

FOCUS



ON
WORLD-WIDE
INFLATION

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ON WORLD-WIDE INFLATION

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ON WORLD-WIDE INFLATION

INTRODUCTION

For the past decade, Canadians have been living with the most sustained, high rate of inflation since Confederation. During the ten years 1973-1982, inflation averaged over 9 per cent and reached a peak of 12.5 per cent in 1981. This is a rate of price increase almost three times that of the previous decade and nearly six times the inflation rate of the decade before. But, looking abroad during the 1970s, some Canadians drew cold comfort from the observation that most other countries seemed to be embroiled in the same inflationary fire. Annual inflation rates reached 12.7 per cent in the United States, 19 per cent in Italy, and 22 per cent in the United Kingdom.

Commentators in Canada, especially politicians, spoke of inflation as a world-wide phenomenon, suggesting that Canada was the unwilling victim of rising prices. Blame for inflation was apportioned to rising international oil prices, labour union greed, and astonishingly high interest rates. What with foreigners, organized labour, and capitalists pressed into service as perpetrators of inflation, it is hardly surprising that the average Canadian felt acutely uneasy with the economic path Canada was following. The world seemed set on a spiralling path toward inflationary Armageddon.

By 1983, however, Canadian inflation had fallen to levels similar to those found in the United States and the United Kingdom. And, unlike the 1970s, Ottawa was eager to take the credit. Indeed, there does seem to be a difference between the decades as inflation has remained "stubbornly" high in Italy (13 per cent), France (17 per cent), and many other countries. The world-wide inflation of the 1970s

appears to have given way to an era of national inflations.

The inflation rate in Canada has returned to a pre-1970s rate of 5 per cent per year or so, but, unlike the pre-1970s, the rates of inflation around the world seem to be largely independent of one another. The cooling of domestic inflation and the apparent independence of national inflation rates suggest that now is an appropriate time to step back and explore the facts of the inflationary experience of the 1970s. For example, was inflation an unavoidable phenomenon, a policy made abroad of which Canadians were supine recipients? Was labour greed the cause of the prolonged inflationary experience as the 6-and-5 program attempted to maintain, and did interest rate policy exacerbate the existing inflation? Finally, what role did the U.S. abandonment of the gold standard in 1971 play in the subsequent developments?

I. INFLATION IN THE WESTERN WORLD

Pre-1972

Until the early 1970s, most post-World War II democracies experienced relatively low rates of inflation. More universal than the low levels, however, is the fact that the rates of inflation were very similar across countries. During the late 1950s, major industrial nations, with the exception of France, saw annual inflation rates between 0 and 5 per cent. In Figure 1, the first bars indicate the average levels of inflation in Canada and several other countries during the late 1960s and early 1970s. What is striking about the graph is that not only are the inflation rates low during the 1960s but they are within 2 per cent or so of one another.

In Canada, annual inflation rates averaged about 3 per cent and only once reached the heights of 4½ per cent. The United States experienced similar rates of inflation and, even at the peak of the Vietnam War, the rate of inflation was below 6 per cent. Europe, the U.K., France, and Germany had average inflation rates in the neighbourhood of 3 per cent during the 1960s and France was the only country to have its inflation rate go as high as 6 per cent. This similarity of experience was markedly different from what was to follow in the 1970s when inflation rates soared for most countries but remained curiously low for others.

Differential Inflation in the 1960s and 1970s

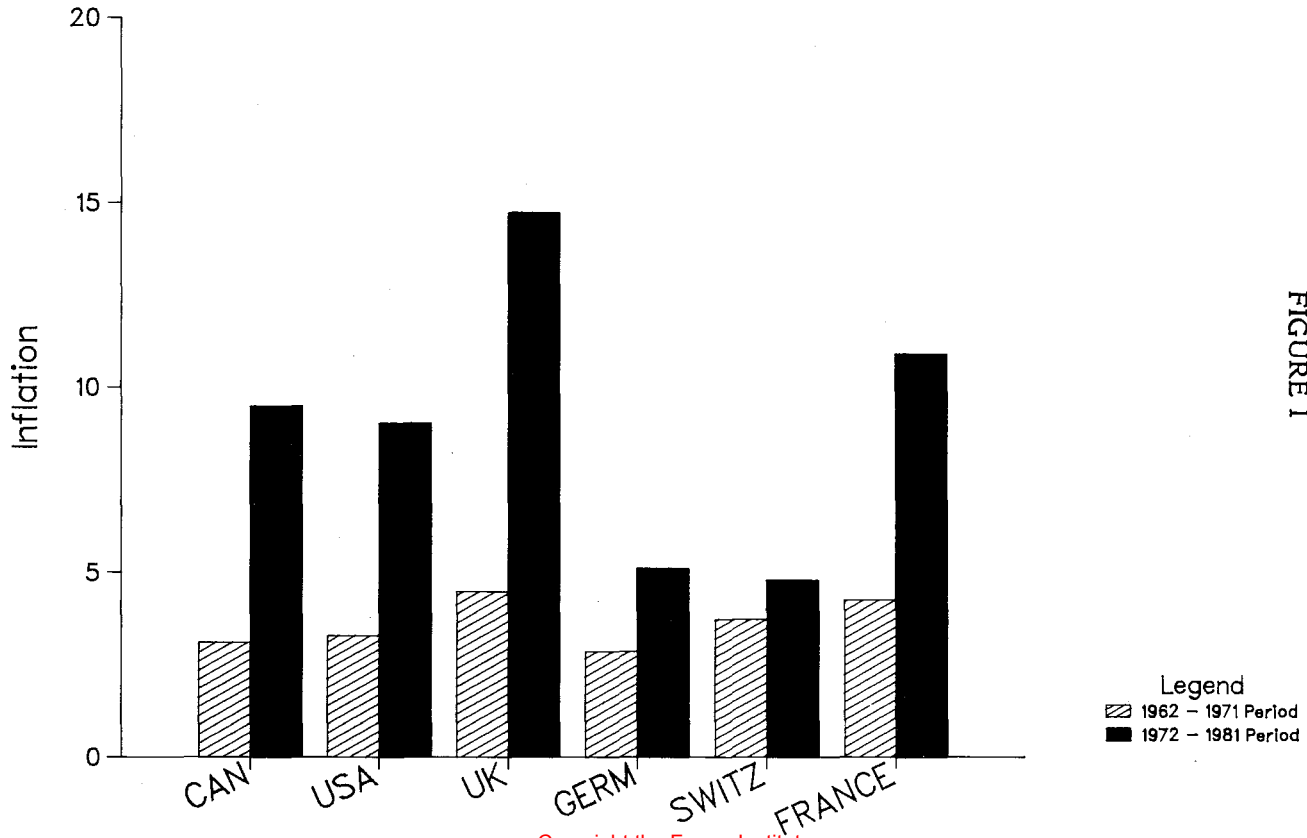


FIGURE 1

1972-1982 period

From the low and relatively similar rates of inflation witnessed in the 1960s, the 1970s present a very different picture. From an inflation rate of less than 3 per cent in 1971, Canada's inflation rate rose to an annual rate of 11 per cent by 1974. During the same period, inflation in the United States also rose to 11 per cent, while in the U.K., prices were changing at a rate of 16 per cent per year. Even higher rates of inflation were experienced in Italy and Japan where rates touched 20 and 24 per cent respectively. As can be seen clearly in Figures 2 and 3, while rates of inflation varied little across countries in the 1960s, dramatic differences had appeared by 1974.

This widening difference is most evident in Figure 1 where, for each country, the lined bar reflects the average inflation from 1962-1971 and the second (solid) bar indicates the average rates of inflation during the period 1972-1981. Although the average rate of inflation is higher in each and every country during the 1970s than in the 1960s, just as notably, there emerged large inflation rate differences among countries.

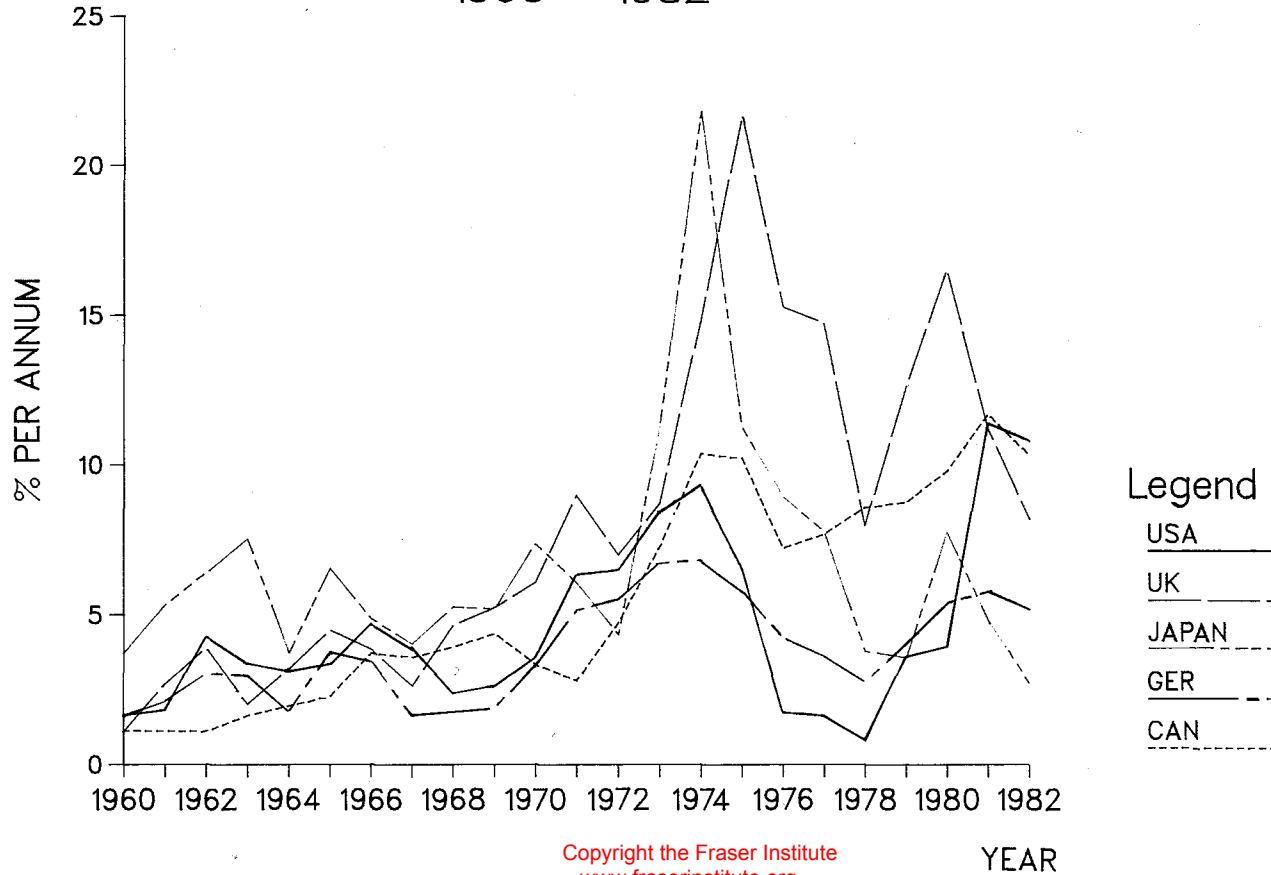
Swiss, Japanese, and German inflations were shorter-lived than those of other nations. By 1974, Switzerland's inflation rate had jumped to just less than 10 per cent and had quickly fallen to less than 2 per cent in the following two years. In Germany, the inflation rate rose only as high as 7 per cent, and by 1976 was down to about 4 per cent. In response to the oil price shock, Japan's price level in 1974 was 24 per cent above that of 1973 but by 1976 the Japanese inflation rate had plummeted to 8.8 per cent.

