

# UNDERSTANDING MONETARY INFLATION

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## General

Inflation is a real phenomenon but over time tends to be a zero sum game for ordinary people and organizations. Incomes of most ordinary individuals, working or retired, are periodically adjusted for cost-of-living factors that are largely inflation adjustments so that real income remains fairly constant. Sales prices of goods are adjusted periodically to account for the effects of inflation. The revenues of governments of all levels -- federal state and local, are largely based on percentage rates (e.g., sales and income taxes) and as such are adjusted automatically for inflation to maintain constant real revenues. Why then does inflation have such a bad press?

Inflation can be a real problem for the wealthy, i.e., owners of capital (currency). Such owners find their capital wealth (currency reserves) declining in value due to inflation. Such decline in wealth can be offset by lending out the currency reserves at lending rates greater than the rate of inflation. Borrowers pay off such loans in deflated dollars while their incomes are generally indexed to inflation. Astute lenders factor in the anticipated rate of inflation when establishing lending rates. Unanticipated changes in the rate of inflation from year to year cause uncertainty in currency markets.<sup>55</sup>

## Monetary Phenomena

Inflation is a phenomenon well understood in high financial circles though perhaps little understood outside those circles. *Inflation is a monetary phenomenon.* That is -- **it is the currency that changes in value, not the goods purchased.** Technically, what we call inflation is actually *deflation of currency value*. The term *inflation* applies to the price of goods and is the commonly used term because it is directly observable. The deflation of currency value can only be determined indirectly by observing the apparent inflation of the prices of goods and services over a period of time.<sup>36, 55, 60</sup> To complicate the issue of identifying and measuring inflation, not all price change is inflationary. Prices on individual commodities vary according to seasonal supply and demand, uniqueness or obsolescence,

While inflation is a concern for capital owners and lenders, it is a boon to borrowers in that the payback over time is with increasingly deflated currency. The biggest borrowers tend to be governments, including the US federal government. As such, governments tend to promote inflationary policies. Central banks, on the other hand, tend to represent capital owners and tend toward anti-inflationary policies.<sup>55</sup>

## Price Changes<sup>55, 60</sup>

Inflation is reflected in a change in the price of goods but it is not the only factor involved in price changes. Price changes occur for reasons other than inflation such as supply and demand, regional surpluses and shortages, season, and obsolescence.

While inflation is a *monetary* phenomenon, that is -- it is the currency that changes in value, not the goods purchased -- it can only be determined indirectly and after-the-fact. Before inflation can be estimated, season, demand, supply, inventories, and other factors must be accounted for. In the US, the Bureau of Labor Statistics, under the US Department of Labor,

estimates inflation from a "basket" of several key commodities. Price changes are tracked for the entire basket and a *consumer price index* (CPI) calculated from the aggregate of all price changes, assuming that temporary non-inflationary price adjustments for individual items cancel each other out.

### Rate of Inflation

Inflation is normally expressed as an annual rate calculated from the CPI from year to year. The comparison points can be any month of the year, the December "end-of-year" value, the annual average value, or even a semi-annual average value. The example below calculates the end-of-year annual inflation rate for 2005:

CPI <sub>2</sub> Dec 2005:	196.8	Rate of inflation: $\rho = (CPI_2 - CPI_1) / CPI_1$
CPI <sub>1</sub> Dec 2004:	<u>190.3</u>	$\rho = (6.5) / 190.3 = \mathbf{3.4\%}$
Difference:	6.5	

Some experts, including Alan Greenspan, the recently retired Chief of the Federal Reserve Bank, advise that the CPI slightly overstates the rate of inflation, and other formulas using other financial data are also used to estimate inflation.

### Real Rate of Interest

Once a businessman has a handle on the *rate of inflation* is, He can calculate the *real rate of interest* or set an appropriate *contract rate of interest* to protect himself. The relationship between the rate of inflation,  $\rho$ , the real rate of interest,  $r$ , and the contract rate of interest,  $i$ , was defined by Irving Fisher in his 1933 publication *Inflation*, as follows:

$$(1 + i) = (1 + r) \cdot (1 + \rho) \quad \text{where } i = \text{the contract rate of interest}$$

$$r = \text{the real rate of interest, and}$$

$$\rho = \text{the rate of inflation}$$

The Fischer equation can also be written in more familiar form as

$$i = r + \rho + r \cdot \rho$$

The cross-product  $r \cdot \rho$  can be discarded for values of  $r$  and  $\rho$  below 10%, which reduces the relation to:

