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Working Paper

The KTKV model of the economics department of the Bank of Finland

Bank of Finland Discussion Papers, No. 10/1988

Provided in Cooperation with:

Bank of Finland, Helsinki

Suggested Citation: Kuosmanen, Hannele; Pyyhtiä, Ilmo; Siiskonen, Reijo (1988) : The KTKV model of the economics department of the Bank of Finland, Bank of Finland Discussion Papers, No. 10/1988, ISBN 951-686-153-9, Bank of Finland, Helsinki,
<https://nbn-resolving.de/urn:nbn:fi:b0f-201807301739>

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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

Suomen Pankin monistuskeskus
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 tärkeimmat 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.

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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

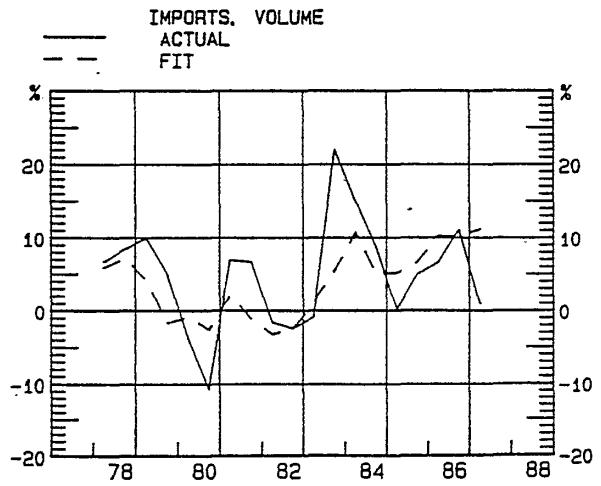
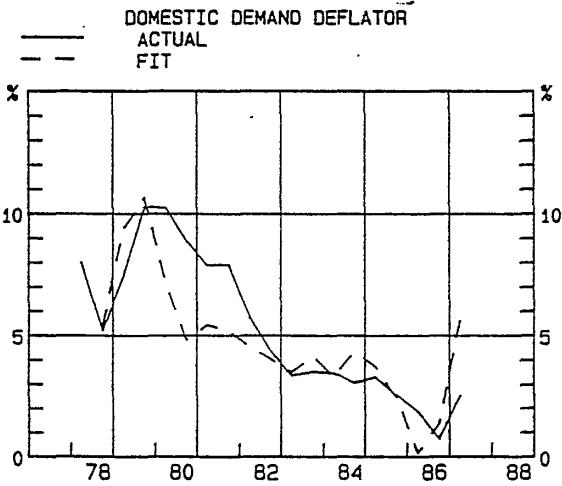
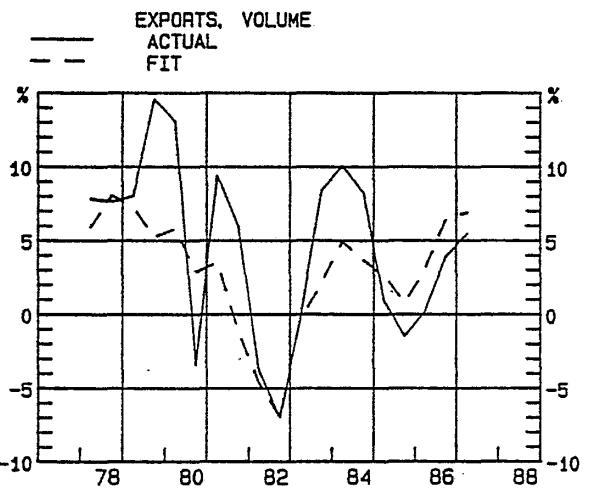
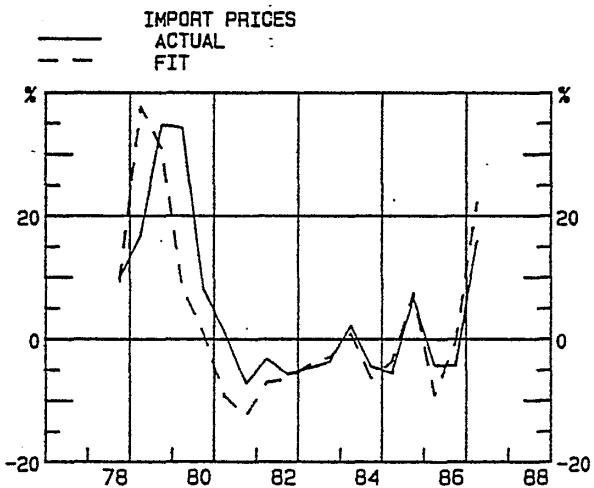
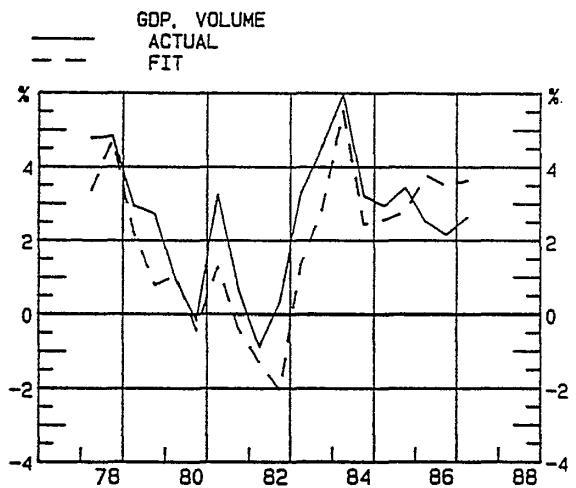
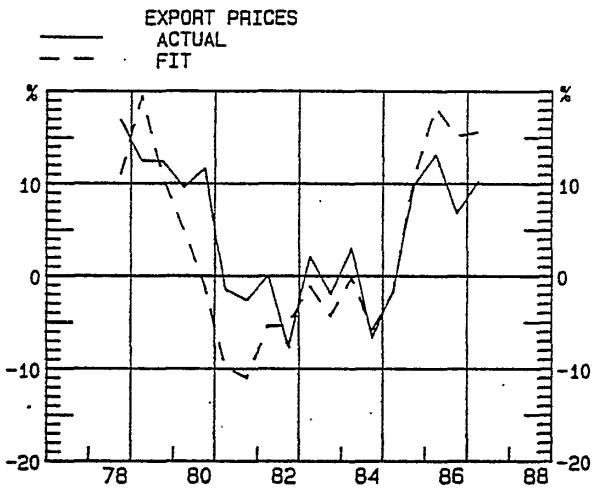
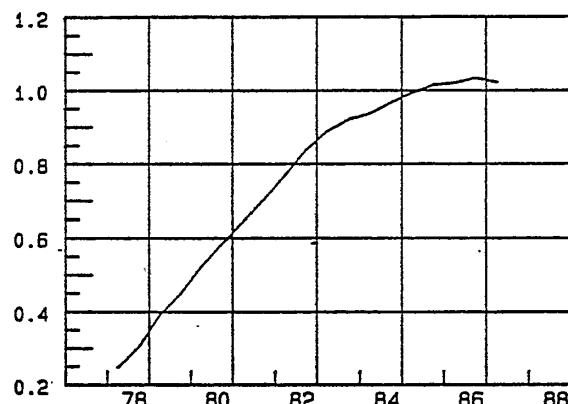


