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6.6.1988 10/88

THE KTKV MODEL OF THE ECONOMICS DEPARTMENT OF THE BANK OF FINLAND

A semiannual model for forecasting world economic prospects

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Helsinki 1988
ISBN 951-686-153-9
ISSN 0785-3572

ABSTRACT

This is a report on an updated version of the KTKV-model of Bank of Finland's Economics Department. The model was originally designed in the early 80's for the forecasting of short-term international economic developments. It is basically a world trade flow model, in which the main components of world trade flows are generated using trade weight matrices. Until recently, the demand side of the model has been entirely exogenous. For this version consumption and investment equations have been estimated. All other equations have been re-estimated and some technical equations for exchange rate and interest rate structures are introduced.

TIIVISTELMÄ

Tässä keskustelualoitteessa raportoidaan Suomen Pankin kansantalouden osaston KTKV-mallin päivitetty versio. Alunperin malli suunniteltiin 1980-luvun alussa kansainvälisen talouden lyhyen aikavälin ennustamiseen. Se on pohjimmiltaan maailmankaupan malli, jossa tärkeimmät kauppavirrat lasketaan maailmankaupan osuusmatriisien avulla. Aikaisemmin kysyntä oli mallissa täysin eksogeeninen. Tähän versioon on estimoitu investointi- ja kulutusyhtälöt. Kaikki muut yhtälöt on estimoitu uudelleen, ja malliin on lisätty muutamia teknisiä valuuttakurssi- ja korkorakenteita kuvaavia yhtälöitä.

CONTENTS page

BRIEF DESCRIPTION OF THE KTKV - MODEL

Changes in the KTKV-model

This paper reports an updated version of the KTKV-model. The model has been estimated at the Economics Department of the Bank of Finland and was originally designed for short-term forecasting of world economic prospects. It is basically a world trade flow model, in which imports of each country are modelled and exports are calculated using trade flow matrices. As to foreign trade prices, export prices are modelled and import prices are then derived using trade flow weights.

The initial version of KTKV was developed in 1980 - 1982. At this stage the model was principally a computing framework and data management system. Since then the model, while being permanently in use, has been gradually refined and extended.

In spite of the extensions the basic structure of the KTKV-model has not been subsequently changed. Foreign trade equations still form the essential block of the model. The most recent additions include investment and consumption equations, as well as some preliminary interest rate relations. All other equations have been reconsidered during the winter of 1988. The estimation period has been extended to the early half of 1987.

The model comprises some 550 variables, 46 of which are strictly speaking exogenous. There are 357 equations, 54 of which are behavioural. The rest are largely either identities or equations with constant coefficients based on the world trade matrix.

Estimations have been carried out on the basis of semiannual data, using OLS as the estimation technique. As a rule, estimations start from 1971 and extend up to the first half of 1987. Availability of data may have altered the choice of estimation period in some cases.

The KTKV-model comprises the six countries most important for Finnish foreign trade, namely the USA, Japan, Germany, France, the United Kingdom and Sweden. In addition, there are four country groupings: OPEC, LDC's, other OECD and 'the rest of the world'.

The present version of the model can be divided into three large blocks. First, there is a **price block** comprising the equations for domestic demand deflators, foreign trade prices and GDP-deflators for the six countries above plus Finland. Interest rates, user costs and inflation expectations are generated in this block. In addition, this block contains equations for aggregate commodity prices, OECD-consumer prices and producer prices.

The second block generates **foreign trade volumes** for the six countries plus Finland and for the four country groupings. In addition, the change in world trade is computed as a weighted average.

The third block consists of equations and identities for **volumes of domestic demand and GDP**. Consequently, the volumes of total supply and demand for the seven countries are calculated in the model.

Each country's **domestic demand deflator** is mainly determined by domestic unit labour costs. Import prices contribute with a relatively short lag. A fairly sophisticated error correction term has been incorporated in these deflator equations. Taxes less subsidies are excluded from the dependent variable. The **GDP deflator** is computed using a purely technical transformation. The change in the terms of trade is added to the domestic deflator using the GDP-weight of foreign trade.

Export prices are based on competitors' export prices but are also influenced by domestic costs. Changes in exchange rates are taken into account as well. A somewhat simpler error correction mechanism has been included in these equations.

Import prices are derived from export prices using the weights of a world trade matrix. The base year for the constant weights is 1980.

The **import volumes** of the seven industrial countries mentioned above are determined by total domestic demand as well as by the price competitiveness of domestic producers. Countries' imports are allocated to export markets for each of the countries using the weights of the world trade matrix. In order to obtain the final **export volumes** the export markets given by fixed shares are adjusted to take into account the prevailing level of a country's price competitiveness. The imports of the four regional groupings also contribute to the growth of a country's export markets. The imports of two of the four groupings are exogenous, namely the imports of developing countries and 'the rest of the world'.

Of the **components of domestic demand**, inventory investments and government consumption in the seven countries are exogenous. The equations determining **private consumption** are simple error correction functions in which real interest rate changes and inflation are taken into consideration. GDP volumes approximate disposable incomes. Volumes of **fixed investment** are modelled according to neo-classical investment theory, with the prices of capital and labour as the main determinants. A proxy for the user cost of the capital is calculated. A demand variable is also included in the equations assuming imperfect competition in the markets. Having calculated foreign trade flows and the components of domestic demand, the model gives a country's GDP as a residual.

In the course of forecasting rounds, the consistency of the outcome is checked through careful analysis of projected current account developments. The effects on world trade of the four areas are also studied by analysing the prospects for their external balances. Financial restrictions are taken into account in this connection. As a rule, the world current balance discrepancy is assumed to remain broadly unchanged over the forecasting period.

Considerable efforts have been put in to estimating equations for **commodity prices**. So far, success has been limited. In the present version of the model the prices of four subgroups, food, tropical beverages, non-ferrous metals and minerals, and agricultural raw materials are exogeneously determined. Forecasts for the composite HWWA-index numbers are weighted averages of these subindexes.

Interest rates are determined by using normal interest rate parity conditions and estimating the empirical relation. The US short rates are given, and the German and UK rates are linked to it. Long rates are determined by term structure equations.

Exchange rates are exogenous. The rates for the main currencies as well as for developments in their cross rates are given exogenously. Exchange rates for minor currencies are linked to development's in the relevant main currency. These rates are needed in calculating the price competitiveness of Finnish exports. The FIM/USD rate is computed on the assumption that the FIM-index remains constant.

Main weaknesses and further development of the KTKV-model

Although, in the course of several forecasting rounds, the KTKV model has shown its applicability in structuring the forecasting process and reducing the efforts required to reach a consistent view of world economic prospects, there remain many areas for further development of the model.

One of the most fundamental issues concerns the trade flow equations. The price elasticities of the import and export equations are annoyingly low. This brings an element of instability into the model, since the Marshall-Lerner-condition does not hold. However, low price elasticities are a common outcome with aggregate data, simple functional forms and unsophisticated estimation techniques.

Another related problem arises when foreign trade price developments are forecast with aggregate price equations. Peculiar movements in prices of crude oil and other raw materials enhance the changes in aggregate time series. Consequently, the correct measure of the price competitiveness of manufactures exports is impossible to derive from aggregate price developments.

These two issues favour disaggregating the foreign trade block into at least two components, trade in manufactures and trade in raw materials or energy.

In the event that the Finnish block of the model should some time be taken seriously, an easy way to improve it would be to separate eastern and western trade. The model would give a first rough estimate for western exports based on growth of the markets.

There are many other suggestions for improving the KTKV-model, such as modelling unit labour costs, exchange rates, international financial flows and using more advanced estimation techniques, and it is hoped these will be covered in future reports.

Simulation tests

The KTKV-model is not designed for policy simulations. However, even for forecasting purposes it is useful to know how the model behaves and how serious are the omissions of, for instance, price-wage-linkages.

The statistical and dynamic properties of the model were examined by means of dynamic ex-post simulations. The model was first run through the years 1978S1 - 1987S1, with the latter half of 1977 as a starting point, using model-generated values as lagged endogenous variables. The values of exogenous variables were the same as the actual ones. This simulation is referred to as the control solution. The first chart depicts the actual and control-simulation changes (at annual level) of the main aggregates for OECD-countries.

The sensitiveness of the dynamic solution to exogenous shocks was studied by means of four disturbance simulations as follows:

I An increase in government consumption in all seven countries by one per cent

II An increase in unit labour costs of one per cent

III A devaluation in the exchange rate of the US dollar against the other main currencies (DEM, JPY, GBP and FRF) by 10 per cent

IV An increase in the price of crude oil by 10 per cent.

All there shocks were implemented in the first half of 1978 and no recovery was assumed. Thus the levels of the disturbed variables stayed at the new level thereafter. The dynamic elasticities for the OECD-aggregates are shown in charts 2 to 6.

The first shock, an **increase in government consumption**,is quite straightforward. The GDP of OECD-countries eventually increases by the same percentage as the original shock. Foreign trade effects are larger, reflecting noticeably high income elasticities in the import equations. The price effects are negligible.

An increase in unit labour costs by one per cent in the seven countries leads in the short run to higher domestic and foreign trade prices and slower growth in the OECD-area. The negative effects diminish fairly rapidly, however, because changes in relative prices work in favour of increased imports which in turn generate exports and production. Since there is no feedback from foreign or domestic prices to unit labour costs, the effect of this disturbance experiment might be too optimistic. On the other hand, this model does not take into account the income effects of a wage rise, which would also induce increased domestic demand and foreign trade.

The third shock, **the devaluation of the exchange rate of the USD**, seems to be a favourable phenomenon from the point of view of OECD-countries. Inspite of the deterioration in the terms of trade, the growth of US exports generates an improvement in the trade balance and GDP.

The results of **the oil price shock** may seem peculiar at first sight. The positive GDP effects come from an expansion of exports to OPEC-countries and a slight reduction in imports. Because of the low price elasticities in the foreign trade equations and the lack of wage equations, the deterioration in the terms of trade does not worsen the trade balance in the OECD-area.

CHART 1

OECD-COUNTRIES

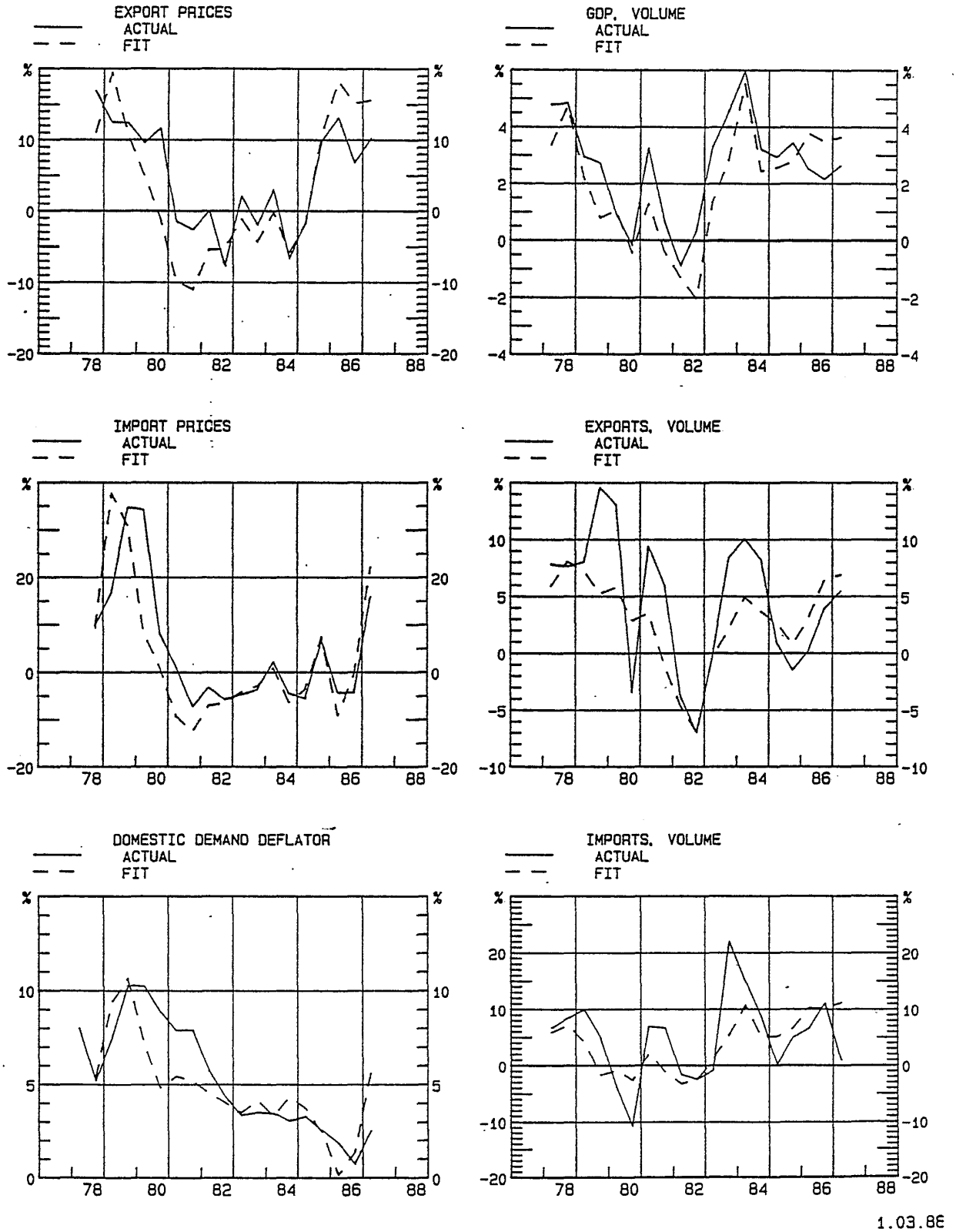

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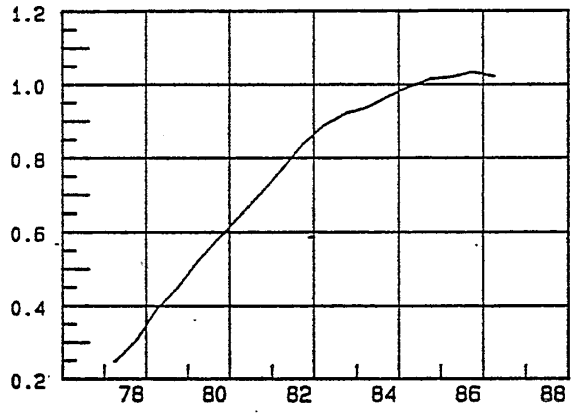
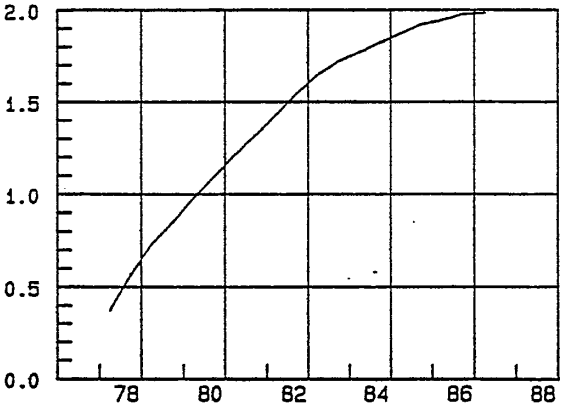
CHART 2

OECD-COUNTRIES
AN INCREASE OF GOVERNMENT CONSUMPTION
BY 1 PER CENT, DYNAMIC ELASTICITY

GDP



FINLAND'S EXPORT MARKETS



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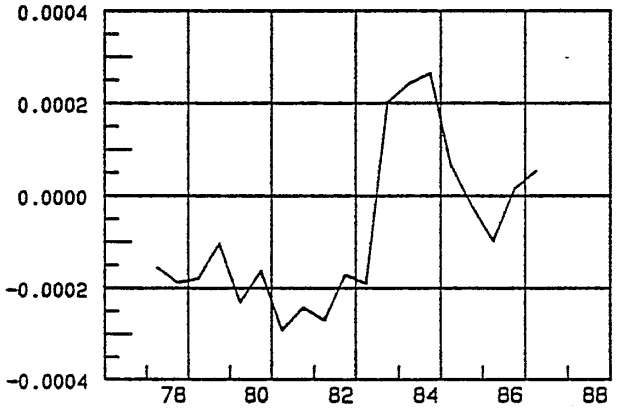

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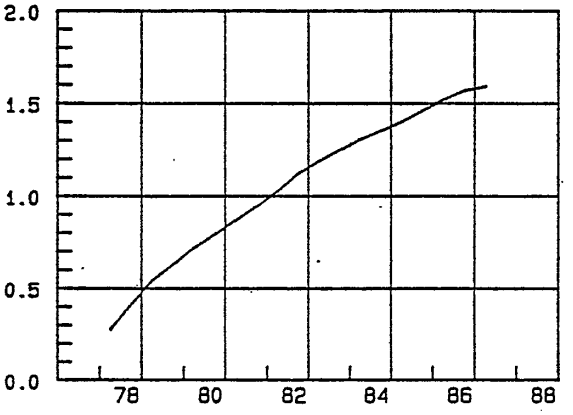

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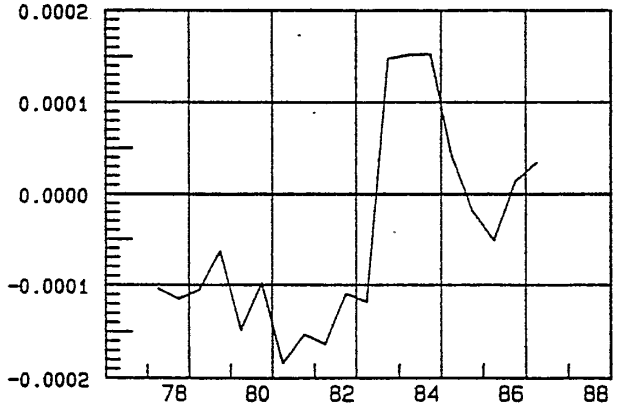

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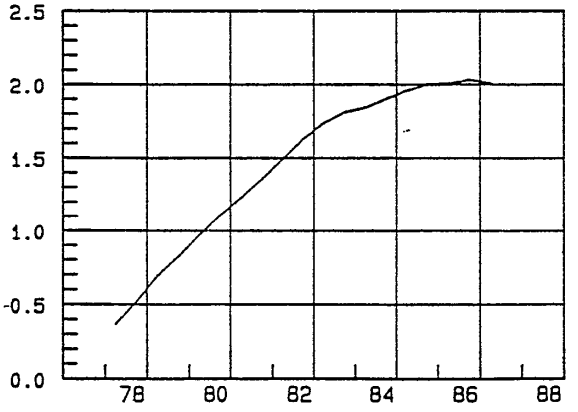

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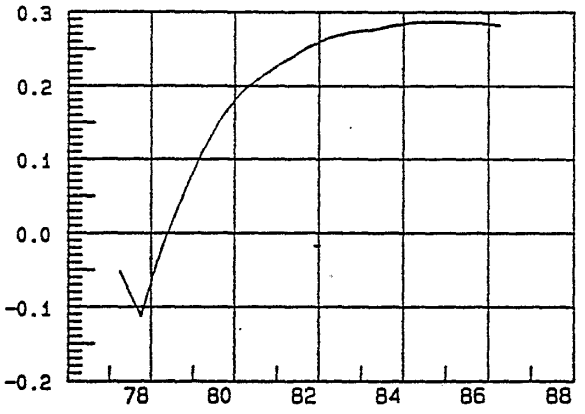
CHART 3

OECD-COUNTRIES
AN INCREASE OF UNIT LABOUR COSTS BY 1 PER CENT, DYNAMIC ELASTICITY

GDP



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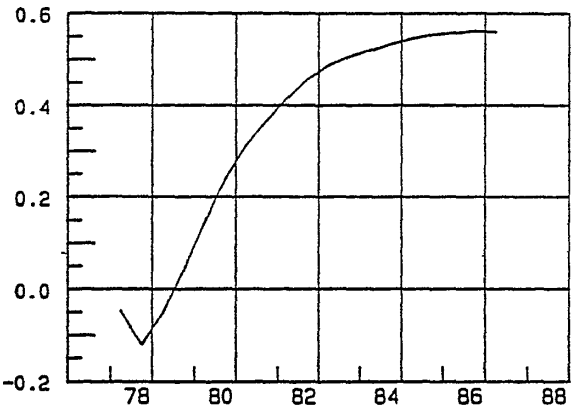

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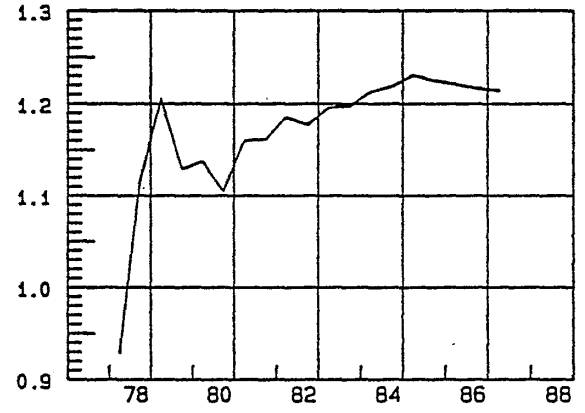

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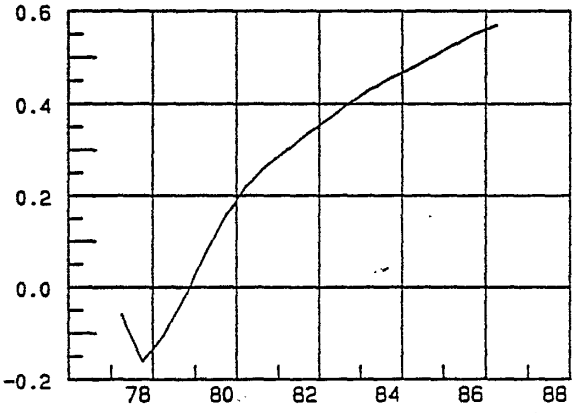

