Oil-Push Inflation: A Broader Examination*

I. Introduction

In his article, " Oil Push Inflation? ", Professor Michael Parkin claims to demonstrate that " OPEC with its oil price rise in the Fall of 1973 did not cause the inflation of the 1970's. That inflation was caused by the monetary policies pursued by the individual governments in the years leading up to 1973 ". He also asserts that " The central conclusion — that OPEC did not cause the inflation of the 1970's — does not imply that the oil price rise and inflation are independent of each other. It may well be that the rapid money supply growth of the late 1960's and early 1970's were the cause both of the rise in the inflation and rise in the price of oil in 1973 ".[1] This paper argues that the evidence presented does not warrant either conclusion and presents the argument for a cost-push inflation accommodated by growth in the money supply.

The paper will not consider seriously the allegation that monetary policy in the late 60's and early 70's brought about the rise in the price of oil in the Fall of 1973. To suggest that the outbreak of war in the Middle East and the consequent oil embargo by the Arab nations required prior research on the rate of monetary growth in the western world, is not particularly appealing.[2]

As Professor Parkin indicates, the oil push inflation hypothesis attributes the main causative role for the inflation in the 1970's in most oil-importing nations to the OPEC induced increase in the

* The author is indebted to Professors Jan Kregel and Joe Salerno for comments on an earlier draft.

[1] Michael Parkin, " Oil Push Inflation?," in this *Review*, No. 133, (June 1980), pp. 163-185 (particularly p. 184).

[2] For an account of the background leading to the oil price increase, see Charles Issawi, " The 1973 Oil Crisis and After," *Journal of Post-Keynesian Economics*, I (Winter 1978-79), pp. 3-26.

world price of oil. This increase works its way through the economy causing increases in the cost of virtually all goods and the cost of oil-substitutes: nominal wage-rates rise in consequence. "An unending, or at least only very slowly ending, upward spiraling of oil prices, product prices in general and wages ensues. Proponents of the "oil push" view... take the view that demand restriction induced by slowing the rate of monetary growth would make little difference to the inflationary course".[3]

This paper broadens somewhat the concept of oil-push inflation. Following Klein,[4] it introduces the possibility of inflation-impeti deriving from other primary product sectors — notably from increased prices of agricultural goods. Section II argues that strict monetary analysis is less appropriate to analysis of a situation in which real variables assume new magnitudes than to a situation in which monetary aggregates change without any spontaneous changes in real variables. Section III introduces the effects of changes in exchange rates of currencies and changes in food prices and costs within different nations. It also considers the question of the 'accommodating' quality of money supply growth. Section IV considers briefly the mechanism by which nominal wage-rates increase and the implications of this mechanism for the inflationary process. Section V summarizes the arguments very briefly.

II. Monetary Analysis and Composite Goods

Professor Parkin's examination of the recent inflationary surges in six countries is based on analysis of the monetary experience in those countries and their rates of inflation. The use of strict monetary analysis can be objected to if the process under investigation has its origin outside of the monetary sector. Under these

[3] PARKIN, *op. cit.*, p. 163.
[4] LAWRENCE W. KLEIN, "Understanding Inflation," in F.J. Bonello and Thomas Swartz (eds.), *Alternative Directions of Economic Policy*, (Notre Dame, Indiana: University of Notre Dame Press, 1978), pp. 62-77, identifies six possible causes of inflation: demand-pull; cost-push; food-push; oil-push or energy-push; administered wages and prices and wartime capacity pressures. This paper is concerned with food-push and oil-push and with wage-push that is induced by food-push and oil-push disturbances.

conditions, the real disturbances bring about changes in intersectoral terms of trade and could induce a shift in the demand-for-money-balances function.

