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CONTENTS

A Primer on Inflation: Its Conception, Its Costs, Its Consequences	2
Unusual Factors Contributing to Economic Turmoil An Address by Darryl R. Francis	9
The St. Louis Equation and Monthly Data	14
Monetary Effects of the Treasury Sale of Gold	18

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A Primer on Inflation: Its Conception, Its Costs, Its Consequences

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A GREAT deal of public rhetoric has recently been advanced regarding our present problem of inflation. In fact, as the various price indices moved progressively higher, inflation was elevated to the position of "Public Enemy No. 1". As we crossed the bridge from single- to double-digit inflation, public discussion of inflation intensified. Concern has been expressed that that bridge might very well be burned behind us unless steps are taken immediately to assure a return trip to price stability.

Implicit in a decision by society to seek a lower rate of inflation is some knowledge of the costs involved. In particular, in demonstrating a willingness to endure some temporary hardship, society decides that the cost of allowing inflation to continue unchecked exceeds the cost of pursuing a determined anti-inflation policy.

For many of us, these costs are not always readily identifiable and certainly not perfectly predictable. The purpose of this article is to discuss in general terms, without attempting to quantify, the costs and consequences of inflation. Prior to that discussion, inflation is defined and an explanation is provided of how inflationary pressures develop.

INFLATION: A DEFINITION

In this article inflation is defined as a continuing rise in the average level of prices. Although this definition may seem fairly straightforward and generally acceptable to all, there are a few distinguishing features which are often overlooked in its application. Specifically, there are three situations which do not necessarily fit this definition:

- 1) price increases of individual goods;
- 2) a once - and - for - all increase in the average level of prices;
- 3) a temporary increase in the average level of prices.

It has been particularly popular in recent times to focus on the price increases of individual goods and

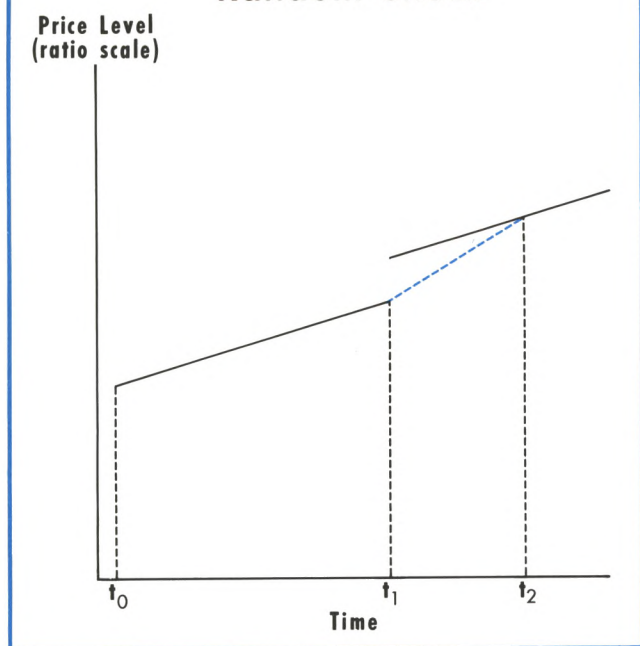
services and conclude, on the basis of that evidence, that inflation is running rampant. Individual prices neither cause nor lead to inflation, as defined above. What is missing is recognition of the fact that there are a myriad of individual prices which constitute a given average price level.¹ At any point in time, there are some individual prices being affected by downward pressures, others by upward pressures. A measure of inflation is obtained only when the changes in *all* prices are considered. In essence, the price of one commodity may increase in a given period, but that reveals little about price changes in the whole universe of other commodities available for consumption.

A once - and - for - all jump in the average level of prices could occur as a result of some sustained random event, but a one - time rise does not affect the subsequent *rate of increase* in the average level of prices. Such a situation is depicted in the accompanying diagram. The trend rate of inflation is indicated in Figure I by the slope of the line between t_0 and t_1 . At point t_1 this trend is suddenly interrupted by some random event which, for example, causes a cut-back in the supply of commodities available for consumption. The reduced supply is now consistent with a higher price level. If the price adjustment were instantaneous, we would immediately observe a higher price level but no change in the *rate* of price increase.

In the real world, however, the adjustment to the higher price level would not be instantaneous, but would probably be distributed over some time interval. This is indicated by the dotted line between t_1 and t_2 . Over this adjustment interval, the rate of change in the price level is higher than the previous trend rate of inflation. But, it is noted that the trend rate is re-established after the adjustment is completed at point t_2 ; that is, the higher rate of change in the price level during the adjustment period is not a "continuing" phenomenon. Therefore, at most this

¹For a discussion of one measure of changes in the price level, see Denis S. Karnosky, "A Primer on the Consumer Price Index," this *Review* (July 1974), pp. 2-7.

Figure 1
Price Level Adjustment to a Random Shock



situation can be referred to as a transitory bulge in the rate of change in the price level. The jump in the price level might be attributable to the operation of "special factors"; it would not be appropriate, however, to label this jump as an increase in the rate of inflation.

Price is determined by the interaction of supply and demand forces. Both of these forces can be affected by temporary events which can alter their previous relationship. In such situations prices might change, but since the event is considered temporary and likely to reverse in some later period, a label of inflation is not consistent with the definition. For example, if the harvest of some particular crop is affected by unfavorable weather conditions, the reduced supply will be distributed among buyers by a rise in the price of the crop. This occurs because at previously existing prices total quantity supplied falls short of total quantity demanded. Even though this individual price increase may affect the average price level, such a development need not be regarded as inflationary since by its very nature "it will be self-limiting, and . . . does not in itself represent any serious policy problem."² Either the supply of the same commodity will increase again in some later period, or the productive factors which are released in the production of one

commodity will be employed to produce a new commodity or more of other existing commodities.

THE DEVELOPMENT OF INFLATIONARY PRESSURES

A Demand-Supply Imbalance

Assuming the market is permitted to function, prices always and everywhere respond to the forces of demand and supply. When the quantity of goods and services demanded at prevailing prices exceeds the available supply of goods and services, prices tend to rise, frequently with a considerable lag; conversely, when the supply of goods and services available for consumption at prevailing prices exceeds the quantity of those goods and services demanded, prices tend to decline, also with a considerable lag.

Growth of aggregate demand for goods and services over time is influenced by economic policy actions, such as the growth of monetary aggregates and the tax and expenditure actions of the Government. For the most part, potential aggregate supply of goods and services tends to grow at a rate independent of stabilization policy actions. This rate of growth is determined by factors such as increases in the labor force, trends in hours worked, and advances in technology which affect productivity and efficiency.³ An effective anti-inflation policy, therefore, would be one in which aggregate demand is permitted to expand at a rate consistent with the expansion in aggregate supply.

Noninflationary Actions

According to the analysis presented in this article, inflation (that is, continuing increases in the average level of prices) is the result of excessive growth in aggregate demand relative to aggregate supply. Since it is generally recognized that the ability to influence aggregate demand exists, why do inflationary conditions develop? The search for a cause ultimately leads one to look to the management of Government economic policies.⁴

²It should be noted, however, that there are situations in which stabilization policy actions can affect the level of output available for consumption. As will be argued later, inflation (a policy-induced phenomenon) affects production efficiency adversely, which obviously affects the available supply of goods and services.

⁴In a recent question and answer session arranged with the Office of Women's Programs of the White House, Treasury Secretary William E. Simon made the following observations on Government's contribution to the current rate of price increases: "Unsound government policies include our three-year experiment with wage and price controls. . . . Political

²Harry G. Johnson, *Essays in Monetary Economics*, 2d ed. (Cambridge: Harvard University Press, 1969), p. 104.

Human nature is such that our demands for goods and services are insatiable; that is, we (individually and collectively) would prefer to consume more rather than less. The supply of resources available for consumption, however, is always less than what we would like to consume. Given that the quantity demanded must exceed the quantity supplied for inflation to occur, does this imply that inflation is a perpetual development buoyed by human nature? No; one must distinguish between what we would *like* to consume and what we are *able* to consume. The latter is determined by our wealth, or budget, constraint.

Our constrained demand is an important element in discussing the development of inflationary pressures. To be somewhat more specific than earlier, inflation occurs when the amount of goods and services commanded (that is, the power which economic units possess for making purchases at current prices) persistently exceeds the available supply of goods and services. Thus, the policy-makers' attention should be directed at maintaining balance between command over and supply of goods and services, assuming the avoidance of inflation is regarded seriously as an economic goal.

