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INTERNATIONAL PRICE BEHAVIOR AND THE DEMAND FOR MONEY

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ABSTRACT

Oil prices, commodity prices and American monetary policy, the last operating through a variety of channels, have all figures prominently in explanations of the international inflation process in the last 1960s and early '70s. Our major purpose in this paper is to test these various hypotheses. We do so in the context of a reduced-form rational-expectations price equation which we estimate for the United States and seven other industrial countries using quarterly data for the period 1955 through 1976.

The principal conclusion that emerges from this exercise is that movements in domestic money in these countries served as the key link in the inflation process. The factors that produced these monetary changes, however, differed among countries. Price shocks of various sorts were clearly of secondary importance.

The other important set of conclusions concerns the demand for money. In place of a traditional stock adjustment model, we used GLS with a second-order correction for autocorrelation. We believe this produced more plausible estimates of the parameters of the long-run demand function and of the adjustment process itself.

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Oil prices, commodity prices and American monetary policy, the last operating through a variety of channels, have all figured prominently in explanations of the international inflation process in the late 1960s and early '70s. Our major purpose in this paper is to test these various hypotheses. We do so in the context of a reduced-form rational-expectations price equation which we estimate for the United States and seven other industrial countries using quarterly data for the period 1955 through 1976.[1]

One of our central concerns in the estimation of this model is the properties of the demand for money function. Unlike many studies using post-World War II time-series data that rely on the stock adjustment model, we obtain what we regard as reasonable estimates of the parameters of the long-run demand for money function--particularly the income elasticity--without having to posit unacceptably slow speeds of adjustment. The adjustment mechanism implicit in the estimated equation, in fact, is quite different from the standard formulation.

For all eight countries we find evidence of second order serial correlation that is consistent with the existence of two types of error processes: permanent stochastic shifts that follow of random walk and other types of disturbances that, unlike the first sort, are transitory in nature. Hence, a shock that alters the equilibrium rate of change of prices will gradually be eliminated, but the level of prices will not necessarily return to its original path.

With respect to the causes of inflation internationally, our results suggests that domestic money supplies played the crucial role. In the seven foreign countries, monetary growth increased in response to both foreign monetary pressures and domestic factors. In the United States, the reserve-currency country, domestic factors alone were important. Direct price-arbitrage appears to have little additional effect in most countries. Oil price shocks, however, may have made some contribution to the increases in U.S. and most foreign price levels but relative to domestic money, they were clearly of secondary importance.[2]

The Structural and Reduced-Form Price Equation

Three equations make up the basic model: a money demand function, an aggregate supply function and an expected money equation.

The money demand function takes the fairly conventional form

$$(1) \qquad (M/P)_t = \alpha + \beta_1 y_t^P + \beta_2 y_t^T + \beta_3 r_t \quad ,$$

where M/P is the log of real per capita cash balances, y^P is the log of real per capita permanent income, y^T is transitory income--defined as the difference between the logs of measured and permanent real income and r is the log of the interest rate.[3]

The aggregate supply function is of the form used by Lucas (1973).

$$(2) \qquad y_{T,t} = \lambda\, y_{T,t-1} + \phi(P_t - P_t^*) \quad ,$$

where P and P* are the logs of the actual and expected levels of prices, respectively.

Expected prices in this framework represent the cost of production. An increase in actual over expected price fools producers into believing that there has been a rise in the relative price of their product and induces an increase in output. The autocorrelation that is apparent in movements in real output has been rationalized by Blinder and Fischer (1978) as the result of using inventories to stabilize production. A positive price shock leads suppliers to increase their sales partially from increased production and partially from drawing down stocks of inventories. The shock will have a delayed effect on output as inventories are replaced slowly over time.

By solving for real transitory income in equation (1), substituting it into equation (2) and taking expected values of the variables, we derive the following equation for expected prices,

(3) $P^* = M_t^* - \alpha - \beta_1 y_t^P - \lambda\beta_2 y_{t-1}^T - \beta_3 r_t$,

where the asterisk denotes expected values. Substituting this expression into the aggregate supply equation (2) and rearranging terms yields the reduced form price equation.

(4) $P_t = -\alpha + M_t - \beta_1 y_t^P - \beta_2 \lambda y_{t-1}^T - \beta_3 r_t - \frac{(\phi\beta 2)}{(1+\phi\beta_2)} (M-M^*)_t$.

Given the equations for P and P*, we can also derive a reduced form real output relationship,

(5) $y_t^T = \lambda y_{t-1}^T + \frac{\phi}{1+\beta_2\phi} (M_t - M_t^*)$.

Using (5), we can then substitute for y_{t-1}^T in the price equation (4) to arrive at the alternative form:[4]

(6) $P_t = M_t - \alpha - \beta_1 y_t^P - \beta_3 r_t - \sum_{i=0}^{\infty} \frac{\lambda^i \beta_2\phi}{1+\beta_2\phi} (M-M^*)_{t-i}$.

The last term on the right hand sides of (4) and of (6) is the monetary shock--the difference between the actual and the expected values of the nominal stock of money. The latter we determined empirically, from a variety of equations of the general form:

(7) $M_t = f(L(M_t),X)$,

where L is a lag operator and X is a vector of variables that enter the monetary authority's reaction function.

Estimates of the Price Equation

In Table 1 we report the estimates of equation (6) using M2 as the definition of money, the GNP or GDP deflator as the price variable and Friedman's weighting scheme for our proxies for real permanent income.[5] The coefficient for actual per capita nominal money balances we constrained to unity, so the dependent variable was log (P/M_2N), the log of the reciprocal of real per capita money balances, rather than simply log P.[6]

In Table 2 we present the estimates of the expected money equations that we used to construct the monetary shocks. Before turning to the price equations themselves, let us briefly describe these results.

The final form of the expected money equation relates the current quarter's change in the log of M2 to lagged values of itself, lagged transitory income, lagged values of the balance of payments scaled by high-powered money and the change in the lagged log of U.S. M2.

For all countries at least one autoregressive money term, and usually more, is statistically significant. Transitory income has the hypothesized negative sign in all except Japan, but is significant at the 5% level in only two of the countries, Italy and the U.S.; and at the 10% level in one other, the Netherlands. The balance of payments, though again of the correct sign in 7 of 8 cases, is significant at the 5% level in only two, Japan and the U.K. and at the 10% level in two others, France and Italy. The lagged U.S. monetary variable is significant at the 5% level in Canada and Germany and the 10% level in France, the Netherlands, and the U.K. Tests for serial correlation of the residuals of these equations revealed no significant serial correlation in any of the eight equations.

Now let us turn to the price equations themselves. Since we found evidence of both first and second order autocorrelation in the equations for all eight countries, we used GLS with a second-order correction to estimate the equations. The OLS estimates and GLS estimates based on a first-order correction are given in the appendix. The reason for the autocorrelation is a topic we return to in the next section.

In general, the equations fit the data reasonably well. The standard errors, with the exceptions of those for the U.S. and the U.K., are all between roughly 50 and 150 basis points. The R^2s are respectable, four .90 or above and all greater than .66.

The coefficients of permanent income and the interest rate in these equations are both well identified, being the same as in the money demand function except that they are opposite in sign. The coefficients on the lagged monetary shocks, however, are underidentified. They are a composite of the coefficient on transitory income β_2 from the money demand function, the price elasticity from the supply equation ϕ, and for the lagged shock terms, the autocorrelation coefficient from the supply equation λ.

Still we can say something about the size and sign of the shock variables. Since λ should be positive and less than or equal to unity and since β_2 and ϕ are greater than or equal to zero, the coefficient on the contemporaneous shock variable should be negative and between zero and minus one. The lagged terms should also be negative and declining in absolute value by an exponential of λ.

The results are fairly consistent with these expectations. All of the monetary shock variables have the correct sign. In every country, other than Italy, the great majority are significant and they display a general tendency to decline over time. The decline, however, is not monotonic and a number of the coefficients are greater then unity--three significantly so.[7]

For the most part, our estimate of the parameters of the money demand functions appear reasonable. The income elasticities--with the exception of the estimate for Italy of 1.82--cluster about unity, ranging from a low of approximately .60 for the U.K. to a high of approximately 1.3 for Germany.

The Italian income elasticity, moreover, we have reason to suspect is biased upwards by measurement error in the income series we have used. According to Martino (1980), tax evasion has led to a systematic understatement of the Italian income data in the post-World War II period. This bias, he claims, has increased over time.

The estimate for the U.K. also may be somewhat biased due to institutional change. The introduction of Competition and Credit Controls in 1971, led to the payment of more competitive rates of interest on CDs and hence a substantial increase in the ratio of CDs to other types of commercial bank deposits. Our inability to account for this change may mean that our estimated income elasticities are, therefore, less than the true values.

The interest elasticities are less satisfactory. For three countries--Germany, the U.K. and the U.S.--the elasticity estimates are positive.[8] Those for the remaining five, though negative and similar in magnitude are significantly different from zero at the .10 level or better in only four instances.

Implications for Money Demand

Our estimates of the price equations provide new and reasonably consistent cross-country evidence on what we regard as two of the important unresolved questions of money demand. One is the magnitude of the parameters of the long-run money demand function, in particular, the income elasticity.

The other is the speed with which the monetary sector reaches equilibrium. Studies with recent time-series data provide a disconcertingly broad range of estimates of both. Many of these, moreover, differ from what one would have expected to find a priori. Comparison of two recent papers using multi-country quarterly data samples similar to ours illustrates the problem.