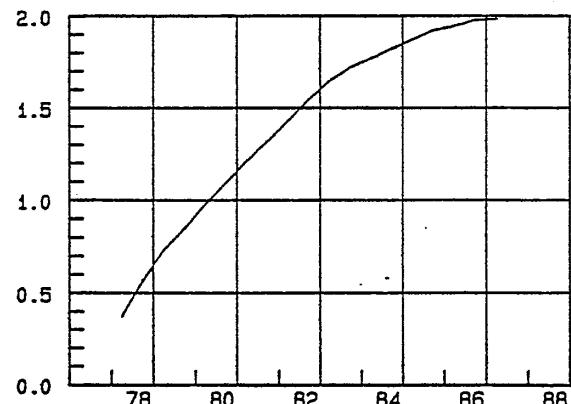
CHART 2

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

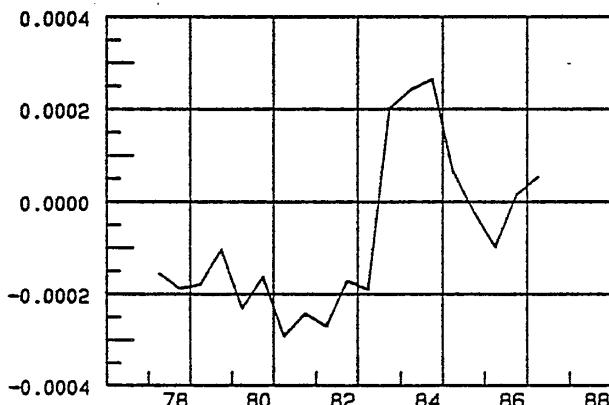
GDP



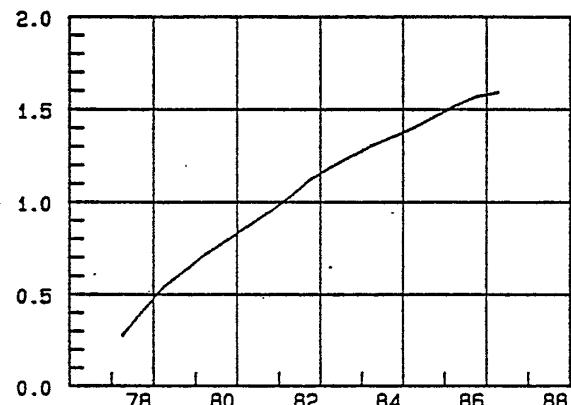
FINLAND'S EXPORT MARKETS



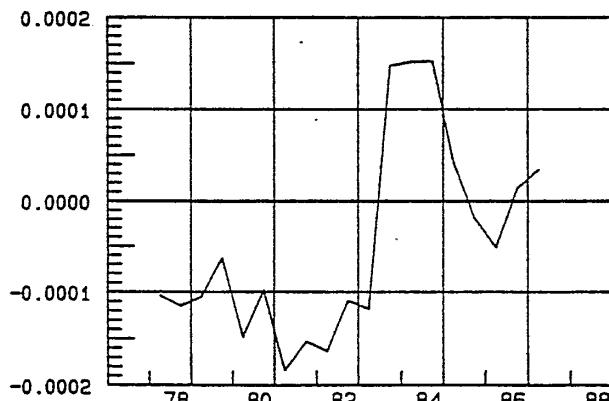
EXPORT PRICES



EXPORTS



IMPORT PRICES



IMPORTS

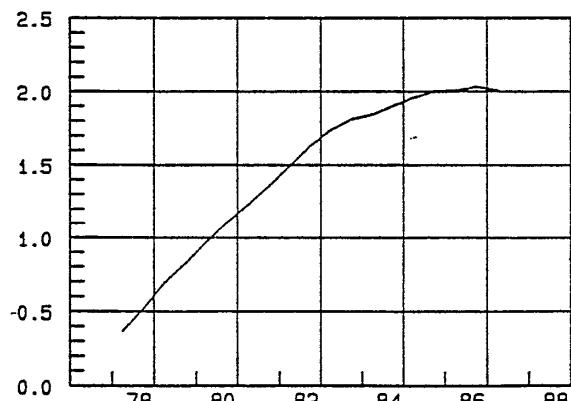


CHART 3

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

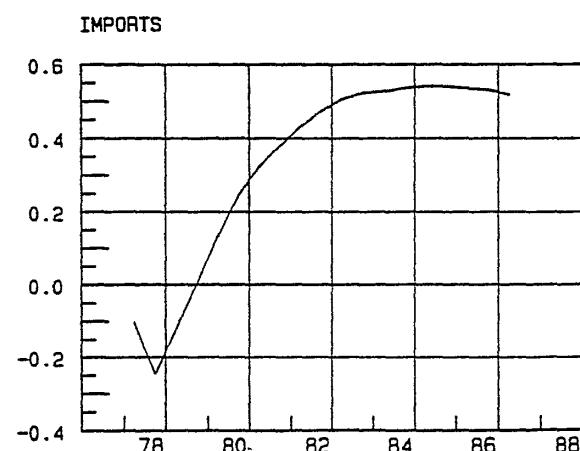
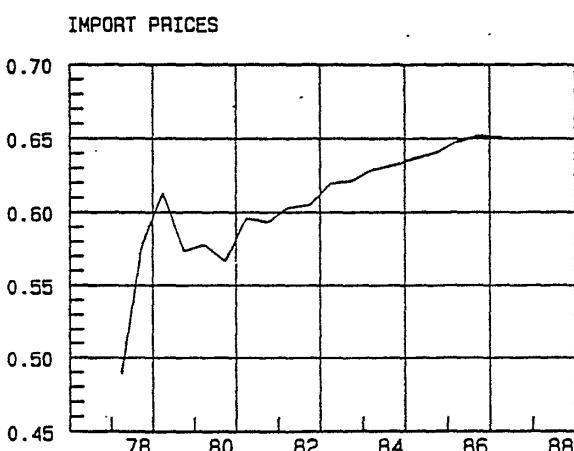
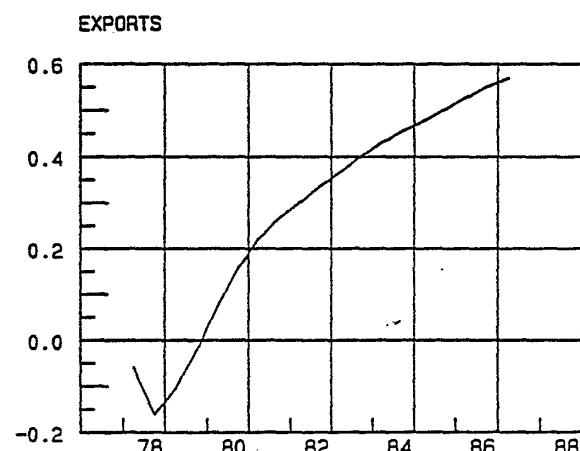
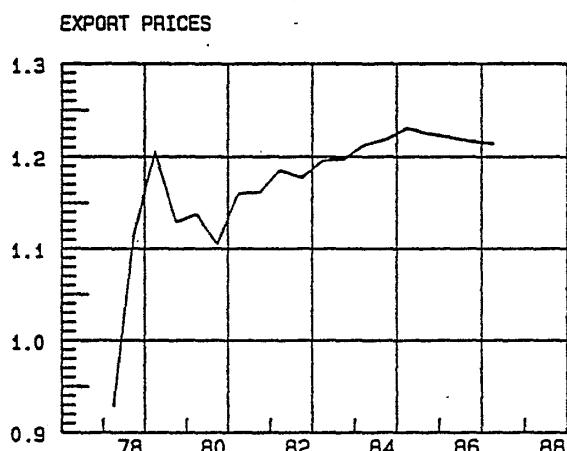
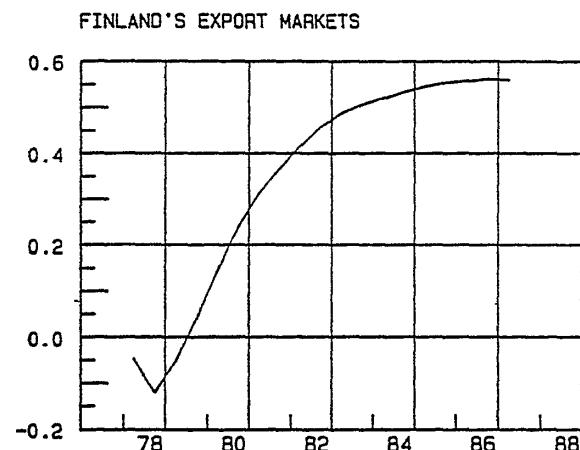
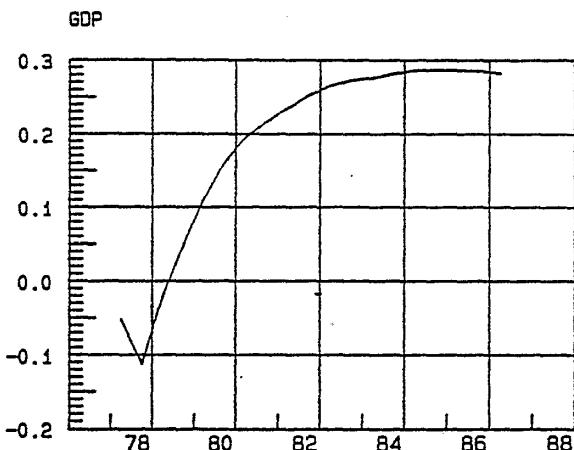


