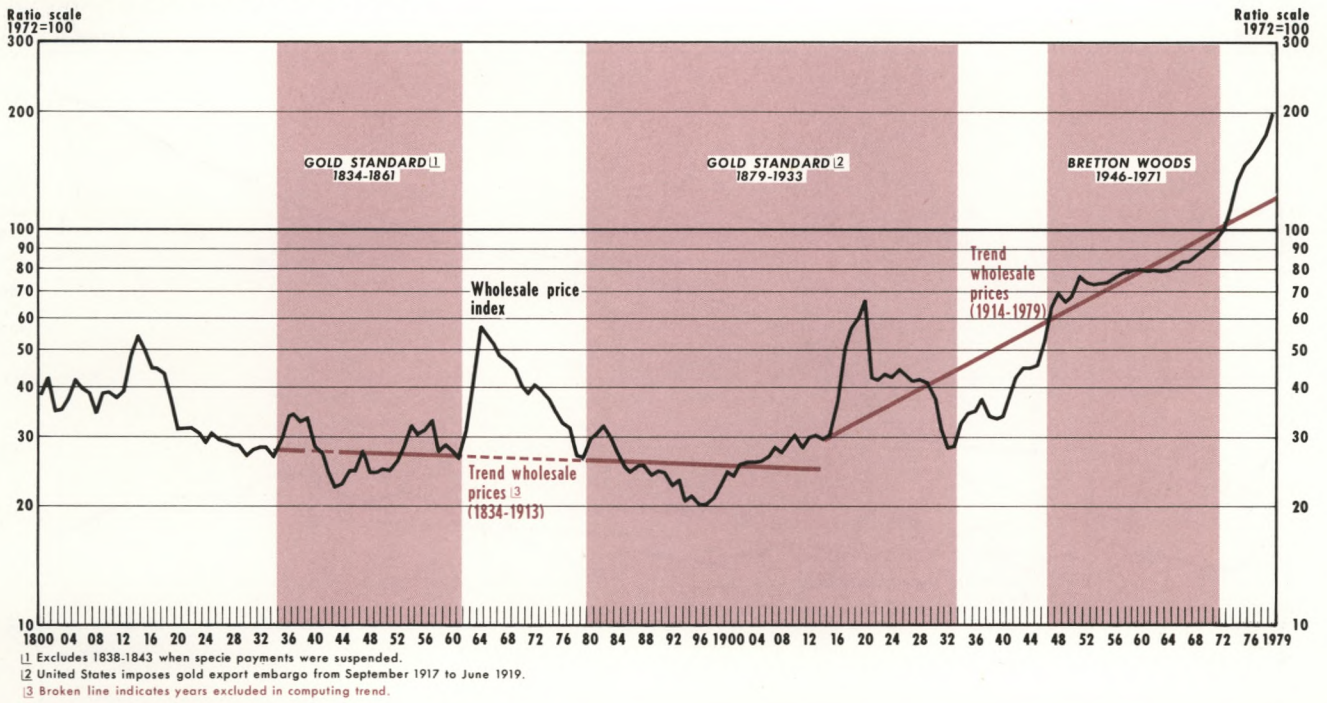
From 1797 to 1821, during and immediately following the Napoleonic Wars, the United Kingdom was on a fiat (or paper) standard; it officially joined the gold standard in 1821, maintaining a fixed price of gold until 1914. There is little change in the U.K. price level comparing the first year of the gold standard, 1821, to the last, but over the whole period there was a slight downward trend in prices, declining on average by 0.4 percent per year. Within that approximate 100-year span, however, periods of declining prices alternated with periods of rising prices, a pattern consistent with the commodity theory of money. Prices fell until the mid-1840s, reflecting the pressure of rising real incomes on the limited stock of gold. Following the California and Australian gold discoveries of the late 1840s and early 1850s, prices turned around and kept rising until the late 1860s. This was followed by a 25-year period of declining prices, again reflecting both rising real income and expansion of the number of countries on the gold standard. This deflation ended after technical advances in gold processing and major gold discoveries in the late 1880s and 1890s increased world gold supplies.

The United States followed a pattern similar to the United Kingdom, experiencing a slight downward trend in the price level with prices declining on average by 0.14 percent per year from 1834-1913. The country adopted the gold standard in 1834 (it had been on silver for the preceding 35 years) and remained on it at the same price of gold until World War I, with the exception of the Greenback episode from 1861 to 1878.[36] During that period, the country abandoned the gold standard and prices increased rapidly until 1866. To restore convertibility to gold, prices had to fall sufficiently to restore the pre-war purchasing power parity. This occurred in the rapid deflation from 1869 to 1879.

The period since World War I has not been charac-

[36]Also to be excluded from the gold standard are the turbulent years 1838-1843, during which specie payments were generally suspended.

Chart 2
Wholesale Price Index, United States



[1] Excludes 1838-1843 when specie payments were suspended.
[2] United States imposes gold export embargo from September 1917 to June 1919.
[3] Broken line indicates years excluded in computing trend.

terized by price stability except for the 1920s under the Gold Exchange Standard, and the 1950s and early 1960s under the Bretton Woods System. Indeed, since the end of the gold standard, price levels in both countries have on average been rising. The U.K. price level increased at an average annual rate of 3.81 percent from 1914 to 1979, while U.S. price level increased by an average annual rate of 2.2 percent.

Charts 3 and 4 present further evidence on the operation of a commodity money standard and on the long-run price stabilizing character of the gold standard.

Chart 3 compares the purchasing power of gold for the world (measured by the ratio of an index of the price of gold to the wholesale price index for the United Kingdom) in relation to its trend with the world monetary gold stock in relation to its trend over the period 1821-1914.[37]

The purchasing power of gold index presented here varies inversely with the wholesale price index presented in chart 1. This inverse association is a reflection of the fixed price of gold over this period.[38] The trends of both series were rising over the whole period. The upward trend in the purchasing power of gold series reflects a more rapid growth of world real output and, hence, in the demand for monetary gold than could be accommodated by growth in the world's monetary gold stock.

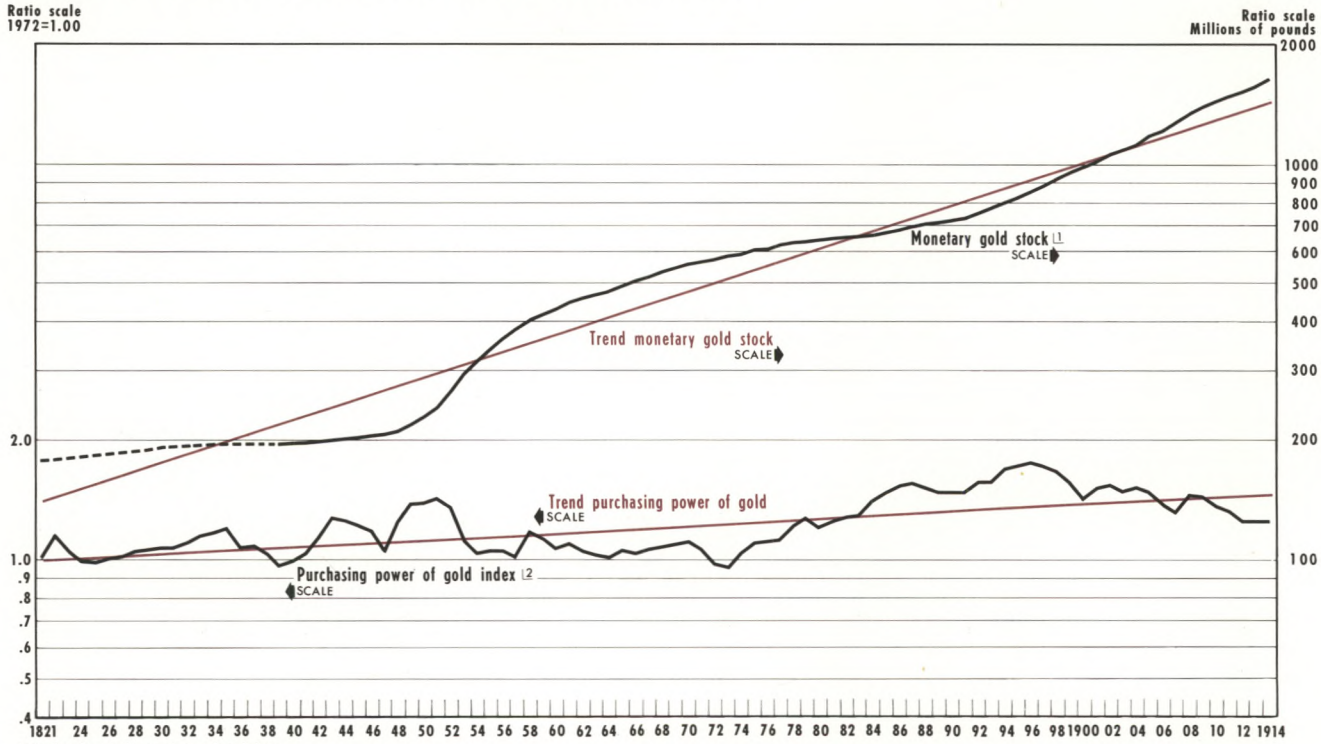
In comparing deviations from trend in the purchasing power of gold to that in the world monetary gold stock, one would expect that deviations from trend in the monetary gold stock would produce corresponding changes in the price level and, for a given nominal price of gold, would inversely affect the purchasing power of gold. A comparison reveals this negative association, with deviations from trend in the world monetary gold stock leading deviations from trend in the purchasing power of gold.[39]

[37] The United Kingdom was chosen to represent the pre-1914 world because it was a large open economy with few trade restrictions. Hence the wholesale price index would be dominated by internationally traded goods.

[38] Indeed, this inverse relationship prevailed virtually until the late 1960s. Since the freeing of the price of gold in 1968, the purchasing power of gold has varied directly with the wholesale price index. This primarily reflects rising demand for gold as a hedge against inflation, and increasing world political and monetary instability.

[39] The highest statistically significant negative correlation in the 1821-1914 period occurred with deviations from trend in the monetary gold stock leading deviations from trend in the purchasing power of gold by two years. The correlation coefficient, −.644, was statistically significant at the 1 percent level.

Chart 3
Monetary Gold Stock and Purchasing Power of Gold Index, World



[1] Broken line indicates interpolated data.
[2] Measured by the ratio of an index of the price of gold to the wholesale price index for the United Kingdom.

In addition, according to the operation of a commodity money standard, movements in the purchasing power of gold would be expected to precede movements in the monetary gold stock — a rising purchasing power of gold would induce both a shift from nonmonetary to monetary uses of gold and increased gold production. Such a positive association between deviations from trend of the two series is observed.[40] Thus the 1820s and '30s were largely characterized by the purchasing power of gold exceeding its long-run trend. This was followed by a rapid increase in the world monetary gold stock after 1848 as the output of the new California and Australian mines were added to the world's stock. Subsequently, the purchasing power of gold declined from its peak above trend in the mid-1850s and was succeeded by a marked deceleration in the monetary gold stock after 1860. The same pattern can be observed comparing the rise in the purchasing power of gold in the 1870s and '80s with the subsequent increase in the monetary gold stock in the mid-1890s.

Chart 4 compares the U.S. purchasing power of gold in relation to its trend with the U.S. monetary gold stock in relation to its trend over the 1879-1914 gold standard period.[41]

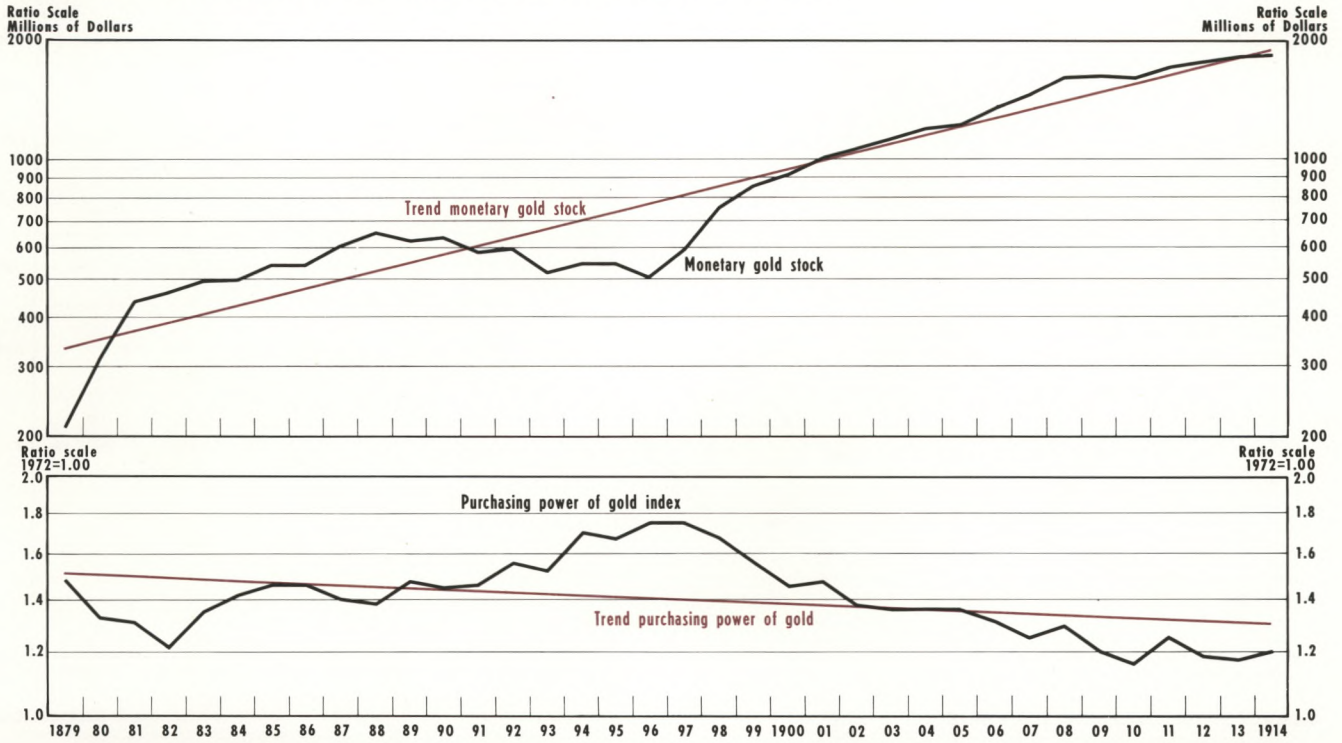
In this period, the trends of the two series moved in opposite directions. The declining trend in the purchasing power of gold series, reflecting more rapid growth in the U.S. monetary gold stock than in real output, was a consequence of two developments: the accumulation of monetary gold from the rest of the world early in the period following the resumption of specie payments, and the effects of gold discoveries in the 1890s.

As in chart 3, a negative association between deviations from trend in the monetary gold stock and

[40] The highest statistically significant positive correlation in the 1821-1914 period occurred with deviations from trend in the purchasing power of gold leading deviations from trend in the world monetary gold stock by 25 years. The correlation was .436, statistically significant at the 1 percent level.

[41] An important difference in comparing the behavior of the U.S. monetary gold stock with that of the world is that short-run movements in the U.S. series would reflect, in addition to changes in gold production and shifts between monetary and nonmonetary uses of gold, gold movements between the United States and other countries.

Chart 4
Monetary Gold Stock and Purchasing Power of Gold Index, United States



the purchasing power of gold is observed.[42] Also, similar to the evidence in chart 3, deviations in trend in the purchasing power of gold preceded deviations from trend in the monetary gold stock with a lead.[43] Thus, declines in the purchasing power of gold from 1879 to 1882 preceded declines in the monetary gold stock below trend in the late 1880s and early 1890s, while rises in the purchasing power of gold after 1882 can be associated with a rising monetary gold stock after 1896. Finally, a declining purchasing power of gold in the mid-1890s can be associated with a falling monetary gold stock after 1903.