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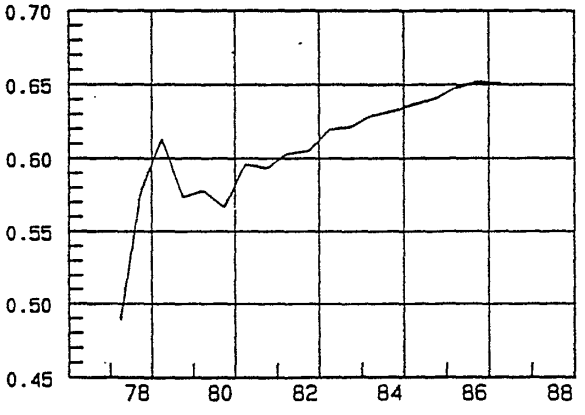

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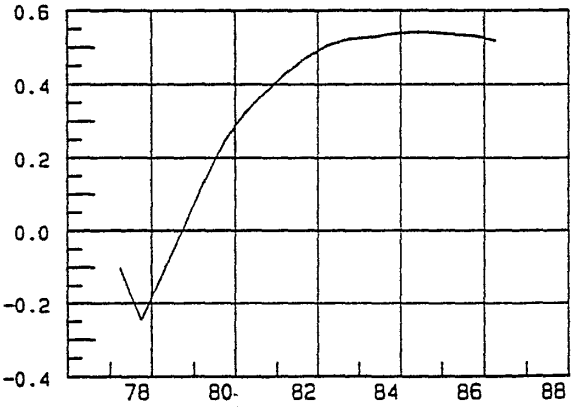

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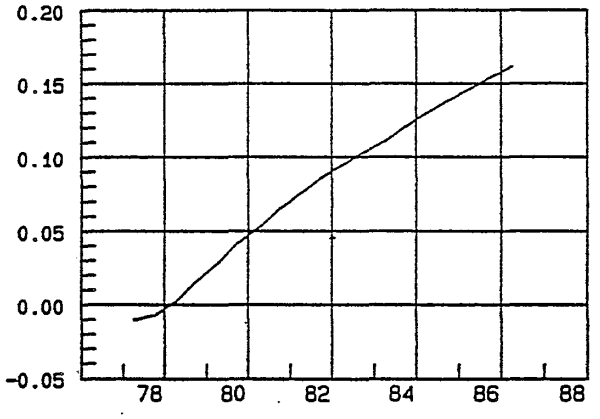
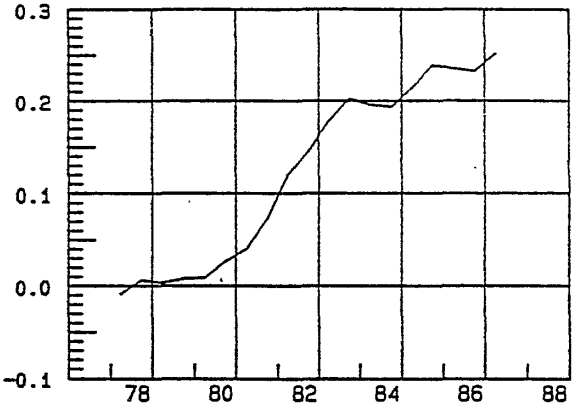
CHART 4

OECD-COUNTRIES
AN DEVALUATION OF THE US DOLLAR BY 10 PER CENT, DYNAMIC ELASTICITY

GDP



FINLAND'S EXPORT MARKETS



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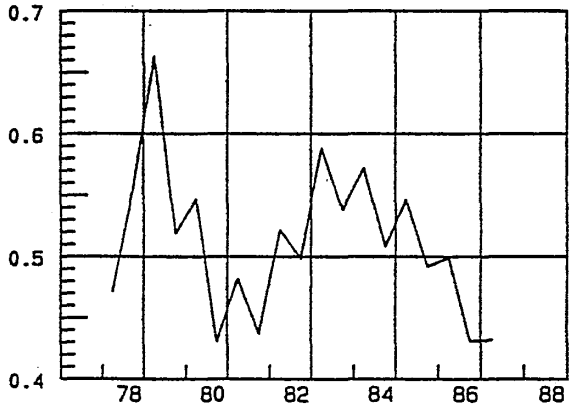

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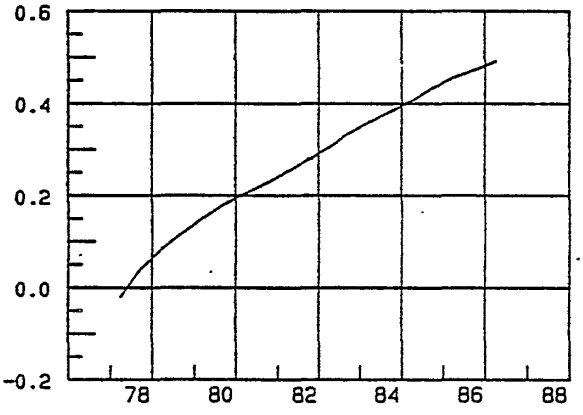

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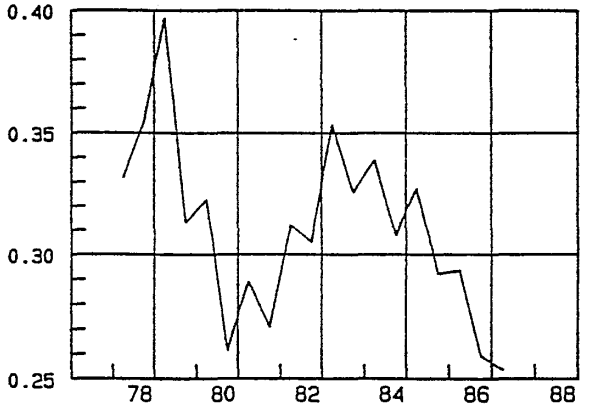

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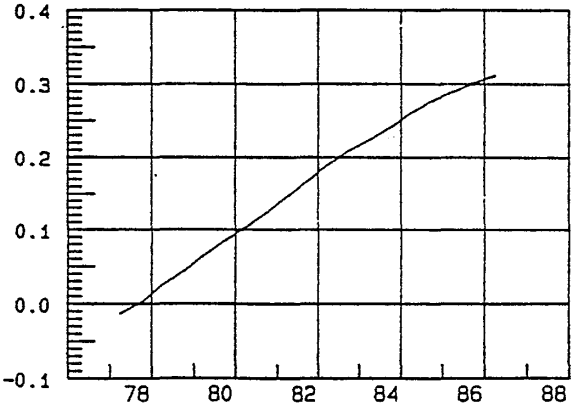

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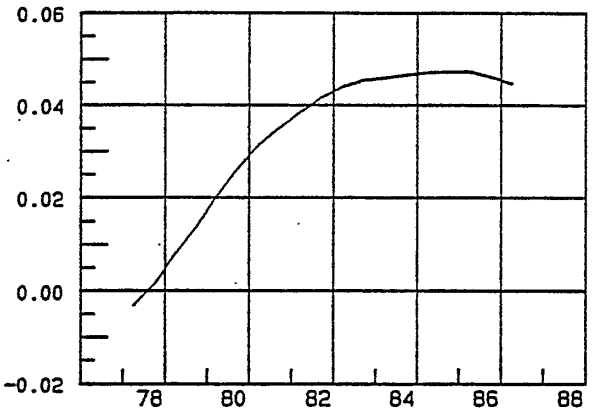
CHART 5

OECD-COUNTRIES-
AN INCREASE OF THE PRICE OF CRUDE OIL BY 10 PER CENT, DYNAMIC ELASTICITY

GDP



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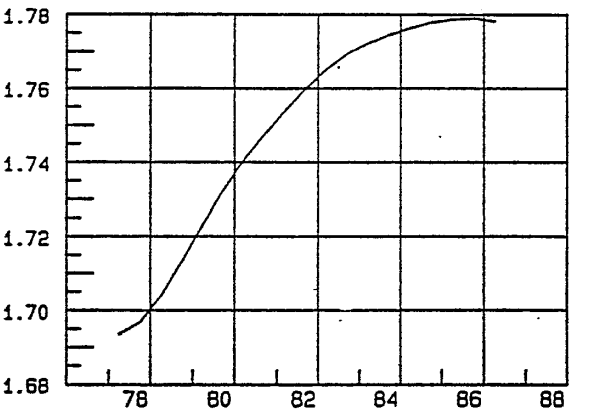

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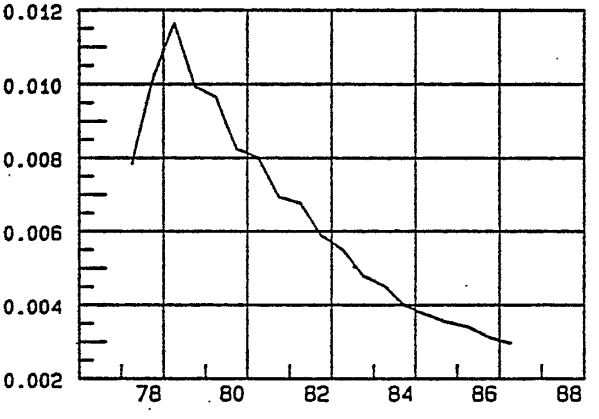

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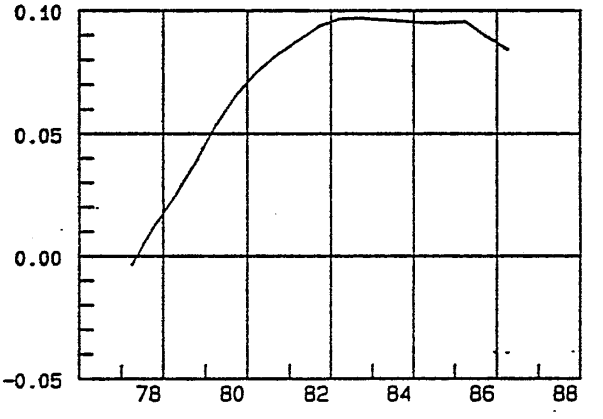

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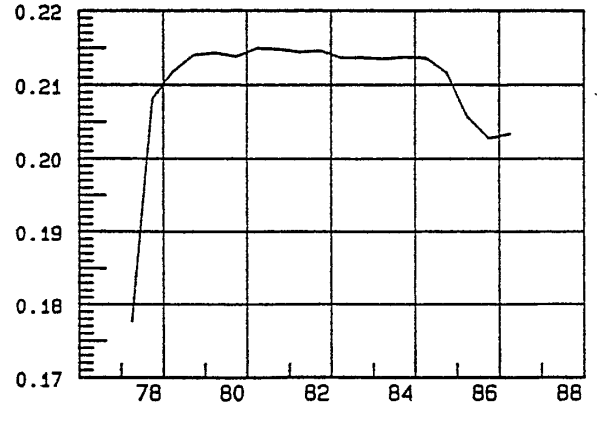

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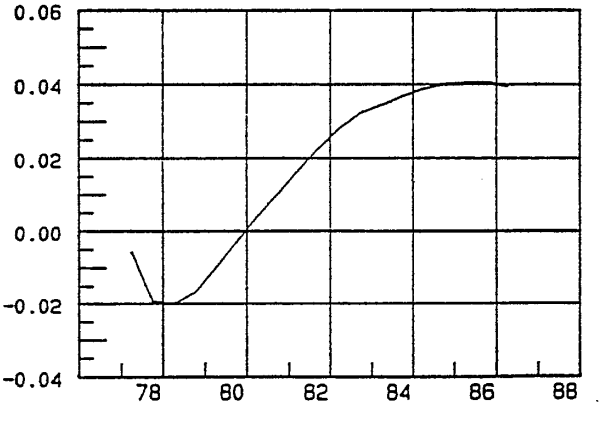

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Outline of the report

On the next four pages, the KTKV-model is presented in implicit equation form in order to provide a general overview of the model. First, the so-called stochastic equations and the main identities for each country are presented. Second, there is a list of other estimated equations and identities concerning country groupings and commodity prices. A third group of equations consists of price and trade linkages. Variable names are presented in concise form after the equations. A full explanation of the variables of the model is found in the Appendix 4.

The Appendix 2 contains the estimation results for all stochastic equations, and the Appendix 3 presents the main identities and weights used.

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APPENDIX 1

KTKV-model in implicit form

A LIST OF EQUATIONS FOR COUNTRY i:

a) STOCHASTIC EQUATIONS:

1. $M_i = f_1(PM_i, PDD_i, DD_i, M_{i-1})$ [IMPORTS]
2. $I_i = f_2(PQ_i, ULC_i, UCR_i, Q_{i-1}, I_{i-1})$ [FIXED INVESTMENT]
3. $C_i = f_3(\Delta PDD_i, R_i, PDDE_i, \Delta Q_i, Q_{i-1}, C_{i-1})$ [PRIVATE CONSUMPTION]
4. $\Delta PDD_i = f_4(\Delta ULC_i, \Delta PM_i)$ [DOMESTIC DEMAND DEFLATOR]
5. $\Delta PX_i = f_5(\Delta VINO, \Delta ULC_i, \Delta PXW_i, \Delta e_i)$ [CH. OF EXPORT PRICES]
6. $X_i = f_6(PX_i, PXW_i, XW_i, XW_{i-1}, X_{i-1})$ [EXPORTS]
7. $RS_i = f_7(PQ_i/PQ_{us}, RS_{us})$ [SHORT TERM INTEREST RATE]
8. $R_i = f_8(RS_i, RS_{i-1}, R_{i-1})$ [LONG TERM INTEREST RATE]

b) IDENTITIES:

9. $UCR_i = PDD_i(R_i - PDDE_i)/PQ_i$ [USERCOSTS]
10. $PDDE_i = \sum_{i=1}^{n} \Delta PDD_{i-n}$ [EXPECTED DOMESTIC INFLATION]
11. $PQ_i = PQ_{i-1} + \Delta PDD_i + \Delta[(M_i/Q_i)(PX_i - PM_i)]$ [GDP DEFLATOR]
12. $Q_i = DD_i + e_i X_i - M_i$ [GDP]
13. $DD_i = C_i + G_i + I_i + IV_i$ [DOMESTIC DEMAND]

PM_i, PXW_i, XW_i are explained when the countries are linked together.

B LIST OF OTHER EQUATIONS

a) OTHER STOCHASTIC EQUATIONS:

14. $OPPX = f_{14}(OP)$ [OPEC'S EXPORT PRICES]

15. $DCPX = f_{15}(VINO)$ [D-COUNTRIES' EXPORT PRICES]

16. $OPM = f_{16}(OP, OEPDD, OPM_{-1})$ [OPEC'S IMPORTS]

17. $OOM = f_{17}(OODD, OOM_{-1})$ [OTHER OECD-COUNTRIES' IMPORTS]

b) OTHER IDENTITIES:

18. $VINO = \sum_{n=1}^{4} \alpha_m PR_m \qquad \Sigma \alpha_m = 1$ [COMMODITY PRICES]

19. $OEQ = \sum_{n=1}^{N} \beta_n Q_n \qquad \Sigma \beta_n = 1$ [OECD-COUNTRIES' GDP]

20. $OEPDD = \sum_{n=1}^{N} \beta_m PDD_m$ [OECD-COUNTRIES DOM. DEM. DEFL.]

c) PRICE AND TRADE LINKAGES:

21. $PXW_i = \sum_k (\sum_j q_{ij} W_{kj}) PX_k \qquad k \neq 1$ [WORLD EXPORT PRICES]

in which $q_{ij} = (x_{ij}/x_i)[1/(1 - W_{ij})]$

22. $\Delta PM_i = \sum_j W_{ij} \Delta PX_j \qquad i \neq j$ [CH. IMPORT PRICES, USD]

23. $PM_i = e_i PM_i'$ [IMPORT PRICES]

24. $XW_i = \sum_j W_{ij} M_j \qquad i \neq j$ [EXPORT MARKET]

25. $SDR = \sum_k b_k e_i$ [SDR IN USD]

EXOGENOUS VARIABLES:

ULC_i, e_i, RS_i, C_i, G_i, IV_i, OP, PR_m

C LIST OF VARIABLES OF THE KTKV-MODEL

N:O OF EQ	NAME	DESCRIPTION
1	M_i	IMPORTS OF GOODS & SERVICES, VOL, LC=LOCAL CURRENCY
1,23	PM_i	IMPORT PRICES
1,3,4,9,10	PDD_i	DEFLATOR OF TOTAL DOMESTIC DEMAND
3,9,10	PDDE	EXPECTED RATE OF INFLATION
1,12,13	DD_i	TOTAL DOMESTIC DEMAND, VOL, LC
2,13	I_i	GROSS FIXED INVESTMENT, VOL, LC
2,6,8	PQ_i	GDP DEFLATOR
2	ULC_i	UNIT LABOURS COSTS
2,9	UCR	USERCOST OF CAPITAL
2,3,12	Q_i	GDP, VOL, LC
3	C_i	PRIVATE CONSUMPTION, VOL, LC
6,21	PX_i	EXPORT PRICES
5,15,18	VINO	INDEX OF NON-OIL ECONOMY PRICES
5,21	PXW_i	COMPETITOR'S EXPORT PRICES
5,12,23	e_i	EXCHANGE RATE TO USD
6,12	X_i	EXPORT, VOL, USD
6,24	XW_i	EXPORT MARKET, VOL, USD
8	Ri	LONG-TERM INTEREST RATE
7	RS_i	SHORT-TERM INTEREST RATE
13	IV_i	INVENTORY INVESTMENT, VOL, LC
14	OPPX	EXPORT PRICES OF OPEC
14,16	OP	CRUDE OIL PRICE USD/b
15	DCPX	EXPORT PRICES OF DEVELOPING COUNTRIES

16	OPM	OPEC'S IMPORTS, VOLUME
16,20	OEPDD	DOMESTIC DEMAND DEFLATOR OF OECD COUNTRIES
17	OOM	IMPORTS VOL. OF OTHER OECD COUNTRIES
17	OODD	DOMESTIC DEMAND DEFLATOR OF OTHER OECD COUNTRIES
18	PR_m	PRICE OF A COMMODITY GROUP m
13,17	OEQ	GDP OF OECD COUNTRIES, WEIGHTED AVERAGE
19,20,22	W_{ij}	A SHARE OF THE COUNTRY i OF THE TOTAL IMPORTS OF THE COUNTRY j
19	X_{ij}	A SHARE OF THE COUNTRY i OF THE TOTAL EXPORTS TO THE COUNTRY j
20	PM_i'	IMPORT PRICES IN USD

APPENDIX 2
Estimated equations

Total Domestic Demand Deflators

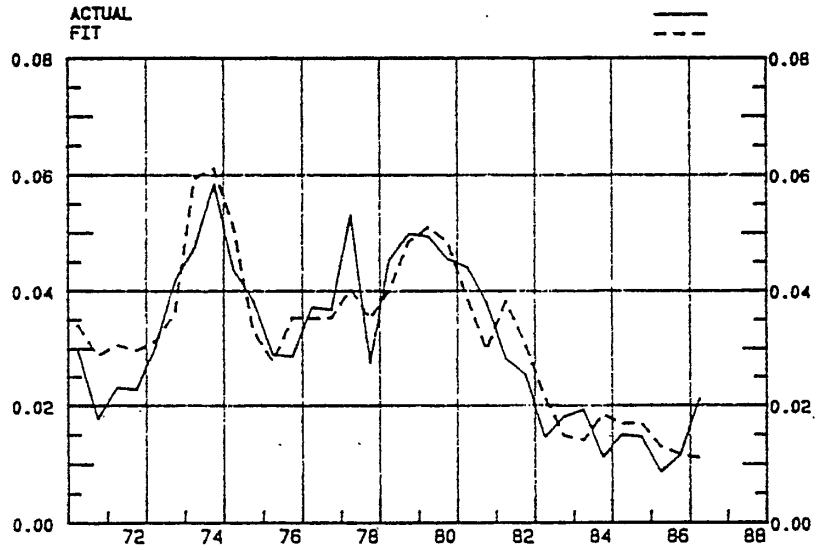
USPDDTS UNITED STATES DOMESTIC DEMAND DEFLATOR

$$USPDDTS = .18146\ \Delta\log USULC + .17361\ \Delta\log USULC_{-1} + .06998\ \Delta\log USPM - .07675\ \Delta\log (A-B) + .01833$$
$$(2.818) \qquad (3.200) \qquad (2.870) \qquad (3.117) \qquad (10.595)$$

R^2 = .792
SEE = .007
DW = 1.928
Estimation period 71S1 - 87S1

USPDDTS	$\log (USPDDI/USPDDI_{-1}) + \log ((1-USTINDLSS)/(1-USTINDLSS_{-1}))$
USULC	unit labour costs
USPM	imports unit value index
A	$\log (USPDDI_{-1} * (1-USTINDLSS_{-1}))$
B	$\log (USULC_{-1} + USM_{-1}/USQ_{-1} * (USPM_{-1} - USULC_{-1}))$
USPDDI	domestic demand deflator index (75=1)
USTINDLSS	indirect taxes less subsidies

UNITED STATES DOMESTIC DEMAND DEFLATOR



Total Domestic Demand Deflators

JAPDDTS JAPAN DOMESTIC DEMAND DEFLATOR

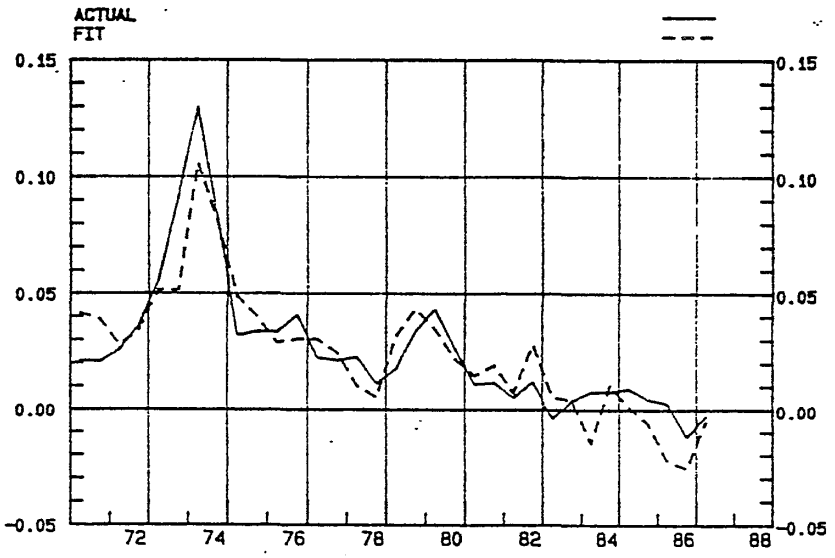
JAPDDTS =

$$.25443\ \Delta\log JAULC + .09614\ \Delta\log JAPM - .07484\ \Delta\log (C-D) + .03119$$
$$(4.326) \qquad (5.602) \qquad (3.649) \qquad (7.570)$$