In one, Samir Al-Khuri and Saleh M. Nsouli estimate money demand functions of the simple stock-adjustment genre for M1 and M2 for six of our eight countries over a sample period slightly shorter than ours. As their paper's title implies, Al Khuri and Nsouli were chiefly concerned with obtaining estimates of the speed of adjustment between actual and desired cash balances. Most of these appear plausible: an adjustment of 30% or greater per quarter in 17 of 24 instances and for at least one formulation for each country an adjustment in the 40-60% range. The problem is, however, that the estimated long-run income elasticities in these equations make almost no sense at all. In each of their four formulations, the average of the individual country elasticities is 0.3 or lower and the range is from slightly negative to a high of less than 0.6.

Another recent study by James Boughton of the demand for money in seven of our eight countries (he excludes the Netherlands) produces results at the opposite end of the spectrum. His estimates of long-run income elasticities, also derived from a simple stock adjustment model and based upon data for the period 1960-77, are a good deal higher than those of Al-Khuri and Nsouli--the mean of the elasticities for M1 is 1.27 and for M2, 1.52. Furthermore, in only four instances, M1 in the U.S., M2 in the U.K., for which no estimate could be obtained (the coefficient on the lagged dependent variable being greater than unity) and both M1 and M2 in Italy, for which the estimated elasticities are both over 2.5, are there great divergences from those averages. The difficulty is that the adjustment coefficients for all of these countries are exceedingly low--most falling below 0.15 per quarter and none being much above 0.20.

The problem, therefore, is that statistically there appears to be a tradeoff between the estimated values of the speed of adjustment and of the income elasticity in the simple stock adjustment formulation. Relatively rapid speeds of adjustment can be obtained, but at the expense of extremely low income elasticities; higher income elasticities can be had but only with much slower adjustments. That tradeoff, moreover, seems to be a common result with postwar data not just a peculiarity of these two studies.

Our own belief is that the short-run adjustment is fairly rapid and the income elasticity of demand for money fairly high--in the neighborhood of unity and perhaps above for the countries with which we are dealing.

Stock adjustment speeds of between 5% and 10% per quarter imply that it takes somewhere between 5 and 11 years for 90% of the gap between money demand and money supply to be closed. In a world in which there are other financial assets, the existence of disequilibrium for that length of time is incongruous .

The belief that the income elasticity is considerably higher than often estimated with postwar data is based upon the results of investigations of other bodies of data. Long-term time series for the U.S. and U.K., cross-state data for the U.S., and cross-country data are all examples. In each of these instances, the estimated income elasticities range from slightly below unity to considerably above for various monetary assets.[9]

The results we have reported conform closely with these prior beliefs. They, thus, stand in sharp contrast with the standard findings of studies using post-World War II time-series data. We suspect that the source of these differences is the manner in which various studies treat the adjustment process whereby actual and desired money balances are equated.

The usual way of handling the adjustment process is to specify a stock adjustment model that entails including a lagged-dependent variable in the final estimating equation. But, as Griliches (1961) has pointed out, even if the lagged-dependent variable is appropriate, the presence of positive auto-correlation will bias the coefficient on the lagged-dependent variable upward, thus leading to the conclusion that the adjustment process is slower than it actually is. A further problem is that the lagged-dependent variable may "improve" an equation when the true structure does not include such an adjustment process if the autocorrelation of the residuals is due to some other misspecification.

Normally the stock adjustment process is modeled as follows:

(8) $$M_t = M_{t-1} + \rho(M_t^d - M_{t-1}) + \varepsilon_t \quad .$$

If M_t is not a stationary series but rather is trend dominated, actual money balances will consistently and unrealistically lag behind desired.

As an alternative to the conventional stock adjustment process we initially chose to define one of the following form:

(9) $$M_t = M_t^d + \rho(M_{t-1} - M_{t-1}^d) + \varepsilon_t \quad .$$

This is equivalent to a standard first order autoregressive process:

(10) $$M_t = M_t^d + u_t \quad \text{and}$$

(11) $$u_t = \rho u_{t-1} + \varepsilon_t \quad .$$

The GLS estimates of the price equation based on this model, however, were unsatisfactory. The Durbin-Watson statistics on average were exceedingly low, suggesting a more complicated structure for the errors. For this reason we used a second-order model of the errors in the estimates we report in Table 1. From the standpoint of the Durbin-Watson statistics these equations are much more acceptable, though there is some evidence of mild negative serial correlation remaining.

The problem with these estimates is that the autoregressive pattern for the price equation appears to follow not only a second order process but one which entails an overadjustment to last period's error and then an offsetting adjustment to this error in the next period.

The weights associated with the lagged errors in Table 1 provide a clue as to the possible nature of the adjustment process. Since the autocorrelation correction is equivalent to a series of quasi-differencing operations on all the variables, the fact the the coefficient on the first lagged error term is equal to one plus the absolute value of the coefficient on the second lagged term suggests that the proper specification of the price equation entails a first order correction of the first difference of the dependent and independent variables,

(12) $X_t - (1+\rho)X_{t-1} + \rho X_{t-2}$,

which in turn equals

(12a) $(X_t - X_{t-1}) - \rho(X_{t-1} - X_{t-2})$.

What possible arguments could justify such a specification? The most obvious is that there are two types of error processes involved in our estimation. First, there are stochastic shifts that follow an essentially random walk process. For example, a shift in "tastes" or some error in measurement that affects the intercept in a once and for all fashion:

(13) $\alpha_t = \alpha_{t-1} + v_t$,

where α is the intercept and v is the error term which may or may not be serially correlated. There is no reason for this type of error to be adjusted away in subsequent periods. This drift means that a disturbance from level equilibrium need never be eliminated and the level of desired real money balances or correspondingly the price level will be subject to the same sort of random walk.[10]

Our results also suggest that in addition to the random-walk process there are other types of disturbances which are not permanent but which are autocorrelated. Thus, if there is a shock which alters the equilibrium <u>rate of change</u> of prices it will gradually be eliminated, but the <u>level</u> of prices need not return to its original path.

For example, if the error term of equation (13) which describes the behavior of the intercept term of the price equation were autocorrelated and accounted for all the stochastic behavior of prices, we could write:

(14) $P_t = \alpha_t + \beta X_t$

(15) $\alpha_t = \alpha_{t-1} + v_t$

(16) $v_t = \rho v_{t-1} + \varepsilon_t$,

where ε is normally distributed, not serially-correlated with mean zero and βX_t represents all explanatory variables. In this case, we could solve this series of equations and estimate the following:

(17) $(P_t - P_{t-1}) - \rho(P_{t-1} - P_{t-2}) = \beta[X_t - X_{t-1}) - \rho(X_{t-1} - X_{t-2})]$.

If our interpretation of the error term is correct, the extremely large coefficients on the lagged dependent variable and, hence, extremely long periods of adjustment in equations estimated in level form are the result of confusing the shorter term adjustment process with longer term shifts. Similarly, the very low estimated income elasticities obtained in other studies like that of Al-Khuri and Nsouli, who use a first differenced equation and include both a lagged dependent variable and a correction for first order serial correlation of the disturbances in that differenced equation, also appear suspect. We conjecture that the use of both the lagged dependent variable and the first-order auto-regressive transformation is affecting both the estimates of the adjustment process and the income coefficient.

Foreign Shocks

The way in which international factors operate in the price equations that we have presented is through the public's expected money function. For almost all countries we have uncovered some evidence of an effect of the balance-of-payments or of U.S. money--sometimes both--on the domestic nominal stock of money. An international transmission mechanism of this sort is consistent with theoretical models of the specie-flow type. It is not, however, consistent with the adjmstment mechanism posited in the early literature of the monetary approach to the balance of payments or with the mechansims implicit in various discussions of international inflation that emphasize the role played by commodity and oil price shocks.

In the early monetary approach literature, the "law of one price" and international price-arbitrage were key areas of emphasis. Viewed from that perspective, our price equations are misspecified.

The way in which inflation is transmitted internationally in the simplest models of this type is via price arbitrage. An increase in inflation in the rest of the world leads to a near-instantaneous increase in domestic inflation in the small open economy subject to a regime of fixed exchange rates. This, in turn, leads to an excess demand for money in the small economy, a balance of payments surplus and an increase in the domestic nominal stock of money, in that order.

One way to test whether such effects are empirically important in the context of our model is to add foreign price variables to our basic equations. If price-arbitrage does provide an international link, and unless adjustment of the domestic nominal stock of money to an incipient excess supply of, or demand for, money produced by increases in price levels abroad were completed within the quarter, then these foreign price variables should enter the equations positively and significantly.

To the extent that the domestic monetary authorities prevent the adjustment of the domestic nominal supply of money to eliminate the excess supply of or demand for money, real output will vary. If the coefficients on transitory income in the demand for money function were close to unity, the addition of foreign price variables may prove to be insignificant even though they were responsible for the change in the price level and the opposite and equal change in real income. In this case, the change in real transitory income would be sufficient to offset the change in real balances due to the price shock. In our model we avoid this simultaneity problem by making transitory income endogenous and replacing its current and lagged values with current and lagged values of the monetary shock variable.[11]

Table 3 summarizes the results of including the various price-shock terms in our basic price equations.[12] The most interesting of the regression estimates themselves--those for the U.S. and oil price-shocks--are contained in a series of tables in the appendix. In all instances--for each country and for each of the price shocks--we used two measures of the domestic price level: the CPI or other cost of living index as well as the GNP or GDP deflator that we used in the regressions summarized above. Again we estimated these equations via GLS.