Figure 3 plots the inflationary history of Western Europe (and Scandinavia). Inspection of the Figure points to both the rise in inflation during the 1970s and the dramatic differences among European inflation experience beginning in the mid-1970s. A similar pattern emerges if we look at the annual inflation rates among Canada's major trading partners. Figure 2 tells the tale.

Post-1982

1982 appears as a watershed in the post-war history of worldwide inflation. While countries which had low inflation rates

INFLATION IN CANADA & HER MAJOR TRADING PARTNERS 1960 - 1982



EUROPEAN INFLATION 1960 - 1982

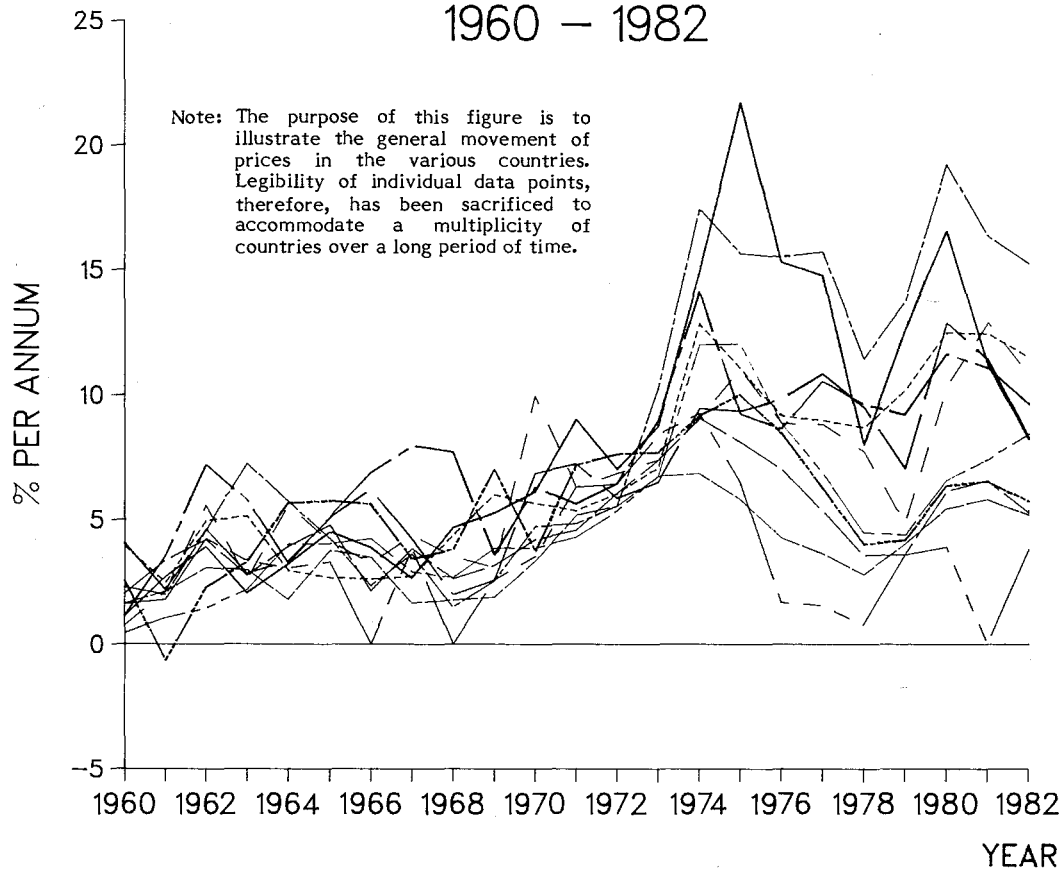


FIGURE 3

in the 1970s, such as Germany and Switzerland, continue to maintain low rates, dramatic reductions in rates of inflation have appeared in the U.K., the U.S., and, more recently, Canada. In other countries, however, rates of inflation have remained stubbornly high: the 1983 inflation rate in Italy was 13.3 per cent and in France the rate was 10 per cent.

Why the dramatic turnaround?

What has caused the recent drop in inflation rates in some countries while inflation continues unabated in others? If the world-wide recession caused inflation to fall in Canada and the U.S. and the U.K., why has it not done the same in France or in Italy? If union greed caused inflation, does that mean that unions are less greedy now in Canada, the U.S., and the U.K. than they were before and less greedy now than unions in France and Italy? Is greed not a characteristic of German and Swiss union workers?

In the following sections of this **Focus: On World-Wide Inflation**, we examine these and other popular explanations of inflation and provide a more fundamental analysis of inflation which can account for consistently low rates of inflation in some countries and rising and falling rates in others.

II. INFLATION AND MONEY: AN OVERVIEW

A definition of inflation

Inflation is a sustained increase in the general level of prices. The Consumer Price Index or the CPI, as it is called, is the most commonly used indicator of general prices. It has been used to calculate the price changes portrayed in Figures 1 through 5.

The Canadian CPI tracks changes in the money price of a bundle of commodities and services that a (mythical) average Canadian purchased in a particular reference year or base year. Percentage changes in the money price of this bundle of commodities and services is the common definition of the rate of inflation. If, for example, the bundle of commodities (e.g., housing, food, clothing, and transportation) that cost \$100 in 1980 costs \$112.40 in 1981, the resulting 12.4 per cent increase in the CPI is called the rate of inflation between 1980 and 1981.

The purchasing power of a unit of currency

Another way to view increases in the price level is to look at the purchasing power of a nominal dollar, a pound sterling or franc in terms of the goods they will buy. A nominal dollar is simply a piece of paper with "one dollar" stamped across its face. In that sense, a dollar is always a dollar. What it will purchase, however, its "real value," is something entirely different and highly changeable. Figure 4 plots the real value of various European currencies between 1965 and 1982. For example, in 1965, the base year, one unit of currency purchased one bundle of goods for the average consumer. By 1982 that same nominal currency purchased 20 per cent of that same basket of commodities in the U.K. and 50 per cent of that same commodity basket in Germany. In the case of Canada, the rise in prices had eroded 60 per cent of the value of the dollar in terms of the amount of goods it could purchase. Figures 4 and 5 indicate the erosion of purchasing power that has beset every currency. Some, however, have lost significantly less of their 1965 value than others although by 1982 most had lost more than half of their 1965 value.

For any Canadian who was "locked into" a contract denominated in Canadian dollars during the last 15 years, and who anticipated that a dollar would be worth the same from one year to the next, the tale has been a sad one. A typical 10 year \$100 savings bond purchased in 1970 returned about 7.9 per cent interest while the average level of inflation was nearly 9 per cent. By 1980, the maturing \$100 bond would purchase only 46 per cent of the real goods and services it would have purchased in 1970. While some of the decline in purchasing power was covered by the interest payments received, the average bondholder was still worse off in 1980 than he had been in 1970.

Where inflation comes from

The price level is the money price of goods and services: it tells how much money must be given up to purchase a particular bundle of goods and services. As we begin our enquiry into the rate of inflation, which is the rate of change in the money price of goods and services, a natural place to begin is to examine changes in the supply of money.

