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The World Trade Model: Revised Estimates

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Abstract

This paper presents updated and revised estimates for the World Trade Model. The model estimates import and export price and volume relationships for each of three types of merchandise trade--manufactured, raw material, and agricultural--for 14 of the largest industrial countries. The extended data set has generally resulted in estimated price and volume equations that fit the data better than previous versions of the model. In addition, the simulation properties of the model have been enhanced by imposing long-run activity elasticities of unity on the activity terms in the demand for imported manufactures equations.

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I. Introduction

This paper presents the results of improving the specification of the International Monetary Fund's World Trade Model (WTM) and re-estimating its parameters with an updated and extended data base. The present version of the model is quite similar to earlier versions of the model and builds heavily upon the work of Deppler and Ripley (1978), which initially presented the WTM, and Spencer (1984), which improved the specification of the WTM's price equations and re-estimated the model with an updated data base.

The World Trade Model has several uses. First, it is used as an aid in forecasting merchandise trade flows in the semi-annual World Economic Outlook exercise at the IMF. Given domestic demand and cost projections together with an assumed trajectory for nominal exchange rates, a set of merchandise trade flows among the industrial countries is generated. Second, the model has been used in a number of research applications in which its structure has been used to gauge such things as the future effects on trade flows of past exchange rate changes. 1/ Third, the model is a source of price and activity elasticities for a number of industrial countries estimated in a consistent fashion with a standardized data base.

The present version of the model seeks to explain import and export price and volume behavior in each of three catagories of merchandise trade--manufactures, agriculture, and raw materials--for 14 of the largest industrial countries. 2/ The model is partial equilibrium in nature. Domestic demand in each country is exogenous as are nominal exchange rates, wage rates, labor productivity, commodity prices and GNP deflators. Import and export unit values and quantities for each of these catagories are endogenously determined in the WTM for the 14 countries modeled. Table 1 presents a summary of the country and commodity coverage of the model together with a listing of the principle endogenous and exogenous variables.

The WTM has two recursive blocks of equations: the first consists of price equations and the second of volume equations. The prices block

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1/ Issues in the Assessment of the Exchange Rates of Industrial Countries, a study by the Research Department of the International Monetary Fund, prepared by Jacques Artus and Malcolm D. Knight (1984) Occassional Paper 29, pp. 13, 26.

2/ The present version of the model treats the demand for fuel imports as exogenous; estimated demand equations for fuel imports have proven to be particularly unreliable outside of the sample period. Price and volume equations for the developing country regions have been deleted from the model for similar reasons.

Table 1. Summary of Model Specification

Geographic Disaggregation	Commodity Disaggregation (SITC) 1/	Endogenous Variables	Exogenous Variables
Industrial countries: Austria Belgium-luxembourg Canada Denmark France Germany, Fed. Rep. of Italy Japan Netherlands Norway Sweden Switzerland United Kingdom United States	SITC 0+1: Agricultural goods SITC 2+4: Raw materials SITC 5-8: Manufactures	Import volumes by commodity class, by country Export volumes by commodity class, by country Import unit values by commodity class, by country Export unit values by commodity class, by country Domestic wholesale prices of manufactures by country Domestic wholesale prices of raw materials by country	Real domestic demand for manufactures by country Real personal consumption expenditure by country Potential output in manufacturing by country Exchange rates by country Fuel prices Implicit GNP deflators by country Output per manhour in manufacturing by country Potential manhours of employment in manufacturing by country Spot prices for 35 non-oil commodities

1/ Standard Industrial Trade Classification.

endogenously determines eight prices for each of the 14 countries: the wholesale price of manufactures, the price of raw materials, and import and export unit value indices for each of three commodities-manufactures, agricultural goods, and raw materials.

The prices of traded goods are determined simultaneously, and one cannot properly speak of export price changes leading to a change in import price changes anymore than one can speak of the reverse. However, as a conceptual matter, the important behavioral relationships are the equations for export unit values which are expressed as functions of the domestic costs of production and the prices charged by foreign competitors. A country's import unit values are modeled as trade weighted sums of its trading partners' export unit values, expressed in its own currency.

The trade volume equations are treated as functions of relative prices, which are determined in the prices block, and domestic activity, which is exogenous to the model. As with the prices block, import and export volumes are simultaneously determined and a unilateral direction of causation cannot be isolated. However, as a tactical matter, the emphasis is on modeling the demand for a country's imports as the important behavioral relationship and treating the demand for a country's exports primarily as a weighted sum of its trading partners' imports.

Previous versions of the WTM experimented with estimating industrial country import demand for fuels as well as with estimating some developing country trade relationships on an aggregate level. In practice these equations proved to be too unstable to be useful in simulation exercises and have subsequently been deleted from the model.

The present version of the model, in contrast to previous versions, is specified in such a fashion that equiproportional changes in demand and potential output will lead to the same proportional demand for manufactured imports. Previously equiproportional changes in potential output across countries led to unchanged merchandise trade balances. In addition, the data set has been revised and extended by four years; it now spans the period from the first semester of 1962 to the second semester of 1983. The revisions to the data set include revising the potential output in manufacturing series as described in Turner (1987).

A more detailed description of the theoretical specification of the model and its estimated parameters follow. The theoretical description of the model necessarily overlaps significantly with those found in Deppler and Ripley (1978) and Spencer (1984). The next section discusses the specification of the price equations and presents estimates of the structural parameters of the equations; the following section does the same for the volume equations.

II. Price Equations for the Industrial Countries

As outlined above, an export unit value equation for each of the three goods is fit to domestic cost and foreign competitor price data for each of the 14 industrial countries in the model. Import unit values are weighted sums of trading partner export unit values. Each country has a single export price; there is no price discrimination among different foreign markets in the model. In addition there are separate estimated equations for the wholesale price of manufactures and for the price of raw materials. The former enters in to the relative price of manufactured imports, while the latter is a factor in determining both the unit value of manufactured exports as well as the wholesale price of manufactures.

1. Manufacturing price equations

The detailed specification of the manufacturing price equations are presented in Table 2. Homogeneity constraints are imposed on three equations: export and import unit values of manufactures and the wholesale price of manufactures. A given percentage change in all of the right hand side arguments gives rise to the same change to the price in question. In addition the coefficients on the cost variables in the export unit value of manufactures equation are constrained to have the same relative importance as they had in production in the base period.

Manufacturing export unit values are functions of raw material prices, the price of oil, normalized unit labor costs (i.e. changes in the cost of labor adjusted for short-run variations in the business cycle), and a measure of the export prices of other industrial countries, expressed in local currency. This latter variable provides a measure of foreign competitive pressure. As explained in Deppler and Ripley (1978), the coefficient on this term can be interpreted as an index of a country's monopolistic power in the world market. The lower the coefficient, the more the country in question can affect world prices.

This inclusion of other countries' export prices in a country's own export price equation introduces an element of simultaneity into the system. Consequently the manufactured export unit value equations were estimated using a modified instrumental variable technique; rather than include all domestic cost variables for the other 13 industrial countries, an instrument list was constructed for each country which consisted of a weighted sum of the raw material, labor, and energy costs of each of its trading partners. This list was used in turn to generate fitted values of partner country manufactured export prices which were then used in estimating each country's manufacturing export unit value equation. The results are presented in Table 4.

All of the price equations in the model are estimated using the first difference of the logarithms of the variables. The coefficient on competitors prices is relatively low in the U.S. equation--about 1/6--and relatively high, on impact, for Austria and Canada--about 2/3. This

result, which suggests that the United States has more market power than the other two country's, was also found in the previous version of the model. Increasing the sample size has generally resulted in better fitting equations. The R^2, corrected for degrees of freedom, has increased--in some cases substantially--for 10 of the 14 countries in the model.

The equations for manufacturing import unit values are modeled, as described above, as a geometrically weighted sum of a country's trading partners' manufacturing export unit values with the coefficient constrained to unity. As an empirical matter, the data have been used to decide whether the effect is entirely contemporaneous or involves a lag. The equations were estimated with ordinary least squares and are presented in Table 5.

The wholesale price of manufactures are modeled as a function of raw material prices, normalized unit labor costs, import prices, and export prices. The rational for including the latter two variables is the following. Manufacturing wholesale prices should reflect both import prices and domestic prices. Domestic prices, in turn, reflect both domestic costs and prices prevailing in export markets. Thus either, or both, of these variables may prove to be statistically significant. These equations were estimated with ordinary least squares subject to the homogeneity constraint described above and in Table 2. The results are presented in Table 6.

2. Price equations for agricultural goods and raw materials

The specification of these equations, as given in Table 2, is straightforward and unchanged from past versions of the model. Both agriculture and raw material export unit values are modeled as functions of export weighted spot commodity prices and domestic energy and labor costs, all of which are exogenous to the model. Where indicated by the data, a partial adjustment mechanism is incorporated by using a lagged dependent variable in the equation. Following the procedure used in modeling manufacture import unit values, agriculture and raw material import unit values are modeled as an import weighted sum of trading partner export unit values. In addition, the import unit value equations contain an import weighted commodity price variable in order to capture the effects of developing countries in determining industrial country agricultural and raw material import prices.

Tables 7 through 10 present the results of re-estimating agricultural and raw material export and import unit values. In the cases of both import and export unit values for agricultural goods and export unit values for raw materials, the overall goodness-of-fit of almost all of the equations has increased, relative to the previous version of the model, often substantially. In the case of raw material import unit values, the overall explanatory power of the equations differs little

between the current and previous versions, but to the degree it does, it is slightly weaker in the present version of the model. Commodity prices typically have lower elasticities in both the agricultural export unit value equations (12 out of 14 cases) and in the raw material export unit value equations (11 out of 14 cases) than in the previous version of the model. Conversely energy prices generally play more of a role in these two equations than previously.