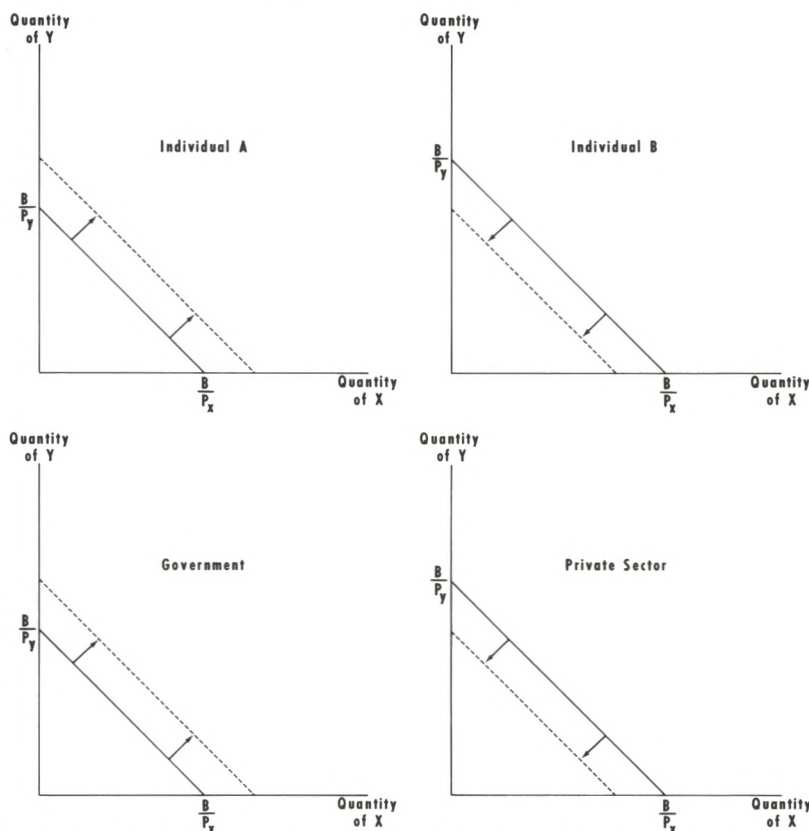
A visual presentation of the development of inflationary pressures is displayed in Figures II and III. Figure II displays the noninflationary actions of individuals and Government, respectively. Figure III shows the inflationary actions of the Government and the induced price level change.

In the analysis of the Government's contribution to the economic climate, the following observations are

pressures have long put a premium on excessive consumption. . . . Monetary policies have been overly stimulative. And Federal budget deficits have been spurring inflation since the early 1960s.

"In fact, to my way of thinking, these unsound monetary and fiscal policies have been the most fundamental causes of present-day rampaging inflation." [U.S., Treasury Department, Office of Public Affairs, *Department of the Treasury News*, November 20, 1974, p. 4.]

Figure II
Noninflationary Financing
Command Over Output Equals Output



The diagrams in Figures II and III make use of a concept referred to as a budget constraint. For illustrative purposes, it is assumed that the economy produces two goods--X and Y. In addition, it is assumed that there exists a budget, denominated in money, which can be employed only for the purchase of these two goods. The price of good X times the quantity of X, plus the price of good Y times the quantity of Y equals the budget. In algebraic form, the budget is represented by the expression $B = P_X \cdot Q_X + P_Y \cdot Q_Y$. The point where the line crosses the horizontal axis represents a situation where the budget is used exclusively for the purchase of good X; that is, $Q_X = \frac{B}{P_X}$. The point where the line crosses the vertical axis represents complete exhaustion of the budget for the purchase of good Y; that is, $Q_Y = \frac{B}{P_Y}$.

The position of the budget line depends on $\frac{B}{P_X}$ and $\frac{B}{P_Y}$. Shifts in the budget line, then, are the result of changes in the level of the budget (B), the level of prices (P_X , P_Y), or both. In the above diagrams, all of the shifts in the budget line are the result of changes in the size of the budget (B).

made. It is recognized that Government exists to serve the people and that the people, in turn, collectively demand services provided by the Government. When efforts to provide more services lead to expenditures that exceed Government's revenues, Government must extend its command over resources. The means by which this command is extended is a key consideration in the determination of inflationary pressures.

In the upper panel of Figure II, individual A desires to increase current consumption above that commanded by his current income. Individual A decides that borrowing is the means by which he will increase

his share of available output.⁵ This is indicated by an outward shift in consumer A's current budget constraint, or resource command, line. In making such a decision, individual A relinquishes claims to future consumption, to repay the loan, for the purpose of increasing current consumption. Individual B agrees to act as a lender and furnish the funds. This is indicated by a leftward shift in B's current budget constraint line. In so deciding, individual B foregoes a part of his current consumption for the sake of increasing future consumption. In the process A has increased his current purchasing power by the same amount as B has decreased his current purchasing power. There is no change in the total command over available output, only a transfer of command from individual B to individual A. No inflationary pressures develop from this process.

This same noninflationary process is observed in the lower panel of Figure II. Government, for one reason or another, deems it necessary to increase its command over goods and services, as shown by an outward shift in the Government's budget constraint line.⁶ So long as this task can be accomplished by siphoning funds from the private sector (a leftward shift in the private sector's budget line), no upward pressure on prices develops. The transfer of purchasing power from the private sector to the Government takes place via explicit borrowing or tax increases.

Inflationary Actions

Figure III reveals the source of sustained price level increases. In this example, Government decides that money creation is the means by which it will extend its power to purchase, while the purchasing power of the private sector is initially unaffected. In the United States the process of money creation takes the following form. In order to cover expenditures that exceed current receipts, the Government attempts to sell securities to the public at a fixed price. If the public is not willing to purchase all of these *new* securities, the central bank intervenes in the securities market and purchases already outstanding Government se-

curities from the public. In the process, the central bank gains an asset, the Government securities, and creates a liability, the money paid to the private sector which finances the purchase of the newly issued Government securities.

In effect this procedure is tantamount to printing money. The Government has more funds available to spend, while the purchasing power of the private sector appears to remain unchanged. Based on nominal measures, this method is appealing because it appears that no one is forced to relinquish command over output for the sake of Government's gain—initially we might conclude that all of us are better off.

Such, however, is not the case. There has been an increase in the total command over resources by an amount equal to the quantity of money created. Since the quantity demanded now exceeds available supply at current prices, the economy generates reactions which tend to restore economic balance. The most dominant "balance-restoring" reaction is price level change. This process is indicated in Figure III which shows that increased Government spending underwritten by monetary expansion results in a price level increase. This, in turn, reduces the private sector's purchasing power and restores balance between output and output commanded. If, however, the Government maintains the policy of attempting to satisfy unlimited wants by, in effect, "printing money," a *continuous* imbalance between supply and demand results and price level increases will persist.⁷

COSTS AND CONSEQUENCES OF INFLATION

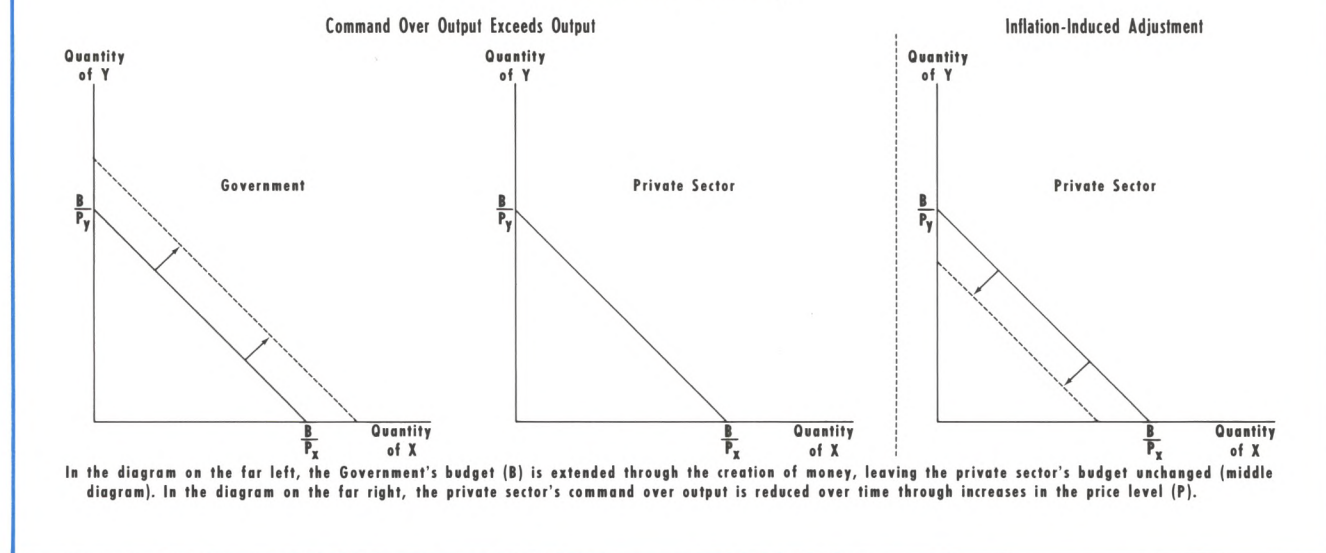
In the United States, as well as in many other countries, price stability has long been regarded as a desirable goal. For almost a decade, however, this goal has remained elusive. One reason for its elusive quality has been the promulgation of the belief that the short-run cost of reducing the rate of inflation was greater than the cost of allowing inflation to continue unchecked. Another reason may be a lack of understanding of the causes and cures of inflation. Wage and price controls were a dramatic attempt to lower the rate of price increases while avoiding the

⁵Another means by which a consumer can increase his consumption of goods and services is to accept additional employment. This alternative is not considered here, however, because in the aggregate it involves an increase in output, violating the implicit assumption of a fixed supply of goods and services in the short run.

