AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

PRICE INFLATION AND MONEY STOCK GROWTH

Dennis R. Starleaf
Professor of Economics
Iowa State University

Price inflation is the rise in the *money* price level of goods and services in general or in the aggregate. Stated differently, it is the decline in the real value or the real purchasing power of a sum of money.

If there was no inflation (positive or negative), we would not expect to see the money price of every commodity remain exactly constant through time. We would not be surprised to observe increases in the prices of some commodities, decreases in the prices of other commodities, and little change in the price of still other commodities.

Similarly, during a period of inflation, we should not expect to see the prices of all commodities rising at the same rate. We should not be surprised to observe the prices of some commodities rising more rapidly than the prices of other commodities—and, during mild inflations, we should not be surprised to observe the money price of some commodities actually falling.

The Measurement of Inflation

Inflation is measured with price indices, and there are a large number of price indices available for the U.S. economy. These various price indices differ from one another according to the commodities they cover and also according to the weights (or importance) which is attached to the covered commodities. Three of the most commonly used price indices of the U.S. economy are the Consumer Price Index (CPI); the Wholesale Price Index, which is now officially referred to as the Producer Price Index (PPI); and the Gross National Product Price Index (GNPPI).

The Consumer Price Index. The CPI measures the relative dollar cost at different points in time of a certain market basket of goods and services which is thought to be representative of the purchasing patterns of urban consumers. It covers everything urban consumers buy—food, clothing, shelter, transportation, medical care, recreation, etc.

The CPI is currently based on the year 1967, so the value of the index in 1967 is 100 by definition. The value of the index in June 1979 was 216.3, which indicates that it took 116.3 percent more dollars to buy essentially the same market basket of consumer commodities in June of 1979 than it did on the average in 1967.

From June 1971 to February 1973, the CPI rose at an average rate of 3.9 percent per year; from February 1973 to November 1974, it rose at 10.6 percent per year; from November 1974 to December 1977, it rose at 6.3 percent per year; and from December 1977 to June 1979, it rose at an average rate of 10.6 percent per year.

The Producer Price Index. The PPI measures the relative dollar cost at different points in time of a market basket of goods—no services are covered by this index—which are sold in bulk amounts or in large quantities. Important items covered by this index are wheat, corn, soybeans, crude oil, sheet steel, copper, rubber, etc. This index does cover some finished or final goods, but it is heavily weighted toward raw materials and intermediate goods.

Examination of the PPI during the 1971-1979 period indicates that it has more than doubled—from about 110 to 230 (1967=100) —for all commodities. The same observation holds when the PPI for Industrial Commodities and for Farm Products are examined separately, though their rates of change have varied during individual and groups of years during the 1970s.

I have also looked at the PPI for much longer periods—back to 1800 for All Commodities; back to 1913 for the separate indices for Industrial Commodities and for Farm Products. They indicate quite clearly that periods of price-level stability have been historically rare in the United States. In fact, the longest period of high price-level stability which the United States has thus far experienced was the 13-year period which ran from 1952 to 1965.

The Gross National Product Price Index. The Gross National Product is a measure of the dollar value of the total output of the economy, and the GNPPI is the price index for the Gross National Product. It measures the relative dollar cost of a market basket of goods and services which includes everything produced in the U.S. economy.

The GNPPI is obviously much more comprehensive than either the CPI or the PPI. The GNPPI for the period from early 1971 through the second quarter of 1979 (1972=100) shows an increase from 95 to 164. But its rate of increase varied within that period, as we will see later.