The World Trade Model also contains equations for the domestic price of raw materials in each of the 14 countries modeled. This price is modeled as a function of domestic labor and energy costs as well as, in principle, both import and export weighted commodity prices; because most industrial countries import more raw materials than they export, in practice the export weighted commodity index was important only in the case of the U.S. equation. In simulation, the price of raw materials is a determinate of both a country's manufacturing export unit value and its wholesale price of manufactures.

Table 11 presents the results of estimating, by ordinary least squares, this equation for each of the industrial countries in the model. As with most of the other equations reported in the prices block, the new equations typically fit the data better (in 12 out of 14 cases), with commodity prices playing slightly less of a role than in the previous version of the model.

III. Industrial Country Import and Export Volume Equations

The theoretical specification of the volumes block is laid out in Table 3. The important behavioral relationships are the demands for a country's imports, in volume terms. These demands are functions of exogenously given domestic activity, endogenously determined trade--an increase in the volume of manufactured exports requires some increase in manufactured and raw material intermediate imports--and relative prices, which are determined inside the prices block.

1. Import and export volume equations for manufactured goods

The present version of the model has been re-specified so that equi-proportional increases in actual and potential output lead to equi-proportional increases in manufactured export and import volumes. The previous version sought to maintain the trade balance for manufactured goods constant when potential output increased by the same amount, proportionately, in all of the industrial countries.

The demand for a country's manufactured imports, in real terms, is modeled as a function of the gap between actual demand and potential output in manufacturing, the level of potential output in manufacturing, and relative prices. The coefficient on the potential output term, in accordance with the imposed homogeneity property described above, is

constrained to unity. The relative price term is defined as the ratio of a country's import unit value of manufactures to the domestic wholesale price of its manufactures. Both of these variables are determined in the prices block.

Trend terms were included where indicated by the data. Because international trade increased at a faster rate than output over the sample period, either a trend term must be included to capture this effect or the coefficient on output must be freely estimated if the equation is to fit the data well. We have rejected the latter alternative in order to have desirable long-run properties, realizing that the inclusion of a trend term does not 'explain' past import growth in any meaningful way.

Table 12 presents the estimated parameters of the 14 industrial country manufacturing import demand functions. Table 13 gives further information on the pattern of the distributed lag effects of changes in relative prices. The manufacturing import demand functions were estimated as log-linear functions with instrumental variables because net exports enter into the equations' activity variable. The new equations are quite similar to those in the model in a several regards and differ in others. The long run price elasticities are unchanged for the 14 industrial countries as a group but the mean lag length is shorter. In both the old and the new versions of the model the average long run price elasticity is .83, but typically occurs with no more than a one period lag in the new model. The constancy of the relative price elasticity for the group masks substantial variation for individual countries; the U.S. long-run price elasticity increased from 1.06 to 1.55, for example.

Lag lengths were determined by starting with a general form and eliminating statistically insignificant coefficients. In the case of multi-period polynomial distributed lags, the final value was constrained to zero in accordance with theoretical priors. In this regard, it should be pointed out that distributed lag profiles are notoriously difficult to isolate with any precision in trade equations; alternative specifications frequently fit the data almost equally well. Since small changes in the data set can lead to noticeable changes in the estimated effect of relative prices over time, these results should be viewed with some caution.

Manufacturing export volumes in the World Trade Model are determined by three factors: foreign market size, relative export prices, and relative capacity utilization. The foreign market variable is generated by summing, using base period (1980) shares, the imports, in real terms, of a country's trading partners. The relative price term, defined as the ratio of a country's manufactured export unit value relative to a weighted sum of its trading partners, is meant to capture the effect of changing relative prices on the shares used to construct the foreign market variable.

Because the foreign market variable has, implicitly, a relative price term in it--the foreign imports which constitute the foreign market variable are themselves functions of relative prices--the estimated

price elasticities do not have the conventional Marshall-Lerner textbook interpretation. That is, the model can still be stable in the face of an exchange rate shock even if the sum of the import and export price elasticities are less than one, assuming the other requirements of the Marshall-Lerner conditions are satisfied. This is a moot point as inspection of the import and export equations for manufacturing shows that the Marshall-Lerner conditions are easily satisfied.

The third factor determining a country's manufacturing export volume is its capacity utilization in manufacturing relative to that in its trading partners. This term is meant to reflect the fact that, for a given level of demand and relative prices, an increase in productive capacity in a country will lead to an increase in exports. The coefficient on this term is constrained to unity for the reasons outlined above.

Table 14 reports the estimated parameters of the manufacturing export volume functions; Table 15 presents additional information on the effect of relative price changes over time. The log-linear equations were estimated with ordinary least squares. Both the old and new equations fit the data very well. As with import price elasticities, the average manufacturing export price elasticity for the 14 countries as a group was virtually unchanged (1.17 in the previous version of the WTM, 1.16 in the current version), although export price elasticity for a number of individual countries did change noticeably. There was a tendency for the lag lengths to become slightly shorter in the current version of the model.

2. Import and export volume equations for agriculture and raw materials

The particulars of the specification of these equations are given in Table 3. In brief, they follow the form used in previous versions of the model. Import demand functions depend on domestic activity and relative prices. In the case of the demand for agricultural imports, the activity variable is real consumption. In one instance, Italy, the data also indicated that a change in real consumption could exert a transitory effect on agricultural imports. The relative price term is the import unit value of imported agricultural goods, determined in the prices block, relative to the country's GNP deflator.

In the case of the demand for imported raw material, the activity variable is an index of value added in manufacturing. In several cases the first difference of this variable also proved useful in explaining the short-run demand for imported raw materials in industrial countries. Thus the faster manufacturing increases in a country, the more raw materials it will import in the short-run. The relative price term is the import unit value of raw materials relative to the GNP deflator. In several cases the data suggested that import for raw materials demand is best modeled in a partial adjustment framework.

Tables 16 and 17 present the empirical results for these two sets of equations estimated with ordinary least squares. The overall fit of these equations is quite similar in both the old and new versions of the model; the coefficients in the demand for agricultural imports are also little affected by re-estimation. However, the elasticity of demand for raw material imports with respect to manufacturing output increases substantially in many countries to values close to unity. In both equations, there is a strong tendency to model the adjustment process as occurring faster in the new version of the World Trade Model.

Export functions for both agricultural goods and raw materials are modeled in a way completely analogous to that described above for manufactured exports. Foreign market variables are constructed from import volumes by using 1980 trade shares. These foreign market variables are then used as explanatory variables in the export demand functions together with a relative export price variable.

Both of these equations were estimated with ordinary least squares; the results are presented in Tables 18 and 19. These results accord very closely with those of the previous version of the model, but there is, in most cases, a noticeable improvement in the goodness of fit statistics.

IV. Summary and Conclusions

This paper has presented new estimates for the World Trade Model. The revised and extended data base used in estimating the current version of the model includes data from the first part of the present decade and thus exhibits more relative price variability than the past data sets. In principle this should lead to more precision in estimating the parameters of the model, and this is generally the case.

These estimates were generated by a specification very similar in most respects to the previous verson of the World Trade Model, with the notable exception of the specification of the demand for manufactured imports. Here the specification was altered with the intention of improving the longer-term simulation properties of the model. The current version of the model ensures that equi-proportionate increases in actual and potential output lead to the same equi-proportionate increase in export and import demand.

The World Trade Model serves several functions. First, it is a simulation model suitable for generating merchandise trade forecasts for 14 of the largest industrial countries, as well as simulating counterfactual scenarios. Second, it presents estimates linking export prices to domestic costs--labor, energy, and raw materials--and foreign prices. Finally, and importantly, it provides a set of individual industrial country import and export demand price and activity elasticities for each of three goods--manufactured, raw materials, and agricultural--estimated with a common data set.

Table 2. World Trade Model: Specification of the Prices Block for "Country i"

(i = 1 to 14 and all summations are from 1 to 14)

Manufactures

(1) $\Delta \ln XPM_i = a_1 \Delta \ln PRM_i + a_2 \Delta \ln NULC_i + a_3 \Delta \ln(POIL.LCD_i) + a_4 \Delta \ln(PFX_i.LCD_i)$

Restrictions:

(1.1) $a_1+a_2+a_3+a_4 = 1$

(1.2) $a_1 = r_i^1 . a_2$

(1.3) $a_3 = r_i^2 . a_2$

(1a) $\ln PFX_i = \sum_j smx_{ij} \sum_{k \neq i} \frac{smm_{kj}}{1-smm_{ij}} \ln(XPM_k/LCD_k)$

(2) $\Delta \ln MPM_i = b_1 \Delta \ln(PFMD_i.LCD_i)$

Restrictions:

(2.1) $b_1 = 1$

(2a) $\ln PFMD_i = \sum_j smm_{ji} \ln(XPM_j/LCD_j)$

(3) $\Delta \ln PM_i = c_1 \Delta \ln MPM_i + c_2 \Delta \ln PRM_i + c_3 \Delta \ln NULC_i + c_4 \Delta \ln (POIL.LCD_i) + c_5 \Delta \ln XPM_i + c_6 \Delta \ln(PM_i)_{-1}$

Restrictions:

(3.1) $c_1+c_2+c_3+c_4+c_5+c_6 = 1$

Raw materials

(4) $\Delta \ln XPR_i = d_1 \Delta \ln(PRWDX_i.LCD_i) + d_2 \Delta \ln NULC_i + d_3 \Delta \ln(POIL.LCD_i) + d_4 \Delta \ln(XPR_i)_{-1}$

(5) $\Delta \ln MPR_i = e_1 \Delta \ln(PRWDM_i.LCD_i) + e_2 \Delta \ln(PFRD_i \cdot LCD_i)$

(5a) $\ln PFRD_i = \sum_j srm_{ji} \ln(XPR_j/LCD_j)$

Table 2 (continued). World Trade Model: Specification of the Prices Block for "Country i"

(i = 1 to 14 and all summations are from 1 to 14)

(6) $\Delta \ln PRM_i = f_1 \Delta \ln(PRWDM_i . LCD_i) + f_2 \Delta \ln(PRWDX_i . LCD_i) + f_3 \Delta \ln NULC_i + f_4 \Delta \ln(POIL . LCD_i) + f_5 \Delta \ln(PRM_i)_{-1}$

Agricultural goods

(7) $\Delta \ln XPA_i = g_1 \Delta \ln(PAWDX_i \cdot LCD_i) + g_2 \Delta \ln NULC_i + g_3 \Delta \ln(POIL \cdot LCD_i) + g_4 \Delta \ln (XPA_i)_{-1}$

(8) $\Delta \ln MPA_i = h_1 \Delta \ln(PAWDM_i \cdot LCD_i) + h_2 \Delta \ln (PFAD_i \cdot LlCD_i) + h_3 \Delta \ln(MPA_i)_{-1}$

(8a) $\ln PFAD_j i = \sum_j sam_{ji} \ln(XPA_j / LCD_j)$

Definitions of variables

Endogenous

MPA_i Index of import unit values of agricultural goods in country i, expressed in the currency of country i, 1970=100.

MPM_i Index of import unit values of manufactures in country i, expressed in the currency of country i, 1970=100.

MPR_i Index of import unit values of raw materials in country i, expressed in the currency of country i, 1970=100.

$PFAD_i$ Average of partner-country export unit value indices for agricultural goods in U.S. dollars.

$PFMD_i$ Average of partner-country export unit value indices for manufactures in U.S. dollars.

$PFRD_i$ Average of partner-country export unit value indices for raw materials in U.S. dollars.

PFX_i Double-weighted index reflecting an average of competitor countries' export prices for manufactures in U.S. dollars.

Table 2 (continued). World Trade Model: Specification of the Prices Block for "Country i"

(i = 1 to 14 and all summations are from 1 to 14)

PM_i	Index of wholesale price of manufactures in country i, in the currency of country i, 1970=100.
PRM_i	Index of domestic costs of raw materials in country i, in the currency of country i, 1970=100.
XPA_i	Index of export unit values of agricultural goods from country i, expressed in the currency of country i, 1970=100.
XPM_i	Index of export unit values of manufactured goods from country i, expressed in the currency of country i, 1970-100.
XPR_i	Index of export unit values of raw materials from country i, expressed in the currency of country i, 1970=100.
Exogenous 1/	
LCD_i	Exchange rate variable for country i, calculated as the number of currency units of country i per U.S. dollar, expressed in index form, 1970=100.
$NOMH_i$	"Normal" output per man-hour in manufacturing, in country i.
$NULC_i$	Normal unit labor costs in manufacturing, $WM_i/NOMH_i$, in country i, expressed in the currency of country i, 1970=100.
OMH_i	Output per man-hour in manufacturing, in country i.
$PAWDM_i$	Index of world spot prices of agricultural goods in U.S. dollars, with weights for the 15 individual agricultural commodities reflecting the relative importance of the commodities in country i's imports in 1970.
$PAWDX_i$	Index of world spot prices of agricultural goods in U.S. dollars, with weights for the 15 individual agricultural commodities reflecting the relative importance of the commodities in country i's exports in 1970.

1/ These variables are all exogenous both to the prices block and to the overall model.

Table 2 (concluded). World Trade Model: Specification of the Prices Block for "country i"

(i = 1 to 14 and all summations are from 1 to 14)

POIL	Average oil export unit value of the oil exporting countries, in U.S. dollars, 1980=100.
$PRWDM_i$	Index of world spot prices of raw materials in U.S. dollars, with the weights for the 20 individual goods reflecting the relative importance of the goods in country i's imports in 1970.
$PRWDX_i$	Index of world spot prices of raw materials in U.S. dollars, with the weights for 20 individual goods reflecting the relative importance of the goods in country i's exports in 1970.
r_i^1	Ratio of raw material to labor inputs in gross manufacturing output, in country i, based on 1970 input-output weights.
r_i^2	Ratio of fuel to labor inputs in gross manufacturing output, in country i, based on 1970 input-output weights.
skm_{ij}	Share of commodity k imports from industrial countries in market j originating in country i, in value terms, in 1970, where k = a (agriculture), m (manufactures), and r (raw materials).
skx_{ij}	Share of commodity k exports of country i going to market j, in value terms, in 1970, where k = a (agriculture), m (manufactures), and r (raw materials).
ULC_i	Unit labor costs in manufacturing, WM_i/OMH_i, in country i, in the currency of country i, 1970=100.
WM_i	Index of compensation per man-hour in manufacturing in country i, expressed in the currency of country i, 1970=100.

Table 3. World Trade Model: Specification of the Volume Block for "Country i"

(i = 1 to 14 and all summations are from 1 to 14)

Manufactures

(9) $\ln MVM_i = a_o + a_1 \ln(AVG_i/QMT_i) + a_2 \ln QMT_i + a_3 \ln(RMPM_i)$

restriction: $a_2 = 1$

(10) $\ln XVM_i = b_o + b_1 \ln FM_i + b_2 \ln RQMT_i + b_3 \ln RXPM_i + b_4 \ln RXCU_i$

restriction: $b_2 = 1$

(10a) $FM_i = \sum_j smm_{ij} \cdot MVM_j \cdot M_j$

Raw materials

(11) $\ln MVR_i = c_o + c_1 \ln QM_i + c_2 \Delta \ln QM_i + c_3 \ln RMPR_i + c_4 \ln(MVR_i)_{-1}$

(12) $\ln XVR_i = d_o + d_1 \ln FR_i + d_2 \ln RXPR_i$

(12a) $FR_i = \sum_j srm_{ij} \cdot MVR_j \cdot R_j$

Agricultural goods

(13) $\ln MVA_i = e_o + e_1 \ln CC_i + e_2 \Delta \ln CC_i + e_3 \ln RMPA_i + e_4 \ln(MVA_i)_{-1}$

(14) $\ln XVA_i = f_o + f_1 \ln FA_i + f_2 \ln RXPA_i$

(14a) $FA_i = \sum_j sam_{ij} \cdot MVA_j \cdot MVA_j \cdot A_j$

Table 3 (continued). World Trade Model: Specification of the Volume Block for "Country i"

(i = 1 to 14 and all summations are from 1 to 14)

Definition of Variables

Variables endogenous to the volume block

FA_i Foreign market variable for agricultural goods exports from country i.

FM_i Foreign market variable for manufactured exports from country i.

FR_i Foreign market variable for raw materials exports from country i.

MVA_i Import volume of agricultural goods for country i.

MVF_i Import volume of fuels for country i.

MVM_i Import volume of manufactures for country i.

MVR_i Import volume of raw materials for country i.

QM_i Index of real value added in manufacturing in country i, 1970=100.

XVA_i Export volume of agricultural goods from country i.

XVM_i Export volume of manufactures from country i.

XVR_i Export volume of raw materials from country i.

Variables exogenous to the volume block

(Variables exogenous to the volume block but endogenous to the model are marked with an asterisk.)

A_i Share of country i's imports of agricultural goods coming from the industrial countries, in value terms, in 1970.

AVG_i* Weighted average of output in manufacturing (QM_i), and real final domestic demand for manufactures (DVM_i) both in index form, 1970=100, with the weights reflecting the share of manufactured imports going to intermediate and final demand, respectively.

$$AVG_i = (1-SH_i)\cdot QM_i + SH_i \cdot DVM_i$$

Table 3 (continued). World Trade Model: Specification of the Volume Block for "Country i"

(i = 1 to 14, and all summations are from 1 to 14)

CC_i	Index of real personal consumption expenditure in country i, 1970=100.
DVM_i	Index of real final domestic demand for manufactures in country i.
LCD_i	Exchange rate variable for country i, calculated as the number of currency units of country i per U.S. dollar, expressed in index form, 1970=100.
M_i	Share of country i's imports of manufactured goods coming from the industrial countries, in value terms, in 1970.
MPA_i*	Index of import unit values of agricultural goods in country i, expressed in the currency of country i, 1970=100. (cf. equation 8 of Table 1).
MPF_i	Index of import unit values of fuels in country i, expressed in the currency of country i, 1970=100.
MPM_i*	Index of import unit values of manufactures in country i, expressed in the currency of country i, 1970=100. (cf. equation 2 of Table 1).
MPR_i*	Index of import unit values of raw materials in country i, expressed in the currency of country i, 1970=100. (cf. equation 5 of Table 1).
$PFAD_i$*	Average of partner-country export unit value indices for agricultural goods, in U.S. dollars. (cf. equation 8a of Table 1).
$PFMD_i$*	Average of partner-country export unit value indices for manufactures, in U.S. dollars. (cf. equation 2a of Table 1).
$PFRD_i$*	Average of partner-country export unit value indices for raw materials, in U.S. dollars. (cf. equation 5a of Table 1).
PY_i	Gross national product deflator for country i, expressed in the currency of country i, 1970=100.

