Oil Push Inflation?*

I. Introduction

The most popular, if subsequently shown to be wrong, explanation for the inflation of the 1960's was wage push. The popular explanation of the 70's has become "oil push". The basic idea seems to be that a rise in the price of oil leads to an immediate rise in the costs of oil-using activities and, therefore, to a rise in the general Consumer Price Index. The amount by which the Consumer Price Index rises initially is equal to the percentage rise in the price of oil, multiplied by the share of oil in the consumer bundle whose prices make up the Index. This impact effect is followed by subsequent effects which amplify the consequences for the general price level of the initial oil price rise. The prices of oil substitutes, both in energy and non-energy uses, increase. Also, the initial rise in consumer prices triggers subsequent increases in wages. The rise in wages and the rise in oil substitutes' prices further raise unit costs and further raise final product prices. These further price rises stimulate yet further wage rises and indeed subsequently yet further rises in the price of oil itself. 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 of the inflation of the 1970's take the view that demand restriction induced by slowing the rate of monetary growth would make little difference to the inflationary course. Either the tightening of monetary policy is impossible because voters simply will not re-elect governments who initiate such policies and, therefore, such policies will in fact not be pursued; or, a tightening of monetary policy would be ineffective in controlling inflation and would

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merely generate a deep and prolonged recession of real output growth.

This paper investigates the above line of reasoning and conclusions. It does this by examining the evolution of inflation and related variables in six countries, over the period 1968-1978. The paper is mainly empirical. It uses standard propositions from macroeconomics and monetary theory. But these are in the background rather than the forefront of the analysis.

The paper will proceed in the following order. First, the oil push hypothesis will be examined. It will be found severely lacking in empirical content. Next, the monetary policies of the last decade will be reviewed and it will be discovered that they account remarkably well for the evolution of inflation. Indeed, it will be discovered that inflationary monetary policies were in place well before the fateful quadrupling of the price of oil in the Fall of 1973. Indeed, in several countries monetary policy had been placed on a disinflationary path by that time so that subsequent course of both inflation and real economic activity were determined by the interaction of severe monetary deflation and a severe negative aggregate supply shock. The next section of the paper briefly examines the costs of the reduction of inflation in the post-1973 period. The final section summarizes the main conclusions.

II. The Oil Push Hypothesis Examined

(1) *Common Shock and Uncommon Experiences*

In the Fall of 1973 the world price of crude oil was quadrupled. In the period since then there have been steady price rises but nothing remotely comparable to that initial massive step increase. This behavior of the price of oil can be regarded as a shock which is *common* to all countries. 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. Let us examine the inflationary records of six countries selected for a degree of diversity in spanning the range of experience of the major industrial countries. These inflation records of Italy, Japan, Switzerland, United Kingdom, United States, and West Germany for the period 1968-1978 are set out in Table 1. The initial massive oil

price rise occurred in the fourth quarter of 1973 and therefore is reflected to some degree in the 1973 inflation figures reported. 1974 is the first full year immediately following that initial oil price rise. What is immediately apparent is that far from the common shock giving rise to the common inflation experience there is tremendous diversity in the way in which national inflation rates responded to that 1973 oil shock. The biggest rise in inflation between 1973 and 1974 occurred in Japan (94%). Three countries, Italy, the United Kingdom, and the United States, experienced very similar percentage increases in their inflation (77%, 72% and 77%, respectively). Switzerland experienced only a very mild rise in its inflation rate (11%), and in West Germany the inflation rate of 1974 was identical to that of 1973. Thus, this common shock had very uncommon initial impacts upon national inflation rates, all the way from almost doubling the inflation rate in Japan to having no effect at all in West Germany. Subsequent experience reinforces this initial view that the common shock had very uncommon effects. If the average inflation from 1975 through 1978 is compared with average inflation from 1970 through 1973, it becomes apparent that again there is great diversity of experience. Italy's inflation increased some 2½ times, that in the United Kingdom doubled, and that in the United States increased 1½ times. The Japanese inflation rate hardly increased at all and in Germany and Switzerland was actually lower from 1975 to 1978 than it had been in 1970 to 1973. In the Swiss case, it was less than one-half its preceding level.

TABLE 1

INFLATION IN SIX COUNTRIES 1968-1978
(percent per annum)

	Italy	Japan	Switzerland	United Kingdom	United States	West Germany
1968	1.3	5.6	2.5	4.7	4.2	1.6
1969	2.7	5.6	2.5	5.5	5.4	1.9
1970	5.0	7.3	3.6	6.4	5.9	3.4
1971	4.8	6.3	6.6	9.5	4.3	5.2
1972	5.7	4.8	6.7	7.1	3.3	5.5
1973	10.8	11.7	8.8	9.2	6.2	7.0
1974	19.1	22.7	9.8	15.9	11.0	7.0
1975	17.0	11.9	6.7	24.2	9.2	5.9
1976	16.8	9.3	1.7	16.5	5.8	4.5
1977	17.0	8.1	1.3	15.9	6.5	3.9
1978	12.1	3.8	1.1	8.3	7.5	2.6

Sources:
1968-1974 *International Financial Statistics*, May 1977, p. 52.
1975-1978 *International Financial Statistics*, October 1979, p. 45.