⁶Increasing Government command over goods and services does not necessarily mean that Government grows in size, that is, in terms of the amount of people it employs or the amount of resources it consumes. Rather, it is possible that the redistributive function of Government increases; that is, purchasing power is increased for those groups of society who are effective in convincing Government of their "need".

⁷A Government-induced deficit is not necessarily the *only* means by which an imbalance between supply and demand at prevailing prices occurs. For example, as noted earlier, if part of the private sector desires more current consumption, enlarged loan demand will exert upward pressure on interest rates. The central bank, in an attempt to resist this upward pressure, may respond by expanding the nation's money supply. In this process, there is no corresponding reduction in consumption in another part of the private sector.

Figure III
Inflationary Financing



temporary costs of transition. As the "control" effort proceeded, underlying inflationary pressures mounted as a result of the maintenance of stimulative monetary and fiscal policies, and economic dislocations developed. With the realization that controls were a failure and the recognition of the costs of unchecked inflation, a re-evaluation of the inflation-price stability alternatives has been necessary.

Inflation, at any rate, generates very definite effects. These effects are related to both the transfer of wealth from one economic group to another and the allocation of resources from productive to unproductive activity. In addition, if the rate of price level increases is allowed to reach some critical point, there exists a potential for serious distortions in our system of economic as well as political organization.

Wealth Transfer

There are a variety of features which distinguish one type of inflation from another. An inflation which proceeds at a relatively steady, and hence predictable, pace has one set of effects; an inflation which proceeds by "fits and starts," and is thus not very predictable, has another set of effects.⁸

Holders of money lose wealth during a period of inflation, regardless of the type of inflation. Since cash balances do not earn interest, they do not rise as prices rise. Therefore, purchasing power, or com-

mand over resources, declines for those economic units whose assets are held in money form.

The generalization that inflation causes a rechanneling of wealth from creditors to debtors is incomplete unless accompanied by statements about the extent to which inflation is correctly anticipated. This effect of inflation is most easily observed in a situation where the price level changes rather sharply over relatively short time spans, catching economic units unprepared.

In such a situation, a transfer of wealth occurs when economic units engage in transactions with a less than accurate perception of the future rate of inflation. For instance, sellers may contract to sell their goods and services in the future at prices which incorporate an inadequate adjustment for inflation. It follows that the receipts from the sale of these goods and services, when adjusted for the actual rate of inflation, will not be sufficient to permit the maintenance of the seller's real standard of living. The buyer, however, has experienced an increase in real wealth as the product purchased has appreciated in price by an amount greater than that anticipated at the time of contract formation. In effect, there has been a transfer of wealth from the seller to the buyer.⁹

⁸Milton Friedman, *Dollars and Deficits: Living with America's Economic Problems* (Englewood Cliffs: Prentice-Hall, Inc., 1968), pp. 46-50.

⁹A consequence of such an inflation-induced transfer of wealth may be a reduction in people's willingness to lend long term. A reduction of long-term loans is likely to have allocative effects which could reduce economic welfare. For example, the financing of the U. S. housing industry is predicated on long-term loans. If average mortgages were reduced to, say, ten years, a great many people would find the cost of home ownership prohibitive.

In addition, those receiving pensions fixed in amount or those who maintain their savings in the form of fixed income assets will find that the purchasing power of these assets declines also.

In a steady, fully anticipated inflation little wealth redistribution occurs, except for those whose wealth is held in the form of money.¹⁰ Economic units expect prices to rise at some average rate and thus make a variety of economic arrangements that will adjust for the expected price rise. For example, wage contracts would include escalator clauses or would be drawn up on the basis of the average rate of inflation expected. Interest rates would include a premium based on the generally expected increase in the level of prices. As a result of near-perfect anticipation of inflation, no particular group would be forced to transfer wealth to another group because of the change in the price level.¹¹

Resource Utilization and Allocation

This is not to say, however, that the steady inflation is without costs. As mentioned earlier, inflation of any magnitude has the effect of making cash balances (money) an expensive item to hold. As inflation proceeds, more and more effort is devoted to keeping this expense at a minimum. By constantly scrutinizing one's cash position, valuable productive time is wasted and, in general, scarce resources are diverted from more productive activity to less productive activity due to the required monitoring of inflation. Otherwise productive members of the labor force become involved in not only figuring out what the changes in prices and wages are likely to be, but also in hedging against those changes.

In the very process of predicting inflation, transactions and information costs are likely to increase. For example, list prices would be difficult to establish for any length of time. Firms issuing catalogs containing the prices of their products would find it difficult to continue this practice. Sales representatives would be forced to contact head offices for the most up-to-date prices. In general, business planning would be frustrated because it would be necessary to constantly reassess price information. As this sort of activity becomes widespread, society in general experiences a decreased level of output available for consumption.

¹⁰Friedman, *Dollars and Deficits*, p. 47.

¹¹It should be noted, however, that even in a noninflationary climate there are always changes in *relative* prices taking place. Associated with such relative price changes are transfers of wealth from one group to another.

Potential Cost: Serious Economic Dislocations

As the recently recorded rates of inflation approached and exceeded 10 percent, public concern about inflation intensified. In fact, several spokesmen, both within and outside of Government, have painted a very gloomy picture of our future in the event that inflation is not brought under control. According to this view, disruptive forces, inherent in an advanced inflationary process, may surface and cause serious distortions in our economic system. Such distortions could become severe enough to ultimately result in strong desires to change our institutions.

In all economies with organized markets, at least one commodity evolves as universally acceptable in exchange for all other commodities. "Money" is the commodity which serves this purpose. Money also provides services as a store of purchasing power and as a unit of account for recording relative values.¹²

During periods of inflation all of these services from money are diminished. Its function as a store of purchasing power declines, its credibility as a unit of account suffers, and its reliability as a medium of exchange is subject to greater uncertainty. As these services continue to erode as a result of accelerating inflation, there is a tendency for economic units to restructure their portfolios of real and financial assets. The restructuring takes the form of an attempt to reduce holdings of money and to increase holdings of other assets.

At some point in the inflationary process, referred to as the inflation threshold, it is generally believed that this sort of activity reaches epidemic proportions and proceeds at a very rapid pace. Such a reaction could be triggered by the recognition that the cost of holding money, especially that cost related to declining purchasing power, is so great that widespread divestment of money by individuals is pursued. Society as a whole, however, is not able to divest itself of the available stock of money; it can only circulate the existing stock of money at a faster rate. As a consequence, inflation changes from a canter to a gallop, being spurred by changes in the velocity of money circulation, completely independent of current monetary policy actions.

If inflation were to proceed to such an extent that money, as customarily defined, no longer serves as a medium of exchange, another commodity or commodi-

¹²For a theoretical discussion of the services of money, see Karl Brunner and Allen H. Meltzer, "The Uses of Money: Money in the Theory of an Exchange Economy," *The American Economic Review* (December 1971), pp. 784-805.

ties would emerge as money. Initially, however, it is not likely that any other *single* commodity would be accepted as a means for conducting transactions. A single commodity may eventually emerge to serve as money or what is more likely, a new form of currency would be introduced. During the transition, however, barter would probably become the common mode of transacting. This, then, is what is meant by serious economic distortion—barter (that is, goods and services being directly exchanged for other goods and services) becomes the dominant method of exchange. It is the consequence of a period of runaway inflation.

SUMMARY AND CONCLUSION

This article defined inflation as a continuing rise in the average level of prices. The cause of inflation was identified as the accommodation of unlimited wants through excessive monetary expansion. The costs of inflation include: a less than optimal resource use; an arbitrary redistribution of income in the case where inflation is less than perfectly anticipated; and to the extent that inflation is permitted to accelerate, the eventual occurrence of severe disruptions in our economic system.

In evaluating the inflation-price stability alternatives, a great deal of attention has been focused on

the costs of achieving price stability. Often ignored, however, is the recognition that these costs are of a short-term nature; that is, declines in production and increases in unemployment occur during the period of adjustment to a lower rate of inflation.

In an apparent willingness to accept these costs, society may demand the initiation of an anti-inflation policy. However, once the short-term costs associated with such a policy manifest themselves and inflation appears to remain unaffected, society may demand a hasty policy reversal. Failure to recognize the long lags associated with the initiation of an anti-inflation policy and the expected results of that policy results in short-run costs being incurred while the long-run benefits are not given sufficient time to materialize.

One can only hope that both the short- and long-run aspects of an anti-inflation policy will continue to be discussed. If attention is focused only on the short-term costs of reducing inflation, public sentiment toward the achievement of this goal might weaken. In such a case a high and accelerating rate of inflation is likely to plague the economy for many years to come. If, however, concern about the long-term effects of accelerating inflation remains strong, then the adoption and continuation of a determined anti-inflation policy may eventually succeed.