Table 3 (continued). World Trade Model: Specification of the Volume Block for "Country i"

(i = 1 to 14 and summations are from 1 to 14)

QMT_i	Index of potential output in manufacturing in country i.
R_i	Share of country i's imports of raw materials coming from the industrial countries, in value terms, in 1970.
$RMPA_i$*	National product deflator relative to import price of agricultural goods, calculated as: $RMPA_i = PY_i/MPA_i$
$RMPF_i$	National product deflator relative to import price of fuels, calculated as: $RMPF_i = PY_i/MPF_i$
$RMPM_i$*	Index of domestic prices of manufactures relative to import price of manufactures. This index is calculated as: $RMPM_i = PM_i/MPM_i$
$RMPR_i$*	National product deflator relative to import price of raw materials, calculated as: $RMPR_i = PY_i/MPR_i$
$RQMT_i$	Index of potential output in manufacturing in country i relative to competitors' potential output in manufacturing. $\ln RQMT_i = \ln QMT_i - \sum_j smx_{ij} \cdot \sum_k smm_{kj} \cdot \ln QMT_k$
$RXCU_i$*	Average measure of capacity utilization in countries importing from country i, calculated as: $RXCU_i = \sum_j smx_{ij} X_i \cdot XM_j/QMT_j$ where X_i is the share of country i's exports going to industrial countries, in value terms, in 1970.

Table 3 (concluded). World Trade Model: Specification of the Volume Block for "Country i"

(i = 1 to 14 and all summations are from 1 to 14)

$RXPA_i$*	Index of export unit values of agricultural goods in country i relative to competitors' price index, calculated as: $\ln(RXPA_i) = \ln(XPA_i/LCD_i) - \sum_j sax_{ij}\ln(PFAD_j)$
$RXPM_i$*	Index of export unit values of manufactures in country i relative to competitors' price index. $\ln(RXPM_i) = \ln(XPM_i/LCD_i) - \sum_j smx_{ij} \cdot \ln(PFMD_j)$
$RXPR_i$*	Index of export unit values of raw materials in country i relative to competitors' price index, calculated as: $\ln(RXPR_i) = \ln(XPR_i/LCD_i) - \sum_j srx_{ij}\ln(PERD_j)$
skm_{ij}	Share of commodity k imports from industrial countries in market j originating in country i, in value terms, in 1970, where k = a (agriculture), m (manufactures), and r (raw materials).
skx_{ij}	Share of commodity k exports from country i to market j, in value terms, in 1970, where k = a (agriculture), m (manufactures), and r (raw materials).
XPA_i*	Index of export unit values of agricultural goods from country i, in local currency, 1970=100.
XPM_i*	Index of export unit values of manufactured goods from country i, expresed in the currency of country i, 1970=100.
XPR_i*	Index of export unit values of raw materials from country i, in local currency, 1970=100.

Table 4. Fourteen Industrial Countries: Estimates of Export Unit Value Equations for Manufactures, First Half 1962-Second Half 1983 1/

(See equation 1, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Domestic raw material prices	0.057	0.057	0.031	0.045	0.049	0.099 3/	0.022	0.034	0.052	0.022	0.011	0.173	0.064	0.024
Normal unit labor costs	0.231 (3.197)	0.315 (4.098)	0.235 (2.359)	0.314 (4.777)	0.192 (3.418)	0.365 (11.204)	0.270 (2.014)	0.397 (6.351)	0.234 (3.146)	0.351 (3.084)				0.700 (10.808)
Normal unit labor costs (-1)											0.277 (5.137)	0.650 (8.248)	0.252 (5.343)	
Energy price		0.068	0.051	0.039	0.002	0.096		0.158	0.062	0.065	0.068	0.100	0.028	
Energy price (-1)	0.028				0.073 (2.952)		0.034					0.079 (2.672)	0.071 (4.209)	0.053
Energy price (-2)	0.033 (1.400)													0.060 (2.966)
Competitor prices	0.651	0.295 (2.104)	0.699 (4.511)	0.461 (4.452)	0.510 (5.162)		0.338 (2.751)	0.435 (4.446)	0.455 (2.450)		0.281 (3.407)		0.364 (7.243)	0.163
Competitor prices (-1)		0.265	-0.016	0.141	0.174	0.440	0.336	-0.024	-0.197	0.562	0.363	-0.002	0.221	
Seasonal dummy 4/ 5/			-0.008 (-1.388)			-0.005 (-1.431)	-0.011 (-1.770)						0.598 (4.809)	
SEE	0.025	0.019	0.026	0.014	0.017	0.015	0.026	0.027	0.022	0.031	0.016	0.027	0.015	0.019
$\bar{R}^2$	0.159	0.528	0.520	0.802	0.763	0.738	0.443	0.842	0.513	0.162	0.611	0.639	0.864	0.725
D.W.	2.417	1.967	2.012	1.924	1.507	1.546	1.857	1.535	1.617	1.468	1.756	1.441	1.741	1.708

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2. All variables log first differences.
3/ Domestic raw material prices (-1).
4/ The mean effect of the seasonal term is zero.
5/ Rho for the United Kingdom.

Table 5. Fourteen Industrial Countries: Estimates of Import Unit Value Equations for Manufactures, First Half 1962-Second Half 1983 1/

(See equation 2, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Partner country Export prices	0.904 (7.75)	1.014 (8.518)	0.627 (8.531)	1.033 (15.723)	0.926 (17.274)	0.845 (10.364)	0.757 (12.877)	0.895 (10.717)	0.566 (4.355)	0.535 (5.675)	0.806 (12.226)	0.825 (14.803)	0.784 (12.159)	0.658 (7.317)
Partner country Export prices (-1)	0.096	-0.014	0.373	-0.033	0.074	0.155	0.243	0.105	0.434	0.465	0.194	0.175	0.216	0.342
Dummies	-0.036 (-2.526)			-0.042 (-3.326)	-0.050 (-2.909)	-0.067 (-3.661)	-0.086 (-4.983)	-0.136 (-3.868)		-0.023 (-1.749)		0.041 (4.787)		
Seasonal Dummy 3/	-0.003 (-0.738)	-0.009 (-1.55)	-0.010 (-2.22)		-0.013 (-2.623)	-0.008 (-1.378)	-0.009 (-1.619)			-0.010 (-3.489)	-0.013 (-2.889)			
Rho										0.547 (3.943)				
SEE	0.014	0.020	0.015	0.012	0.017	0.018	0.017	0.035	0.018	0.014	0.015	0.017	0.021	0.019
$\overline{R}^2$	0.620	0.628	0.660	0.867	0.890	0.739	0.831	0.736	0.290	0.557	0.779	0.833	0.769	0.544
D.W.	2.264	2.044	1.381	1.618	1.505	1.298	2.092	2.076	1.553	1.812	1.523	2.284	1.658	2.152

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2. All variables log first differences (excluding dummies).
3/ The mean effect of the seasonal term is zero.

Table 6. Fourteen Industrial Countries: Estimates of Equations for Domestic Wholesale Price of Manufactures, First Half 1962-Second Half 1983 1/

(See equation 3, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Export price of manufactures			0.099 (1.926)			0.254 (2.305)	0.457 (8.418)		0.256 (4.367)		0.532 (7.295)	0.097 (1.975)	0.341 (3.210)	
Export price of manufactures (-1)													0.340 (3.178)	0.166 (2.590)
Import price of manufactures	0.326 (2.361)	0.350 (6.658)	0.239 (2.749)	0.551 (6.178)						0.600 (3.823)				0.169 (2.948)
Import price of manufactures (-1)							0.169 (3.100)							
Normal unit labor costs	0.157	0.402	0.182	0.449	0.248	0.125	0.281	0.646	0.369	0.061	0.037	0.379	0.286	0.522
Normal unit labor costs (-1)						0.255 (2.390)								
Domestic raw material prices	0.298 (3.098)		0.171 (5.211)		0.055 (2.149)	0.366 (5.690)	0.093 (4.315)	0.354 (10.044)		0.339 (2.809)	0.431 (8.320)	0.397 (12.035)		0.091 (4.474)
Energy price			0.017 (2.189)		0.029 (3.115)								0.033 (2.918)	
Energy Price (-1)														0.052 (5.034)
Domestic wholesale price of manufactures (-1) 3/	0.219 (2.175)	0.248 (2.364)	0.292 (3.033)		0.668 (7.075)			0.590 (4.671)	0.375 (3.878)			0.127 (2.040)		
SFE	0.017	0.011	0.008	0.018	0.009	0.011	0.012	0.017	0.012	0.021	0.009	0.006	0.012	0.009
$\bar{R}^2$	0.722	0.529	0.810	0.471	0.652	0.658	0.838	0.699	0.520	0.667	0.932	0.790	0.693	0.738
D.W.	2.358	1.624	1.772	1.779	1.892	2.140	1.516	1.741	2.372	1.569	1.666	2.056	2.135	1.787

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2. All variables log first differences.
3/ Rho for Japan.