In virtually every case, moreover, we had to use a second-order autoregressive model of the disturbances before we found no eivdence of significant autocorrelation. That in and of itself is a finding of some interest since a possible explanation for the findings reported above is that foreign price shocks were omitted from the regressions. Such shocks conceivably could be responsible for the apparent random-walk process we have uncovered.

Our finding of little difference in the error process after inclusion of the price shocks in the regressions, however, does not support that hypothesis. Either something else is responsible or our price-shock measures are highly imperfect proxies for the true shocks. The latter, however, does not seem to be the case--at least with respect to oil and other commodity price shocks. Estimating the basic equations over shorter periods in which such shocks might be considered of little importance, in general, produced no substantial changes in our estimates of the error process.

Now let us consider the test results, first those for the U.S. and rest-of-world price variables. Here the evidence is quite mixed. Only for Japan and the U.K. are both of the U.S. price variables significantly greater than zero at a level of 10% or better. Rest-of-world prices are significant for both France, Japan and the U.K. in the deflator and the CPI regressions, and for Italy in the CPI regression. Some evidence of price arbitrage, therefore, exists but, even on the most favorable interpretation of the evidence it is weak and hardly universal. Canada, Germany and the Netherlands (relative to both measures of rest-of-world prices) show little or no such effects, and Italy an inconsistent effect. In most instances, moreover, the bulk of the effects show up after a lag of two quarters or more.

Commodity prices, in general, do not fare well at all in the test of price shock effects. The London Economist index of commodity prices is only significant in four of the sixteen comparisons.

The variable that appears to have the most persistent influence is the relative price of oil. With the deflator as the measure of the price level, the oil price variable is significant at a level of 10% or better in five countries: Canada, Germany, Japan, the U.K. and the U.S. In one other, France, the effect was nearly significant. Using the CPI, we found significant effects for Japan again as well as for France and Italy.

Table 4 contains alternative estimates of the magnitude of these effects on both measures of the price level for all of the countries other than the Netherlands. We omitted the Netherlands because its coefficients were consistently negative, a problem to which we return below.

These estimates are for two periods, 1973:I to 1974:IV and 1973:I to 1976:IV, and for both the CPI and deflator measures of the price level. To derive them we first multiplied the ratio of the annualized change in the logarithm of the relative price of oil by the sum of the oil-price coefficients in the relevant regression. We then divided that product by the annualized change in the logarithm of the price level.

With relatively few exceptions, the ratios for the deflator fall in a range of roughly 5% to 30%. These ratios, moreover, tend to decrease with the length of the time period and the complexity of the error model used in the underlying regressions. The median ratio for the period ending in 1974:IV is 24.5% in the regressions with a first-order correction and 14.9% in those with a second-order regression. For the longer period, the median ratios are 14.2% and 9.2% from the two types of regressions respectively.

The median ratios for the CPI exhibit the same general pattern: 27.6% and 10.4% for the period ending 1974:IV and 14.2% and 6.1% for the period ending 1976:IV in the two types of regressions.

Comparison of these estimates with those reported in a recent study by Phillip Cagan of manufacturing industries in the United States may prove interesting. Cagan estimates that approximately 15% of the 17.0% annual average rate of increase of manufacturing prices in 1972-74 or about 2.6 percentage points can be accounted for in terms of increases in oil prices. Our own estimates are for the shorter 1973-74 period and for price indices that place less weight on traded goods. Their range is from approximately equal to Cagan's to considerablv below.[13]

The estimate derived from the regressions with a first-order correction are 24.5% of the increase in the deflator and 27.6% of the increase in the CPI, or 2.1 and 2.5 percentage points respectively. Those derived from the regressions with a second-order correction are a good deal lower: 4.1% of the deflator increase (.3 percentage points) and 12.5% of the CPI increase (or 1.12 percentage points).

There are, however, a number of problems with our results that lead us to question how seriously they can be taken. The most obvious is the negative coefficients obtained in a considerable number of cases: Canada, Italy, Germany and the U.K. for at least one price variable and one type of regression and the Netherlands, as we have already stated, for both price variables and both types of regressions.

For the deflator, which is based upon value added in production, negative effects are possible but over periods of several years somewhat implausible. For the CPI, which is an index of prices in consumption, negative estimates for countries that do not produce petroleum make little sense.

That difference in what the two prices indices measure, raises an additional question. Even if we ignore the greater incidence of negative sums of coefficients with the CPI on the grounds that the use of the second-order correction may be unduly influencing the results, the CPI fares no better than the deflator. We would have expected exactly the opposite. Indeed that was the main reason we reestimated the price equations using the CPI in place of the deflator, the price variable we used in developing the basic model.

Equally disturbing is the lack of consistency in results for the two indices. Only for Japan do we obtain significant positive effects with both price measures and both types of regressions.

A further problem, as Michael Darby (1980) has pointed out, is that in a number of countries the removal of price controls occurred more or less coincidentally with the rise in oil prices. Separating these effects from those of oil prices on the price level is virtually impossible.

Summary and Conclusions

Starting with a conventional money demand function, a Lucas-type aggregate supply function and a general form of the public's expected money function we have derived a reduced-form price equation that we have estimated with quarterly data for the United States and seven other industrial countries for a near 20 year period beginning in the late 1950s. We have then gone on to use these equations to test a variety of hypotheses about the international inflation process during these years.

The equations themselves fit the data fairly well. Moreover, the parameter estimates we obtain are both reasonably consistent across countries and tolerably close to our prior expectations of magnitude and, in the case of the monetary shocks, temporal pattern. We, therefore, have confidence in using the equations as a basis for testing competing hypotheses.

The principal conclusion that emerges from this exercise is that movements in doemstic money in all eight countries serve as the key link in the process leading to changes in the domestic rates of inflation. The factors that produced changes in the domestic money stocks, however, differed among countries. In the seven foreign countries, international factors--the balance-of-payments or United States money, in some instances, both--had some influence in the expected money equations; in the United States, the reserve currency country, they did not.

Foreign rates of inflation, as measured either by United States inflation and a rest of world inflation index, however, had a direct impact on domestic rates of inflation in relatively few of the comparisons we made. To the extent that inflation was actually transmitted from one country to another, it appears to have been via channels much closer to a specie-flow type mechanism than to the price-arbitrage mechanism.[14]

These findings, therefore, point to the short-run possibility of monetary control. Other evidence, namely that foreign factors by no means predominate in terms of explainability in the expected money equations, add to this impression.

The other factor that may have had an influence upon domestic inflation rates in these countries is increases in the relative price of oil. The extent of the influence, though, is not easily ascertainable from our comparisons. Viewed in terms of the results most favorable to the hypothesis, the regressions with the corrections for first-order autocorrelation, the oil price impact accounted for a substantial, but in most countries, far from major proportion of the inflation over the 1973-74 period. Viewed on the basis of the regressions with the second-order correction, the effects are, in general, of considerably less magnitude and may in fact be largely spurious.

The other major area requiring some additional discussion is the demand for money. We find that in all of these countries, the rate of inflation rather than level of prices is uniquely determined. This is consistent with a number of other pieces of evidence. Our study using time series of cross state data, the Huffman and Lothian paper on the United Kingdom and several studies based upon time series data for the United States are all examples.[15]

The cause of these stochastic shifts, however, so far has not been determined. Measurement error, in either prices, real income or money is a possibility. Omitted variables in the money demand function--the change in "financial sophistication" used by Friedman and Schwartz (forthcoming) or the similar variable used by Bordo and Jonung in their long-term time-series study--is another. Further investigation of this question is clearly of considerable importance. Our results suggest, however, that the explanation will have to be applicable to more countries than just the United States.

Table 1

Price Equation with Dependent Variable log PD - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log(y^P/N)_{t-1}$	$\log R_L$	$\log y^T_{t-7}$	RHO1	RHO2	$\bar{R}^2$	SER	D.W.
Canada	3.096	-0.508	-1.099	-0.860	-0.897	-0.731	-0.973	-0.339	-1.224	0.079	0.058	1.0383	-0.1492	0.835	0.0147	2.04
	(3.977)	(2.931)	(4.813)	(3.675)	(4.210)	(3.150)	(4.367)	(2.044)	(14.303)	(1.907)	(0.424)					
France	0.678	-0.936	-1.044	-0.842	-0.581	-0.441	-0.205	-0.087	-0.941	0.076	0.022	1.8667	-0.8929	0.784	0.0086	1.93
	(0.620)	(9.717)	(6.006)	(4.001)	(2.552)	(1.984)	(1.060)	(0.831)	(8.154)	(2.423)	(0.540)					
Germany	4.121	-0.927	-0.686	-0.561	-0.600	-0.404	-0.221	-0.171	-1.288	0.002	0.057	1.7176	-0.7971	0.908	0.0085	2.68
	(7.480)	(12.507)	(5.049)	(3.157)	(3.080)	(2.178)	(1.473)	(1.945)	(21.808)	(0.110)	(0.866)					
Italy	11.733	-0.845	-0.645	-0.523	-0.292	-0.104	-0.127	0.079	-1.817	0.068	0.172	1.4123	-0.5274	0.955	0.0124	2.26
	(15.676)	(5.387)	(2.537)	(1.675)	(0.892)	(0.335)	(0.502)	(0.532)	(35.171)	(2.206)	(1.449)					
Japan	3.540	-0.910	-1.078	-1.096	-1.002	-0.863	-0.373	-0.154	-1.182	0.303	0.122	1.4245	-0.4694	0.950	0.0086	2.16
	(7.323)	(5.347)	(4.024)	(3.911)	(3.934)	(3.146)	(1.488)	(0.960)	(35.569)	(4.391)	(1.907)					
Nether-lands	0.614	-0.879	-0.846	-0.837	-0.620	-0.523	-0.333	-0.287	-0.938	0.009	0.134	1.1737	-0.2092	0.667	0.0136	2.06
	(0.525)	(8.549)	(6.207)	(5.773)	(4.293)	(3.317)	(2.259)	(2.620)	(7.378)	(0.257)	(1.034)					
U.K.	-1.948	-1.021	-0.842	-0.771	-0.941	-0.745	-0.591	-0.265	-0.577	-0.030	-0.0001	1.3967	-0.4666	0.661	0.0176	2.48
	(1.217)	(9.726)	(5.215)	(4.031)	(4.853)	(3.826)	(3.433)	(2.187)	(2.529)	(0.535)	(0.0001)					
U.S.	-0.684	-0.904	-1.571	-1.592	-1.276	-0.809	-0.533	-0.285	-0.818	-0.005	-0.039	1.6667	-0.7890	0.945	0.0040	2.44
	(2.459)	(10.071)	(9.683)	(7.592)	(5.840)	(3.880)	(3.215)	(3.023)	(26.666)	(0.456)	(0.757)					

Source: NBER, International Transmission of Inflation Data Base, (1978).
Note: ResM2 is the residuals from the expected money function (see Table 2), PD is the CNP/GDP deflator, y^P_T/N is real per capita permanent income, R_L is the long-term bond rate (except in the regression for Italy the short-term rate is used) and y^T is transitory income.