This straightforward reporting of the facts about inflation prior to, at the time of, and in the period subsequent to the 1973 oil price rise in and of itself proves very little. However, the facts do seem to be inconsistent with the view that the oil price rise inevitably lead to a rise in inflation. That simply is not the case. It is not even the case that there is a necessary impact effect on the inflation rate. However, there may be features of individual national economies concerning their use of oil in general and imported oil in particular which can explain the national divergences previewed in Table 1. Also it is possible that the way in which oil products are taxed differs across countries in such a way as to explain in part the different inflation experiences. These two possibilities will now be explored.

(2) *Dependence on Imported Oil?*

The degree of dependence on imported oil varies considerably across the economies that are being examined here. Table 2 sets out this dependence for five of the six countries. Data for Switzerland could not be found. However, a reasonable judgement might be that Switzerland has a dependence similar to that of West Germany. It lacks West Germany's coal but it possesses nuclear power facilities and considerable hydro power sources. The data in Table 2 show considerable diversity of dependence on imported oil ranging from that of Japan which, in 1973, relied for almost four-fifths of its energy on imported oil, down to the United States which had a

TABLE 2

THE IMPORTANCE OF IMPORTED OIL IN FIVE COUNTRIES ENERGY USE, 1970-78
(Net oil imports as percentage of total energy use)

	Italy	Japan	United Kingdom	United States	West Germany
1970	69.2	70.9	47.2	9.7	51.2
1973	73.2	77.6	49.4	16.5	53.8
1975	65.8	74.5	42.9	18.1	49.9
1978	58.8	70.5	19.6	22.2	51.8

Source: OECD Economic Outlook, 25, July 1979, Table 33, p. 64.

dependence of approximately one-sixth. Italy was almost as dependent as Japan; whereas the United Kingdom and West Germany were dependent on imported oil for approximately one-half of their energy use. Presumably, if the oil push hypothesis set out in the beginning of this paper is true, countries with a high dependence on imported oil should have a higher initial rise in inflation — a higher impact effect — than those with a low dependence on oil. However, since the price/wage/price spiral view would amplify any initial disturbance, the longer run inflation records of countries ought to reflect the importance of their dependence on imported oil in the same way as the impact effects do. What are the facts on this matter? Table 3 provides a basis for examining these facts. The first column shows the ratio of the inflation of 1974 to that of 1973. This may be regarded as a

TABLE 3

INFLATION AND DEPENDENCE ON IMPORTED OIL

Country	Impact Effect: Ratio of 1974 Inflation to 1973 Inflation	Longer Run Effect: Ratio of 1970-3 Inflation to 1975-8 Inflation	Net Oil Imports in 1973 as % of total energy use
Italy	1.8	2.4	73.2
Japan	1.9	1.1	77.6
Switzerland	1.1	0.4	(**)
United Kingdom	1.7	2.0	49.4
United States	1.8	1.5	16.5
West Germany	1.0	0.8	53.8

Sources: Tables 1 and 2.
(**) = not available.

measure of the impact effect of the oil price rise on the inflation rate. The second column shows the ratio of the average inflation of 1975 to 1978 to that of 1970 to 1973. This can be viewed as indicating the longer run performance of inflation in the six countries. The third column of Table 3 is simply the second row of Table 2, and shows net oil imports as a percentage of total energy use in 1973. There is no entry for Switzerland in the third column of Table 3 but it may be presumed that the Swiss figure would be of the order of 50%. Inspection of the figures in Table 3 immediately indicate that there is no relationship whatsoever between the dependence on imported oil and the inflation consequences of the oil price rise. In terms of impact effects, Italy, Japan,

the United Kingdom, and the United States all show strong inflation increases but span the full range of imported oil dependence. Switzerland and Germany, which show virtually no impact effect (and in the German case exactly no impact effect), have a dependence on oil which is comparable to that of the United Kingdom and close to the center of the range spanned by Japan and the United States. It is clear from these figures then that there is no ready explanation for the divergent inflation rates of 1974 to be found in the variations among countries in their dependence on imported oil. The story is similar as regards the longer-run inflation performance. If anything, however, there is an even stronger rejection of the oil push view by these data. The two countries which have the worst inflation record, Italy and the United Kingdom, had, in 1973, dependences on imported oil of 73% and 49% respectively. Both countries reduced their dependence (the United Kingdom dramatically so) in the subsequent years. Japan, which is more dependent on imported oil than any other economy, brought its inflation rate down to average in 1975 to 1978 only 10% higher than it had been in 1970 to 1973. Germany and Switzerland with an approximately 50% dependence on imported oil brought their inflation rates down to less than the pre-1973 average.

In view of these facts it is hard to sustain the hypothesis that the 1973 oil price shock had very much to do with the subsequent course of inflation in these six countries. It may be however that the behavior of taxes on oil can explain the national divergences. This is examined next.