CHART 4

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

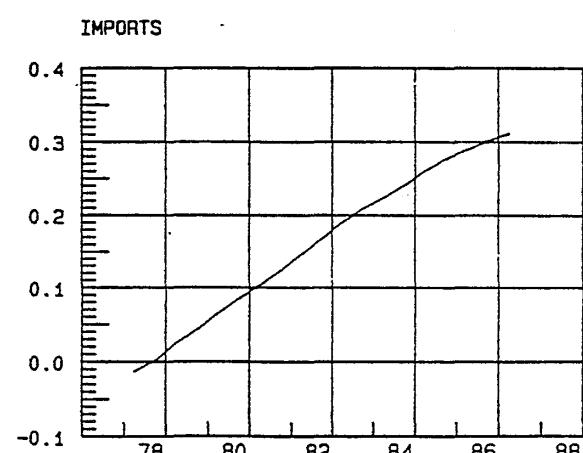
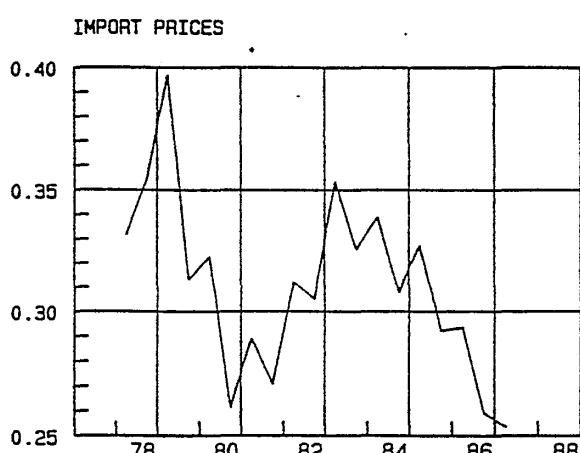
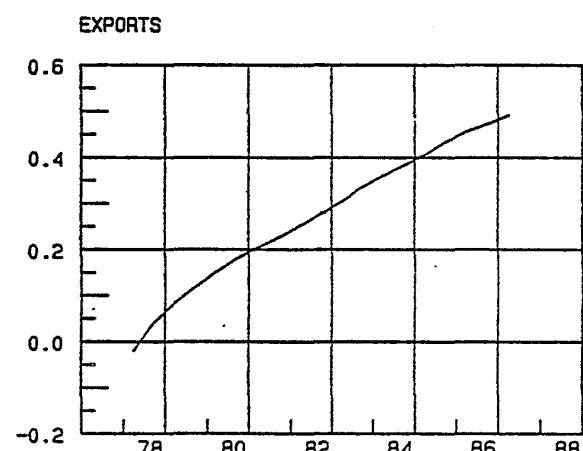
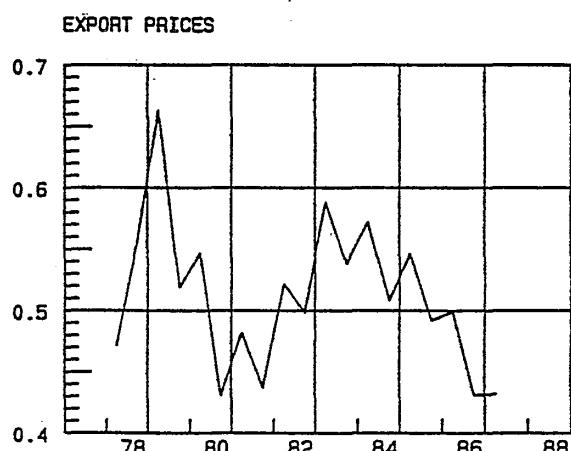
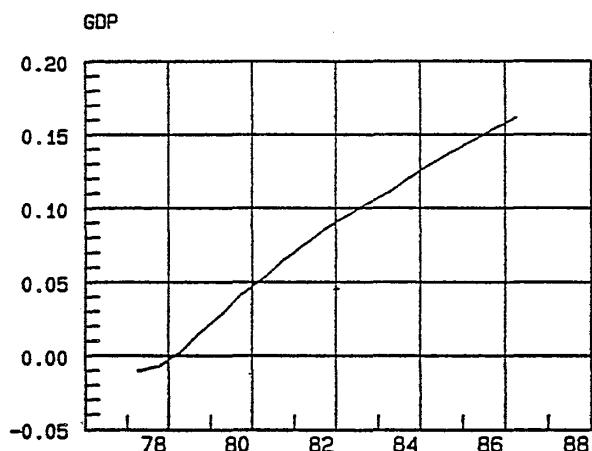
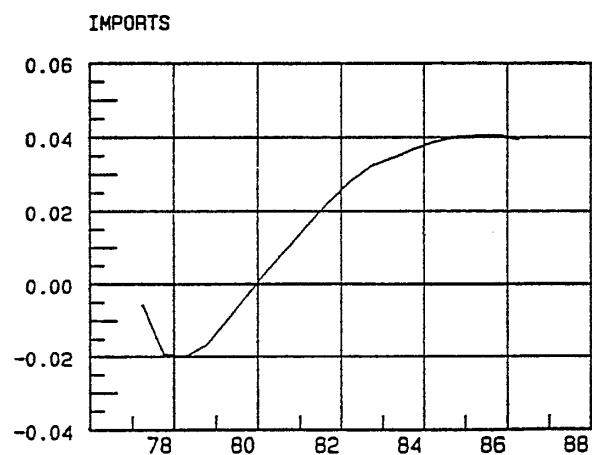
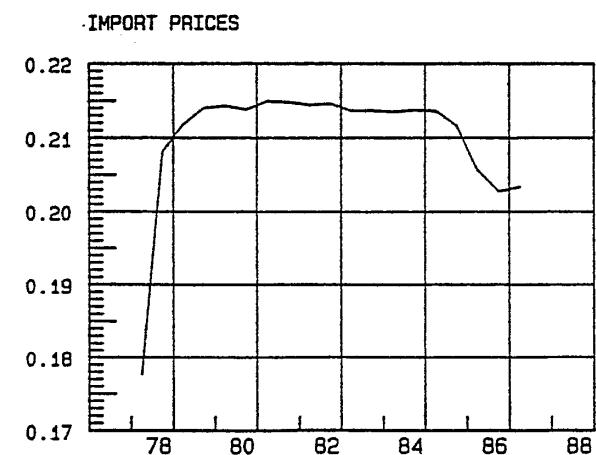
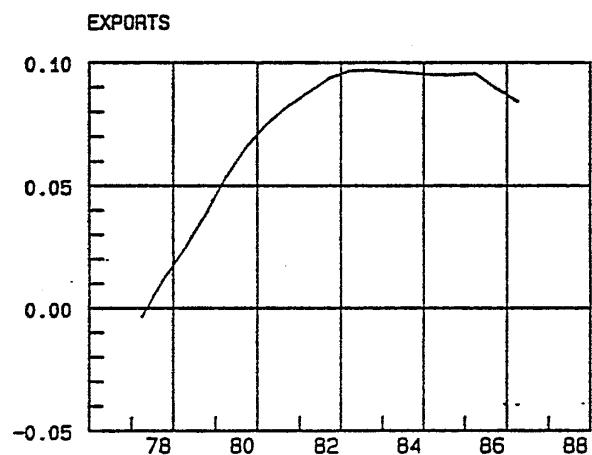
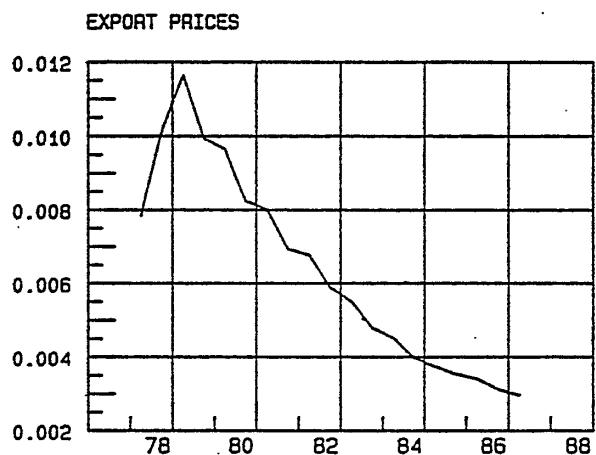
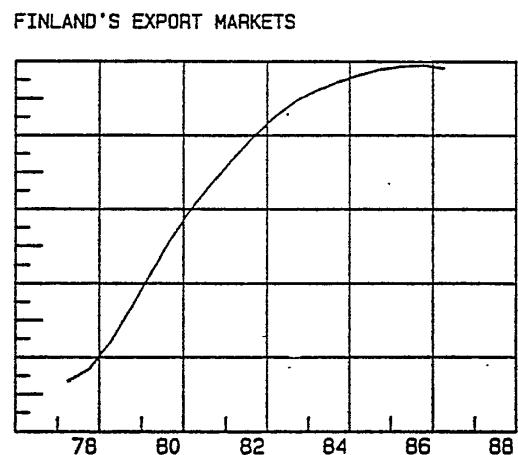
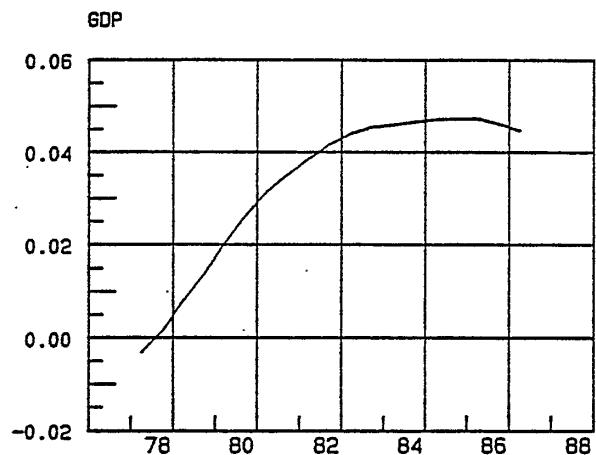


CHART 5

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



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

TKV-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. $OPP_X = f_{14}(OP)$ [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. $VINO = \sum_{n=1}^4 \alpha_n PR_m$ $\sum \alpha_m = 1$ [COMMODITY PRICES]
 19. $OEQ = \sum_{n=1}^N \beta_n Q_n$ $\sum \beta_n = 1$ [OECD-COUNTRIES' GDP]
 20. $OEPDD = \sum_{n=1}^N \beta_m PDD_m$ [OECD-COUNTRIES DOM. DEM. DEFL.]

c) PRICE AND TRADE LINKAGES:

21. $PXW_i = \sum_k (\sum_j q_{ij} w_{kj}) PX_k$ $k \neq i$ [WORLD EXPORT PRICES]
 in which $q_{ij} = (x_{ij}/x_i)[1/(1 - w_{ij})]$
 22. $\Delta PM_i = \sum_j w_{ij} \Delta PX_j$ $i \neq j$ [CH. IMPORT PRICES, USD]
 23. $PM_i = e_i PM_i$ [IMPORT PRICES]
 24. $XW_i = \sum_j w_{ij} M_j$ $i \neq j$ [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	R_i	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 DEFULATOR