R^2 = .781
SEE = .014
DW = 1.269
Estimation period 71S1 - 87S1

JAPDDTS	$\log (JAPDDI/JAPDDI_{-1}) + \log ((1-JATINDLSS)/(1-JATINDLSS_{-1}))$
JAULC	unit labour costs
JAPM	imports unit value index
C	$\log (JAPDDI_{-1} \times (1-JATINDLSS_{-1}))$
D	$\log (JAULC_{-1} + JAM_{-1}/USQ_{-1} \times (JAPM_{-1} - JAULC_{-1}))$
JAPDDI	domestic demand deflator index (75=1)
JATINDLSS	indirect taxes less subsidies

JAPAN DOMESTIC DEMAND DEFLATOR



Total Domestic Demand Deflators

GEPDDTS GERMANY DOMESTIC DEMAND DEFLATOR

GEPDDTS =

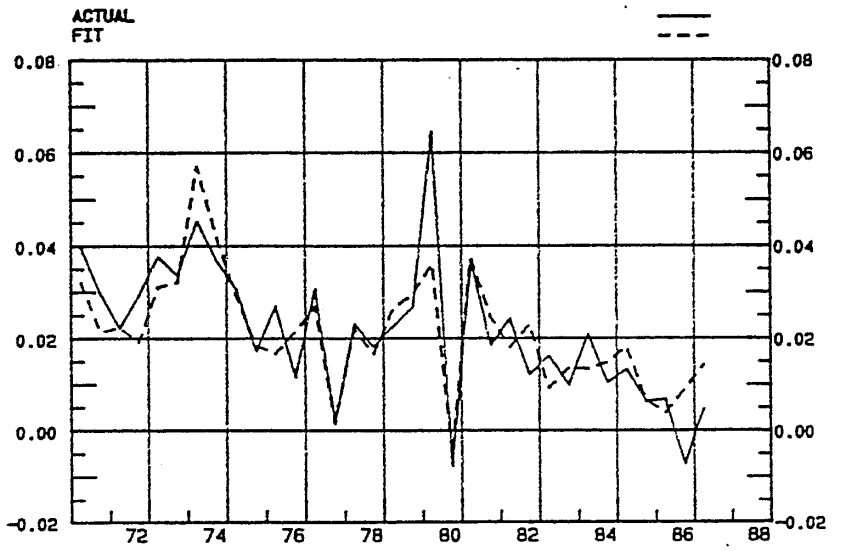
$$.22963\ \Delta\log GEULC + .13343\ \Delta\log GEULC_{-1} + .15256\ \Delta\log GEPM -$$
$$(2.966) \qquad (19.152) \qquad (5.107)$$

$$.01729\ GEDUM1 - .04013\ GEDUM2 + .01332$$
$$(1.881) \qquad (4.193) \qquad (5.620)$$

R^2 = .698
SEE = .009
DW = 1.805
Estimation period 71S1 - 87S1

GEPDDTS	$\log (GEPDDI/GEPDDI_{-1}) + \log ((1-GETINDLSS)/(1-GETINDLSS_{-1}))$
GEULC	unit labour costs
GEPM	imports unit value index
GEDUM1	dummy variable (77S2=1)
GEDUM2	dummy variable (80S2=1)
GEPDDI	domestic demand deflator index (75=1)
GETINDLSS	indirect taxes less subsidies

GERMANY DOMESTIC DEMAND DEFLATOR



Total Domestic Demand Deflators

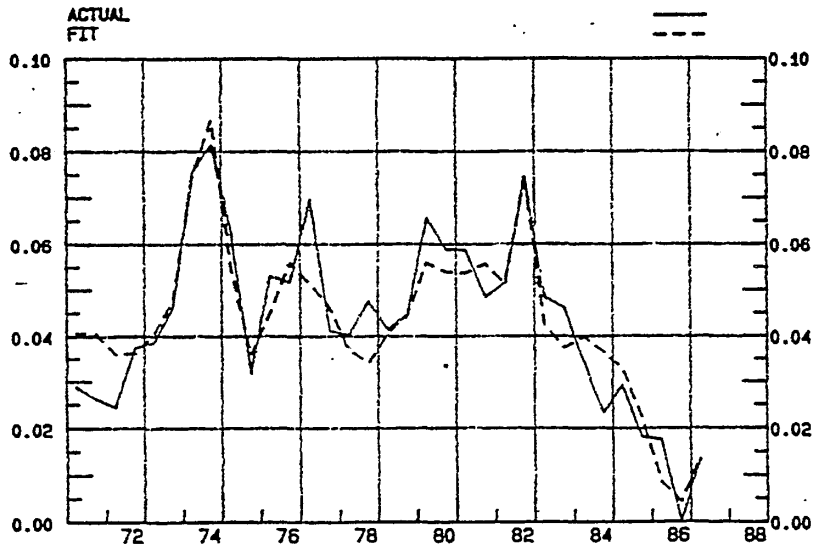
FRPDDTS FRANCE DOMESTIC DEMAND DEFLATOR

$$FRPDDTS = .15253\ \Delta\log FRULC + .09762\ \Delta\log FRPM + .08430\ \Delta\log FRPM_{-1} - .11707\ (E-F) + .02380\ STOP + .02196$$
$$(2.018)\qquad (4.170)\qquad (2.820)\qquad (2.936)\qquad (2.767)\qquad (6.799)$$

R^2 = .8356
SEE = .008
DW = 1.653
Estimation period 71S1 - 87S1

FRPDDTS	$\log (FRPDDI/FRPDDI_{-1}) + \log ((1-FRTINDLSS)/(1-FRTINDLSS_{-1}))$
FRULC	unit labour costs
FRPM	imports unit value index
E	$\log (FRPDDI_{-1} * (1-FRTINDLSS_{-1}))$
F	$\log (FRULC_{-1} + FRM\ FRQ_{-1} * (FRPM_{-1} - FRULC_{-1}))$
STOP	dummy variable 82S2=1)
FRPDDI	domestic demand deflator index (75=1)
FRTINDLSS	indirect taxes less subsidies

FRANCE DOMESTIC DEMAND DEFLATOR



Total Domestic Demand Deflators

UKPDDTS UNITED KINGDOM DOMESTIC DEMAND DEFLATOR

UKPDDTS =

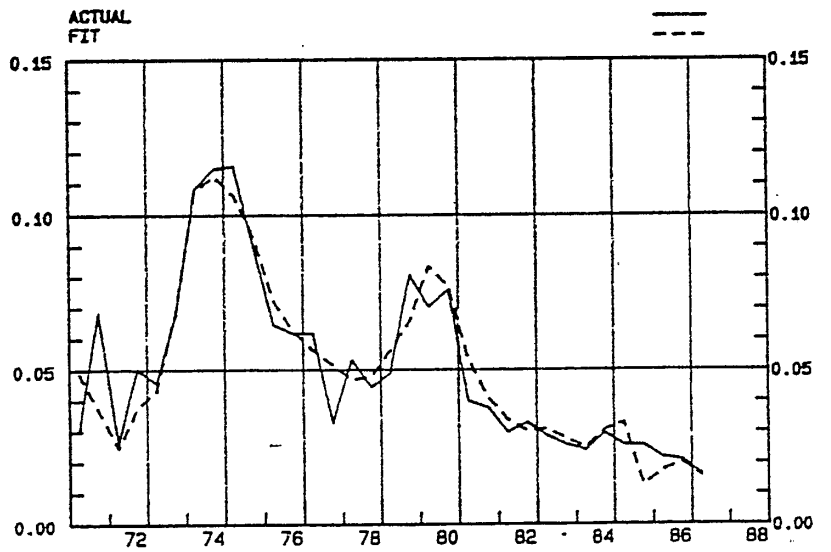
$$.28812\ \Delta\log UKULC + .23093\ \Delta\log UKULC_{-1} +$$
$$(3.480) \qquad (3.608)$$

$$.17054\ \Delta\log UKPM + .06697\ \Delta\log UKPM_{-1} + 0.01207$$
$$(4.462) \qquad (1.268) \qquad (3.669)$$

R^2 = .8857
SEE = .001
DW = 2.328
Estimation period 71S1 - 87S1

UKPDDTS	log (UKPDDI/UKPDDI$_{-1}$) + log ((1-UKTINDLSS)/(1-UKTINDLSS$_{-1}$))
UKULC	unit labour costs
UKPM	imports unit value index
UKPDDI	domestic demand deflator index (75=1)
UKTINDLSS	indirect taxes less subsidies

UNITED KINGDOM DOMESTIC DEMAND DEFLATOR



Total Domestic Demand Deflators

SWPDDI SWEDEN DOMESTIC DEMAND DEFLATOR

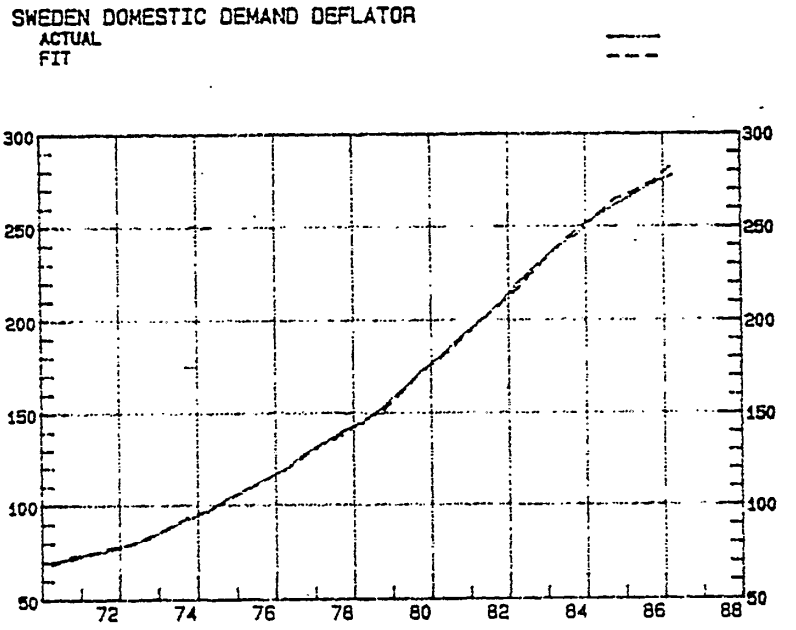
$\Delta \log$ SWPDDI =

$$.20950 \underset{(3.331)}{\Delta \log \text{ SWULC}} + .085963 \underset{(0.8596}{\Delta \log \text{ SWPM}} + .05995 \underset{(1.497)}{\Delta \log \text{ SWPM}_{-1}} +$$

$$.02942 \quad (8.730)$$

R^2 = .486
SEE = .011
DW = 1.946
Estimation period 71S1 - 87S1

SWPDDI	domestic demand deflator index (75=1)
SWULC	unit labour costs
SWPM	imports unit value index



Total Domestic Demand Deflators

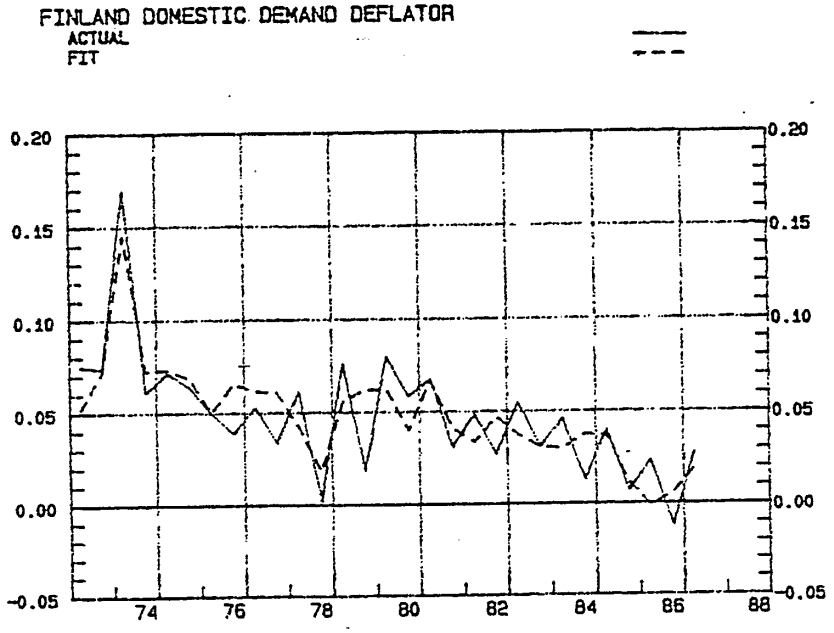
FIPDDTS FINLAND DOMESTIC DEMAND DEFLATOR

FIPDDTS =

$$.28425\ \Delta\log FIULC_{-1} + .37868\ \Delta\log (FIPM) - .01858$$
$$(2.945) \qquad (6.105) \qquad (3.342)$$

R^2 = .701
SEE = .0189
DW = 2.784
Estimation period 73S1 - 87S1

FIPDDTS	$\log (FIPDDI/FIPDDI_{-1}) + \log ((1-FITINDLSS)/(1-FITINDLSS_{-1}))$
FIULC	unit labour costs
FIPM	imports unit value index
FIPDDI	domestic demand deflator index (75=1)
FITINDLSS	indirect taxes less subsidies



Export prices

USPX UNITED STATES EXPORT PRICE DEFLATOR

$\log (USPX/USPX_{-2}$ =

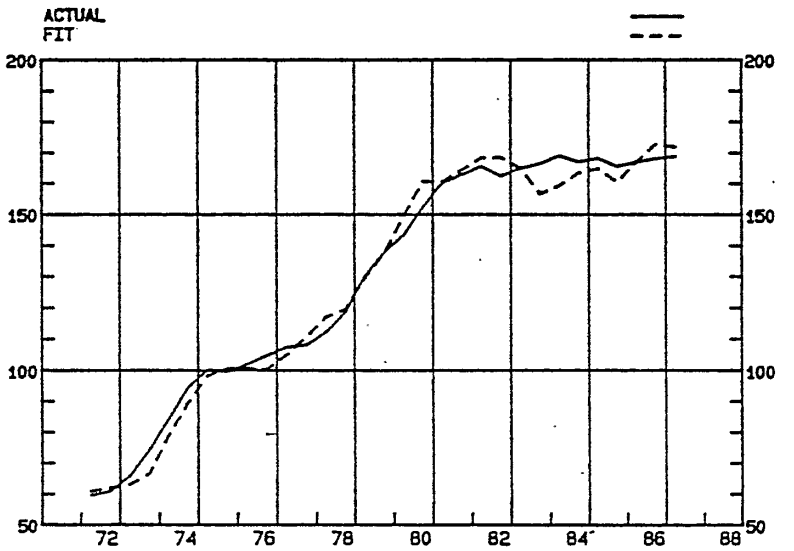
$.98808 \log (USULC/USULC_{-2}) + .27005 \log (USWPX_{-1}/USWPX_{-2}) +$
(5.678) (2.851)

$.50366\ USPXE_{-2}$
(2.672)

R^2 = .699
SEE = .042
DW = .659
Estimation period 72S1 - 87S1

USPX export unit value index
USULC unit labour costs
USWPX competitors' export price index
USPXE error correction term = (.813 log USULC + .422 log USWP - 1.135) - log USPX

UNITED STATES EXPORT PRICE DEFLATOR



Export prices

JAPXDOL JAPAN EXPORT PRICE DEFLATOR

$$\log (JAPXDOL/JAPXDOL_{-2}) =$$

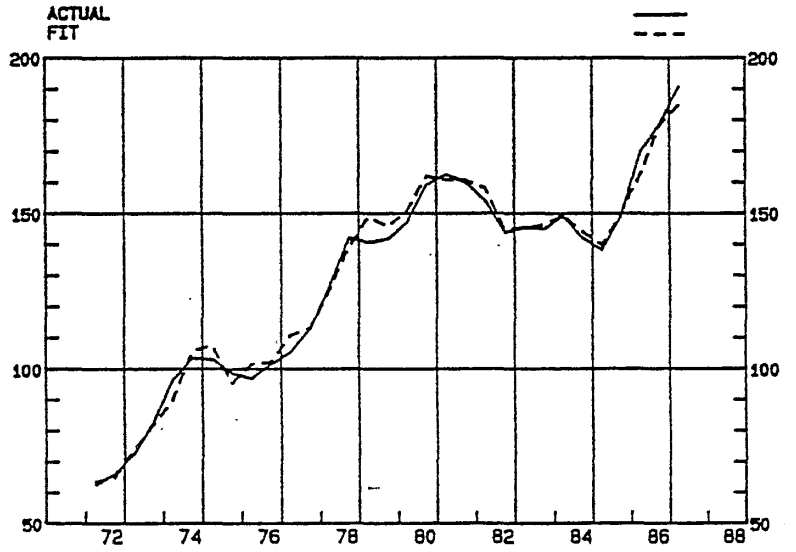
$$\underset{(20.726)}{1.02927} \log (JAWPX/JAWPX_{-2}) - \underset{(6.060)}{.92648}\ JAPXE_{-1} +$$

$$\underset{(10.492)}{1.6203}\ JAPXE_{-2}$$

R^2 = .931
SEE = .029
DW = 2.052
Estimation period 72S1 - 87S1

JAPXDOL export unit value index (in USD)
JAWPX competitors' export price index
JAPXE error correction term = (.952 log JAWPX + .254) - log JAPXDOL

JAPAN EXPORT PRICE DEFLATOR



Export prices

GEPXDOL GERMANY EXPORT PRICE DEFLATOR

$\Delta \log$ GEPXDOL =

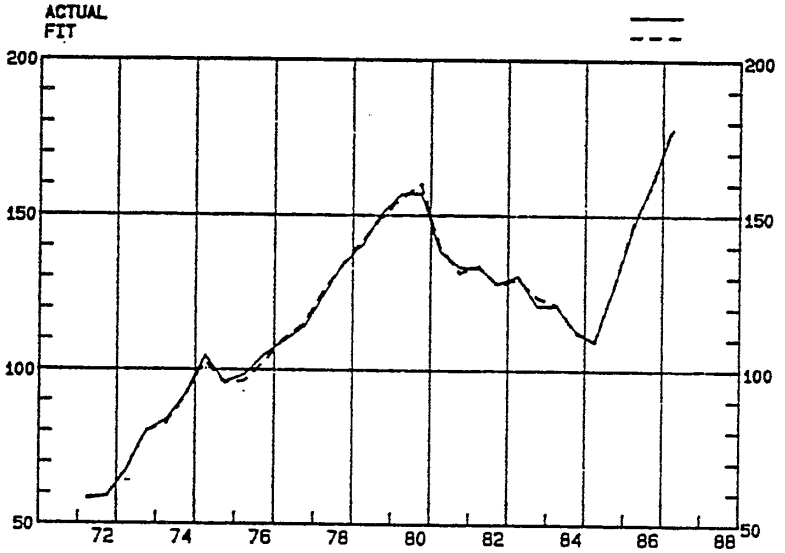
.22541 $\Delta \log$ GEULC + .60017 $\Delta \log$ GEWPX + .60942 $\Delta \log$ DEM +
(2.031) (8.300) (15.995)

.08584 $GEPXE_{-1}$
(3.173)

R^2 = .978
SEE = .012
DW = 1.732
Estimation period 72S1 - 87S1

GEPXDOL	export unit value index
GEULC	unit labour costs
GEWPX	competitors' export price index
DEM	exchange rate to USD (75=1)
GEPXE	error correction term = (.906 log GEWPX + .387) - log GEPX

GERMANY EXPORT PRICE DEFLATOR



Export prices

FRPXDOL FRANCE EXPORT PRICE DEFLATOR

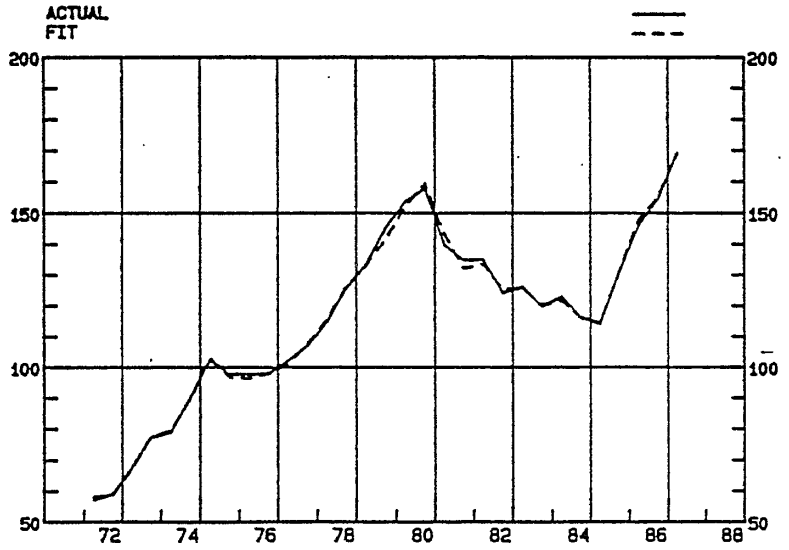
$\Delta \log$ FRPXDOL =

$$.21958\ \Delta \log \text{FRULC} + .78566\ \Delta \log \text{FRWPX} + .41874\ \Delta \log \text{FRF} + .14072\ \text{FRPXE}_{-1}$$
$$(3.065) \qquad (11.453) \qquad (10.925) \qquad (3.665)$$