The keystone of all monetary analysis is that expenditure rates are determined by discrepancies between the actual and desired money balances in an economy. The demand schedule for real money balances is deemed to be a stable relationship definable in terms of a small number of determinants such as income levels, wealth and the (spectrum of) interest rate(s). The decision to reduce any excess balances can instigate the acquisition either of assets or of goods and the choice between these two categories of expenditure is made in terms of the individuals' permanent-income consumption function as affected by their prevailing expectations. Without de-emphasizing the importance of the movement out of money balances into alternative assets, an analysis of the recent inflationary process can be confined to the exchange of excessive money balances for goods. When the choice is restricted to the demands for money balances and for goods, the range of available goods is collectively cast into a single composite entity. The notion of composite goods has been fully developed by Samuelson: it achieves its usefulness at the substantial cost of assuming away the effects on the demand for money balances of any and all changes in the mix and relative prices of goods buried within the composite.[5] In the present context, this cost could be tremendous. When used within a single nation, changes in the composite reflect changes in intranational income distribution and will leave national wealth and income largely unchanged. When the change in the composite good involves a substantial change in the price of important internationally-traded goods, national gains from trade can be seriously reduced and the perceived values of real national income and wealth are altered. These alterations can impinge upon the demand for money balances. Changes within the composite good constitute disturbances with their origin in the real, rather than in the monetary sector. They are 'real disturbances'.[6] By neglecting the possibility that changes will occur within the composite good and will react back upon the

[5] PAUL A. SAMUELSON, *Foundations of Economic Analysis*, (Cambridge, Mass.: Harvard University Press, 1947), pp. 141-6.
[6] MILTON FRIEDMAN, "The Case for Flexible Exchange Rates," in *Essays in Positive Economics*, (Chicago: Chicago University Press, 1953), pp. 157-203.

demand for money balances, monetary analysis is handicapped in analyses of disequilibria that have their origin in changes in international supply and demand for important commodities. The fact that the major changes within the composite good in the period under review involve substantial wealth effects among quite disparate national groups must weaken the claim that the national demand for money balances (with given expectations) is stable through time. Primary producers in oil and agriculture have gained substantially at the expense of persons engaged in the secondary and tertiary sectors. When sovereign nations are net importers of the two classes of goods, they undergo a large adverse shift in their international terms of trade with obvious implications for perceived wealth. Even within a single nation, monetary analysis would have to assume that substantial redistribution of income from persons in the secondary and tertiary sectors to persons in the primary sectors would not affect the demand for real money balances.

For a disturbance which has its origin in the real sector to be analysed within a monetary framework, it is necessary for the effect of the real disturbance on the aggregate demand-for-money function to be identified: strict monetary analyses do not do this. Processes which have their origins in the real sector may be more usefully analysed in terms of an income-expenditure-price framework because such a framework identifies directly the behavioral shifts which will take place. Then the repercussions on the monetary sector and the feedback on the real sector need to be taken into account. On the other hand, monetary analyses will be superior to income-expenditure-price frameworks in identifying the effects of disturbances which find their origins in the monetary sector — such as differential rates of monetary growth in different nations.

The problems inherent in using an essentially monetary analysis for the diagnosis of the effects of changes in real conditions has an important niche in the history of economic thought. Attempts to force the equilibrating mechanism of the balance of payments after a harvest failure into the same mold as that which occurred in response to a spontaneous doubling of monetary gold in a single nation were at the bottom of the objections of Thornton and Malthus to the arguments of Ricardo and Wheatley. While it is possible to analyse the effects of real disturbances through monetary phenomena, the analysis is 'at one remove': the impact of the real disturbance on the monetary variables has to be defined before the equilibrating mechanism can be identified.[7] This difficulty follows directly from the composite-good aspects of monetary analyses.

The method of analysis selected should not, then, be independent of the disturbance to be analyzed. If a monetary disturbance has taken place, the use of a system of analysis based on real variables must first examine the implications of the monetary disturbance for the (real) arguments on which the system is built: frequently these relationships are not defined and must be generated by *ad hoc* reasoning. A system of analysis based on monetary variables would be more direct. Similarly, a disturbance in the real sector is better analyzed by a system of analysis based on real variables. None of this permits the role of the " indirect sector " to be ignored completely but its role is avowedly secondary.

III. Additional Variables

1. - *National Differences in Oil-Price Increases.*

The first strand of Parkin's argument that inflation in the 1970's was not an oil-push phenomenon is that inflation rates experienced by different nations were quite different despite the common nature of the oil-price shock. " Given that the shock is common to all countries, it would be reasonable to hypothesize that, if this shock is the principal cause of inflation, then the inflation records of different countries ought to be, if not identical, at least similar ".[8] The common quality of the shock of high oil prices could be mitigated by differences in changes in taxes levied on oil and oil products and by differences in relative dependence upon imported oil.