Unusual Factors Contributing to Economic Turmoil

Remarks by DARRYL R. FRANCIS, President, Federal Reserve Bank of St. Louis,
Before The Wesleyan Associates, Illinois Wesleyan University,
Bloomington, Illinois, December 6, 1974

THE YEAR we are about to end has been very unusual in that it was characterized by one of the most rapid increases in the price level, and by one of the sharpest drops in reported real output in the post-World War II period. In order to understand the view we hold at the Federal Reserve Bank of St. Louis regarding the outlook for 1975, it is necessary to take time to develop, in some detail, the interpretation we apply to the events in 1974.

First, let's review some definitions of economic concepts. We all talk about inflation; we hear a lot about inflation; but I think that there are some inaccurate ideas prevailing in the press and in the minds of the general public as to what the phenomenon called inflation really is. Inflation is simply a process involving erosion of the purchasing power of a nation's money supply—that is, simply a deterioration in the exchange rate between money and goods and services.

I use the word "process" because inflation is an ongoing phenomenon; it is continuous, although not necessarily at a steady rate. This is distinct from a *price increase*, or an increase in the *price level* that is not continuous, or ongoing. That distinction becomes very crucial to understanding the forces influencing our economy and general welfare in 1974.

The general phenomenon of a continuous inflation is due basically to monetary causes. Normally, we attribute inflation to a growth in the nation's money supply which produces a growth of total spending at a rate faster than the growth in real output—in other

words, too much money chasing too few goods. Since inflation is a decline in the purchasing power of money, I think that there can be little quarrel with the general idea that inflation is a monetary phenomenon.

However, while a *persistent* inflation occurs only as the growth in money supply and resultant total *demand* for goods and services exceeds the total *supply* of goods and services, a *temporary* or *transitory* inflation can result from forces which produce a decline in the supply, or ability to produce goods, while demand continues to grow. In other words, a temporary bulge in the rate of inflation, while the economy is adjusting to a new higher equilibrium price level, is not necessarily associated with a marked acceleration in the rate of growth of the money supply. On the contrary, it can be associated with a steady, continuing growth of the money supply and aggregate demand for goods and services, while at the same time there is a sudden drop in the economy's real economic capacity.

It is our view that both a persistent monetary inflation and a temporary bulge in the rate of inflation occurred in 1974 in the United States and in many other countries of the world. Our analysis holds that the trend growth in the nation's money supply this year and over the past four years is consistent with an ongoing, sustained rate of increase in the general price level of about 5 to 6 percent per year. This year, however, we have seen both the GNP implicit price deflator and the consumer price index increase in excess

of 12 percent. This is an increase that we do not believe can be explained by the growth of the money supply, either this year or over the past few years.

We attribute about half of the increase in the general price level this year to the trend growth of the money stock, and about half to forces which constrained the real economic capacity of the U. S. economy. We consider these forces to have only a one-time, transitional effect, although the process is distributed over a period of time that has so-far lasted about four quarters.

Given this view, we would argue that the *rate of increase* of the general price level will decelerate to the range of 5 to 6 percent per year, even if the rate of growth of the nation's money supply were to continue at about the same average pace observed over the past several years. To put it another way, we think about one-half of the inflation observed this year was of the persistent excessive aggregate demand variety, and about one-half was of the temporary, or transitory, variety. The latter occurred as the economy adjusted to a lower real economic capacity, and therefore, a higher equilibrium level of average prices.

Allow me to take a few moments to review the developments of the past few years. During 1967 and 1968 there is no doubt that stabilization policies in the United States were highly expansionary. This contributed both to an acceleration in the rate of inflation and to a high rate of real output growth accompanied by a low rate of unemployment. In 1969 monetary actions turned decisively restrictive as monetary policymakers sought to curb the building inflationary pressures. The actions taken in 1969, as indicated by a marked reduction in the rate of growth of the nation's money stock, produced a slowdown in aggregate demand in 1970 and resulted in conditions that were characteristic of the previous business cycle recessions in the post-World War II period. Quite appropriately (and some time after the fact) the National Bureau of Economic Research declared that a recession had occurred, lasting approximately from November 1969 to November 1970.

During 1970 the rate of growth of the nation's money stock reaccelerated as policymakers sought to cushion the weakening economy. At the same time, the Federal Government's budget produced a deficit, indicating (according to the usual analysis) that fiscal policy was also stimulative.

In 1971 the growth of the money stock accelerated further and, then again in 1972 another step-up oc-

curred. It was not surprising that growth in the demand for goods and services rose markedly through this period. I would argue that forces were at work contributing to the building of a familiar inflationary process, wherein too much money is chasing too few goods as the economy approaches its real economic capacity. Thus, we saw an erosion of the purchasing power of the nation's currency.

The inflation was not directly observable in the second half of 1971 and throughout 1972 since the Government chose to impose a rather rigid system of wage and price controls. These controls, if nothing else, had the effect of holding down the reported increases in prices, and therefore, the rise in the price indices. However, the system of controls began to break down, as was inevitable, and early in 1973 the Administration switched to a much less rigid program of controls, thereby allowing a catch-up to begin. Throughout 1973 the rate of price increase, as measured both by the consumer price index and the GNP deflator, accelerated sharply as the process of de-control allowed the markets to begin to take us back to conditions consistent with underlying economic forces.

The growth of the nation's money stock in 1973 was somewhat slower than the rate experienced in 1972, but was still at a very high rate by historical standards. According to some empirical research at the Federal Reserve Bank of St. Louis, even though the *rate* of price increase in 1973 was much more rapid than implied by the growth in the money stock that year and in the years immediately prior, the *price level* at the end of 1973 was below the one indicated by the growth of the money stock over the prior few years. In other words, this research indicates that in the second half of 1971 and throughout 1972 the price level was being held below what the prevailing monetary growth would have implied. Therefore, in 1973 the high *rate* of price increase was simply the expected consequence of the removal of controls and return to the rate of exchange between money and goods that would bring us back to equilibrium conditions. In other words, after the re-adjustment or "catch-up" process was completed, we would expect a *level* of prices, as indicated by monetary growth, to prevail.

It is our judgment that the distortions on prices caused by controls and de-controls had pretty well worked themselves out by the end of 1973. Moreover, we would argue that the rate of inflation in 1974 would have been less than in 1973 (and only about half what has actually been observed in 1974) if there had not been a succession of what have become

known as "special factors" which were providing further shocks to the economy.

One of the factors affecting relative prices (and therefore production) in the past few years is related to the depreciation of the dollar that occurred since 1971. The fact that the depreciation occurred indicates that the U. S. price level was out of line with its major trading partners. What had happened was that in the late 1960s and early 1970s, as the United States was pursuing inflationary policies associated with large Government deficits and a high rate of military spending, the international agreement on exchange rates (known as Bretton Woods) served to hold down prices of foreign goods to American consumers and producers, while raising prices of our goods to foreigners.

This means that for a number of years we were experiencing less inflation to the extent that foreign goods, in relative terms, became successively cheaper. Also, our goods were not being demanded in the same quantities that would have otherwise occurred. But once the dollar was permitted to depreciate, there were sharp shifts in underlying conditions. Demand for some goods declined and demand for other goods increased, bringing about marked shifts in relative prices to U. S. consumers. The prices of foreign goods rose sharply, while the prices of our goods to foreigners decreased sharply in terms of their currencies. Since foreign goods were now more expensive to us, American consumers and producers shifted their demands away from foreign goods and towards the relatively cheaper American produced goods. Similarly, the now cheaper American goods caused foreigners to step-up their purchase orders of our products. The adjustment to these sudden changes in relative prices naturally would be distributed over an extended period of time.

In addition to the shifts in demand and the associated changes in relative prices caused by the dollar depreciation, the American social and political process resulted in decisions to shift the utilization of some of our nation's resources away from the production of conventional goods and services and towards a healthier living environment and a safer working environment. These laws took many forms, but basically they have been geared towards less pollution of the air by our factories and automobiles; less pollution of our nation's rivers and a safer working environment, as well as safer automobiles to transport American citizens. These decisions to re-allocate a share of our resources towards these objectives naturally implied significant shifts in demand, for both labor and other resources, away from the production of "widgets" and

towards the production of clean air, clean water, and greater safety.

In the language of economists, these decisions essentially amounted to a change in our society's consumption basket, wherein we decided to forego the production of some goods, both now and in the future, in favor of the rather intangible benefits of less pollution and more safety. Given limited resources, such a re-allocation of resource utilization necessitates a reduction in our ability to produce the usual types of goods and services. In other words, we made a social and political decision which resulted in an absolute decrease in our production capacity for goods and services.

Furthermore, there were other factors at work constraining the domestic supply of goods. Crops around the world were not good in 1972. Foreign exchange rates were changing in the direction that made American goods look cheaper, and at the same time foreign countries were producing less grain, less anchovies, and so on; so naturally the demand for American agricultural products increased markedly. And we met that demand through very large increases in the volume of goods exported. Consequently, it should not be surprising that there were less goods and services available for American consumers.