FIGURE 4

Value of Currency: 1965 – 1982

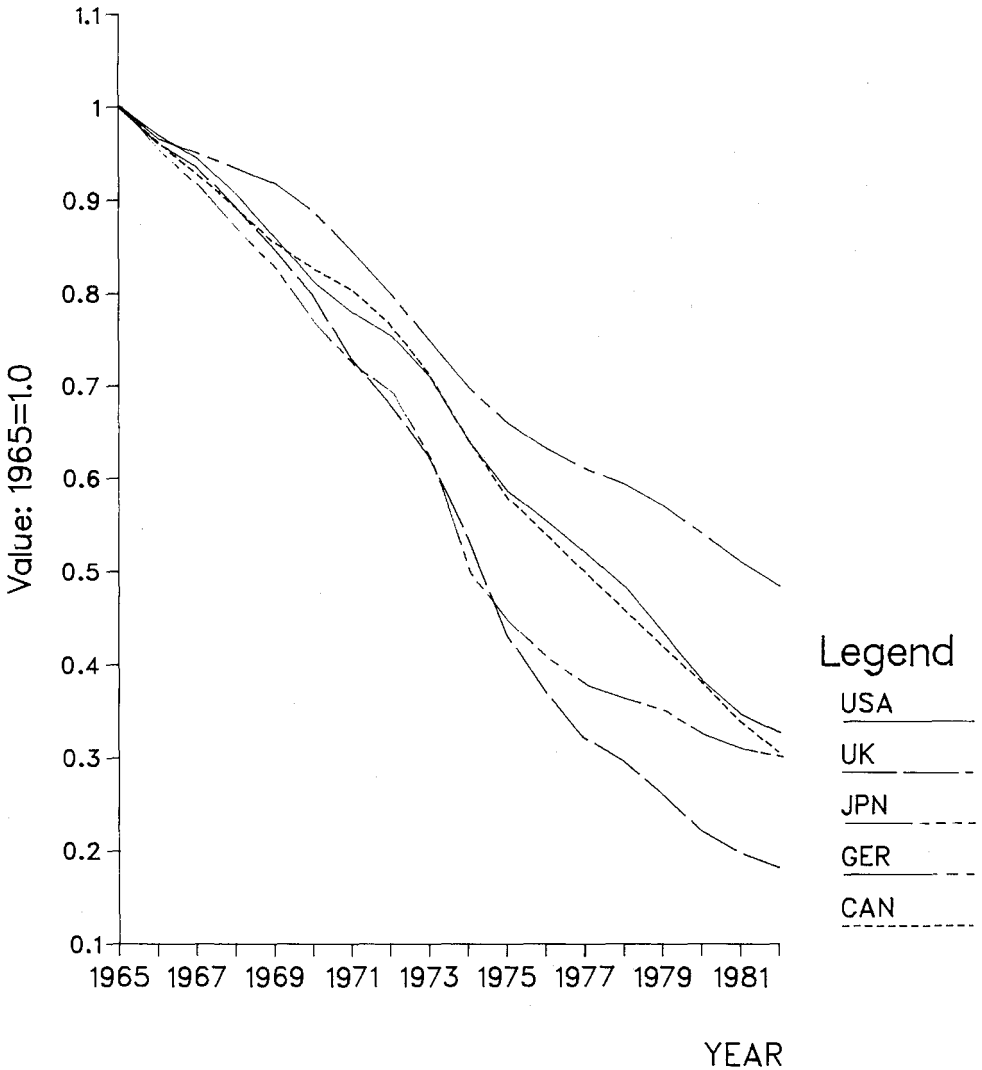
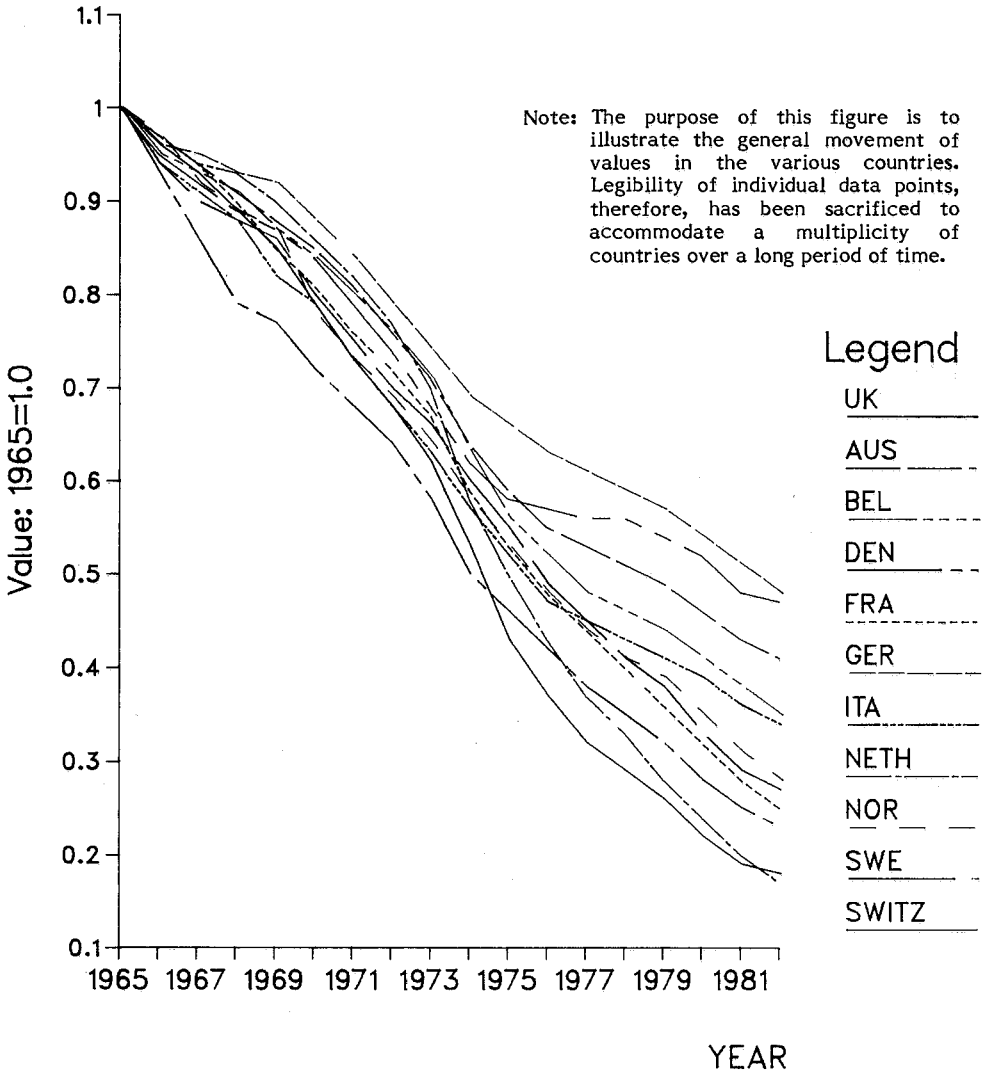


FIGURE 5

Value of Currency: Europe 1965 – 1982



Money and Inflation in 20 Countries – 1950 to 1982

Annual Average Rates

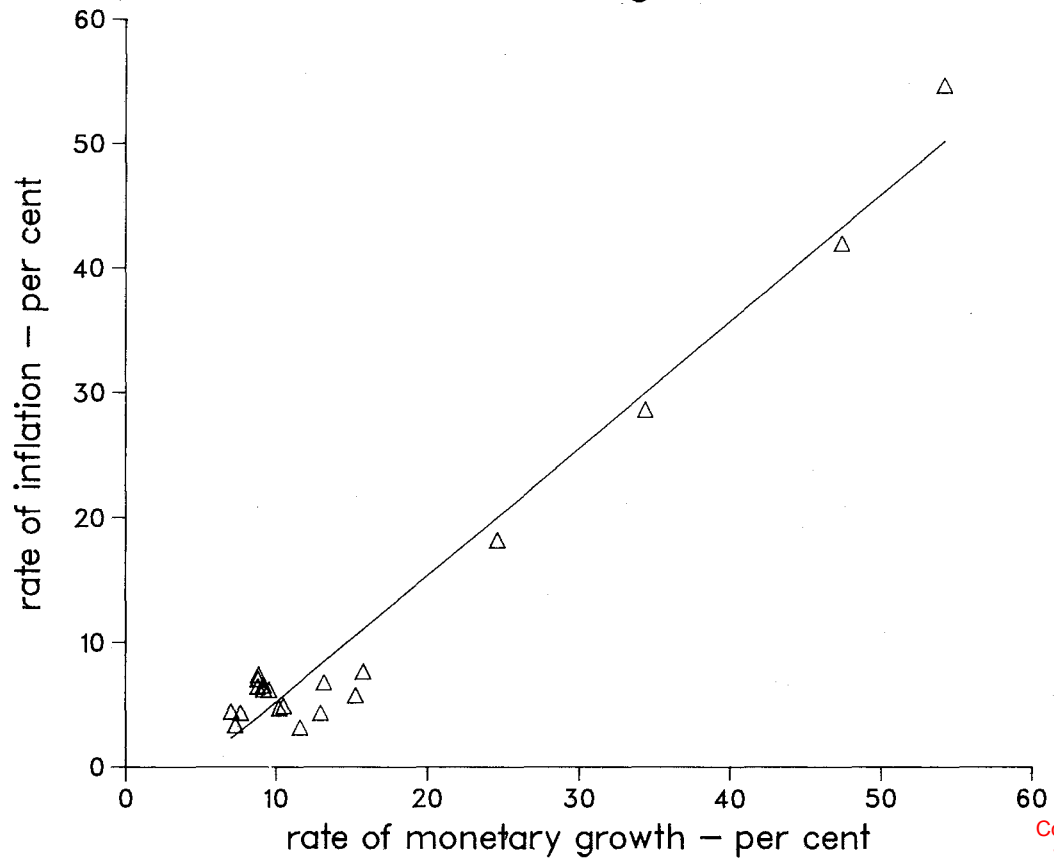


FIGURE 6

Figure 6 plots the average rate of inflation and money supply growth for 20 countries from 1950-1982.¹ The rate of inflation for each country is plotted on the vertical axis, and the rate of money supply is plotted on the horizontal axis. Every triangle on the chart, therefore, is the average inflation and money growth rate for a single country. The dark line in the graph is what is called the "line of best fit." It is the line that best summarizes the average relationship between inflation and money supply growth among the 20 countries during this period.

The slope of the "line of best fit" implies that for every per cent that the supply of money has grown, the average level of prices has also increased by 1 per cent. In some countries the price levels have grown somewhat more than proportionally, and others have grown somewhat less. On average, however, across all of these countries, an increase of 1 per cent in the money supply is associated with a 1 per cent increase in the level of prices. While economists have reasons (which we describe later) to predict this one-to-one relationship, it is still striking -- especially when we realize that no account has been taken of such things as oil price shocks, wage and price control programs, trade union power (or greed), interest rates, "6-and-5" programs, or any of the other special explanations for inflation which are commonly given.