In fact, the basic premise of the argument is wrong. The change in the price of oil was by no means a common experience for oil-importing countries (taxes and dependency ratios notwithstanding). Parkin simply neglects the fact that the world (OPEC) price of

[7] This argument is summarized in JACOB VINER, *Canada's Balance of International Indebtedness, 1900-1913*, (Cambridge, Mass.: Harvard University Press, 1924), pp. 195-220. See also JOSEPH SCHUMPETER, *History of Economic Analysis*, (New York: Oxford University Press, 1954), pp. 731-8.

[8] PARKIN, *op. cit.*, p. 164.

TABLE 1

EXCHANGE RATES AND NATIONAL OIL COSTS

Exchange Rates [1]
(U.S. Cents per Unit of Foreign Currency)

	1973	1974	1975	1976	1977	1978	1979
Italy	0.172	0.154	0.153	0.120	0.113	0.118	0.120
Japan	0.369	0.343	0.337	0.337	0.373	0.480	0.458
Switzerland	31.7	33.7	38.7	40.0	41.7	56.3	60.1
United Kingdom	245.1	234.0	222.2	180.5	174.5	191.8	212.2
West Germany	37.8	38.7	40.7	39.7	43.1	49.9	54.6

World Oil Price [2]
(U.S. $ per barrel)

	3.39	11.28	11.02	11.77	12.88	12.93	18.67

Domestic Currency Cost of Imported Oil
(1976 = 100)

	1973	1974	1975	1976	1977	1978	1979
Italy	20	75	73	100	116	112	159
Japan	26	94	94	100	99	77	117
Switzerland	36	114	97	100	105	78	106
United Kingdom	21	74	76	100	113	103	135
United States	29	96	94	100	109	110	159
West Germany	30	98	91	100	101	87	115

Sources: 1. Exchange rates are annual averages as reported in the *Federal Reserve Bulletin*.
2. OPEC Official Prices: *World Oil*, August 15, 1980, p. 55.

oil is denominated in U.S. dollars and that the cost of oil to an individual nation depends both on the world price of oil and on the exchange rate of the nation's currency against the dollar. Some countries whose currencies appreciated sharply against the U.S. dollar in the 1970's will have experienced much smaller oil-push stimuli than did the United States. Some countries even enjoyed absolute price decreases.[9] Table 1 provides the data on the change in the cost of imported oil in domestic currency for the six nations which provide the empirical basis for Professor Parkin's analysis. The data consist of the annual average rate of exchange of the currencies of the five nations against the U.S. dollar together with the dollar-denominated world price of oil: these two data are then combined to yield the domestic price of imported oil in index number form. The experience of the six nations was reasonably similar between 1973 and 1974 but, after 1974, the experiences differed sharply. Switzerland enjoyed an absolute decrease in the price of oil between 1974 and 1976 of approximately 12 percent at the same time that the United Kingdom underwent an increase in the price of imported oil of approximately 33 percent. Both West Germany and Switzerland enjoyed large decreases in the price of imported oil between 1976 and 1978 while the price in Switzerland in 1979 (not included in Parkin's analysis) was smaller than in 1974. Thus, the stimuli to increased costs of other goods and to increases in nominal wages varied widely among the nations.

[9] This is also pointed out in LESTER C. THUROW, *The Zero-Sum Society*. (New York: Basic Books, 1980), pp. 62-3.

Taking the ranking of countries by their individual ratios of inflation in 1975-1978 to inflation in 1970-1973 and comparing it with the ranking of countries by changes in the domestic price of imported oil between 1974 and 1978 provides an almost perfect rank correlation. This comparison is given in Table 2. This relationship suggests that the oil-push stimulus may be a significant contributor to the inflationary process and provides an important explanation of the variation in the rate of inflation among the six nations. The only inconsistency between the two rankings is that Japan has a higher ratio of inflation rates than West Germany but has a smaller increase (larger decrease) in the domestic currency price of imported oil. This inconsistency in the two rankings can be attributed to a difference in the rate of increase of food prices in the two countries over the period in question. (This facet of the inflationary process is developed in the next subsection.)