(3) *Taxes on Energy*

A further hypothesis which might rescue the oil push view is that countries which had low inflation rates following the 1973 oil price rise were those which lowered taxes on energy use by the greatest percentage amount. This view is examined in this section. Although there is a wealth of data available on taxes on energy this section reports only on a very limited exercise designed to give a broad indication of the tax effects rather than to give a full definitive accounting of all their detail. The tax on regular gasoline has been used as representative of tax changes in general. Clearly a

more comprehensive set of calculations of tax changes ought to be undertaken. Table 4 sets out the effects of tax changes on the prices of regular gasoline paid by consumers in the six countries for two periods, 1970-1974 and 1974-1977. The changes reported for 1970-1974 may be presumed to refer primarily to the year 1974. Those for the period 1974-1977 had diverse timings across the countries and are reported in Table 4 as an annual average for those four years. The figures contained in Table 4 indicate the percentage change in the final price of gasoline that would have occurred if there had been no change in the pre-tax price and if the

TABLE 4

EFFECTS OF TAX CHANGES ON OIL PRICES
PAID BY CONSUMERS (CET PAR)
[% per annum (average)]

Country	1970-74 (a)	1974-77 (b)
Italy	3.6	4.4
Japan	— 29.7	2.2
Switzerland	— 26.3	0.7
United Kingdom	— 51.1	— 0.2
United States	— 11.8	— 0.5
West Germany	— 31.6	— 4.1

(a) Total effect (presumed to be mainly in 1974).
(b) Annual average rate.

Note: The entries in the table only give an indication of the tax effects. They were calculated from data on taxes as a percent of consumption prices of regular gasoline in *Energy and Hydrocarbons 1977*, ENI Rome, 1979, Table 135d, pp. 94-5 using the following procedure: figure in table is $\frac{\Delta t}{1-t}$ where $t = \frac{t'}{1-t'}$ and t' is tax as percent of final consumer price. The reported figure may thus be interpreted as the effect of the tax change on the final price change assuming no change in the pre-tax price. This last assumption whilst in general not valid, should not affect the international comparison.

change in taxes themselves had no effect upon that pre-tax price. It is evident that, in 1974, the biggest tax cuts occurred in the United Kingdom (51%) and in Japan, Switzerland and West Germany (around 30%). The smallest tax cut was in the United States (approximately 12%) and Italy actually raised taxes by about 4%[1]. How does the ranking of these tax changes in 1974 correlate with the ranking of the impact effects on inflation? Taking the rank of tax changes from the first column of Table 4 with the rank of impact effects of inflation from the first column of Table 3 and

[1] These figures refer not to the percent change in tax but to the implications of the tax change for the percent change in price.

computing Kendall's Coefficient of Rank Correlation gives a coefficient of 0.72 which is not significant at the conventional 95% level but is significant at a 90% level. Thus, there is something better than a nine out of ten chance that the association between tax changes and impact effects did not arise by accident. However, even if the association between the inflation change between 1973-1974 and the gasoline tax change during that year is almost significant in statistical terms, its economic significance seems to be slight. After all, Italy, Japan, the United Kingdom and the United States all had impact effects on their inflation rates of the order of 1.8 (Column 1, Table 3), whilst their tax changes ranged from +4% (Italy) to —51% (United Kingdom).

Examining the longer-run effects of tax changes on the subsequent inflation reveals virtually no association at all. Looking at the association between the ranks of countries in the second column of Table 3 (longer-run inflation change) and the second column of Table 4 (average tax changes over the period 1974-1977) gives a Kendall coefficient of rank correlation of 0.3, which is totally insignificant at any respectable level.

Thus, while there is weak support for the hypothesis that tax changes occurring at the time of the 1973 oil price rise had an effect upon the inflation rate of the year immediately following, the economic significance of that association is very weak and there is virtually no association between subsequent tax changes and subsequent inflation performances.

Overall, the "oil push" hypothesis does not appear to have very strong empirical support. A common oil shock is followed by very uncommon inflation experiences; different national degrees of dependence on imported oil do not account for differences in either impact effects or subsequent inflation effects; differences in tax changes on gasoline provide a partial but weak explanation for differences in initial inflation effects and no explanation at all for subsequent inflation differences across countries.

III. Monetary policy

This section examines the course of monetary policy in the six selected countries. It will be recalled that, as set out at the beginning of this paper, the proponents of the "oil push" view

suggest that monetary policy either is impossible to use because elected politicians will not risk the unpopularity that would inevitably arise from a sharp contraction of money supply growth, or is ineffective at least as regards control of inflation and would have all of its effects (or at least its major effects) upon the rate of real output growth. The central questions addressed in this section arise from these views. Can money supply growth rates in fact be lowered significantly? What happens when they are lowered? Do inflation rates fall or do all the effects come out in real output growth?