One important implication of the tendency for price levels to revert toward a long-run stable value under the gold standard was that it insured a measure of predictability with respect to the value of money: though prices would rise or fall for a few years, inflation or deflation would not persist.[44] Such belief in long-run price stability would encourage economic agents to engage in contracts with the expectation

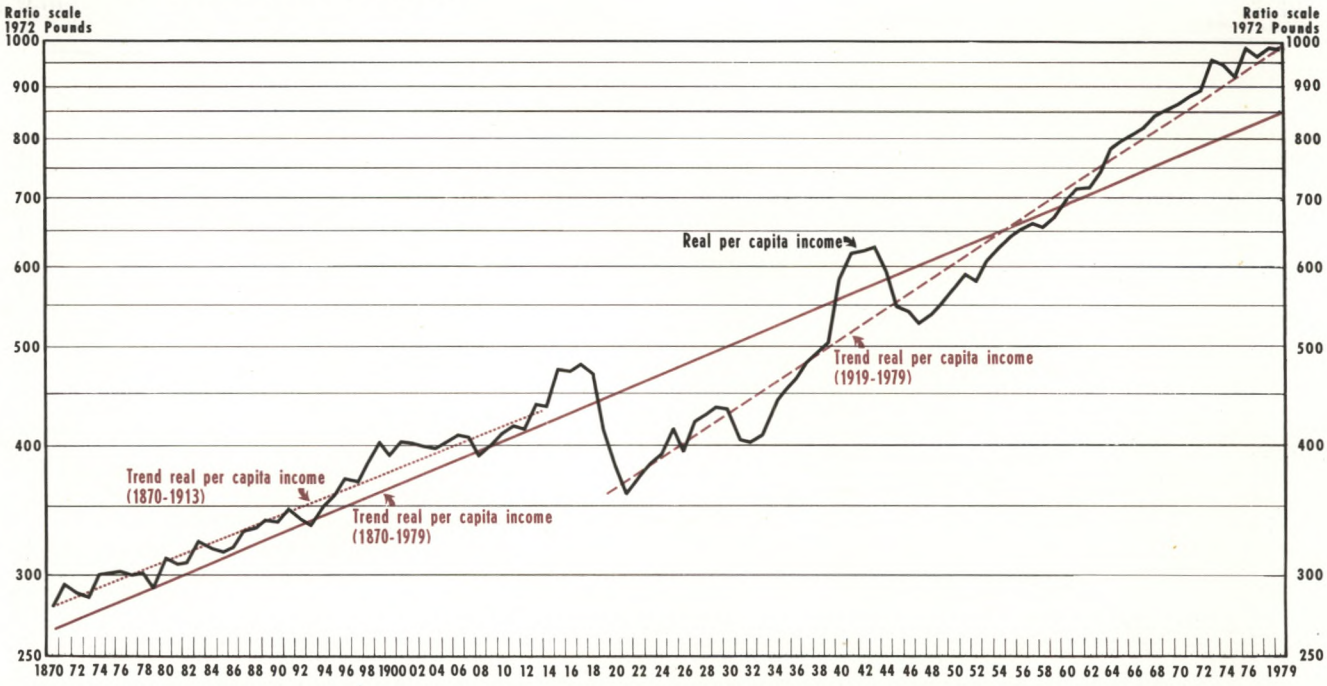
[42]The highest statistically significant negative correlation in the 1879-1914 period occurred with a contemporaneous relationship between deviations from trend in the monetary gold stock and deviations from trend in the purchasing power of gold. The correlation coefficient, −.656, was statistically significant at the 1 percent level.

[43]The highest statistically significant positive correlation in the 1879-1914 period occurred with deviations from trend in the purchasing power of gold leading deviations from trend in the monetary gold stock by 14 years. The correlation coefficient was .793, which was statistically significant at the 1 percent level.

The highest statistically significant positive correlation in the 1879-1914 period occurred with deviations from trend in the *world* purchasing power of gold leading deviations from trend in the *world* monetary gold stock by 16 years. The correlation coefficient was .863, which was statistically significant at the 1 percent level. The considerably longer lead observed over the 1821-1914 period in footnote 40 above likely reflects a longer adjustment period in the early part of the 19th century.

[44]See Benjamin Klein, "Our New Monetary Standard: The Measurement and Effects of Price Uncertainty, 1880-1973," *Economic Inquiry* (December 1975), pp. 461-84 for evidence of long-run price stability for the United States under the gold standard. His evidence that positive (negative) autocorrelations of the price level are succeeded by negative (positive) autocorrelations is consistent with the hypothesis that the price level reverted back to its mean level. A consequence of this mean reversion phenomenon was that year-to-year changes in the price level were substantial for each country. However, the standard deviations of year-to-year changes in the wholesale price index were still considerably lower in the pre-World War I gold standard era compared with the post-World War I managed fiduciary money era. For the United Kingdom, the standard deviations were: 1821-1913, 6.20; 1919-79 (excluding 1939-45), 12.00. For the United States, the standard deviations were: 1834-1913 (excluding 1838-43 and 1861-78), 6.29; 1919-79 (excluding 1941-45), 9.28.

Chart 5
Real Per Capita Income, United Kingdom



that, should prices of commodities or factors of production change, the change would reflect real forces rather than changes in the value of money.

Belief in long-term price level stability has apparently disappeared in recent years, as people now realize that the long-run constraint of the gold standard has vanished.[45] As a consequence, it is more difficult for people to distinguish between changes in relative prices and changes in the price level. Such absolute vs. relative price confusion has increased the possibility of major economic losses as people fail to respond to market signals.[46]

Finally, evidence on real output stability for the United Kingdom and the United States is presented. It is frequently argued that under the gold standard, when countries had to subordinate internal balance considerations to the gold standard's iron discipline, real output would be less stable than under a regime of managed fiduciary money. Charts 5 and 6 show the deviations of real per capita income from its long-run trend over the period 1870 to 1979.

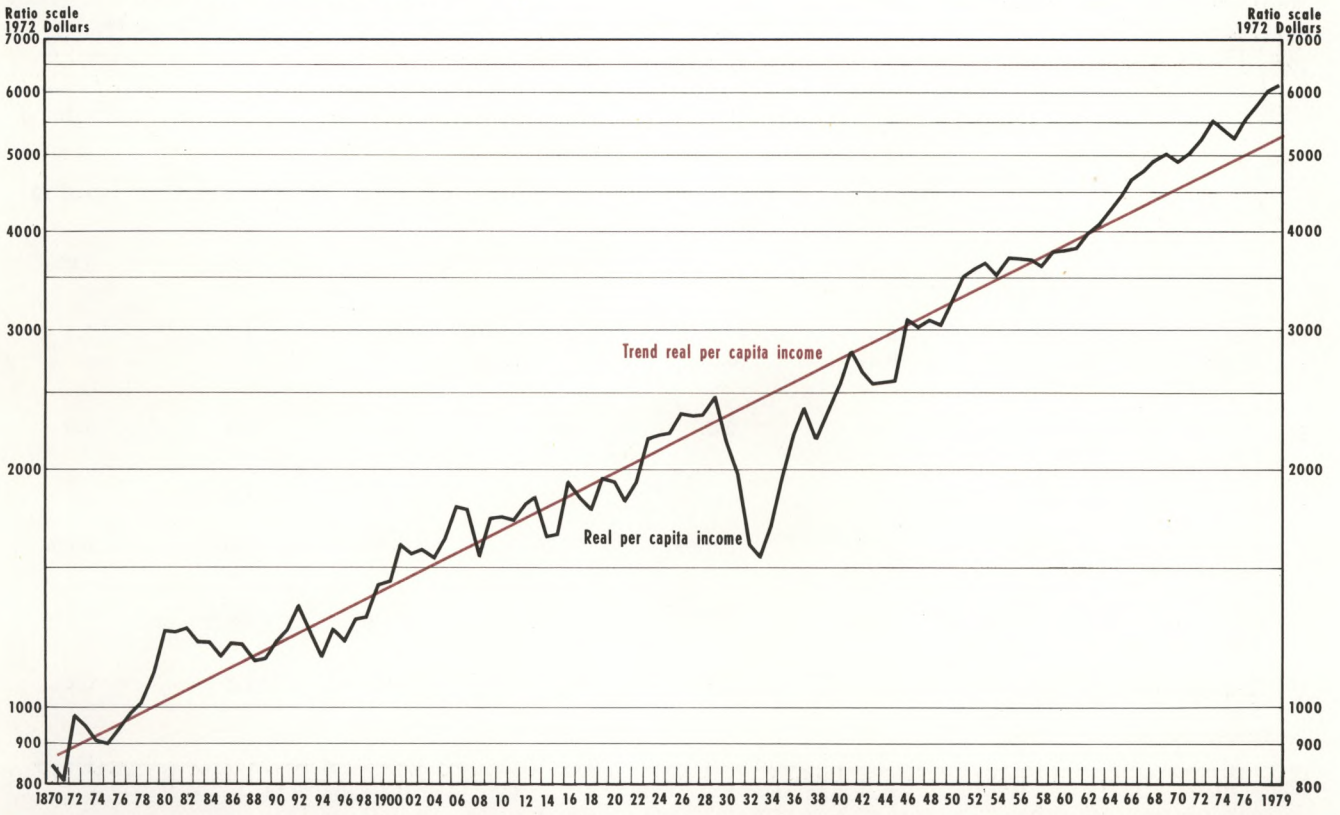
For the United Kingdom, chart 5 shows both a single trend line for the 1870-1979 period and separate trend lines for each of the pre- and post-World War I subperiods. The U.K. data was split into two subperiods because the trend line for the entire period results in real output after 1919 being virtually always below trend. This suggests that World War I permanently altered the trend growth rate of real per capita income in the United Kingdom and, hence, the two periods should be handled separately. Examining the deviations from trend (using the subperiod trends) suggests that real per capita income was less variable in the pre-World War I period than subsequently. The mean absolute value of the percentage deviations of real per capita income from trend was 2.14 percent from 1870-1913 and 3.75 percent from 1919-79 (excluding 1939-45).

As in the U.K. case, U.S. real per capita income was more stable under the gold standard from 1879 to 1913 compared with the entire post-World War I

[45]Indeed, evidence presented by Klein, "Our New Monetary Standard," shows a marked decline since 1960 in long-term price level predictability, the belief about long-term price behavior (measured by a moving standard deviation of changes in the price level). At the same time, short-term price level predictability, the belief about price level behavior in the near future, has improved in the post-war period.

[46]See Friedrich August von Hayek, *A Tiger by the Tail*, Hobart Papers (Institute of Economic Affairs, 1972); Milton Friedman, "Nobel Lecture: Inflation and Unemployment," *Journal of Political Economy* (June 1977), pp. 451-72; and Axel Leijonhuvud, "Costs and Consequences of Inflation," in Axel Leijonhuvud, *Information and Co-ordination: Essays in Macro Economic Theory* (Oxford University Press, 1981).

Chart 6
Real Per Capita Income, United States



period. The mean absolute values of the percentage deviations of real per capita income from trend were: 6.64 percent from 1879-1913 and 8.97 percent from 1919-79 (excluding 1941-45).

Moreover, unemployment was on average lower in the pre-1914 period in both countries than in the post-World War I period. For the United Kingdom, the average unemployment rate over the 1888-1913 period was 4.30 percent, while over the period 1919-79 (excluding 1939-45) it was 6.52 percent. For the United States, average unemployment rates by subperiod were: 1890-1913, 6.78 percent and 1919-79 (excluding 1941-45), 7.46 percent.

Thus, the evidence suggests that the managed fiduciary money system superceding the gold standard generally has been associated with less real economic stability.

THE CASE FOR A RETURN TO GOLD

The pre-World War I gold standard was the closest thing to a worldwide commodity money standard. Hence, an examination of the record for that period is crucial in determining what we might expect should we return to some form of commodity standard.

One dominant feature of that period was long-run price stability. This contrasts favorably with the behavior of the price level under the managed fiduciary money standard for much of the period since World War I. Also, though real output varied considerably from year to year under the gold standard, it did not vary discernibly more than it has in the entire period since the first world war.[47]

One problem with comparing the pre-World War I gold standard to the managed fiduciary money standard after World War I is that the latter period includes the turbulent interwar years, a period that may bias the case against managed fiduciary money. To account for this, table 1 compares several measures of performance of the price level, real output and money growth for three time periods: the pre-World War I

[47]The standard deviations of year-to-year percentage changes in real per capita income for the United States were: 1879-1913, 5.79; 1919-79 (excluding 1941-45), 6.34. For the United Kingdom: 1870-1913, 2.62; 1919-79 (excluding 1939-45), 3.24.

Table 1

A Comparison of the Behavior of Price Level, Real Output and Money Growth in the United Kingdom and the United States

	The Gold Standard[1]		The Interwar Period		Post-World War II	
	U.K.	U.S.	U.K.	U.S.	U.K.	U.S.
	1870-1913 (1821-1913)	1879-1913 (1834-1913)	1919-38	1919-40	1946-79	1946-79
(1) The average annual percentage change in the price level	–0.7% (–0.4)	0.1% (–0.1)	–4.6%	–2.5%	5.6%	2.8%
(2) The coefficient of variation of annual percentage changes in the price level (ratio)	–14.9 (–16.3)	17.0 (6.5)	–3.8	–5.2	1.2	1.3
(3) The coefficient of variation of annual percentage changes in real per capita income (ratio)	2.5	3.5	4.9	5.5	1.4	1.6
(4) The average level of the unemployment rate	4.3%[2]	6.8%[3]	13.3%	11.3%	2.5%	5.0%
(5) The average annual percentage change in the money supply	1.5%	6.1%	0.9%	1.5%	5.9%	5.7%
(6) The coefficient of variation of annual percentage changes in the money supply (ratio)	1.6	0.8	3.6	2.4	1.0	0.5

Notes: Rows 1 and 5 calculated as the time coefficient from a regression of the log of the variable on a time trend.
Rows 2, 3 and 6 calculated as the ratio of the standard deviation of annual percentage changes to their mean.

[1]Data for the longer periods (in parentheses) were available only for the price level. Years 1838-43 and 1861-78 were excluded for the United States.

[2]1888-1913

[3]1890-1913

Data Sources: See data appendix

gold standard period, the interwar period and the post-World War II period.[48]

First, row 1 presents evidence on long-run price level stability as measured by the average annual rate of change in the price level over the period. As can be observed, the interwar period in both countries was characterized by substantial deflation in both the United States and the United Kingdom, while the post-World War II period has been characterized by inflation. This performance is in marked contrast to the near price stability of the gold standard period. However, price variability, measured in row 2 by the coefficient of variation of percentage year-to-year changes in the price level, reveals a slightly different picture. Prices were more variable under the gold standard than in both post-gold-standard periods, with the least variability occurring in the post-World War II period.

Second, row 3 presents evidence on real output stability as measured by the coefficient of variation of year-to-year percentage changes in real per capita output. Real output was considerably less stable in both countries in the interwar period than in either the gold standard or the post-World War II period,

[48]In this comparison, both World Wars are omitted. This was done for two reasons. First, both wars were accompanied by rapid inflation in both countries, and in each case wartime government expenditures were largely financed by the issue of government fiat money. Hence, a comparison of the price-stabilizing characteristics of the two monetary standards – including two major wars in the case of the managed fiduciary money standard and none in the gold standard – would bias the case against the former. Second, measured real output would tend to be higher than otherwise in wartime to the extent that resources (both employed and otherwise unemployed) are devoted to (nonproductive) wartime use. Hence, including wartime real output would bias the case in favor of managed fiduciary money.

with the latter period having the best record. In addition, the evidence on average unemployment rates in row 4 agrees with the evidence on real output stability: unemployment was by far the highest in the interwar period and by far the lowest in the post-World War II period in both countries.[49]

Finally, a comparison is made across periods in the average annual rate of monetary growth in row 5, and in the variability in monetary growth measured by the coefficient of variation of percentage year-to-year changes in the money supply in row 6. According to monetary theory, a reduction in monetary growth below the long-run trend of real output growth will produce deflation, while a rise in monetary growth above the long-run trend of real output growth will lead to inflation. In the transition between different rates of monetary growth, both the levels and growth rates of real output will deviate considerably from long-run trend. Thus monetary variability will lead to real output variability.[50]

The rate of monetary growth was lower in both countries in the interwar period than in both the post-World War II and the gold standard periods. In the case of the United Kingdom, the post-World War II period exhibits more rapid monetary growth than under the gold standard, while for the United States, monetary growth rates are similar in both the post-war and gold standard periods.

Finally, monetary growth was more variable in both countries in the interwar period than in the other two periods, with the post-World War II period displaying the least variability in monetary growth.