Given the lesser degree of dependence of the United States on imported oil, it is arguable that the increase in the OPEC oil price could exaggerate the inflationary stimulus experienced by the United States. Table 3 lists the two fuel-related components of the U.S. consumer price index. The data which will include the effects of any changes in the level of taxes imposed on fuel products during the years covered, show that the increase in oil prices at the consumer level were not so different from the data presented in Table 1 as to invalidate any conclusions drawn from those data. The price of gasoline in the United States showed greater increases after 1976 than the OPEC official oil price did in Japan, Switzerland or West Germany although the 1973-74 increase in the price of gasoline in the United States was notably smaller than the increase in

TABLE 2

NATIONAL CHANGES IN OIL PRICES AND INFLATION RATES

	Ratio of 1975-8 Inflation to 1970-3 Inflation	Percentage Increase in Price of Imported Oil, 1974-78
Italy	2 . 4	+ 49.3
United Kingdom	2 . 0	+ 39.2
United States	1 . 5	+ 14.6
Japan	1 . 1	− 18.1
West Germany	0 . 8	− 12.2
Switzerland	0 . 4	− 31.6

Sources: Inflation Ratios, PARKIN, *op. cit.*, p. 167.
Price of Oil, Table 1.

TABLE 3

COSTS OF ENERGY TO THE U.S. CONSUMER
(1976 = 100)

	Fuel Oil, Coal, and Bottled Gas	Gasoline
1973	54.2	66.4
1974	85.6	89.9
1975	93.8	96.0
1976	100.0	100.0
1977	112.0	105.8
1978	119.0	110.3
1979	160.7	149.3

Source: *Economic Report of the President, 1980,* (Washington, D.C.: U.S.G.P.O., 1980), pp. 260-4. The data have been recomputed to give a 1976 base to facilitate comparison with Table 1.

the OPEC price of oil. The increase in the cost of fuel oil, coal and bottled gas may be expected to reflect the cost of fuel inputs to industry so that the cost increases experienced by other goods will also correspond approximately to the effects of the increase in the world oil price. The oil-push pressures for increases in nominal wage rates will be based on the prices of goods and on the prices of oil products that figure directly in the consumer price index: there can then be no suggestion that the United States experienced an identifiably-smaller stimulus to wage inflation than the world price of oil would imply.

The *uncommon* experience of different nations to the quadrupling of the world oil price is attributed to changes in the rates of exchange between individual currencies and the U.S. dollar in its role of numeraire for the world price of oil. This divergence in national experience may have been aggravated to some degree in the later years of the decade by the different national rates of inflation (and money supply growth) but this can be, at best, only a partial explanation unless it is deemed that the OPEC price was in fact determined in terms of a bundle of currencies and then expressed in terms of dollars for pricing purposes. However, changes in exchange rates in the early years of the decade were undoubtedly dominated by the adjustment of the U.S. dollar from its position of arrant overvaluation at the time of the breakdown of the Bretton Woods system. This depreciation of the dollar will undoubtedly have provided a separate inflationary stimulus to wages and prices in the United States.

2. - *Food Prices as Inflationary Stimuli.*

The inflation of the 1970's is not attributable uniquely to the quadrupling of oil prices. The year, 1973, also saw a substantial increase in world food prices as a result of the steady elimination of surplus agricultural capacity in the United States and the eradication of stockpiles in that country, of surplus agricultural goods. To no small degree, this sudden shift from excess agricultural output to a shortage was triggered by harvest failures in India and the Soviet Union. Just as the increase in the price of oil results in higher product prices, inflation and demands for higher nominal wage rates, so too did the increase in the price of food products

instigate pressures from workers in the secondary and tertiary sectors of individual nations.[10] Like the increase in the price of oil, the increase in food prices was spread unevenly among manufacturing nations and the inequality of the food-push effect will be seen to reinforce the pattern of unequal oil-push stimuli.

The world price of grains, particularly grains for which the United States is the important marginal producer to the world market such as wheat and foodgrains, is defined in terms of U.S. dollars. This characteristic means that appreciations of national currencies against the U.S. dollars could reduce the impact of the increase in grain prices in the countries concerned. Increases in food prices, like those of oil prices, affect the rate of inflation directly through the food component in the deflator and through any induced increases in wage-rates instituted to offset (at least partially) the increase in the price of food. Table 4 gives the food-push effects for several nations for the years 1972 to 1976. The indices show the ratio of the food component of the national consumer price index to the total index. They show whether or not food prices are providing a stimulus to inflation or are acting as counters to inflationary forces in other sectors of the economy. They do *not* show the rate of increase in consumer prices.

The food-push component of inflation is largest in the United Kingdom and is clearly visible in Canada and the United States. Japan has an appreciably lower level of food-push. With the exception of Italy, the original members of the European Economic Community enjoy negligible (and even negative) inflationary impeti from food prices.