In the next section, we explain the reasons for this striking association between the supply of money in these countries and the rates of inflation which have been observed.

III. WHAT IS MONEY AND WHY DO WE HOLD IT?

In the previous section, we have shown a very strong empirical regularity between the growth rate of money and the rate of inflation. In virtually every country in every time period, the appearance of inflation and abnormally high growth rates of money are coincidental -- but not "by coincidence." In this section we describe some attributes of money and why people hold money in order to provide the link between changes in the "quantity" of money and inflation.

What is money?

Throughout recorded history, a multitude of different commodities have served as money -- stones, beads, shells, animals (both dead and alive), pieces of gold or silver, and the form we know best today, pieces of paper.² Paper money, or "fiat" money because it is created by government fiat, has no intrinsic value as did animals or gold but has value because of the real goods and services for which we believe it can be exchanged.

The importance of confidence

This belief in the fact that essentially worthless pieces of paper can be exchanged for real goods and services is the thing which truly gives worth to our "money." Indeed, this trust is so important that the governments of virtually all nations go to much trouble to encourage this belief: in Canada, for example, taxes must be paid with Canadian currency, annuities purchased from Registered Retirement Savings Plans must be in Canadian currency, and private debts may be discharged with money. Among private citizens, while currency may be used, it need not be. Private citizens can discharge their debts through barter transactions or can make transactions in the currency of other nations.

What makes Canadian money useful is that Canadians have faith that they can predict the value in the future of a dollar they receive today; they can predict the number of goods and services that today's dollar will deliver in the future. To the extent that the predictability of the value of the dollar is eroded, money in Canadian society becomes less useful and less used.

Why money?

Money performs several interrelated functions in our society. Our dollar serves as a unit of account -- we typically refer to the dollar value of goods and services we wish to acquire. Obviously, we could refer to the number of loaves of bread that an automobile is worth and while for specialized purposes we may do so, for the vast majority of transactions, we speak of the dollar value of an object or service.

Money is also the most common medium of exchange in transactions. Exchanging goods for goods makes it necessary to find a supplier of what we want who is also a buyer of what we have. This is called the "double coincidence of wants." Money allows a more efficient exchange in which the supplier of what we want can receive money. Money enables him or her to purchase exactly what he or she wants or, alternatively, to store purchasing power for future use.

The ability to store purchasing power (cheaply) provides another reason for the use of money. Physical goods or services may be expensive or even impossible to store for future use; money allows individuals to transfer purchasing power amongst themselves and from one time period to another. Money allows us to save in a much cheaper fashion than would be the case in a barter economy (i.e., to save for a house one does not have to buy part of a new house each day).

In short, money is held by Canadians because it facilitates their day-to-day living. At this very general level, money is used or held for exactly the same reason as other assets are held -- to make life easier. Refrigerators and automobiles are held for the services they provide -- cooling and transportation. Money too yields a set of services -- it allows us to avoid searching for the "double coincidence of wants"; it allows us to save in a more efficient way; and it allows us to compare cheaply and quickly the value of different goods, services, and assets.

How much are these services of money worth to Canadians? As an approximation, we can ask another question -- how much do Canadians pay for the convenience of carrying money when they could deposit that money and earn interest on it? The amount of interest people forego by carrying money rather than putting it in a savings account is a (low) estimate of the worth of money to them. In 1982, money carried around by Canadians would have earned nearly four billion dollars in interest in a normal savings account.³

In sum, money is held just like any other asset, be it an automobile, a stock, a bond, or a refrigerator: it yields valuable services. Typically, Canadians desire to hold a significant amount of their wealth in the form of money and it is this desire, what economists call the "demand for money," which underpins the relationship between money and inflation.

IV. THE DEMAND FOR MONEY

The demand for money is the key link between money and inflation. When we speak of the demand for money, we are not speaking about the nation's or our personal greed but rather about the fact that money is held or "demanded" exactly as are other assets.

The demand for real balances

When we speak about the demand for money, we do not mean the demand for pieces of paper with "one dollar" stamped on them. In and of themselves, these pieces of paper are not particularly significant. What is important is the command over goods and services which our faith in those pieces of paper provides. Consequently, when we speak of the demand for money, we are referring to the amount of real goods and services that we wish to hold in the form of money. In 1982, Canadians held 31 billion dollars of their wealth in the form of money (narrowly defined), \$1,255 per capita. In the United States, the equivalent figure is somewhat higher at \$1,950. In stating that the holdings of money are \$31 billion, we do not know whether that is command over a large quantity of real goods and services or only a small amount. The key to that is knowledge about the purchasing power of money. By expressing that amount of nominal balances, \$31 billion, as a fraction of GNP or as the equivalent in number of weeks' income, we produce a measure of the "real balances," or the command over real goods and services, held by Canadians in the form of money.⁴ In 1982 Canadians, on average, held the equivalent of 4½ weeks income in the form of money whereas Americans typically held 7½ weeks.

What determines the demand for real balances?

As a first approximation, the demand for money or, as we have expressed it in the last section, the demand for a command over real goods and services held in the form of money, depends upon two things: the wealth of the individual and the cost of holding money relative to the cost of holding other assets. The wealthier is an individual, the more money he or she will hold. If this relationship is about proportional, then a 1 per cent increase in wealth (or income if income is a

constant fraction of wealth) will increase the demand for money by 1 per cent. In other words, money is like other assets. As we become wealthier, we demand better housing, better nutrition, more of just about all of those things which yield services to us, including money.

The other important determinant of the demand for money is the cost of holding money. Economists speak of the "opportunity cost" of holding money as the difference between the yield from holding our wealth in the form of money and holding it in our next preferred asset, which might be an automobile, a stock, a savings bond or a savings account. For convenience, we limit our discussion to the case where the alternative ways of holding wealth are just money or bonds and, in this case, the opportunity cost of money is the interest payment which must be foregone if we are to hold our wealth in the form of money which (frequently) yields a zero interest rate.⁵

When interest rates on bonds rise, it can be predicted that the proportion of wealth held as money will fall. Money is held to provide services but the service flow from each additional unit falls as the amount held increases. A holding of \$50 cash yields a certain amount of convenience, \$100 yields more convenience but not necessarily twice as much. The first \$50 might provide enough service that the holder would be willing to forego interest payments of \$10 per year just for that service. On the next \$50, however, the services might only be worth \$2 in the sense that those services would be willingly traded for any amount greater than \$2. If the annual interest rate is 3 per cent then the interest payment foregone to hold the second \$50 in cash is only 3 per cent of \$50 or \$1.50. Since the services from the \$50 is worth \$2, cash will be held in preference to bonds. If, however, the interest rate rises to 6 per cent, the foregone interest payment rises to \$3 which is more than the value of the services from the second \$50 held as money. In this case, the holder is better off using the last \$50 to buy interest yielding bonds rather than holding it as service yielding money. Thus, the demand for money falls when the cost of holding money, the interest rate, rises.

In the next sections, we concentrate on the way in which the demand for money affects the determination of the price level and the rate of inflation.

V. HOW MONEY CAUSES INFLATION

How is the price level determined?

The price level is the link between the amount of real goods and services in the economy -- automobiles, haircuts, food, dinners out, etc., on the one hand, and the amount of nominal money on the other. The price level is the money price of those real goods and services. If, as the amount of money in the economy rises, there is no increase in the supply of goods and services, there will be fewer goods for each dollar in the economy and so the money price of those goods available will rise -- each dollar will be related to a smaller bundle of goods than previously.

On June 7, 1983, the Argentine government provided a striking example of how the price level is determined. The government declared on that day that a "new" currency would be issued to replace the old currency. The new currency would replace the old at a rate of one new peso for ten thousand old pesos. Effectively, the Argentine government just knocked off four zeros from the currency -- each ten thousand old pesos in circulation became one peso. Money supply in Argentina fell to one ten-thousandth of its former level. Because each new (and more scarce) peso was now related to a greater amount of real goods by a factor of ten thousand to one, the nominal price level in Argentina fell by that same amount.

Prices in Canada are determined in the same way, although on a more modest level, through the relationship between the real goods and services, on the one hand, and the amount of nominal money on the other. To illustrate and to strip a rather complicated business down to its essentials, consider a version of Canada which is somewhat simpler than the one we know. In this version of Canada, there is a stable population with a constant proportion of young and elderly, and the real amount of goods and services produced each year (real income) is also constant. In addition, there is no net saving; that is, income produced is just equal to what is consumed, on average. This does not mean that each person consumes what he produces, for young people could be saving and elderly people consuming more than they produce. All it means is that for the economy as a whole, total income is equal to total consumption.

In this Canada, there is a fixed number of nominal dollars or money supply. Individuals hold this stock of money for its convenience in transactions and these transactions take place at the money price of goods and services. The consumer price index (CPI), therefore, is just the average money price of a specified bundle of these real goods and services. Because we observe in this example that people are, on average, neither saving nor reducing their stock of assets, we say that the demand and supply of money is in balance at the prevailing price level. If the desired level of money or real balances were not equal to the actual level, then people would be saving -- spending less than they earned -- to increase their level of money holdings or disposing of assets -- spending more than they earned -- to decrease their real money holdings. In the next section we describe how this saving or spending activity which people pursue in order to change their holdings of money changes the price level and, ultimately, the rate of inflation.

Once and for all changes in the price level

In the preceding section we described the activity of the Argentine government's recent "monetary reform" in which they knocked off four zeros from their currency: an old ten thousand peso note became a new, one peso note. This sort of revision does not, of course, affect any real variable in the economy -- the quantity of real goods and services produced does not change. It is easy to see that the price level denominated in old pesos would not change but the price level in new pesos would fall by a factor of ten thousand: what used to be priced ten thousand (old) pesos would now be priced at one (new) peso.