Monetary theory (and a vast amount of empirical research) have very clear statements to make on the second question. The effects of the lowering of the money supply rate on the economy depend upon whether that money supply growth rate reduction was anticipated or not. A fully anticipated change in the growth rate of the money supply will have all its effects upon the price level (and inflation rate) and no effect (to a first approximation) on the level of real output. An unanticipated reduction in the money supply growth rate will have some effects on the inflation rate and some effects on the real output level (and growth rate). The more nearly a reduction of the money supply growth rate is fully anticipated the more will it affect the inflation rate and the less the real output growth rate. The effects of a reduction in the fully anticipated growth rate of the money supply are to reduce the inflation rate by initially a greater amount than the reduction in money supply growth and subsequently (ultimately) by an amount equal to the reduction in money supply growth. The overshooting arises simply as a result of the fact that a change in the inflation rate affects the average ratio of desired money balances to income — a fall in the inflation rate raising that ratio. As individuals attempt to achieve their desired money to income ratio so the consequential demand reduction lowers the inflation rate by even more than the reduction in the rate of money supply growth for an interim period. The effects of the unanticipated component of any money supply growth reduction depend essentially upon the steepness of the aggregate supply curve in the economy and in no way upon aggregate demand conditions.

With this background concerning the predictions of monetary theory, the course of monetary policy in the six countries will be examined. Table 5 sets out the growth rate of the money supply

(M1) in the six countries for the period 1965-1978. (The starting date of 1965 was selected for these data on the grounds that it is widely held that there are lags in the operation of monetary policy and since the other data used in this paper begin in 1968 it was felt appropriate to have available to the reader data on the course of monetary policy for a few years prior to 1968.) One thing which becomes immediately apparent is that there is virtually no association across these six countries between averages of inflation and money supply growth. Italy and Japan have money supply growth rates which exceed their inflation rates on the average by around 8%, in West Germany money supply growth exceeds inflation on the average by about 5%, in Switzerland by 3%, and in the United Kingdom and United States the two averages are almost equal. There are many reasons for these cross-country divergences in broad averages: different growth rates of real output, different income elasticities of demand for M1 balances, different changes in the anticipated rate of inflation, and finally different trend changes in the demand for M1 balances arising from financial innovations. This is not the place to give a detailed investigation of all these sources of differences in broad averages. Rather, the broad averages themselves will be taken as given and *variations over time*

TABLE 5

MONEY SUPPLY GROWTH IN SIX COUNTRIES, 1965-1978
(percent per annum)

	Italy	Japan	Switzerland	United Kingdom	United States	West Germany
1965	13.4	16.7	5.1	3.1	4.1	9.5
1966	14.6	15.3	3.2	3.1	4.7	4.5
1967	13.6	13.4	5.5	3.8	4.2	3.2
1968	13.4	14.6	11.1	4.6	7.5	8.1
1969	14.9	18.4	9.5	—0.5	5.3	9.9
1970	21.7	18.4	10.0	7.0	3.5	6.5
1971	23.0	25.3	18.5	13.3	6.8	12.3
1972	18.6	22.2	13.6	16.8	7.3	13.6
1973	20.4	26.4	—0.4	10.1	7.2	5.6
1974	15.9	13.3	—1.7	3.5	4.3	5.9
1975	8.3	10.3	2.2	15.1	4.5	14.1
1976	20.5	14.2	6.9	14.6	5.1	10.2
1977	19.8	7.0	4.7	13.5	7.2	8.3
1978	23.8	10.8	12.6	20.3	7.2	13.8

Sources:
1965-1974 *International Financial Statistics*, May 1977, pp. 48-9.
1975-1978 *International Financial Statistics*, October 1979, pp. 44.

in money supply growth rates in the individual countries and the associated and subsequent *variations over time* in inflation will be examined. This is not to deny the potential usefulness and validity of a cross-country investigation of money supply growth rates and inflation rates. However, such an investigation would involve the kind of detailed analysis of the demand for money that is indicated by the preceding remarks.

Each country's money supply growth record and inflation record will now be examined.

Italy

The money supply growth of Italy divides usefully into four parts: 1965-1969; 1970-1973; 1974-1975 and 1976-1978. In the period 1965-1969 money supply growth in Italy was in the range 13% to 15% per annum. Given the trends in real income growth and other considerations concerning the demand for money function, this would translate to a steady state rate of inflation in the range of 5% to 7%. In fact, Italy's inflation rate during the period 1968-1973 was increasing toward the 5% area. In the period 1970-1973, the money supply growth rate rose from its previous level to the 18% to 20% range. If maintained, this would give rise to an inflation rate in the range of 10% to 12%. In fact the Italian inflation rate increased between 1972 and 1974 to 19% overshooting this steady state rate. Such an overshooting is entirely in line with the predictions of monetary theory on the presumption that the higher money supply growth rate was expected to be maintained into the indefinite future. The third phase of monetary policy in Italy is one of severe contraction between 1974 and 1975 when the money supply growth rate more than halves from 20% (1973) down to 8.3% by 1975. The final phase, 1976-1978, sees the money supply growth rate returning to its 20% zone as established in the early 1970's. Given this behavior of monetary policy one would expect Italy's inflation rate, having increased in the first few years of the 1970's, to decrease somewhat after 1975 but then to subsequently return to a steady state level in the range of 12% to 15%. This is almost exactly what Italy's inflation rate does. It increases in sympathy with the rising money supply growth up to 1974 and it subsequently moderates toward the level implied by a