R^2 = .974
SEE = .012
DW = 1.944
Estimation period 72S1 - 87S1

FRPXDOL	export unit value index
FRULC	unit labour costs
FRWPX	competitors' export price index
FRF	exchange rate to USD (75=1)
FRPXE	error correction term = (.915 log FRWPX + .326) - log FRPXDOL

FRANCE EXPORT PRICE DEFLATOR



Export prices

UKPXDOL UNITED KINGDOM EXPORT PRICE DEFLATOR

$\Delta \log$ UKPXDOL =

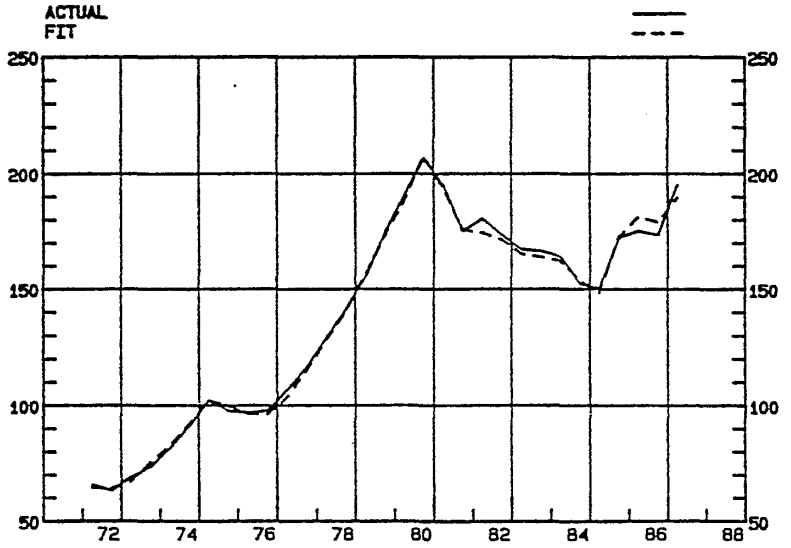
.45708 $\Delta \log$ UKULC + .40685 $\Delta \log$ UKWPX + .53207 $\Delta \log$ GBP +
(6.511) (4.635) (9.842)

.13244 $UKPXE_{-1}$ + .03882 $\Delta \log$ OP
(2.551) (3.071)

R^2 = .939
SEE = .019
DW = 1.609
Estimation period 72S1 - 87S1

UKPXDOL	export unit value index
UKULC	unit labour costs
UKWPX	competitors' export price index
GBP	exchange rate to USD (75=1)
UKPXE	error correction term = (.911 log UKWPX - .230) - log UKPXDOL
OP	spot price of crude oil

UNITED KINGDOM EXPORT PRICE DEFLATOR



Export prices

SWPXDOL SWEDEN EXPORT PRICE DEFLATOR

$$\log (SWPXDOL/SWPXDOL_{-2}) =$$

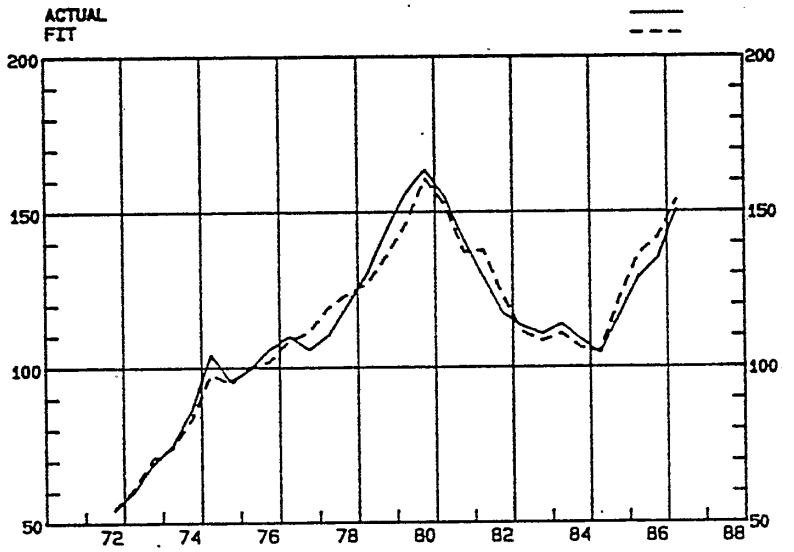
$$.29118 \log (SWULC/SWULC_{-2}) + .81190 \log (SWWPX/SWWPX_{-2}) +$$
(1.788) (7.673)

$$.50426 \log (SEK/SEK_{-2}) + .10728\ SWPXE_{-2}$$
(5.708) (1.237)

R^2 = .916
SEE = .041
DW = .879
Estimation period 72S2 - 87S1

SWPXDOL	export unit value index
SWULC	unit labour costs
SWWPX	competitors' export price index
SEK	exchange rate to USD (75=1)
SWPXE	error correction term = (.950 log SWWPX + .121) - log SWPXDOL

SWEDEN EXPORT PRICE DEFLATOR



Export prices

FIPXDOL FINLAND EXPORT PRICE DEFLATOR

$$\log (FIPXDOL/FIPXDOL_{-2}) =$$

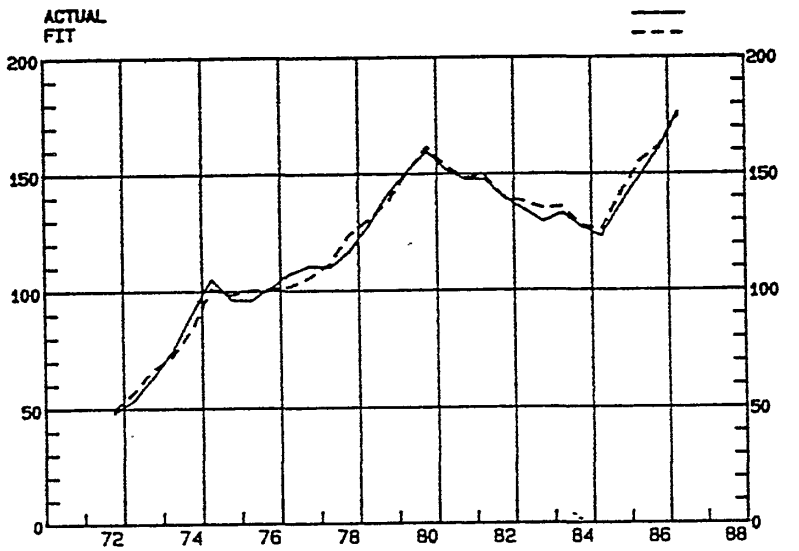
$$\underset{(4.111)}{.40803} \log (FIUL/FIULC_{-2}) + \underset{(7.968)}{.89556} \log (FIWPX/FIWPX_{-2}) +$$

$$\underset{(70.783)}{.24921} \log (FMK/FMK_{-2}) + \underset{(3.659)}{.47310} FIPXE_{-2}$$

R^2 = .937
SEE = .037
DW = .983
Estimation period 72S2 - 87S1

FIPXDOL	export unit value index
FIULC	unit labour costs
FIWPX	competitors' export price index
FMK	exchange rate to USD (75=1)
FIPXE	error correction term = (1.170 log FIWPX - .889) - log FIPXDOL

FINLAND EXPORT PRICE DEFLATOR



Export prices

OPPX OPEC COUNTRIES EXPORT PRICES

$\Delta \log OPPX =$

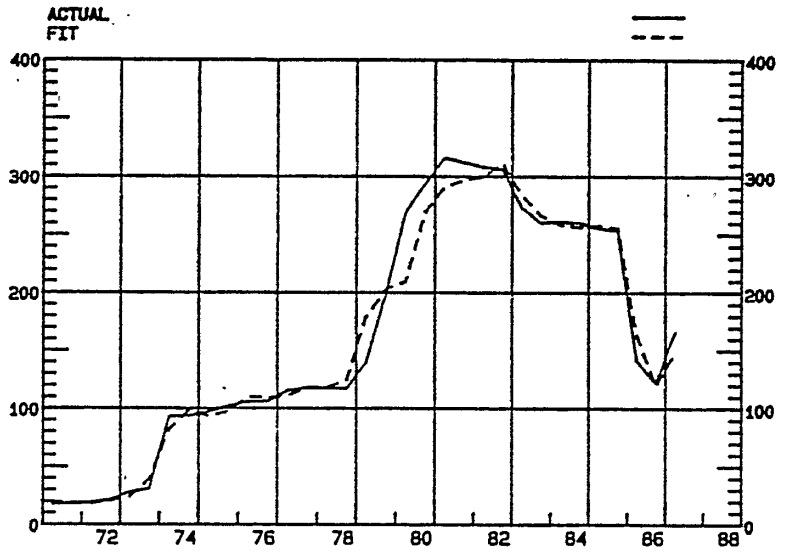
$0.74418\ \Delta \log OP + .13039\ \Delta \log OP_{-1}$

(12.024) (2.017)

$R^2 = .833$
SEE = .100
DW = 2.053
Estimation period 71S1 - 87S2

OPPX export unit value index
OP crude oil price $/bar

OPEC COUNTRIES EXPORT PRICES



Export prices

DCPX	DEVELOPING COUNTRIES EXPORT PRICES

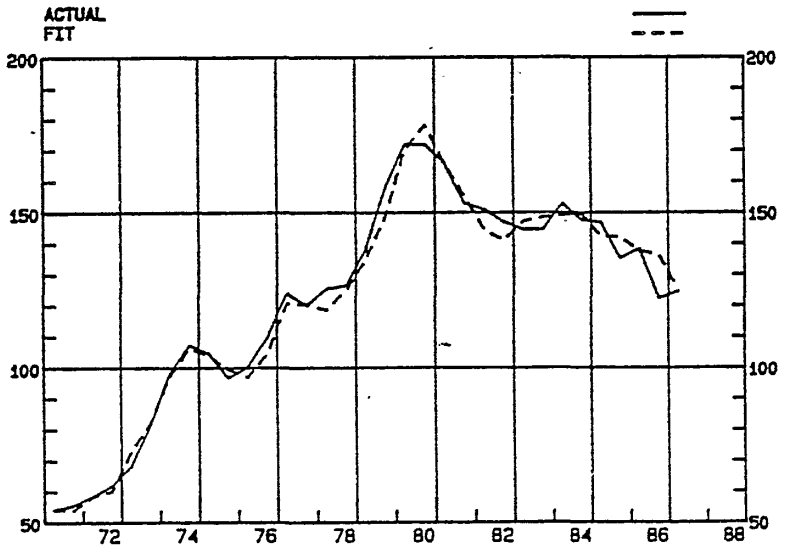
$\Delta \log DCPX =$

$$.47928\ \Delta \log VINO + .16089\ \Delta \log VINO_{-1} + .18045\ \Delta \log VINO_{-2}$$
$$(6.63) \qquad (1.93) \qquad (2.51)$$

$R^2 = .759$
SEE = .037
DW = 1.966
Estimation period 71S1 - 87S2

DCPX	export unit value index
VINO	commodity price index (oil excl.)

DEVELOPING COUNTRIES EXPORT PRICES



Import volumes

USM UNITED STATES IMPORTS, VOLUME (82-USD)

---

log USM =

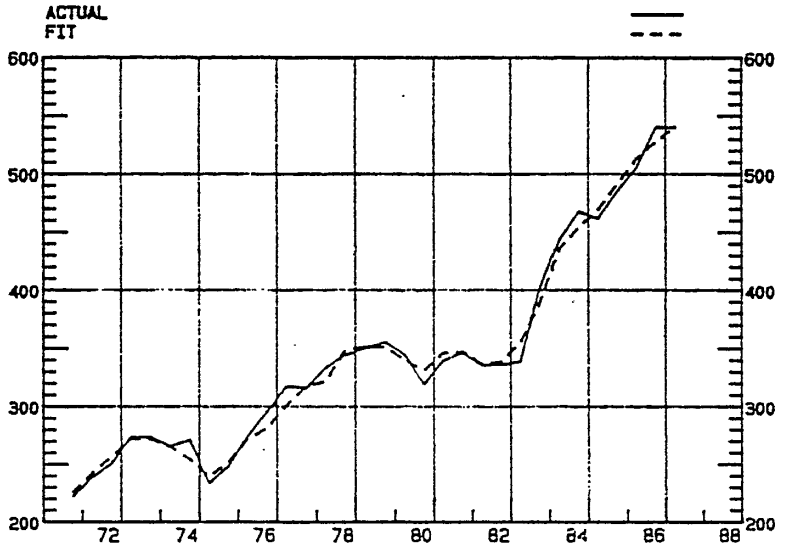
$$-0.07542 \underset{(2.588)}{\log(USPM/USPDDI)_{-1}} + \underset{(5.585)}{1.90576 \log USDD}$$

$$+ \underset{(0.724)}{.06629 \log (USM)_{-1}} - \underset{(10.599)}{9.89963}$$

R^2 = .9960
SEE = .0270
DW = 1.9082
Estimation period 71S2 - 87S1

USM	imports, volume (82-USD)
USPM	imports, unit value index
USPDDI	(total) domestic demand price deflator
USDD	(total) domestic demand (82-USD)

UNITED STATES IMPORTS, VOLUME (82-USD)



Import volumes

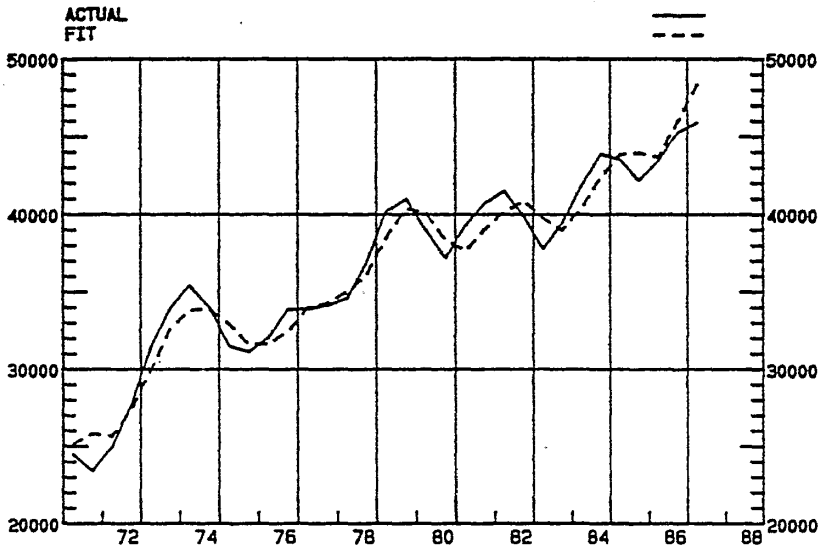
JAM JAPAN IMPORTS, VOLUME (80-JPY)

$$\log JAM = -.07254 \underset{(2.030)}{\log (JAPM/JAPDDI)_{-1}} + .35248 \underset{(2.992)}{\log JADD} + .63135 \underset{(5.865)}{\log (JAM)_{-1}} - 0.47733 \underset{(0.799)}{}$$

R^2 = .949
SEE = .039
DW = .989
Estimation period 71S1 - 87S1

JAM imports, volume (80-YEN)
JAPM imports, unit value index
JAPDDI (total) domestic demand price deflator
JADD (total) domestic demand (80-YEN)

JAPAN IMPORTS, VOLUME (80-YEN)



Import volumes

GEM GERMANY IMPORTS, VOLUME (80-DEM)

---

log GEM =

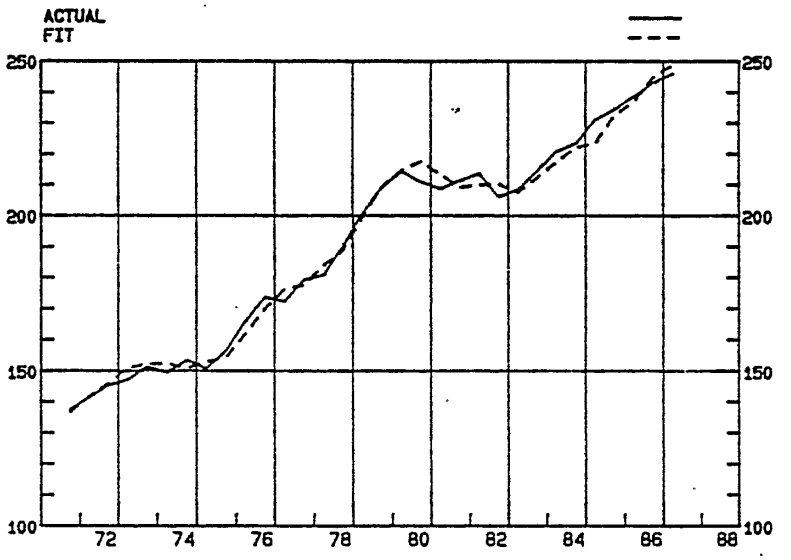
$$-.03335\ \Delta\log(GEPM/GEPX)_{-1} + .70068\ \log(GEDD) + .65863\ LOG(GEM)_{-1}$$
$$(1.269) \qquad (4.360) \qquad (8.896)$$

$$- 2.78697$$
$$(4.102)$$

R^2 = .993
SEE = .017
DW = 1.767
Estimation period 71S2 - 87S1

GEM imports, volume (80-DEM)
GEPM imports, unit value index
GEPX exports, unit value index
GEDD (total) domestic demand

GERMANY IMPORTS, VOLUME (80-DEM)



Import volumes

FRM FRANCE IMPORTS, VOLUME (80-FRF)

log FRM =

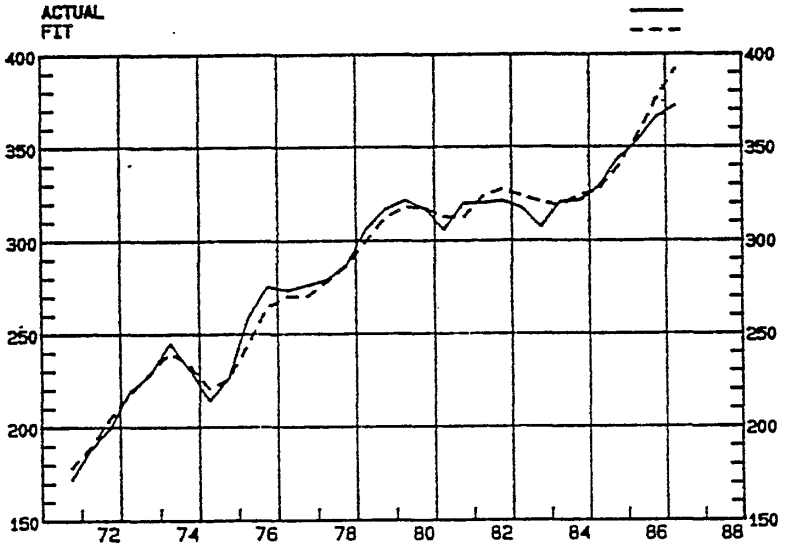
$$-.20126 \log (FRPM/FRPDDI)_{-1} + 1.03194 \log FRDD$$
$$(3.198) \qquad (5.402)$$

$$+ .43580 \log (FRM)_{-1} - 4.25062$$
$$(4.641) \qquad (4.889)$$

R^2 = .987
SEE = .024
DW = 1.255
Estimation period 71S2 - 87S1

FRM	imports, volume (80-FRF)
FRPM	imports, unit value index
FRPDDI	domestic demand price deflator
FRDD	(total) domestic demand

FRANCE IMPORTS, VOLUME (80-FRF)



Import volumes

UKM UNITED KINGDOM IMPORTS, VOLUME (80 - GBP)

---

log UKM =

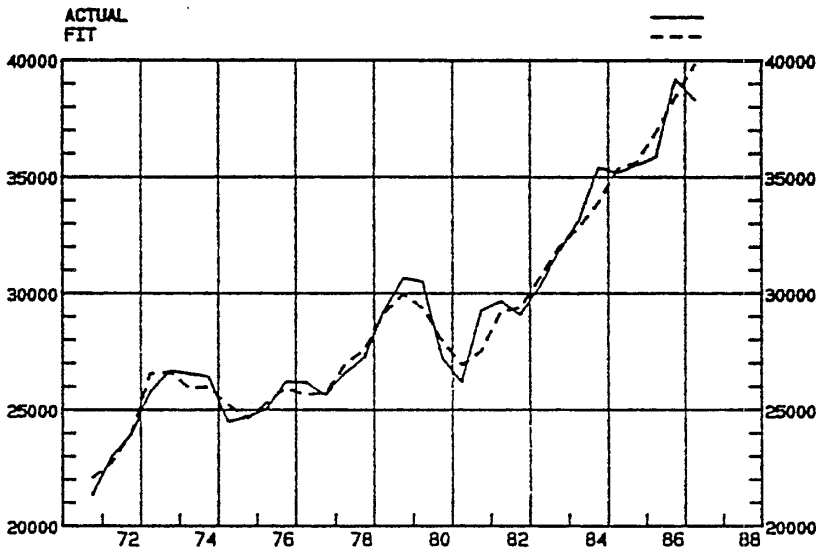
$$-.06438 \underset{(1.337)}{\log(UKPM/UKPDDI)_{-1}} + 1.49798 \underset{(8.124)}{\log UKDD}$$

$$+ .23762 \underset{(2.470)}{\log (UKM)_{-1}} - 9.59295 \quad (7.669)$$

R^2 = .975
SEE = .025
DW = 2.004
Estimation period 71S2 - 87S1

UKM	imports, volume (80-GBP)
UKPM	imports, unit value index
UKPDDI	domestic demand price deflator
UKDD	(total) domestic demand

UNITED KINGDOM IMPORTS, VOLUME (80-GBP)



Import volumes

SWM SWEDEN IMPORTS, VOLUME (80 - SKR)

