

## INFLATION AND INTERNATIONAL TRADE

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International trade and trade policy are difficult enough to understand when price levels remain relatively constant. But when rapid or chronic inflation are added, most of us find that whatever grip we have on economic principles begins to slip away. This is because general price inflation reflects changes in the level and distribution of real income within countries and across national boundaries. Inflation also tends to change currency exchange rates and international balance of payments accounts.

This paper examines briefly some of the major ways in which inflation can influence trade among nations.

Inflation is a sustained increase in the general price level of a national economy measured either at the retail or wholesale level. The annual rate of change in this price level, commonly expressed in index numbers, is the inflation rate.

### Constant Inflation Rates

First imagine a curious world in which all trading nations display rapid but *equal* inflation rates. No changes occur anywhere in relative prices—all conceivable price and cost ratios stay constant over time. Since currency exchange rates are really price relatives, no exchange rates would change in response to this inflation. Thus, no price-induced changes in imports, exports, interest rates, capital flows, or balance of payments would occur.

Such a world would be uninteresting from our point of view unless this constant international inflation rate were accompanied by unequal rates of change in real income. These could emerge because of differential rates of growth in real output across international borders. Unequal changes in real income could induce changes in commodity trade and foreign exchange through demand shifts, but these would not be inflation phenomena as such. Now consider the more relevant case involving differential inflation rates occurring from one trading nation to another.

## Differential Inflation and Fixed Exchange Rates

For whatever underlying reasons, imagine that at least two major trading nations display substantially different internal inflation rates affecting prices of both traded and non-traded goods. If the rate of exchange of one nation's currency for that of the other is *fixed*, relative prices across the border would be changing at a rate equal to the difference between the two inflation rates. For example, if the U.S. inflation rate is 10 percent and the West German rate is 7 percent, then relative prices for U.S. goods would be rising by 3 percent per year in terms of German currency. Similarly, relative prices for German goods in U.S. currency would be falling at 3 percent per year.

With fixed exchange rates, the exports of the rapidly-inflating nation would tend to dwindle, and their imports would tend to rise. In our example, this adjustment would dampen inflation in the United States and heighten it in Germany if large balance of payments surpluses and deficits are not allowed to accumulate and if trade is responsive to price change.

This theoretically-tight, international linkage of economic activity and price levels is a major advantage seen by supporters of the gold standard and other types of fixed exchange rates. They favor the automatic external discipline on economic activity and inflation which such schemes provide. With fixed currency exchange rates, inflation is clearly an export commodity.

How easily and rapidly inflation can move from nation to nation under fixed exchange rates depends upon the importance of trade in total economic activity and the degree to which exports and imports respond to international price differences. The more important trade is and the more responsive demand and supply are to price changes, the more readily inflation will surge from one country to another.

## Differential Inflation and Flexible Exchange Rates

Completely fixed exchange rates are one polar extreme. Is there a link between inflation and trade at the other extreme where exchange rates are fully flexible? Here we can turn to the venerable "purchasing power parity" doctrine of economic theory which dates back to the work of the Swedish economist Gustav Cassel at the end of World War I. This principle shows relationships that should exist among freely-determined, equilibrium currency exchange rates when two or more nations display different rates of internal price inflation and their international payments are in balance.

It is beyond the scope of this paper to trace the history of this principle or to provide a rigorous discussion of its derivation. The basic relationship can be stated as follows for any pair of nations.

$$(1) \quad r_t = r_o(P_{1t}/P_{2t})$$

where  $P_{1t}$  is nation #1's price level in period  $t$  (relative to some base);  $P_{2t}$  is nation #2's price level in period  $t$  (relative to the same base);  $r_o$  is the base-period exchange rate expressed as the number of units of nation #1's currency that a single unit of #2's currency will buy; and  $r_t$  is the equilibrium exchange rate for period  $t$ . In terms of annual rates of change, the purchasing-power parity relation of equation (1) can be written

$$(2) \quad r^* = P_1^* - P_2^*$$

where  $r^*$  is the annual rate of change in the equilibrium exchange rate;  $P_1^*$  and  $P_2^*$  are the annual inflation rates in nations #1 and #2 respectively.