The poor economic performance of the interwar period compared with either the preceding gold standard period or the post-World War II period has been attributed to the failure of monetary policy. Indeed, the attempt by the Bank of England to restore convertibility to gold at the pre-war parity has often been characterized as the reason for British deflation and unemployment in the 1920s.[51] Likewise, the failure of the Federal Reserve System to prevent the drastic decline which occurred in the U.S. money supply from 1929 to 1933 has been blamed for the severity of the Great Depression in the United States.[52] One could well argue that the greatly improved performance of monetary policy and economic stability in the two countries in the post-World War II period reflects learning from past mistakes. This suggests that in considering the case for a return to the gold standard, a meaningful comparison should really be made between the post-World War II period and the gold standard. In such a comparison, the gold standard provided us with greater *long-run* price stability, but at the expense of both *short-run* real output and price stability. The higher rates of inflation and lower variability of real output (and lower unemployment) in the two countries in the recent period likely reflects changing policy preferences away from long-run price stability and toward full employment. Indeed, the strong commitment to full employment in both countries likely explains the worsening of inflation in the post-war period.[53]

In assessing the case for a U.S. return to a gold standard, the benefits of such a policy must be weighed against the costs. The key benefit of a return to a gold standard would be long-run price stability. The costs, however, are not inconsiderable. A commodity money standard such as the gold standard involves significant economic costs: (1) the resource costs of maintaining the standard and (2) the short-run instability of both the price level and real output that would accompany the adjustment of the commodity to changing supply and demand conditions.

Moreover, the history of the pre-World War I gold standard suggests that it worked because it was a "managed" international standard. In addition, the concentration of world capital and money markets in London and the use of sterling as a key currency enabled the system to function smoothly with limited gold reserves and to withstand a number of severe external shocks. Perhaps of paramount importance for the successful operation of the managed gold standard

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[49]A comparison between the two unemployment rates and the measures of real output stability reveals an interesting difference. Real output was less stable in the United States, but unemployment was higher in the United Kingdom. One explanation offered for the high and persistent unemployment in the United Kingdom in the interwar period is that it was caused by significant increases in the ratio of unemployment benefits to wages. See Daniel K. Benjamin and Levis A. Kochin, "Searching for an Explanation of Unemployment in Interwar Britain," *Journal of Political Economy* (June 1979), pp. 441-78.

[50]See Milton Friedman, *A Theoretical Framework for Monetary Analysis*, Occasional Paper No. 112 (National Bureau of Economic Research, 1971).

[51]See John Maynard Keynes, "The Economic Consequences of Mr. Churchill," in Johnson and Moggridge, eds., *Collected Works of John Maynard Keynes*, vol. IX (1972).

[52]See Friedman and Schwartz, *A Monetary History of the United States.*

[53]Friedman forcefully argued this point in his 1968 presidential address to the American Economic Association. See Milton Friedman, "The Role of Monetary Policy," *The American Economic Review* (March 1968), pp. 1-17.

was the tacit cooperation of the major participants in (ultimately) maintaining the gold standard link and its corollary, long-run price stability, as the primary goal of economic policy.[54] This suggests that one country alone on the gold standard would likely find its monetary gold stock and hence its money supply subject to persistent shocks from factors beyond its control.

A fiduciary money standard based on a monetary rule of a steady and known rate of monetary growth could provide both greater price level and real output stability than a return to the gold standard. The key problem with a fiduciary system, however, is to ensure that such a rule is maintained and that a commitment be made to the goal of long-run price stability.

[54]Other conditions amenable to the successful operation of the gold standard were the free mobility of labor and capital, the absence of exchange controls and the absence of any major wars.

Data Appendix

Chart 1

United Kingdom

1. **Wholesale Prices** 1800-1979. (1972 = 100). Data for 1800-1938 and 1946-1975 from Roy W. Jastram, *The Golden Constant* (John Wiley and Sons, New York, 1977), Table 2, pp. 32-33; 1939-1945 from B. R. Mitchell, *European Historical Statistics 1750-1970* (Columbia University Press, New York, 1975), Table I1, p. 739; 1976-78 Central Statistical Office, *Economic Trends Annual Supplement 1980 Edition* (Her Majesty's Stationery Office, London, 1979), p. 112, series: Wholesale Prices for All Manufactured Products, 1976 figure used was an average of the CSO 1976 value and Jastram's 1976 value; 1979 from CSO, *Monthly Digest of Statistics* (Her Majesty's Stationery Office, London, Nov. 1980), p. 159, series: same as 1976-78.

Chart 2

United States

1. **Wholesale Prices** 1800-1979. (1972 = 100). Data for 1800-1975 from Roy W. Jastram, *The Golden Constant* (John Wiley and Sons, New York, 1977), Table 7, pp. 145-46; 1976 from U.S. Dept. of Labor, Bureau of Labor Statistics, *Wholesale Prices and Indexes Supplement 1977* (1977), Table 4, series: All Commodities; 1977 from Dept. of Labor, BLS, *Monthly Labor Review* (April 1978), Table 26, series: All Commodities; 1978 from *Monthly Labor Review* (April 1979), Table 27, series: All Commodities; 1979 from Dept. of Labor, BLS, *Supplement to Producer Prices and Price Indexes Data for 1979* (1980), Table 4, series: All Commodities.

Chart 3

World

1. **United Kingdom Purchasing Power of Gold** 1821-1914. (1972 = 1.00). 1821-1914 from Roy W. Jastram, *The Golden Constant* (John Wiley and Sons, New York, 1977), Table 3, pp. 36-37.

2. **World Monetary Gold Stock** 1821-1914. Data for 1821-38 represent interpolation between values for 1807, 1833 and 1839. These values, along with the 1839-1914 values, from League of Nations, *Interim Report of the Gold Delegation and Report of the Gold Delegation* (Arno Press, New York, 1978), Table B, col. (1), series: Monetary Stock of Gold, end of year, millions of pounds at 84s 11½d per fine oz.

Chart 4

United States

1. **Purchasing Power of Gold** 1879-1914. (1972 = 1.00). Data for 1879-1914 from Roy W. Jastram, *The Golden Constant* (John Wiley and Sons, New York, 1977), Table 8, pp. 147-48.

2. **Monetary Gold Stock** 1879-1914. Data for 1879-1914 from Phillip Cagan, *Determinants and Effects of Changes in the Stock of Money 1875-1960* (Columbia University Press, New York, 1965), Appendix F, Table F-7, col. (1), current par value = $20.67 per oz. Cagan's sources include the following: 1879-1907, *Annual Report*, Mint, 1907; 1908-1913, *Circulation Statement of United States Money;* 1914, *Banking and Monetary Statistics*, FRB, 1941.

Chart 5

United Kingdom

1. **Real Per Capita Income** 1870-1979. (1972 pounds).

   (a) *Nominal Income* 1870-1979. Data for 1870-1975 from Milton Friedman and Anna J. Schwartz, forthcoming *Monetary Trends in the United States and the United Kingdom: Their Relation to Income, Prices, and Interest Rates 1867-1975*, National Bureau of Economic Research, Chapter 4, Table 4-A-2, col. (2). Nominal income for 1976-79 computed as GNP at factor cost less consumption of fixed capital. 1976-78 GNP at factor cost from CSO, *Economic Trends Annual Supplement 1980 Edition*, Table 36, col. (2); 1979 GNP at factor cost from CSO, *Monthly Digest of Statistics* (Jan. 1981), Table 1.2, col. (2). 1976-79 Consumption of fixed capital from OECD, *National Accounts of OECD Countries* (Paris, 1981), Vol. 1, p. 70, series #36: Consumption of the Fixed Capital.

   (b) *Implicit Price Deflator* 1870-1979. (1972 = 100). Data for 1870-1975 from Friedman and Schwartz, *Monetary Trends*, Chapter 4, Table 4-A-2, col. (4); 1976-79 from International Monetary Fund, *International Financial Statistics* (Jan. 1981), p. 404; deflator calculated as P = 100 × (nominal GDP/real GDP), real and nominal GDP appearing in *IFS*.

   (c) *Population* 1870-1979. Data for 1870-1965 from C. Feinstein, *National Income, Expenditure and Output of the United Kingdom, 1855-1965*, Table 44, col. (1); 1966-75 from CSO, *Annual Statistical Abstract;* 1976-79 from CSO, *Monthly Digest of Statistics* (Nov. 1980), p. 16.

Chart 6

United States

1. **Real Per Capita Income** 1870-1979. (1972 dollars). This series is the result of splicing together two series, the earlier based upon data from Friedman and Schwartz, *Monetary Trends* and the later based upon data from U.S. Dept. of Commerce, *Survey of Current Business.*

   For 1870-1949, a real per capita income series was computed using the following data: nominal income, Friedman and Schwartz, *Monetary Trends*, Chapter 4, Table 4-A-1, col. (2); implicit price deflator, 1972 = 100, Chapter 4, Table 4-A-1, col. (1); population, U.S. Department of Commerce, *Historical Statistics* (1960). This series was then adjusted in the following way:

   $$[Y/(P \times N)]_t = \exp[\ln(FS_t) + (\ln(SCB_{1950}) - \ln(FS_{1950}))], \quad t = 1870, \ldots, 1949$$

   where FS_t = Friedman-Schwartz value of real per capita income in time t and SCB_t = *Survey of Current Business* value in time t. The adjusted series was then joined to the 1950-1979 series computed from the following data in the *Survey of Current Business*: nominal NNP, average of quarterly figures, seasonally adjusted and NNP implicit price deflator, average of quarterly figures, 1972 = 100; population data (resident population less armed forces, average of monthly figures) from U.S. Dept. of Commerce, Bureau of the Census.

Other Data Used

1. **U.S. Unemployment Rates** 1890-1979. Data for 1890-1900 from Stanley Lebergott, "Changes in Unemployment 1800-1960," in Robert W. Fogel and Stanley L. Engerman, eds., *The Reinterpretation of American Economic History* (Harper & Row, New York, 1971), p. 80, Table 1; 1901-57 from Dept. of Commerce, Bureau of the Census, *Historical Statistics of the United States* (1960), series D-47; 1958 from Dept. of Labor, BLS, *Monthly Labor Review Statistical Supplement* (1959), Table I-1; 1959-62 from *MLR Statistical Supplement* (1962), Table I-1, p. 1; 1963 from *MLR Statistical Supplement* (1963), Table I-1; 1964-79 from Dept. of Labor, BLS, *Monthly Labor Review* (Jan. 1981), Table 1.

2. **Great Britain Unemployment Rates** 1888-1979. Data for 1888-1966 from B. R. Mitchell, *European Historical Statistics 1750-1970* (Columbia University Press, 1975), Table C2, series: UK:GB; 1967-72 from CSO, *Monthly Digest of Statistics* (March 1973), Table 21, series: Percent unemployed of total employees for Great Britain; 1973-77 from same publication as for 1967-72 (Oct. 1978), Table 3.9, series: same as that for 1967-72; 1978-1979 from same publication as 1967-72 (Nov. 1980), Table 3.10, series: same as that for 1967-72.

3. **U.S. Money Supply** 1879-1979. Data for 1879-1975 from Friedman and Schwartz, *Monetary Trends*, Chapter 4, Table 4-A-1, col. (1); 1976-1979 from Board of Governors of the Federal Reserve System, Statistical Release: Money Stock Measures, H.6, series M2, annual average of monthly figures, seasonally adjusted.

4. **U.K. Money Supply** 1870-1979. Data for 1870-1975 from Friedman and Schwartz, *Monetary Trends*, Chapter 4, Table 4-A-2, col. (1); 1976-79 from CSO, *Financial Statistics* (Her Majesty's Stationery Office, London, Nov. 1980), p. 144, series: M3, not seasonally adjusted, end of second quarter.

We Are All Supply-Siders Now!

JOHN A. TATOM

THE latest sensation in the popular press and among policymakers is the discovery of "supply-side economics" and the exciting promise of supply-side policies.[1] To provide a perspective on the current debate, this article reviews the conceptual basis for supply-side economics and examines the fundamentals of supply performance in the United States.

WHAT IS SUPPLY-SIDE ECONOMICS ALL ABOUT?

Supply-side economics is growth- and efficiency-oriented. It covers the entire range of economic decisions: what gets produced, how, for whom, and how fast production and consumption possibilities expand. The supply-side approach is not novel in economic analysis. Indeed, it has been the core of economic analysis since the first systematic analysis of scarcity and aggregate supply, Adam Smith's pioneering *Inquiry into the Nature and Causes of the Wealth of Nations,* was published over 200 years ago.[2]

The recent emphasis on supply is novel, however, in at least one respect — the assertion that supply effects are of central importance in evaluating government efforts to improve the functioning of the economy. The conventional view of the functioning of the economy emphasizes a role for the management of aggregate demand as an appropriate macroeconomic policy for stabilizing the economy. The normal tools for influencing aggregate demand are monetary and fiscal policy, including spending for goods and services, transfer programs and taxation policies. By influencing demand for output, such policies are presumed to affect the levels of the nation's output, employment and prices, as well as their rates of change. Expanding the growth of the money stock or government expenditures for goods, services or transfer programs is viewed as "expansionary" in its effects on output and employment. Supply-siders reject such arguments as woefully incomplete. They emphasize that standard expansionary macroeconomic policies can significantly *reduce* the economy's ability to produce. In particular, they stress that individual choices affect the current and future availability of resources, as well as the efficiency of resource employment, effects that often are ignored in both macroeconomic analysis and policy decisions.

The supply-side view can be explained using a simple introductory economics framework. Suppose an economy has a given quantity of resources such as labor and capital (plant, equipment, knowledge, etc.) and an existing array of technologies for producing two goods called product X and product Y. At any time, resources can be completely devoted to the production of one or the other good, or both. If resources are

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[1]One of the first major policymaking endorsements of supply-side economics is contained in *Outlook for the 1980's,* Midyear Report and Staff Study of the Joint Economic Committee of the Congress (August 1979).

[2]For an historical perspective on supply-side economics, see Robert E. Keleher and William P. Orzechowski, "Supply-Side Effects of Fiscal Policy: Some Historical Perspectives," reviewed in the Federal Reserve Bank of Atlanta *Economic Review* (February 1981), pp. 26-28.

Figure 1
A Simple Production Possibility Frontier

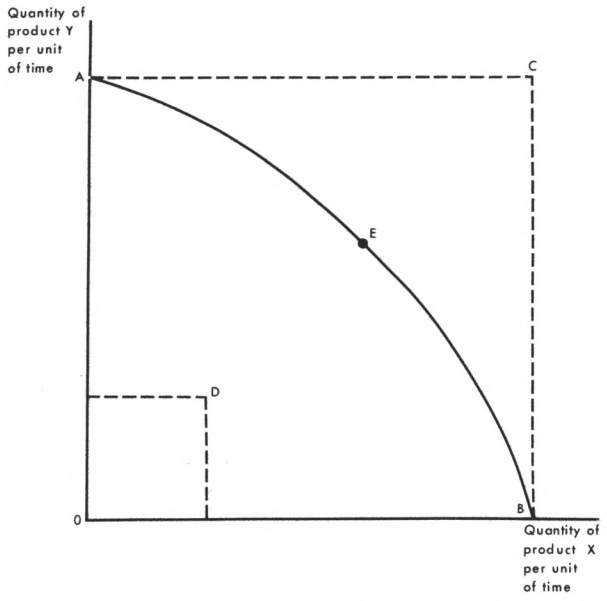
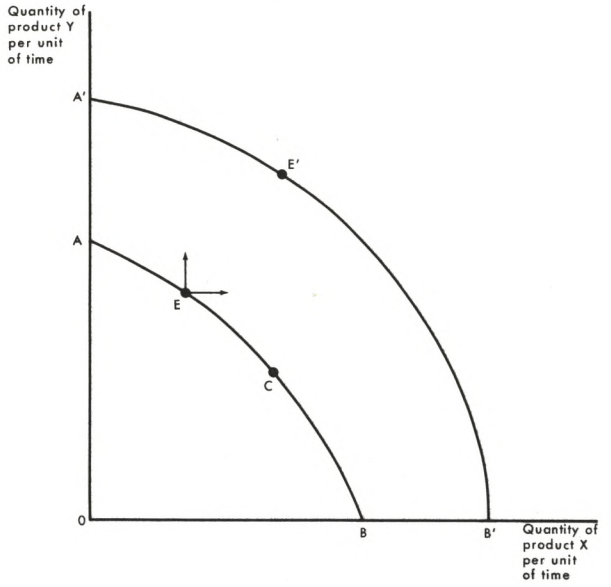


Figure 2
A Shift in the Production Possibility Frontier



used so that the largest production of X is obtained, for any given output of product Y, the production and consumption possibilities of the economy can be depicted as the curve AB in figure 1. Combinations of product X and Y output beyond AB (such as point C) are unattainable, given the technology and resources available, while those inside the curve (such as point D) are possible, but involve either unemployed resources, the use of inferior technologies, or both.