Then late in 1973 the oil producing and exporting countries outside the United States (called OPEC) took collusive action to bring about a sharp increase in the world price of petroleum products. Let me digress a moment and characterize what had been going on. The OPEC group had been selling their oil output to the Western world countries at prices that now look quite low indeed. With the revenue received from oil, they purchased goods and services from the Western world. In other words, viewed in barter terms, they were exchanging current output of oil for current goods and services produced by others. By agreeing to raise prices, the OPEC group, in effect, decided that they wanted to receive not only claims to current output in the Western world in exchange for oil, but also claims to future output.

The way this takes place is that we wind up selling securities to them, either equities or bonds, which represent claims to our future production of goods and services. In a very crude sense, we are now giving up some of our future production in exchange for some of their present oil. Even at the higher prices, apparently we are willing to do so rather than accept the alternative of reducing our current rate of oil consumption. Nevertheless, the effects are the same:

U. S. consumers have had a wealth loss. We have been made poorer by the actions of the OPEC cartel. The standard of living of American consumers has been reduced, and probably will grow at a slower rate, because of the higher price of oil. The effects of the higher price of oil and substitute sources of energy have created massive shifts in demands, and therefore relative prices, which has been a dominant factor in the developments experienced in 1974.

The higher cost of energy, together with the environmental and safety laws, acts as a tax imposed upon the economic productive capacity of the United States. This means that the present value of the existing capital stock was reduced in much the same way as the value of the capital stock would decrease if the Government were to increase sharply the corporate tax rate. The decrease in the present value of the capital stock means that equity prices on the stock market decrease, reflecting the fact that the expected real earning power of corporations has been reduced by these varied actions.

The decrease in the real economic capacity of the country is, by and large, a one-time occurrence. However, the shifts in demand and changes in relative prices to adjust to a new equilibrium take some time to be fully completed. So far, this year has been one of four calendar quarters of shortages, sharp increases in the prices of many commodities, and a marked decrease in the reported volume of real output; but at the same time a continued high level of total employment.

This latter development, a rather high level of total civilian employment, is a development that I do not believe has received sufficient attention this year. The unemployment rate has been widely publicized, but the total number of persons employed has not been. The very sharp increase in the price level, even though about half the rate of inflation was transitory, *did* have the effect of reducing the standard of living of American consumers. That's part of the adjustment process. But because of the inflation, many persons who were not otherwise counted as part of our labor force — such as women, and young people — were induced to declare their intentions to seek jobs. More women found it desirable to work to supplement family income, and students chose to postpone entering or returning to college. This increase in the overall participation rate in the labor force was very large by historical standards. The increase in the participation rate was much faster than the ability of the economy to absorb these new job-seekers.

But why dwell on the fact that about one-half of the number of new persons seeking jobs did not find them, while neglecting the fact that one-half of these new entrants into the labor market did find jobs. Since one of the inputs to production — energy — has increased sharply in cost, our economic analysis tells us that the demand for other inputs to production, such as labor, would increase since the cost of these other inputs have become *relatively* cheaper. Since the present value of the existing capital stock in the U. S. economy has declined, there is naturally an increase in the demand for *additions* to capital stock; and therefore we have had an investment, or capital goods, boom throughout this year. That's what we would expect under the circumstances; and the fact that it takes quite a bit of time to put new plant and equipment in place indicates to me that, in the short run, firms will seek more labor as a temporary substitute for capital as they try to maintain production while waiting to restore real economic capacity.

The so-called "real output" numbers derived from the national income accounts give us an idea about changes in the volume of goods and services produced over time. But if we are devoting a much larger proportion of our resources to the production of such things as a cleaner environment and safer working and living conditions, then I believe it is appropriate to be skeptical of interpretations of the falling real output as being solely indicative of a sluggish economy.

Look at what goes into producing 1975 automobiles; in addition to the pollution control and safety devices on the automobile itself, there are environmental and safety restrictions imposed on the manufacturing process. And I think that in terms of inputs, the auto industry continued to command a very large share of our resources until very recently, even though the volume of outputs, measured simply as the number of cars, declined.

With this analysis as background, let me turn to a few remarks about appropriate stabilization policy actions. On the one hand there is a temptation to want to do something about the 12 percent inflation, and on the other hand there is the desire to do something about the falling real output and rising unemployment rate. According to my interpretation of the events of the last few years, I believe that, without further special actions on the part of either monetary or fiscal authorities, and continuation of monetary growth at the 1973-74 rates, the rate of inflation will decelerate markedly next year to the range of 5 or 6 percent. At the same time, the growth in real output

should resume and I doubt that the rate of unemployment will rise as high as some analysts have feared.

We have had a wealth loss; our standard of living has declined, and our absolute real economic capacity is now lower than it was a year ago. We should not seek policies designed to close the gap between what we are now producing and what could be interpreted as being real potential *before* the energy crisis, the environmental laws, the safety laws, the agricultural short-falls, and so on. That is simply unobtainable. Instead, we are forced to be satisfied to see a resumption of the growth rate of real output consistent with long-term growth trends in population, technology, and so forth—in other words, around three to four percent. But let me quickly add that this would also

occur without any overt actions by government policymakers. As long as we do not suffer any further adverse shocks to the economy, I believe that the inherent stabilizing properties and the resiliency of the market system will return us to our potential growth path.

If Congress wishes to take some sort of action to increase the total output of consumers' goods, then it will have to think in terms of relaxing the environmental and safety standards imposed on industry generally and on specific consumer products, such as automobiles. Short of that, more spending programs to simply augment aggregate demand runs the risk of creating conditions leading to further acceleration in our underlying, permanent rate of inflation.



The St. Louis Equation and Monthly Data

KEITH M. CARLSON

IN THE November 1968 issue of this *Review*, Leonall C. Andersen and Jerry L. Jordan published a study which reported results relating to the response of GNP to monetary and fiscal actions.¹ Since then, there have been a number of articles which have analyzed and challenged these findings.² Even though the final returns are probably not in yet, one has to be impressed with the way their results have withstood the criticism to which they have been subjected.³

The Andersen-Jordan article was concerned with the *relative* impact of monetary vs. fiscal actions, testing hypotheses relating to the magnitude, speed, and reliability of the response of GNP. Yet one of the more interesting implications of the St. Louis equation (the reduced-form equation developed in their article) was that GNP responds quickly to monetary actions and that the adjustment is essentially completed in a year's time. This finding ran contrary to the prevailing view at that time, which was based, in part, on results obtained by large econometric models. For example, the Federal Reserve — MIT econometric model, a model specifically designed to quantify the effect of monetary actions on the economy, concluded

"that monetary policy is ultimately quite powerful but that the lags are long."⁴

There is an indication that some of the large econometric models have been modified in such a way that the impact of monetary actions now appears to be quicker than in earlier versions.⁵ For the most part, however, the St. Louis equation continues to stand apart from other models, showing that virtually all of the GNP response to changes in money occurs in about a year, though mention should be made of another model — the Laffer-Ranson model.⁶ Arthur Laffer and David Ranson not only found a quick response to monetary actions, but they concluded that monetary actions have an immediate and permanent effect on the level of GNP, rejecting the presence of any lags at all.

The purpose of this note is to report the results of estimating the St. Louis equation with monthly data and thereby sharpen our understanding of the lag in the effect of monetary and fiscal actions. The question being asked here is whether the St. Louis equation continues to hold when monthly data are used in the estimation. It is well-known among economic analysts that the use of data aggregated over time can introduce a bias in the results.⁷

Data

The data used to estimate the St. Louis equation consisted of changes in nominal GNP as the dependent variable and alternative measures of monetary and fiscal actions as the independent variable. For purposes of comparison here, only the specification

¹Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968), pp. 11-24.

²Representative examples are Frank deLeeuw and John Kalchbrenner, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization — Comment," this *Review* (April 1969), pp. 6-11; Richard G. Davis, "How Much Does Money Matter? A Look at Some Recent Evidence," Federal Reserve Bank of New York *Monthly Review* (June 1969), pp. 119-31; Franco Modigliani, "Monetary Policy and Consumption: Linkages via Interest Rate and Wealth Effects in the FMP Model," *Consumer Spending and Monetary Policy: The Linkages* (Proceedings of a Monetary Conference held on Nantucket Island, Sponsored by Federal Reserve Bank of Boston, June 1971), pp. 59-74; Lawrence R. Klein, "Empirical Evidence on Fiscal and Monetary Models," in James J. Diamond (ed.), *Issues in Fiscal and Monetary Policy: The Eclectic Economist Views the Controversy* (DePaul University, 1971), pp. 35-50; and Alan S. Blinder and Robert M. Solow, "Analytical Foundations of Fiscal Policy," *The Economics of Public Finance* (Washington, D.C.: The Brookings Institution, 1974), pp. 63-71.

³Professor Klein, for example, draws the following conclusion: "Hard econometric evidence points to the fact that large structural models stand up at least as well as small reduced form models." [Klein, "Empirical Evidence on Fiscal and Monetary Models," p. 49.]

⁴Frank deLeeuw and Edward M. Gramlich, "The Federal Reserve — MIT Econometric Model," *Federal Reserve Bulletin* (January 1968), pp. 11-40.