Variation in the food-push component can be attributed to differences in national food policies as well as to changes in the underlying circumstances. Canada and the United States are major suppliers to the world grain market and their domestic prices reflect international market conditions.[11] With the exception of 1973, Canadian prices patterns were similar to those of the United States. The 1973 discrepancy is probably due to changes in the timing of international effects on home markets.

[10] While all increases in primary product prices have the same direction of impact, oil by virtue of the magnitude of the price increase and food because of its importance as a component of the consumer price index, merit special treatment.

[11] The United States did impose a floor on domestic food prices by means of farm price supports.

TABLE 4

FOOD-PUSH INFLATION STIMULI

	1972	1973	1974	1975	1976
Italy	100	102	102	105	107
Japan	100	101	104	105	105
United Kingdom	100	109	111	112	115
United States	100	108	111	110	107
West Germany	100	100	98.2	97.6	98.2
Belgium	100	101	98.0	101	100
Canada	100	96.1	112	114	109
France	100	102	101	101	102
Netherlands	100	96.5	94.2	92.4	93.2

Source: OECD, *Main Economic Indicators*, (Paris: OECD, various issues).

Notes: This table gives the ratio of the food component of the consumer price index to the total index in percent to three significant digits. The series is terminated in 1976 because a new base and weighting were introduced in 1977. These data say nothing about the rate of inflation: they merely show whether or not and, if so, to what degree food prices were a stimulus to inflation.
Data for Switzerland are not available.

The United Kingdom had the highest rate of increase in food prices relative to other prices in the c.p.i. as well as absolutely.[12] This can be attributed primarily to the entry of the United Kingdom into the E.E.C. with the consequent change in national food policy. The traditional British policy of 'cheap food' was replaced over a period of a few years by the protective Common Agricultural Policy (CAP) of the Community and the self-imposition of the administered prices for food products that emanate from Brussels. In fact, the United Kingdom chose an opportune time for entry into the E.E.C. since the inflationary impact of the adoption of the Community's food policies more or less matched the increase in the costs of food worldwide (as reflected by the U.S. increases). The United Kingdom's inflationary surge was small relative to outsiders but was, of course, large relative to the original members of

[12] The food component of the c.p.i. in the United Kingdom rose by over 111 percent in the four years — rising from 117.4 in 1972 (1970=100) to 247.6 in 1976.

the E.E.C. with consequent adverse effects on the price competitiveness of British exports as wages rose to counter the increase in food (and oil) prices. In fact, the United Kingdom effectively indexed wage rates in manufacturing to the cost of living (and therefore to the higher prices of food and oil) with the inevitable spiral.[13]

Japan shelters its agricultural market from world competition quite severely. It was therefore quite possible for world food prices to increase sharply without their full impact being passed on to the consumer. The degree to which increases in international food prices are reflected in domestic food prices is largely a matter of policy. The food-push stimulus in Japan is notably less severe than in the United States but much stronger than in West Germany. The food-push stimulus in Japan in comparison with that in the Federal Republic of Germany, provides an explanation of the one discrepancy in the rankings given in Table 2. The fact that the Japanese economy had a higher ratio of inflation in the late 1970's relative to the early 1970's despite the smaller increase (larger decrease) in the price of oil, can be attributed to the difference in food-push inflation.

The original members of the E.E.C. all, with the exception of Italy in 1974 and 1975, enjoyed negligible food-push inflation. In fact, for the Netherlands food prices increased so slowly as to be a counter-inflationary force. Similarly, West German food prices rose by less than the price of other components of the c.p.i. A large part of both these effects may be the appreciation of the guilder and the mark against the dollar in 1973. All of the original members of the E.E.C. enjoyed low-food-push stimuli. Italy for the years 1973 and 1974 and France and Belgium throughout the period had effectively no food-push. This insulation may be attributed to the effect of the CAP on internal food prices. The CAP effectively imposes a so-called scientific tariff on food imports. A scientific tariff increases the cost of an import to equal domestic costs of production in the importing country and, in this way, insulates domestic costs of production from international conditions. The CAP combines the scientific tariff with administered prices for agricultural products. The economies of the original members of

[13] For a full discussion of British inflation during these years see MARCUS H. MILLER, " Can a Rise in Import Prices Be Inflationary and Deflationary? Economics and U.K. Inflation, 1973-74," *American Economic Review*, 66 (September 1976), pp. 501-519, especially, pp. 510-516.

the E.E.C. could have remained immune to changes in world conditions. Ultimately, the administered food prices will be likely to adapt partially to changes in world market conditions. To the extent that the adaptation is partial and that it is delayed, the impetus of the 1973 increase in food price of E.E.C. inflation rates was negligible.