As useful as the price indices are for measuring inflation, they are often used in such a way as to give the public a misleading impression of the cause of inflation. This is partly because the price indices by their very nature are built from weighted averages of individual prices, and it is usually possible to account for a specific increase in a

price index with increases in the prices of a small number of classes of commodities or even increases in the prices of particular commodities. For example, we are all familiar with statements issued by the federal government (and dutifully reported by the national news media) of the following type:

> Last month, the Consumer Price Index rose 1.2 percent. Most of this rise—0.8 percent—was the result of increases in retail food prices. Beef prices were the leading offender in that they rose 5.0 percent, but the prices of fresh fruits and vegetables were also up 2.0 percent. The increases in the retail prices of beef and fresh fruits and vegetables reflect in large part recent increases in farm prices for these same commodities. However, it appears that the mark-up on beef by the meat packing industry and also the mark-up by both wholesalers and retailers of fresh fruits and vegetables rose last month.
>
> Aside from the increase in food prices, other important contributors to inflation last month were increases in new automobile prices and home construction costs.

The clear implication of a statement such as this is that "last month's inflation" was the result of villainous actions on the part of certain groups in the economy—in this particular case, certain groups of farmers, food processers and distributors, automobile manufacturers, and home builders.

We get a statement like this each month. In fact, we get two statements: one when the CPI is released and one when the PPI is released. Of course, the inflation villains of any particular month are usually not the same as the villains of the previous month or of the following month, and they are not always groups of people. The blame for inflation is shifted from month to month among such diverse groups as oil producers, farmers, labor unions, manufacturers, merchants, etc., and among such events as early frosts, cold winters, droughts, insect infestations, transportation breakdowns, etc.

Such explanations of specific, short-run changes in the price indices are misleading. They give the public the false impression that there is no underlying or fundamental force responsible for inflation; that inflation is merely the result of an unfortunate sequence of increases in the prices of particular commodities and that these in turn are due to the socially irresponsible acts of groups of sellers of goods and services (including the sellers of labor services) and/or acts of nature.

The Cause of Inflation

Inflation is fundamentally a monetary phenomenon. It is caused by too rapid a rate of increase in the nation's money stock. A

significant rate of inflation over an appreciable period to time cannot occur unless it is accompanied by a sufficiently rapid increase in the money stock. Similarly, for all practical purposes, no set of public policy actions intended to reduce the rate of inflation can succeed in the long run unless that set of policy actions includes a reduction in the rate of money stock growth.

Money is like any other commodity. When its supply increases rapidly (more rapidly than its demand), its value tends to fall. That is what inflation is all about—the decline in the real value or the real purchasing power of money.

Table 1 shows some data on the rate of inflation and the rate of money stock growth in the United States since the early 1950s. During 1952-65, the average rate of increase in the money stock was low and so was the average rate of inflation (as measured by the CPI, PPI, or GNPPI). During 1966-70, the average rate of money stock growth was higher and so was the rate of inflation. During 1971-76, the average rate of money stock growth was even higher and so was the rate of inflation. Finally, during 1977-78, the average rate of money stock growth was still higher and so was the average rate of inflation as measured by the CPI and the GNPPI (although the average rate of increase in the PPI was about 1.0 percent lower during 1977-78 than during 1971-76).

Table 1: U.S. Inflation, 1952-78

	1952-65	1966-70	1971-76	1977-78
Average Annual Increase in CPI	1.3%	4.5%	6.6%	7.9%
Average Annual Increase in PPI	0.7%	2.7%	8.9%	7.8%
Average Annual Increase in GNPPI	1.9%	4.4%	6.6%	7.2%
Average Annual Increase in Money Stock	2.2%	5.1%	6.1%	7.3%

In Table 1, the money stock is measured according to the M1 definition. M1 consists of the sum of currency and commercial bank checking (or demand) deposits owned by the nonbank public. The "nonbank public" consists of individuals, ordinary business firms (excluding commercial banks), and state and local governments. In other words, the "nonbank public" is all persons and institutions other than the U.S. federal government, the Federal Reserve Banks, and commercial banks.

Other definitions of the money stock could have been employed in constructing a table like Table 1. However, the use of any of the other common definitions of the money stock would not have

resulted in different qualitative findings. Periods of several years duration in which rate of money stock growth, by any definition, is relatively low are periods in which the rate of inflation is relatively low. Periods of relatively rapid money stock growth are periods of relatively rapid inflation.