Table 7. Fourteen Industrial Countries: Estimates of Export Unit Value Equations for Agricultural Goods, First Half 1962-Second Half 1983 1/

(See equation 7, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Spot commodity prices			0.223 (6.507)	0.104 (1.642)	0.173 (2.859)	0.100 (1.411)			0.099 (1.791)	0.262 (3.107)	0.125 (2.112)	0.053 (1.712)	0.112 (3.725)	0.486 (11.946)
Spot commodity prices (-1)			0.239 4.928				0.168 (2.303)			0.326 (3.848)	0.267 (4.239)		0.048 (1.409)	0.193 (4.643)
Spot commodity prices (-2)										0.155 (1.790)				
Normal unit labor costs	0.729 (2.222)	0.375 (2.756)		0.860 (5.400)						0.270 (1.496)			0.428 (4.317)	0.355 (2.160)
Normal unit labor costs (-1)					0.731 (4.535)		0.642 (4.169)		0.504 (3.111)					
Energy price		0.135 (6.900)	0.209 (6.769)					0.196 (4.499)			0.112 (3.618)	0.033 (1.348)		
Energy price (-1)						0.053 (1.759)						0.028 (1.064)		
Export unit value agricultural goods (-1)								0.242 (2.014)					0.257 (2.099)	
Seasonal Dummy 3/	0.039 (1.553)				-0.028 (-2.141)						-0.044 (-5.936)			-0.022 (-2.568)
Rho											0.479 (3.367)			
SEE	0.082	0.023	0.026	0.038	0.043	0.039	0.060	0.058	0.031	0.050	0.036	0.031	0.021	0.028
$\bar{R}^2$	0.106	0.706	0.901	0.450	0.477	0.099	0.425	0.420	0.252	0.440	0.752	0.140	0.801	0.872
D.W.	2.547	1.397	2.360	1.945	2.013	2.350	2.399	1.565	2.184	1.871	1.754	1.673	2.370	2.160

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2.
3/ Mean effect of seasonal dummy term is zero.

Table 8. Fourteen Industrial Countries: Estimates of Export Unit Value Equations for Raw Materials, Second Half 1961-Second Half 1983 1/

(See equation 4, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Spot commodity prices	0.282 (2.874)	0.065 (2.099)	0.355 (2.838)		0.278 (3.877)			0.155 (3.331)	0.067 (2.664)		0.563 (7.274)		0.109 (2.341)	0.291 (3.771)
Spot commodity prices (-1)				0.192 (1.940)	0.179 (2.490)	0.25[illegible] (5.671)	0.204 (5.265)			0.197 (3.100)	0.204 (2.014)		0.185 (3.870)	0.260 (3.177)
Spot commodity prices (-2)				0.207 (1.982)										
Normal unit labor costs	-0.350 (-1.791)													
Energy price		0.117 (6.285)	0.167 (3.438)	0.270 (4.260)	0.172 (5.807)	0.154 (6.404)	0.177 (7.151)	0.366 (10.478)	0.118 (7.315)	0.119 (3.260)		0.131 (3.850)	0.102 (3.414)	
Energy price (-1)					0.076 (2.361)		0.127 (5.544)			0.108 (3.050)	0.086 (2.538)		0.127 (4.284)	0.194 (6.883)
Export unit value raw materials (-1)	0.536 (4.244)	0.354 (4.221)		0.243 (2.082)		0.130 (1.497)			0.282 (3.042)					
Seasonal dummy 3/			-0.050 (-2.997)			-0.020 (-2.112)								-0.024 (-2.375)
SEE	0.047	0.020	0.055	0.080	0.036	0.031	0.029	0.047	0.020	0.043	0.033	0.045	0.035	0.033
$\bar{R}^2$	0.386	0.758	0.504	0.588	0.784	0.709	0.854	0.770	0.675	0.515	0.775	0.252	0.709	0.749
D.W.	1.520	2.238	2.221	1.966	1.854	1.838	2.044	1.711	2.495	2.067	1.813	1.775	2.013	1.752

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2. All variables in log first differences.
3/ Seasonal dummy variable takes values which alternate between +1/2 and -1/2, so giving a mean effect of zero.

Table 9. Fourteen Industrial Countries: Estimates of Import Unit Value Equations for Agricultural Goods, First Half 1962–Second Half 1983 1/

(See equation 8, Table 2)

Explanatory Variable 2/	Austria 3/	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Partner country export prices	0.277 (1.711)	0.536 (5.237)		0.910 (7.032)	0.561 (4.053)	0.484 (3.810)	0.726 (9.184)	0.588 (4.897)	0.266 (4.257)	0.667 (4.027)	0.495 (6.962)	0.330 (4.309)	0.572 (7.961)	0.345 (2.439)
Partner country export prices (-1)		0.165 (1.216)					0.297 (3.705)				0.274 (3.933)		0.200 (2.312)	
Spot commodity prices	0.196 (4.290)		0.492 (8.902)	0.075 (1.705)	0.218 (3.834)	0.100 (2.183)		0.151 (1.853)		0.233 (4.208)	0.107 (4.878)	0.196 (6.523)		0.298 (5.042)
Spot commodity prices (-1)	0.138 (3.019)				0.162 (2.562)	0.120 (2.849)		0.275 (5.109)		0.270 (4.100)	0.128 (5.693)	0.102 (3.106)	0.161 (3.375)	0.156 (2.865)
Spot commodity prices (-2)			0.144 (2.290)											0.102 (1.889)
Import unit value, agricultural goods (-1)		0.296 (2.184)	0.289 (3.201)		-0.241 (-1.782)				0.474 (4.518)	-0.237 (-1.837)		0.244 (2.939)		
Seasonal dummy 4/	-0.033 (-3.766)		-0.024 (-1.808)			-0.035 (-4.705)	0.012 (1.423)	-0.031 (-2.651)	0.007 (1.389)	0.030 (2.834)	-0.011 (-2.188)	-0.009 (-1.933)	-0.020 (-3.209)	
SEE	0.028	0.024	0.039	0.034	0.030	0.024	0.024	0.038	0.015	0.032	0.017	0.015	0.020	0.039
$\overline{R}^2$	0.564	0.662	0.760	0.615	0.742	0.642	0.865	0.825	0.586	0.708	0.904	0.873	0.877	0.689
D.W.	1.979	2.007	1.880	1.711	2.144	1.596	1.979	1.878	2.000	2.445	1.730	2.162	1.842	2.046

1/ The t-statistics are in parentheses.
2/ Exact algebraic forms of the equations and variable definitions are given in Table 2. All variables in log differences.
3/ Estimated over first half 1965–second half 1983.
4/ Mean effect of seasonal dummy term is zero.

Table 10. Fourteen Industrial Countries: Estimates of Import Unit Value Equations for Raw Materials, First Half 1962-Second Half 1983 1/

(See equation 5, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Partner country export prices	0.875 (8.262)	0.660 (12.941)		0.863 (9.499)	0.816 (9.298)	0.764 (11.871)	0.919 (10.477)	0.505 (6.307)	0.988 (9.312)	0.826 (6.329)	0.708 (7.730)	0.582 (3.780)	0.635 (10.225)	0.622 (4.819)
Partner country export prices (-1)			0.434 (2.268)	0.140 (1.622)						0.031 (0.237)		0.314 (2.032)		0.402 (3.000)
Spot commodity prices							0.237 (3.464)	0.472 (7.166)						
Spot commodity prices (-1)			0.532 (3.275)		0.244 (3.704)	0.284 (6.154)		0.135 (1.992)	0.064 (0.819)				0.321 (6.282)	
Seasonal Dummy 3/	-0.029 (-2.936)					-0.012 (-2.099)	-0.023 (-2.259)			0.021 (1.949)	-0.051 (-4.219)			
Dummy 1 4/				0.187 (8.733)										
SEE	0.032	0.019	0.075	0.027	0.029	0.018	0.033	0.032	0.030	0.034	0.040	0.058	0.023	0.060
$\bar{R}^2$	0.671	0.796	0.397	0.907	0.862	0.885	0.891	0.862	0.788	0.638	0.675	0.367	0.898	0.499
D.W.	2.444	1.651	1.975	1.780	1.873	1.996	1.786	2.346	1.903	3.025	1.976	2.041	2.092	2.102

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2.
3/ Mean effect of seasonal dummy term is zero.
4/ Dummy variable for Denmark equals 1 in the first semester of 1974, -1 in the second semester of 1975 and zero elsewhere.

Table 11. Fourteen Industrial Countries: Estimates of Equations for Domestic Whole sale Prices of Raw Materials, First Half 1962-Second Half 1983 1/

(See equation 6, Table 2)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Spot commodity prices, import weighted		0.312 (11.850)	0.214 (4.230)		0.407 (7.883)	0.079 (2.185)	0.199 (2.901)	0.409 (7.399)		0.282 (5.113)			0.289 (6.074)	
Spot commodity prices, import weighted (-1)	0.195 (4.171)	0.070 (2.396)		0.204 (2.871)	0.187 (3.366)	0.174 (4.302)	0.211 (2.627)				0.126 (7.053)	0.157 (5.237)	0.093 (1.728)	
Spot commodity prices, import weighted (-2)													0.114 (2.308)	
Spot commodity prices, export weighted														0.510 (5.354)
Spot commodity prices, export weighted (-1)														0.419 (4.333)
Normal unit labor costs	0.268 (3.203)	0.414 (5.512)		0.278 (1.164)		0.295 (2.891)			0.656 (1.479)			0.409 (2.718)		
Normal unit labor costs (-1)	0.274 (3.057)										0.133 (2.084)		0.308 (4.948)	
Energy price	0.103 (5.633)	0.041 (3.253)		0.408 (9.968)	0.144 (6.385)	0.089 (6.087)	0.410 (13.351)	0.263 (10.444)	0.157 (2.421)	0.037 (1.958)	0.121 (9.713)	0.071 (4.522)	0.162 (8.277)	
Energy price (-1)								0.143 (6.229)		0.068 (3.380)				
Domestic wholesale price of raw materials (-1)			0.769 (10.765)							0.422 (4.708)	0.384 (6.476)			
Seasonal dummy 3/	-0.009 (-1.325)	-0.009 (-2.410)	-0.015 (-1.900)					-0.011 (-1.393)			-0.009 (-2.038)		-0.023 (-3.801)	-0.029 (-3.275)
Rho														0.403 (2.838)
SEE	0.020	0.012	0.026	0.049	0.028	0.017	0.036	0.026	0.075	0.019	0.014	0.017	0.019	0.040
$\bar{R}^2$	0.764	0.912	0.791	0.804	0.866	0.776	0.907	0.922	0.242	0.820	0.925	0.739	0.934	0.745
D.W.	2.409	1.592	1.713	1.673	1.909	1.797	2.034	1.327	1.970	1.883	1.607	1.542	1.419	1.821

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 2. All variables in log differences.
3/ Mean effect of seasonal dummy is zero.