Food-push constitutes an important factor in the explanation of the change in the rate of inflation experienced in different countries during the decade of the 1970's. Food-push rankings are perfectly correlated with inflation rankings for the four countries, United Kingdom; United States; Japan and West Germany in Table 2 (column 1).

3. - *Accommodating Monetary Growth*

There is a real question as to the degree to which the growth rate of the money stock constitutes a causal factor in inflation. It is possible that central banks institute monetary policy in an accommodative rather than in a deterministic way. Monetary policy may well accommodate historic changes in the price level and then vary the money supply growth rate to " lean against the wind " to effect marginal changes in the pressure of aggregate demand. Under such circumstances, the growth of the money supply responds primarily to real forces such as changes in the prices of primary products. It is accommodating rather than determined without reference to the internal workings of the system (in the jargon of monetary economists and macro-model builders, the money supply is endogenous rather than exogenous).

Two empirical studies have recently addressed the question of whether monetary policy in the United States initiates inflationary pressures or accommodates them.[14] Their results must be interpreted with some caution because of the problems inherent in removing serial correlation from the raw data and the question of

[14] BASIL J. MOORE, " The Endogenous Money Stock," *Journal of Post-Keynesian Economics*, II (Fall 1979), pp. 49-70, and KENNETH L. RHODA, " The Endogenous Money Stock: Additional Evidence," (Mimeo). Note that a different interpretation of " demand-determined " money supply growth is given in THOMAS J. SARGENT, " A Classical Macroeconomic Model for the United States," *Journal of Political Economy*, 84 (April, 1976), pp. 207-238.

whether a change in one variable prior to a change in the second variable constitutes evidence of "causality". In fact, the causal mechanism may be extremely complex so that a straightforward test based on *post hoc, ergo propter hoc* is not adequate. Both tests do indicate that the data are quite consistent with the hypothesis that monetary growth accommodates changes in wages and prices.

It is very probable that the relative importance of accommodating monetary decisions in comparison with an initiating or independent policy formulation is not constant through time. The greater the severity of changes in the markets of important commodities with consequent effects upon domestic price levels, the proportionately larger may the accommodation factor be expected to be. In times of relative stable conditions in commodity markets, monetary policy may well be predominantly determined with reference to price stability and will be largely independent of recent changes in price levels. A second factor influencing the growth of monetary aggregates is the degree to which the monetary authorities are capable in a world of integrated financial markets, to isolate their own. International factors affecting money-supply growth and the demand for a particular currency are themselves factors contributing to accommodation of monetary aggregates to existing conditions.[15] When the growth of the money stock is "demand-determined" to a changing degree through time, it is almost impossible to attribute to money more than a permissive role in inflation. Under these circumstances in which individual prices are determined by changes in important commodity markets and wage-rates changes respond to price-level changes, it is difficult to see how a reliable set of expectations concerning monetary behavior can be achieved. This argument can be stated in terms of the vulnerability of monetary analysis when the composite good undergoes severe change. Under these conditions changes in the demand for money take place — particularly so when the international redistribution of wealth is involved — and the effect of these changes on the demand schedule must be correctly identified before monetary analysis can be used. In addition, the more severe the changes within the composite good, the more likely is the growth rate of monetary aggregates (money supply) to contain accommodating elements.

[15] See JAMES TOBIN, "A Proposal for International Monetary Reform." *Eastern Economic Journal*, 4 (July/October, 1978), pp. 153-159.

IV. The Wage-Spiral Mechanism

Both the monetary explanation of the inflation of the 1970's and the push-theory developed in the previous section identify increases in nominal wage-rates as taking place during an inflation. But there is a serious difference in the role of wage-rate increases in the two explanations.

The mechanism of wage-rate increases in a monetary analysis is best exemplified by John E. Bilson.[16] Nominal wage-rates are drawn up by excessive stocks of money and by inflationary expectations. Monetary analyses do not, because of their emphases on composite goods, identify changes in real wages in different industries or changes in income shares between different sectors — such as between the oil and agriculture sectors and the secondary and tertiary sectors in an advanced economy. It is, however, implicit in monetary analyses that the appropriate changes in relative nominal wage rates and real incomes will take place and that no self-generating inflationary mechanism exists unless it is induced by monetary factors. Presumably, the willingness of labor to bargain for higher wages depends exclusively on its expectations with regard to the future money supply. This type of analysis neglects the dynamics of the labor movement,[17] and particularly the reliance of the office-holder on rank-and-file support and on the ability to persuade the electorate that any unfavorable changes in real wage-rates have been eliminated to the degree possible.