⁵See Gary Fromm and L. R. Klein, "The NBER/NSF Model Comparison Seminar: An Analysis of Results," forthcoming in *Annals of Economic and Social Measurement*.

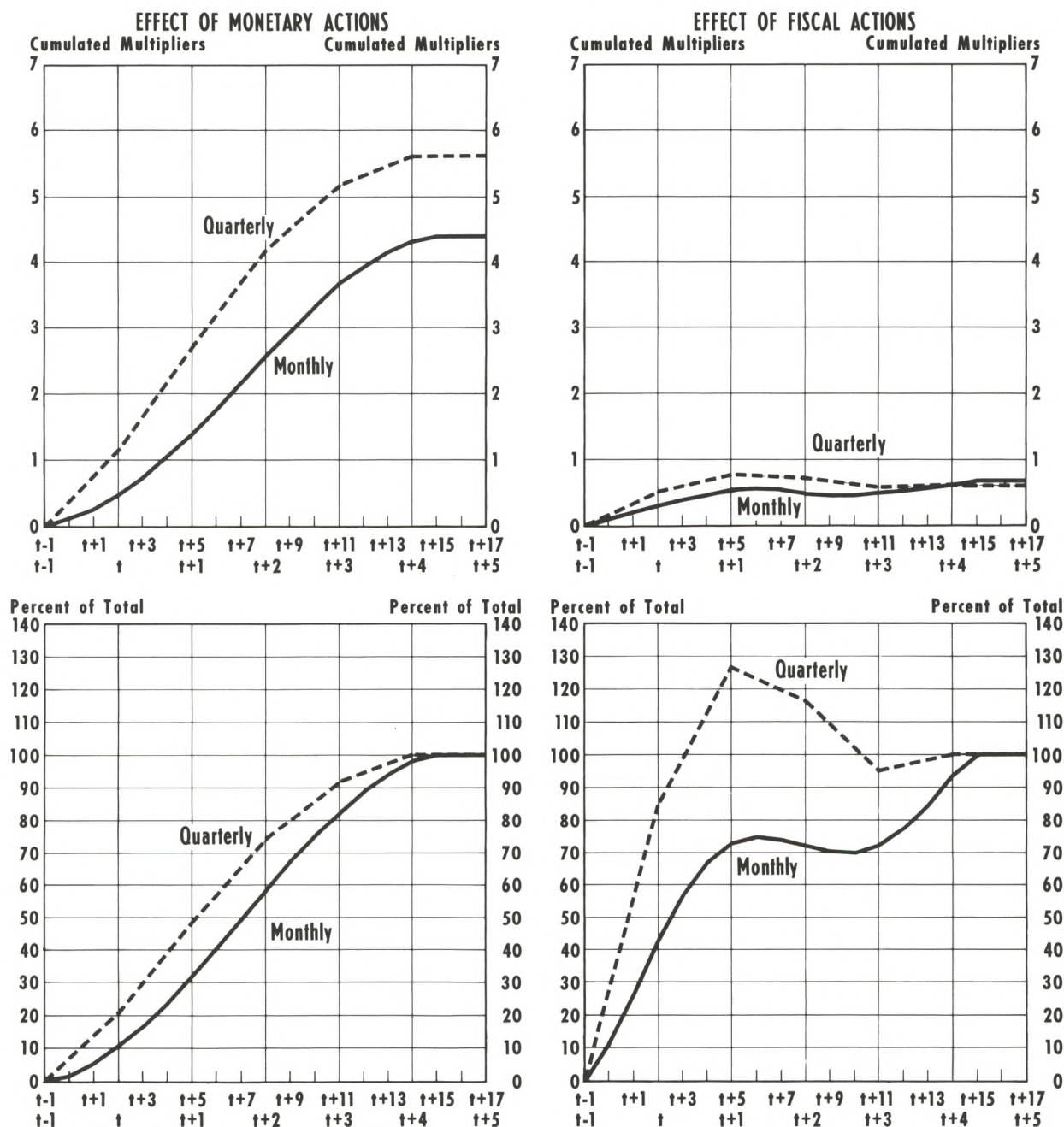
⁶Arthur B. Laffer and R. David Ranson, "A Formal Model of the Economy," *The Journal of Business* (July 1971), pp. 247-60.

⁷Yair Mundlak, "Aggregation Over Time in Distributed Lag Models," *International Economic Review* (May 1961), pp. 154-63, and William R. Bryan, "Bank Adjustments to Monetary Policy: Alternative Estimates of the Lag," *American Economic Review* (September 1967), pp. 855-64."

Summary of Lag Response

Monthly vs. Quarterly Specification

Sample Period: 1953-1973



Note: Dependent variable for monthly data is dollar change in personal income and for quarterly data is change in current dollar GNP. The horizontal scale shown as t-1 through t+17 refers to months, and that shown as t-1 through t+5 refers to quarters.

preferred by Andersen and Jordan is used. That specification used money, narrowly defined as demand deposits and currency held by the public, as the

measure of the monetary variable, and high-employment Federal expenditures as the measure of the fiscal variable.

Table 1

ST. LOUIS EQUATION
Monthly vs. Quarterly Data
1953 - 1973

(Fourth Degree Polynomial with $t + 1 = t - n = 0$)

Monthly Data					Quarterly Data		
Coefficients	ΔM	$\Sigma \Delta M$	ΔE	$\Sigma \Delta E$	Coefficients	ΔM	ΔE
t	.08 (.92)		.07 (1.93)		t	1.16 (2.49)	.51 (3.01)
t - 1	.15 (1.28)	.45	.11 (1.96)	.29	t - 1	1.56 (5.69)	.26 (1.85)
t - 2	.22 (1.86)		.11 (1.96)		t - 2	1.43 (3.57)	-.06 (-.42)
t - 3	.27 (2.79)		.09 (1.84)		t - 3	1.00 (3.71)	-.13 (-.86)
t - 4	.32 (3.87)	.95	.07 (1.46)	.20	t - 4	.47 (1.02)	.03 (.16)
t - 5	.35 (4.19)		.04 (.85)				
t - 6	.38 (3.86)		.01 (.29)				
t - 7	.39 (3.62)	1.16	-.00 (-.08)	-.00			
t - 8	.39 (3.64)		-.01 (-.26)				
t - 9	.38 (3.93)		-.01 (-.25)				
t - 10	.36 (4.32)	1.07	-.00 (-.04)	.00			
t - 11	.33 (4.06)		.02 (.31)				
t - 12	.28 (2.94)		.04 (.64)				
t - 13	.23 (1.97)	.68	.05 (.86)	.14			
t - 14	.16 (1.36)		.06 (.99)				
t - 15	.09 (.99)		.04 (1.08)				
Sum	4.40 (7.31)		.68 (1.81)		Sum	5.63 (8.58)	.61 (1.50)
Constant	.38 (1.29)				Constant	1.09 (1.14)	
R ²	.39				R ²	.71	
S. E.	2.80				S. E.	5.31	
D. W.	2.32				D. W.	1.86	

Note: Dependent variable for monthly data is dollar change in personal income and for quarterly data it is dollar change in GNP. Monetary variable (ΔM) is M_1 for both regressions. Fiscal variable (ΔE) is high-employment Federal expenditures for both regressions; monthly data are linear interpolations of quarterly data. Σ 's for monthly data are monthly coefficients summed over quarters. Figures in parentheses are "t" statistics. R^2 is adjusted for degrees of freedom. S. E. is the standard error of estimate, and D. W. is the Durbin-Watson statistic.

Total spending— The dependent variable used in the St. Louis equation is the dollar change in nominal GNP. No similar comprehensive measure is available on a monthly basis. As a proxy for GNP on a monthly basis personal income is used. The rationale underlying this choice is that personal income is the most comprehensive measure of aggregate economic activity available on a monthly basis. Over the last twenty years personal income has averaged 79.8 percent of GNP. It should be noted, however, that personal

income leaves much to be desired as a monthly proxy for GNP, since it excludes depreciation, indirect business taxes, undistributed corporate profits, and includes transfer payments.

Monetary variable— The choice of a monthly measure of monetary actions is automatic once a particular form of the St. Louis equation is chosen. The quarterly observations on the money stock narrowly defined are simply the quarterly averages of the

monthly estimates of the seasonally adjusted money data.

Fiscal variable — With regard to a monthly measure of fiscal actions, no such measures are available on a seasonally adjusted basis. Though complex methods of interpolation could probably be developed using the Treasury's "Monthly Statement of Receipts and Expenditures," the procedure followed here was to interpolate linearly between quarterly estimates of high-employment Federal expenditures. The quarterly observations were assumed to be equal to expenditures for the mid-month of the quarter, and expenditures for the intervening months were calculated by linear interpolation.

Results

The estimation proceeded by specifying the same constraints as used by Andersen-Jordan in their study. The equation was estimated with ordinary least squares and the lag structure was estimated by the Almon lag technique. The polynomial was constrained to fourth degree but several lag lengths were examined. In each case the coefficients on the $(t + 1)$ and $(t - n)$ lags were constrained to zero. The sample period used was 1953 through 1973.