Table 12. Fourteen Industrial Countries: Estimates of Volume Equations for Manufactured Imports, First Half 1962-Second Half 1983 1/

(See equation 9, Table 3)

Explanatory Variable 2/	Austria 6/	Belgium/ Luxembourg	Canada 3/4/	Denmark	France 3/4/	Fed. Rep. Germany 4/9/	Italy 4/7/	Japan 4/	Netherlands 4/	Norway 4/	Sweden	Switzerland 4/	United Kingdom 4/	United States 4/
Demand relative to potential output	1.348 (2.167)	1.123 (6.811)	1.449 (8.285)	0.907 (1.493)	3.032 (2.260)	1.749 (11.637)	2.136 (3.705)	2.012 (5.850)	2.345 (7.385)	1.307 (3.388)	1.166 (6.241)	1.839 (4.679)	1.123 (3.337)	0.810 (3.632)
Potential output	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Relative price 5/	1.133 (11.874)	0.592 (23.016)	0.938 (4.016)	1.308 (4.132)		1.121 (5.586)	0.963 (2.286)	1.069 (3.876)	0.354 (1.708)	0.619 8/ (2.566)	0.421 (2.655)	0.488 (2.156)	0.486 (3.935)	
Relative price (-1)					0.569 (3.015)									1.547 (4.283)
Constant	7.086 (254.614)	7.602 (281.069)	7.937 (298.496)	7.130 (115.645)	7.840 (205.029)	8.379 (99.014)	7.455 (186.271)	7.838 (92.249)	7.975 (196.995)	6.405 (80.813)	7.372 (156.83)	7.113 (150.293)	7.599 (183.837)	7.927 (70.987)
Seasonal dummy		-0.046 (-5.522)	-0.053 (-6.810)	-0.015 (-1.172)	-0.078 (-9.539)				-0.022 (-2.612)		-0.032 (-3.243)		-0.050 (-4.199)	
Time trend		0.019 (21.776)	0.011 (13.967)		0.025 (11.839)	0.020 (7.615)	0.024 (19.176)		0.012 (7.494)	0.018 (8.563)	0.013 (8.167)	0.020 (12.804)	0.030 (18.268)	0.042 (11.597)
Dummy 1	0.078 (3.384)	-0.073 (-3.673)			0.102 (3.516)	-0.084 (-3.904)	0.139 (1.897)	0.018 (1.056)	0.083 (3.191)			-0.178 (-5.113)	0.049 (3.315)	-0.087 (-3.740)
Dummy 2					-0.055 (-2.760)								0.107 (2.498)	
Rho	0.500 (4.526)		0.258 (1.951)	0.575 (6.274)	0.385 (2.777)	0.708 (8.099)		0.816 (9.819)	0.240 (1.647)	0.401 (2.842)		0.258 (2.087)		0.518 (4.082)
SEE	0.043	0.027	0.033	0.055	0.031	0.023	0.071	0.066	0.034	0.036	0.033	0.036	0.039	0.049
$\bar{R}^2$	0.975	0.978	0.960	0.827	0.992	0.996	0.913	0.852	0.881	0.978	0.957	0.959	0.990	0.977
D.W.	1.197	1.563	1.844	1.149	1.743	2.273	1.261	2.057	1.933	1.816	1.540	1.855	1.543	2.021

1/ Exact algebraic forms of the equations and variable definitions are given in Table 3. The t-statistics are in parentheses.
2/ All non-dummy variables in log levels.
3/ Estimated over second half 1961 to second half 1983.
4/ No polynomially distributed lags.
5/ Only the total long-run elasticity and its t value are given here. See Table 13 for the lag distribution of this effect.
6/ Estimated over second half of 1962 to second half of 1983.
7/ Estimated over first half of 1964 to second half of 1983.
8/ Relative price (-3) for Norway; relative price (-2) for Switzerland.
9/ Estimated over first half 1963 to second half 1983.

Table 13. Relative Price Lag Distributions From Manufactured Imports Equations 1/

	Austria	Belgium/ Luxembourg	Canada 4/	Denmark	France 4/	Fed. Rep. Germany 4/	Italy 4/	Japan 4/	Netherlands 4/	Norway 4/	Sweden	Switzerland 4/	United Kingdom 4/	United States 4/
Time delay in six-month units														
t	1.133 (11.874)	0.592 (23.016)		1.308 (4.132)							0.421 (2.655)			
t-1	0.849 (11.874)	0.395 (23.016)		0.872 (4.132)							0.280 (2.655)			
t-2	0.566 (11.874)	0.197 (23.016)		0.436 (4.132)							0.140 (2.655)			
t-3	0.283 (11.874)													
t-4														
Sum of weights 2/	2.831	1.184		2.615							0.841			
Average lag length 3/	1.00	0.67		0.67							0.67			
Degree of poly	1	1		1							1			

1/ Total weights only are shown in Table 12.
2/ Represents long-run elasticity.
3/ Measured in six-month units.
4/ No polynomially distributed lag.

Table 14. Fourteen Industrial Countries: Estimates of Volume Equations for Manufactured Exports, First Half 1962-Second Half 1983 1/

(See equation 10, Table 3)

Explanatory Variable 2/	Austria 7/	Belgium/ Luxembourg	Canada 7/	Denmark 7/	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland 3/7/	United Kingdom 4/	United States
Foreign demand	1.027 (18.920)	1.462 (20.386)	0.835 (31.288)	0.871 (13.676)	0.649 (5.019)	1.149 (22.680)	0.947 (14.788)	0.908 (66.031)	1.261 (9.244)	1.427 (9.049)	0.728 (5.133)	0.861 (12.921)	0.803 (60.933)	0.674 (8.524)
Potential output relative to competitors	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Relative price 5/	-0.510 (-3.058)	-1.525	-0.413 (-3.314)	-0.712 (1.651)	-1.318		-1.088	-1.298	-1.590	-1.636	-1.174	-0.267 (-1.796)	-0.638	-1.334
Relative price (-1)	-0.218 (-1.198)			-0.446 (-1.009)		-1.674 5/						-0.350 (-2.166)		
Constant	-0.536 (-1.291)	-2.829 (-5.419)	1.070 (5.072)	0.731 (1.596)	3.139 (2.465)	-1.616 (-3.228)	0.257 (0.452)	0.498 (3.767)	-1.682 (-1.700)	-2.679 (-2.925)	2.064 (1.652)	0.956 (1.826)	1.761 (14.579)	2.706 (4.148)
Seasonal Dummy	0.041 (8.244)	-0.027 (-3.381)			-0.067 (-14.868)	0.011 (2.281)		0.072 (5.467)			-0.021 (-3.849)	0.036 (7.579)	-0.040 (-3.177)	-0.035 (-4.943)
Time trend 6/		-0.035 (-12.252)				-0.034 (-2.312)			-0.018 (-3.418)	-0.022 (-3.816)				0.006 (1.693)
Dummy 1 8/	0.041 (4.810)	0.021 (2.599)	0.121 (3.348)			0.073 (3.525)	0.064 (4.247)					-0.174 (-7.293)		0.770 (3.212)
Dummy 2	0.071 (2.934)					-0.042 (-2.097)								
Rho	0.799 (8.935)	0.335 (2.143)	0.361 (2.576)	0.769 (13.553)	0.938 (38.527)	0.590 (4.516)	0.695 (6.611)		0.513 (3.408)	0.549 (4.029)	0.940 (39.208)	0.799 (9.273)		0.209 (1.392)
SEE	0.027	0.029	0.043	0.045	0.028	0.023	0.055	0.042	0.038	0.042	0.035	0.028	0.040	0.072
$\bar{R}^2$	0.997	0.994	0.992	0.987	0.996	0.997	0.992	0.992	0.991	0.987	0.995	0.995	0.990	0.995
D.W.	2.320	1.983	2.024	2.322	2.298	2.146	2.288	1.590	2.129	2.272	2.118	2.156	1.550	2.001

1/ The t statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 3. All variables log levels excluding dummies.
3/ Estimated over first half 1968 to second half 1983.
4/ Estimated over second half 1963 to second half 1983.
5/ Only the total long-run elasticity is given here except as noted in footnote 7. See Table 15 for the lag distribution of this effect.
6/ The coefficient in this row for Germany corresponds not to a time trend, but to a third dummy variable.
7/ No polynomially distributed lag. For Denmark relative price (-3) and relative price (-4) respectively.
8/ The coefficient in this row for the United States corresponds not to a dummy variable but to capacity utilization relative to competitors.