The Argentine "reform" is analogous to a more subtle but much more common change in money supply which is observed in Canada on a very regular basis. Changes in the money supply are continuously being made through activities directed by the Bank of Canada and the impact of these changes is identical to that observed in Argentina from their change in money supply. The activities of the Bank of Canada often result in an increase in the supply of nominal money. In the simplest case where there is no change in the supply of goods and services, any increase in the supply of money is translated into a proportional increase in the

general price level. We refer to this as a long-run proposition since it usually takes some time for individuals to absorb the increase in the money stock. The empirical observation made earlier, that for a large number of countries over a fairly long time span a 1 per cent increase in the money supply is equivalent to a 1 per cent increase in the price level, is the result of activities by individuals to adjust their real money holdings to these changes in money supply.

Individual behaviour and the price level

As an example of how individual activities relating to adjustments in money demand cause the price level to change, consider what happens when the Bank of Canada increases the money supply. For simplicity, say the government makes transfer payments to Canadians equivalent to the current stock of money, say that was \$31 billion. To accomplish this the government writes \$31 billion of cheques drawn on the Bank of Canada; in our crude example, this is equivalent to printing 31 billion more dollar bills. This directly increases people's money holdings. However, if people were holding their desired level of real balances before (according to their income and the level of interest rates), they will now be holding more than they desire to hold at the current price level. Individuals find they have "too much" of their wealth in the form of money and not enough in the form of other assets.

How do they attempt to adjust the composition of money and other assets? They do so by spending. They will continue to spend until they reach their desired level of real balances. In such a situation, when more people have "too many" real balances than have "too few" real balances, the amount of money offered for assets at the current price level will exceed the amount of assets for sale. More people will be attempting to buy than are willing to sell. By attempting to spend more money than there are goods for sale at the initial price level, people bid up prices until the amount of money offered is equal to the value of goods offered. In the case at hand, where the government doubled the supply of money, this process of bidding prices up will cease only when the price level has doubled. Since no real changes have taken place, the number of pieces of paper (nominal money) must just equal the value of real goods and services at the new

price level. The once and for all increase in the supply of money has increased the price level in a once and for all way -- adding or deleting zeros from the currency does not change any real component of the economy.

The analysis of what causes a one-time increase in the price level, while necessary to discuss, is less interesting than our main topic to which we now turn: the determination of the rate of inflation.

The rate of inflation in the long run

As described in the previous section, if the money supply is increased, then the price level increases proportionately so long as the supply of goods and services and the opportunity cost of holding money remains the same. It follows, then, that if there are increases in the money supply each and every year, then the price level will rise continuously. If the money supply is increased by a constant amount each year, prices will rise but they will rise by a smaller and smaller percentage each year. If the money supply is increased by a constant percentage each year, increases in the price level will continue at this same rate. Inflation is said to prevail when increases in prices persist.

The rate of inflation when income is growing

But now suppose that we live in an environment in which the level of real income is growing. How does this alter our analysis of what determines the rate of inflation? Recall that the level of desired money holdings is related to the level of wealth or real income. If a 10 per cent increase in the level of real income causes people to desire to hold 10 per cent more money, then a growth rate of money of 10 per cent per year, along with a growth of real income of 10 per cent per year will cause zero inflation: each new dollar supplied will be held since higher incomes cause individuals to desire to hold higher levels of real balances. Previously, the price level was bid up because people had a higher proportion of their wealth in the form of money than they desired but, in this case, people do not spend to readjust their holdings of money; they hold onto it so the relationship between the number of dollars bidding for and the amount of real goods being supplied remains the same. Hence, the price level does not change.

If the rate of growth of real income and the rate of growth of money are not the same, it is simply a matter of deciding how much of the newly produced money will be held as people desire higher levels of money holding and how much will be spent (and thus bid up prices). If the supply of money grows at 10 per cent per year and real income grows at 5 per cent per year, then desired money holdings will rise by 5 per cent and the remaining 5 per cent growth in money will be reflected in higher prices as people spend the "extra" 5 per cent in order to adjust their holdings of real balances. The rate of inflation is, therefore, the rate of growth of money supply less that rate of growth of real income. This, of course, abstracts from any changes in the opportunity cost of holding money and it is to this question which we now turn.

The rate of inflation when the opportunity cost of money changes

To complete our discussion of the demand for money and how it relates to inflation, we now consider how the rate of interest is related to the rate of inflation.

When we lend money, we forego the use of the goods that money can buy for a specified period of time, and, as we have said, this involves a loss of the money's services to us. (Why else would we hold money at all?) To compensate us for this loss, we demand that borrowers "pay" for the use of our money, usually in the form of an interest rate. This payment, however, is composed of two parts. The first represents a payment for the use of our money which we would require even if there were no inflation. Economists usually refer to this part of the payment as the "real rate" of interest.

The second part of the payment refers to the "premium" we demand when prices are expected to rise. If we loan out \$100 today and prices are expected to rise by 10 per cent between now and when the loan is to be repaid, then the demand by us of a 10 per cent inflation premium ensures that the money in the form of dollar bills we loan out will have the same real purchasing power when that money is repaid. The rate of interest we observe in our local bank or credit union, called the "nominal" interest rate, reflects these two parts, the real interest rate plus the premium paid to compensate for the expected reduction in purchasing power caused by inflation.⁶

Recall that the demand for real money balances is a negative function of the opportunity cost of holding money or the nominal interest rate: when the nominal interest rate rises, money becomes more expensive to hold and individuals attempt to conserve on their holdings. As we have noted before, attempts by all individuals to reduce their real balances can only be successful when these activities result in a higher price level. When all individuals attempt to spend at the same time without an increase in the number of real goods and services, the price level rises until the number of dollars being bid equals the quantity of goods at the given price level. Hence, if we were to observe an increase in the nominal interest rate with no change in real income or the amount of money being supplied, we would observe also an increase in the price level as individuals attempt to reduce their real balances of money by spending. Does this mean that higher interest rates can cause inflation? The short answer is no, but increases in the opportunity cost of holding money are related to a phenomenon which accompanies inflation. Economists call this phenomenon "overshooting."

The "overshooting" phenomenon

Overshooting is a phenomenon that is characterized by increases in the rate of inflation which are beyond those explained by either the growth of the supply of money or by changes in the level of real income. Recall that, as a general rule, the long run rate of inflation was the difference between the growth rate of nominal money and the growth rate of real income. When money is produced, people must either hold it or spend it. If income is growing they will be willing to hold more wealth as money but when money is increased beyond the growth of real income, people will spend the excess and ultimately bid up the price level. Overshooting occurs when the increase in the price level is greater than that predicted just using the difference between the growth rates of money and real income.

Let us suppose that the rate of growth of money supply increases from zero (a constant money supply) to 10 per cent per year. For simplicity, let us also suppose that real income is not growing. This situation is similar to the one we encountered in the discussion of once and for all price changes and we could predict that prices would rise

continuously by 10 per cent per year. But this prediction ignores the possibility that the opportunity cost of money might have risen.

Over and above the increase in the actual rate of inflation which arises from the injection of money into the economy, there is another source of a price level increase which is associated with the expectations people have about inflation. As lenders learn to expect inflation (as they will when, year after year, prices rise because of increased injections of money), they will, as we have noted before, seek higher interest rates on their money. Accordingly, the opportunity cost of holding non-interest bearing money will rise. Individuals attempt to conserve on their holdings of real money balances by spending and this extra expenditure causes the price level to rise. This additional increase in prices means that the overall increase in the inflation will be greater than is implied by the rate of growth of the money supply.

Alternatively, when the money supply growth rate is reduced, the overshooting phenomenon is reversed: as expectations about future inflation begin to fall, the market interest rates will fall also thus making the cost of holding money cheaper. Hence, as inflation falls individuals reduce their rate of spending in order to increase their holdings of real balances and the observed change in the rate of deflation will exceed the rate at which money supply growth has been reduced.

Some consequences of overshooting

The existence of the overshooting phenomenon has a very important consequence: it hides the strong linkage between the growth of money supply and the rate of inflation. As we have seen, much of the observed increase of prices, which results from increases in the money supply, will depend upon how quickly individuals in the economy learn to expect inflation -- if the money supply begins to grow and individuals do not immediately interpret this as an increase in future inflation, then the price rise will be less than the increased growth of money supply. When people catch on to the higher future inflation, the impact through the higher costs of holding real balances, will cause overshooting to occur and again the increase in prices will be different than the

increase in the money supply. In both cases, the appearance will be that there is no, or only a weak, relationship between the growth rate of the supply of money and the rate of inflation. However, over long periods of time or across several countries, the positive and negative impacts tend to even out and the one-to-one relationship between the growth rate of money and the rate of inflation becomes more apparent (see Figure 6).

VI. WHAT ABOUT OIL PRICES, UNIONS, AND INTEREST RATES?

We have described the way in which inflation is always the result of monetary growth in excess of the growth rate of real income. To the extent that Canadians do not desire to hold extra money supplied by the Bank of Canada, that extra money is spent with resulting pressure on prices and, ultimately, inflation. Nevertheless, we hear, almost daily, claims that inflation was caused by the dramatic rise in oil prices in the early 1970s or that high interest rates are to blame for inflation or that if only unions would reduce their demands, inflation would go away. Are any of these claims valid?

Interest rates cause inflation

This claim is fundamentally wrong, even if it has the appearance of common sense at first glance. Recall that we said that the nominal rate of interest, the rate prevailing at our local bank or credit union, was composed of two parts: a "real" component which we charge when we lend money even when there is no inflation -- this component compensates the lender for the services he or she loses by foregoing the use of his or her money. In addition to this "real" component, the nominal interest rate will reflect the lenders' and borrowers' views about future inflation. If the lender expects inflation to be 10 per cent during the period of the loan, then the rate he will accept will be (approximately) 10 per cent higher than if there was an expectation of no inflation. Conversely, if the borrower expects inflation to be 10 per cent, then, since future dollars will be worth 10 per cent less, he or she will be willing to pay an interest rate which is (approximately) 10 per cent higher than if there were expectations of zero inflation.

Nominal interest rates then are a reflection of expectations about inflation, not the causes of inflation. Citing higher interest rates as the cause of inflation is putting the cart before the horse.