USPDDTS =

$$.18146 \Delta \log \text{USULC} + .17361 \Delta \log \text{USULC}_{-1} + \\ (2.818) \qquad \qquad \qquad (3.200)$$

$$.06998 \Delta \log \text{USPM} - .07675 \Delta \log (\text{A}-\text{B}) + .01833 \\ (2.870) \qquad \qquad \qquad (3.117) \qquad \qquad \qquad (10.595)$$

$$R^2 = .792$$

$$\text{SEE} = .007$$

$$\text{DW} = 1.928$$

Estimation period 71S1 - 87S1

$$\text{USPDDTS} \quad \log (\text{USPDDI}/\text{USPDDI}_{-1}) + \log ((1-\text{USTINDLSS})/(1-\text{USTINDLSS}_{-1}))$$

USULC unit labour costs

USPM imports unit value index

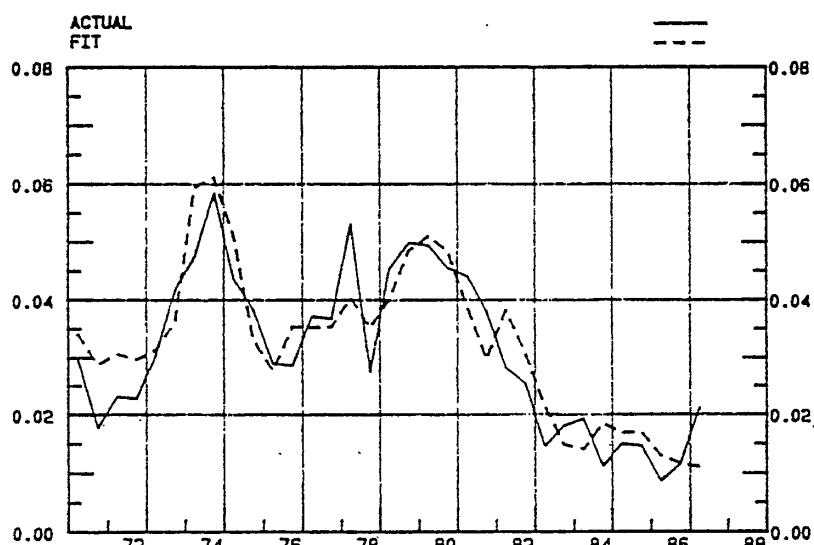
A $\log (\text{USPDDI}_{-1} * (1-\text{USTINDLSS}_{-1}))$

B $\log (\text{USULC}_{-1} + \text{USM}_{-1}/\text{USQ}_{-1} * (\text{USPM}_{-1} - \text{USULC}_{-1}))$

USPDDI domestic demand deflator index (75=1)

USTINDLSS indirect taxes less subsidies

UNITED STATES DOMESTIC DEMAND DEFULATOR



Total Domestic Demand Deflators

JAPDDTS JAPAN DOMESTIC DEMAND DEFLATOR

JAPDDTS =

$$.25443 \Delta \log JAULC + .09614 \Delta \log JAPM - \\ (4.326) \quad (5.602)$$

$$.07484 \Delta \log (C-D) + .03119 \\ (3.649) \quad (7.570)$$

$$R^2 = .781$$

$$SEE = .014$$

$$DW = 1.269$$

Estimation period 71S1 - 87S1

$$JAPDDTS \log (JAPDDI/JAPDDI_{-1}) + \log ((1-JATINDLSS)/(1-JATINDLSS_{-1}))$$

JAULC unit labour costs

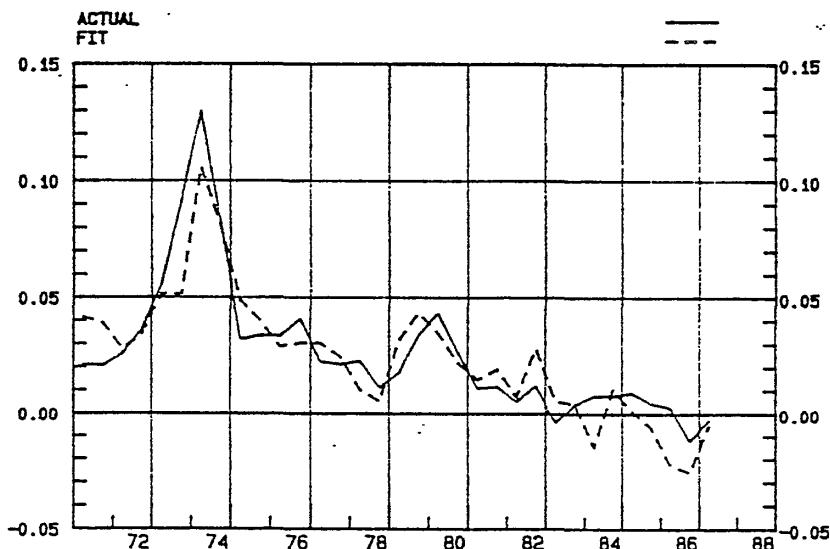
JAPM imports unit value index

C $\log (JAPDDI_{-1} \times (1-JATINDLSS_{-1}))$ D $\log (JAULC_{-1} + JAPM_{-1}/USQ_{-1} \times (JAPM_{-1} - JAULC_{-1}))$

JAPDDI domestic demand deflator index (75=1)

JATINDLSS indirect taxes less subsidies

JAPAN DOMESTIC DEMAND DEFULATOR



Total Domestic Demand Deflators

GEPDDTS GERMANY DOMESTIC DEMAND DEFULATOR

GEPDDTS =

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

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

$$R^2 = .698$$

$$SEE = .009$$

$$DW = 1.805$$

Estimation period 71S1 - 87S1

GEPDDTS $\log(GEPDDI/GEPDDI_{-1}) + \log((1-GETINDLSS)/(1-GETINDLSS_{-1}))$

GEULC unit labour costs

GEPM imports unit value index

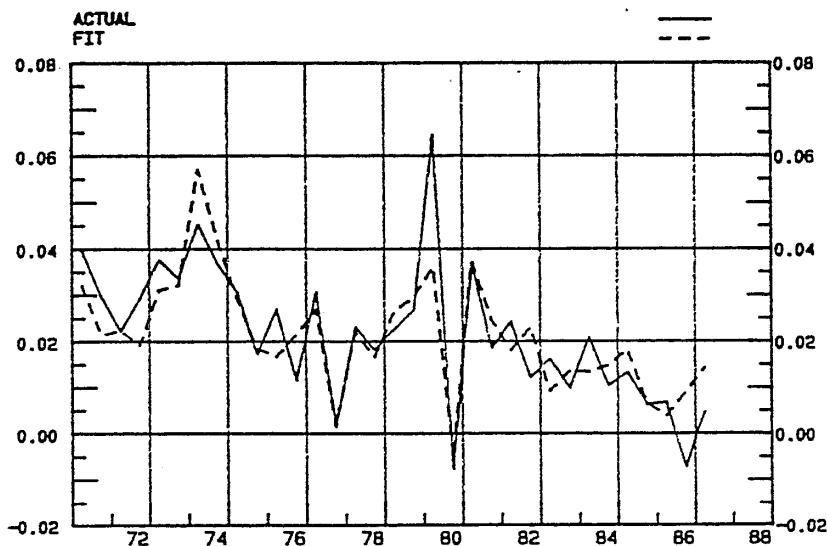
GEDUM1 dummy variable (77S2=1)