The monetary analysis negates the concept of a wage-push spiral (in the absence of such behavior being induced by monetary factors) while the push-theory emphasizes the concept of a wage-push spiral responding to higher prices for primary products. The push-theorists perceive increases in the nominal wage-rate to be built-in through accepted societal values so that the real wage is maintained by means

[16] See JOHN E. BILSON, "The Vicious Cycle Hypothesis," *IMF Staff Papers*, (March 1979), p. 13, equation (8) where the money wage is deemed to react completely to changes in the price level (provided that monetary policy validates the changes in the price level).

[17] For an analysis of labor-market factors in inflation and productivity change, see MICHELE NAPLES, "Industrial Conflict andt its Implications for Productivity Growth," *American Economic Association Papers and Proceedings*, (February 1981) (Forthcoming).

of such mechanisms as Okun's "inflationary handshake" whereby employees' wage increases are based on changes in the cpi or the very similar 'sense of fairness' postulate of Scitovsky.[18] Straightforward indexation of nominal wage rates and social transfer payments to the cpi will accomplish much the same result. A variant theory is that there exists 'real-wage resistance' whereby the aggressiveness of labor unions grows when the real wage is decreasing.[19] Implicit in this definition of real-wage resistance is the idea that a constant real-wage will leave bargaining strategies unchanged but there is no assurance that labor will be happy with a zero rate of increase in the real wage through time. It is possible therefore that there is some threshold and positive value of increase in the real wage below which labor bargaining stance may be expected to change. A second aspect of the phenomenon is whether or not real-wage resistance will be inaugurated in response not to changes in real income but to changes in real discretionary income (or take-home pay). In the latter event an increase in public goods financed by payroll taxes could inaugurate real-wage resistance.

Real-wage resistance implies that the bargaining pressures applied by unions will increase whenever real wage-rates decline (or fail to grow at some accepted normal rate). When a change in conditions in primary commodity markets occurs that is unfavorable to employees in the secondary and tertiary sectors, real-wage resistance forces up labor costs in the manufacturing and services sectors. The increased price of manufactures (and services) shifts the terms of trade between the primary and secondary sectors back, more or less, to their original value: but the post-disturbance changes in the terms of trade will reassert themselves (provided they are permanent) and primary product prices will increase again. This will again induce real-wage resistance (or some form of wage-push) and the whole cycle will repeat itself. As continuing cycles make their appearance, the clarity of the causal relationships gets lost as lags of different lengths merge the whole spiral into an ongoing, in-step inflationary process.

[18] ARTHUR M. OKUN, "The Invisible Handshake and the Inflationary Process," *Challenge*, Vol. 22, No. 6 (January/February 1980), pp. 5-12. TIBOR SCITOVSKY, "Market Power and Inflation," *Economica*, 45 (August 1978), pp. 221-223, especially, pp. 224-5.

[19] For a thorough review of real-wage resistance, see Sir JOHN HICKS, "What's Wrong with Monetarism?" *Lloyds Bank Review*, (October 1975), pp. 1-13, and NICHOLAS KALDOR, "Inflation and Recession in the World Economy," *Economic Journal*, 86 (December 1976), pp. 703-714. For the British experience in the early 1970's, see MILLAR, *loc. cit.*

TABLE 5

REAL-WAGE RESISTANCE IN THE UNITED STATES

A

Purchasing Power of the Wage-Rate in Manufacturing[1]
(U.S. dollars)

	I	II	III	IV
1973	$ 2.96	$ 2.93	$ 2.90	$ 2.89
1974	2.87	2.86	2.86	2.87
1975	2.90	2.89	2.87	2.88
1976	2.91	2.92	2.93	2.96
1977	2.97	2.96	2.97	3.01

B

Percentage Annual Changes in the Manufacturing Nominal Wage Rate and the C.P.I.[2]

	1973	1974	1975	1976	1977
Change in Nominal Wage	6.79	11.31	7.45	7.98	8.37
Change in c.p.i.	8.43	12.06	7.32	5.02	6.62

1. The nominal wage (excluding overtime) divided by the c.p.i. (1970=100).
2. Computed from OECD, *Main Economic Indicators*. Based on fourth quarter data.