Table 15. Relative Price Lag Distributions From Manufactured Exports Equations 1/

	Austria 5/	Belgium/ Luxembourg	Canada 5/	Denmark 5/	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland 5/	United Kingdom	United States
Time delay in 6-month units														
t		-0.381			-0.321	-0.008	-0.544	-0.548	-0.289	-0.409	-0.469		-0.137	-0.167
t-1		-0.327			-0.275	-0.150	-0.363	-0.368	-0.260	-0.350	-0.352		-0.114	-0.246
t-2		-0.272			-0.230	-0.201	-0.181	-0.223	-0.231	-0.292	-0.235		-0.091	-0.283
t-3		-0.218			-0.184	-0.238		-0.114	-0.202	-0.234	-0.117		-0.068	-0.276
t-4		-0.163			-0.138	-0.258		-0.004	-0.173	-0.175			-0.046	-0.227
t-5		-0.109			-0.092	-0.263		0	-0.145	-0.117			-0.023	-0.135
t-6		-0.054			-0.046	-0.253			-0.116	-0.058				
t-7						-0.227			-0.087					
t-8									-0.058					
t-9									-0.029					
Sum of weights 2/		-1.525 (-6.388)			-1.286 (-2.365)	-1.674 (-3.080)	-1.088 (-1.951)	-1.298 (-5.595)	-1.590 (-2.195)	-1.636 (-4.836)	-1.174 (-3.368)		-0.638 (-6.100)	-1.334 (-1.004)
Average lag length 3/		2.00			2.00	4.00	0.67	1.00	3.00	2.00	1.00		2.00	2.00
Degree of poly		1			1	2	1	2	1	1	1		1	2
End point zero restrictions 4/		far			far	near	far	far	far	far	far		far	far

1/ Total weights only are shown in Table 14.
2/ Represents long-run elasticity. t-value for total weights given in brackets.
3/ Measured in six-month units.
4/ non: no restriction; far: far end point restriction; near: near end point restriction.
5/ No polynomially distributed lag.

Table 16. Fourteen Industrial Countries: Estimates of Volume Equations for Imports of Agricultural Goods 1/
First Half 1962-Second Half 1983

(See equation 13, Table 3)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden 3/	Switzerland	United Kingdom	United States
Consumer expenditure	0.813	1.563	0.863	1.177	1.269	1.146	1.570	1.303	1.469	0.618	0.743	0.789	0.258	0.784
	(7.136)	(18.671)	(16.798)	(2.935)	(13.369)	(14.256)	(30.187)	(22.642)	(5.189)	(9.833)	(14.971)	(10.525)	(1.199)	(13.096)
Consumer expenditure, first difference							1.063							
							(1.795)							
Relative price	0.275	0.773	0.296		0.560				0.597	0.284	0.500			
	(1.369)	(4.722)	(3.297)		(2.754)				(1.649)	(2.749)	(5.546)			
Relative price (-1)						0.205		0.175						0.523
						(1.619)		(1.616)						(8.300)
Imports of agricultural goods (-1)														
Constant	5.064	6.469	6.170	5.555	7.160	7.821	7.144	7.166	6.810	4.925	5.808	5.916	7.913	8.021
	(217.980)	(316.007)	(296.159)	(43.999)	(266.248)	(973.227)	(393.462)	(337.002)	(266.783)	(322.129)	(574.780)	(466.305)	(112.486)	(788.023)
Seasonal dummy 4/		0.024	0.123	0.019	-0.048	0.031	0.034		-0.018	-0.087	-0.026		-0.004	0.165
		(2.392)	(10.942)	(1.490)	(-4.136)	(3.751)	(1.808)		(-1.548)	(-4.742)	(-1.951)		(-1.694)	(3.222)
Dummy 1						0.128		0.024	-0.132				-0.031	-0.093
						(4.005)		(1.782)	(-3.090)				(-3.120)	(-2.601)
Dummy 2								0.173						
								(3.087)						
Rho	0.511	0.555	0.412	0.892	0.609	0.254	0.109	0.464	0.466			0.450		
	(4.077)	(4.357)	(2.923)	(11.955)	(5.881)	(2.699)	(0.820)	(3.484)	(3.847)			(3.414)		
SEE	0.064	0.051	0.051	0.081	0.060	0.032	0.068	0.061	0.055	0.061	0.042	0.045	0.037	0.050
$\overline{R}^2$	0.929	0.987	0.956	0.934	0.972	0.987	0.967	0.984	0.987	0.909	0.879	0.904	0.261	0.828
D.W.	1.838	1.827	2.276	1.947	2.504	2.114	2.190	2.076	1.842	1.679	1.984	2.256	1.445	1.707

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 3. All non-dummy variables in log-levels.
3/ Estimated over second half 1963 to second half 1983.
4/ In the case of the United Kingdom this is a trend variable.

Table 17. Fourteen Industrial Countries: Estimates of Volume Equations for Imports of Raw Materials 1/
First Half 1962-Second Half 1983

(See equation 11, Table 3)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Output in manufacturing	0.324 (2.274)	0.341 (3.688)	1.216 (3.419)	0.822 (10.456)	0.626 (10.464)	0.432 (2.685)	0.170 (1.973)	0.144 (5.484)	0.297 (4.103)	0.881 (3.712)	0.877 (3.861)	0.345 (3.387)		1.473 (5.695)
Output in manufacturing first difference	1.669 (4.916)	1.647 (4.214)				0.562 (2.459)	0.973 (2.877)						1.611 (6.731)	
Relative price			0.736 (4.316)				0.152 (1.463)			0.564 (2.150)		0.363 (5.542)		0.753 (5.518)
Relative price (-1)				0.394 (4.740)	0.252 (2.559)	0.147 (1.760)			0.576 (5.591)					
Imports of raw materials (-1)	0.790 (7.630)	0.569 (4.537)				0.509 (3.912)	0.688 (6.172)		0.250 (2.168)				0.566 (6.546)	
Constant	1.068 (2.001)	2.817 (3.448)	5.981 (53.949)	5.138 (168.733)	7.054 (404.908)	3.744 (3.767)	2.246 (2.833)	6.064 (8.562)	4.796 (6.477)	5.163 (141.613)	5.290 (150.920)	5.193 (223.296)	3.163 (5.014)	7.463 (96.288)
Seasonal dummy		-0.061 (-3.184)		-0.086 (-2.670)	-0.100 (-11.572)		-0.052 (-2.054)		0.057 (3.240)		0.066 (5.519)	-0.038 (-2.883)		
Dummy 1	0.088 (2.251)				-0.067 (-2.451)				-0.163 (-2.776)			-0.136 (-4.006)	0.033 (2.529)	
Rho	-0.306 (-1.903)		0.833 (11.191)		0.574 (4.582)			0.980 (226.42)		0.451 (3.298)	0.706 (6.629)	0.293 (2.012)		0.838 (16.387)
SEE	0.048	0.062	0.097	0.106	0.045	0.033	0.083	0.055	0.057	0.108	0.066	0.055	0.045	0.066
$\overline{R}^2$	0.984	0.920	0.851	0.729	0.957	0.981	0.853	0.976	0.918	0.793	0.794	0.839	0.678	0.899
D.W.	1.886	2.027	2.644	1.841	1.747	2.117	2.214	2.318	1.918	2.190	2.365	2.038	2.205	2.149

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 3. All non-dummy variables in log-levels.

Table 18. Fourteen Industrial Countries: Estimates of Volume Equations for Exports of Agricultural Goods 1/
First Half 1962-Second Half 1983

(See equation 14, Table 3)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg 3/	Canada	Denmark	France	Fed. Rep. Germany 3/	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Foreign demand	1.489 (13.315)	1.456 (17.353)	0.904 (3.823)	0.769 (4.474)	1.639 (21.894)	0.856 (3.807)	1.259 (21.353)	0.390 (1.326)	1.723 (36.061)	0.803 (6.250)	0.761 (8.787)	0.897 (4.579)	1.226 (31.441)	1.006 (9.314)
Foreign demand (-1)				0.176 (1.067)		1.422 (6.427)								
Relative price	-1.164 (-6.571)	-1.004 (-5.196)	-0.764 (-2.344)	-0.404 (-1.979)	-0.682 (-2.016)	-1.278 (-5.247)	-1.007 (-4.476)	-0.619 (-1.368)			-0.324 (-0.732)	-0.597 (-2.748)	-0.547 (-4.516)	
Relative price (-1)									-0.861 (-2.592)	-0.335 (-1.432)				-0.801 (-1.947)
Constant	-1.977 (-4.232)	-2.950 (-5.316)	0.587 (0.359)	0.279 (0.310)	-4.829 (-8.673)	-8.667 (-15.278)	-1.819 (-4.831)	3.423 (2.191)	-5.516 (-15.391)	0.903 (1.405)	0.935 (2.248)	0.625 (0.659)	-1.672 (-6.393)	-0.123 (-0.138)
Seasonal dummy			0.162 (7.971)	0.015 (1.998)			0.164 (6.512)			0.049 (2.894)	-0.097 (-3.228)	0.111 (8.817)	0.083 (5.421)	0.042 (3.098)
Rho	0.261 (1.799)		0.695 (5.959)	0.704 (6.415)	0.395 (2.875)			0.410 (2.907)	0.287 (2.053)	0.462 (3.542)	0.279 (1.864)	0.824 (11.899)	0.291 (2.015)	0.710 (7.117)
SEE	0.110	0.043	0.111	0.043	0.085	0.045	0.082	0.186	0.059	0.080	0.118	0.071	0.064	0.074
$\overline{R}^2$	0.965	0.957	0.830	0.939	0.970	0.990	0.961	0.066	0.984	0.827	0.817	0.964	0.982	0.960
D.W.	1.849	1.696	2.149	2.052	2.351	1.814	1.521	2.527	1.997	2.164	2.030	2.330	2.052	2.028

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Table 3. All non-dummy variables are log-levels.
3/ Estimated over second half 1970-second half 1983.