---

log SWM =

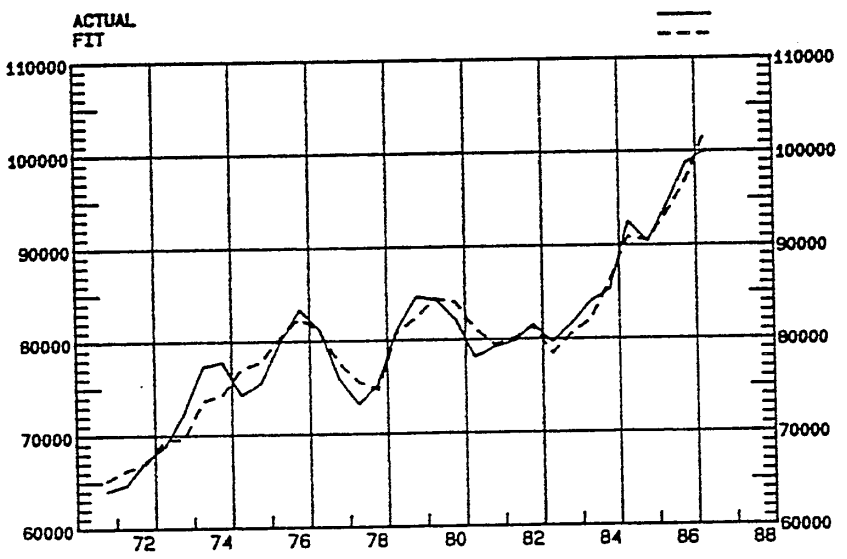
$$-.13383 \underset{(2.612)}{\log (SWPM/SWPDDI)_{-1}} + 1.31749 \underset{(6.392)}{\log SWDD}$$

$$+ .26152 \underset{(2.045)}{\log (SWM)_{-1}} - 8.07952 \quad (5.887)$$

R^2 = .954
SEE = .024
DW = 1.284
Estimation period 71S2 - 87S1

SWM	imports, volume (80-SKR)
SWPM	imports, unit value index
SWPDDI	domestic demand price deflator
SWDD	(total) domestic demand

SWEDEN IMPORTS, VOLUME (80-SKR)



Import volumes

FIM FINLAND IMPORTS, VOLUME (85-FIM)

---

log FIM =

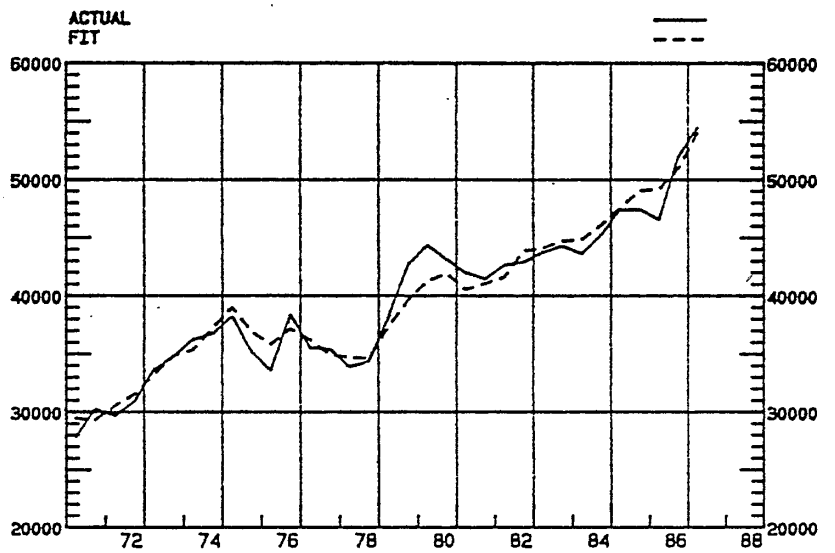
$$-.06080 \log (FIPM/FIPDDI)_{-1} + 1.02998 \log FIDD + .15130 \log FIM_{-1}$$
$$(.611) \qquad (6.632) \qquad (1.116)$$

$$- 3.22266$$
$$(4.580)$$

R^2 = .959
SEE = .033
DW = 1.148
Estimation period 71S1 - 87S2

FIM	imports, volume (85-FIM)
FIPM	imports, unit value index
FIPDDI	domestic demand price deflator
FIDD	(total) domestic demand

FINLAND IMPORTS, VOLUME (85-FIM)



Import volumes

OOMD OTHER OECD COUNTRIES IMPORTS, VOLUME, %-CHANGE

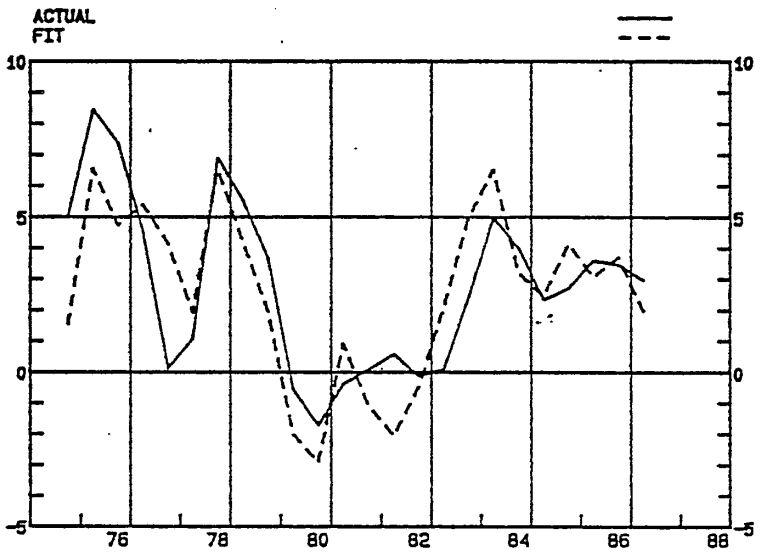
OOMD =

$$2.17765\ \underset{(6.734)}{OODDD} + \underset{(2.519)}{.28117}\ (OOMD)_{-1} - \underset{(2.210)}{1.41845}$$

R^2 = .719
SEE = 2.694
DW = 1.492
Estimation period 75S2 - 87S1

OOMD	imports, volume (USD), percentage change
OODDD	(total) domestic demand, percentage change

OTHER OECD COUNTRIES IMPORTS, VOLUME, %-CHANGE



Import volumes . . .

OPMI OPEC COUNTRIES IMPORTS, VOLUME (80=100)

---

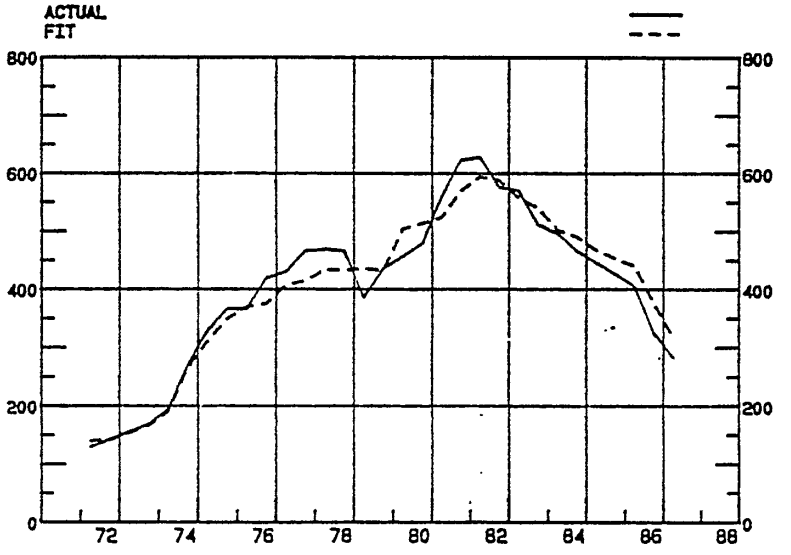
log OPMI =

$$.61320 \log OPMI_{-1} + .21141 \log (OP/OEPDDI)_{-1} + 2.77520$$
$$(10.596) \qquad (5.371) \qquad (6.612)$$

R^2 = .975
SEE = .071
DW = 1.195
Estimation period 72S1 - 87S1

OPMI OPEC-countries imports, volume index (80 = 100)
OP SPOT-price of crude oil
OEPDDI domestic demand deflator of OECD-countries

OPEC COUNTRIES IMPORTS, VOLUME (80=100)



Export volumes

USXDOL UNITED STATES EXPORTS, VOLUME (82-USD)

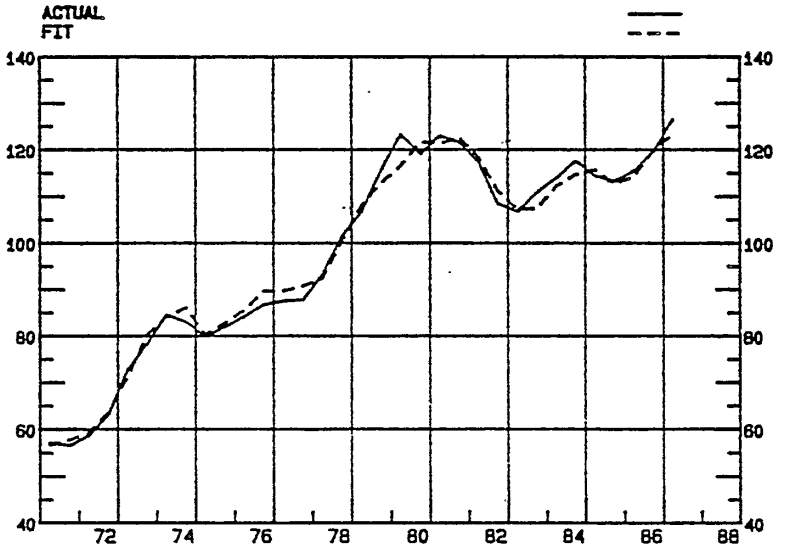
$$\log(USXDOL/USXDM) =$$

$$\underset{(3.659)}{-.17358}\ \log(USPX/USWPX) + \underset{(7.455)}{.71168}\ \log(USXDOL/USXDM)_{-1} - \underset{(2.054)}{.02003}$$

R^2 = .832
SEE = .023
DW = 1.592
Estimation period 71S1 - 87S2

USXDOL	exports, volume (82-USD)
USXDM	exports given by market growth
USPX	export price deflator
USWPX	competitors' export price deflator

UNITED STATES EXPORTS, VOLUME (82-USD)



Export volumes

JAXDOL JAPAN EXPORTS, VOLUME (80-USD)

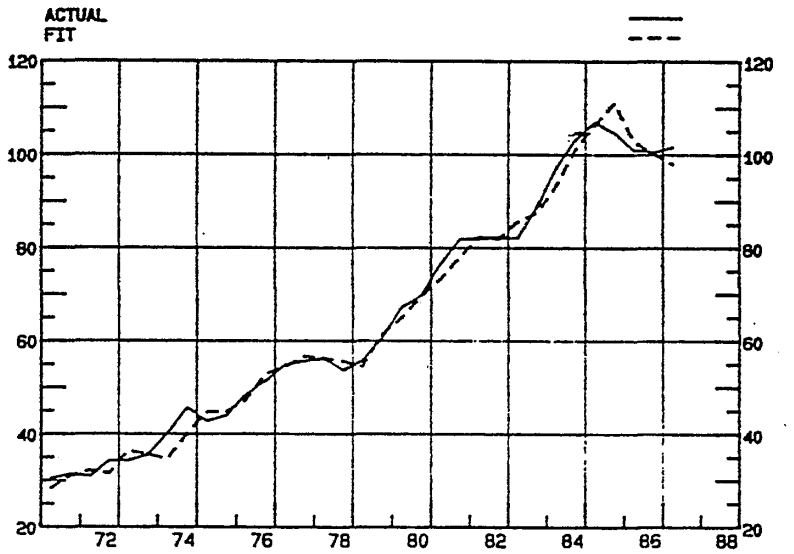
$$\log(JAXDOL/JAXDM) =$$

$$\underset{(4.021)}{-.63890}\ \log(JAPXDOL/JAWPX) + \underset{(25.184)}{1.00987}\ \log(JAXDOL/JAXDM)_{-1} + \underset{(3.184)}{.02108}$$

R^2 = .967
SEE = .031
DW = 1.748
Estimation period 71S1 - 87S1

JAXDOL	exports, volume (80-USD)
JAXDM	exports given by market growth
JAPXDOL	export price deflator
JAWPX	competitors' export price deflator

JAPAN EXPORTS, VOLUME (80-USD)



Export volumes

GEXDOL GERMANY EXPORTS, VOLUME (80-USD)

$$\log(GEXDOL/GEXDM) =$$

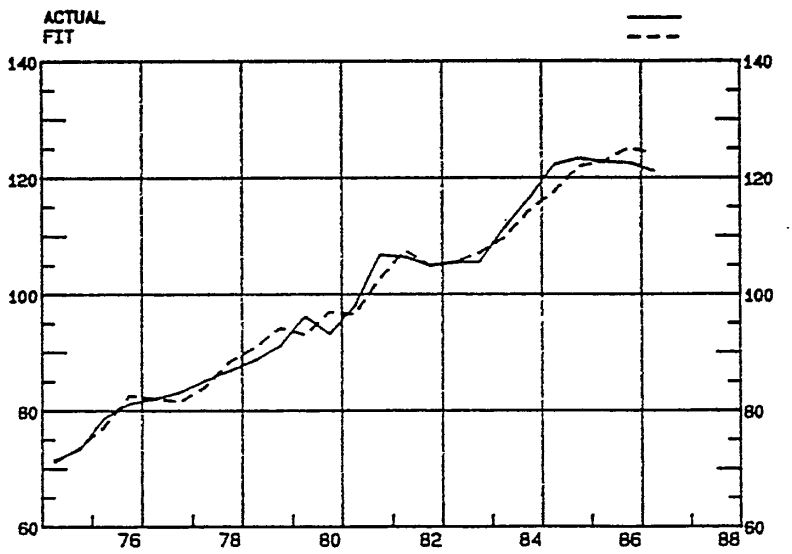
$$-.09435 \underset{(2.405)}{\log(GEPXDOL/GEWPX)} + .88348 \underset{-2\ (9.764)}{\log(GEXDOL/GEXDM)_{-1}}$$

$$- \underset{(0.469)}{.00392}$$

R^2 = .820
SEE = .023
DW = 2.623
Estimation period 75S1 - 87S1

GEXDOL	exports, volume (80-USD)
GEXDM	exports given by market growth
GEPXDOL	export price deflator
GEWPX	competitors' export price deflator

GERMANY EXPORTS, VOLUME (80-USD)



Export volumes

FRXDOL FRANCE EXPORTS, VOLUME (80 - USD)

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log(FRXDOL/FRXDM) =

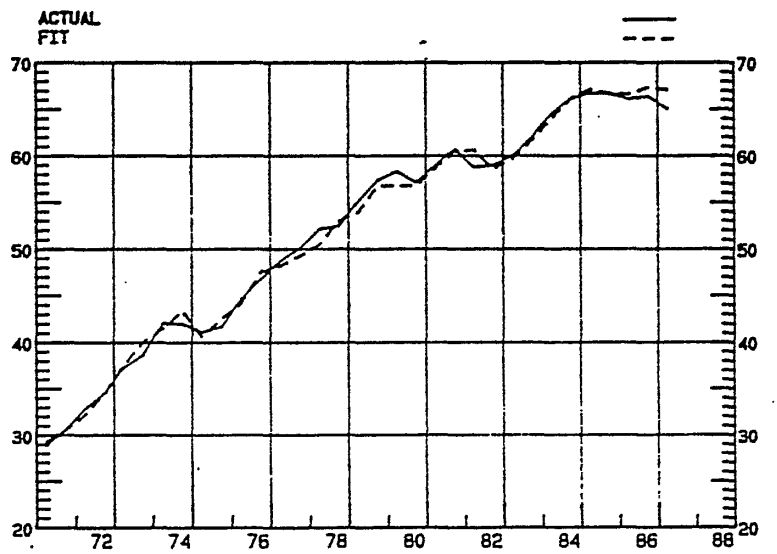
$$-.19459 \underset{(3.389)}{\log(FRPXDOL/FRWPX)} + .43117 \underset{(3.774)}{\log(FRXDOL/FRXDM)_{-1}}$$

$$- \underset{(2.439)}{.01322}$$

R^2 = .661
SEE = .018
DW = 2.142
Estimation period 71S1 - 87S1

FRXDOL	exports, volume (80-USD)
FRXDM	exports given by market growth
FRPXDOL	export price deflator
FRWPX	competitors' export price deflator

FRANCE EXPORTS, VOLUME (80-USD)



Export volumes

UKXDOL UNITED KINGDOM EXPORTS, VOLUME (80-USD)

$$\log(UKXDOL/UKXDM) =$$

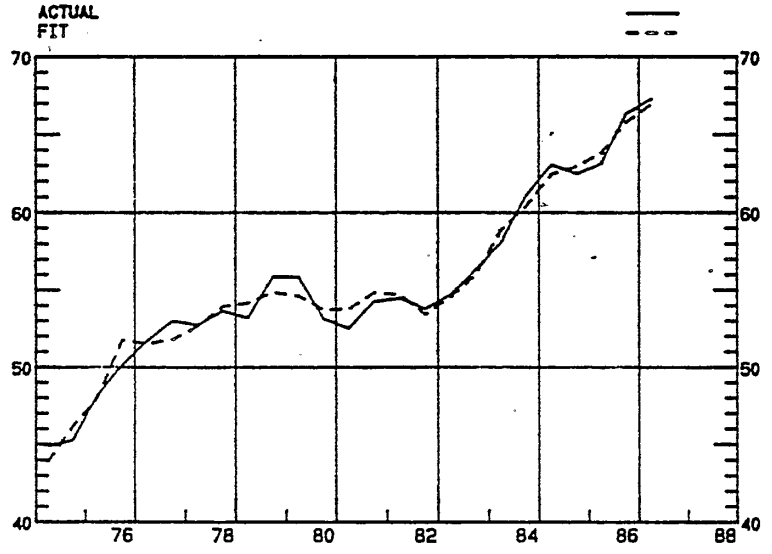
$$\underset{(4.281)}{-.22348}\ \log(UKPXDOL/UKWPX) + \underset{(7.372)}{.62142}\ \log(UKXDOL/UKXDM)_{-1}$$

$$+\ \underset{(4.170)}{.04082}$$

R^2 = .918
SEE = .016
DW = 1.979
Estimation period 75S1 - 87S1

UKXDOL	exports, volume (80-USD)
UKXDM	exports given by market growth
UKPXDOL	export price deflator
UKWPX	competitors' export price deflator

UNITED KINGDOM EXPORTS, VOLUME (80-USD)



Export volumes

SWXDOL SWEDEN EXPORTS, VOLUME (80-USD)

$\log(SWXDOL/SWXDM) =$

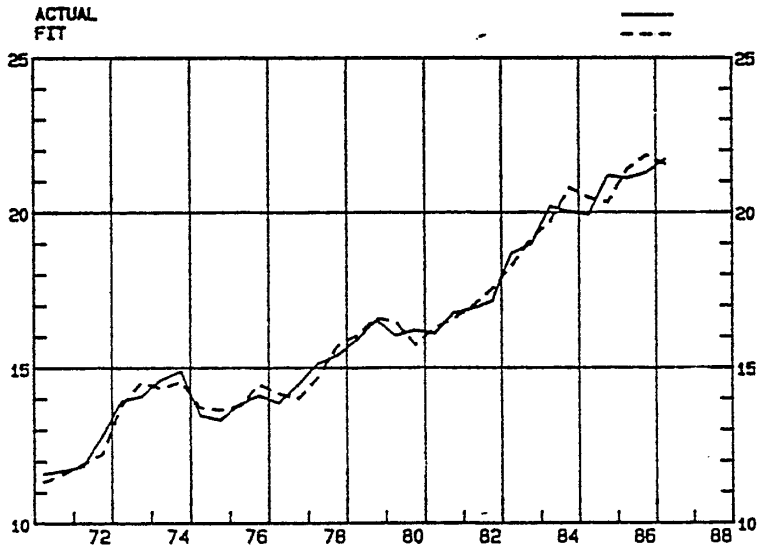
$-.09138 \log(SWPXDOL/SWWPX) + .84285 \log(SWXDOL/SWXDM)_{-1} +$
$(1.939) \qquad (18.263)$

$.04237*DUM82$
(2.153)

$R^2 = .910$
SEE = .0242
DW = 2.328
Estimation period 71S1 - 87S1

SWXDOL	exports, volume (80-USD)
SWXDM	exports given by market growth
SWPXDOL	export price deflator
SWWPX	competitors' export price deflator
DUM82	devaluation dummy

SWEDEN EXPORTS, VOLUME (80-USD)



Export volumes

FIXDOL FINLAND EXPORTS, VOLUME (80-USD)

$$\log(FIXDOL/FIXDM) =$$

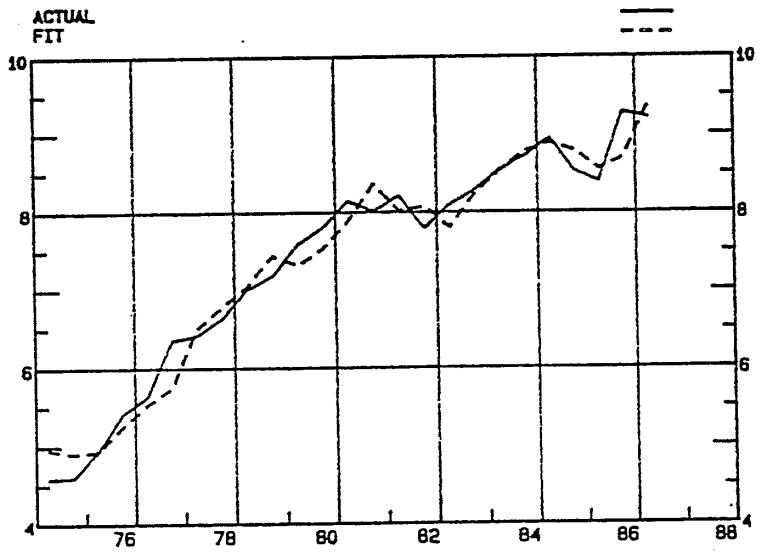
$$-.04116 \log(FIPXDOL/FIWPX) + .92861 \log(FIXDOL/FIXDM)_{-1}$$
$$(\ .662) \qquad\qquad\qquad\qquad -1(10.326)$$

$$+\ .01147$$
$$(\ .785)$$

R^2 = .874
SEE = .041
DW = 1.686
Estimation period 75S1 - 87S1

FIXDOL	exports, volume (80-USD)
FIXDM	exports given by market growth
FIPXDOL	export price deflator
FIWPX	competitors' export price deflator