Table 2 shows the relationship between the rate of money stock growth and the rate of inflation in the United Kingdom and Sweden during three recent time periods. These two countries were singled out because they have experimented considerably (and unsuccessfully) with wage and price controls as anti-inflation tools in the post-World War II period. Note the strong correlation between the rate of money stock growth and the rate of inflation in the United Kingdom. The correlation is not nearly as strong in Sweden, but then few people would argue that wage and price controls have no short-run effect upon the rate of increase in the price indices.

Table 2: Inflation in the United Kingdom and Sweden

	Average Annual Increase in Money Stock	Average Annual Increase in CPI
U.K.		
1953-63	2.5%	2.9%
1963-70	4.7%	5.1%
1970-76	15.1%	16.6%
Sweden		
1953-63	6.8%	3.5%
1963-70	5.6%	5.1%
1970-76	13.5%	10.1%

Table 3 shows rates of inflation and rates of money stock growth in 16 Latin American countries during the 19-year period 1950-69. The correlation between the rate of money stock growth and the rate of inflation among these countries is very strong.

During this century, there have been seven instances of hyperinflation for which we have good data. A hyperinflation is a very high rate of inflation: in excess of 50 percent per month. Table 4 shows what happened to the price level and the money stock during each of these hyperinflations. For example, between January of 1921 and August of 1922, Austria experienced a hyperinflation. At the end of this period, the price level in Austria was nearly 70 times higher than it had been at the beginning of the period (19 months earlier). During the hyperinflation, the Austrian money stock expanded rapidly: at the end of the hyperinflation, it was more than 19 times larger than it had been at the beginning. For another example, Germany experienced its famous hyperinflation between August of 1922 and November of 1923. During this period, the German money stock

Table 3: Inflation in Latin America, 1950-1969

	Average Annual Rate of Inflation	Average Annual Rate of Money Stock Growth
Uruguay	43.0	40.1
Bolivia	41.3	41.6
Brazil	35.1	38.2
Chile	28.2	35.2
Argentina	26.4	24.6
Paraguay	12.5	15.4
Columbia	9.2	16.5
Peru	8.5	13.4
Mexico	5.3	11.3
Nicaragua	3.4	8.6
Ecuado	3.0	8.8
Honduras	2.1	8.0
Costa Rica	1.9	9.0
Guatemala	1.1	5.9
Venezuela	1.1	7.9
El Salvador	0.3	3.5

was expanded 7.3 billion-fold and the German price level rose 10.2 billion-fold.

During each of these instances of hyperinflation, the price level rose considerably more than did the money stock. The explanation is straightforward. As the rate of inflation rose, people spent money more and more rapidly in order to avoid holding it, since its value was declining commensurate with the rate of inflation. The effect

Table 4: Seven Hyperinflations

Austria (Jan. 1921 to Aug. 1922)	
Money Increase	19.3 times
Price Increase	69.9 times
Germany (Aug. 1922 to Nov. 1923)	
Money Increase	7.3 billion times
Price Increase	10.2 billion times
Greece (Nov. 1943 to Nov. 1944)	
Money Increase	3.6 million times
Price Increase	470.0 million times
Hungary I (Mar. 1923 to Feb. 1924)	
Money Increase	17 times
Price Increase	44 times
Hungary II (Aug. 1945 to July 1946)	
Money Increase	1.19×10^{25} times
Price Increase	3.81×10^{27} times
Poland (Jan. 1923 to Jan. 1924)	
Money Increase	395 times
Price Increase	699 times
Russia (Dec. 1921 to Jan. 1924)	
Money Increase	33.8 thousand times
Price Increase	124.0 thousand times

of this action on the part of people to protect themselves from inflation was to cause the price level to rise all the more.

The Federal Rate of Money Stock Growth

Contrary to popular belief, for the past 30 years or so, there has been no firm connection between government deficits and money stock growth in the United States. When the federal government runs a fiscal deficit, it does not finance its deficits by printing money. It finances its deficits by selling government bonds to people, business firms, commercial banks, and state and local governments. The sale of federal government bonds to these groups does not cause the U.S. money stock to rise.