Given individual preferences and the distribution of resource ownership among individuals, an economy with free markets will tend to attain some equilibrium point (E), where the value of goods reflects the cost of production and where full employment of existing resources occurs. Competition among resource owners, the producers of the two goods and consumers will determine the prices of the products and resources, how much of each of the goods are produced, which of the available resources and technologies are used to produce each good, the incomes of individuals, and the distribution of goods produced among individuals.

An economy can improve its possibilities for consumption by shifting out its *production possibility frontier* (AB in figure 1). This occurs when the supply of labor or capital resources is increased or when technology is improved. Thus, individuals make choices that determine the rate of growth of income or the supply of goods producible under high-employment conditions. These choices involve foregoing present consumption so that resources can be used for research and development, innovation or the production of new capital goods. Figure 2 shows such a shift in production (and consumption) possibilities. When the production possibility frontier shifts from AB to A′B′, individuals choose the opportunity to consume an output mix such as E′.

Supply-side economics focuses on two aspects of the simple framework above: first, that economic policy directly affects the rate of growth of resource supplies and the pattern of innovation, impinging on the rate at which the economy's production possibilities improve; second, that economic policy can alter the position of the current production possibility frontier.[3]

Supply-Side Effects of Regulation

Economic policies to regulate business can affect supply. In a market economy, the government can promote efficiency by regulating efforts to achieve monopoly control in resource or product markets. Such regulatory policies can also promote faster output growth by policing business practices that limit competition, technological development and innovation.

[3]A detailed discussion of the supply-side approach to macroeconomic policy may be found in Laurence H. Meyer, ed., *The Supply-Side Effects of Economic Policy* (Center for the Study of American Business and the Federal Reserve Bank of St. Louis, 1981).

Regulatory policies can adversely affect consumption possibilities, however. Regulatory programs that mandate the use of inefficient technologies or that restrict the use of resources in some or all production processes cause the production possibility frontier to shift inward (for example, from A′B′ to AB in figure 2). Such regulations can slow the rate of growth by retarding technological innovation or by reducing incentives to accumulate resources or improve their quality.

Supply-Side Effects of Government Spending

The decision to provide more of one good through government provision involves attracting resources away from the production of other goods (a movement *along* the production possibility frontier). Supply-siders emphasize, however, that the increased taxes levied to pay for the new goods can reduce the total resources available, *shifting* the frontier inward. Suppose the economy is initially producing and consuming at point E′ in figure 2. An attempt by the government to increase the output of good X, moving along the frontier A′B′, can lead to fewer available resources so that (1) the frontier shifts inward to a new frontier such as AB, and (2) production occurs at a point like C. The shift occurs because owners of human resources can forego supplying these resources in the marketplace, choosing instead to use labor resources at home or in leisure when confronted with larger taxes on labor income. Similarly, owners of capital resources can avoid taxes by reducing the use of existing plant and equipment, lengthening the useful life of assets, and spending the proceeds from current use of capital services on consumer goods instead of replacing the plant and equipment or investing in new assets. In the case of taxation of income of capital resources, the effects on the production possibility frontier tend to show up more heavily in the future through reduced growth of resources, rather than in immediate inward shifts of the frontier.

Taxation can also give rise to other forms of tax avoidance that shift the frontier inward. When taxes on resource incomes are different depending on the use of the resources, resource owners may continue supplying resources in the marketplace, but divert these resources to lower-taxed, less-efficient uses. While this lowers the total productivity of the resources, the after-tax incomes are larger than they would have been if resources were used in the high-tax sectors. Such tax avoidance leads to an inward shift of the frontier, even if the total supplies of resources remain the same.

Supply-Side Effects of Redistribution

Similarly, an economic policy aimed at changing the distribution of consumption goods among individuals can affect supply. A program that taxes income recipients in order to transfer existing output to particular groups can reduce the *total* consumption possibilities of the community. For example, increased unemployment benefits, food stamps and social security benefits involve increased transfers and taxes. Higher taxes can reduce the supply of resources available both now and in the future; in addition, higher transfer payments reduce some individuals' incentives to accumulate and supply resources in the marketplace. Both the programs and the higher taxes to support them can reduce resource supplies.[4] Reductions in resource employment reduce output. Government policies to transfer more of the goods produced at point E in figure 1 to a particular group can shift the overall production and consumption possibilities of the economy inward, as the higher taxes to pay for the redistributed goods and the increased availability of transfer payments reduce the total resources available for use in production.

Supply-siders emphasize that the critical factor in government transfer and spending decisions is that such expenditures are financed either by taxation, borrowing from the public or increasing the money supply. These methods of finance lead to reductions in the total supply of resources available for production. Higher tax rates discourage individuals from work, saving and productive investment. Financing through government deficits (borrowing), simply postpones taxes and "crowds out" private-sector investment in plant, equipment and consumer durables such as housing and autos, as financing costs are raised.

Supply-Side Effects of Monetary Policy

Attempts to finance expenditures by printing money similarly reduce the nation's production possibilities. A faster rate of money growth increases the rate of inflation (the rate at which the value of money declines). Inflation interferes with economic efficiency. For example, it creates uncertainties about the meaning of price changes. When a product's price is raised or when wages in an industry rise, it is

[4]These considerations do not imply an aversion to redistribution schemes on the part of supply-siders. From a strictly positive view, however, supply-siders would tend to emphasize that the nation's distributional objectives can be accomplished more or less efficiently depending on the supply-side incentives involved.

less clear whether the increase reflects the scarcity of the product or resource, or the inflation process. Inflation also distorts the allocation of resources, as people employ scarce resources to economize on the higher cost of holding money. The disproportionate growth of resource employment in banking, financial intermediaries and financial management services is an example of such an inefficiency.

The supply-side effects of inflation also arise through the U.S. tax system. The principal characteristic of the tax system that creates supply-side disincentives when inflation occurs is its basis on historical *nominal* accounting of income. For the individual income tax, this has two important implications. First, when inflation is higher, investors require higher rates of return to compensate for the erosion of purchasing power of both future interest payments and the original sum loaned. These higher interest rates simply allow the maintenance of the purchasing power of investors' portfolios. The added interest is compensation for a maintenance expense, not income. Nonetheless, these higher interest payments are taxed as income. The higher taxes on these non-income payments reduce the incentives to save and invest.

Second, the individual income tax is applied against nominal income in a progressive fashion. As a result, when wages and other income simply keep pace with inflation, individuals find themselves in higher and higher tax brackets, so that the purchasing power of their income declines. This process, sometimes called "bracket creep," subjects individuals to increasingly higher taxes on existing and any prospective additions to purchasing power. Consequently, workers have less incentive to work or save, despite the tendency of wages to keep pace with inflation.

For business, tax accounting again is based on historical nominal magnitudes. Thus, inventory expenses and depreciation are computed on the basis of the past dollar expenditures on goods, equipment or plant, instead of the current dollar costs of replacing the inventory or plant and equipment currently being used up in production. As a result, inflation leads to an understatement of the true costs and therefore an overstatement of business income and artificially inflated taxes. Since historical cost accounting subjects a given real cash flow of a business to higher taxes, businesses are discouraged from adding new productive assets during inflationary periods. Of course, the result of reduced savings and investment is to slow the pace at which the production possibility frontier shifts outward. For a given labor force, the growth of output per worker slows.

SUPPLY-SIDE POLICY IMPLICATIONS AND PROPOSALS

An immediate policy concern of supply-siders is to redress the destructive effects of policies created by demand management and regulatory strategies over the post-war era, particularly since the early 1960s. This redress involves slower monetary expansion, regulatory reform, tax reduction and tax reform that reduce the disincentives to produce, work, save and invest.

To deal with the disincentives created by inflation, many supply-siders recommend indexing the tax system. For example, replacement cost accounting would permit firms to deduct from receipts the true cost of depreciation in computing income, avoiding the disincentives to invest posed by inflation. Second, inflation premia in interest rates could be excluded from taxation for firms and individuals. Finally, tax brackets for computing the individual income tax can be tied to the inflation rate to avoid bracket creep.

To reverse the disincentives created by past policy, some policymakers influenced by supply-side economics have recommended large reductions in tax rates on additional individual income, specifically a Kemp-Roth tax rate cut of 10 percent per year for 3 years. To reverse disincentives due to under-depreciation in the past, they have recommended a "10-5-3" capital cost recovery plan that accelerates the depreciation of physical assets to 10 years for structures, 5 years for business equipment and 3 years for cars and trucks used by business. Since capital expenditures under this plan are deducted from receipts as an expense sooner than otherwise, the additional income accruing from new capital expenditures is smaller in the earlier years of the life of an asset and larger later on. For the same additional receipts over the useful life of an asset, measured income is unaffected by accelerated depreciation; less of the income, however, is measured in the early years, while more is measured later. Therefore, taxes on income from assets are postponed, providing a greater incentive to invest today.

These two tax proposals have been the subject of controversy for several years. The intensity of the debate has increased dramatically since the proposals became the centerpiece of the initial tax package of the Reagan administration. It is ironic that the debate has become so tightly linked to arguments about

supply-side economics. While both of these proposals arose out of concern for the disincentive effects of bracket creep and historical cost depreciation in an inflationary environment, neither confronts the source of the disincentive — nominal income taxation. Instead, both are aimed at redressing the disincentives created by past inflation.

The Kemp-Roth plan focuses on the importance of cutting "marginal tax rates," the rates applied on additional income, instead of simply cutting average tax rates. This distinction is of critical importance to supply-siders. The average tax rate is simply the total tax paid divided by the tax base, the adjusted gross income in the case of the individual federal income tax. For the income tax, the tax rate (marginal) on successive dollars of income is a rising percentage of additional income. The tax rate applied to additions to income (marginal rate) exceeds the average tax paid at any level of income. The *marginal* tax rate is the rate that influences decisions to earn more income by increasing work or savings. A rise in the marginal rate from 20 percent to 30 percent means that an additional $100 of income will net only $70 after taxes instead of $80, so the incentive to forego leisure or consumption to work or save to earn this $100 is reduced.

Chart 1 shows measures of the marginal and average tax rates over the past two decades. The average tax rate has changed little over the years shown. Periodic tax reductions have offset the effect of bracket creep on the average tax bill. The marginal rate, however, has risen sharply since 1970.

The Kemp-Roth proposal, however, does not legislate automatic insulation of marginal rates from the inflation rate, a fundamental tenet of supply-side economics. Moreover, the "10-5-3" proposal, a simplified accelerated depreciation plan, is unrelated to the continuing disincentives created through the use of historical cost accounting in an inflationary environment.[5] Neither of these proposals insulate current or future taxes from the ravages of inflation.[6]

Perhaps the greatest irony of the debate over these two proposals is that neither proposal is a path-breaking supply-oriented innovation. Many claim that such policies are unproven and that their effects are unknown. While this may be the case for some supply-oriented policies, it is untrue of the Kemp-Roth proposal or "10-5-3." Experiments with these two types of tax changes were the hallmark of the "New Economics" of the sixties. Much was written before and after such changes about their effectiveness. While supply-siders differ in the analytical approach to such tax changes, the evidence is certainly available.[7]

THE SUPPLY-SIDE RECORD

What has happened to the supply side of the economy during the last 30 years? A review of the record should show whether the changes in economic policy of the past two decades have yielded evidence of the disorders discussed by supply-siders. At the same time, such a review can indicate whether the removal of the disincentives accumulated in the past could radically affect the economy. There is no question that the growth of supply of the nation's output has slowed markedly, at least since 1973, in large part due to the stagnant growth of productivity. This stagnation is supply-related, in that it arises from the astronomical rise in the price of energy resources relative to the price of business output and consequent losses in economic capacity (an inward shift of the production

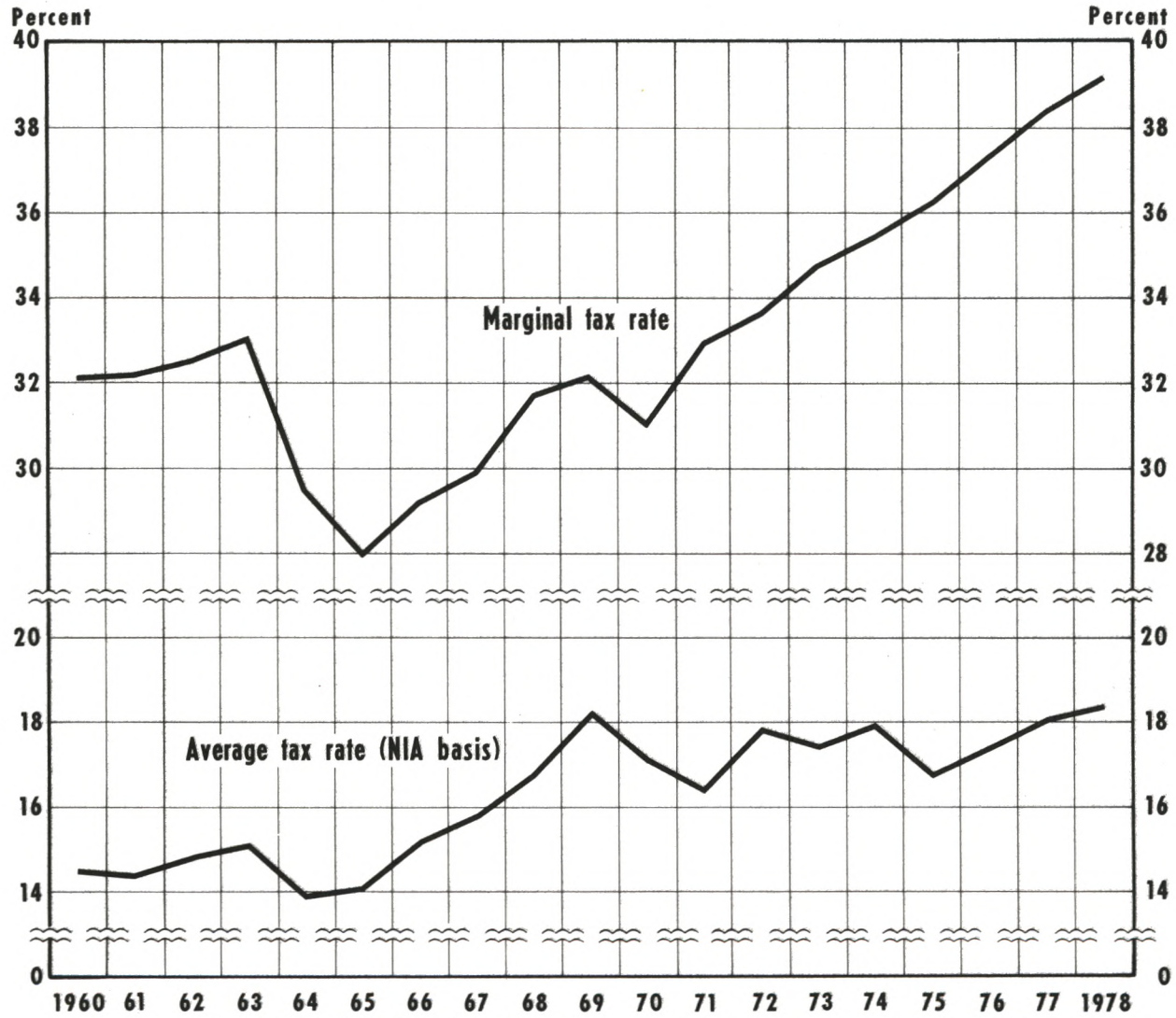
[5]There are alternative proposals that reflect concern over these supply-side issues. For example, the Black Caucus proposes indexing tax rates on so-called earned income while the Jorgenson-Auerbach plan embodied in House Resolution 2525 attempts to eliminate the effects of inflation on depreciation expenses and business tax burdens. On the former, See Bureau of National Affairs, Inc., *Daily Report for Executive*, DER No. 82, April 29, 1981, p. LL-12; the Jorgenson-Auerbach proposal is discussed in Dale W. Jorgenson and Peter Navarro, "10-5-3: 'Deeply Flawed'," and the accompanying editorial "Real Depreciation, Real Inflation," *New York Times*, May 5, 1981. Note that, unlike the President's proposals, these two proposals are aimed at avoiding future supply-side effects of inflation but not at correcting for past disincentives.

[6]The spirit of the tax proposals in correcting for past inflation effects rather than breaking the link between inflation and tax rates can be seen in Paul Craig Roberts, "For Supply-Siders, The Focus is Incentives," *Washington Post*, April 13, 1981, where it is emphasized that the administration plan ". . . doesn't turn the tax clock back to 1965, but it is a big step in the right direction." Roberts notes that the marginal rate faced by the median-income family of four was at most 17 percent in 1965 and a family with twice the median income faced, at most, a 22 percent rate. These figures will rise to 32 percent and 49 percent, respectively, in 1984, without the President's proposal, according to Roberts. These figures, Roberts notes, ignore social security and state taxes and their increase since 1965.