FINLAND EXPORTS, VOLUME (80-USD)



Private consumption volumes

USC UNITED STATES PRIVATE CONSUMPTION (82-USD)

$$\log(USC/USC_{-2}) =$$

$$-.64507 \log(USDDI/USPDDI_{-2}) - .00198(PRIMES*USPDDIE)$$
$$(10.203) \qquad (3.808)$$

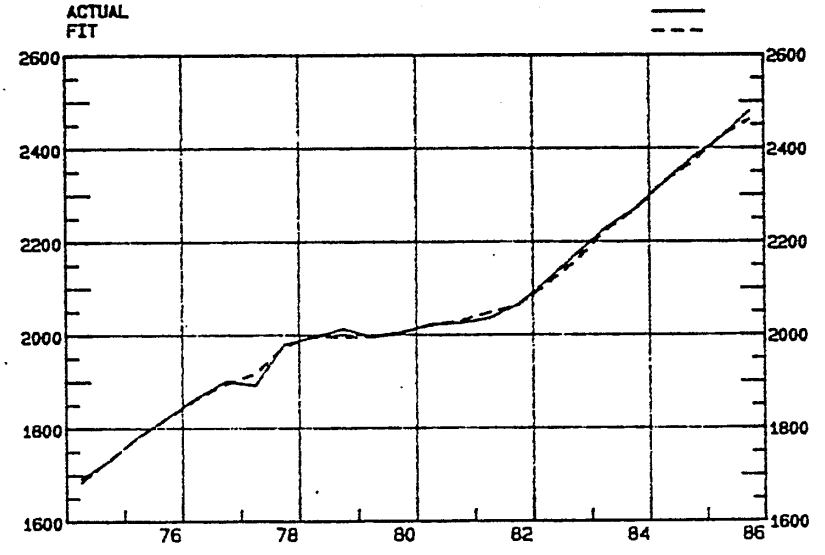
$$+ .62176 \log(USQ/USQ_{-2}) + .82004 \log(USQ_{-2}/USC_{-2})$$
$$(11.077) \qquad (7.222)$$

$$- .30586$$
$$(6.087)$$

R^2 = .936
SEE = .005
DW = 1.988
Estimation period 75S1 - 86S2

USC	private consumption, volume (82-USD)
USPDDI	domestic demand deflator
PRIMES	US-prime rate
USPDDIE	expected change of domestic demand deflator
USQ	GDP, VOLUME (82-USD)

UNITED STATES PRIVATE CONSUMPTION, VOLUME (82-USD)



Private consumption volumes

JAC JAPAN PRIVATE CONSUMPTION (80-JPY)

log JAC =

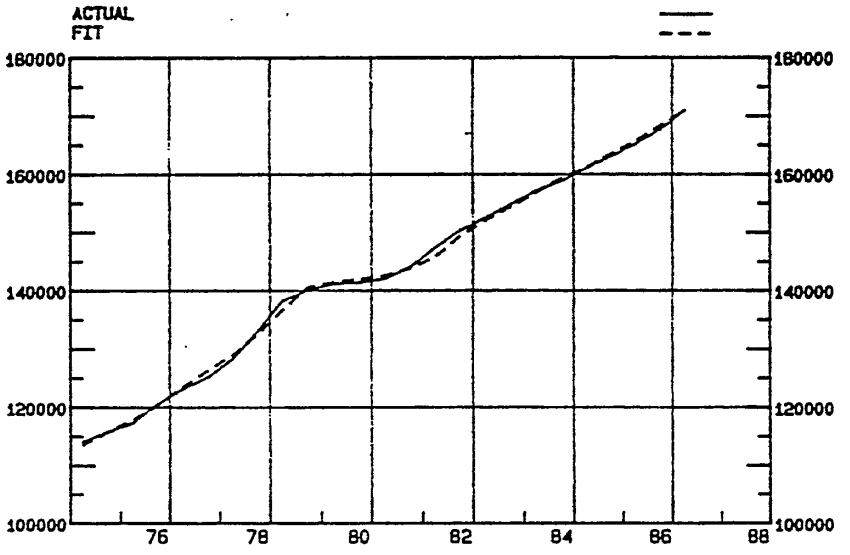
$$.11547\ \underset{(1.362)}{\log JAQ_{-1}} + .76493\ \underset{(6.913)}{\log JAC_{-1}} - .00309\ \underset{(1.981)}{JAPDDIE}$$

$$- .00398\ \underset{(3.159)}{JARI_{-1}} + \underset{(4.060)}{1.40971}$$

R^2 = .998
SEE = .006
DW = 1.25
Estimation period 75S1 - 87S1

JAC	private consumption, volume (82-JPY)
JAPDDIE	expected change of domestic demand deflator
JAQ	GDP, VOLUME (82-JPY)

JAPAN PRIVATE CONSUMPTION (80-JPY)



Private consumption volumes

GEC GERMANY PRIVATE CONSUMPTION, VOLUME (80-DEM)

$\log(GEC/GEC_{-2}) =$

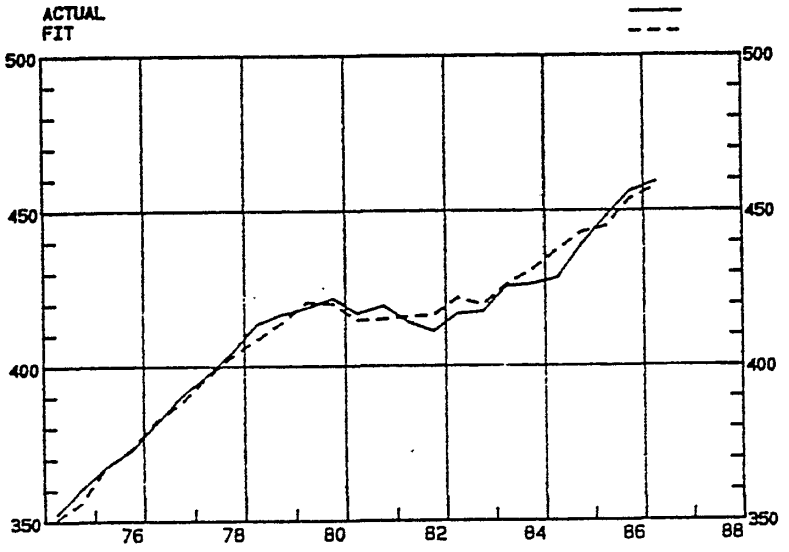
$-.00996(GERI-GEPDDIE) + .45731 \log(GEQ/GEQ_{-2})$
$(4.032) \qquad (3.755)$

$+ .46114 \log(GEQ_{-2}/GEC_{-2}) - .19450$
$(3.429) \qquad (2.227)$

$R^2 = .808$
SEE = .009
DW = .969
Estimation period 75S1 - 86S2

GEC	private consumption, volume (80-DEM)
GERI	yield on fully taxed industry bonds
GEPDDIE	expected change of domestic demand deflator
GEQ	GDP, VOLUME (80-DEM)

GERMANY PRIVATE CONSUMPTION, VOLUME (80-DEM)



Private consumption volumes

FRC FRANCE PRIVATE CONSUMPTION, VOLUME (80-FRF)

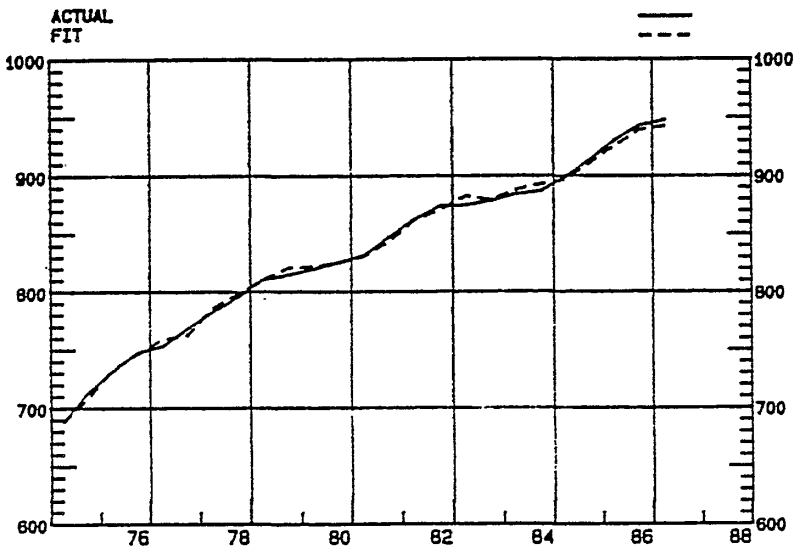
$\Delta \log FRF$ =

$$.74060\ \Delta \log FRQ = .00325\ \Delta(FRRI - FRPDDIE)$$
$$(5.744) \qquad\qquad (2.664)$$
$$+\ .22291\ \log(FRQ_{-1}/FRC_{-1}) - .11138$$
$$(3.136) \qquad\qquad (2.970)$$

R^2 = .662
SEE = .005
DW = 2.012
Estimation period 75S1 - 87S1

FRC	private consumption, volume (80-FRF)
FRRI	yield on fully taxed industry bonds
FRPDDIE	expected change of domestic demand deflator
FRQ	GDP, VOLUME (80-FRF)

FRANCE PRIVATE CONSUMPTION, VOLUME (80-FRF)



Private consumption volumes

UKC UNITED KINGDOM PRIVATE CONSUMPTION, VOLUME (80-GBP)

$\log(UKC/UKC_{-2}) =$

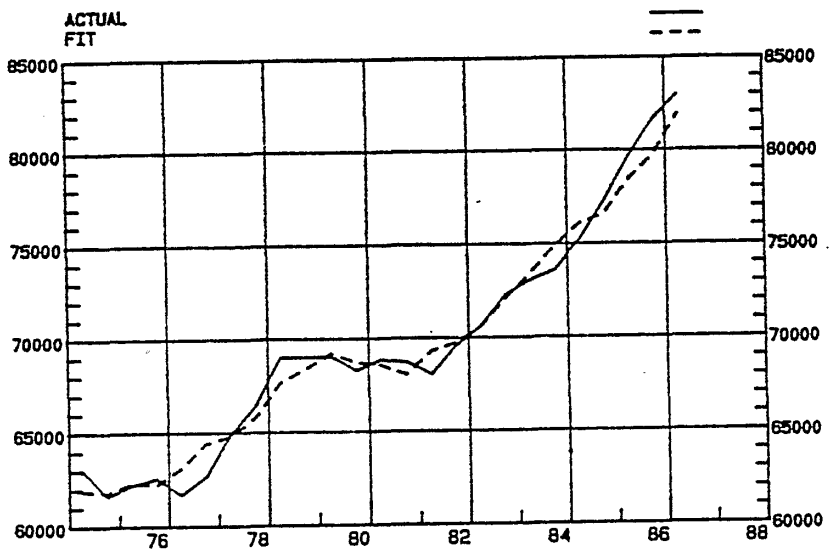
$-.00680\ UKPDDIE + .28561 \log (UKQ/UKQ_{-2})$
$(5.231)\qquad\qquad (1.808)$

$+\ .48672 \log(UKQ_{-2}/UKC_{-2}) - .20076$
$(4.054)\qquad\qquad\qquad\quad (3.341)$

$R^2 = .761$
SEE = .013
DW = 1.284
Estimation period 75S1 - 86S2

UKC	private consumption, volume (80-GPB)
UKPDDIE	expected change of domestic demand deflator
UKQ	GDP, VOLUME (80-GPB)

UNITED KINGDOM PRIVATE CONSUMPTION, VOLUME (80-GBP)



Private consumption volumes

SWC SWEDEN PRIVATE CONSUMPTION, VOLUME (80-SKR)

$$\log SKC =$$

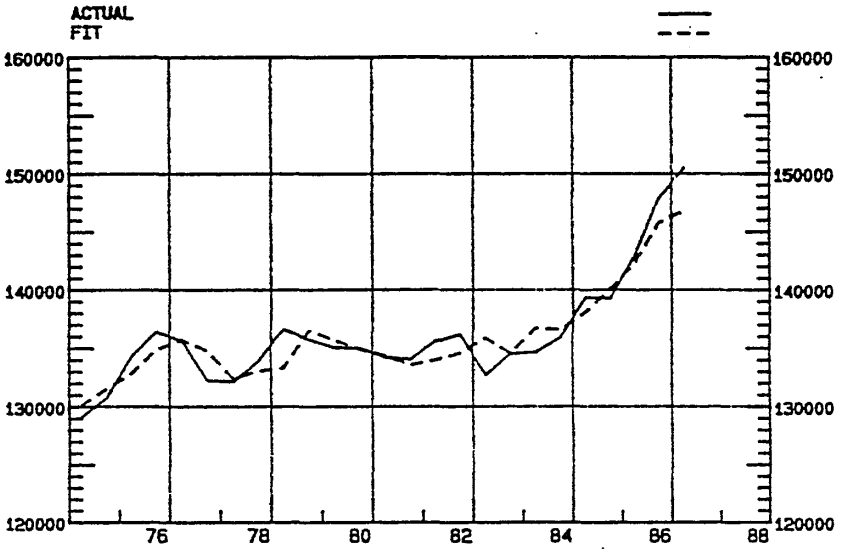
$$\underset{(4.153)}{.38007}\ \log SWQ_{-1} + \underset{(6.299)}{.60303}\ \log SWC_{-1}$$

$$- \underset{(3.418)}{.00728}\ (SWRI - SWPDDIE)$$

R^2 = .878
SEE = .012
DW = 1.983
Estimation period 75S1 - 87S1

SWC	private consumption, volume (80-SKR)
SWRI	yield of long-term GVT-bonds, %
SWPDDIE	expected change of domestic demand deflator
SWQ	GDP, VOLUME (80-SKR)

SWEDEN PRIVATE CONSUMPTION, VOLUME (80-SKR)



Private consumption volumes

FIC FINLAND PRIVATE CONSUMPTION, VOLUME (85-FIM)

$\log(FIC/FIC_{-2})$ =

$$-.01080\ FIPDDIE - .01458(FIRI-FIPDDIE)$$
$$(3.149) \qquad (4.263)$$

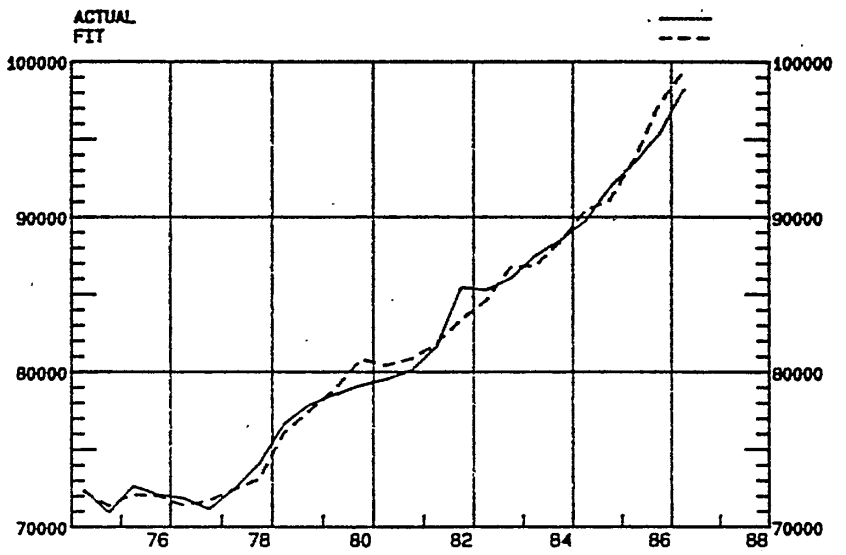
$$+ .57691 \log(FIQ/FIQ_{-2}) + .47894 \log(FIQ_{-2}/FIC_{-2})$$
$$(5.277) \qquad (4.548)$$

$$- .14103$$
$$(2.207)$$

R^2 = .742
SEE = .0113
DW = 1.544
Estimation period 75S1 - 87S2

FIC	private consumption, volume (85-FIM)
FIRI	yield of long-term GVT-bonds, %
FIPDDIE	expected change of domestic demand deflator
FIQ	GDP, VOLUME (85-FIM)

FINLAND PRIVATE CONSUMPTION, VOLUME (85-FIM)



Investment volumes

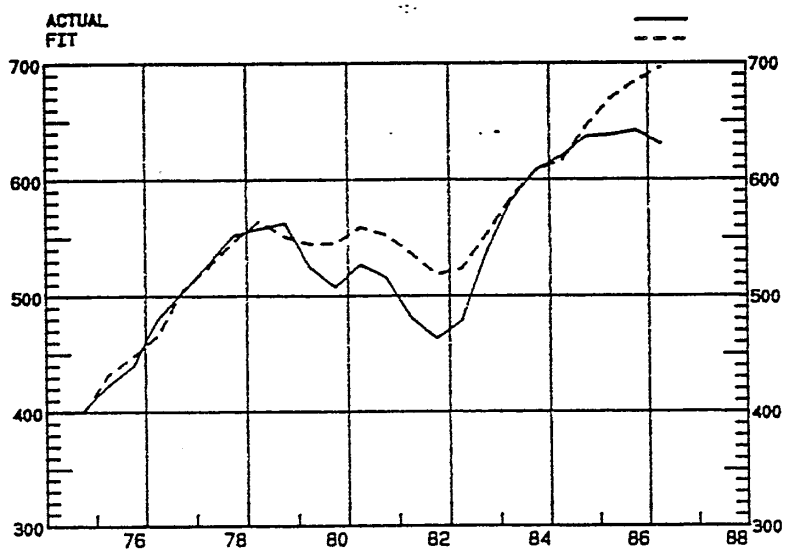
USI UNITED STATES FIXED INVESTMENTS, VOLUME (82-USD)

$$USI = \underset{(1.515)}{2.84881}\ (100 * USULC/USPQ)_{-2} - \underset{(6.421)}{8.25340} * USERCOST_{-1} + \underset{(4.871)}{0.21149} * USQ_{-1} + \underset{(3.924)}{0.46277} * USI_{-1} - \underset{(2.258)}{591.00544}$$

R^2 = 0.970
SEE = 13.320
DW = 1.718
Estimation period 75S2 - 86S1

USI	fixed investments, volume (82-USD)
USULC	unit labour costs
USPQ	GDP-deflator
USQ	GDP, volume (82-USD)
USERCOST	(USPDDI * (PRIMES - USPDDIE))/USPQ
USPDDI	domestic demand deflator
USPDDIE	expected change of domestic demand deflator
PRIMES	US prime rate

UNITED STATES FIXED INVESTMENTS, VOLUME (82-USD)



Investment volumes

JAI	JAPAN FIXED INVESTMENTS, VOLUME (80-JPY)

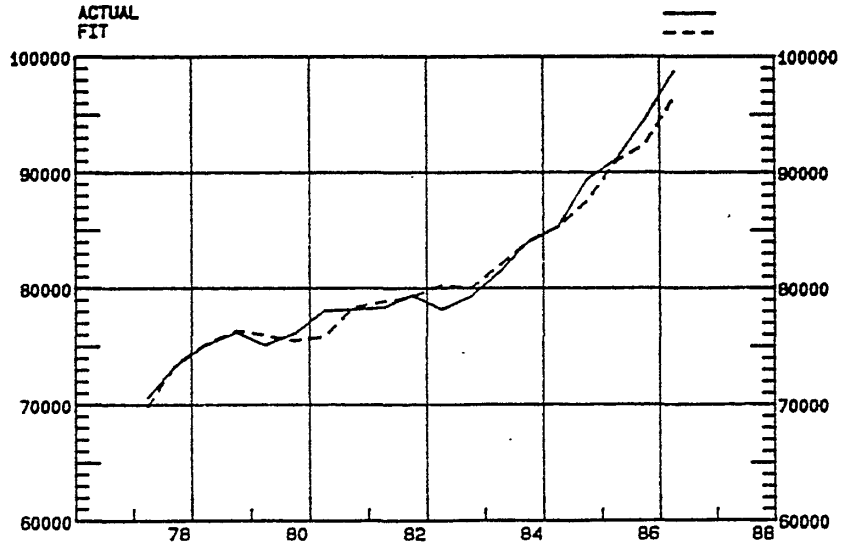
$$JAI = \underset{(1.94)}{2.70064} * (100 * JAULC/JAPQ)_{-2} - \underset{(1.96)}{6.75730} * JAUCR_{-2} + \underset{(3.48)}{0.18780} * (JAQ/100)_{-1} + \underset{(3.64)}{.61237} * (JAI/100)_{-1} - \underset{(1.65)}{319.03424} * 100$$

R^2 = .982
SEE = 11.274
DW = 1.998

Estimation period 78S1-87S1

JAI	fixed investments, volume (80-JPY)
JAULC	unit labour costs
JAPQ	GDP-deflator
JAQ	GDP, volume (80-JPY)
JAUCR	(JAPDDI * (JARI-JAPDDIE))/JAPQ
JAPDDI	domestic demand deflator
JAPDDIE	expected change of domestic demand deflator
JARI	bond yields central govt

JAPAN FIXED INVESTMENTS, VOLUME (80-JPY)