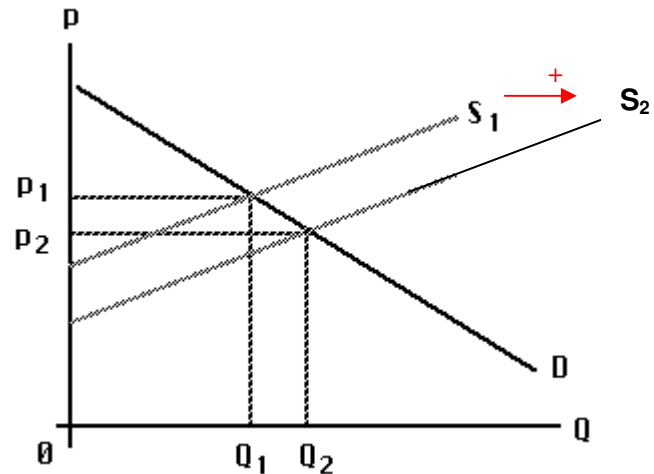
$$i \cong r + \rho$$

which is what we might have intuitively concluded.

### Money as a Commodity

Money is more than just the medium of exchange for labor, goods and services. In and of itself, it is also a commodity. Large projects typically need much more money than available on-hand to fund a project. The additional cash is used to obtain labor, materials, equipment, supplies, and services to turn into facilities and enterprises to earn profits. Since there is a finite quantity of money available at any one time, demand for *use* of the money affects the "price" of money. The price for the *use* of money is the premium we pay for the use of it – commonly called "interest."

But there can also be a fundamental change in the *value* of money due to the law of supply and demand. If demand is fairly constant, and the *supply* is significantly increased from  $Q_1$  to  $Q_2$ , as shown in the figure to the right, the result can be that the entire supply curve shifts to the right from  $S_1$  to  $S_2$ , and the *value* of money drops, from  $P_1$  to  $P_2$ . If this occurs over a sustained period, the result can be a permanent change in the value of the monetary unit. An inordinate increase in the supply of money is the classic cause of inflation, and it is typically the result of a government deliberately printing additional currency in a vain attempt to create wealth. History has demonstrated over and over through the centuries that such tactics always result in inflation (a deflated currency.)



Inflation can also be caused by a restriction in the supply of an essential commodity such as crude oil. Oil is an energy source, and energy need is pervasive in a modern economy. The high inflation rates in the US and Europe in the '80's is attributed to the oil cartel's success in limiting production and raising crude oil prices.<sup>55</sup>

The supply and demand example explained above is a simplified model. In the real world, both supply and demand can interact in a vicious cycle. As government increases the supply of its currency in a vain attempt to create wealth, the currency falls in value, the demand for the currency decreases, which prompts the government to print even more currency to make up its loss in value, and so the cycle of increasing the supply and the fall in value of the currency repeats until the currency becomes worthless or the economy collapses into a recession.

### Controlling Inflation

As explained above in the Law of Supply and Demand model, the cause of inflation is generally related to an unjustified expansion of the money supply<sup>36</sup>. Money supplies are always fluctuating to some degree, because worn out currency needs to be retired from circulation and replaced with new currency, because some individuals and subgroups within a society tend to hoard currency rather than let it circulate, and because currency is held in the foreign exchange reserves of other countries.

The money supply can be increased without causing inflation only if demand increases. If demand falls, deflation can be avoided by decreasing the money supply. In the United States, the money supply is typically controlled (or attempted to be controlled) by the Federal Reserve Bank (central bank, in other countries) by varying the interest rate at which it loans money to its member banks. The theory behind this is that the Federal Reserve Bank is the sole source of its currency supply (for US dollar), and the rate of interest it charges affects the supply and demand for US dollars – if the price of borrowing increase, the demand for currency will decrease.