Table 2

Expected Money Function with Dependent Variable $\log \dot{M2}$
1956:I to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$\log \dot{M2}_{t-1}$	$\log \dot{M2}_{t-2}$	$\log \dot{M2}_{t-3}$	$(BP/MH)_{t-1}$	$(BP/MH)_{t-2}$	$\log y^T_{t-1}$	$\log \dot{M2US}_{t-1}$	$\bar{R}^2$	SER	D.W.
Canada	0.004 (1.283)	0.411 (3.629)			0.023 (0.665)		-0.041 (0.919)	0.628 (2.847)	0.522	0.0115	1.92
France	0.012 (3.570)	0.349 (3.785)				0.164 (4.131)		0.276 (1.733)	0.351	0.0118	2.15
Germany	0.002 (0.395)	0.040 (0.340)	0.183 (1.743)	0.352 (3.233)	0.012 (0.431)		-0.028 (0.403)	0.379 (1.966)	0.162	0.0143	1.91
Italy	0.018 (3.560)	0.054 (0.497)	0.201 (1.940)	0.212 (1.955)		0.066 (1.765)	-0.154 (3.553)		0.275	0.0099	1.88
Japan	0.016 (3.654)	0.515 (4.286)	0.094 (0.822)		0.036 (2.027)		0.008 (0.695)		0.433	0.0070	1.90
Nether-lands	0.005 (1.194)	0.276 (2.393)	0.249 (2.186)	0.010 (0.086)	-0.057 (1.511)		-0.137 (1.815)	0.403 (1.699)	0.211	0.0167	1.98
U.K.	0.001 (0.239)	0.077 (0.685)	0.206 (1.953)	0.251 (2.424)	0.060 (2.120)		0.026 (0.231)	0.540 (1.763)	0.257	0.0191	2.00
U.S.	0.005 (3.549)	0.880 (7.871)	-0.352 (2.419)	0.172 (1.583)			-0.050 (2.602)		0.617	0.0052	1.91

Source: See Table 1.
Note: BP is the official settlements balance, MH is high-powered money and y^T is transitory income. A dot above a variable signifies a first difference.

Table 3

The Effects of Foreign-Price Shocks on Domestic Price Levels

Country	GNP/GDP Deflator				CPI/Cost of Living			
	Relative Price of Oil	World Commodity Price Index	U.S. Deflator	Rest-of-World Deflator	Relative Price of Oil	World Commodity Price Index	U.S. CPI	Rest-of-World CPI
Canada	*	*,+						
France				*,+	*,+			*,+
Germany	+							
Italy		*			*,+	*,+		+
Japan	*,+		+	*	*,+		*,+	*,+
Netherlands								
U.K.	*,+		+	*			*	*
U.S.	*	*			*,+			
Number of countries for which foreign shock is significant:								
First order	4	3	-	3	4	1	2	3
Second order	3	1	2	1	4	1	1	3

Source: See Table 1.

Note: Variables are as defined in text.

* indicates significant F-statistics at 10% or better in equation with a correction for first order autocorrelation.

+ indicates significant F-statistics at 10% or better in equation with a correction for second order autocorrelation.

Table 4

Contribution of Changes in Relative Oil Prices to Domestic Price Levels

Country	1973:I - 1974:IV GLS 1	1973:I - 1974:IV GLS 2	1973:I - 1976:IV GLS I	1973:I - 1976:IV GLS 2
	GNP/GDP Deflator			
Canada	28.8	29.2	15.5	15.7
France	51.9	23.5	25.0	11.2
Germany	17.9	14.9	11.1	9.2
Italy	21.9	-4.6	12.5	-2.7
Japan	25.9	31.0	18.2	21.8
U.K.	7.3	4.0	3.3	1.8
U.S.	24.5	4.1	14.2	2.4
	CPI/Cost of Living			
Canada	17.0	-38.4	9.0	-20.4
France	58.1	52.2	30.1	27.0
Germany	9.3	-10.0	5.7	6.1
Italy	28.1	10.4	14.2	5.1
Japan	34.5	43.0	23.3	29.0
U.K.	-8.8	-21.5	-3.5	-8.6
U.S.	27.6	12.5	16.4	7.4

Source: See Table 1.

Note: The above figures are the ratio of:
(1) the product of the change in logarithm of the relative price of oil over the appropriate period and the sum of the oil-price coefficients in the relevant regression to (2) the change in the logarithm of the relevant domestic price index. The symbol GLS1 denotes a regression with a correction for first-order autocorrelation; GLS2 a regression with a correction for second order autocorrelation.

NOTES

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1 The seven foreign countries are: Canada, France, Germany, Italy, Japan, the Netherlands, and the United Kingdom. The data are taken from individual country sources and are described in Lothian (1978).

2 See the paper by Cassese and Lothian using Granger causality tests, and by Darby and Stockman, using a simultaneous model, for corroborative evidence for these countries over this period. The study by Dewald and Marchon and various papers in the conference volume edited by Brunner and Meltzer also contain findings that are largely consistent with ours.

3 In the empirical work reported below, we use a long-term bond rate as the interest rate variable to reduce problems of simultaneity.

4 The final form of the equation is similar to the equation estimated by Barro (1978) with annual data for the United States.

5 Of the three monetary variables we tried, M1, M2 and high-powered money, M2 performed the best. The estimated coefficients were more consistent among countries and closer to what we regard as of plausible magnitude.

We derived the permanent income series using a logarithmic version of the method outlined in Darby (1972). The choice of weights was largely arbitrary. We wanted to use an a priori scheme and the two most likely --Darby's (.10 annual weight) and Friedman's (.33 annual weight) produced no appreciable differences in the estimates.

6 As Laidler (1980) has pointed out, having actual money on the righthand side of the equation may lead to bias. Reestimating our equations with expected rather than actual money however, produced virtually the same results.

7 The estimated equations also include transitory income lagged seven quarters, which is one more quarter than the maximum lag on the monetary shocks. In no instance is this term significant. This is consistent with the assumption implicit in our derivation of the price equation that the monetary shocks account for movements in transitory income.

8 Recall that the interest elasticities are opposite in sign from the regression coefficients.

9 Laidler (1977) contains a summary of the long-term time-series evidence. More recent studies include Huffman and Lothian who estimate demand functions for high-powered money for the U.K. for the years 1833-1968 and Friedman and Schwartz (forthcoming), which present estimates for M2 for both the U.K. and U.S. for the years 1874 to 1975. Gandolfi and Lothian contains estimates from time series of cross-state data for the period 1929-68 and Lothian (1976) estimates from time-series of cross-country data.

10 The papers by Coats and by Hafer and Hein present results for money demand functions estimated with quarterly U.S. data that are consistent with this explanation. The authors of both papers claim that a first-differenced version of the equation is warranted. Gordon finds the same thing in his study of longer-term U.S. inflation.

11 Darby (1980) contains a more complete theoretical discussion of the impact of oil prices on the overall price level.

12 As measures of the relative price of oil we used the ratio of the dollar price of Venezuelan crude to either the U.S. CPI or GNP deflator. As measures of commodity prices, we used the ratio of the London Economist's dollar based index of commodity to either the U.S. CPI or GNP deflator. For each country, we calculated separate rest-of-world indices of the CPIs or deflator as nominal-income weighted averages of the indices for the seven foreign countries.

13 There is a further difference between Cagan's and our estimates. What Cagan is measuring is impact effects. Our estimates, in contrast, implicitly allow for subsequent adjustment of the relevant prices of other products.

14 The two are not competing hypotheses. Both channels of transmission in principle can operate at the same time. The important question is the quantitative importance of the one vis-a-vis the other within the relevant time period.

It is important to note also that our results are for measured price indices. Aggregation as well as measurement error may obscure the effects of price arbitrage in individual markets.