Since currency exchange rates are really price relatives of one unit of money in terms of another, they can be linked to differential inflation rates in the same way as the other price relatives. Returning to our previous example, compare the United States, with a 10 percent inflation rate, to West Germany, with a 7 percent rate. Under the purchasing power parity principle, the number of dollars that a given amount of German marks will buy on world money markets should increase at approximately 3 percent annually. Similarly, the number of marks obtainable per dollar will deteriorate at 3 percent annually.

The next step in this line of reasoning is to consider the trade impacts of flexible exchange rate adjustments occurring in response to inflation. Fully-adjusting currency exchange markets would completely neutralize the changes in relative prices implied by differential inflation rates. Hence, the purchasing power parity doctrine with flexible exchange rates teaches that we should expect no systematic international trade changes to flow from differential inflation rates themselves.

However, if a time lag exists in the rate at which exchange values adjust in response to differential inflation, then the nation with the more rapid inflation will find its exports slipping and its imports rising. Because the value of its currency will not be falling fast enough to maintain equal commodity price relatives. So the net impact that price inflation itself has on international trade hinges upon where actual currency exchange markets fit between the polar extremes of fixity and full flexibility.

### The Current Situation

For the last 10-15 years, the world's trading nations have been edging away from fixed rates toward more flexible, market-determined exchange rates. Governments still intervene heavily in money markets to influence currency values, and currencies of some nations are still welded together in fixed-value blocks.

So on one hand, it is a mistake to view today's exchange rates as being determined in a fully-flexible system. Yet the relative values of major reserve currencies and currencies of many important trading nations are now more free to change in response to market forces than at any other time in this century.

Experts in this field agree that currency exchange rates are influenced in today's world by factors other than price level changes. Government intervention in exchange markets occurs continually. Private currency speculation doubtless disturbs basic trends in exchange rates. International flows of financial capital and governmental manipulation of interest rates powerfully affect exchange rates in ways quite distinct from traditional transactions in goods and services. Differential rates of price inflation among and between traded and non-traded goods *within* a major trading nation can affect exchange rates. These factors, operating in both the short and long run, can override and obscure the linkages between inflation and exchange rates suggested by the purchasing power parity theory.

A recent econometric study by Charles Freedman, Bank of Canada, focused on the exchange rate between the U.S. dollar and the Canadian dollar. He found that about 85-90 percent of the quarterly fluctuation in this exchange rate between 1971 and 1977 can be attributed to changes in the following factors, listed here in order of their statistical importance:

1. Ninety-day interest rate differential between Canada and U.S. for commercial paper.
2. Price index ratio of export goods to import goods.
3. Business cycle position of Canada relative to U.S. (Canadian minus U.S. unemployment rates).
4. Inflation differential between U.S. and Canada.
5. Net long-term capital flows into Canada relative to GNP.

Note that the inflation differential was only one of many factors at work on this particular exchange rate—and not the most important in this period. However, there are at least two broader studies (one by Yeager of the University of Virginia in 1958, and one by Meyers of the University of Minnesota in 1977) which suggest that, for earlier historical periods and for several nations taken together, the purchasing power parity hypothesis could not be rejected as a determinant of equilibrium exchange rates.

Table 1 summarizes recent inflation rates for several major trading nations. It is clear from these data that differential inflation is occurring among trading nations. If the purchasing power parity relationship were dominant in exchange markets, we would expect to see the U.S. dollar appreciating with respect to the currencies of France, Italy, and the United Kingdom but depreciating with respect to Japan and Germany. The U.S.-Canada exchange rate should be about constant. Table 2 illustrates the mixed nature of the actual situation over the 1976-79 period.