steady state money supply growth rate of about 20% per annum. Thus, in broad qualitative terms, the predictions of monetary theory and the facts about Italy's money supply growth and inflation fit together remarkably well. It is of some importance to note that the acceleration of money supply growth in Italy occurred at the beginning of the 1970's with the steep rise in money supply growth from about 15% in 1969 to rather more than 20% in 1970. This 20% growth rate was maintained for the four years, 1970 through 1973 — all well before the oil price shock in the fourth quarter of 1973. Italy's inflation rate also had begun to accelerate prior to the oil price rise. At the time of the oil shock monetary policy in Italy was tightened. Indeed, for the two years subsequent to the oil shock, there is a severe tightening of monetary policy with the growth rate in the money supply being reduced to some two-fifths of its 1973 rate.

Japan

Japanese money supply growth, like that in Italy, can be divided into four phases, although not coinciding with those of Italy. The first is a short one, running from 1965 to 1967 when money supply growth was pulled back systematically from approximately 17% down to 13%. This would imply, given the underlying real growth rate and other properties of the demand for money in Japan a steady state inflation rate reduction from approximately 9% to approximately 6%. In fact, the Japanese inflation rate was settling down in the 5½% area by 1968-1969. This is slightly lower than would be predicted but not by much. The second phase of monetary policy in Japan runs from 1968 to 1971 when there is a strong acceleration of money supply growth from 15% to 25% per annum. This would imply an acceleration of inflation in Japan if maintained from 6% up to about 17%. In fact the actual rate of inflation in Japan did begin to increase but only reached approximately 12% by 1973. This is lower than would be expected ultimately. The third phase of Japanese monetary policy runs from 1971-1973 when money supply growth rates in the middle 20's percent range are maintained. These would give rise, if maintained indefinitely, to inflation in the middle teens percent per annum. In fact, the Japanese inflation rate accelerated to over 20% by 1974.

This is entirely consistent with the predictions of monetary theory concerning the overshooting of inflation consequent upon a rise in the anticipated growth rate of the money supply. The fourth phase of Japanese monetary policy runs from 1974 through 1978 when the money supply growth rate is approximately halved from its 1973 level and is maintained with some fluctuations between 14% and 7%. The money supply growth rate in this region would bring Japan's inflation rate down to a steady state level of somewhere between 0% and 6% or 7% per annum. In fact, the Japanese inflation rate did fall from 1974 all the way through to 1978 by which year the rate had fallen below 4%. Again, the predictions of monetary theory fit remarkably with the Japanese experience. The rise in inflation through 1974 can be seen as the predicted overshooting effect arising from a substantial rise in the money supply growth rate between the late 1960's and the early 1970's. The subsequent reduction in inflation can be seen as the consequence of the strong reduction in money supply growth starting in 1974. As in the case of Italy, it is noteworthy that the money supply growth acceleration occurred before the oil price rise of 1973. In the Japanese case the strongest phase of money supply growth occurred between 1967 and 1971. The inflation rate in Japan was increasing between 1970 and 1973. Again, as in the case of Italy, at the time of the 1973 oil shock, monetary policy was substantially tightened in Japan with the money supply growth rate almost halving in 1974 compared with its 1973 rate.

Switzerland

Monetary policy in Switzerland can be considered in three phases. The first, a long one, runs from 1965 to 1971 and is a period during which money supply growth tended to accelerate from the 3% to 5% range in the middle 1960's to the very high teens by 1971. This strong acceleration of money supply growth in Switzerland would have been consistent with a rise in Swiss inflation from around 2% in the middle-1960's to around 25% by the early 1970's. In fact, Swiss inflation increased from 2½% in 1968 up to almost 10% by 1974. This was a smaller rise than would have been expected if the faster Swiss money supply growth was expected to be maintained into the indefinite future. However, if the 1971 money

supply growth rate was unexpected and the growth rate of 10% maintained for the three years, 1968 through 1970, regarded as the expected maintained money supply growth rate, then a steady state inflation rate of around 7% would be predicted and the actual rate of 9% fully consistent with the predicted oveershooting that occurs as a result of a rise in the expected money supply growth rate. The second phase of money supply growth in Switzerland is a period of severe and almost unprecedented contraction running from 1972 through 1974. During this period the money supply growth rate was pulled back from nearly 20% annual growth to a negative growth rate of almost 2% per annum. Monetary theory predicts that if such monetary policy was to be maintained then prices will ultimately begin to fall in Switzerland. In fact, whereas prices did not begin to fall, the rate of inflation was cut back very sharply and systematically from a 9.8% peak in 1974 to 1.1% by 1978. The money supply growth rate in the third phase from 1975-1978 began to accelerate again. If this subsequent acceleration of money supply growth in Switzerland is maintained then Swiss inflation will begin to accelerate again. (The 1979 inflation in Switzerland in fact is beginning to show some of the effects of this higher money supply growth during 1976-1978. However, some of the additional money supply growth during this period can be viewed as an increase in the demand for real Swiss francs as the result of international portfolio operations reflecting exchange rate expectations.)