GEDUM2 dummy variable (80S2=1)

GEPDDI domestic demand deflator index (75=1)

GETINDLSS indirect taxes less subsidies

GERMANY DOMESTIC DEMAND DEFULATOR



Total Domestic Demand Deflators

FRPDDTS FRANCE DOMESTIC DEMAND DEFLATOR

FRPDDTS =

$$.15253 \Delta \log \text{FRULC} + .09762 \Delta \log \text{FRPM} + .08430 \Delta \log \text{FRPM}_{-1} - \\ (2.018) \quad (4.170) \quad (2.820)$$

$$.11707 (\text{E}-\text{F}) + .02380 \text{STOP} + .02196 \\ (2.936) \quad (2.767) \quad (6.799)$$

$$R^2 = .8356$$

$$\text{SEE} = .008$$

$$\text{DW} = 1.653$$

Estimation period 71S1 - 87S1

$$\text{FRPDDTS} \quad \log (\text{FRPDDI}/\text{FRPDDI}_{-1}) + \log ((1-\text{FRTINDLSS})/(1-\text{FRTINDLSS}_{-1}))$$

FRULC unit labour costs

FRPM imports unit value index

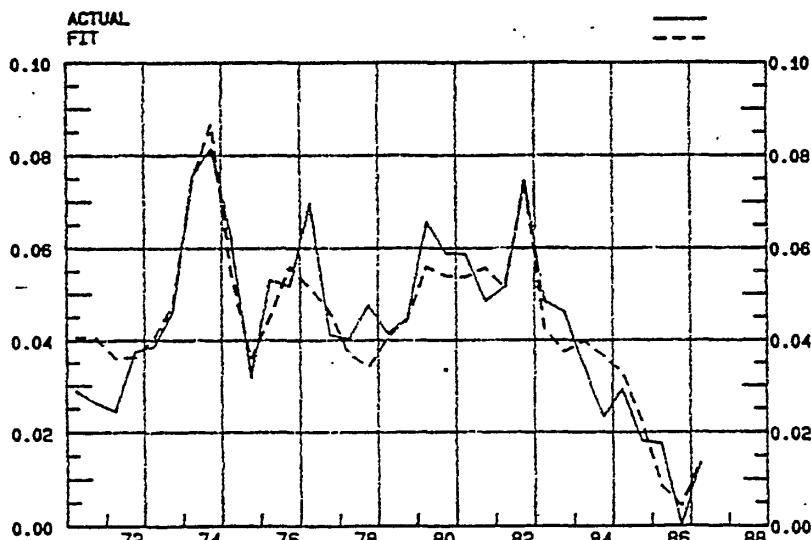
E $\log (\text{FRPDDI}_{-1} * (1-\text{FRTINDLSS}_{-1}))$ F $\log (\text{FRULC}_{-1} + \text{FRM FRQ}_{-1} * (\text{FRPM}_{-1} - \text{FRULC}_{-1}))$

STOP dummy variable 82S2=1)

FRPDDI domestic demand deflator index (75=1)

FRTINDLSS indirect taxes less subsidies

FRANCE DOMESTIC DEMAND DEFULATOR



Total Domestic Demand Deflators

UKPDDTS UNITED KINGDOM DOMESTIC DEMAND DEFLATOR

UKPDDTS =

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

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

$$R^2 = .8857$$

$$\text{SEE} = .001$$

$$\text{DW} = 2.328$$

Estimation period 71S1 - 87S1

UKPDDTS $\log (\text{UKPDDI}/\text{UKPDDI}_{-1}) + \log ((1-\text{UKTINDLSS})/(1-\text{UKTINDLSS}_{-1}))$

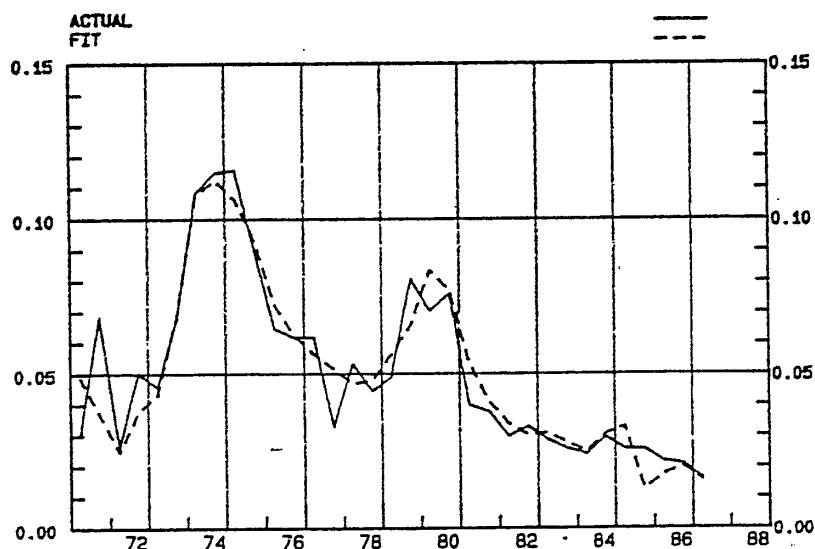
UKULC unit labour costs

UKPM imports unit value index

UKPDDI domestic demand deflator index (75=1)

UKTINDLSS indirect taxes less subsidies

UNITED KINGDOM DOMESTIC DEMAND DEFULATOR



Total Domestic Demand Deflators

SWPDDI SWEDEN DOMESTIC DEMAND DEFULATOR

Δlog SWPDDI =

$$.20950 \Delta \log SWULC + .085963 \Delta \log SWPM + .05995 \Delta \log SWPM_1 + \\ (3.331) \qquad \qquad \qquad (0.8596) \qquad \qquad \qquad (1.497)$$

.02942
(8.730

$$R^2 = .486$$

SEE = .011

DW = 1.946

Estimation period 71S1 - 87S1

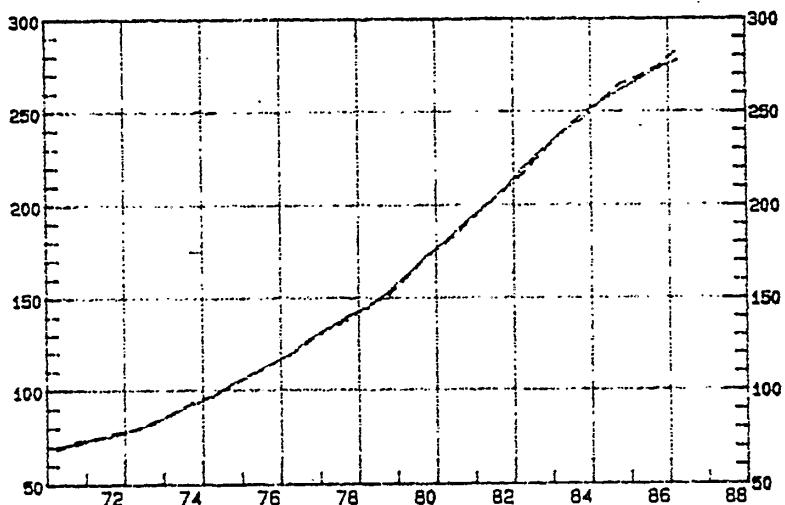
SWPDDI domestic demand deflator index (75=1)