15 See the studies cited above in footnote 8.

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International Price Behavior and the Demand for Money

APPENDIX

Table 5a

Price Equation with
Dependent Variable log PD - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log (y^P/N)_{t-1}$	$\log R_L$	$\log y^T_{t-7}$	$\bar{R}^2$	SER	D.W.
Canada	2.774 (3.829)	-0.148 (0.378)	-1.032 (2.697)	-1.117 (3.035)	-0.991 (3.022)	-0.765 (2.050)	-1.345 (3.678)	-0.934 (2.581)	-1.185 (16.332)	0.077 (1.513)	0.119 (0.759)	0.982	0.0306	0.32
France	5.834 (6.484)	0.485 (0.655)	-0.103 (0.152)	0.030 (0.046)	0.113 (0.169)	-0.037 (0.054)	0.479 (0.674)	-0.299 (0.377)	-1.375 (17.870)	0.479 (6.460)	-0.784 (2.123)	0.952	0.0661	0.21
Germany	5.087 (9.830)	-0.722 (2.331)	-0.619 (1.989)	-0.366 (1.203)	-0.696 (2.254)	-0.428 (1.336)	-0.790 (2.189)	-1.274 (3.579)	-1.386 (31.148)	0.023 (0.463)	0.878 (4.203)	0.981	0.0354	0.41
Italy	11.837 (39.380)	-0.731 (2.126)	-0.644 (1.847)	-0.554 (1.627)	-0.590 (1.708)	-0.504 (1.450)	-0.538 (1.548)	-0.121 (0.347)	-1.810 (94.312)	0.137 (6.701)	1.008 (5.543)	0.996	0.0287	0.30
Japan	5.307 (29.060)	-0.552 (1.321)	-0.595 (1.405)	-0.934 (2.212)	-0.791 (2.209)	-0.593 (1.441)	-0.410 (1.007)	-0.554 (1.392)	-1.213 (165.900)	0.828 (17.128)	0.131 (2.386)	0.999	0.0202	0.34
Netherlands	1.706 (2.763)	-0.233 (0.898)	-0.389 (1.521)	-0.553 (2.184)	-0.294 (1.240)	-0.023 (0.094)	-0.071 (0.286)	-0.123 (0.454)	-1.029 (18.355)	0.104 (2.394)	1.247 (6.673)	0.968	0.0332	0.45
U.K.	-0.109 (0.099)	-0.904 (2.751)	-0.861 (2.612)	-1.119 (3.279)	-1.292 (4.085)	-1.254 (3.876)	-1.226 (3.692)	-1.025 (3.116)	-0.836 (5.735)	0.026 (0.475)	-0.566 (1.397)	0.849	0.0513	0.26
U.S.	-0.967 (1.409)	-0.927 (2.311)	-1.963 (5.239)	-2.158 (6.056)	-1.889 (5.411)	-1.704 (4.721)	-1.580 (4.291)	-1.496 (4.325)	-0.785 (11.556)	-0.008 (0.201)	0.090 (1.278)	0.988	0.0143	0.32

Source: See Table 1.
Note: Variables are defined as in Table 1.

Table 5b

Price Equation with
Dependent Variable log PD - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log(y^P/N)_{t-1}$	$\log R_L$	$\log y^T_{t-7}$	RHO1	$\bar{R}^2$	SER	D.W.
Canada	3.178 (3.856)	-0.465 (2.658)	-1.063 (4.940)	-0.842 (3.889)	-0.886 (4.584)	-0.688 (3.256)	-0.948 (4.550)	-0.337 (2.032)	-1.232 (13.405)	0.086 (2.096)	0.105 (0.735)	0.9102	0.804	0.0148	1.77
France	0.703 (0.619)	-0.983 (5.693)	-1.145 (4.698)	-0.874 (3.451)	-0.584 (2.272)	-0.485 (1.871)	-0.291 (1.152)	-0.198 (1.104)	-0.928 (7.828)	0.128 (2.389)	-0.068 (0.667)	0.9884	0.554	0.0154	0.52
Germany	3.640 (3.553)	-0.841 (7.751)	-0.560 (3.944)	-0.411 (2.685)	-0.492 (3.073)	-0.344 (2.205)	-0.220 (1.398)	-0.223 (1.689)	-1.234 (11.239)	0.0003 (0.011)	0.220 (1.660)	0.9714	0.692	0.0130	0.71
Italy	12.477 (12.279)	-0.716 (4.336)	-0.571 (2.669)	-0.474 (2.043)	-0.339 (1.444)	-0.214 (0.931)	-0.240 (1.145)	0.028 (0.177)	-1.863 (25.891)	0.106 (3.316)	0.454 (3.221)	0.9410	0.912	0.0137	1.34
Japan	3.895 (7.717)	-0.944 (5.160)	-1.086 (4.508)	-1.138 (4.832)	-1.058 (5.275)	-0.920 (4.045)	-0.473 (2.145)	-0.235 (1.357)	-1.181 (34.760)	0.441 (6.281)	0.158 (2.241)	0.9694	0.954	0.0093	1.36
Netherlands	0.731 (0.639)	-0.841 (8.059)	-0.818 (6.490)	-0.818 (6.288)	-0.605 (4.747)	-0.515 (3.625)	-0.335 (2.441)	-0.287 (2.588)	-0.953 (7.678)	0.005 (0.131)	0.151 (1.134)	0.9704	0.672	0.0139	1.63
U.K.	-3.800 (1.817)	-0.968 (8.644)	-0.804 (5.663)	-0.703 (4.679)	-0.931 (6.412)	-0.757 (5.074)	-0.660 (4.549)	-0.368 (3.041)	-0.318 (1.037)	-0.098 (1.735)	0.097 (0.545)	0.9767	0.540	0.0193	1.28
U.S.	-1.371 (2.389)	-0.942 (6.815)	-1.698 (10.111)	-1.759 (9.690)	-1.464 (8.107)	-1.113 (6.079)	-0.857 (4.985)	-0.522 (3.933)	-0.738 (11.426)	-0.009 (0.479)	0.174 (2.575)	0.9508	0.814	0.0058	0.80

Source: See Table 1.
Note: Variables are defined as in Table 1.

Table 6a

Price Equation with Dependent Variable log PC - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$RealM2_t$	$RealM2_{t-1}$	$RealM2_{t-2}$	$RealM2_{t-3}$	$RealM2_{t-4}$	$RealM2_{t-5}$	$RealM2_{t-6}$	$\log (y^P/N)_{t-1}$	$\log R_L$	$\log y^T_{t-7}$	$\log USPC_t$	$\log USPC_{t-1}$	$\log USPC_{t-2}$	$\log USPC_{t-3}$	RHO 1	$\bar{R}^2$	SER	D.W.
Canada	2.361	-0.671	-0.824	-0.790	-0.859	-0.736	-0.557	-0.236	-1.173	-0.010	0.076	-0.882	0.064	-0.178	-0.774	0.9889	0.734	0.0099	0.80
	(1.246)	(5.928)	(5.681)	(5.528)	(6.762)	(5.249)	(4.068)	(2.151)	(5.108)	(0.370)	(0.801)	(2.187)	(0.139)	(0.390)	(2.074)				
France	4.193	-1.011	-1.284	-1.128	-0.887	-0.791	-0.591	-0.386	-1.325	0.047	-0.106	0.566	0.644	0.328	-0.869	0.9893	0.558	0.0146	0.62
	(2.349)	(5.766)	(5.312)	(4.559)	(3.523)	(3.104)	(2.352)	(2.178)	(6.852)	(0.729)	(1.066)	(0.842)	(0.878)	(0.426)	(1.442)				
Germany	5.788	-0.846	-0.556	-0.435	-0.556	-0.344	-0.295	-0.223	-1.453	0.041	0.054	-0.179	-0.192	-0.088	0.462	0.9678	0.779	0.0119	0.98
	(3.602)	(8.060)	(4.185)	(3.048)	(3.704)	(2.358)	(1.988)	(1.779)	(8.408)	(1.381)	(0.425)	(0.373)	(0.344)	(0.139)	(0.982)				
Italy	12.854	-0.732	-0.653	-0.776	-0.679	-0.494	-0.267	-0.093	1.887	0.127	0.145	0.174	0.908	-0.365	-0.813	0.8936	0.973	0.0107	1.10
	(10.681)	(5.455)	(3.736)	(4.113)	(3.604)	(2.694)	(1.601)	(0.711)	(21.114)	(4.253)	(1.268)	(0.403)	(1.726)	(0.702)	(1.929)				
Japan	5.768	-0.887	-1.223	-1.290	-1.094	-1.237	-0.712	-0.516	-1.327	0.421	0.110	0.655	-0.168	0.236	-0.181	0.8451	0.990	0.0104	1.62
	(13.300)	(4.102)	(4.357)	(4.656)	(4.641)	(4.609)	(2.759)	(2.511)	(36.887)	(4.494)	(1.438)	(1.341)	(0.273)	(0.390)	(0.384)				
Netherlands	-1.520	-0.867	-0.882	-0.983	-0.724	-0.649	-0.516	-0.349	-0.684	0.042	-0.064	-0.082	-0.527	-0.749	0.918	0.9801	0.695	0.0137	1.61
	(0.586)	(8.322)	(6.972)	(7.548)	(5.649)	(4.551)	(3.732)	(3.150)	(2.381)	(1.116)	(0.476)	(0.149)	(0.832)	(1.158)	(1.764)				
U.K.	6.287	-0.852	-0.714	-0.679	-0.677	-0.540	-0.400	-0.201	-1.812	-0.019	0.038	-1.574	0.295	0.745	1.388	0.9799	0.673	0.0138	0.75
	(2.483)	(10.078)	(6.727)	(6.133)	(6.417)	(4.897)	(3.779)	(2.300)	(4.745)	(0.420)	(0.292)	(2.711)	(0.440)	(1.126)	(2.418)				

Source: See Table 1.
Note: USPC is the U.S. consumer price index; the other variables are as defined in Table 1.