Yet again, the predictions of monetary theory and the facts about money supply growth and inflation fit together remarkably well. The major increases and reductions of inflation in Switzerland are preceded by expansions and reductions in money supply growth. Yet again, as in the cases of Italy and Japan, the major period of money supply acceleration took place prior to the oil price rise of 1973. In the Swiss case the acceleration period was from 1965 to 1971. Swiss inflation began to accelerate from 1969 and 1973. Even during the year in which the oil price rise occurred, Swiss money supply growth was severely curtailed, being pulled back from a growth rate of 13.6% in 1972 to —0.4% in 1973. It was even more severely curtailed in 1974. Thus, exactly as in the two preceding cases, monetary policy was inflationary and pointing toward inflation acceleration prior to 1973 and, at the time of the oil shock, was on a contractionary course. Monetary policy in

Switzerland was more contractionary than the other two (or subsequent three) cases, and began to contract earlier.

United Kingdom

Monetary policy in the United Kingdom has been more variable than in the preceding three cases. From 1965 to 1968 there was some degree of steadiness in policy with a money supply growth in the 3% to 5% per annum range. Given Britain's low growth rate of real income, low income elasticity of demand for M1, and general trend in the demand for M1 balances, if maintained this money supply growth rate would generate an inflation rate in the same 3% to 5% range. In fact the actual rate of inflation between 1968 and 1970 settled down to approximately 5%. In 1969 there was a single sharp contraction of money supply growth to a negative rate of 0.5%. If this was to a large degree unanticipated then it should not have had much effect upon the price level (although it clearly should have had some). In fact the inflation rate in the United Kingdom did begin to fall by 1972, possibly as a consequence of the delayed effects of this period of monetary tightness. The third phase of monetary policy from 1970-1972 was one of strong acceleration with the growth rate increasing all the way from —0.5% to 16.8% per annum. If a growth rate of almost 17% in M1 was maintained in the United Kingdom an inflation would eventually settle down at somewhere close to that rate. In fact the inflation rate increased to almost 16% by 1974 and subsequently to 24% in 1975. By then, however, monetary policy was in its fourth phase, one of brief contraction with the growth rate being reduced all the way down to 3½% by 1974. Subsequently, in 1975 through 1978, money supply growth in the United Kingdom again returned to the middle teens range and even hit 20% again by 1978. This pattern of money supply growth in the United Kingdom would indicate a slackening of inflation following the tightening of monetary policy from 1972 through 1974. That inflation reduction might be expected to continue through 1977 with 1978 seeing the inflation rate increasing again. In fact, inflation in the United Kingdom fell each and every year from 1976 through 1978. Thus, 1978 inflation in Britain was perhaps lower than would have been anticipated on the basis of the behavior of money supply growth in the two or three preceding

years. However, indications during 1979 are that the inflation rate has indeed turned up again and is now roughly reflecting the money supply growth of the preceding two or three years.

It seems that in this fourth case, the predictions of monetary theory broadly fit the facts. Further it seems that money supply growth accelerated prior to the oil price rise of 1973. In the British case, 1969 to 1972 is the major phase of monetary expansion and 1972-1974 a major phase of inflation acceleration. During the period 1972 through 1974 monetary policy in the United Kingdom was on a severe contractionary course. It was right in the middle of this contraction of monetary policy that the OPEC oil price rise occurred.

United States

Monetary policy in the United States can be usefully divided into three phases. The first was one in which money supply growth was at a steady rate of between 4% and 5% per annum. This would have implied a steady inflation of approximately that rate if fully maintained. In fact the inflation rate in the United States during 1968-1969 was settling down in precisely that range. The two subsequent phases of monetary policy were very similar to each other. Between 1968 and 1973 money supply growth stepped up to almost 8% and went through a cycle the trough of which in 1970 had a money supply growth rate of 3½% and the peak of which returned to money supply growth rates comparable to those established in 1968. The third U.S. monetary policy cycle was very similar to the second, with money supply growth rates again cycling from the peak of 7.3% in 1972 down to a trough of this time 4.5% in 1975, climbing back to 7.2% in 1977 and 1978. The predictions of monetary theory concerning the effects of these movements in money supply growth on inflation are, first, that there would be a rise in the inflation rate following the acceleration of money supply growth from 1967 to the rates experienced in the later 1960's, that inflation would fall off in the early 1970's as a result of the contraction of money supply growth from 1968 through 1970 but would again accelerate in the middle 1970's as a result of the monetary acceleration from 1970 to 1972. Inflation would be predicted to fall yet again in the later 1970's following the monetary contraction from 1973 down to 1975. There would be a

yet further acceleration of inflation in the final years of the 1970's as a result of the monetary expansion from 1974 through 1978. The course of U.S. inflation almost exactly fits these predictions. Again, it is remarkable that the strongest acceleration of money supply growth in the United States occurred prior to the oil shock. From 1970 through 1972 money supply growth increased from 3½% to over 7% and was maintained at that rate in 1973. Thus, in the U.S. as in the other cases so far examined, monetary policy was on an increasing inflation course prior to the oil price rise. Further, the oil shock itself occurred at a time when monetary policy in the United States was put on a severe deflationary course. The money supply growth rate of 1974 and 1975 was pulled back to 4.3% and 4.5% respectively, compared with growth rates of 7.3% and 7.2% respectively in 1972-1973 and 6.8% in 1971. Thus, monetary policy in the United States can be seen as having been set to contribute to a rise in inflation prior to the oil price rise of 1973 and to be on a disinflation course at the time of, and immediately subsequent to, the 1973 oil shock.