[7]Unfortunately the existence of such evidence does not mean that it has been intensely scrutinized or, if it has been, that there is a consensus among policy analysts about the effectiveness of past policies. In the case of accelerated depreciation, business tax cuts, or investment tax credits, debate usually centers more on the relative merits of the three. See, for example, Richard W. Kopcke, "The Efficiency of Traditional Investment Tax Incentives," *Public Policy and Capital Formation*, (Board of Governors of the Federal Reserve System, April 1981), pp. 163-75. There is little question that these three policies temporarily increase the pace of investment. Whether such tax cuts *temporarily* reduce the inflation rate as supply-side arguments imply, leave it unaffected, or raise it, as Keynesians might expect, has been largely neglected.

Chart 1

Personal Tax Rates in the United States



Source: Steven Braun, "Discussion of the Evans Paper, "The Supply-Side Effects of Economic Policy (Federal Reserve Bank of St. Louis and Center for the Study of American Business, 1981), p.95. The marginal tax rate series is that computed by Michael K. Evans. Both series includes state and local taxes and social security taxes.

possibility frontier). This analysis has been detailed elsewhere, along with an examination of the potential contributions of traditional sources of productivity growth to this stagnation.[8] The emphasis here is on the past macroeconomic policy effects on supply.

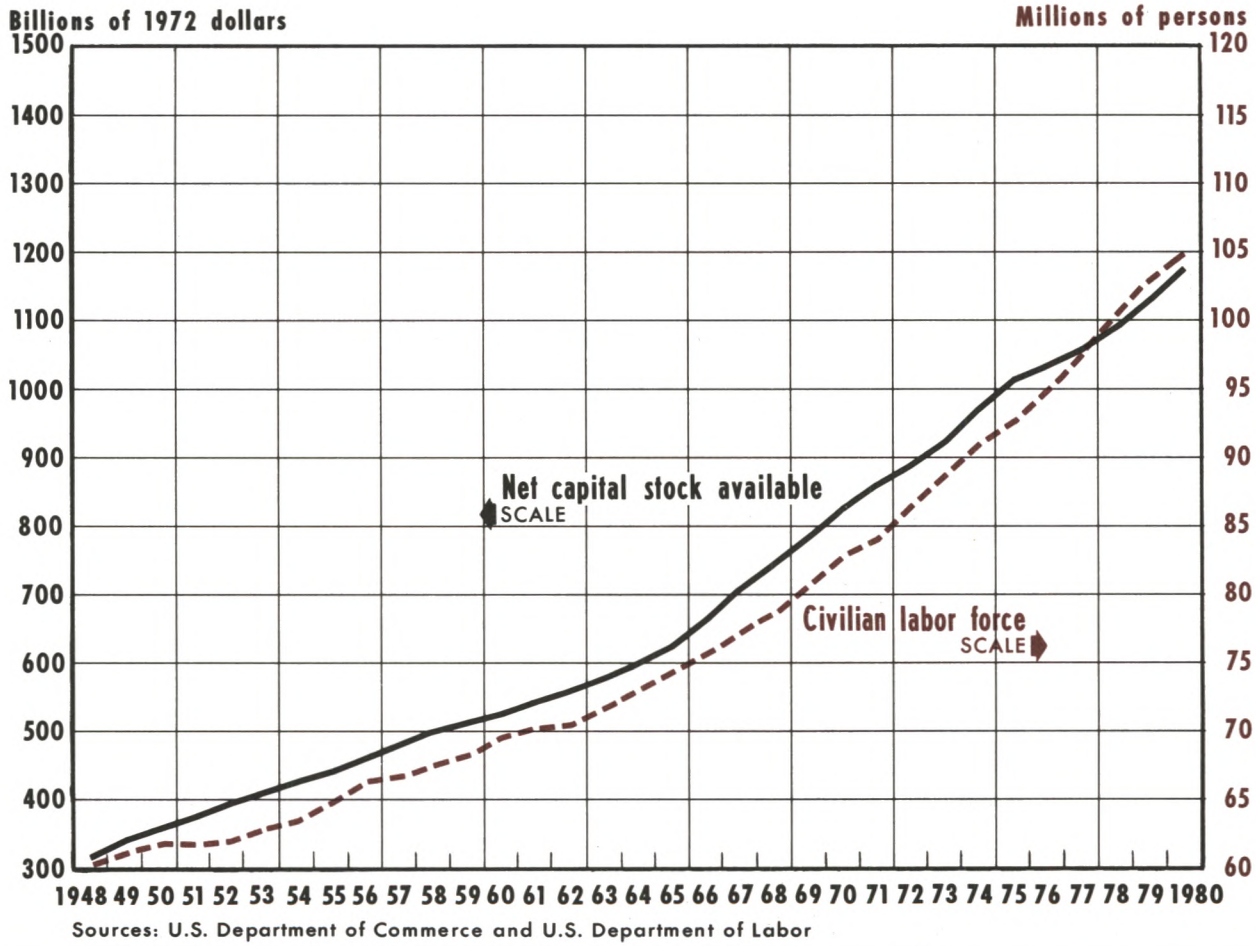
Chart 2 shows the civilian labor force and the stock of nonresidential private structures and equipment available since 1947.[9] The civilian labor force has grown more rapidly since the mid-sixties. From 1948 to 1965, the labor force expanded at a 1.2 percent annual rate. From 1965 to 1980, it accelerated to a 2.3 percent rate. Capital stock growth shows about the same acceleration up until 1973. From 1948 to 1965,

[8]See John A. Tatom, "The Productivity Problem," this *Review* (September 1979), pp. 3-16, and the references cited therein.

[9]The stock of plant and equipment is the constant dollar net stock of fixed non-residential private capital, see John C. Musgrave, "Fixed Capital Stock in the United States: Revised Estimates," *Survey of Current Business* (February 1981), pp. 57-68.

Chart 2

Supply of Capital and Labor in the United States



Sources: U.S. Department of Commerce and U.S. Department of Labor

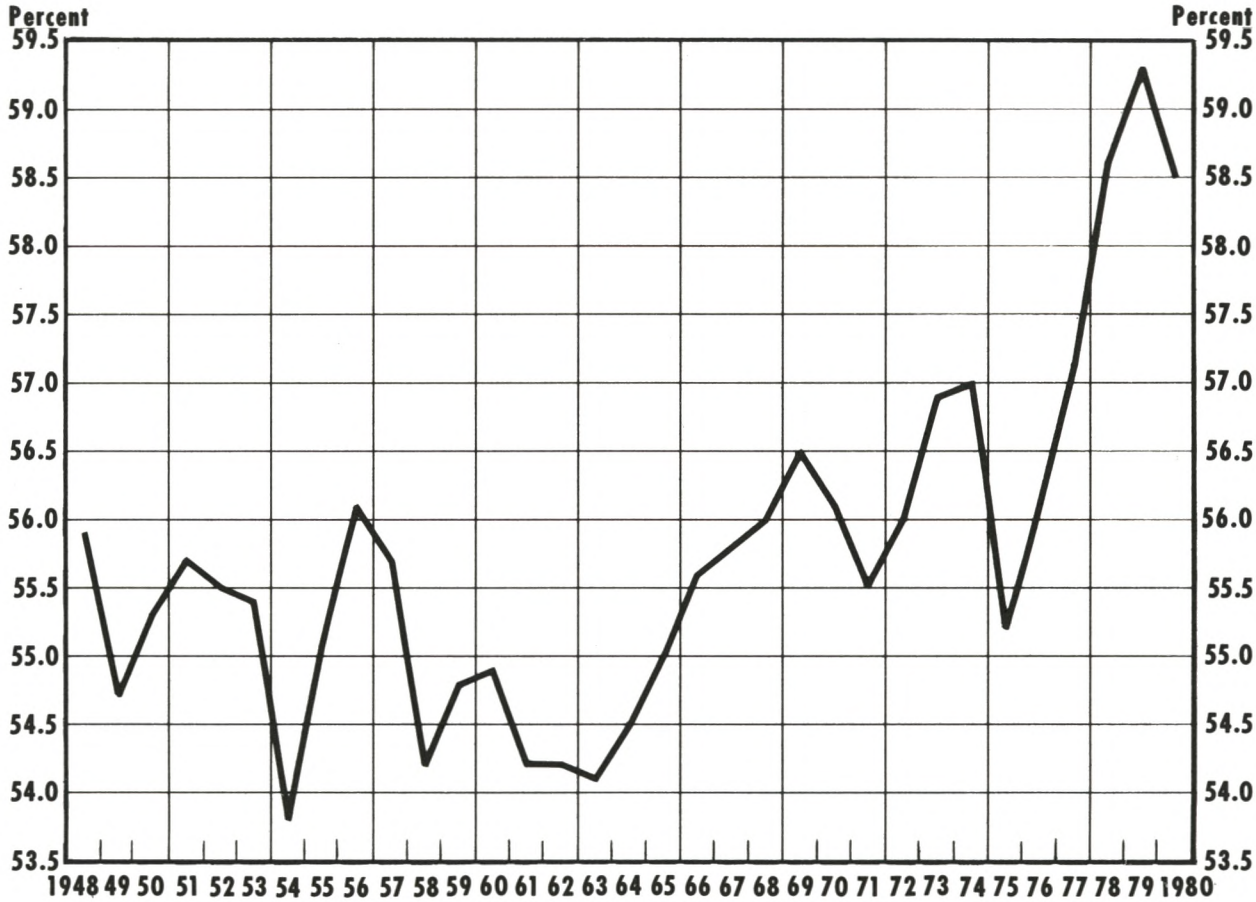
the stock of plant and equipment rose at a 4.1 percent rate. Such growth accelerated to a 4.9 percent rate from 1965 to 1975, then dropped to a 3.0 percent rate from 1975 to 1980.

Thus, when one looks at growth rates of available resources, there appears to be no major deterioration in the economy's aggregate supply until after 1975. Indeed, from 1965 to 1975, supplies of resources were expanding much faster than before. The factors cited by supply-siders that reduce resource availability (such as the increasing regulation of both technology and the pattern of resource employment, inflation, rising marginal tax rates on income, and a growing share of government spending and transfer payments) do not seem to have seriously impaired resource availability, at least not before 1975.

Although this analysis is crude, a more detailed analysis shows essentially the same patterns. In particular, labor force growth is a crude measure of labor resource availability because it is heavily influenced by population trends rather than short-term economic factors. Supply-side policies can change the willingness of a given population of labor-force age to work by increasing their participation in the labor force or by increasing the effort of the labor force. Chart 3 shows the percentage of the population over age 16 in the labor force. There has been no apparent deterioration in overall participation in the labor force.[10] Supply-side policies could also affect labor resource

[10]In a detailed study of the labor force participation rate, Leonall C. Andersen, "An Explanation of Movements in the Labor Force Participation Rate: 1957-76," this *Review* (August 1978), pp. 7-21, found that an individual income tax rate cut would have a small transitory effect of increasing the participation rate. He also observed that social security tax cuts would have small permanent effects, *lowering* participation, and that reduced social security benefits would have permanent effects raising participation.

Chart 3
Labor Force Participation Rate



Source: U.S. Department of Labor

availability by altering the supply of work effort of a given labor force, for example, by changing the average hours worked per worker. Average hours worked have shown a significant downward trend throughout the post-World War II period, but this trend has not significantly accelerated in recent years. Nonetheless, studies of labor supply indicate that higher marginal tax rates have small negative effects on working hours, especially for wives with children.[11]

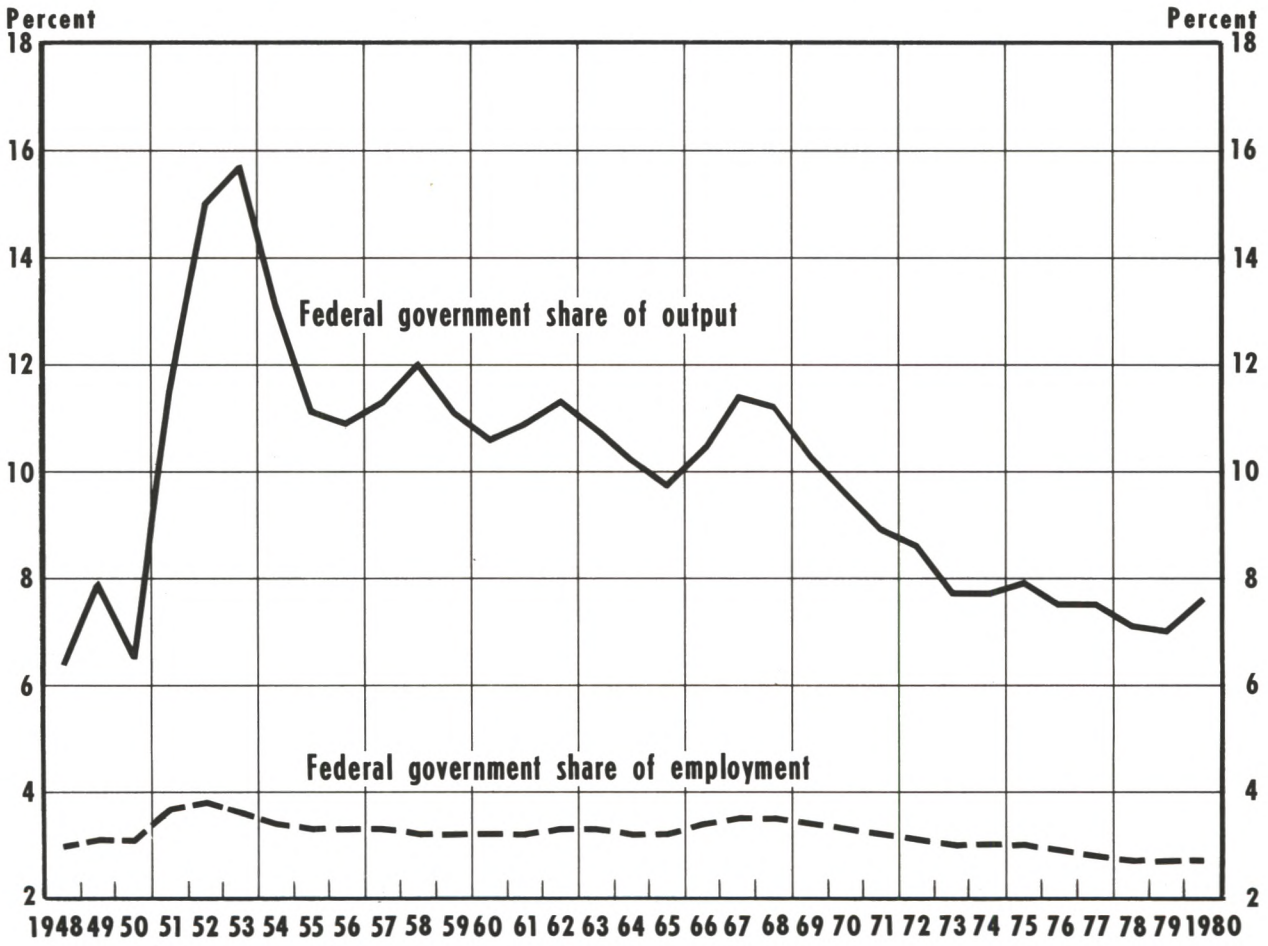
Finally, the available supply of labor need not have kept pace with the expansion of the labor force if the unemployment rate associated with full employment has risen significantly. While most analysts agree that the unemployment rate associated with high employment conditions has risen over the last 25 years, even the largest estimates of this increase would not reverse the pattern of accelerated labor resource growth shown in chart 2. More important, there is scant evidence that the rise in such a "full-employment" unemployment rate has been associated with growing supply-side disincentives.[12] Some policies presumably lead to a withdrawal from the labor force

[11]See Jerry A. Hausman, "Labor Supply," in Henry J. Aaron and A. Joseph Pechman, eds., *How Taxes Affect Economic Behavior* (Brookings Institution, 1981), pp. 27-83. Detailed statistical analysis is required to support these results because the effect is relatively small, given the increases in marginal rates that have occurred in the post-war period. For reductions in marginal rates to 1965 levels, the tax effect on labor resource availability would be correspondingly small and difficult to observe by simple statistical analysis. In addition, unless the reductions were repeated in subsequent years, the modest increase in hours would be of a once-and-for-all variety.