Investment volumes

GEI	GERMANY FIXED INVESTMENTS, VOLUME (80-DEM)

$$GEI = \underset{(4.109)}{0.67897} * GEI_{-1} + \underset{(1.719)}{0.07822} * GEQ_{-1}$$

$$\underset{(2.889)}{-3.32877} * GEUCR_{-1} + \underset{(1.530)}{0.79500} *$$

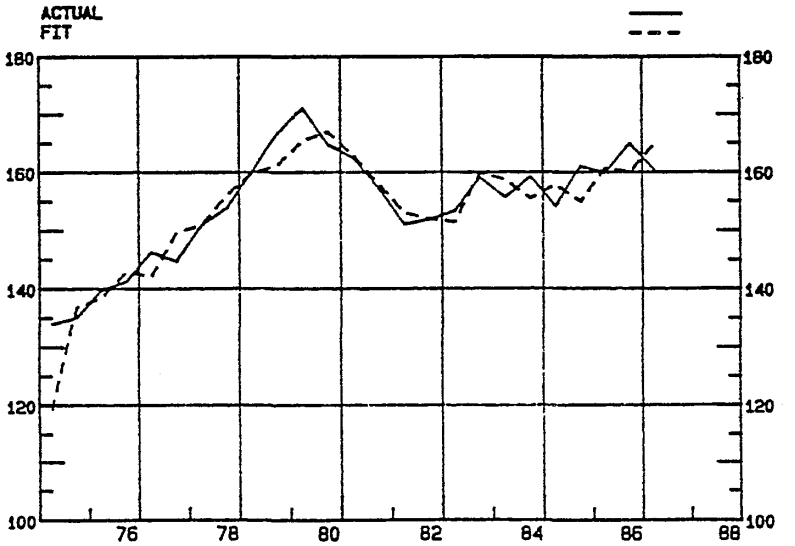
$$(100 * GEULC/GEPQ)_{-2} - \underset{(1.036)}{64.23761}$$

R^2 = 0.832
SEE = 4.1029
DW = 2.9116

Estimation period 75S2 - 86S1

GEI	fixed investments, volume (80-DEM)
GEULC	unit labour costs
GEPQ	GDP-deflator
GEQ	GDP, volume (80-DEM)
GEUCR	(GEPDDI * (GERI-GEPDDIE))/GEPQ
GEPDDI	domestic demand deflator
GEPDDIE	expected change of domestic demand deflator
GERI	yield on fully taxed fixed interest industry bonds

GERMANY FIXED INVESTMENTS, VOLUME (80-DEM)



Investment volumes

FRI FRANCE FIXED INVESTMENTS, VOLUME (80-FRF)

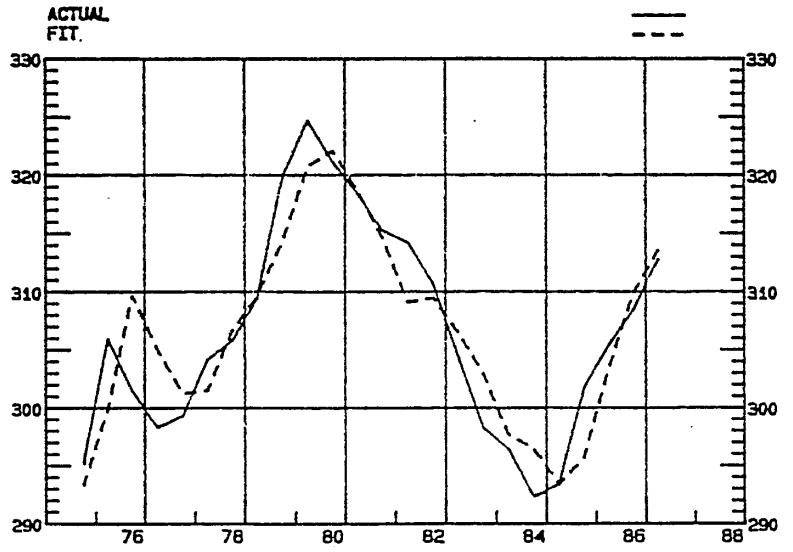
$$FRI = \underset{(\ .113)}{.09958} * (100 * FRULC/FRPQ)_{-1} - \underset{(1.706)}{1.78200} * FRUCR_{-1} + \underset{(\ .443)}{.02208} * FRQ_{-1} + \underset{(9.236)}{.89643} * FRI_{-1} - \underset{(1.391)}{5.97688}$$

R^2 = .828
SEE = 4.147
DW = 1.496

Estimation period 75S2 - 87S1

FRI	fixed investments, volume (70-FRF)
FRULC	unit labour costs
FRPQ	GDP-deflator
FRQ	GDP, volume (70-FRF)
FRUCR	(FRPDDI * (FRRI - FRPDDIE))/FRPQ
FRPDDI	domestic demand deflator
FRPDDIE	expected change of domestic demand deflator
FRRI	bond yields garanteed by govt

FRANCE FIXED INVESTMENTS, VOLUME (80-FRF)



Investment volumes

UKI	UNITED KINGDOM FIXED INVESTMENTS, VOLUME (80-GBP)

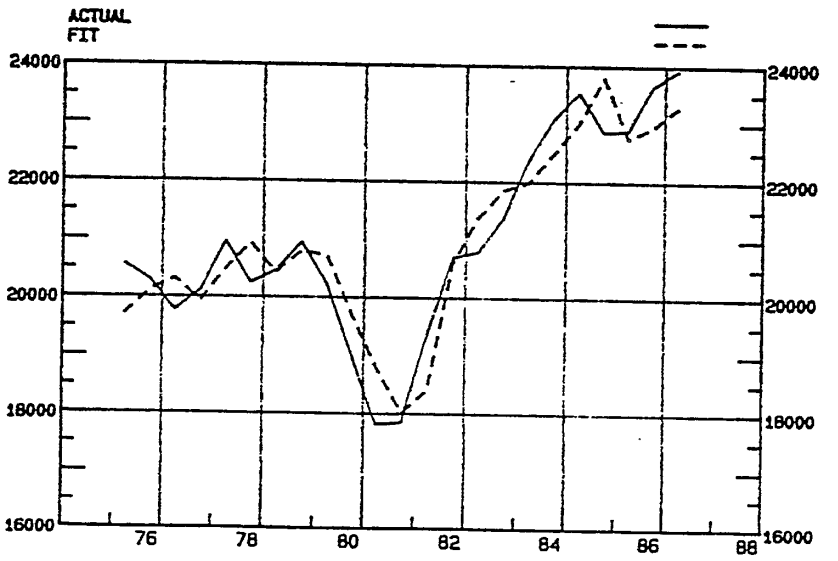
$$
\begin{aligned}
UKI = {} & (-0.03417 * (100 * UKPI * UKRI/UKPQ) \\
& \quad (2.405) \\
& + 0.17494 * (UKQ/100)_{-1} - 0.21364 * \\
& \quad (1.316) \qquad\qquad\quad (1.853) \\
& \quad (UKQ/100)_{-2} + 0.72624 * (UKI/100)_{-1} \\
& \qquad\qquad\qquad\quad (4.596) \\
& + 138.13965) * 100 \\
& \quad (1.889)
\end{aligned}
$$

R^2 = 0.861
SEE = 6.767
DW = 1.980

Estimation period 76S1 - 86S1

UKI	fixed investments, volume (80-GBP)
UKPI	investment price index
UKRI	yield of long-term govt bonds
UKPQ	GDP-deflator
UKQ	GDP, volume (80-GBP)

UNITED KINGDOM FIXED INVESTMENTS, VOLUME (80-GBP)



Investment volumes

SWI SWEDEN FIXED INVESTMENTS, VOLUME (80-SEK)

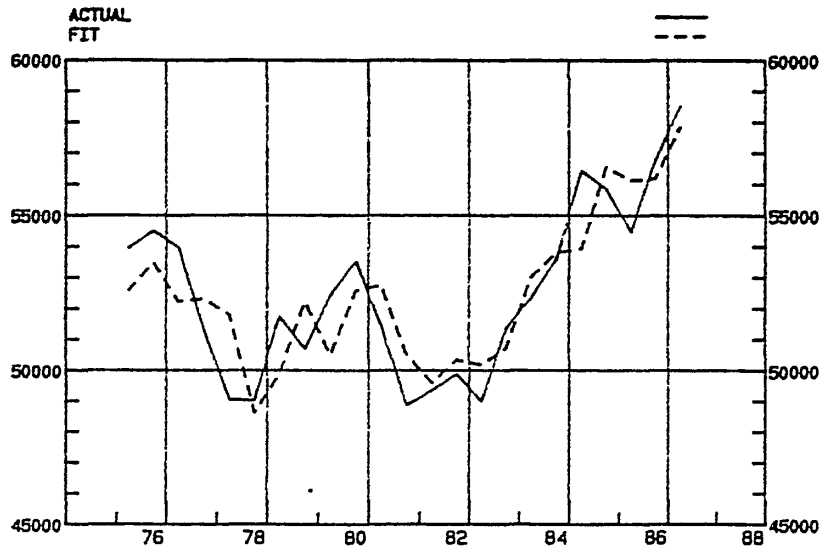
$$\log SWI = .44957 \underset{(1.162)}{\log (SWQ/SWQ_{-2})} + .15349 \underset{(1.252)}{\log SWQ_{-1}} + .82352 \underset{(5.867)}{* \log SWI_{-1}} - .08709 \underset{(1.479)}{\log (SWUCR_{-1}/SWUCR_{-2})}$$

R^2 = .742
SEE = .029
DW = 1.995

Estimation period 76S1 - 86S1

SWI	fixed investments, volume (80-SEK)
SWUCR	(SWPDDI) * (SWRI - SWPDDIE)
SWPDDI	domestic demand deflator
SWPDDIE	expected change of domestic demand deflator
SWRI	yield of long-term govt bonds
SWQ	GDP, volume (80-SEK)

SWEDEN FIXED INVESTMENTS, VOLUME (80-SEK)



Investment volumes

FII FINLAND FIXED INVESTMENTS, VOLUME (85-FIM)

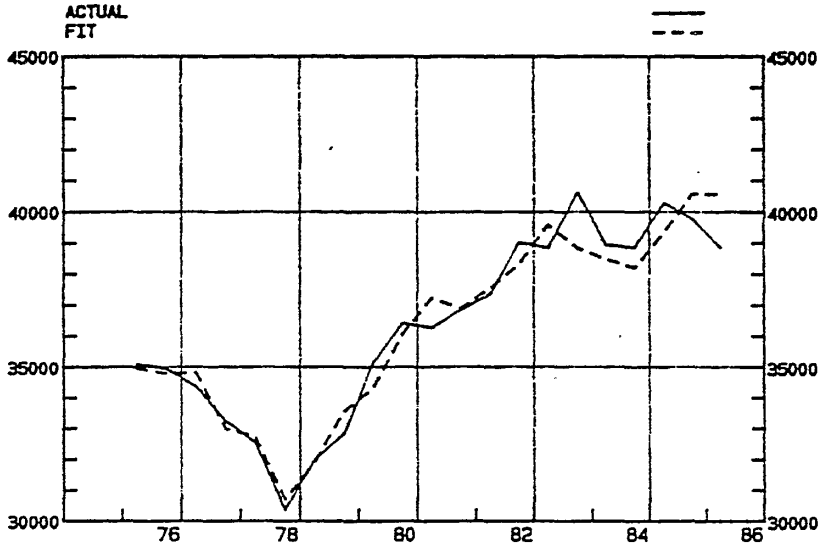
$$\begin{aligned}\log FII &= \underset{(10.27)}{1.87999} * \log FIQ_{-1} - \underset{(4.25)}{.07734} * \log FIUCR_{-1} \\ &+ \underset{(5.70)}{1.14337} * \log(FIULC/FIPQ)_{-1} - \underset{(5.39)}{11.55888}\end{aligned}$$

R^2 = .940
SEE = .022
DW = 1.897

Estimation period 76S1 - 86S1

FII	fixed investments, volume (85-FIM)
FIQ	GDP, volume (85-FIM)
FIUCR	(FIPDDI) * (FIRI - FIPDDIE))FIPQ
FIPDDI	domestic demand deflator
FIPDDIE	expected change of domestic demand deflator
FIRI	yield of long-term govt bonds
FIPQ	GDP-deflator
FIULC	unit labour costs

FINLAND FIXED INVESTMENTS, VOLUME (85-FIM)



Interest Rates

PRIMES USA PRIME RATE

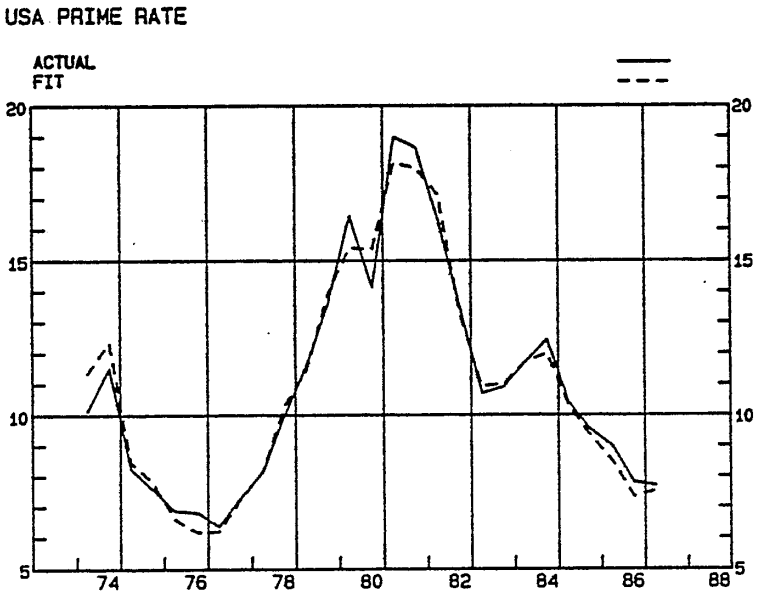
PRIMES =

$$.85655\ E100 + .224542\ PRIMES_{-1}$$
$$(15.81) \qquad (4.61)$$

R^2 = .975
SEE = .576
DW = 2.045

Estimation period 74S1 - 87S1

PRIMES USA, PRIME RATE, %
E100 EURODOLLAR, 3 MONTH RATE



Interest Rates

JARI	JAPAN CENTRAL GOVERNMENT BOND YIELD, %

JARI =

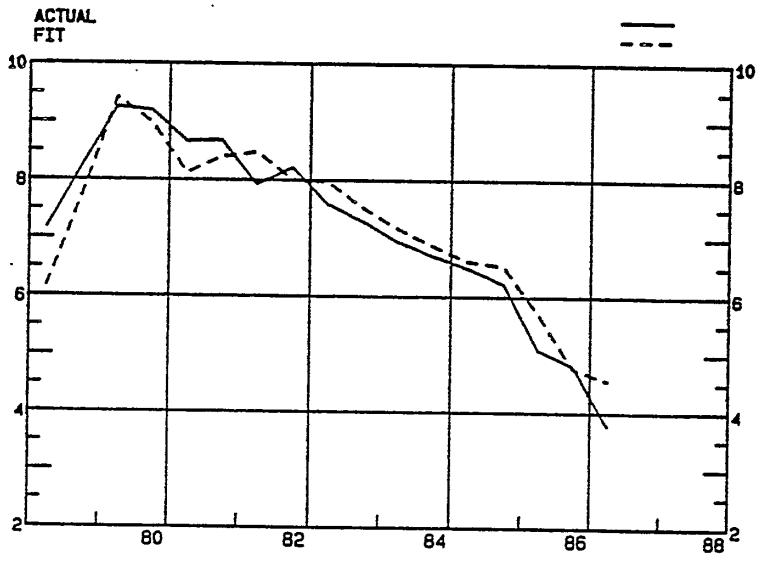
$$.3069*JASRI - .35288*JASRI_{-1} + 1.03188*JARI_{-1}$$
$$(3.05) \qquad (3.18) \qquad (8.06)$$

R^2 = .917
SEE = .452
DW = 1.592

Estimation period 79S1 - 87S1

JARI	CENTRAL GOVERNMENT BOND YIELD
JASRI	"GENSAKI RATE" (3 MONTHS)

JAPAN CENTRAL GOVERNMENT BOND YIELD, %



Interest Rates

GERI GERMANY YIELD OF FULLY TAXED FIXED INTEREST INDUSTRY BONDS

GERI =

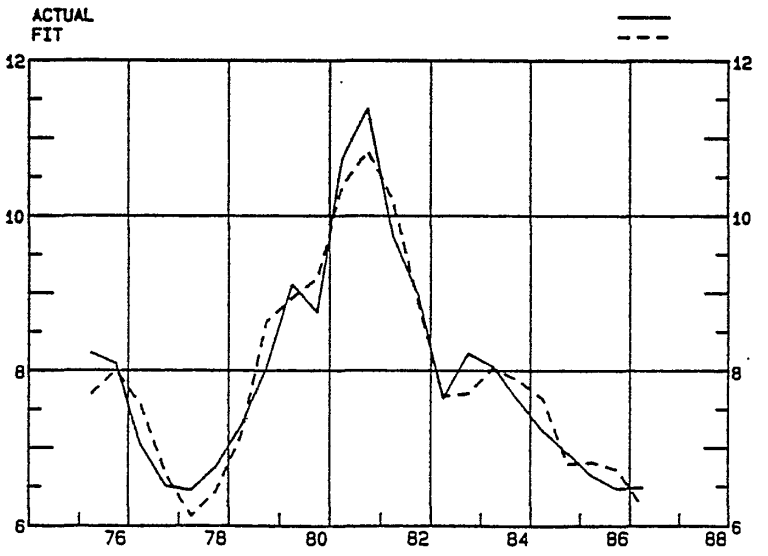
$$.49704\ GESRI - .29700*GESRI_{-1} + .68209*GERI_{-1} + 1.23020$$
$$(7.74)\qquad (3.05)\qquad (5.33)\qquad (1.74)$$

R^2 = .935
SEE = .377
DW = 2.142

Estimation period 76S1 - 87S1

GERI	YIELD OF FULLY TAXED FIXED INTREST INDUSTRY BONDS
GESRI	EUROPOUND 3 MONTH RATE (GEPQ/USPQ)*E100
GEPQ	GERMANY, GDP DEFLATOR
USPQ	USA, GDP DEFLATOR
E100	EURODOLLAR, 3 MONTH RATE

GERMANY YIELD OF FULLY TAXED FIXED INTEREST INDUSTRY BONDS



Interest Rates

UKRI UNITED KINGDOM YIELD OF LONG-TERM GOVT BONDS

UKRI =

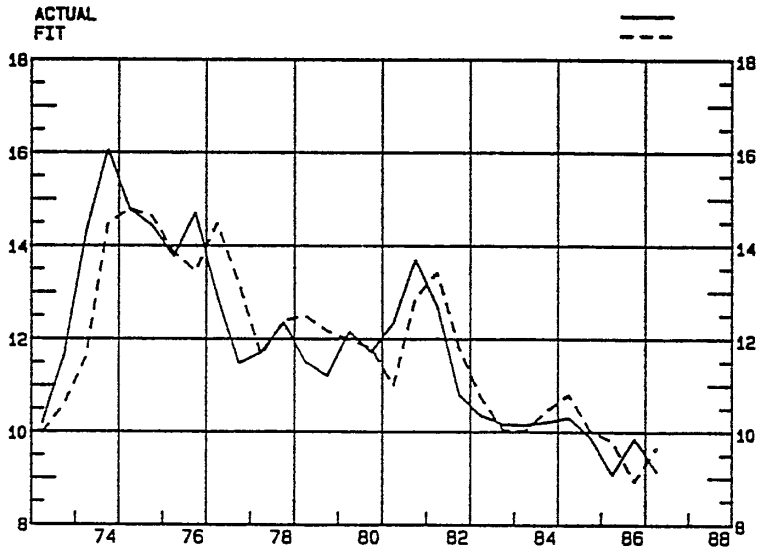
$$.27942\ UKSRI - .23875*UKSRI_{-1} + .96630*UKRI_{-1}$$
$$(2.54) \qquad (2.23) \qquad (20.97)$$

R^2 = .735
SEE = 1.004
DW = 1.290

Estimation period 73S1 - 87S1

UKRI	YIELD OF LONG-TERM GOVT BONDS
UKSRI	EUROPOUND 3 MONTH RATE (UKPQ/USPQ)*E100
UKPQ	UNITED KINGDOM, GDP DEFLATOR
USPQ	USA, GDP DEFLATOR
E100	EURODOLLAR, 3 MONTH RATE

UNITED KINGDOM YIELD OF LONG-TERM GOVT BONDS



Some Price Equations

F161 OECD CONSUMER PRICES, IND. 1980=100

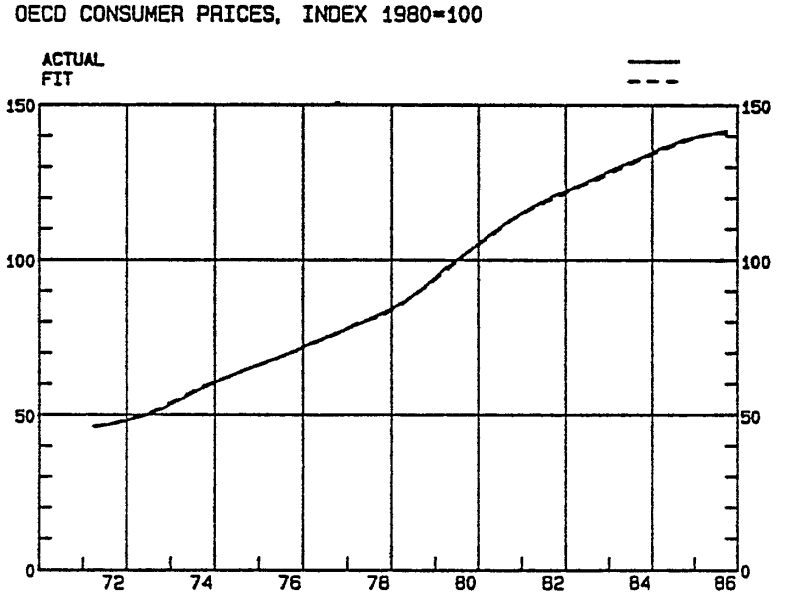
$\Delta \log F161$ =

1.15118*ΔlogOEPDDI
(34.41)