SWULC unit labour costs

SWPM imports unit value index

SWEDEN DOMESTIC DEMAND DEFULATOR

ACTUAL
FIT



Total Domestic Demand Deflators

FIPDDTS FINLAND DOMESTIC DEMAND DEFLATOR

FIPDDTS =

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

(2.945) (6.105) (3.342)

$$R^2 = .701$$

$$SEE = .0189$$

$$DW = 2.784$$

Estimation period 73S1 - 87S1

FIPDDTS $\log(FIPDDI/FIPDDI_{-1}) + \log((1-FITINDLSS)/(1-FITINDLSS_{-1}))$

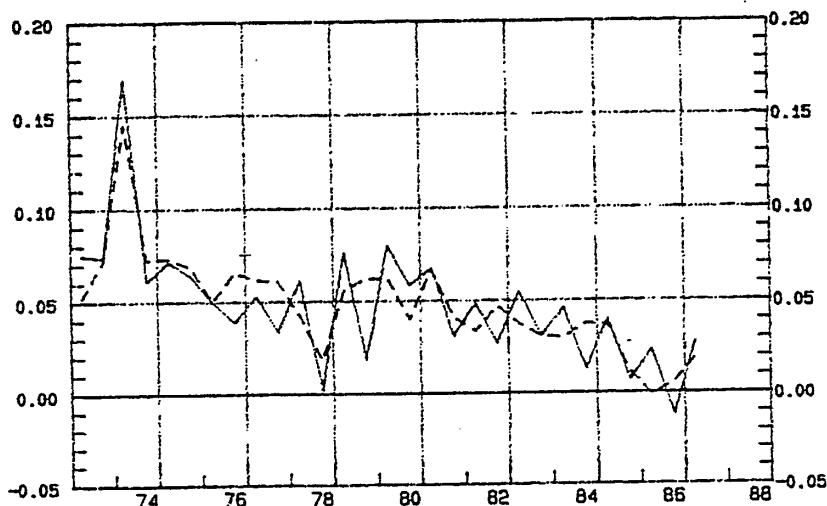
FIULC unit labour costs

FIPM imports unit value index

FIPDDI domestic demand deflator index (75=1)

FITINDLSS indirect taxes less subsidies

FINLAND DOMESTIC DEMAND DEFULATOR
 ACTUAL ---
 FIT - - -



Export prices

USPX UNITED STATES EXPORT PRICE DEFULATOR

$$\log (\text{USPX}/\text{USPX}_{-2}) =$$

$$.98808 \log (\text{USULC}/\text{USULC}_{-2}) + .27005 \log (\text{USWPX}_{-1}/\text{USWPX}_{-2}) + \\ (5.678) \qquad \qquad \qquad (2.851)$$

$$.50366 \text{ USPXE}_{-2} \\ (2.672)$$

$$R^2 = .699$$

$$\text{SEE} = .042$$

$$\text{DW} = .659$$

Estimation period 72S1 - 87S1

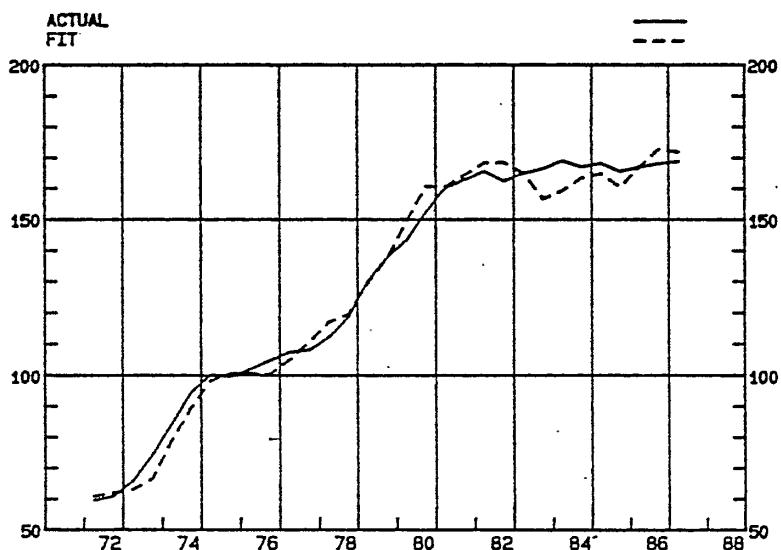
USPX export unit value index

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 DEFULATOR



Export prices

JAPXDOL JAPAN EXPORT PRICE DEFLATOR

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

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

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

$$R^2 = .931$$

$$SEE = .029$$

$$DW = 2.052$$

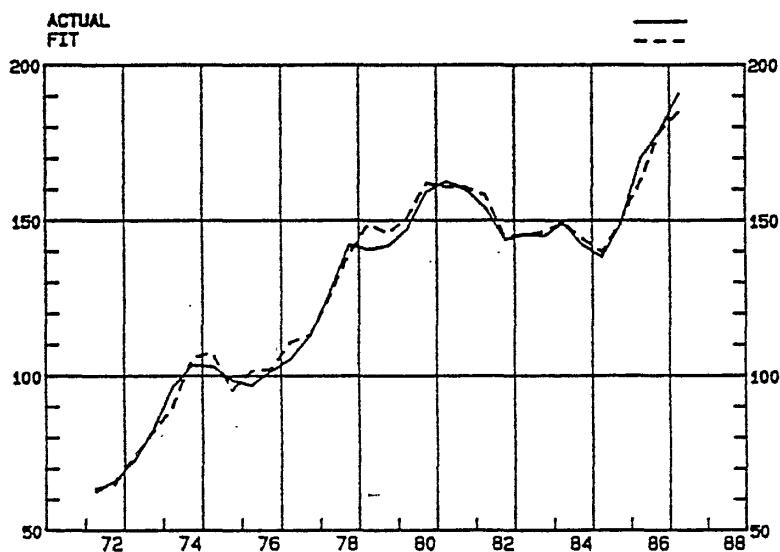
Estimation period 72S1 - 87S1

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 DEFULATOR



Export prices.....