If the wage-push forces are sufficiently strong and the monetary authorities are sufficiently compliant, the economy can leap-frog its way to the everlasting bonfire of unending inflation.

Under this scenario, what matters is the degree to which workers (and management) in the secondary and tertiary sectors will ultimately or can be made to accept a decrease in their real wages. Only if the new income shares between primary sectors and manufacturing and service sectors can be established, will the spiral be terminated. Unless sufficient productivity increases are generated, persons engaged in the manufacturing and services sector will be required to suffer an absolute decrease in their standard of living.

There exists supportive evidence for the hypothesis that real-wage resistance prevailed in the United States during the 1970's. Table 5A shows that the manufacturing wage was kept at better than 96.5 percent of its value in the first quarter of 1973 until it finally

reattained that value in the fourth quarter of 1976. As Table 5B shows, double digit increases in the cost of living were matched, with a small lag, by increases in the manufacturing wage rate during a period in which Americans have been lamenting about the lack of productivity gains. Nominal wage-rates increased by over six percent per annum in each quarter in 1973 and the first quarter of 1974. When inflation rates increased in the third quarter of 1973 and attained double-digit rates in the second quarter of 1974, nominal wage increases rose sharply and began to catch up with inflation as quickly as the first quarter of 1975.[20]

V. Conclusions

This paper has offered an alternative to the purely-monetary theory of the inflation of the 1970's. The point has been made that, because of their reliance upon composite goods, monetary frameworks are ill-equipped to undertake analysis of periods in which severe changes in inter-sectoral terms of trade are taking place. Non-monetary analyses are similarly ill-equipped to provide insights into economic adjustment following severe disturbances in the monetary sector. But neither analysis can be complete in itself and both must recognize the secondary influences of the other sector. This is particularly true for non-monetary theories of inflation which must explicitly rely on accommodating growth in the money supply or on institutional evolution increasing velocity by the necessary amount. In the absence of accommodating monetary growth, the world will be plunged into a deep recession which will suppress the inflationary impeti deriving from the changes in the demand and supply conditions in primary markets. The possibility that monetary growth rates are not determined without reference to the inflationary forces drastically weakens some of the more elaborate econometric tests of monetary analyses.

[20] The post-Iran surge in oil price meant that wage-rates in the United States fell behind increases in the c.p.i. in 1979. It will be interesting to see whether real-wage resistance can be avoided in the early 1980's. Recent statements on bargaining positions by major U.S. labor unions are emphasizing the need to "cath up" to inflation.

The push-theory of inflation confronts the existing evidence and shows clearly that changes in inter-sectoral terms of trade do explain a great deal of Parkin's measure of differential rates of inflation in different countries. Changes in the prices of primary products are fundamental determinants of changes in inflation rates. But it may well be that there is some compatibility between the expectational and push theories of inflation: the rate at which the implications of increases in primary product prices were incorporated into wage demands may well have been far higher because of the demand-pull inflation and inflationary expectations formed in the late 'sixties and early 'seventies.

The policy implications of the two theories are quite different. The monetary explanation would require merely that the rate of growth of the money supply be gradually reduced until it became equal to the real growth of the economy. The push-theory argues for recognition by the inflating countries that standards of living or rates of absorption must be reduced in the absence of offsetting productivity gains and/or favorable countervailing disturbances (such as North Sea oil in the United Kingdom). Whether such policies can be achieved without some cumbersome administrative apparatus limiting wage increases and impairing the freedom of labor-management contracts (at least for some protracted period of time) is not clear.[21] But in the absence of positive steps of this kind, the push-theory envisages a long-lasting inflationary spiral emanating from the feedback mechanism as each sector repudiates the others' efforts to impose inter-sectoral terms of trade. The alternative is a dominating event such as a major depression invoked, possibly, by an international financial crisis, or a war.

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[21] The idea of "safeguarded wage-controls" as a variant to tax-based incomes policies is appealing. Wage rates would be indexed in terms of value-added in the manufacturing sector while primary-product prices would be free to vary without inducing wage-push reactions. Some penalty apparatus on the profit-rates of manufacturing firms would have to be instituted to induce labor's co-operation: this might take the form of a tax on any increases in profit rates on revenues over some established historical norm.