Oil prices cause inflation

In general, the increased oil prices of a dozen or so years ago can be blamed for an increase in the CPI but not for inflation. The difference, of course, is that while higher oil prices might cause the price level to jump in the year that those prices increase, they will not produce the continued increase in prices we have observed since the early 1970s. A dramatic case in point is Japan.

Unlike Canada, which produces the vast majority of her energy needs, Japan is almost completely dependent on imported oil and coal for energy. In response to the oil price shock, Japan's CPI rose dramatically but only for a few years: prices rose about 12 per cent in 1973, 25 per cent in 1974, 12 per cent in 1975, and 9 per cent in 1976. By 1978 inflation was less than 4 per cent. In comparison, Canada, which was not nearly so hard hit by the oil price changes, experienced rising inflation during that same period. In 1974 and 1975 inflation was about 11 per cent; in 1976 it fell to 7.5 per cent and then rose steadily to 12½ per cent by 1981. If the oil price shock was truly the cause of inflation, we should have observed at least similar directions in inflation in Canada and Japan and more severe inflation in Japan. Instead, inflation fell in Japan right after the shock while it rose in Canada and, except for the brief 1974-1976 period, was always higher in Canada.

If, instead of the oil price explanation, we turn to the growth of money, a much better prediction is available: in the early 1970s, Japan caused her money supply to grow at rates in the neighbourhood of 20 per cent per year. In the later part of the decade, that growth rate had fallen significantly and in 1980 was less than 1 per cent per year. While money supply growth and inflation were falling in Japan, money growth and inflation were rising in Canada.

Union demands for higher wages cause inflation

Again, this charge puts the cart before the horse. While wages will surely rise as a result of inflation, rising wages cannot themselves cause inflation.

This is not to say, however, that unions cannot cause a one-time increase in the level of prices but only that they cannot cause inflation. If a union finds itself in a position where it can successfully demand higher wages, those wages will have to come from somewhere. If the money supply is constant, then so will be the total level of spending and income. Accordingly, higher wages for one union or group will have to be diverted from other uses. One source for the extra wage money could be the consumer, but to the extent that the consumer pays higher prices for the output of the industry in which our mythical union works, then consumers will have less money for the output of other industries. Not everyone can have higher wages at the same time and not all prices can rise at the same time. Not, that is, unless more money is produced and this leads us back to our original explanation -- inflation is caused by an excessive rate of growth of money, a rate of growth which is higher than the rate at which real income is growing.

Federal deficits cause inflation

Deficits, the excess of government spending over explicit tax revenue, cause inflation if they are monetised, i.e., if the government finances the deficit by, in effect, printing money. There is no necessary connection between deficits and the rate of inflation. But experience in the past has suggested that deficits are frequently associated with growth in the supply of money. Deficits, once incurred, must be financed either through bond sales or increases in the money supply -- the (metaphorical) printing of money. Since bond sales may raise interest rates unacceptably, there may be indirect pressure to resort to money printing and, hence, to "inflationary finance." But is there an iron-clad, necessary relationship between deficits and inflation? No. We still need to watch the effect on the amount of money relative to goods in the Canadian economy.

Inflation is imported through floating exchange rates

During the 1960s most of the world was on a system of fixed exchange rates and, as we have seen, inflation levels were relatively low and fairly similar across countries. After 1971, most exchange rates were allowed to "float" and we have seen high and highly variable rates of inflation. Does this mean that floating exchange rates can be blamed for inflation? The answer is, "in a way."

The exchange rate is the ratio of prices of money between two countries. At the present time, one Canadian dollar is approximately equal to 81 cents in American currency. If the government were to "fix" that exchange rate, it would be announcing that it stood ready to purchase any and all Canadian dollars for 81 cents U.S. If the Canadian money supply grows faster than U.S. money supply then, as we have seen, money prices in Canada will rise faster than in the U.S. and, in this situation, a "currency crisis" will develop. As the value, in terms of goods and services, of the Canadian dollar falls faster than the value in terms of the U.S. dollar, individuals holding Canadian currency will attempt to exchange them for U.S. dollars (or German marks or whatever). The only way that the "crisis" can be alleviated is for the Canadian dollar to be devalued so that foreign currency becomes less of a bargain in terms of Canadian currency. In our example, if the fixed exchange rate of 81 cents U.S. were reduced to 75 cents U.S. then fewer individuals would exchange Canadian for U.S. dollars.

However, the re-fixing of the exchange rate at a devalued level is only a temporary cure if money supply growth (relative to real income growth) continues to be different in the two countries. It is in this sense that there is a kernel of truth in the charge that fixed exchange rates prevent or cause inflation: to the extent that countries on fixed exchange rates are forced to have similar monetary growth rates (or suffer the crises of intermittent devaluations), then they will have similar rates of inflation -- if we fix our dollar to that of the U.S. then, in the absence of devaluations, the inflation rate in the U.S. will be "imported" into Canada and vice-versa.

With the move to flexible rates in the 1970s, the link between foreign and domestic monetary growth rates was weakened. Instead of intermittent devaluations (such as the

"Diefenbuck" case of 1960), the flexible exchange rate regime allows continuous changes in the exchange rate on a day-to-day and even an hour-to-hour basis. As Canadian money supply growth exceeds that of the U.S., the exchange rate will tend to fall and as it lags behind, the exchange rate tends to appreciate vis-a-vis the U.S. dollar.

The move from gold

Supplementing fixed exchange rates, the international monetary system during the 1960s included a feature whereby U.S. dollars could be converted into gold at a fixed rate of one thirty-fifth of an ounce of gold for each U.S. dollar. This convertibility of gold and dollars was maintained by explicit U.S. government policy⁷ and had an important influence on the rate of monetary growth in the U.S. As we have explained, this constraint on U.S. monetary policy together with the fixed exchange rates of the period resulted in low levels of inflation in the U.S. and similar low levels of inflation in those countries with exchange rates fixed to the U.S. dollar. Indeed, this is what was observed during the 1960s: by recent standards inflation rates were generally low and similar across many countries of the western world.

By agreeing to convert U.S. dollars into gold, the U.S. government was endowing U.S. dollars with more of a characteristic we discussed earlier in this paper: faith in the future value of money. With the option to convert their U.S. dollars into gold, holders of U.S. dollars were secure in the knowledge that if the value of U.S. dollars fell (in terms of the number of real goods and services which could be exchanged for them), then the dollars could be converted to gold whose value in terms of real goods would not be diminished by inflation in the United States. The promise that gold and dollars were convertible therefore made holders of dollars less worried about U.S. inflation, because it made U.S. inflation less likely.

The reason that inflation was less likely under conditions of convertibility is that if the U.S. allowed inflation, then holders of dollars would convert and the exodus of gold in return for debased dollars would represent a net outflow of wealth from the United States -- the U.S. Treasury would be left holding more, lower valued dollars at the same time it held less, higher valued gold.

To summarize: gold convertibility constrained the growth of U.S. money supply; the constrained growth of U.S. money and the fixed exchange system constrained monetary growth rates in non-U.S. countries which had exchange rates fixed to the U.S. dollar. Although other methods of constraining monetary growth (and thus inflation) exist, and could have been used in place of the convertibility policy, the abandonment of this constraint can be seen as partly responsible for the dramatic increase in inflation and the large differences in rates observed during the middle and late 1970s and early 1980s.

The abandonment of the convertibility policy took place on August 15, 1971. President Nixon announced that the U.S. government would no longer exchange gold for U.S. dollars and this change along with the change from fixed to flexible exchange rates had two important results.

The first result was that the U.S. government was now capable of financing expenditures through money creation without the threat (implied by convertibility) that debased dollars would have to be imported in return for exports of more valuable gold. Prior to 1971, financing of government expenditures in the U.S. was conducted primarily by taxation and borrowing from the public. As we explained in a previous section, expenditures, even those associated with deficits, are incapable of producing inflation unless they affect the supply of money. By creating "new" money, the U.S. government found a third source from which it could finance its expenditure: taxation of the private money holdings of its citizens.

For each extra dollar printed which was not "backed up" by production of extra goods or services, the value of existing goods and services exchanged for dollars fell. Money in the bank or a bond became exchangeable for fewer goods and services as the government printed more new money. The real goods lost to private citizens became expenditure for government. Instead of taxing income, the government taxed private savings.

While the U.S. inflation rate was rising as a result of the move from convertibility, this policy also allowed other nations to pursue different monetary policies. As in the U.S., many other countries moved toward using inflation, the tax on private savings, as a source of finance for government expenditures. While the fixed exchange rates prior to 1971

would have meant currency crises or one-at-a-time devaluations (such as the Diefenbuck episode in Canada), the flexible exchange regime allowed for currencies to adjust more automatically, if less dramatically. During the late 1970s, for example, Canadian monetary growth relative to that in the U.S. was sufficiently large as to cause the value of Canadian currency (the exchange rate) measured in U.S. dollars to fall from a high of \$1.04 in 1976 to 84 cents in 1978. While this was indeed a large drop, it was nevertheless less dramatic than the much smaller May 2, 1962 overnight depreciation from \$1.00 to 92½¢ of the Diefenbuck crisis.⁸

Other countries suffered similar inflations and large, if "automatic," devaluations were not uncommon. Indeed, a sufficient number of other countries experienced enough inflation through monetary excesses (taxation by inflation) that the term "world-wide inflation" was not inappropriate.⁹ Nevertheless, the term is not wholly accurate either. The evidence indicates that those countries, including Switzerland and Germany, which refused to follow policies of using monetary expansion to finance their expenditures were themselves relatively unaffected by inflation.