Table 1. Average Annual Rates of Consumer Price Inflation for Selected Nations, 1976 through Mid-Year 1979

Country	Annual inflation rate (1976-79)
	(percent)
United States	6.3
Canada	6.1
Japan	4.9
France	8.5
Germany, Fed. Rep.	3.4
Italy	13.8
United Kingdom	11.3

A dominant link between differential inflation and exchange rates would be reflected in similar signs (both plus or both minus) on the rates of change in exchange rates and prices. Such a relation, from the U.S. viewpoint, does occur with respect to Japan and Germany, two of our major trading partners. Opposite signs occur for the other nations. Even with Japan and Germany, widely different values of the change in exchange rates and the inflation differentials occur. This indicates that in recent months and years the purchasing power parity relation has been heavily obscured by other factors. In general, these forces tend to push down the U.S. dollar's value relative to some other important currencies. Many observers feel that international capital flows, changes in reserve asset holding behavior, and government interventions are largely responsible.

Table 2. Exchange Rate Changes and Inflation Rate Differentials for Selected Countries, 1976-79

Country	Average annual inflation rate differential above (+) or below (-) the United States	Average annual rate of change in U.S. dollar's value relative to the foreign currency
	(percent)	
Canada	-0.2	+ 5.6
Japan	-1.4	-12.3
France	+2.2	- 3.0
Germany, Fed. Rep.	-2.9	-11.9
Italy	+7.5	- 0.4
United Kingdom	+5.0	- 5.7

## Another View of the Purchasing Power Parity Relation

The traditional purchasing power parity theory implies that the dominant flow of causation is from price levels to currency exchange rates. It is probably at least as correct to argue that in today's highly interdependent world inflation rates and exchange rates are mutually determined. Many governments attempt to alter inflation rates and exchange values *via* economic policy maneuvers, including direct market intervention.

To illustrate, consider a simple rearrangement of equation (2)

$$(3) \quad P_1^* = r^* + P_2^*$$

It is suggested that the inflation rate for one nation is affected by the inflation rate in another nation and the rate of change in the currency exchange rate. Policymakers in one nation probably have little or nothing to say about the inflation rate in another nation, but they can do something about the exchange value of their own currency. They can "overvalue" it by using foreign exchange holdings to buy their own currency and thereby support its price. Or they can "undervalue" it by acquiring foreign exchange through price depressing disposals of their own currency.

Nations which exert central control over all foreign currency transactions can overvalue or undervalue their own money by simple administrative decisions. In either case, the inflation rate in one nation can be influenced if the theoretical relation holds in practice.

For instance, downward pressure on inflation rates can be achieved by holding down the annual rate of change in the exchange rate—by overvaluing the currency of a nation. This will dampen exports and encourage imports. On the other hand, if the currency of a nation is systematically undervalued, upward pressure will be applied to its inflation rate as its exports appear cheaper on world markets and as its imports become relatively more expensive. Looking at matters this way gives us some insight into why policymakers in nations with high rates of inflation tend to overvalue their currencies by resisting devaluation at least partly on the grounds that it would add further fuel to domestic inflationary fires. And resulting balance of payments problems are less obvious.

## Concluding Comments

As unsatisfactory as our economic theory is about the root causes and cures of chronic inflation, we know that it is not a "natural" phenomenon like the force of gravity or the evolution of plant and animal species. Moreover, inflation does not proceed equally throughout an economy as we have assumed here. Particular changes in real or monetary factors push up specific prices, wages, or interest rates. These specific changes spread and ripple across an economy through

the processes of private and public substitution, negotiation, and administrative reaction. Over time, the *net* result of these differing actions and reactions is the inflation rate.

Inflation, therefore, is not something as fundamental or inherent to human society as, say, the speed of light is to the physical world. Inflation, as a general economic phenomenon, is comprehensible and manageable only to the extent that its underlying forces are identifiable and subject to control. Thus, the major way that *general* inflation affects international trade is through its relation with currency exchange rates. Changing currency values alter relative prices and costs to simulate or dampen international transactions in goods and services.

To dig beneath these general tendencies requires that we identify and analyze the forces which underlie and drive modern international inflation. These include the systematic escalation of energy prices, intermittent raw material shortages and inventory speculation, fiscal and monetary actions by various governments, rising real incomes, non-competitive markets, and people's expectations about future inflation. Each is clearly the subject of another paper.