The size (and rate of growth) of the U.S. money stock is determined by the people who run the Federal Reserve System. The Federal Reserve System is a quasi-public institution which is by law, for the most part, independent of the President of the United States and also of the Congress. However, it should be pointed out that the people who run the Federal Reserve are generally reluctant to cross swords with the President; they tend to set monetary policies which are consistent with the wishes of the administration in power.

The Federal Reserve authorities can make the U.S. money stock grow rapidly or grow slowly (or even decline) regardless of whether the federal government is running a large or a small fiscal deficit (or even a fiscal surplus). For some examples: in 1969, the federal government had a fiscal surplus of $8.5 billion, and the M1 money stock grew 3.3 percent; in 1972, the federal government had a fiscal deficit of $17.3 billion, and the M1 money stock grew a whopping 9.2 percent; in 1975, the federal government's fiscal deficit amounted to $70.2 billion, and yet the M1 money stock grew only 4.1 percent; in 1978, the federal fiscal deficit was $29.9 billion, and the M1 money stock grew 6.6 percent.

Reducing the Rate of Inflation

In order to bring down the rate of inflation in the United States, the rate of growth of the U.S. money stock must be permanently reduced. Balancing the federal budget, imposing wage and price guidelines or controls, achieving energy independence, etc., will have no lasting effect upon the rate of inflation if the money stock continues to grow at 6.0 or 7.0 percent per year (or greater) as it has during recent years.

However, reducing the rate of inflation in the United States is not necessarily a simple and painless matter of cutting the rate of money stock growth. A decline in the rate of money stock growth will cause a decline in the rate of growth of total spending for the output of the economy. This is likely to have only a small effect upon

the rate of inflation in the short run. Its primary short-run effect is likely to be upon the real output of the economy, causing it to grow more slowly or possibly to decline. Assuming that the rate of money stock growth remains permanently reduced, with the passage of time the rate of inflation will slowly drop off, and the real output of the economy will return to its long-run growth path.

How long it will take for the rate of inflation to fully respond to a reduction in the rate of money stock growth is a matter of some debate among economists. The longer it takes, the longer the real output of the economy will be adversely affected (i.e., depressed).

The reason that the rate of inflation is not very sensitive in the short run to reductions in the rate of money stock growth (or reductions in the rate of growth of total spending) is that the behavior of most individual wages and prices in the United States is heavily influenced by expectations of inflation. For example, when people generally expect the rate of inflation to be high in the near future, wage increases in both unionized and nonunionized sectors tend to be set to reflect the anticipated rise in the general price level. [In early 1975, when the economy was quite depressed and the unemployment rate was about 9.0 percent, wage (including fringe benefits) increases still averaged 7.4 percent per year.] Since labor costs are about 75 percent of the total factor costs of producing goods and services in the United States, large wage increases result in price increases which are nearly as large.

Wage and price guidelines or controls may be useful devices to help the economy adjust to a decrease in the rate of money stock growth. They may make inflation fall faster and real output fall less than would otherwise be the case. However, wage and price controls are not a substitute for a reduction in the rate of money stock growth. A permanent reduction in the rate of money stock growth is the essential ingredient in any anti-inflation program if the program is to prove successful in the long run.

Controlling the U.S. Money Stock

Some additional comments are appropriate relative to my earlier argument that the size and rate of growth of the U.S. money stock is determined through the Federal Reserve System. This statement is sometimes challenged; therefore, I offer the following supporting evidence for my position.

The conventional wisdom of the economics profession is that the Federal Reserve authorities are capable of controlling the size of the U.S. money stock with some degree of accuracy or precision. For evidence to substantiate this contention, take a look at any of the popular economics principles texts. Each contains one or more chapters describing how the Federal Reserve authorities are capable of affecting the size of the U.S. money stock.