Table 6b

Price Equation with Dependent Variable log PC - log (H2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	ResH2$_t$	ResH2$_{t-1}$	ResH2$_{t-2}$	ResH2$_{t-3}$	ResH2$_{t-4}$	ResH2$_{t-5}$	ResH2$_{t-6}$	log $(y^P/H)_{t-1}$	log RL_t	log y^T_{t-7}	log $USPC_t$	log $USPC_{t-1}$	log $USPC_{t-2}$	log $USPC_{t-3}$	RHO1 RHO2	$\bar{R}^2$	SER	D.W.
Canada	-1.107 (1.686)	-0.917 (14.814)	-1.128 (10.390)	-1.058 (7.974)	-1.016 (7.669)	-0.817 (6.153)	-0.481 (4.323)	-0.107 (1.688)	-0.746 (9.522)	-0.008 (0.512)	-0.075 (1.837)	0.479 (1.991)	-0.536 (2.809)	-0.503 (2.652)	0.054 (0.221)	1.7243 -0.8915	0.984	0.0057	2.02
France	-3.179 (0.912)	-0.885 (9.358)	-1.023 (6.038)	-0.970 (4.779)	-0.783 (3.568)	-0.601 (2.782)	-0.310 (1.651)	-0.619 (1.646)	-0.547 (1.477)	0.046 (1.440)	0.021 (0.523)	0.694 (1.955)	-0.082 (0.244)	-0.180 (0.543)	-0.663 (1.893)	1.8789 -0.9007	0.734	0.0086	2.04
Germany	2.989 (1.847)	-0.867 (10.591)	-0.592 (4.027)	-0.453 (2.456)	-0.555 (2.785)	-0.300 (1.582)	-0.259 (1.680)	-0.187 (2.036)	-1.166 (6.691)	0.001 (0.034)	-0.105 (1.455)	0.360 (0.984)	-0.550 (1.708)	-0.634 (1.834)	0.522 (1.322)	1.6919 -0.7642	0.904	0.0089	2.48
Italy	13.045 (13.368)	-0.920 (8.243)	-0.844 (4.392)	-0.919 (3.760)	-0.773 (2.969)	-0.528 (2.174)	-0.299 (1.570)	-0.111 (1.022)	-1.911 (26.612)	0.064 (2.699)	0.019 (0.240)	0.014 (0.040)	0.506 (1.612)	-0.448 (1.454)	-0.043 (0.118)	1.5458 -0.6931	0.985	0.0086	2.09
Japan	5.649 (14.337)	-1.065 (4.990)	-1.411 (4.377)	-1.340 (4.057)	-1.130 (3.815)	-1.316 (4.105)	-0.691 (2.324)	-0.442 (2.197)	-1.331 (39.526)	0.355 (3.654)	0.045 (0.618)	0.634 (1.318)	-0.054 (0.106)	0.269 (0.539)	-0.308 (0.691)	1.1470 -0.3370	0.992	0.0100	2.09
Netherlands	-1.831 (0.624)	-0.928 (9.057)	-0.928 (6.725)	-1.020 (6.906)	-0.757 (5.122)	-0.683 (4.261)	-0.537 (3.590)	-0.371 (3.382)	-0.649 (1.998)	0.045 (1.258)	-0.125 (0.972)	-0.101 (0.191)	-0.568 (1.016)	-0.822 (1.459)	1.026 (1.995)	1.2111 -0.2419	0.702	0.0134	2.01
U.K.	1.527 (0.640)	-0.751 (12.521)	-0.594 (6.105)	-0.562 (4.610)	-0.544 (4.308)	-0.402 (3.189)	-0.261 (2.485)	-0.092 (1.392)	-1.099 (3.056)	-0.023 (0.717)	-0.084 (1.169)	-0.606 (1.444)	0.003 (0.009)	0.374 (1.105)	0.561 (1.286)	1.7379 -0.7994	0.826	0.0098	2.11

Source: See Table 1.
Note: USPC is the U.S. consumer price index; the other variables are as defined in Table 1.

Table 7a

Price Equation with Dependent Variable log PD - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log (y^P/N_{-1})$	$\log R_L$	$\log y^T_{t-7}$	$\log USPD_t$	$\log USPD_{t-1}$	$\log USPD_{t-2}$	$\log USPD_{t-3}$	RHO1	$\bar{R}^2$	SER	D.W.
Canada	0.100	-0.442	-1.037	-0.829	-0.845	-0.702	-0.920	-0.303	-0.865	0.072	0.129	0.441	-0.859	0.710	-0.616	0.8455	0.901	0.0145	1.78
	(0.065)	(2.470)	(4.720)	(3.866)	(4.366)	(3.098)	(4.046)	(1.712)	(4.711)	(1.712)	(0.927)	(0.828)	(1.400)	(1.224)	(1.219)				
France	3.694	-1.059	-1.270	-0.992	-0.666	-0.574	-0.430	-0.273	-1.253	0.106	-0.074	-0.007	0.679	0.111	-0.328	0.9869	0.568	0.0153	0.55
	(1.905)	(6.001)	(5.061)	(3.812)	(2.538)	(2.175)	(1.657)	(1.458)	(6.012)	(1.821)	(0.722)	(0.012)	(1.163)	(0.192)	(0.664)				
Germany	3.969	-0.797	-0.495	-0.400	-0.482	-0.316	-0.242	-0.241	-1.266	0.007	0.269	-0.741	-0.038	1.024	-0.187	0.9694	0.711	0.0128	0.80
	(2.152)	(6.867)	(3.418)	(2.629)	(3.005)	(2.025)	(1.518)	(1.780)	(6.381)	(0.223)	(1.997)	(1.702)	(0.075)	(2.070)	(0.425)				
Italy	9.980	-0.736	-0.552	-0.487	-0.432	-0.363	-0.392	-0.081	-1.681	0.125	0.476	0.473	0.568	-0.328	-0.977	0.8934	0.960	0.0129	1.56
	(6.369)	(4.494)	(2.675)	(2.206)	(1.923)	(1.625)	(1.911)	(0.514)	(14.497)	(3.584)	(3.480)	(1.094)	(1.152)	(0.664)	(2.272)				
Japan	5.473	-0.870	-1.009	-1.085	-1.039	-0.875	-0.364	-0.173	-1.316	0.367	0.130	0.636	-0.155	0.067	-0.237	0.8906	0.989	0.0089	1.42
	(11.137)	(4.715)	(4.146)	(4.579)	(5.270)	(3.891)	(1.615)	(0.983)	(33.231)	(4.789)	(1.825)	(2.002)	(0.442)	(0.198)	(0.708)				
Netherlands	-6.822	-0.876	-0.872	-0.894	-0.675	-0.580	-0.405	-0.332	-0.108	0.004	0.091	-0.743	-0.666	-0.046	0.728	0.9664	0.73	0.0128	1.80
	(2.647)	(8.852)	(7.217)	(7.128)	(5.462)	(4.148)	(3.047)	(3.065)	(0.381)	(0.132)	(0.713)	(1.715)	(1.374)	(0.096)	(1.813)				
U.K.	6.855	-1.029	-0.830	-0.730	-0.932	-0.735	-0.622	-0.314	-1.919	-0.080	0.272	-0.823	0.458	0.022	1.366	0.9604	0.646	0.0170	1.73
	(2.289)	(9.930)	(6.482)	(5.406)	(7.197)	(5.442)	(4.739)	(2.876)	(4.267)	(1.451)	(1.615)	(1.306)	(0.650)	(0.032)	(2.158)				
U.S.	0.679	-0.950	-1.663	-1.729	-1.603	-1.340	-1.024	-0.505	-0.992	-0.031	0.104	0.882	-0.001	-0.323	-0.407	0.9843	0.794	0.0050	0.71
	(0.637)	(8.066)	(11.560)	(11.141)	(10.117)	(8.118)	(6.536)	(4.263)	(7.895)	(1.768)	(1.678)	(4.774)	(0.006)	(1.724)	(2.364)				

Source: See Table 1.
Note: USPD is the U.S. GNP deflator; the other variables are as defined in Table 1.