[12]See, for example, Daniel Hamermesh, "Transfers, Taxes, and the NAIRU," in *The Supply Side Effects of Economic Policy*. The NAIRU is the non-accelerating inflation rate of unemployment and is comparable to (usually used as synonomous with) the "natural rate of unemployment," or the full-employment unemployment rate.

Chart 4

Federal Government Share of Output and Employment



Source: U.S. Department of Commerce and U.S. Department of Labor

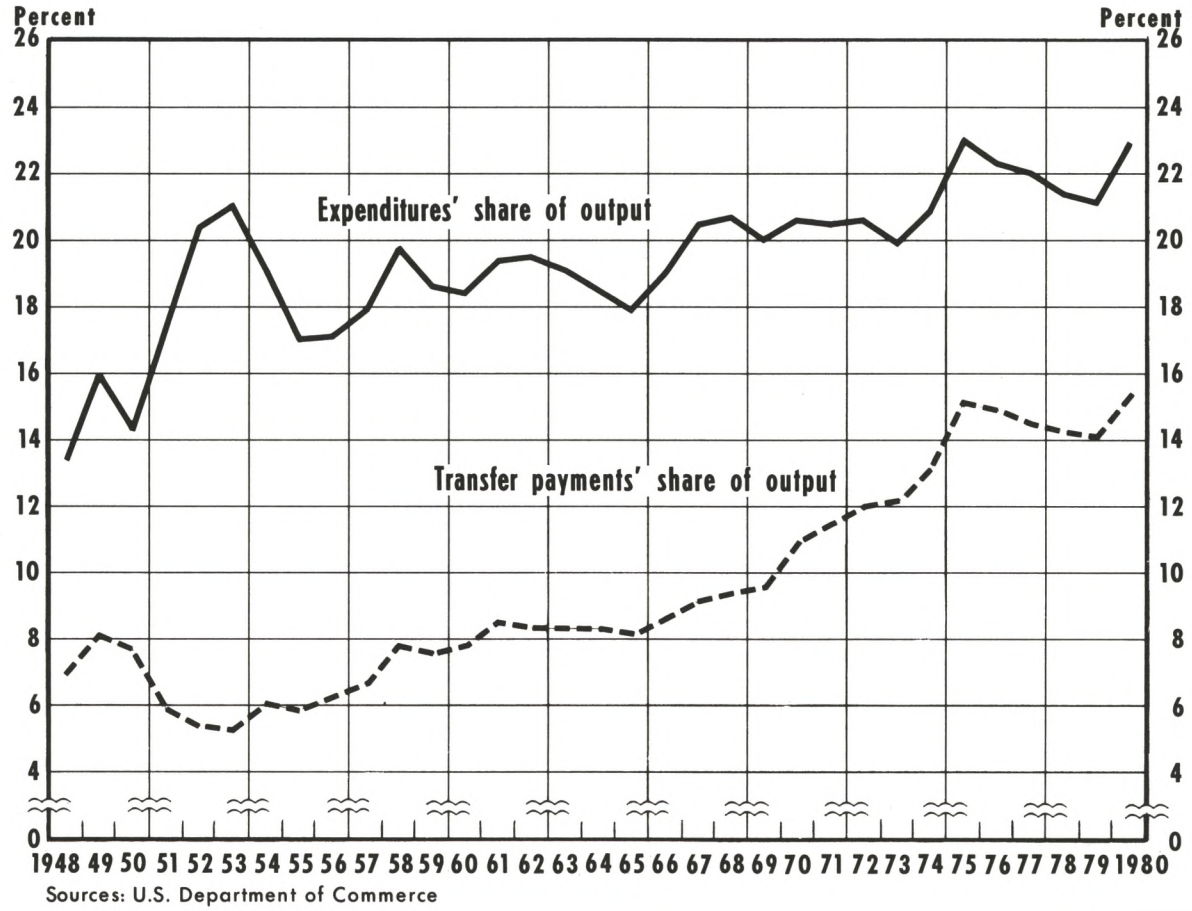
of workers with relatively high unemployment rates while others lead to withdrawal of individuals with relatively low unemployment rates. An example of the former is the rising minimum wage that reduces opportunities for the young, resulting in their dropping out of the labor force. An example of the latter is the effect of an increasingly generous social security system that induces older workers who normally have a more favorable employment record to quit earlier. Changes in the composition of the labor force due to demographic changes have been the primary source of the increase in the full-employment unemployment rate.

Another factor often accused of creating supply-side problems is the rapid growth of government activity. The expansion of the role of government in the economy can draw resources away from the private sector where productivity growth tends to be greater. Thus, the rate at which the production and consumption possibility curve shifts could be lowered. This view, however, misstates the pattern of government growth in the economy in recent years. Chart 4 shows the share of federal government purchases of goods and services in total output (GNP) and the share of federal employment in civilian employment. Both of these measures peaked some years ago.[13] It is difficult to

[13]The same pattern holds for state and local governments. The share of state and local government purchases of goods and services in GNP rose steadily until 1971 when it reached the 13 percent level. In 1973-75, the share surged upward to over 14 percent and has subsequently declined to below 13 percent. Employees on state and local government payrolls as a percent of the civilian labor force also climbed steadily throughout the post-war period, peaking at about 13 percent in 1975, then declining slightly.

Chart 5

Federal Government Expenditures and Transfer Payments as a Share of Output



Sources: U.S. Department of Commerce

show that government has constrained output growth by altering the allocation of resources away from the private sector.[14]

How, then, has growth in the size of government adversely affected the supply side of the economy? Chart 5 shows the growth of federal government expenditures (purchases of goods and services plus transfer payments) and transfer payments alone, with both measured as a share of GNP. The share of expenditures has grown due to the extremely rapid growth of transfer payments. The growth in transfer payments is the only likely candidate as a major source of government disincentives for production and growth.

Moreover, it is this type of fiscal development over which there is the greatest difference between demand and supply analysts. Demand analysts presume that tax increases to pay for increased transfer payments simply redistribute purchasing power with no real effects on demand, prices or aggregate output. From a supply analyst's view, such a policy produces a "double whammy," as both increased transfers and taxes provide disincentives to supplying resources in

[14]Other forms of capital formation, including government, show the same slowing as that in the business sector. From 1960 to 1973, the growth of the federal government capital stock was at a 1.1 percent rate; from 1973 to 1980, this growth rate declined to a 0.4 percent rate. For state and local governments, the decline was from a 4.8 percent to a 2.0 percent rate from 1973 to 1980. The growth of the residential housing stock declined from a 4.0 percent rate from 1948 to 1965, to a 2.7 percent rate from 1973 to 1980. Thus while inflation and the tax system combined to reduce capital formation in business and divert some capital formation toward the housing sector, there was a slowing there. Even in owner-occupied housing, the sector with the greatest relative attractiveness, the growth rate of the housing stock declined from a 5.0 percent rate from 1948 to 1965 to a 3.2 percent rate from 1973 to 1980. See Musgrave, "Fixed Capital Stock" for data on these sectors.

the market. But it must be emphasized that the trends in growth of resources do not indicate that the growing share of transfer payments has severely affected aggregate resource supplies.

THE OUTLOOK FOR SUPPLY-SIDE EFFECTS

While the past record does not indicate the possibility of revolutionary developments on the supply side of the economy, supply-oriented policies could modestly affect resource availability, economic efficiency and growth. As noted earlier, for example, higher marginal tax rates have negative effects on work effort. Thus, reductions in marginal rates should increase labor resource availability. In addition, supply-side policies can have modest *temporary* effects on investment and productivity growth.

Investment

The growth of the capital stock accelerated mildly (chart 2) following a move toward accelerated depreciation and the introduction of the investment tax credit in 1962, and the cut in individual and business marginal tax rates in 1964-65. Similar actions in late 1971 also appear to have led to a mild subsequent acceleration. When the investment tax credit was suspended from October 1966 to March 1967 and again from April 1969 to December 1971, real producer durable investment slowed. From the third quarter of 1966 to the first quarter of 1967, real investment in equipment declined at a 3.0 percent rate, substantially slower than the 14.1 percent rate of expansion over the prior year or the 16.7 percent rate of the prior two years. From the first quarter of 1969 to the fourth quarter of 1971, such investment slowed to a 3.7 percent rate of growth. Over the prior year, such investment had risen at a 10.1 percent rate; it rose at a 9.6 percent rate for the two years ending in the first quarter of 1969. In the year following the end of each of these two suspensions, real investment in producer durables accelerated — to a 9.1 percent rate of growth in the first case, and to a 17.9 percent rate of growth in the second. From the end of 1962 to 1974, the constant dollar net stock of private nonresidential fixed capital rose at a 4.8 percent rate, much faster than the 3.5 percent rate of the prior decade, or the 3.0 percent rate from end of 1974 to the end of 1980.

Productivity

Accelerations in capital formation affect productivity growth. Nonetheless, improvements in the quantity and quality of plant and equipment do not yield massive changes in aggregate productivity. Most estimates of the impact of faster growth of plant and equipment show that a 1 percent increase in the growth rate of the capital stock adds no more than 0.3 percent to the growth rate of productivity. Thus, a 3 percentage-point increase in the pace of capital formation, extremely large by historical standards, would likely add less than 1 percent to the rate of advance of output per worker, or output per hour.

Also, most programs to cut the cost of plant and equipment for firms or to increase returns from investing in new capital only temporarily affect capital formation. Essentially, such policies raise the optimal amount of plant and equipment available per worker. According to economic theory, investment will accelerate to reach the optimal proportions, but is subsequently unaffected. This is important because it indicates that any added productivity growth from supply-oriented policies is temporary.

Inflation

The greatest controversy concerning recent supply-oriented proposals concerns the effect on inflation. Some advocates of supply-side economics contend that supply-oriented policies will contribute to the elimination of inflation.[15] The source of confusion in this analysis is a standard mark-up view of inflation that equates the inflation rate ($\dot{P}$) to the rate of increase in wage rates ($\dot{W}$), less the rate of productivity growth ($\dot{X}$). In this view, if productivity growth accelerates, then the rate of inflation slows (given the rate of increase in wages, $\dot{W}$). Even were this view correct, supply-oriented policies would provide little assistance for the anti-inflation effort. For the massive acceleration in capital formation and productivity growth in the example above, the pace of price increases would slow by less than 1 percentage point; even this gain would be as temporary as the acceleration in productivity growth.

But this mark-up view of inflation really has little to say about inflation. Instead, the equation tells something about the wedge between inflation of prod-

[15]See, for example, the analysis in the Joint Economic Committee, *Outlook for the 1980's*, pp. 11-14.

uct prices and the rate of increase in resource prices, especially prices of labor; that is, the rate of increase in the purchasing power of wages, $(\dot{W} - \dot{P})$, equals the rate of increase in productivity, $(\dot{X})$. Consequently, faster productivity growth will increase the pace of growth of the purchasing power of wages, with little or no effect on the pace of wage and price inflation, *per se*. Since inflation is solely a monetary phenomenon, the only workable solution is to slow the growth in the supply of money.

At the other extreme, some supply-side critics argue that tax cuts, like those in the administration proposals, will lead to an increase in inflation.[16] This conclusion is based on the argument that tax cuts increase demand for the nation's output, since only part of the proceeds of a tax cut is saved, while the rest is spent. Two corollaries of this view are that a tax cut raises the deficit and that it causes higher interest rates. *Given* the nation's income or tax base, it is easy to see that the deficit increases. Also, the government must replace the funds involved in a tax cut by borrowing (assuming government expenditures remain the same), but only part of the cut is available for lending, that is, the portion saved. Consequently, interest rates will tend to rise to attract the additional lending required and to bid funds away from private sector borrowers.

The conceptual shortcomings of this view are equally well known. The burden of government expenditures on household budgets is not measured by current taxes, but rather by the expenditures themselves. If current taxes are insufficient to pay for current expenditures, then either future taxes must be raised to pay the interest costs on a larger debt, or the debt can remain the same, if the Federal Reserve finances the additional portion by expanding the money supply faster. In the latter case, households pay the remainder of current taxes through higher inflation rates. Since the wealth and income of the economy is unaffected by a tax cut, it cannot lead to higher spending. A second problem is that even if individuals incorrectly perceive their wealth as larger after a tax cut and attempt to spend more on goods and services, a tax cut would indeed imply a shortage of funds in financial markets to finance the larger deficit. Interest rates would have to rise by enough to reduce spending to its original level.

For example, if taxes were cut $50 billion and neither government expenditures nor the Federal Reserve's holding of government debt were changed, the government would have to borrow an additional $50 billion. Now if individuals initially planned to spend $40 billion while saving only $10 billion of the tax cut, the excess borrowing requirement would be the amount of increased private spending, $40 billion. As the government attempts to raise the additional $40 billion in credit markets, interest rates would rise to increase household savings or reduce the borrowing and spending of other borrowers. Whether the $40 billion is attracted through more saving (less consumer spending) or less business borrowing (less investment spending), total spending will tend to be unaffected by the tax cut. In summary, a tax cut may cause interest rates to rise, but is unlikely to affect total spending demands and, therefore, inflation.

The difficulties encountered by the higher deficits/interest rates/inflation argument are not simply logical shortcomings. First, the tax cuts envisioned by the administration are accompanied by spending reductions, so there will tend to be little effect on the deficit or on interest rates. Second, the Kemp-Roth "cuts" in taxes are likely only to offset bracket creep over the next three years; thus, they are not really cuts in current taxes at all, simply offsets to keep average and marginal rates from rising due to current and prospective inflation.[17] Finally, the experience surrounding the 1964 Kennedy tax cut and the 1975 tax cut would not support the higher deficits/interest rates/inflation scenario even if the administration were proposing a cut in taxes. In the 1964 case, the deficit rose very slightly and briefly, but interest rates did not rise until well after the tax cut.[18] Inflation did begin to worsen, but only in response to the acceleration in money growth that began in 1963.

In 1975, federal taxes were reduced by increasing exemptions and the standard deduction. In that instance, the deficit rose sharply but interest rates did

[16]An example of this argument is found in "Ease Off Kemp-Roth," *The New York Times,* May 15, 1981.

[17]This argument has been made by, among others, Martin Feldstein, " 'No Real Tax Cut' in Administration Plan," *New York Journal of Commerce,* May 21, 1981. This point has also been made recently by Walter H. Heller, "Supply-Side Follies of 1981," *Wall Street Journal,* June 12, 1981. Heller uses this point as part of an argument against the Kemp-Roth cuts. The cuts would keep marginal rates from rising further, however, so they would avoid a further deterioration in incentives over the next few years. This argument merely indicates that Kemp-Roth type cuts will have to be much larger to eliminate the impact of past inflation on marginal tax rates and incentives, not that such cuts are ineffective.

[18]Numerous studies have shown that the 1964 tax cut had no effect on total spending. Also, a recent discussion by Paul Evans, "Kemp-Roth and Saving," *Federal Reserve Bank of San Francisco Weekly Letter,* May 8, 1981, shows that more than 100 percent of the tax cut was saved, that is, that consumption actually declined relative to disposable income.

not. The 1975 tax cut was not associated with a more expansionary monetary policy. Instead, the growth rate of money stock for the year ending in the fourth quarter of 1974 was 4.7 percent; for 1975 it was 4.9 percent. These rates followed the rapid pace of monetary expansion at a 6.1 percent rate during the previous five years (ending in IV/1974). Consequently, inflation (GNP deflator) slowed, declining from a 7.7 percent rate in the year ending in the fourth quarter of 1974 to 4.7 percent in the year ending in the fourth quarter of 1975. Thus, even when a tax cut does not lower marginal rates, and/or the deficit increases as in 1975, it is not the case that interest rates must rise or that inflation must accelerate.[19]

CONCLUSION

Traditional macroeconomic policies affect the allocation, efficiency and growth rate of the supply of resources in an economy. These effects have been central to discussions of stabilization policies for centuries, but with few exceptions have been ignored in the post-war era. The reemphasis of these effects is what "supply-side economics" is all about.

There is little evidence to support the notion that supply-oriented policies will work miracles in restoring productivity growth or in reducing inflation. Indeed, it is difficult historically to see any major disruptions of aggregate resource supply or allocation that are sufficiently profound to explain the stagflationary performance of the U.S. economy since the early '70s. Only in the area of recent capital formation is there a clear resource supply shortfall and this is fully explained by supply forces other than government policy (energy price increases).[20]

At the same time, however, the historical record clearly indicates that supply-oriented policies can modestly affect resource availability, especially capital formation. Also, economic theory indicates a number of disincentives created by the tax system in an inflationary environment. While the magnitude of these disincentive effects is difficult to establish empirically, few economists or policymakers disagree with the importance of remedying these defects in macroeconomic policy.