West Germany

Between 1965 and 1969 German money supply growth through one complete cycle starting out at 9½% dipping by 1967 to just over 3% and ending at almost 10% in 1969. Monetary theory predicts that Germany's inflation would follow this cycle with a lag of perhaps up to two or more years and at a rate of some 5% less than the average rate of money supply growth (allowing for demand for money factors). This is approximately what did happen to German inflation which fell to a trough in 1968 and then subsequently began to climb through the early part of the 1970's. However, the subsequent course of German inflation was determined largely by the second phase of monetary policy which saw a sharp acceleration from 1970 through 1972 in which period the money supply growth rate more than doubled. This would be predicted to raise German inflation to a steady state rate of around 8% if maintained. In fact, German inflation did not quite reach that level, although did reach 7% by 1973 and 1974. The third phase of monetary policy in Germany, 1973-1974, was one of severe contraction. The money supply growth rate was pulled back from

13.6% to below 6% where it was maintained for two years. This would be predicted to lower German inflation, though not by as much as the cutback in money supply growth because to some extent presumably the cutback in money supply growth was unanticipated. In fact there was a reduction of inflation in Germany each and every year after 1974 up to 1978. Through this last four years — 1975-1978 — monetary policy returned to a more rapid growth rate; although, ignoring 1978 itself on an apparently decreasing path. (As in the Swiss case to some extent the strong growth rate of money supply in Germany during the late 1970's can be seen as a response to a sharp rise in the demand for German marks as a result of international portfolio considerations and expected exchange rate adjustments.) However, if German money supply growth rates in the low teens are maintained into the indefinite future, it is inconceivable that Germany's inflation rate will not begin to increase. (There is some indication in the 1979 figures that that has indeed begun to happen.)

As in the other five cases, it is clear that changes in the money supply growth rate in Germany precede movements in the rate of inflation broadly in the manner predicted by monetary theory. Again, as in the other five cases, it is clear that the strongest period of monetary acceleration took place prior to the oil price rise in the fourth quarter of 1973. In Germany's case, 1968-1972 was the longest and strongest phase of monetary acceleration. As in the other cases, monetary policy in Germany was set on a disinflationary course during the period in which the oil price shock occurred.

General Remarks on Monetary Policy

The patterns which emerge from this country by country examination of monetary policies over the last fourteen years are remarkable for their consistency. First, the predictions of monetary theory broadly support the facts about money supply growth and inflation. Secondly, in all six cases examined here, money supply growth rates began to accelerate substantially well before the 1973 oil price rise. Again in all six cases, inflation rates were beginning to accelerate reflecting that money supply acceleration prior to the oil shock. Yet again, in all six cases, at the time of the oil shock

column of Table 7 simply reproduces the second column of Table 3. It shows the ratio of inflation on the average in 1975-1978 to that on the average of 1970-1973. The second column shows the ratio of real GDP growth in 1974-1978 to that of 1968-1973. It is evident that there is a weak association between these two variables. Switzerland, which achieves the best inflation record, pays the biggest price in terms of real growth reduction. Italy and the United States, which achieve relatively little inflation reduction, also pay a smaller price in terms of real output losses. However, there is by no means a perfect association between these series. For example, the United Kingdom has the second worst inflation performance and also the second worst real output performance. Overall, the Kendall Coefficient of Rank Correlation indicates a weak association amongst the variables. However, it is clear that the very heavy losses suffered by Switzerland in particular in 1975 must have been generated by the savage pullback of money supply growth in the two preceding years. What the figures in Table 7 seem to indicate is that whilst there is no inevitable persistent relationship between the change in the rate of inflation and the real output growth rate, there is some clear contribution to real output growth arising from the strength of anti-inflationary monetary policy. However, there is more to the loss of real output growth than simply the degree of tightness of anti-inflationary monetary policies.

TABLE 6

REAL GDP GROWTH IN SIX COUNTRIES, 1968-1978
(percent per annum)

	Italy	Japan	Switzerland	United Kingdom	United States	West Germany
1968	6.3	13.5	3.6	3.5	4.5	6.3
1969	5.7	10.7	5.6	1.5	2.6	7.8
1970	5.0	10.9	6.4	2.4	—0.1	6.0
1971	1.6	7.3	4.1	2.6	2.9	3.2
1972	3.1	8.9	3.2	2.3	5.8	3.7
1973	6.9	9.8	3.0	7.9	5.4	4.9
1974	4.2	—1.0	1.5	—1.8	—1.3	0.5
1975	—3.5	2.4	—7.3	—1.7	—1.0	—2.1
1976	5.7	6.0	—1.4	3.6	5.5	5.6
1977	2.0	5.4	2.7	2.0	4.9	2.6
1978	2.6	5.6	0.9	3.2	4.0	3.4

Sources: *OECD Economic Outlook*, 25, July 1979
1968-1976, p. 148
1977-1978, pp. 17 and 19.