Table 7b

Price Equation with Dependent Variable log PD - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log(y^P/N)_{t-1}$	$\log RL_t$	$\log y^T_{t-7}$	$\log USPD_t$	$\log USPD_{t-1}$	$\log USPD_{t-2}$	$\log USPD_{t-3}$	RHO1 RHO2	$\bar{R}^2$	SER	D.W.
																0.9969			
Canada	-0.212	-0.473	-1.052	-0.822	-0.832	-0.685	-0.894	-0.285	-0.828	0.067	0.085	0.225	-0.793	0.674	-0.452	-0.1755	0.916	0.0143	2.08
	(0.144)	(2.662)	(4.452)	(3.488)	(3.817)	(2.745)	(3.616)	(1.603)	(4.742)	(1.566)	(0.644)	(0.424)	(1.390)	(1.257)	(0.888)				
																1.8884			
France	5.649	-0.955	-1.075	-0.857	-0.571	-0.451	-0.256	-0.126	-1.465	-0.077	0.026	0.062	0.500	0.227	-0.110	-0.9312	0.831	0.0085	1.99
	(2.566)	(9.871)	(6.094)	(3.994)	(2.464)	(1.996)	(1.294)	(1.158)	(6.300)	(2.437)	(0.643)	(0.230)	(2.104)	(1.001)	(0.425)				
																1.7950			
Germany	1.445	-0.920	-0.704	-0.625	-0.632	-0.409	-0.227	-0.179	-1.000	0.004	0.045	0.062	-0.164	0.332	-0.533	-0.8740	0.915	0.0082	2.63
	(0.878)	(12.342)	(5.003)	(3.436)	(3.249)	(2.215)	(1.532)	(2.109)	(5.652)	(0.245)	(0.718)	(0.220)	(0.710)	(1.416)	(1.934)				
																1.2988			
Italy	9.759	-0.798	-0.549	-0.464	-0.307	-0.170	-0.191	0.035	-1.668	0.105	0.216	0.385	0.310	-0.224	-0.724	-0.4301	0.966	0.0123	2.18
	(6.359)	(4.972)	(2.241)	(1.613)	(1.032)	(0.595)	(0.800)	(0.237)	(14.723)	(2.934)	(1.725)	(0.924)	(0.792)	(0.569)	(1.756)				
																1.1178			
Japan	5.449	-0.978	-1.038	-1.048	-1.051	-1.061	-0.318	-0.063	-1.326	0.307	0.106	0.317	0.170	0.180	-0.330	-0.2634	0.991	0.0092	2.04
	(11.509)	(4.968)	(3.569)	(3.616)	(4.186)	(3.817)	(1.165)	(0.336)	(34.331)	(3.730)	(1.446)	(0.946)	(0.513)	(0.557)	(0.946)				
																1.0656			
Netherlands	-6.860	-0.888	-0.879	-0.899	-0.682	-0.585	-0.404	-0.333	-0.105	0.002	0.087	-0.678	-0.719	-0.090	0.763	-0.1049	0.731	0.0127	2.00
	(2.548)	(8.984)	(6.969)	(6.779)	(5.182)	(3.984)	(2.927)	(3.078)	(0.354)	(0.067)	(0.684)	(1.572)	(1.549)	(0.200)	(1.893)				
																1.1463			
U.K.	5.908	-1.044	-0.850	-0.757	-0.942	-0.749	-0.617	-0.292	-1.771	-0.067	0.195	-0.710	0.292	0.008	1.306	-0.1996	0.656	0.0168	2.18
	(1.908)	(10.055)	(6.146)	(5.016)	(6.382)	(4.915)	(4.291)	(2.608)	(3.807)	(1.162)	(1.224)	(1.141)	(0.452)	(0.013)	(2.055)				

Source: See Table 1.
Note: USPD is the U.S. GNP deflator; the other variables are as defined in Table 1.

Table 8a

Price Equation with Dependent Variable log (PC) - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log (y^P/N)_{t-1}$	$\log R_L$	$\log y^T_{t-7}$	$\log OIL_t$	$\log OIL_{t-1}$	$\log OIL_{t-2}$	$\log OIL_{t-3}$	RHO1	$\bar{R}^2$	SER	D.W.
Canada	3.595	-0.672	-0.880	-0.930	-0.976	-0.806	-0.619	-0.301	-1.320	0.002	0.104	0.004	0.015	0.003	0.003	0.9937	0.667	0.0106	0.79
	(2.966)	(5.416)	(5.606)	(5.847)	(6.924)	(5.098)	(4.066)	(2.540)	(9.103)	(0.054)	(0.995)	(0.314)	(1.314)	(0.295)	(0.229)				
France	0.758	-1.085	-1.279	-1.137	-0.935	-0.765	-0.545	-0.381	-0.955	0.076	-0.081	0.017	0.022	0.028	0.033	0.9876	0.565	0.0146	0.55
	(0.698)	(5.929)	(5.244)	(4.545)	(3.699)	(3.001)	(2.215)	(2.191)	(8.311)	(1.362)	(0.830)	(1.022)	(1.362)	(1.727)	(1.905)				
Germany	6.039	-0.829	-0.541	-0.416	-0.538	-0.308	-0.269	-0.201	-1.482	0.043	0.043	-0.007	-0.002	0.003	0.016	0.9637	0.793	0.0119	0.99
	(6.785)	(8.086)	(3.954)	(2.768)	(3.401)	(2.003)	(1.790)	(1.606)	(15.478)	(1.548)	(0.346)	(0.547)	(0.202)	(0.231)	(1.172)				
Italy	13.764	-0.744	-0.650	-0.784	-0.704	-0.544	-0.311	-0.078	-1.957	0.115	0.180	0.030	0.011	0.014	0.015	0.9833	0.878	0.0106	0.92
	(10.959)	(5.778)	(3.811)	(4.179)	(3.652)	(2.876)	(1.825)	(0.604)	(21.524)	(3.883)	(1.604)	(2.437)	(0.915)	(1.258)	(1.305)				
Japan	3.230	-0.770	-1.012	-1.065	-0.977	-0.923	-0.497	-0.329	-1.150	0.359	0.108	0.043	0.018	0.030	0.004	0.9561	0.950	0.0108	1.37
	(5.620)	(3.316)	(3.542)	(3.782)	(4.055)	(3.362)	(1.852)	(1.586)	(32.398)	(3.022)	(1.287)	(3.041)	(1.622)	(2.719)	(0.324)				
Netherlands	2.494	-0.852	-0.862	-0.956	-0.690	-0.623	-0.479	-0.332	-1.126	0.055	-0.048	0.005	-0.029	-0.020	-0.007	0.9660	0.733	0.0138	1.64
	(2.197)	(8.007)	(6.717)	(7.308)	(5.435)	(4.347)	(3.439)	(2.875)	(9.087)	(1.513)	(0.350)	(0.338)	(2.062)	(1.430)	(0.421)				
U.K.	-2.450	-0.824	-0.733	-0.717	-0.749	-0.663	-0.520	-0.247	-0.506	-0.054	-0.127	-0.018	-0.014	-0.007	0.021	0.9832	0.493	0.0171	0.54
	(1.220)	(7.982)	(5.547)	(5.044)	(5.514)	(4.797)	(3.954)	(2.262)	(1.704)	(1.002)	(0.749)	(0.919)	(0.801)	(0.396)	(1.003)				
U.S.	-0.734	-1.029	-1.741	-1.762	-1.648	-1.381	-1.056	-0.585	-0.824	-0.032	0.153	0.018	0.009	0.010	0.004	0.9685	0.769	0.0614	0.65
	(0.998)	(6.917)	(9.589)	(8.944)	(8.446)	(7.082)	(5.744)	(4.076)	(9.756)	(1.463)	(2.058)	(2.545)	(1.519)	(1.575)	(0.521)				

Source: See Table 1
Note: OIL is the relative price of oil index; the other variables are as defined in Table 1.

Table 8b

Price Equation with Dependent Variable log (PC) - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log(y^P/N)_{t-1}$	$\log R_L$	$\log y^T_{t-7}$	$\log OIL_t$	$\log OIL_{t-1}$	$\log OIL_{t-2}$	$\log OIL_{t-3}$	RHO1 RHO2	$\bar{R}^2$	SER	D.W.
Canada	2.796	-0.927	-1.182	-1.110	-1.034	-0.828	-0.526	-0.147	-1.206	0.013	-0.094	-0.007	-0.020	-0.023	-0.006	1.7477	0.964	0.0069	1.95
	(7.622)	(12.418)	(8.959)	(7.029)	(6.650)	(5.302)	(3.989)	(1.939)	(28.786)	(0.684)	(1.854)	(1.137)	(2.820)	(3.477)	(0.929)	-0.8802			
France	0.173	-0.934	-1.022	-0.943	-0.767	-0.565	-0.305	-0.189	-0.900	0.051	0.028	0.018	0.019	0.026	0.028	1.8879	0.776	0.0080	1.98
	(0.161)	(9.312)	(5.960)	(4.642)	(3.525)	(2.638)	(1.648)	(1.901)	(7.871)	(1.691)	(0.731)	(2.034)	(1.549)	(2.185)	(2.818)	-0.9139			
Germany	5.863	-0.871	-0.615	-0.500	-0.596	-0.351	-0.273	-0.172	-1.469	0.023	-0.103	-0.004	-0.009	-0.003	0.007	1.5988	0.896	0.0094	2.45
	(8.693)	(10.439)	(4.187)	(2.679)	(2.926)	(1.829)	(1.718)	(1.750)	(20.079)	(1.213)	(1.293)	(0.389)	(0.826)	(0.318)	(0.690)	-0.6712			
Italy	12.929	-0.875	-0.786	-0.870	-0.721	-0.496	-0.252	-0.045	-1.902	0.069	0.090	0.019	-0.001	0.002	0.006	1.5661	0.988	0.0082	2.00
	(30.057)	(8.252)	(4.261)	(3.677)	(2.840)	(2.082)	(1.354)	(0.442)	(64.910)	(2.865)	(1.189)	(2.423)	(0.155)	(0.226)	(0.795)	-0.7201			
Japan	2.774	-1.006	-1.240	-1.084	-0.950	-0.881	-0.288	-0.107	-1.155	0.168	0.029	0.055	0.023	0.032	0.010	1.4562	0.964	0.0097	2.16
	(5.549)	(5.042)	(3.869)	(3.159)	(3.022)	(2.609)	(0.941)	(0.554)	(40.114)	(1.419)	(0.407)	(4.525)	(2.230)	(3.036)	(0.847)	-0.5321			
Netherlands	2.505	-0.919	-0.916	-1.003	-0.725	-0.667	-0.512	-0.371	-1.126	0.061	-0.132	0.011	-0.030	-0.019	-0.008	1.1918	0.753	0.0135	2.07
	(2.340)	(8.747)	(6.507)	(6.716)	(4.891)	(4.107)	(3.381)	(3.250)	(9.658)	(1.707)	(0.972)	(0.691)	(2.112)	(1.323)	(0.515)	-0.2420			
U.K.	-1.155	-0.727	-0.591	-0.593	-0.578	-0.445	-0.286	-0.094	-0.690	-0.003	-0.094	0.005	-0.015	-0.016	-0.018	1.8294	0.839	0.0097	2.08
	(1.123)	(12.650)	(6.113)	(4.811)	(4.566)	(3.596)	(2.843)	(1.479)	(4.565)	(0.160)	(1.329)	(0.540)	(1.120)	(1.237)	(1.515)	-0.8946			
U.S.	-0.095	-0.962	-1.552	-1.472	-1.263	-0.880	-0.531	-0.188	-0.892	-0.014	-0.024	0.004	0.002	0.005	0.008	1.7757	0.965	0.0033	1.98
	(0.392)	(13.116)	(11.532)	(8.392)	(6.907)	(5.068)	(3.853)	(2.375)	(32.717)	(1.494)	(0.552)	(1.272)	(0.510)	(1.457)	(2.701)	-0.8968			

Source: See Table 1
Note: OIL is the relative price of oil index; the other variables are as defined in Table 1.