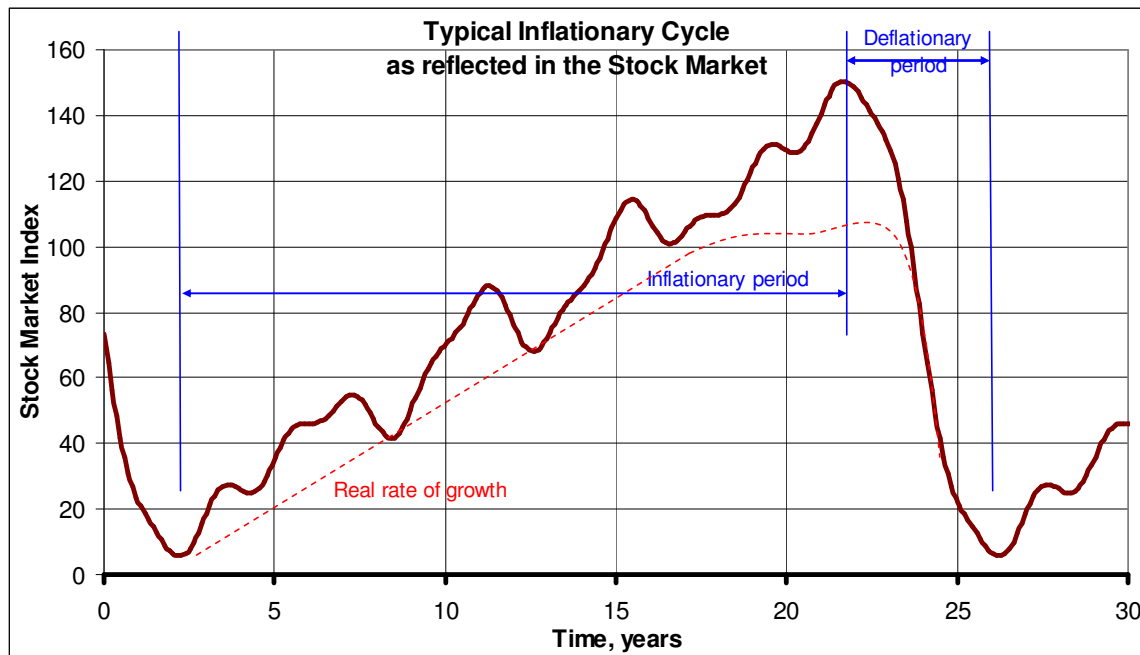
However, because the US dollar is the de facto international currency, and so much of it is held by foreign markets, they can have more influence on its supply or demand than the Federal Reserve Bank.

## Inflationary - Deflationary Cycles

Our experience over the centuries is that inflationary cycles are a permanent part of a capitalistic economy. If left unchecked and unattended, inflationary cycles tend to spiral out of control and end in a brief but brutal period of deflation we call a depression. A temporary collapse of the economic system is the end of the cycle, with a permanent loss in the illusory wealth created in the inflationary period.

The positive effect of inflation is that it requires capital owners to invest in profit-making ventures in order to counter the wealth-robbing effects of inflation. In an inflationary period, the economy tends to expand as capitalists look for more opportunities to invest as a hedge against inflation. However, investment in and of itself does not guarantee that profits exceeding the loss to inflation will actually occur. There is a risk of losing money in an investment or capital venture. In an inflationary period, the specter of reduction in capital value due to inflation is what drives the potential investor to take the risk.

So long as inflation occurs at a constant or low rate, or changes slowly, lenders and investors can factor it into their decision-making process, and inflation is not a big concern. Inflation becomes a concern when it begins to increase rapidly or unexpectedly. It is the uncertainty of future inflation rates that cause inflation to be such a concern for long term investments.



Stock market indexes can be useful in visualizing an inflationary cycle, as they represent a significant segment of investments capitalists make to avoid losing out to inflation. The typical inflation cycle is depicted in the figure above. In this depiction the start of an inflationary period is at the bottom of depression, when the economy is finally starting to improve. Stock values increase in little jerks of over-speculation followed by small corrections of sell-offs, gradually increasing in speculation courage and retreats. Somewhere along the peak of inflationary cycle, with the rate of inflation increasing ever more rapidly, investors begin to realize they may be substantially over-committed. This realization seems to occur rapidly in the investor population, and as a result there is a sudden divestment or abandonment of risky ventures. Capitalist begin

to sell off even their solid capital assets in favor of holding cash or buying gold. There is an investment retrenchment, production is reduced, jobs are eliminated, labor becomes cheaper as unemployment grows, wage-earners have less income to buy goods and services, and the entire economy contracts suddenly, spiraling into a depression – another name for the deflationary period. For the ordinary man, it is indeed depressing, but for capitalist – their money increases in value automatically, and there is no need to incur the risk attached to investment or capital venture. Eventually, the economy begins to recover, production slowly begins to increase, and the inflationary cycle begins again.