VII. WHAT DOES IT ALL MEAN?

In this monograph we have focused on the inflationary experiences of the past quarter century, particularly those of Canada. Examining the claims that unions cause inflation, that high interest rates cause inflation, that the oil price shock caused inflation, we have been forced to turn to a simpler, stronger explanation. Across all of the countries in the western world, through the 1950s, 1960s, 1970s, and now into the 1980s, the most striking relationship found is that between the rate of monetary growth and inflation. Falling inflation in Japan at a time when oil prices had risen throws severe doubt on the oil price explanation. Dramatic reductions in inflation in the U.K. with high inflation in France and Italy denies the impact is solely through the current recession. Low and stable price movements in Germany and Switzerland imply that union activity cannot explain inflation. And, as we have seen, interest rates may be the result but cannot be the cause of inflation. What are we left?

The simplest and the strongest explanation of inflation, the one that explains the stable performance of Germany, the improving inflation performance of the U.K., the U.S. and Canada, and the still high rates of inflation in France and Italy -- is that excessive growth rates of domestic money supply, whether in Italy or Canada or elsewhere, is the single most important cause of inflation. While the move away from fixed or gold-backed currency may have contributed to Canadian inflation, it was not the direct cause. Some policies are made in Canada and inflation is one of them.

NOTES

- 1 Strictly speaking, in correlating inflation and money supply growth, we should adjust for changes in the growth of the supply of goods and services. But, since changes in the rates of growth of the money supply in countries have, typically, been far greater than changes in real income growth rates, no great inaccuracy is introduced at this very general level if we focus primarily on growth in the money supply. As can be observed from the data reproduced in the Appendix, some observations begin in years other than 1950.
- 2 We ignore coins in this discussion although they do constitute a (trivial) portion of the supply of money in Canada.
- 3 The value of money holdings can be approximated by calculating the dollars held as cash or in non-interest bearing accounts (M1A). (\$31 billion in 1982) times the interest rate on a savings account (12 per cent in 1982). This yields \$3.7 billion or about four and one-half weeks of real income.
- 4 As an alternative measure, we could deflate the nominal amount, \$31 billion by dividing by the price level. This method is especially useful when we wish to compare money holdings from year to year.
- 5 Money can be held in a form which yields interest, as in the case of chequing accounts which sometimes pay low rates of interest. While such institutional details alter the specific cost of holding money in different forms, the analysis remains valid.
- 6 We don't observe the "real" interest rate and "expected" inflation rate directly. What we see is the nominal interest rate.
- 7 In fact, the U.S. government extended the exchange privilege only to other countries' central banks.
- 8 See Peter Stursberg, Diefenbaker: Leadership Gained 1956-62 (especially around p. 251) for a discussion of the constraining effects of the overnight devaluation.

- 9 See Henry Hazlitt's "Why Inflation is Worldwide" in The Freeman for a salient discussion written at the height of the inflation.

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DATA APPENDIX

The prices used are those for the Consumer Price Index, line A64, from the International Financial Statistics of the International Monetary Fund. Money supply figures, from the same source, are the sum of lines A34 and A35 and are denominated in local currency units. Country codes are: US - 111; UK -112; Austria - 122; Belgium - 124; Denmark --128; France - 132; Germany -134; Italy - 136; Netherlands -138; Norway - 142; Sweden - 144; Switzerland -146; Canada -156; Japan - 158; Australia - 193; New Zealand - 196; Argentina - 213; Bolivia - 218; Brazil - 223; Peru - 293.

Table 1

Year	Argentina		Australia		Austria	
	Prices	Money ¹	Prices	Money ²	Prices	Money ³
1948	0.1	0.3		3476.	21.2	
1949	0.1	0.3	25.1	3908.	26.0	
1950	0.1	0.3	27.4	4465.	29.8	
1951	0.1	0.3	32.9	5041.	38.0	
1952	0.2	0.5	38.5	5012.	43.1	
1953	0.2	0.5	40.2	5518.	42.5	27.35
1954	0.2	0.7	40.5	5743.	44.1	35.39
1955	0.2	0.8	41.3	5924.	44.1	38.02
1956	0.3	0.9	43.9	6149.	45.8	41.78
1957	0.4	1.1	45.0	6535.	47.1	48.17
1958	0.5	1.6	45.6	6632.	48.0	58.13
1959	1.0	2.1	46.4	7150.	48.5	67.42
1960	1.2	2.8	48.2	7401.	49.5	74.88
1961	1.4	3.1	49.4	7753.	51.2	83.19
1962	1.8	3.3	49.2	8367.	53.4	94.28
1963	2.2	4.4	49.5	9242.	54.9	104.80
1964	2.7	6.4	50.6	10313.	57.1	118.31
1965	3.4	8.2	52.7	10845.	59.9	132.69
1966	4.6	10.8	54.2	11686.	61.2	146.30
1967	5.9	14.7	56.0	12739.	63.6	160.19
1968	6.8	18.8	57.4	13635.	65.3	175.89
1969	7.4	21.9	59.1	14934.	67.4	197.00
1970	8.3	26.6	61.4	15699.	70.3	221.70
1971	11.2	35.1	65.1	17067.	73.6	255.69
1972	17.8	54.5	69.0	20425.	78.2	297.15
1973	28.7	108.2	75.5	24715.	84.2	336.10
1974	35.4	177.7	86.9	26965.	92.2	375.44
1975	100.0	420.4	100.0	32554.	100.0	448.14
1976	543.2	1934.2	113.5	36553.	107.3	522.44
1977	1499.6	6563.2	127.5	38712.	113.2	572.08
1978	4131.4	17292.1	137.6	42825.	117.3	653.09
1979	10721.4	49604.0	150.1	47797.	121.6	706.24
1980	21524.0	93867.0	165.4	54495.	129.3	765.04
1981	44012.0	174979.0	181.4	59882.	138.1	843.60
1982	116531.0	318022.0	201.6	66226.	145.6	936.10

¹Millions of Pesos²Millions of Australian Dollars³Billions of Schillings

Table 2

Year	Belgium		Bolivia		Brazil	
	Prices	Money ¹	Prices	Money ²	Prices	Money ³
1948	42.7		0.155			0.06
1949	41.4		0.167			0.08
1950	41.0	170.7	0.207	5.80		0.10
1951	44.9	185.2	0.274	7.10		0.11
1952	45.3	194.8	0.341	10.20		0.12
1953	45.2	202.4	0.685	17.60		0.14
1954	45.8	206.9	1.537	28.30		0.17
1955	45.5	218.4	2.766	58.50		0.20
1956	46.8	223.7	7.711	203.40		0.24
1957	48.3	224.5	16.590	301.20	0.50	0.32
1958	48.9	239.5	17.105	309.50	0.53	0.38
1959	49.5	252.2	20.576	400.40	0.81	0.53
1960	49.7	262.5	22.950	434.40	1.05	0.74
1961	50.2	289.1	24.685	513.10	1.39	1.10
1962	50.9	310.4	26.136	585.00	2.10	1.76
1963	52.0	343.3	25.952	701.60	3.59	2.89
1964	54.1	367.6	28.594	853.20	6.88	5.31
1965	56.3	400.4	29.412	995.00	11.41	9.35
1966	58.7	434.3	31.456	1253.20	16.12	11.42
1967	60.4	466.7	34.980	1342.50	21.03	16.65
1968	62.0	510.4	36.898	1512.50	25.66	24.04
1969	64.4	538.8	37.716	1667.10	31.48	31.77
1970	66.9	582.5	39.195	1914.40	38.51	40.77
1971	69.8	660.4	40.610	2258.70	46.28	48.57
1972	73.6	768.1	43.253	2844.30	53.93	69.45
1973	78.7	875.6	56.905	3775.80	60.76	101.55
1974	88.7	951.7	92.608	5449.00	77.55	135.74
1975	100.0	1096.9	100.000	6714.69	100.00	190.35
1976	109.2	1234.6	104.498	9917.29	142.04	260.92
1977	116.9	1337.9	112.960	12815.00	204.08	374.46
1978	122.2	1438.4	124.662	14484.70	283.06	559.99
1979	127.6	1527.0	149.261	16631.30	432.24	954.41
1980	136.2	1577.6	219.800	23124.00	790.20	1554.20
1981	146.6	1677.3	290.400	29418.00	1624.20	2862.40
1982	159.4	1797.5	649.300	74450.00	3215.70	5329.90

¹Billions of Francs²Millions of Pesos³Billions of Cruzeiros

Table 3

Year	Canada		Denmark		France	
	Prices	Money ¹	Prices	Money ²	Prices	Money ³
1948	40.600	7.55	24.7	11.63	25.7	21.91
1949	41.900	7.95	24.9	11.88	23.7	27.50
1950	43.200	8.37	26.4	12.18	25.6	31.89
1951	47.700	8.56	29.1	11.91	30.1	37.75
1952	48.900	9.14	30.2	12.58	33.7	42.87
1953	48.400	9.25	30.5	13.43	33.0	47.94
1954	48.700	10.04	30.5	13.63	33.2	54.65
1955	48.800	10.74	32.2	14.07	33.5	61.69
1956	49.500	11.08	34.1	14.86	34.9	68.17
1957	51.000	11.40	35.0	15.71	34.7	75.35
1958	52.400	12.79	35.3	17.70	40.0	79.96
1959	53.000	12.65	35.9	19.73	42.3	90.66
1960	53.600	13.19	36.3	20.74	44.0	105.81
1961	54.200	14.36	37.6	22.71	45.1	124.04
1962	54.800	14.96	40.4	24.77	47.4	147.19
1963	55.700	16.78	42.8	27.85	49.9	167.88
1964	56.800	18.51	44.2	30.67	51.4	184.33
1965	58.100	20.37	46.5	33.66	52.8	204.44
1966	60.300	21.99	49.8	38.01	54.2	226.05
1967	62.500	25.64	53.9	41.61	55.7	255.62
1968	65.000	28.84	58.2	46.92	58.2	285.23
1969	67.900	31.05	60.3	51.89	61.8	298.69
1970	70.200	34.02	64.2	54.39	65.4	343.98
1971	72.200	37.13	67.9	59.20	69.0	407.43
1972	75.700	42.62	72.4	67.14	73.3	484.28
1973	81.400	51.48	79.2	76.26	78.7	554.88
1974	90.300	61.38	91.2	82.68	89.5	653.84
1975	100.000	70.75	100.0	104.99	100.0	756.77
1976	107.500	84.46	109.0	117.29	109.6	849.96
1977	116.100	96.29	121.1	128.17	119.9	973.97
1978	126.500	112.59	133.3	136.43	130.8	1092.70
1979	138.100	132.43	146.1	150.37	144.8	1244.40
1980	152.300	144.93	164.1	167.99	164.1	1347.40
1981	171.185	177.58	183.3	198.42	185.9	1498.00
1982	189.766	186.98	201.8	203.18	208.6	1667.00