Table 9a

Price Equation with Dependent Variable log PD - log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log(y^P/N)_{t-1}$	$\log RL_t$	$\log y^T_{t-7}$	$\log OIL_t$	$\log OIL_{t-1}$	$\log OIL_{t-2}$	$\log OIL_{t-3}$	RHO1	$\bar{R}^2$	SER	D.W.
Canada	3.256 (2.569)	-0.557 (3.291)	-1.172 (5.477)	-0.972 (4.479)	-1.001 (5.203)	-0.773 (3.588)	-1.009 (4.869)	-0.348 (2.161)	-1.261 (8.415)	0.043 (1.023)	0.092 (0.646)	0.034 (2.084)	0.014 (0.909)	0.031 (2.068)	-0.029 (1.818)	0.9729	0.627	0.0143	1.81
France	1.253 (1.149)	-1.084 (5.780)	-1.258 (5.033)	-1.019 (3.977)	-0.756 (2.908)	-0.602 (2.304)	-0.408 (1.616)	-0.276 (1.549)	-1.003 (8.699)	0.088 (1.524)	-0.091 (0.911)	0.011 (0.608)	0.012 (0.724)	0.030 (1.809)	0.027 (1.502)	0.9357	0.980	0.0087	1.35
Germany	4.008 (4.080)	-0.846 (7.606)	-0.536 (3.612)	-0.379 (2.323)	-0.467 (2.719)	-0.255 (1.532)	-0.178 (1.090)	-0.175 (1.291)	-1.272 (12.027)	0.015 (0.490)	0.219 (1.621)	-0.019 (1.299)	0.005 (0.354)	0.003 (0.193)	0.031 (2.129)	0.9656	0.718	0.0130	0.72
Italy	12.684 (8.254)	-0.732 (4.371)	-0.608 (2.734)	-0.542 (2.214)	-0.426 (1.691)	-0.313 (1.270)	-0.346 (1.555)	-0.034 (0.200)	-1.886 (16.978)	0.084 (2.173)	0.425 (2.910)	0.003 (0.211)	0.020 (1.310)	0.010 (0.646)	0.018 (1.184)	0.9788	0.819	0.0138	1.40
Japan	3.894 (9.268)	-0.830 (4.681)	-0.944 (4.085)	-0.964 (4.235)	-0.917 (4.712)	-0.722 (3.256)	-0.285 (1.313)	-0.085 (0.508)	-1.203 (50.200)	0.346 (3.591)	0.159 (2.380)	0.026 (2,261)	0.020 (2.294)	0.021 (2.369)	-0.006 (0.559)	0.9357	0.980	0.0087	1.35
Netherlands	-0.082 (0.096)	-0.857 (8.137)	-0.825 (6.500)	-0.818 (6.341)	-0.592 (4.739)	-0.522 (3.703)	-0.339 (2.474)	-0.307 (2.695)	-0.853 (9.396)	0.017 (0.487)	0.172 (1.271)	-0.002 (0.160)	-0.026 (1.907)	-0.016 (1.160)	-0.025 (1.611)	0.9326	0.778	0.0135	1.68
U.K.	-3.474 (1.832)	-1.001 (9.190)	-0.793 (5.690)	-0.645 (4.302)	-0.852 (5.947)	-0.707 (4.848)	-0.602 (4.340)	-0.324 (2.810)	-0.369 (1.324)	-0.097 (1.700)	0.001 (0.005)	-0.030 (1.485)	-0.031 (1.663)	0.051 (2.701)	0.027 (1.194)	0.9731	0.601	0.0180	1.26
U.S.	-0.948 (1.336)	-0.928 (6.848)	-1.670 (10.090)	-1.742 (9.702)	-1.495 (8.405)	-1.129 (6.358)	-0.885 (5.279)	-0.568 (4.337)	-0.793 (9.690)	-0.014 (0.695)	0.130 (1.900)	0.011 (1.715)	0.007 (1.290)	0.009 (1.663)	0.005 (0.853)	0.9747	0.767	0.0056	0.88

Source: See Table 1.
Note: OIL is the relative price of oil index; the other variables are as defined in Table 1.

Table 9b

Price Equation with Dependent Variable log PD − log (M2/N)

1957:III to 1976:IV
(absolute value of t-statistic in parentheses)

Country	Constant	$ResM2_t$	$ResM2_{t-1}$	$ResM2_{t-2}$	$ResM2_{t-3}$	$ResM2_{t-4}$	$ResM2_{t-5}$	$ResM2_{t-6}$	$\log(y^P/N)_{t-1}$	$\log RL_t$	$\log y^T_{t-7}$	$\log OIL_t$	$\log OIL_{t-1}$	$\log OIL_{t-2}$	$\log OIL_{t-3}$	RHO1 RHO2	R^2	SER	D.W.
Canada	3.287	-0.583	-1.195	-0.976	-1.004	-0.792	-1.022	-0.344	-1.265	0.042	0.051	0.035	0.013	0.030	-0.028	-1.0846	0.628	0.0143	2.03
	(2.605)	(3.498)	(5.375)	(4.276)	(4.884)	(3.494)	(4.714)	(2.144)	(8.465)	(0.995)	(0.373)	(2.154)	(0.815)	(2.037)	(1.748)	-0.1170			
France	0.987	-0.883	-0.953	-0.767	-0.528	-0.360	-0.138	-0.075	-0.978	0.068	0.016	0.008	0.0002	0.019	0.009	1.8716	0.800	0.0084	1.86
	(0.970)	(8.344)	(5.263)	(3.573)	(2.298)	(1.593)	(0.707)	(0.712)	(9.071)	(2.142)	(0.400)	(0.864)	(0.002)	(1.508)	(0.069)	-0.9007			
Germany	4.309	-0.967	-0.726	-0.598	-0.643	-0.394	-0.233	-0.156	-1.309	0.002	0.070	-0.009	0.003	-0.001	0.023	1.7546	0.914	0.0082	2.60
	(7.333)	(13.446)	(5.497)	(3.449)	(3.360)	(2.176)	(1.597)	(1.835)	(20.510)	(0.143)	(1.085)	(1.027)	(0.307)	(0.094)	(2.718)	-0.8320			
Italy	11.624	-0.844	-0.628	-0.505	-0.268	-0.076	-0.113	0.071	-1.807	0.072	0.163	-0.010	0.001	-0.007	0.005	1.4179	0.956	0.012	2.29
	(15.256)	(5.135)	(2.339)	(1.527)	(0.766)	(0.228)	(0.418)	(0.444)	(34.305)	(1.868)	(1.301)	(0.776)	(0.100)	(0.512)	(0.362)	-0.5375			
Japan	3.840	-0.931	-0.925	-0.899	-0.913	-0.859	-0.157	0.044	-1.205	0.311	0.145	0.023	0.027	0.019	-0.003	1.1518	0.982	0.0090	2.11
	(8.972)	(4.975)	(3.432)	(3.310)	(3.820)	(3.237)	(0.618)	(0.247)	(53.507)	(2.865)	(2.086)	(1.945)	(3.060)	(2.139)	(0.253)	-0.2386			
Netherlands	-0.197	-0.901	-0.859	-0.844	-0.605	-0.538	-0.350	-0.324	-0.839	0.021	0.153	0.004	-0.027	-0.018	-0.030	1.1210	0.806	0.0133	2.20
	(0.250)	(8.570)	(6.175)	(5.763)	(4.179)	(3.385)	(2.348)	(2.847)	(10.098)	(0.604)	(1.143)	(0.264)	(2.064)	(1.332)	(1.980)	-0.2124			
U.K.	-0.089	-1.026	-0.820	-0.777	-0.929	-0.744	-0.530	-0.213	-0.836	0.036	0.012	0.010	-0.027	0.046	-0.021	1.5894	0.789	0.0153	2.72
	(0.070)	(10.514)	(5.111)	(3.854)	(4.502)	(3.665)	(3.156)	(1.973)	(4.642)	(0.678)	(0.095)	(0.674)	(1.560)	(2.757)	(1.152)	-0.6864			
U.S.	-0.588	-0.915	-1.582	-1.603	-1.297	-0.825	-0.555	-0.307	-0.829	-0.004	-0.055	0.0002	-0.002	0.002	0.005	1.6683	0.948	0.0040	2.51
	(2.029)	(9.896)	(9.471)	(7.418)	(5.768)	(3.851)	(3.229)	(3.079)	(25.684)	(0.289)	(1.020)	(0.071)	(0.461)	(0.574)	(1.277)	-0.7950			

Source: See Table 1.
Note: OIL is the relative price of oil index; the other variables are as defined in Table 1.