### General Effects of Inflation

As stated in the introductory paragraph to this article, inflation over the long run is a zero sum game for the society as a whole. In and of itself inflation is neither good nor bad, but an auto-correcting mechanism for balancing money supply with currency value. Once created, money takes on a life of its own, and obeys rules independent of the government that created it.

But inflation can have a very pronounced effect on classes of currency users. Inflation affects borrowers, lenders, and currency deposits differently. Owners of currency, particularly individuals and institutions that have accumulated large amounts of currency (capital), suffer an automatic wealth loss due to the deflation of the currency. That loss of wealth suffered by capital owners is transferred as a wealth gain to borrowers, who repay loans in deflated currency. It is an axiom that capital owners consider inflation as evil, while astute borrowers consider inflation as a boon.

Another class of currency user who is severely affected by inflation is the retiree on a fixed pension. Every year such retirees see their fixed incomes decreasing in value and buying less. Conversely, governments generally see their tax revenues rise, as most taxes are a percentage of the price of goods, which increase with inflation.

### Effects on Capital Construction Projects

Inflation may adversely affect a fixed-priced construction project already under contract with a very long duration because the contractor would be paid in increasingly deflated dollars over the life of the project. Contractors bidding on such contracts must anticipate the effects of inflation in their bid. Owners rarely include an adjustment for inflation as part of the contract terms. More commonly, bidders price inflation into their bid by applying an estimated inflation factor to the mid-point of construction. Most construction estimating manuals, such as Means<sup>51</sup>, include tables and charts for estimating inflation.

Capital projects in planning are not affected by inflation in real terms. They are routinely estimated in one year's currency (e.g., 1980 dollars), and if delayed, recast in another year's dollar (e.g., 1990 dollars). The cost in original dollars (e.g., 1980 dollars) does not change unless additions or deletions in project scope or made. What changes is that inflated costs (actually deflated dollars) must be accounted for<sup>51, 55</sup>.

A cost estimate for a future project is generally priced at published prices for labor, equipment and materials current at the time the estimate is prepared, but project costs can be cast in any year's dollar value. If a future project is deferred from one year to the next (e.g., 1990 to 1991) during a budget processes, future project costs might need to be adjusted for the new

intended time frame of execution. Such a recast is not a construction cost growth over the original estimate, but merely an adjustment for anticipated inflation.

Construction cost-estimates are normally adjusted for the effects of inflation, by applying the estimated inflation rate at the mid-point of construction. Construction estimating manuals, such as Means<sup>51</sup>, contain graphs or numerical data for estimators to adjust project costs accordingly.

Means Estimating Manual cautions that comparisons of one project to another must be made in the same dollar base<sup>51</sup>. Comparisons of project A to project B must be made in the same dollar base. For example, suppose project A occurred in 1990 at a cost of \$<sub>1990</sub>1 million, and project B occurred in 1991 at the cost of \$<sub>1991</sub>1.05 million. If the rate of inflation from 1990 to 1991 was 5% then project A and project B both cost \$1 million in 1990 dollars. The effect of deflated dollars on project B is not a construction cost growth over project A.

### Summary

Inflation is neither good nor bad for society as a whole, but classes of currency users do feel its effects. Capital owners suffer loss of wealth, while borrowers enjoy a corresponding gain in wealth. Individuals on fixed incomes suffer a reduction in buying power, while tax authorities enjoy a rise in tax revenues as a result of rising prices on the goods taxed.

Inflation gets its name by the price increase of goods and services, but the real mechanism is the decrease in value of the monetary unit, which is reflected as an increase in price of goods and services. The classical cause of inflation is a significant increase in the supply of money without any corresponding increase in demand. Since money obeys the law of supply and demand, the effect of the increase in supply is to decrease the value of the monetary unit, other factors held constant.

Inflation can be controlled by limiting the infusion of new money into the economy consistent with the rise in demand, and removing currency from circulation when demand falls. Governments which increase the money supply to create wealth will find that inflation will automatically follow to negate their attempts.

Central banks, including the US Federal Reserve Bank, attempt to control inflation by increasing the rate at which they loan money to their member banks. This is only partly successful in the US because the US dollar is the de facto international currency, and US dollar reserves held by other countries can significantly affect supply and demand.