The administration's economic policy proposals have incited a great popular debate over supply-side economics. Ironically, the proposals are quite modest in their supply-side orientation. The initial proposals address the disincentive effects of past policy and are not aimed at breaking the link between inflation and the supply of resources and output. Moreover, the proposed individual income tax cuts are sufficiently small so as to maintain marginal tax rates at current levels, rather than lower them.

No doubt, the issues raised by supply analysts will be of central importance for some time to come as policymakers face the continuing challenges to break the inflation-supply linkage, as well as to stay ahead of the deterioration in incentives to work, save and invest due to the cumulative effects of past fiscal, regulatory and monetary policy. It is likely that, when the smoke clears, it will be impossible to say that one can disregard the supply effects of policy any longer. But then the exaggerated claims or hopes of some supply analysts will be forgotten as well. Over a decade ago, Milton Friedman noted that, "In one sense, we are all Keynesians now; in another, no one is a Keynesian any longer." It is likely that a similar characterization will soon be an apt description of supply-side economics.

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[19]On the tenuous link between budget deficits and inflation, see Scott E. Hein, "Deficits and Inflation," this *Review*, (March 1981), pp. 3-10.

[20]The principal determinants of stagflationary developments since 1973 and 1979-80 have been sharp increases in the relative price of energy – supply shocks. These increases fully account for the post-1973 decline in the pace of capital formation as well. For a more detailed discussion, see John A. Tatom, "Energy Prices and Capital Formation: 1972-77," this *Review* (May 1979), pp. 2-11, and Tatom, "The Productivity Problem."

Trends in Federal Revenues: 1955-86

KEITH M. CARLSON

THE Reagan administration has proposed some major changes in the federal tax structure as part of its economic plan for the early 1980s.[1] Included in the proposal are cuts in individual income taxes and an increase in business depreciation allowances retroactive to January 1, 1981. These tax reductions are intended to increase productivity by increasing the incentives to save, work and invest in capital equipment.[2]

This article discusses the effect of these tax cuts on federal revenues. Because the exact form that the tax legislation will take depends on the actions of Congress, the focus of this article is on the effects of the original proposal as presented in March 1981. By way of background, trends in revenues for the last 25 years are summarized and discussed. This period is chosen for historical reference for two reasons: (1) it is long enough to encompass sufficient economic experience so that trends in the federal revenue structure are clearly discernible, and (2) by starting in 1955, it avoids the effects of distortions of the tax structure resulting from World War II and the Korean War.[3] Although this period includes the Cold War of the 1950s and the Vietnam War of the late 1960s, it primarily reflects peacetime conditions in the U.S. economy.

The changing nature of the federal revenue system is analyzed in terms of receipts as a percent of GNP, and the component taxes as a percent of total receipts. GNP provides a useful reference point because discussions of the role of government focus on expenditure and revenue trends relative to growth in the economy.[4] An examination of component taxes relative to total receipts yields information relating to the elasticity of the tax structure, that is, the responsiveness of the tax system to economic growth, and the incidence of the tax system, that is, who pays the taxes.[5]

Tax revenues are determined by two factors: the relevant revenue base and tax rates. Revenue trends, as shown in charts 1 and 2, thus reflect both changes in the revenue base and legislation affecting the effective tax rate. Tables 1 and 2 summarize major tax legislation over the past 25 years.

PAST TRENDS IN FEDERAL REVENUES: 1955-80

From 1955 through 1961, revenues due to tax legislation changed very little (see table 1). The only component of federal revenues that reflected changes in tax rates during this period was social insurance contributions, and these changes were quite small (table 2). Otherwise, the composition of tax revenues changed as a consequence of the differential response of relevant tax bases to movements of the overall economy, as well as the sensitivity of each tax to changes in its base.

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[1]Executive Office of the President and Office of Management and Budget, *Fiscal Year 1982 Budget Revisions* (March 1981). On June 4, 1981, the administration modified the original proposal.

[2]For further discussion, see Laurence H. Meyer, ed., *The Supply-Side Effects of Economic Policy* (Center for the Study of American Business and the Federal Reserve Bank of St. Louis, 1981).

[3]For a perspective that includes the 1930s and 1940s, see Donald W. Kiefer, "The Automatic Stabilization Effects of the Federal Tax Structure," in *The Business Cycle and Public Policy, 1929-80,* A Compendium of Papers submitted to the Joint Economic Committee, Congress of the United States (GPO, November 28, 1980), pp. 172-208.

[4]A more complete analysis of the role of government and its impact on the economy would stress the amount of resources absorbed by way of expenditure. The financing of expenditure includes taxes, borrowing and money creation. The latter is, of course, a hidden tax, but is just as real as an explicit tax in terms of transferring resources from the private sector to the government. For a general discussion of the inflation tax, see Carl S. Shoup, *Public Finance* (Aldine Publishing Company, 1969), pp. 452-61.

[5]The incidence of a tax, that is, who bears the final burden of the tax, is, of course, much more complex than indicated here. Nonetheless, extending such an analysis for a tax system requires information on the types of taxes and their relative importance. For further discussion, see Shoup, *Public Finance.*

Table 1
Major Revenue Actions: 1954-80

Action	Date enacted	Revenue effect (billions of dollars)	Nature of action
Excise Tax Reduction Act of 1954	March 1954	$ –1.0	Dismantled Korean War excise tax structure. All excise tax rates in excess of 10 percent were reduced to 10 percent, except for 20 percent cabaret tax.
Internal Revenue Code of 1954	August 1954	–1.4	Complete revision of Internal Revenue Code of 1939. Included provisions for dividend credit and exclusion, retirement income credit, and accelerated depreciation. Changes in tax laws since 1954 have been enacted as amendments to this code.
Federal Aid Highway Act of 1956	June 1956	2.5	Excise taxes were earmarked for Highway Trust Fund to finance construction of federal highway system. Increased rates on gasoline, diesel and special motor fuels, trucks, tires. New taxes introduced on tread rubber and use of heavy trucks and buses.
Revision of Depreciation Guidelines and Rules	July 1962	*	Increased rate at which businesses could write off plant and equipment. Lives of machinery made 32 percent shorter.
Revenue Act of 1962	October 1962	–0.2	Provided investment tax credit of 7 percent on new and used property other than buildings.
Revenue Act of 1964	February 1964	–11.4	Provided for two-stage cut in personal income tax liabilities and corporate profits tax liabilities in 1964 and 1965.
Excise Tax Reduction Act of 1965	June 1965	–4.7	Repealed excise taxes on several items and provided for systematic reductions in the rates on transportation equipment and communication services.
Tax Adjustment Act of 1966	March 1966	1.1	Restored excise tax rates on transportation equipment and telephone service to rates in effect prior to January 1966. Introduced graduated withholding on personal tax collections.
Temporary Suspension of Investment Tax Credit	November 1966	*	As of October 10, 1966, temporarily suspended 7 percent investment tax credit.
Restoration of Investment Tax Credit	June 1967	–1.7	As of March 10, 1967, restored investment tax credit and raised permissible ceiling.
Revenue and Expenditure Control Act of 1968	June 1968	10.2	Levied 10 percent surtax on personal income taxes effective April 1, 1968, and on corporate taxes effective January 1, 1968. Postponed reduction in excise tax rates on automobiles and telephone service.
Extension of Surtax	August 1969	*	Extended 10 percent surtax on personal and corporate incomes, previously scheduled to expire on June 30, 1969, to December 31, 1969.
Tax Reform Act of 1969	December 1969	–2.5	Increased personal exemption in stages from $600 to $750 in 1973. Increased standard deduction in stages beginning in 1971. Introduced maximum marginal rate of 50 percent on earned income, with maximum rate on unearned income remaining at 70 percent. Extended surtax from January 1, 1970, to June 30, 1970, at 5 percent rate. Postponed scheduled reductions in excise tax rates on automobiles and telephone service until January 1, 1971. Repealed investment tax credit for property acquired after April 18, 1969.

Table 1 (Continued)

Action	Date enacted	Revenue effect (billions of dollars)	Nature of action
Excise, Estate and Gift Tax Adjustment Act of 1970	December 1970	*	Extended excise tax rates on automobiles and telephone service until January 1972. Sped up collections of estate and gift taxes.
Treasury's Asset Depreciation Range Guidelines	June 1971	*	Gave firms option of raising or lowering the guideline lives of depreciable assets by up to 20 percent. Reserve ratio test was abandoned.
Revenue Act of 1971	December 1971	$ –8.0	Accelerated by one year scheduled increases in personal exemptions and standard deduction. Repealed automobile excise tax retroactive to August 15, 1971; on small trucks and buses to September 22, 1971. Reinstated 7 percent investment tax credit and incorporated depreciation range guidelines.
Tax Reduction Act of 1975	March 1975	–22.8	Provided for 10 percent rebate on 1974 taxes up to maximum of $200 for individuals. Provided tax cuts retroactive to January 1975 for both individuals and corporations. For individuals it was in the form of increased standard deductions, $30 exemption credit and an earned income credit for low-income families. Reduced corporate income tax and increased investment surtax exemption. Increased investment tax credit to 10 percent.
Revenue Adjustment Act of 1975	December 1975	*	Provided tax reductions for first six months of 1976. Extended corporate rate reductions enacted in Tax Reduction Act of 1975. Reduced individual taxes in order to maintain withholding rates that applied during last eight months of 1975.
Tax Reform Act of 1976	October 1976	1.6	Provided extensive redrafting of tax laws. Restricted use of tax shelter investments and made changes in taxing of gifts and estates. Increased taxes on very wealthy. Continued tax cuts passed in 1975.
Tax Reduction & Simplification Act of 1977	May 1977	*	Extended for one year the temporary provisions of the Tax Reform Act of 1976, including the general tax credit, the earned income credit and corporate tax reductions. Provided a temporary jobs tax credit. Replaced former standard deduction with amount equal to $3,200 for joint returns, $2,200 for single persons and $1,600 for married persons filing separately.
Revenue Act of 1978	November 1978	–21.3	Reduced taxes for individuals and businesses. Contained some elements of tax reform. Extended several temporary provisions of Tax Reduction and Simplification Act of 1977.
Energy Tax Act of 1978	November 1978	–0.8	Introduced taxes and credits for purposes of reducing country's reliance on foreign energy supplies.
Crude Oil Windfall Profits Tax Act of 1980	April 1980	13.0	Levied windfall profits tax on domestic producers of crude oil and provided several income tax credits to encourage production and conservation of energy. Provided partial exclusion of interest and dividend income from income tax.
Omnibus Reconciliation Act of 1980	December 1980	3.4	Imposed restrictions on use of mortgage subsidy bonds plus other miscellaneous tax changes.

*Indicates either that (1) the action was minimal in its effect, (2) such a calculation was not appropriate because the action extended provisions of expiring legislation, or (3) official estimates were not available.

SOURCES: Joseph A. Pechman, *Federal Tax Policy*, 3rd ed. (The Brookings Institution, 1977); *Federal Reserve Bulletin* (September 1978 and June 1973), *Annual Report of the Secretary of Treasury*, and *The Budget of the United States Government.*

Table 2
Effects of Social Security Legislation

Year	Taxable wage base (dollars)	Combined tax rate (percent)	Maximum tax for employee (dollars)	Effect on federal revenues (billions of dollars)
1955	$ 4,200	4.0%	$ 84	$ 0.6
1956	4,200	4.0	84	*
1957	4,200	4.5	95	1.1
1958	4,200	4.5	95	*
1959	4,800	5.0	120	1.5
1960	4,800	6.0	144	1.9
1961	4,800	6.0	144	*
1962	4,800	6.25	150	0.5
1963	4,800	7.25	174	2.1
1964	4,800	7.25	174	*
1965	4,800	7.25	174	*
1966	6,600	8.4	277	6.2
1967	6,600	8.8	290	1.2
1968	7,800	8.8	342	2.1
1969	7,800	9.6	374	3.0
1970	7,800	9.6	374	*
1971	7,800	10.4	406	3.2
1972	9,000	10.4	468	2.9
1973	10,800	11.7	632	10.8
1974	13,200	11.7	722	3.9
1975	14,100	11.7	825	1.4
1976	15,300	11.7	895	2.1
1977	16,500	11.7	965	2.1
1978	17,700	12.1	1,071	5.6
1979	22,900	12.26	1,404	9.5
1980	25,900	12.26	1,588	3.6
1981	29,700	13.30	1,975	16.6

*No change in legislation.

SOURCE: *1980 Statistical Abstract*, except for effect in 1955 and 1957 estimated by Federal Reserve Bank of St. Louis.

Since 1961, however, tax legislation has been frequent and oftentimes large in magnitude. Even so, apart from the effect of legislation enacted during the Vietnam War, total tax revenues as a percent of GNP changed little from 1961 to 1976. Since then, however, this trend appears to have been broken.

An examination of chart 1 indicates that since 1976, total receipts have been rising faster than GNP. For the entire 1955-80 period, receipts as a percentage of GNP range from 16.8 percent in 1958 to 20.6 percent in 1969. Since 1976, even though new legislation has generally reduced tax rates, the tax base has grown more rapidly than GNP; consequently, receipts as a percent of GNP have trended upward.

Chart 2 summarizes each of the major taxes as a percent of total receipts. Throughout the entire 1955-80 period, the individual income tax was the major source of revenue to the federal government, providing between 41 percent and 47 percent of the total. As a proportion of total revenue, however, individual income taxes have varied considerably over the years. There are two reasons for this: One, the proceeds of

Table 3
Administration Economic Assumptions

	Calendar Years						
		Estimate					
	Actual 1980	1981	1982	1983	1984	1985	1986
Gross national product							
Current dollars (percent change)	8.9%	11.1%	12.8%	12.4%	10.8%	9.8%	9.3%
Constant 1972 dollars (percent change)	–0.1	1.1	4.2	5.0	4.5	4.2	4.2
Deflator (percent change)	9.0	9.9	8.3	7.0	6.0	5.4	4.9
Unemployment rate (percent)	7.2	7.8	7.2	6.6	6.4	6.0	5.6
Proxies for tax bases							
Personal income (percent change)	11.1	2.5	11.5	11.5	9.9	9.3	9.2
Wages and salaries (percent change)	8.7	10.7	12.0	11.2	9.8	9.1	8.8
Corporate profits (percent change)	–5.5	–0.4	16.1	16.0	12.6	11.2	11.5

SOURCE: Executive Office of the President and Office of Management and Budget, *Fiscal Year 1982 Budget Revisions* (March 1981).

this tax are highly sensitive to movements in economic activity. Two, most of the major tax bills enacted in the last 25 years contained provisions that directly affected this particular source of revenue.

Aside from the individual income tax, the remainder of the federal tax structure has changed significantly since 1955. Social insurance contributions, for example, replaced corporate income taxes as the second most important source of revenue after 1966. The decline in the proportion of corporate income taxes to total receipts primarily reflects the downward trend of corporate profits relative to GNP. In addition, however, the effective tax rate for corporate income has been reduced several times since 1955.

The steady rise of social insurance contributions as a percent of total revenues from 1955 to 1975 is the result of frequent increases in the tax rate and the expansion of the tax base (table 2). Since 1975, however, social insurance contributions have stabilized at about 31 percent of total revenues despite annual increases in the taxable wage base.

Excise taxes have become increasingly less important as a source of federal revenue for two reasons: First, major reductions in excise taxes were legislated in 1965 and 1971. Second, revenues from this tax do not generally rise with inflation since they are usually expressed as an amount per physical unit (for example, the federal excise tax on gasoline is 4 cents per gallon).

Finally, other taxes, which include customs duties, estate and gift taxes, and miscellaneous receipts, have been rising in relative importance, with the average rate of increase for the 1955-80 period exceeded only by social insurance contributions.

PROJECTIONS OF FEDERAL REVENUES: 1981-86

The administration has submitted a set of proposals that affects the federal revenue system. Viewed against the trends of the last 25 years, how would these proposals affect the total and the composition of federal tax revenues?

Economic Assumptions

As noted above, changes in the total and the composition of federal revenues occur even without tax legislation. Consequently, projections of future revenue depend, in part, on the nature of one's economic assumptions. The administration's economic assumptions are summarized in table 3.