R^2 = .935
SEE = .377
DW = 2.142

Estimation period 72S1 - 86S2

FIGI	OECD, CONSUMER PRICES, IND 1980=100
OEPDDI	OECD, DOMESTIC DEMAND DEFLATOR



Some Price Equations

F163 OECD EUROPE, CONSUMER PRICES, 1980=100

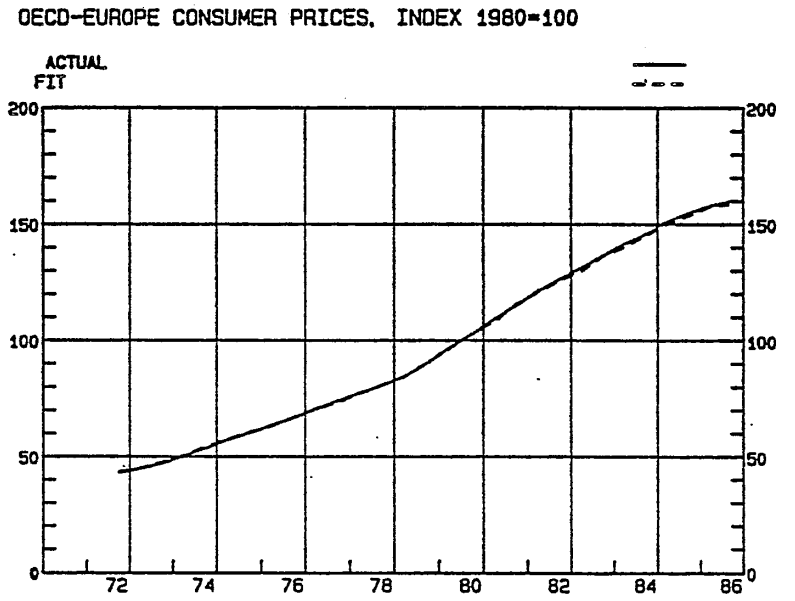
$\Delta \log F163$ =

1.22975 $\Delta \log EUPDDI$
(33.98)

R^2 = .856
SEE = .008
DW = 1.356

Estimation period 72S2 - 86S2

FIG3	OECD EUROPE, CONSUMER PRICES, IND 1980=100
EUPDDI	OECD-EUROPE, COMESTIC DEMAND DEFLATOR



Some Price Equations

PPFC PRODUCER PRICE FOR MANUFACTURING IN FINNISH EXPORT MARKETS

$\Delta \log PPFC$ =

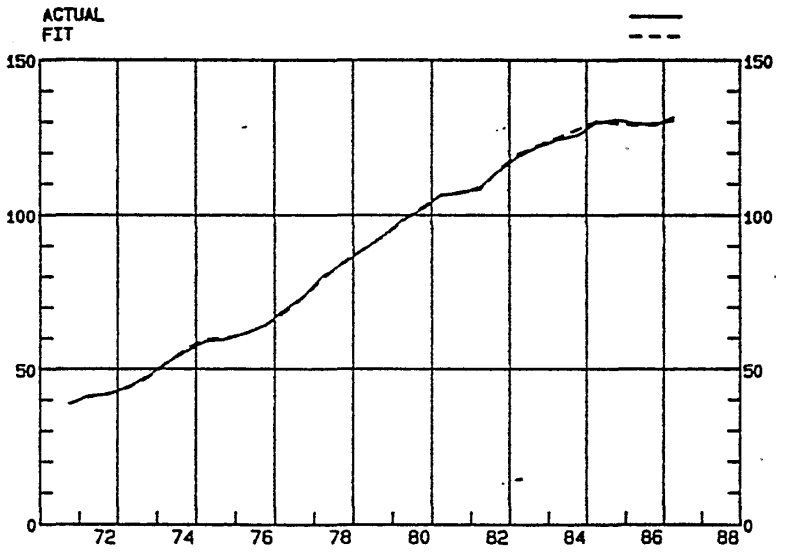
.74172 $\Delta \log SUP*FIM$ + .01031
(17.34) (4.67)

R^2 = .909
SEE = .008
DW = 1.452

Estimation period 71S2 - 87S1

PPFC	PRODUCER PRICES FOR MANUFACTURING IN FINNISH
SVPXFIM	EXPORT PRICES OF THE COUNTRIES MOST IMPORTANT TO FINNISH EXPORTS

PRODUCER PRICE FOR MANUFACTURING IN FINNISH
EXPORT MARKETS



APPENDIX 3
Most important identities

EXPORTS MARKETS GIVEN BY MARKET GROWTH

USXDM =

.174 • JAMDOL + .0754 • GEMDOL +
.0796 • FRMDOL + .1176 • UKMDOL +
.0729 • SWMDOL + .0581 • FIMDOL +
.1552 • OOMDOL + .0542 • COMDOL +
.1357 • OPMDOL + .1885 • DCMDOL 1.1112

JAXDM =

.1303 • USMDOL + .0305 • GEMDOL +
.0205 • FRMDOL + .0331 • UKMDOL +
.0285 • SWMDOL + .0325 • FIMDOL +
.0316 • OOMDOL + .0615 • COMDOL +
.1503 • OPMDOL + .1248 • DCMDOL .6436

GEXDM =

.0489 • USMDOL + .0177 • JAMDOL +
.1619 • FRMDOL + .1103 • UKMDOL +
.1675 • SWMDOL + .1264 • FIMDOL +
.1640 • OOMDOL + .1366 • COMDOL +
.1018 • OPMDOL + .0610 • DCMDOL 1.0961

FRXDM =

.0219 • USMDOL + .0092 • JAMDOL +
.1072 • GEMDOL + .0755 • UKMDOL +
.0432 • SWMDOL + .0305 • FIMDOL +
.0834 • OOMDOL + .0698 • COMDOL +
.0761 • OPMDOL + .0493 • DCMDOL + 0.5661

EXPORTS GIVEN BY MARKET GROWTH

UKXDM =

.0403 • USMDOL + .0139 • JAMDOL +
.0669 • GEMDOL + .0540 • FRMDOL +
.1184 • SWMDOL + .0860 • FIMDOL +
.0751 • OOMDOL + .0385 • COMDOL +
.0847 • OPMDOL + .0483 • DCMDOL .6261

SWXDM =

.0067 • USMDOL + .0033 • JAMDOL +
.0211 • GEMDOL + .0153 • FRMDOL +
.0286 • SWMDOL + .1207 • FIMDOL +
.0236 • OOMDOL + .0186 • COMDOL +
.0129 • OPMDOL + .0089 • DCMDOL .2597

FIXDM =

.0019 • USMDOL + .0008 • JAMDOL +
.0087 • GEMDOL + .0053 • FRMDOL +
.0153 • SWMDOL + .0682 • FIMDOL +
.0070 • OOMDOL + .0402 • COMDOL +
.0050 • OPMDOL + .0025 • DCMDOL .1549

XDM = Exports given by market growth, in US dollars
MDOL = imports in US dollars

Weights are each country's shares of the total imports of other countries

EXPORT MARKETS

FITRAD = FINLAND'S EXPORT MARKETS, %-CHANGES

```
FITRAD =

.192 • SWMAD + .156 • UKMAD +
.131 • GEMAD + .056 • FRMAD +
.051 • USMAD + .013 • JAMAD +
.286 • OOMAD + .043 • OPMAD +
.076 • DCMAD
```

WOTRAD = WORLD TRADE , %-CHANGES

```
WOTRAD =

.016 • SWMAD + .061 • UKMAD +
.094 • GEMAD + .063 • FRMAD +
.142 • USMAD + .062 • JAMAD +
.263 • OOMAD + .080 • OPMAD +
.050 • COMAD + .163 • DCMAD
```

USMAD
JAMAD
GEMAD
FRMAD
UKMAD
SWMAD
OOMAD
OPMAD
DCMAD

CHANGE IN TOTAL IMPORTS OF
USA, JAPAN, GERMANY, FRANCE, UNITED KINGDOM,
SWEDEN, OTHER OECD COUNTRIES, OPEC COUNTRIES AND
DEVELOPING COUNTRIES RESPECTIVELY,
%-CHANGES

IMPORT PRICES

Δlog USPM =

.1303 • Δlog JAPXDOL + .0489 • Δlog GEPXDOL +
.0218 • Δlog FRPXDOL + .0403 • Δlog UKPCDOL +
.0067 • Δlog SWPXDOL + .0019 • Δlog FIPXDOL +
.2525 • Δlog OOPX + .2152 • Δlog OPPX +
.2827 • Δlog DCPX

Δlog JAPMDOL =

.1738 • Δlog USPX + .0177 • Δlog GEPXDOL +
.0092 • Δlog FRPXDOL + .0138 • Δlog SWPXDOL +
.0008 • Δlog FIPXDOL + .1188 • Δlog OOPX +
.4180 • Δlog OPPX + .2451 • Δlog DCPX

Δlog GEPMDOL =

.0754 • Δlog USPX + .0305 • Δlog JAPXDOL +
.1072 • Δlog FRPXDOL + .0669 • Δlog UKPXDOL +
.0211 • Δlog SWPXDOL + .0087 • Δlog FIPXDOL +
.4177 • Δlog OOPX + .1156 • Δlog OPPX +
.1477 • Δlog DCPX

Δlog FRPMDOL =

.0795 • Δlog USPX + .0205 • Δlog JAPXDOL +
.1619 • Δlog GEPXDOL + .0540 • Δlog UKPXDOL +
.0153 • Δlog SWPXDOL + .0053 • Δlog FIPXDOL +
.3315 • Δlog OOPX + .1947 • Δlog OPPX +
.1273 • Δlog DCPX

Δlog UKPMDOL =

.1176 • Δlog USPX + .0331 • Δlog JAPXDOL +
.1103 • Δlog GEPXDOL + .0775 • Δlog FRPXDOL +
.0286 • Δlog SWPXDOL + .0153 • Δlog FIPCDOL +
.3746 • Δlog OOPX + .0910 • Δlog OPPX +
.1540 • Δlog DCPX

Δlog SWPMDOL =

.0729 • Δlog USPX + .0285 • Δlog JAPXDOL +
.1675 • Δlog GEPXDOL + .0432 • Δlog FRPXDOL +
.1184 • Δlog UKPXDOL + .0682 • Δlog FIPXDOL +
.2781 • Δlog OOPX + .1246 • Δlog OPPX +
.0985 • Δlog DCPX

IMPORT PRICES

$\Delta \log$ FIPMDOL =

.0581 • $\Delta \log$ USPX + .0325 • $\Delta \log$ JADXDOL +
.1264 • $\Delta \log$ GEPXDOL + .0305 • $\Delta \log$ FRPXDOL +
.0860 • $\Delta \log$ UKPXDOL + .1207 • $\Delta \log$ SWPXDOL +
.1660 • $\Delta \log$ OOPX + .1619 • $\Delta \log$ OPPX +
.2179 • $\Delta \log$ DCPX

USPM	IMPORT PRICES IN USD OF USA, GERMANY, FRANCE,
JAPMDOL	UNITED KINGDOM, SWEDEN, FINLAND RESPECTIVELY
GEPMDOL	
FRPMDOL	
UKPMDOL	
SWPMDOL	
FIPMDOL	

USPX	EXPORT PRICES IN USD FOR THE SAME COUNTRIES AS ABOVE
JAPXDOL	
GEPXDOL	
FRPXDOL	
UKPXDOL	
SWPXDOL	
FIPXDOL	

GDP DEFLATORS

$$\Delta USPQ = \Delta USPDDI + (USM/USQ) \cdot [\Delta(USPX - USPM)]$$

$$\Delta JAPQ = \Delta JAPDDI + (JAM/JAQ) \cdot [\Delta(JAPX - JAPM)]$$

$$\Delta GEPQ = \Delta GEPDDI + (GEM/GEQ) \cdot [\Delta(GEPX - GEPM)]$$

$$\Delta GFRPQ = \Delta FRPDDI + (FRM/FRQ) \cdot [\Delta(FRPX - FRPM)]$$

$$\Delta UKPQ = \Delta UKPDDI + (UKM/UKQ) \cdot [\Delta(UKPX - UKPM)]$$

$$\Delta SWPQ = \Delta SWPDDI + (SWM/SWQ) \cdot [\Delta(SWPX - SWPM)]$$

$$\Delta FIPQ = \Delta FIPDDI + (FIM/FIQ) \cdot [\Delta(FIPX - FIPM)]$$

USPQ, JAPQ, GEPQ, FRPQ, UKPQ, SWPQ, FIPQ — GDP DEFLATORS OF USA, JAPAN, GERMANY, FRANCE, UK, SWEDEN AND FINLAND RESPECTIVELY

. PDDI = DOMESTIC DEMAND DEFLATOR
. M = VOLUME OF IMPORTS
. Q = GDP, VOLUME
. PX = EXPORT PRICES
. PM = IMPORT PRICES

OTHER IDENTITIES

```
VINO   =

.2826 * FD + .1495 * TBEV + .2772 * NFM + .2907 * ARM
```

```
VINO   =   COMMODITY PRICES, HWWA INDEX (EXCL. ENERGY)
FD     =   "          "     , FOOD
TBEV   =   "          "     , TROPICAL GOODS & BEVERAGES
NFM    =   "          "     , NON-FERROUS METALS & MINERALS
ARM    =   "          "     , AGRICULTURAL RAW MATERIALS
```

```
OEQAD  =

.458 • USQAD + .214 • JAQAD + .139 • GEQAD +

.102 • FRQAD + .068 • UKQAD + .019 • SWQAD
```

```
EUQAD  =

.424 • GEQAD + .311 • FRQAD + .207 • UKQAD +

.058 • SWQAD
```

```
OEQAD  =  GDP GROWTH IN OECD COUNTRIES, %-CHANGE

EUGAD  =  GDP GROWTH IN EUROPE, %-CHANGE


USQAD       GDP GROWTH IN USA, JAPAN, GERMANY, FRANCE, UK
JAQAD       AND SWEDEN, RESPECTIVELY, %-CHANGE
GEQAD
FRQAD
UKQAD
SWQAD
```

OTHER COMPONENTS OF DEMAND AND SUPPLY FOR "TOTAL OECD" AS WELL AS FOR "EUROPE" ARE CALCULATED USING THE WEIGHTS ABOVE.

APPENDIX 4
Variables of the KTKV-model (1)

VARIABLES OF THE KTKV MODEL (1)

SUPPLY AND DEMAND	US	JAP	GER	FR	UK	SWE	FIN
GDP							
volume in nat. currency	USQ	JAQ	GEQ	FRQ	UKQ	SWQ	FIQ
%-change at annual rate	USQAD	JAQAD	GEQAD	FRQAD	UKQAD	SWQAD	FIQAD
deflator	USPQ	JAPQ	GEPQ	FRPQ	UKPQ	SWPQ	FIPQ
%-change at annual rate	USPQAD	JAPQAD	GEPQAD	FRPQAD	UKPQAD	SWPQAD	FIPQAD
IMPORTS							
volume in nat. currency	USM	JAM	GEM	FRM	UKM	SWM	FIM
%-change from prev.period	USMD	JAMD	GEMD	FRMD	UKMD	SWMD	FIMD
%-change at annual rate	USMAD	JAMAD	GEMAD	FRMAD	UKMAD	SWMAD	FIMAD
volume in 80-USD	USMDOL	JAMDOL	GEMDOL	FRMDOL	UKMDOL	SWMDOL	FIMDOL
unit value	USPM	JAPM	GEPM	FRPM	UKPM	SWPM	FIPM
unit value in USD		JAMDOL	GEMDOL	FRMDOL	UKMDOL	SWMDOL	FIMDOL
TOTAL SUPPLY							
volume in nat. currency	USTS	JATS	GETS	FRTS	UKTS	SWTS	FITS
%-change at annual rate	USTSAD	JATSAD	GETSAD	FRTSAD	UKTSAD	SWTSAD	FITSAD
EXPORTS							
volume in nat. currency	USX	JAX	GEX	FRX	UKX	SWX	FIX
%-change at annual rate	USXAD	JAXAD	GEXAD	FRXAD	UKXAD	SWXAD	FIXAD
volume in 80-USD	USXDOL	JAXDOL	GEXDOL	FRXDOL	UKXDOL	SWXDOL	FIXDOL
unit value	USPX	JAPX	GEPX	FRPX	UKPX	SWPX	FIPX
unit value in USD		JAPXDOL	GEPXDOL	FRPXDOL	UKPXDOL	SWPXDOL	FIPXDOL
competitors' export prices	USWPX	JAWPX	GEWPX	FRWPX	UKWPX	SWWPX	FIWPX
growth of export markets	USXDM	JAXDM	GEXDM	FRXDM	UKXDM	SWXDM	FIXDM
PRIVATE CONSUMPTION							
volume in nat. currency	USC	JAC	GEC	FRC	UKC	SWC	FIC
%-change at annual rate	USCAD	JACAD	GECAD	FRCAD	UKCAD	SWCAD	FICAD
GOVERNMENT CONSUMPTION							
volume in nat. currency	USG	JAG	GEG	FRG	UKG	SWG	FIG
%-change at annual rate	USGAD	JAGAD	GEGAD	FRGAD	UKGAD	SWGAD	FIGAD
FIXED INVESTMENT							
volume in nat. currency	USI	JAI	GEI	FRI	UKI	SWI	FII
%-change at annual rate	USIAD	JAIAD	GEIAD	FRIAD	UKIAD	SWIAD	FIIAD
INVENTORY INVESTMENT							
volume in nat. currency	USS	JAS	GES	FRS	UKS	SWS	FIS
GDP-contribution at ann. rate	USSK	JASK	GESK	FRSK	UKSK	SWSK	FISK
TOTAL DEMAND							
Volume in nat. currency	USTD	JATD	GETD	FRTD	UKTD	SWTD	FITD
%-change at annual rate	USTDAD	JATDAD	GETDAD	FRTDAD	UKTDAD	SWTDAD	FITDAD
TOTAL DOMESTIC DEMAND							
Volume in nat. currency	USDD	JADD	GEDD	FRDD	UKDD	SWDD	FIDD
%-change at annual rate	USDDAD	JADDAD	GEDDAD	FRDDAD	UKDDAD	SWDDAD	FIDDAD
deflator	USPDDI	JAPDDI	GEPDDI	FRPDDI	UKPDDI	SWPDDI	FIPDDI
%-change at annual rate	USPDDIAD	JAPDDIAD	GEPDDIAD	FRPDDIAD	UKPDDIAD	SWPDDIAD	FIPDDIAD
FINAL DOMESTIC DEMAND							
Volume in nat. currency	USFD	JAFD	GEFD	FRFD	UKFD	SWFD	FIFD
%-change at annual rate	USFDAD	JAFDAD	GEFDAD	FRFDAD	UKFDAD	SWFDAD	FIFDAD

VARIABLES OF THE KTKV MODEL (2)

DEMAND AND SUPPLY (CONTINUED)	OECD	EUROPE	COUNTR. IMPOR-TANT TO FINNISH EXPORTS	OTHER OECD	OECD	OPEC	LDC	REST OF THE WORLD
GDP								
vol., %-change at annual rate	OEQAD	EUQAD	SVQAD		OEQAD			
deflator, %-change at ann. rate	OEPQAD	EUPQAD	SVPQAD		OEPQAD			
IMPORTS								
volume, index				OOMI		OPMI	DCMI	COMI
vol., %-change from prev.period				OOMD		OPMD	DCMD	COMD
vol., %-change at annual rate	OEMAD	EUMAD	SVMAD	OOMAD	OEMAD	OPMAD	DCMAD	COMAD
volume in 80-USD				OOMDOL				
unit value in USD			SVPMDOL			OPMDOL	DCMDOL	COMDOL
unit value in FIM			SVPMFIM					
EXPORTS								
volume, index				OOXI		OPXI	DCXI	COXI
vol., %-change from prev.period				OOXD		OPXD	DCXD	COXD
vol., %-change at annual rate	OEXAD	EUXAD	SVXAD		OEXAD			
unit value in USD			SVPXDOL	OOPX		OPPX	DCPX	
unit value in FIM			SVPXFIM					
PRIVATE CONSUMPTION								
vol., %-change at annual rate	OECAD	EUCAD			OECAD			
GOVERNMENT CONSUMPTION								
vol., %-change at annual rate	OEGAD	EUGAD			OEGAD			
FIXED INVESTMENTS								
vol., %-change at annual rate	OEIAD	EUIAD			OEIAD			
INVENTORY INVESTMENTS								
GDP-contribution at annual rate	OESK	EUSK			OESK			
TOTAL DOMESTIC DEMAND								
vol., %-change from prev. period				OODDD				
vol., %-change at annual rate	EDDAD	UDDAD	SVDDAD		EDDAD			
deflator, %-change at ann. rate	EPDDIAD	UPDDIAD	SVPDDIAD		EPDDIAD			
FINAL DOMESTIC DEMAND								
vol., %-change at annual rate	EFDAD	UFDAD			EFDAD			

VARIABLES OF THE KTKV MODEL (3)

OTHER VARIABLES	US	JAP	GER	FR	UK	SWE	FIN
unemployment rate, %	USUN	JAUN	GEUN	FRUN	UKUN	SWUN	FIUN
exchange rates in USD		JPY	DEM	FRF	GBP	SEK	FIM
exchange rates in FIM	USDF	JPYF	DEMF	FRFF	GBPF	SEKF	
unit labour costs in national currency	USULC	JAULC	GEULC	FRULC	UKULC	SWULC	FIULC
3 month euromarket rate	E100	JASRI	GESRI		UKSRI		
long term interest rate	USRI	JARI	GERI	FRRI	UKRI	SWRI	FIRI

Relative unit labour costs in FIM (14 countries/Finland, 1963-82=100)	COMP1.A.E.
Relative unit labour costs in national currency (14 countries/Finland, 1963-82=100)	COMP2.A.E.
Unit labour costs in national currency (14 countries, 1863-82=100)	COMP3.A.E.
Unit labour costs (Finland, 1963-82=100)	COMP4.A.E
Consumer prices, OECD	F161
Consumer prices, OECD EUROPE	F163
Producer price for manufacturing	PPFC
Spot-prices of crude oil, USD/b	OP
Oil price index (1975=100)	OPI
Commodity prices exl. energy	VINO
%-change at annual rate	VINOAD
- tropical goods & goverages	TBEV
- food	FD
- non-ferrous metals & minerals	NFM
- agricultural raw materials	ARM
world trade, %-change at annual rate	WOTRAD
Finlands export markets	FITRAD
3 MONTHS EURODOLLAR RATE	E100

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