Table 19. Fourteen Industrial Countries: Estimates of Volume Equations for Exports of Raw Materials 1/
First Half 1962-Second Half 1983

(See equation 12, Table 3)

Explanatory Variable 2/	Austria	Belgium/ Luxembourg	Canada	Denmark	France	Fed. Rep. Germany	Italy	Japan	Netherlands	Norway	Sweden	Switzerland	United Kingdom	United States
Foreign demand	0.344	1.229	0.772	1.497	1.223	1.410	0.971	1.125	1.689	1.455	1.509	1.305	0.796	1.179
	(1.895)	(6.376)	(6.162)	(16.301)	(12.489)	(9.722)	(7.188)	(5.842)	(24.430)	(6.223)	(6.202)	(9.415)	(2.877)	(15.586)
Relative price		-0.512	-0.962	-1.211	-0.613	-1.492		-0.369		-0.644		-0.820		-1.798
		(-1.607)	(-3.517)	(-10.380)	(-2.553)	(-6.996)		(-1.837)		(-2.457)		(-3.154)		(-4.475)
Relative price (-1)					-0.459		-1.420		-0.753		-0.639			
					(-1.830)		(-3.115)		(-2.605)		(-2.877)			
Constant	2.823	-1.003	1.528	-2.463	-1.503	-2.845	0.125	-0.782	-4.690	-2.158	-3.031	-1.290	0.826	-1.416
	(3.445)	(-1.033)	(1.597)	(-5.354)	(-2.407)	(-3.086)	(0.181)	(-0.745)	(-10.563)	(-1.985)	(-2.003)	(-2.293)	(0.588)	(-2.417)
Seasonal dummy			0.057	-0.224	-0.069		-0.083	0.063	0.059	-0.064			-0.098	-0.048
			(4.904)	(-12.557)	(-6.587)		(-3.695)	(4.785)	(3.580)	(-4.843)			(-6.387)	(-2.849)
Time trend	0.013	-0.007								-0.014	-0.019		0.010	
	(3.840)	(-2.272)								(-3.229)	(-5.176)		(1.815)	
Rho	0.681	0.428	0.702	0.342	0.482	0.531	0.342	0.827	0.275	0.379	0.345	0.466	0.467	0.261
	(6.699)	(2.999)	(7.154)	(2.487)	(3.214)	(4.225)	(2.287)	(10.104)	(2.027)	(2.622)	(2.461)	(3.671)	(3.772)	(1.760)
SEE	0.058	0.065	0.062	0.078	0.050	0.066	0.096	0.074	0.068	0.058	0.078	0.098	0.074	0.069
$\overline{R}^2$	0.935	0.876	0.885	0.949	0.979	0.985	0.920	0.975	0.970	0.865	0.660	0.872	0.953	0.937
D.W.	2.099	2.066	2.406	2.200	2.046	2.159	1.798	2.357	2.242	1.975	2.284	2.052	2.216	2.107

1/ The t-statistics are in parentheses.
2/ Exact algebraic form of the equations and variable definitions are given in Tabel 3. All non-dummy variables in log-levels.

APPENDIX

List of Dummy Variables

Most of the dummy variables used in the model have simple structures which may be conveyed through a system of mnemonics. The conventions of the system adopted are as follows:

DYS — equals 1 in year Y semester S, zero elsewhere, e.g., D197201.

DY1Y2 — equals 1 in second semester of year 1, -1 in the first semester of year Y2, e.g., D196768.

DY12 — equals 1 in first semester of year Y, -1 in second semester of year Y, e.g., D196612.

CDYS — equals 1 from year Y semester S onwards, zero elsewhere, e.g., CD196801.

SDY11Y22 — alternates between -1 and +1 from year Y1 semester 1 to Y2 semester 2, and equals zero elsewhere, e.g., SD19691732.

SDY12Y22 — alternates between +1 and -1 from year Y1 second semester to Year Y2 second semester and equals zero elsewhere, e.g., SD19692732.

Dummy variable definitions by country, by equation, are as follows:

Austria

Price of Manufactured imports:

Dummy 1 = D197502.

Volume of Manufactured imports:

Dummy 1 = D197778. Advance purchases of manufactures caused by pre-announcement of VAT increases due in Jannuary 1978.

Volume of Manufactured exports:

Dummy 1 = 2 in 197202, -1 in 197301 and 197302. Distortion resulting from the introduction of value added tax.

Dummy 2 = D197401. Unusual increase in share of eastern block and OPEC markets due to particular commodity composition of Austrian manufactures.

Volume of Raw Material imports:

Dummy 1 = D196869. Stocking in anticipation of border tax measures by the Federal Republic of Germany.

Belgium-Luxembourg

Volume of Manufactured imports:

Dummy 1 = D196612. Effects of U.K. shipping strike.

Volume of Manufactured exports:

Dummy 1 = SD19691732. Shift in seasonal pattern of exports.

Canada

Volume of Manufactured exports:

Dummy 1 = D197001 + D197002.

Denmark

Price of Manufactured imports:

Dummy 1 = D197501.

Price of Raw Material imports:

Dummy 1 = 1 for 197401, -1 for 197502 and zeros elsewhere.

France

Price of Manufactured imports:

Dummy 1 = D197501.

Volume of Manufactured imports:

Dummy 1 = CD196801. Effects of EEC tariff liberalization.

Dummy 2 = D197012. Anticipation of mid-1970 relaxation of tight monetary policies.

Volume of Raw Material imports:

Dummy 1 = D197502-D197602. Abnormal decline and subsequent recovery of inventories.

APPENDIX

Federal Republic of Germany

Price of Manufactured imports:

Dummy 1 = D197402.

Volume of Manufactured imports:

Dummy 1 = D197302 + D197401. Reduction in imports in response to restrictive domestic policies.

Volume of Manufactured exports:

Dummy 1 = D196802. Anticipation of imposition of border tax.

Dummy 2 = D197001 + D197002. Effect of imposition of border tax.

Dummy 3 = Zero up to 198102, increases from 1 to 4 from 198201 to 198302 and 4 thereafter. Effect of an increase in relative prices; depressing export growth.

Volume of Agricultural imports:

Dummy 1 = D196502. Poor harvest in 1965.

Italy

Price of Manufactured imports:

Dummy 1 = D197401.

Volume of Manufactured imports:

Dummy 1 = D197301. Acceleration of domestic demand coincided with a low level of inventories.

Volume of Manufactured exports:

Dummy 1 = SD19772792. Shift in seasonal pattern of exports.

Japan

Price of Manufactured imports:

Dummy 1 = D197402.

Volume of Manufactured imports:

Dummy 1 = 1 in 197202, 2 in 197301, 3 from 197302 to 197601, 4 from 197602 to 197702, 5 from 197801 to 197802, 6 from 197901 to 198101, 7 for 198102, 8 from 198201 to 198301 and 9 from 198302 onwards, and zero elsewhere. Effects of trade liberalization.

Volume of Agricultural imports:

Dummy 1 = SD19691732. Shift in seasonal pattern of imports.

Dummy 2 = D196501. Decline in domestic food production.

The Netherlands

Volume of Manufactured imports:

Dummy 1 = CD197401. Effects of enlargement of EEC.

Volume of Raw Material imports:

Dummy 1 = D197502. Unusually low levels of industrial production and inventory investment relative to total domestic demand.

Volume of Agricultural Imports:

Dummy 1 = D197101 + D197102 + D197201. Good crop yields in 1970 and 1971.

Norway

Price of Manufactured imports:

Dummy 1 = D197502.

Switzerland

Price of Manufactured imports:

Dummy 1 = 1 for 197801 and 197802, -1 for 197901 and 197902, otherwise zero.

Volume of Manufactured imports:

Dummy 1 = D197502. Unusually low level of demand for capital goods relative to total domestic demand.

Volume of Manufactured exports:

Dummy 1 = D197402. World recession and sudden lagged effect of 1973 devaluation.

Volume of Raw material imports:

Dummy 1 = D197576. Unusual rundown and subsequent recovery of inventories.

United Kingdom

Volume of Manufactured imports:

Dummy 1 = 1 in 197301 and 2 thereafter. Effects of entry into the EEC.

Dummy 2 = D197401. Fall in industrial production due to three-day work week.

Volume of Raw Material imports:

Dummy 1 = SD19661712. Shift in seasonal pattern of imports.

Volume of Agricultural imports:

Dummy 1 = SD19671732. Shift in seasonal pattern of imports.

United States

Volume of Manufactured imports:

Dummy 1 = zero up to 196702, increases from 1 to 7 from 196801 to 197101, and equals 7 thereafter. Effect of rapid increase in Japanese car imports.

Volume of Agricultural imports:

Dummy 1 = D197401. Inventory increases due to anticipated price increases.

Dummy 2 = D197512. Sudden upward shift in inventories following a period of rapid decumulation.

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