¹Billions of Canadian Dollars

²Billions of Kroner

³Billions of Francs

Table 4

Year	Germany		Italy		Japan	
	Prices	Money ¹	Prices	Money ²	Prices	Money ³
1948			29.6		18.2	
1949	50.8		29.9		24.1	
1950	47.7		29.6		22.4	
1951	51.4	29.7	33.3		26.1	
1952	52.5	36.2	33.9		27.4	
1953	51.5	43.8	34.4	5596.	29.2	3952.
1954	51.6	52.4	35.4	6253.	31.1	4556.
1955	52.5	59.5	36.2	7014.	30.8	5395.
1956	53.8	66.5	37.4	7857.	30.8	6551.
1957	55.0	75.7	37.9	8589.	31.8	7591.
1958	56.2	87.6	39.0	9843.	31.7	9055.
1959	56.7	102.6	38.8	11353.	32.0	6863.
1960	57.6	114.4	39.7	12959.	33.2	10324.
1961	58.8	129.5	40.5	15101.	35.0	12274.
1962	60.6	145.3	42.4	17749.	37.3	14693.
1963	62.4	161.3	45.6	20153.	40.2	18668.
1964	63.5	181.6	48.3	21893.	41.7	21522.
1965	65.9	203.4	50.4	25409.	44.5	25394.
1966	68.2	225.6	51.6	29061.	46.7	29522.
1967	69.3	254.6	53.5	33213.	48.6	34097.
1968	70.5	277.6	54.3	37193.	51.2	39153.
1969	71.8	306.4	55.7	41660.	53.9	46399.
1970	74.2	333.9	58.4	47858.	58.0	54236.
1971	78.1	378.7	61.3	55800.	61.6	67398.
1972	82.5	432.5	64.8	65808.	64.3	84040.
1973	88.2	470.2	71.8	81240.	71.9	98188.
1974	94.4	503.6	85.5	94020.	89.4	109493.
1975	100.0	560.7	100.0	117011.	100.0	125329.
1976	104.3	603.0	116.8	141599.	109.3	142248.
1977	108.1	666.6	136.7	173059.	118.1	158032.
1978	111.1	734.6	153.3	212943.	122.6	178719.
1979	115.6	769.6	175.9	254326.	127.0	193720.
1980	122.0	803.9	213.2	285247.	137.2	206986.
1981	129.2	833.6	251.1	340783.	143.9	229206.
1982	136.0	890.8	292.5	389684.	147.8	246582.

¹Billions of Deutsche Marks

²Billions of Lire

³Billions of Yen

Table 5

Year	Netherlands		New Zealand		Norway	
	Prices	Money ¹	Prices	Money ²	Prices	Money ³
1948		9.70	25.4	460.8	26.3	10.97
1949	30.1	9.60	25.8	503.2	26.3	11.20
1950	32.7	9.18	27.3	559.6	27.7	10.86
1951	36.7	9.85	30.4	636.0	32.1	12.05
1952	36.7	10.87	32.8	616.4	35.0	12.89
1953	36.7	11.53	34.3	683.0	35.6	13.57
1954	38.2	12.57	35.9	719.6	37.2	14.27
1955	38.9	13.76	36.8	692.4	37.7	15.01
1956	39.6	13.64	38.1	687.2	39.0	15.89
1957	42.2	14.01	38.8	692.6	40.1	16.60
1958	42.9	16.06	40.5	670.6	42.1	17.14
1959	43.3	17.81	42.1	750.2	42.9	18.06
1960	44.4	19.82	42.5	852.8	43.2	19.27
1961	41.1	21.44	43.2	834.8	44.1	20.32
1962	45.1	23.49	44.4	834.6	46.6	21.71
1963	46.6	26.23	45.2	855.0	47.8	23.20
1964	49.3	29.02	46.8	912.8	50.5	25.00
1965	52.2	32.19	48.4	914.5	52.6	27.53
1966	55.2	34.74	49.7	953.5	54.3	29.85
1967	57.1	39.14	52.8	928.5	56.7	32.78
1968	59.3	44.90	55.1	955.7	58.7	36.76
1969	63.6	50.36	57.8	1073.6	60.5	40.59
1970	66.0	56.74	61.4	1171.5	66.8	46.70
1971	70.9	64.79	67.9	1360.9	71.1	52.93
1972	76.5	74.18	72.6	1866.7	76.1	59.57
1973	82.6	86.11	78.5	2494.2	81.9	67.61
1974	90.5	99.96	87.3	2635.2	89.6	75.09
1975	100.0	112.83	100.0	2924.9	100.0	86.59
1976	108.8	132.10	116.9	3449.6	109.2	95.65
1977	115.8	149.15	133.8	3975.6	119.2	112.16
1978	120.5	166.15	149.7	4925.7	128.7	126.01
1979	125.6	185.45	170.3	5951.7	135.0	142.83
1980	133.8	195.83	199.6	6463.0	149.6	158.52
1981	142.8	211.13	230.1	7407.5	170.1	179.91
1982	151.2	222.34	267.5	8448.3	189.4	200.23

¹Billions of Guilders

²Millions of New Zealand Dollars

³Billions of Kroner

Table 6

Year	Peru		Sweden		Switzerland	
	Prices	Money ¹	Prices	Money ²	Prices	Money ³
1948	8.3	2250.	28.6	19.16	44.2	22.03
1949	12.6	2540.	28.9	20.78	43.9	23.02
1950	10.7	3140.	29.1	22.13	43.2	23.89
1951	11.8	3650.	33.8	25.08	45.2	19.95
1952	12.6	4280.	36.4	26.01	46.4	21.03
1953	13.8	4860.	36.9	28.68	46.1	22.63
1954	14.5	5400.	37.2	30.41	46.4	23.81
1955	15.2	6120.	38.4	31.51	46.9	25.28
1956	16.0	7210.	40.1	33.72	47.5	26.99
1957	17.2	7850.	41.9	36.80	48.5	28.39
1958	18.5	8450.	43.7	39.16	49.4	31.05
1959	20.9	10051.	44.1	44.06	49.0	33.35
1960	22.7	11748.	45.9	45.55	49.8	38.22
1961	24.1	13775.	46.9	48.23	50.7	43.67
1962	25.7	15424.	49.1	52.65	52.9	48.91
1963	27.2	18026.	50.5	57.03	54.7	54.23
1964	29.9	22599.	52.2	61.22	56.4	58.47
1965	34.7	27896.	54.9	65.19	58.3	62.44
1966	37.9	31515.	58.4	70.96	61.1	66.80
1967	41.6	34230.	60.9	79.46	63.5	72.51
1968	49.5	36578.	62.1	88.78	65.0	82.23
1969	52.6	40739.	63.7	93.81	66.7	98.06
1970	55.2	54890.	68.2	99.32	69.1	111.41
1971	59.0	60501.	73.3	109.55	73.6	122.13
1972	63.2	74706.	77.7	123.17	78.5	131.70
1973	69.2	91588.	82.9	140.24	85.4	138.98
1974	80.9	123731.	91.1	154.77	93.7	144.85
1975	100.0	143297.	100.0	174.21	100.0	156.66
1976	133.5	177926.	110.3	181.96	101.7	168.87
1977	184.3	222251.	122.9	197.44	103.3	178.76
1978	290.9	357156.	135.1	231.41	104.1	197.65
1979	484.9	686202.	144.9	274.19	107.9	219.39
1980	772.0	1.258710E+06	164.8	302.95	112.2	236.82
1981	1354.0	2.122100E+06	184.7	343.23	119.4	194.94
1982	2226.6	3.599600E+06	200.6	370.75	124.0	225.89

¹Billions of Soles²Billions of Kronor³Billions of Swiss Francs

Table 7

Year	United Kingdom		United States	
	Prices	Money ¹	Prices	Money ²
1948	24.9		44.3	146.1
1949	25.5		45.3	146.2
1950	26.2		44.7	151.9
1951	28.8	8213.	48.3	161.1
1952	30.6	8401.	49.3	168.7
1953	31.1	8755.	49.7	173.3
1954	31.6	9108.	49.9	180.6
1955	32.7	8838.	49.8	185.2
1956	34.1	8978.	50.5	188.9
1957	35.2	9266.	52.3	193.3
1958	36.2	9593.	53.7	205.9
1959	36.4	10138.	54.2	209.9
1960	36.8	10421.	55.0	216.3
1961	37.8	10705.	55.6	230.5
1962	39.3	10483.	56.2	249.4
1963	40.1	11403.	56.9	267.9
1964	41.4	12025.	57.6	288.6
1965	43.3	12934.	58.6	316.2
1966	45.0	13398.	60.4	333.3
1967	46.2	14840.	62.0	369.4
1968	48.4	15905.	64.6	405.9
1969	51.0	16400.	68.1	402.3
1970	54.2	17947.	72.1	451.0
1971	59.3	20319.	75.2	506.6
1972	63.6	25984.	77.7	567.7
1973	69.4	33141.	82.6	630.5
1974	80.5	37430.	91.6	688.7
1975	100.0	40100.	100.0	730.7
1976	116.5	44741.	105.8	789.7
1977	135.0	49121.	112.7	871.5
1978	146.2	56292.	121.2	960.3
1979	165.8	63319.	134.9	1029.6
1980	195.6	75013.	153.1	1143.0
1981	218.8	96330.	169.0	1188.1
1982	237.5	112662.	179.3	1323.5

¹Millions of Pounds²Billions of U.S. Dollars