The estimated equations are shown in the accompanying table and a visual summary is given in the accompanying chart. The results for the St. Louis equation estimated with monthly data are compared with the quarterly specification. The R^2 and the standard error are lower for the monthly specification, and the Durbin-Watson statistic suggests the presence of negative autocorrelation in the residuals.

Examination of these results indicates that the general quarterly pattern of coefficients on the monetary and fiscal variables is reproduced with the monthly data. The sums of the coefficients for the monetary and fiscal variables are little different from those for the quarterly model, though there is some indication that the monthly data show a smaller total impact for monetary actions. However, since personal income is smaller than GNP, the difference in monetary impact can be interpreted as being attributable to the difference in scale of the dependent variable.

The pattern of lagged response to monetary action, is also reproduced with the monthly data. The optimal lag length, which was determined by estimating with successively longer lags until the lagged coefficients trailed off into insignificance, appears to be about 16 months which is consistent with 5 quarters when estimated with quarterly data. That period, when 50 percent of the monetary impact has occurred, is roughly the same for the two data sets. The quarterly model indicates that almost 50 percent of the impact occurs by the second quarter, which conforms with the monthly result indicating one-half of the impact by the eighth month.

The pattern of response to fiscal actions requires additional comment. Since the monthly fiscal variable is a linear interpolation of quarterly observations, reproducing the result of the quarterly model might not seem surprising.⁸ The quarterly version of the St. Louis equation yields a total fiscal multiplier of 0.61 which is not significantly different from zero at the 5 percent level. However, reproduction of these quarterly results for the monthly version comes as a surprise because the dependent variable, personal income, includes transfer payments which are also included in the fiscal variable on the right hand side of the equation. There is some indication of bias though, because scale considerations alone would imply a sum fiscal coefficient for the monthly specification of less than 0.61.

Summary

The St. Louis equation was estimated using monthly data. Using changes in personal income as the dependent variable rather than changes in GNP, the results were consistent with those obtained with quarterly data. Results were presented providing evidence in support of conclusions relating to the magnitude and speed of the impact of monetary and fiscal actions as derived from quarterly data. Use of monthly data thus appear to carry the potential for evaluating the thrust of monetary and fiscal actions before quarterly data on GNP become available.

⁸It should be noted that for the monthly version the "t" statistics for the fiscal variable are probably biased upward because the number of independent observations is overstated as a result of interpolation.



Monetary Effects of the Treasury Sale of Gold

ALBERT E. BURGER

AT THE beginning of 1975, it became legal for U. S. residents to hold gold for the first time in 41 years. In early December, the U. S. Government announced its intention to offer 2 million ounces of gold for sale to the public early in January 1975 from its holdings of 276 million ounces. The Treasury received bids for only about one million ounces of gold and accepted bids for only 753,600 ounces. The gold was sold at an average price of \$165.65 per ounce, hence the sale added about \$125 million to the revenues of the Treasury.

This note illustrates the monetary implications of this sale of gold to the public. It is assumed that the Government did not alter its spending plans as a result of the sale of gold. It is assumed that the Treasury used the proceeds from the sale of gold to make expenditures rather than using tax revenues or using the receipts from the sale of bonds to the public. The effects of the transactions between the Treasury and the Federal Reserve are illustrated, and their effects on the monetary base are discussed. The sources of the monetary base are shown in Table I.

In the following analysis it does not matter whether a U. S. resident or a resident of a foreign country purchased gold sold by the Treasury. In order to purchase gold at the auction, a foreign individual must have dollars. Hence, when he pays for the gold, demand deposits of foreigners at U. S. commercial banks decrease. Since these deposits are part of the U. S. money stock, the analysis would be the same as when demand deposits of U. S. residents decline.

Treasury Monetizes Gold

In early December the U. S. Treasury held about 276 million ounces of gold. Of this total amount, 274 million ounces were held in the General Account of the Treasury and 2 million ounces were held in the Exchange Stabilization Fund. Only the 274 million ounces held in the General Account were counted in the monetary base. The Treasury had issued gold certificates to the Federal Reserve Banks against about 271.5 million ounces of gold, valued at \$11.5

Table I

SOURCES OF THE MONETARY BASE

I. Factors Supplying Monetary Base

Federal Reserve holdings of Government securities¹
Loans
Federal Reserve float
Gold stock plus Special Drawing Rights certificate account²
Treasury currency outstanding
Other Federal Reserve assets

II. Factors Absorbing Monetary Base

Treasury cash holdings
Deposits with Federal Reserve Banks
 Treasury
 Foreign
 Other²
Other Federal Reserve liabilities and capital

III. Reserve Adjustments³

IV. Monetary Base (I — II + III)

¹Includes acceptances held.

²On January 1, 1970, the United States received an initial allocation of \$866.9 million of Special Drawing Rights (SDRs) from the International Monetary Fund. The Treasury, through its Exchange Stabilization Fund, monetized \$400 million of this allocation within a few months. In monetizing, the Treasury issued \$400 million of SDRs to the Federal Reserve Banks and in return received an equal credit to its Exchange Stabilization Fund at the New York Federal Reserve Bank which is included in other deposits.

³Computed by this Bank. It includes the effects of reserve requirement changes and shifts in deposits where different reserve requirements apply.

billion at the official U. S. price of \$42.22 per ounce.¹ The remaining 4.5 million ounces of gold was held in the Exchange Stabilization Fund² and in Treasury cash³ (2 and 2.5 million ounces, respectively).

¹As the Treasury purchased gold in the past, and when the official U. S. price of gold was changed, the Treasury had "monetized" the gold by issuing gold certificates to the Federal Reserve Banks. In return, the Treasury received demand deposits at the Federal Reserve Banks. See, Albert E. Burger, "The Monetary Economics of Gold," this *Review* (January 1974), pp. 2-7.

²The Exchange Stabilization Fund, administered by the Treasury, held 2,019,751 ounces of gold, valued at \$85.3 million. This gold had been acquired by the Fund prior to August 15, 1971, when the Fund engaged from time to time in gold transactions with foreign monetary authorities and with the market for the purpose of stabilizing the value of the dollar relative to gold.

³Treasury cash holdings represent the funds that the Treasury technically has at its disposal without drawing on its deposits

Illustration I

Treasury Monetizes Previously Nonmonetized Gold

(Millions of Dollars)

Treasury		Federal Reserve		Monetary Base ¹	
				Sources	Uses
\$107 monetized gold	\$107 gold certificates	\$107 gold certificates	\$107 Treasury demand deposits	(+) — \$107 Treasury cash	No change
— 107 Treasury cash (non-monetized gold)				(-) \$107 Treasury demand deposits at F.R.	
107 demand deposits					

¹Sign in brackets indicates direction of effect on monetary base. For example, a decrease in Treasury cash increases the base (+).

In December the Treasury monetized the remaining 4.5 million ounces of gold held in its accounts by purchasing 2 million ounces from the Exchange Stabilization Fund and issuing gold certificates against the entire 4.5 million ounces of gold. In return, it received deposits at the Federal Reserve Banks equal to \$192 million.

The “monetary” or Treasury gold stock of the United States consists of both the amount of gold against which gold certificates have been issued and gold against which no gold certificates have been issued (nonmonetized gold). Nonmonetized gold is included in the account “Treasury cash holdings” which appears as a factor affecting bank reserves and is included on the sources side of the monetary base. An increase (decrease) in Treasury cash absorbs (releases) bank reserves and hence reduces (increases) the monetary base.

Illustration I shows the effects of the Treasury monetizing the 2.5 million ounces of previously unmonetized gold in Treasury cash valued at \$107 million.⁴ In the process of monetizing gold, the Treasury issued gold certificates to the Federal Reserve Banks, in return for which the Federal Reserve Banks credited the demand deposits of the Treasury. The decrease in Treasury cash, which occurred as the

Treasury monetized the gold, is a factor increasing the monetary base; the rise in demand deposits of the Treasury at Federal Reserve Banks is a factor decreasing the monetary base. Therefore, the Treasury action of issuing gold certificates against the 2.5 million ounces of nonmonetized gold in December had no effect on the monetary base.

The 2 million ounces of gold held in the Exchange Stabilization Fund (ESF), however, was not previously included in the gold component of the monetary base. In the sources of the monetary base, “other deposits” at Federal Reserve Banks included a special gold account of the Secretary of the Treasury which included the gold held by the Federal Reserve Bank of New York for the Exchange Stabilization Fund. Other deposits also included the special checking account of the Exchange Stabilization Fund. Therefore, when the Treasury purchased the 2 million ounces of gold from the Exchange Stabilization Fund and issued gold certificates against this amount to the Federal Reserve Banks, the value of the gold stock in the monetary base rose by \$85 million. In the week ended December 11 the gold stock of the monetary base rose by \$36 million and then rose by an additional \$49 million in the week ended December 18.