The key assumption underlying the projected growth of federal revenues is the growth in nominal GNP. The administration has projected a relatively rapid 11 percent average rate of growth in nominal GNP for the 1980-86 period. Given the historical relationship between money and GNP, this GNP

growth path implies that M1B will have to increase at an average 8 percent rate over this period.[6]

The administration does not specify its assumptions about the relevant tax bases for particular taxes. Certain indicators, however, serve as proxies. For example, personal income is a proxy for the tax base pertinent to individual income taxes and, with consumption dependent on personal income, it serves the same purpose for excise taxes. Corporate profits before taxes provide a tax base proxy for corporate income taxes. Wages and salaries are a proxy as a tax base for social insurance contributions. The projected growth of each of these tax bases depends primarily on the assumed growth of GNP.

Although economic assumptions relating to prices and output are important in and of themselves, they are not so critical for tax projections. Nominal GNP, regardless of the way it is divided between price and output, is the most important determinant of revenue.[7]

Proposed Legislation

The administration's economic program centers on a reduction of individual income tax rates and depreciation reform. In addition, it proposes to increase aviation-user taxes and user fees for barge operators.

Individual income taxes — Proposals that affect individual income taxes include reducing marginal tax rates by 10 percent each year for the next three years, beginning July 1, 1981. Tax rates would be reduced relative to 1980 by 5 percent for calendar 1981, 15 percent for calendar 1982, 25 percent for calendar 1983, and 30 percent for calendar 1984. Marginal rates would be reduced from their present range of 14-70 percent to 10-50 percent as of January 1, 1984. In addition, to the extent that depreciation reform applies to unincorporated businesses, individual income taxes would be further reduced through a reduction in the taxable income of proprietors and partnerships.

Corporate income taxes — The proposed "accelerated cost recovery system" enables corporations to write-off capital expenditures faster, under simplified and standardized rules, and liberalizes the laws relating to the investment tax credit. The program centers on a "10-5-3" year classification of property. Three-year property consists of autos and light trucks plus machinery and equipment used in research and development. Five-year property consists of other machinery and equipment. Ten-year property includes factory buildings, retail stores, warehouses and some public utility property.

Social insurance contributions — The only proposal affecting social insurance contributions is an increase in railroad retirement payroll taxes. Otherwise, such contributions are scheduled to increase through 1984 under existing legislation.[8]

Excise taxes — Increased charges are proposed for aviation users and barge operators. These charges are intended to recover most of the costs associated with the movement of air traffic and the operation and construction of new waterway facilities.

Projected Trends

The economic assumptions and the proposed legislation provide the basis for revenue projections. Since the proposed legislation takes the form of either changed tax rates or new taxes, revenue trends in the absence of such legislation provide a useful basis for analyzing the impact of the proposed changes. Revenue projections based on existing legislation are called "current services estimates."

Current services basis — Charts 1 and 2 show revenues projected on a current services basis as a percent of GNP, and the component taxes as a percent of total receipts.[9] The nominal GNP used for these calculations are the administration's estimates as of March 1981. Although the split of GNP between prices and output would probably be different if, in fact, no tax changes were legislated, there is little reason to think that nominal GNP would be any different.[10]

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[6]For further discussion of the consistency of the administration's forecast of GNP and its monetary policy assumptions, see Congressional Budget Office, *An Analysis of President Reagan's Budget Revisions for Fiscal Year 1982*, Staff Working Paper (March 1981), pp. 9-11.

[7]See Congressional Budget Office, *A Review of the Accuracy of Treasury Revenue Forecasts, 1963-1978*, Staff Working Paper (February 1981).

[8]The existing legislative schedule for social security taxes includes the following:

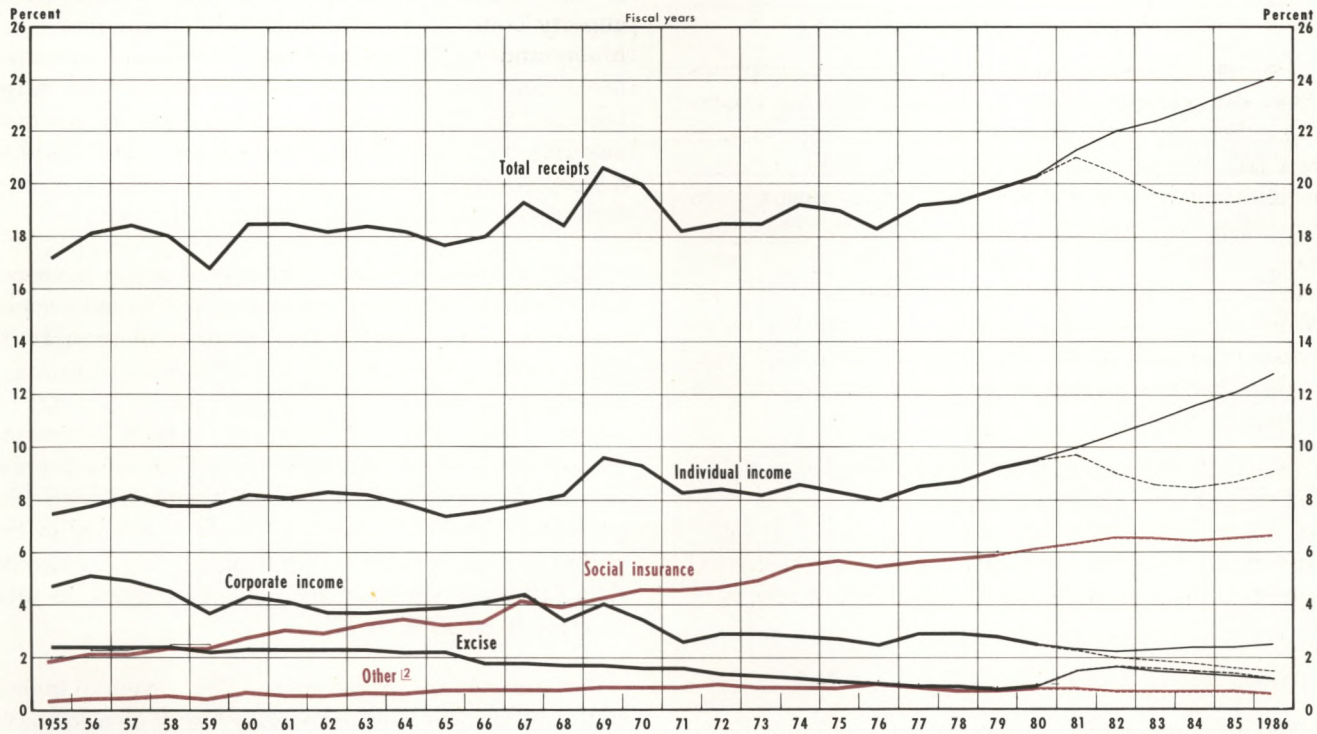
Calendar year	Wage base	Combined tax rate
1981	$29,700	13.3%
1982	32,100	13.4
1983	35,400	13.4
1984	38,700	13.4

[9]Current services estimates are derived from *Fiscal Year 1982 Budget Revisions*, pp. 122-23.

[10]This, of course, is a "monetarist" interpretation. For evidence indicating that nominal GNP depends on the growth of money stock, see Keith M. Carlson, "Money, Inflation, and Economic Growth: Some Updated Reduced Form Results and Their Implications," this *Review* (April 1980), pp. 13-19.

Chart 1

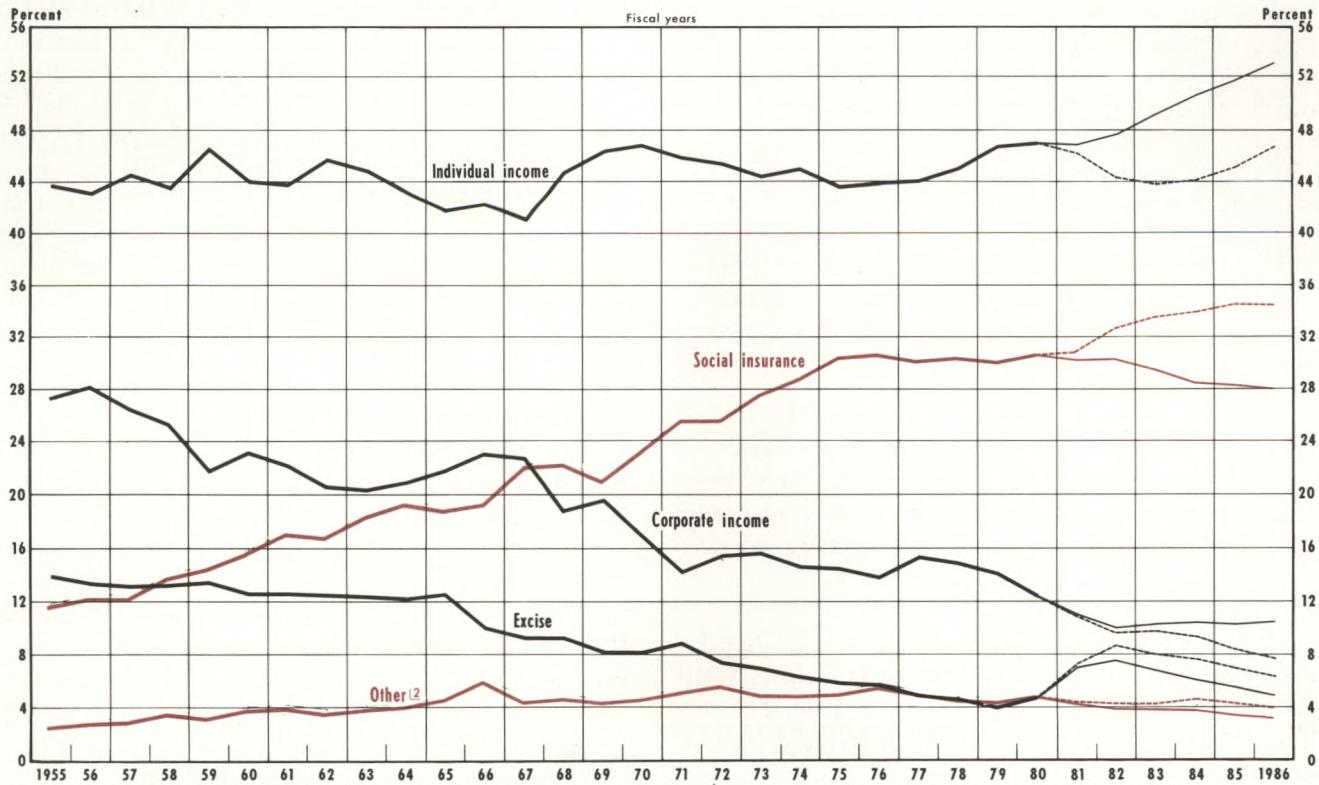
Federal Budget Receipts as a Percent of GNP [1]



[1] Estimates for 1981-1986 are alternative projections: solid lines are current services projections and dashed lines are administration projections from Fiscal 1982 Budget Revisions (March 1981).
[2] Estate and gift, customs duties, miscellaneous receipts.

Chart 2

Federal Budget Receipts as a Percent of Total Receipts [1]



[1] Estimates for 1981-86 are alternative projections: solid lines are current services projections and dashed lines are administration projections from Fiscal 1982 Budget Revisions (March 1981).
[2] Estate and gift, customs duties, miscellaneous receipts.

Table 4

Marginal and Average Tax Rates for Individual Income Tax (percent)[1]

Calendar year	Marginal rate		Average rate	
	Current services	Administration plan	Current services	Administration plan
1962	24.9%		12.9%	
1963	26.1		13.1	
1964	22.7		11.9	
1965	21.8		11.5	
1966	22.2		12.0	
1967	22.9		12.5	
1968	27.0		13.8	
1969	27.5		14.3	
1970	24.5		13.3	
1971	24.0		12.7	
1972	24.4		12.5	
1973	25.7		13.1	
1974	26.2		13.7	
1975	26.8		13.1	
1976	27.8		13.5	
1977	28.7		13.8	
1978	29.7		14.2	
1979	30.6		14.6	
1980	31.4		15.3	
1981	32.2%	31.4%	15.9%	15.6%
1982	34.3	28.3	16.8	14.4
1983	36.5	26.9	17.6	13.8
1984	38.9	26.2	18.6	13.6
1985	41.1	27.2	19.4	14.0
1986	43.7	28.8	20.4	14.6

[1]As applied to adjusted gross income.

SOURCES: Joint Committee on Taxation and Federal Reserve Bank of St. Louis.

Chart 1 shows that, with no changes in tax legislation, total receipts would rise to 24.1 percent of GNP in 1986, compared with 20.3 percent in 1980. The rise would largely be a result of the individual income tax, which would rise from 9.5 percent of GNP in 1980 to 12.8 percent in 1986. When viewed in terms of marginal rates as applied to adjusted income, the rise is even more dramatic (see table 4). Because existing legislation provides for increases in both the wage base and tax rate, social insurance contributions would also rise relative to GNP, from 6.3 percent in 1980 to 6.8 percent in 1986. The remaining taxes would change little relative to GNP over the same period.

Chart 2 shows the distribution of taxes on a current services basis. With no legislation, individual income taxes would rise to 53.0 percent of total receipts by 1986, up from 46.9 percent in 1980. Social insurance contributions would drop to 28.2 percent of total receipts in 1986 from 30.9 percent in 1980. Corporate income taxes would continue to decline as a proportion of the total, to 10.4 percent compared with 12.4 percent in 1980. Excise taxes would rise early in the period because of the windfall profits tax, but would then fall back, showing little change relative to total receipts from 1980 to 1986.

Administration projections — The revenue impact of the administration's proposal is also shown in charts 1 and 2. Relative to GNP, total receipts would decline from 20.3 percent in 1980 to 19.6 percent in 1986, a decline that occurs because the tax cut primarily affects individual and corporate income taxes. Although individual income taxes relative to GNP decline only from 9.5 percent in 1980 to 9.1 percent in 1986, the tax cut is large relative to the current services estimate. Furthermore, the rapid rise in marginal rates would be arrested (table 4). The decline in corporate income taxes is somewhat greater, 1.5 percent of GNP in 1986 compared with 2.5 percent in 1980. Social insurance contributions differ little from current services estimates because the proposed legislation is not directed at these taxes. The remaining taxes are projected to keep pace with GNP, that is, their proportions change little from 1980 to 1986.

Chart 2 summarizes the distribution of total receipts among the components. Although varying during the projection period, individual income taxes in 1986 would be about the same proportion of the total as they were in 1980 — almost 47 percent. Social insurance contributions on the other hand, would rise from 30.9 percent of total receipts in 1980 to 34.8 percent in 1986. Corporate income taxes continue their fall from the 1955-80 period to 7.7 percent of total receipts in 1986. Excise taxes, after rising relative to the total in 1981 and 1982, end up somewhat higher in 1986 than in 1980. Other taxes and revenues are essentially unchanged as a percent of total receipts.

SUMMARY

This article summarizes trends in federal revenues over the past 25 years, examining the potential impact of proposed legislation on these trends for coming years. Only tax receipts are considered explicitly; funds raised by borrowing and money creation are ignored. Furthermore, no attempt is made to evaluate the program in terms of conventional criteria such as impact on economic growth, resource allocation, distribution of income or economic stabilization. Nevertheless, the simple description of developing trends is a starting point for a more complete economic analysis.

Examination of revenue trends for the period 1955-80 indicates that, for most of the period, total receipts essentially kept pace with nominal GNP, though they have accelerated recently. Even so, 1980 total receipts as a percent of GNP were still below the proportion reached in 1969 when a surcharge was added to individual and corporate income taxes during the Vietnam War. Though total receipts remained relatively stable, its composition changed dramatically over the 1955-80 period. Individual income taxes as a percent of total receipts fluctuated within a fairly narrow band, but social insurance contributions rose from 11.9 percent of the total in 1955 to 30.9 percent in 1980. Both corporate income taxes and excise taxes declined throughout the period.

The administration has proposed legislation that would significantly affect these trends. The relevant comparison against which to measure the impact of these proposals is the current service estimates, that is, projections based on the existing tax structure. On a current services basis, total receipts would rise sharply to 24.1 percent of GNP in 1986. The effect of the proposed legislation, which affects mainly individual and corporate income taxes, would be to reduce the rise of total receipts relative to GNP. However, the proposed tax cuts would be insufficient to lower the percentage of total receipts to GNP to its 1955-80 average of 18.6 percent.

With respect to the relationship of specific taxes to total receipts, the legislation appears roughly to keep past trends intact. In other words, individual income taxes would rise slightly relative to total receipts, while social insurance contributions would continue the rising trend established in the 1955-80 period. Corporate income taxes would continue downward, but excise taxes would reverse their 1955-80 downward trend and rise in the 1980-86 period.