TABLE 7

INFLATION AND REAL OUTPUT GROWTH

Country	Ratio of Inflation in 1975-78 to Inflation in 1970-73	Ratio of Real Growth in 1974-78 to Real Growth in 1968-73
Italy	2.4 (6) *	0.46 (2)
Japan	1.1 (3)	0.36 (4)
Switzerland	0.4 (1)	—0.84 (6)
United Kingdom	2.0 (5)	0.32 (5)
United States	1.5 (4)	0.69 (1)
West Germany	0.8 (2)	0.38 (3)

* Numbers in parentheses are ranks. Kendalls' Coefficient of Rank Correlation —0.47.
Source: Tables 2 and 6.

One likely candidate that needs to be investigated is the relationship between the growth rate of an economy and its dependence upon imported oil. Whilst it was shown in Section II above that the degree of dependence on imported oil made no contribution to a country's inflation rate, it may well be that such dependence does affect real output growth. Indeed, it is one of the central propositions of economic theory that real factors have real effects and nominal factors have nominal effects. It would indeed be surprising were the dependence of a country on imported oil to have no effect upon its real output performance following the 1973 oil shock. Examining the ranks of the ratio of real output growth in the post oil shock year to that in the preceding period (second column of Table 7) with the rank of net oil imports in 1973 as a percent of total energy use (Table 3, column 3) and treating Switzerland as ranking equally with West Germany in oil dependence, shows a very weak association amongst those two variables with a Kendall Coefficient of Rank Correlation of only 0.14.

However, informally examining the joint dependence of real output growth reductions on both the degree of disinflation and the dependence on imported oil suggests that there is some partial explanation for the real output growth loss from both of these sources. Considering the relationship between real growth and dependence on imported oil, the United States and West Germany are correctly ranked. That is, the U.S. real output loss is the least and that is the least dependent economy on imported oil. West Germany ranks third in both cases. The most seriously misranked economies are those of Italy, the United Kingdom and Switzerland.

Italy has a high dependence but suffered very little real output loss. It also hardly reduced its inflation rate following the oil shock and had an average inflation of some 2½ times its pre oil shock rate. In the Swiss case, there is the reverse phenomenon, that of less dependence on imported oil than Italy, but very much greater real output loss. This would be explained by the severe nature of Swiss monetary contraction prior to and all through the period of the oil shock. The case of the United Kingdom is not well explained, however, by this story. It was the second worst as regards real output growth reduction, the second worst as regards inflation, and the second least dependent on imported oil. Thus, whilst there is some explanatory power in foreign oil dependence and degree of inflation reduction for the loss of real output growth in some cases, there is obviously more than those two variables at work.

However, the conclusion does seem to emerge that there is no inevitable one-to-one relationship between the degree to which inflation is reduced and the associated loss of real output. Other factors can moderate the effects of a reduction in the inflation rate on the loss of real output growth.

V. Conclusions

The conclusions which emerge from this investigation have been scattered through the paper. However, it seems appropriate to bring them together and summarize them at this point.

The first and most central conclusion is 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 individual governments in the years leading up to 1973. In the six major countries investigated here monetary policies were inflationary and increasingly so prior to the oil price rise. Either at the time of or very shortly after the time of the oil shock, monetary policies were put into a strong disinflation phase. The degree of disinflation contained in the monetary policies of 1974-1975-1976 seems to have been far too severe relative to the degree of looseness of those policies prior to 1974.

There is no evidence in the history of the 1970's that governments are unable to pursue disinflationary monetary policies. On the contrary, there is evidence that they are willing

and able to pursue such policies with far too much vigour. Further, there is no evidence that inflation is stubborn and will not respond to tight monetary policies. Its responsiveness, whilst accompanied by serious real output losses, is considerable.

Overall, the analysis presented here would seem to be yet one more body of evidence pointing to the general validity of the proposition that the best monetary policy that can be pursued is one which sets a steady course for the growth rate of the money supply and does not deviate from that course regardless of the events and shocks which are hitting the economy. Certainly the high inflation of the middle 1970's could not have occurred had the strong monetary accelerations of the early 1970's not been indulged in. Equally certainly, the serious recession in the world economy during the middle 1970's would not have occurred had there not been a sharp tightening of monetary policies at that time.

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 the case that the rapid money supply growth rate of the late 1960's and early 1970's were the cause both of the rise in inflation and rise in the price of oil in 1973. This paper has not investigated that proposition and has little direct light to shed upon it. However, it is a far more plausible hypothesis *prima facie* than the alternative, which this paper has analysed and has rather convincingly rejected.

London, Ontario

MICHAEL PARKIN