When the Treasury purchased gold from the ESF, deposits of the ESF at the Federal Reserve rose and Treasury deposits fell. The gold from the ESF account was initially transferred into the Treasury’s General Account holdings of nonmonetized gold, hence the item Treasury cash rose. When the Treasury issued gold certificates against the gold it had acquired from the ESF, the gold became classified as monetized gold, Treasury cash decreased, and Treasury demand deposits increased. These transactions are shown in Illustration II.

at the Federal Reserve or Tax and Loan accounts at commercial banks. This account includes any currency and coin held by the Treasury in its own vaults plus nonmonetized gold and silver bullion, silver dollars, and nonsilver coinage metal. See Federal Reserve Bank of New York, *Glossary: Weekly Federal Reserve Statements*, “Factors Affecting Bank Reserves” (September 1972), p. 20.

⁴The Treasury held 2,518,006 ounces of nonmonetized gold which, valued at the official price of \$42.22 an ounce, was worth \$106.3 million. For exposition purposes this amount has been rounded up to \$107 million.

Illustration II

**Treasury Purchases Gold From Exchange
Stabilization Fund and Monetizes the Gold**

(Millions of Dollars)

Treasury		Federal Reserve		Monetary Base ¹	Uses
				Sources	
Treasury Purchases Gold From Exchange Stabilization Fund	\$85 Treasury cash (non- monetized gold)	No change	—85 gold due ESF	(+) —\$85 Treasury demand deposits at F.R.	No change
	—85 demand deposits			(—) 85 ESF deposits	
				(+) 85 Gold	
				(—) \$85 Treasury cash	

Treasury Monetizes Gold	—85 Treasury cash	85 gold certificates	85 gold certificates	(+) —85 Treasury cash	No change
	85 monetized gold			(—) 85 Treasury demand deposits at F.R.	
	85 demand deposits				
Net Effect		Net Effect		Net Effect	
\$85 monetized gold	\$85 gold certificates	\$85 gold certificates	85 ESF deposits	(+) 85 gold (—) 85 ESF deposits	No change

¹Sign in brackets indicates direction of effect on monetary base. For example, a rise in Treasury cash decreases the base (—).

These transactions between the Treasury and the Federal Reserve had no effect on the monetary base or the money stock. The increase in the gold stock (\$85 million) in the monetary base was completely offset by a corresponding rise in deposits of the Exchange Stabilization Fund (\$85 million) at the Federal Reserve. However, since the Treasury issued gold certificates against the gold it purchased from the Exchange Stabilization Fund, the amount of gold certificates held by the Federal Reserve Banks rose by \$85 million.

The combined results of the two steps whereby the Treasury monetized \$192 million of gold are shown in Illustration III. All the Treasury's gold holdings have been monetized, gold certificates held by the

Federal Reserve have risen and Treasury deposits at the Federal Reserve Banks have increased.

Treasury Sells Gold to Public

As the Treasury received payment from the public for the gold it sold and deposited these funds in its accounts at Federal Reserve Banks, the money stock temporarily decreased. Demand deposits of the public at commercial banks, which are part of the money stock, declined; Treasury deposits at Federal Reserve Banks rose, and bank reserves fell. These effects are shown in Stage I of Illustration IV.

Since it was assumed that the expenditures of the Treasury are unaffected by the sale of gold, these

Illustration III

Combined Results of Actions Shown in Illustrations I and II

(Millions of Dollars)

Treasury		Federal Reserve		Monetary Base ¹	
				Sources	Uses
\$192 monetized gold	\$192 gold certificates	\$192 gold certificates	\$107 Treasury demand deposits	(+) \$85 gold	No change
—107 Treasury cash			85 ESF deposits	(+) —107 Treasury cash	
107 demand deposits				(-) 85 ESF deposits	
				(-) 107 Treasury demand deposits at F.R.	

¹Sign in brackets indicates direction of effect on monetary base.

Illustration IV

**Effect on Money Stock of Treasury
Sale of Gold**
(Millions of Dollars)

Stage I Treasury Sells Gold		Stage II Treasury Makes Payments to the Public	
Federal Reserve		Federal Reserve	
	\$125 Treasury deposits at Federal Reserve Banks		—\$125 Treasury deposits at Federal Reserve Banks
	—\$125 member bank deposits at Federal Reserve Banks		\$125 member bank deposits at Federal Reserve Banks
Banks		Banks	
—\$125 member bank deposits at the Federal Reserve Banks	—\$125 demand deposits of the public	\$125 member bank deposits at the Federal Reserve Banks	\$125 demand deposits of the public

These effects are shown in Stage II of Illustration IV. The money stock returns to its level prior to the sale of gold.

The effects of the Treasury sale of gold on the monetary base are shown in Illustration V. At the end of December the Treasury held gold in only one account, 276 million ounces against all of which gold certificates had been issued. As the Treasury sold gold to the public in early January, it had to redeem gold certificates from the Federal Reserve representing claims of an equal amount. These gold certificates were redeemed at the official U. S. price of gold (\$42.22 an ounce). Hence, the Treasury paid the Federal Reserve about \$32 million to redeem gold certificates representing claims on 753,600 ounces of gold. This transaction had no effect on the money stock or the monetary base. Treasury deposits at Federal Reserve Banks decreased by \$32 million and the amount of gold in the monetary base (which is valued at the official U. S. price of gold) declined by \$32 million. These effects are shown in the upper third of Illustration V.

transactions will be reversed shortly. The Treasury makes payments for goods and services and makes transfer payments by writing checks drawn on its deposits at the Federal Reserve Banks. Therefore, as the Treasury makes expenditures, Treasury deposits at the Federal Reserve Banks decrease, demand deposits of the public rise, and bank reserves increase.

As the Treasury received payment from the public for the gold, Treasury deposits at Federal Reserve Banks rose by \$125 million. These effects are shown in the middle of Illustration V. When the Treasury spent the proceeds from the sale of gold, these transactions were reversed; demand deposits of the Treasury at Federal Reserve Banks fell by \$125

Illustration V

**Treasury Sells Gold to the Public and Redeems
Gold Certificates at Federal Reserve Banks**
(Millions of Dollars)

	Treasury		Federal Reserve		Monetary Base ¹	
	Sources		Uses			
Treasury Redeems Gold Certificates	—\$32 mone- tized gold	—\$32 gold certificates	—\$32 gold certificates	—\$32 Treasury demand deposits	—\$32 gold	
	—32 demand deposits	—32 net worth			(+) —32 Treasury demand deposits at F.R.	No change
Treasury Receives Payment for Gold	125 demand deposits	125 net worth	No change	125 Treasury demand deposits	(—) 125 Treasury demand deposits at F.R.	—125 member bank deposits at F.R.
				—125 member bank deposits		
Treasury Purchases Goods and Services with Proceeds of Gold Sale	—125 demand deposits	No change	No change	—125 Treasury demand deposits	(+) —125 Treasury demand deposits at F.R.	125 member bank deposits at F.R.
	125 goods and services			125 demand deposits of member banks		

¹Sign in brackets indicates direction of effect on monetary base.

Illustration VI

Summary of Effects of Gold Transactions on the Monetary Base
(Millions of Dollars)

Treasury		Federal Reserve		Monetary Base ¹	
				Sources	Uses
\$160 monetized gold	\$160 gold certificates	\$160 gold certificates	\$75 Treasury demand deposits	(+) \$53 gold	No change
75 demand deposits			85 ESF deposits	(-) 75 Treasury demand deposits at F.R.	
-107 Treasury cash				(+) -107 Treasury cash	
125 goods and services	93 net worth			(-) 85 ESF deposits	

¹Sign in brackets indicates direction of effect on monetary base.

million and deposits of member banks at the Federal Reserve Banks rose by \$125 million, as shown in the lower third of Illustration V.

Illustration VI depicts the final effect on the monetary base, after the Treasury had monetized 4.5 million ounces of gold, sold about 750,000 ounces of gold to the public, and spent the proceeds from the sale of gold (\$125 million). Gold in the monetary base rose by \$53 million, equal to the transfer of gold from the ESF (\$85 million) less the official dollar amount sold to the public (\$32 million). Treasury cash decreased by \$107 million reflecting the decrease in nonmonetized gold. ESF deposits (included in "other deposits") rose by \$85 million, reflecting the purchase of gold from the ESF by the Treasury.

The Treasury experienced an increase in net worth because it sold gold, valued on its accounts at \$42.22

an ounce, to the public at an average price of \$165.65 an ounce. Gold holdings of the Treasury, as valued in Treasury accounts, decreased by \$32 million, but the Treasury received \$125 million from the public. Hence, the Treasury had a gain in net worth of \$93 million.

One important item to note in the final result for the monetary base is that Treasury demand deposits at the Federal Reserve Banks are \$75 million higher even after it has spent the proceeds from the sale of gold. The Treasury received \$192 million in deposits at Federal Reserve Banks as a result of monetizing 4.5 million ounces of gold. It spent \$85 million to pay for the gold it acquired from the Exchange Stabilization Fund and \$32 million to retire gold certificates as a result of the sale of gold. When the Treasury spends the balance of the proceeds from monetizing gold (\$75 million) *the monetary base will increase by this amount.*



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