If the authors did not believe that the Federal Reserve authorities were capable of affecting the size of the U.S. money stock, they would not describe how this is done in their texts. If the great majority of academic economists did not believe that the Federal Reserve authorities were capable of affecting the size of the U.S. money stock, these books would not be (in some cases, through as many as ten editions) the best selling economics principles texts on the market.

Look at any of the popular texts for use in the undergraduate money and banking course. Each contains several chapters in which the impact of Federal Reserve policy actions upon the size of the U.S. money stock is described and discussed in considerable detail. If the Federal Reserve authorities cannot in fact control the size of the U.S. money stock, then virtually all the money and banking texts and economic principles texts which have been written in the last 40 years are in error.

The Federal Reserve authorities believe that they can control the size of the U.S. money stock. For evidence to back up this statement, look at one or two recent issues of the **Federal Reserve Bulletin,** the official publication of the Board of Governors of the Federal Reserve System. Most issues of the **Bulletin** contain a "Record of Policy Actions of the Federal Open Market Committee" pertaining to a date approximately three months earlier.

The Federal Open Market Committee (FOMC) consists of the seven governors of the Federal Reserve System plus five Federal Reserve Bank presidents. At the meetings of the FOMC, the stance of U.S. monetary policy for the near future is decided, and it is described at least in part in terms of the rate of growth of various measures of the U.S. money stock. For example, the August 1979 issue of the **Bulletin** reports what took place during the meeting of the FOMC on May 22, 1979. The directive adopted by the FOMC at this meeting contains the following statement:

> ". . . it is the policy of the Federal Reserve Open Market Committee to foster monetary and financial conditions that will resist inflationary pressures while encouraging moderate economic expansion and contributing to a sustainable pattern of international transactions. At its meeting on February 6, 1979, the Committee agreed that these objectives would be furthered by growth of M1, M2, and M3 from the fourth quarter of 1978 to the fourth quarter of 1979 within the ranges of 1½ to 4½ percent, 5 to 8 percent, and 6 to 9 percent respectively. The associated range for bank credit is 7½ to 10½ percent. These ranges will be reconsidered in July or at any time as conditions warrant.
>
> In the short run, the Committee seeks to achieve bank reserve and money market conditions which are broadly

consistent with the longer-run ranges for monetary aggregates cited above, while giving due regard to the program for supporting the foreign exchange value of the dollar and to developing conditions in domestic financial markets. Early in the period before the next regular meeting, System open market operations are to be directed at maintaining the weekly average federal funds rate at about the current level. Subsequently, operations shall be directed at maintaining the weekly average federal funds rate within the range of 9½ to 10½ percent. In deciding on the specific objective for the federal funds rate, the Manager shall be guided mainly by the relationship between the latest estimates of annual rates of growth in the May-June period of M1 and M2 and the following ranges of tolerance: 0 to 5 percent for M1 and 4 to 8½ percent for M2. If, with approximately equal weight given to M1 and M2, their rates of growth appear to be close to or beyond the upper or lower limits of the indicated ranges, the objective for the funds rate is to be raised or lowered in an orderly fashion within its range.

If the rates of growth in the aggregates appear to be above the upper limit or below the lower limit of the indicated ranges at a time when the objective for the funds rate has already been moved to the corresponding limit of its range, the Manager will promptly notify the Chairman, who will then decide whether the situation calls for supplementary instructions from the Committee."

Admittedly, the ranges of growth in M1, M2, and M3 which the Federal Reserve authorities called for in this directive are quite wide, and the actual growth rates achieved for M1, M2, and M3 are often outside of the targeted range. However, would the Federal Reserve authorities give directives in terms of the rate of growth of the U.S. money stock if they did not believe that these directives would result in actions which affect the rate of growth of the U.S. money stock?

The Congress of the United States believes that the Federal Reserve authorities can control the size of the U.S. money stock. For evidence to support this contention, I refer you to House Concurrent Resolution 133, which was approved by the U.S. Congress on March 24, 1975. This resolution, among other things, requested that the Board of Governors of the Federal Reserve System consult with the Congress at semi-annual hearings before the Committee on Banking, Housing, and Urban Affairs of the Senate and the Committee on Banking, Currency, and Housing of the House of Representatives. These consultations or hearings, the resolution stated, should concern:

". . . the Board of Governors' and the Federal Open Market Committee's objectives and plans with respect to the ranges of

growth or diminution of monetary and credit aggregates in the upcoming twelve months."

Now I ask you: If the Congress does not believe that the Federal Reserve Authorities can control the size of the U.S. money stock (the monetary aggregates), why would the Congress ask the Board of Governors to consult with it periodically concerning the Federal Reserve authorities' plans or money stock growth over the next 12 months?

Money Stock Growth vs. Monopoly Power

Arguments are often heard that it is monopoly power rather than money stock growth which is the cause of modern day inflation. I will elaborate further on my earlier contention that money stock growth causes inflation.

One of the oldest and most durable theoretical propositions in economics is that an increase (a decrease) in a country's money stock will cause an expansion (a contraction) in its aggregate *nominal* income (or its aggregate income measured in terms of money). Although this proposition is often associated with quantity theory of money and with monetarism, it is consistent with all but the most elementary versions of Keynesian macroeconomic theory and with all modern macroeconomic theories which have any degree of acceptance within the profession. While macroeconomists may disagree with one another on how theoretically stable or consistent is the response of nominal aggregate income to changes in the money stock, few if any would argue that nominal national income would not be affected by a change in the money stock.

Of course, an increase in nominal aggregate income can take the form of an increase in the aggregate price level, an increase in real income, or some combination of the two. However, the rate at which the real income (or output) of an economy can grow in the long run is limited by real rather than monetary forces. Real long-term economic growth is limited by the rate of growth of capital, labor, and available natural resources, plus the rate of technological progress.

Few if any economists would argue that the real forces in the second-half of the 20th century are such as to allow the aggregate real output (income) of the U.S. economy to grow by as much as 4.0 percent per year in the long run. If this is true, any long-term money stock increase in excess of 4.0 percent per year times the elasticity of the demand for money with respect to real income will result in significant long-run U.S. price inflation. My own research and the research of other monetary economists indicates that the elasticity of the demand for M1 money with respect to real income is about 0.5. This, together with the long-run growth prospects for the U.S. economy, suggests that the M1 money stock should grow by no more than 2.0 percent per year on the average if the U.S.

economy is to avoid significant inflation.

Thus, the argument that money stock growth has something to do with the rate of inflation is firmly grounded in economic theory. And the argument that price inflation is due to rapid money stock growth is supported by an enormous amount of empirical evidence. Indeed, I am unaware of a single historical example of a country experiencing a significant amount of price inflation over several years without a simultaneous growth in the per capita money stock in that country of comparable magnitude.

By way of contrast, the argument that price inflation is due to the presence of elements of monopoly power in the economy has *no basis in economic theory*. It is, of course, easy to demonstrate that a monopolized industry will charge a higher price and will produce a smaller output, other things remaining the same, than a perfectly competitive industry. However, price inflation is not high prices; inflation is a rising price level. Once a monopoly has found its profit-maximizing price, it will not raise its price further unless the demand for its product increases or its costs rise.

Further, there is little, if any, empirical evidence to support the hypothesis that inflation is due to the presence of sellers with monopoly power in the economy. For example, between 1865 and 1890, the U.S. economy became significantly monopolized as great trusts were organized in the oil, steel, tobacco, meat packing, farm machinery, etc., industries. Based on these facts, a believer in the monopoly explanation for inflation should expect the rate of inflation during 1865-90 to be high and rising. Yet, the price level fell by about 50 percent between 1865 and 1890. The explanation is straight-forward: There was relatively little growth in the U.S. money stock between 1865 and 1890, at least compared with the growth in the real output of the economy between these two dates.