GEPXDOL GERMANY EXPORT PRICE DEFLATOR

 $\Delta \log GEPXDOL =$

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

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

$$R^2 = .978$$

$$SEE = .012$$

$$DW = 1.732$$

Estimation period 72S1 - 87S1

GEPXDOL export unit value index

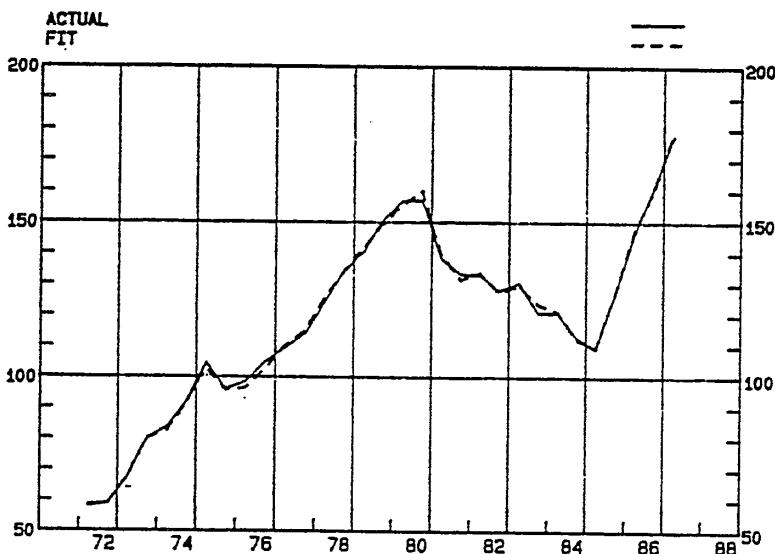
GEULC unit labour costs

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 DEFULATOR

 $\Delta \log \text{FRPXDOL} =$

$$.21958 \Delta \log \text{FRULC} + .78566 \Delta \log \text{FRWPX} + .41874 \Delta \log \text{FRF} +$$

$$(3.065) \qquad \qquad (11.453) \qquad \qquad (10.925)$$

$$.14072 \text{FRPXE}_{-1}$$

$$(3.665)$$

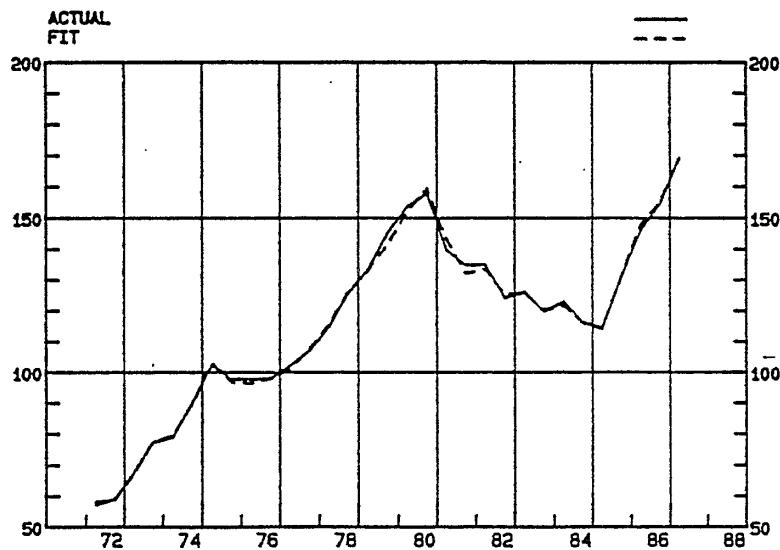
$$R^2 = .974$$

$$\text{SEE} = .012$$

$$\text{DW} = 1.944$$

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 DEFULATOR


Export prices

UKPXDOL UNITED KINGDOM EXPORT PRICE DEFULATOR

$\Delta \log \text{UKPXDOL} =$

.45708 Δlog UKULC + .40685 Δlog UKWPX + .53207 Δlog GBP +
(6.511) (4.635) (9.842)

$$.13244 \text{ UKPXE}_{-1} + .03882 \Delta \log OP$$

(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

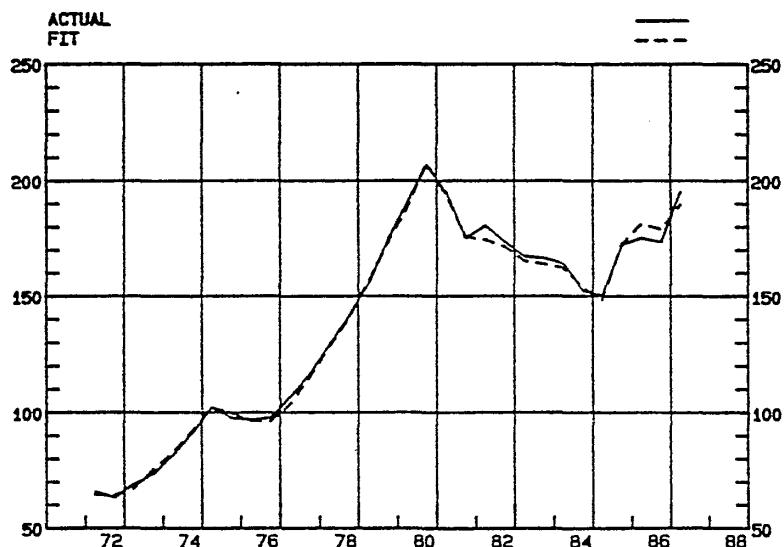
GBP exchange rate to USD (75=1)

UKPXE error correction term = (.911 log UKWPX -

.230) - Log UKPXDOL

OP spot price of crude oil

UNITED KINGDOM EXPORT PRICE DEFULATOR



Export prices...

SWPXDOL SWEDEN EXPORT PRICE DEFLATOR

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

$$.29118 \log (\text{SWULC}/\text{SWULC}_{-2}) + .81190 \log (\text{SWWPX}/\text{SWWPX}_{-2}) +$$

(1.788) (7.673)

$$.50426 \log (\text{SEK}/\text{SEK}_{-2}) + .10728 \text{SWPXE}_{-2}$$

(5.708) (1.237)

$$R^2 = .916$$

$$\text{SEE} = .041$$

$$\text{DW} = .879$$

Estimation period 72S2 - 87S1

SWPXDOL export unit value index

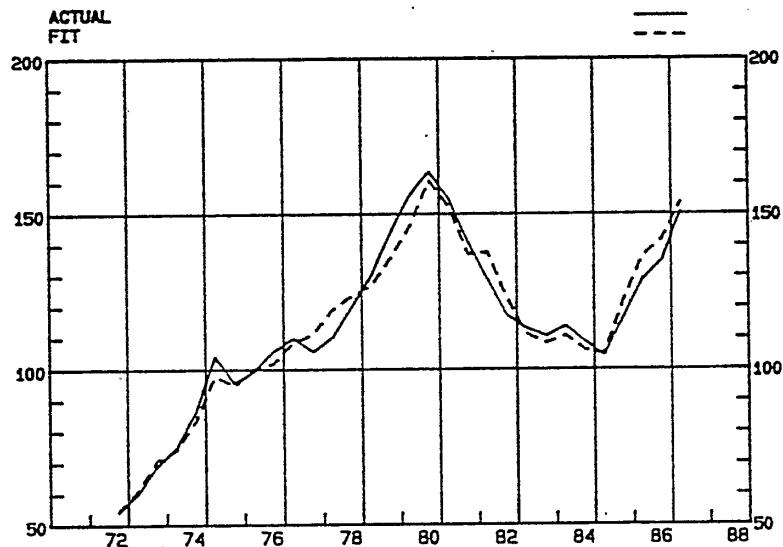
SWULC unit labour costs

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 DEFULATOR

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

.40803 $\log(FIULC/FIULC_{-2}) + .89556 \log(FIWGX/FIWGX_{-2}) +$
 (4.111) (7.968)

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

$R^2 = .937$

SEE = .037

DW = .983

Estimation period 72S2 - 87S1

FIPXDOL export unit value index

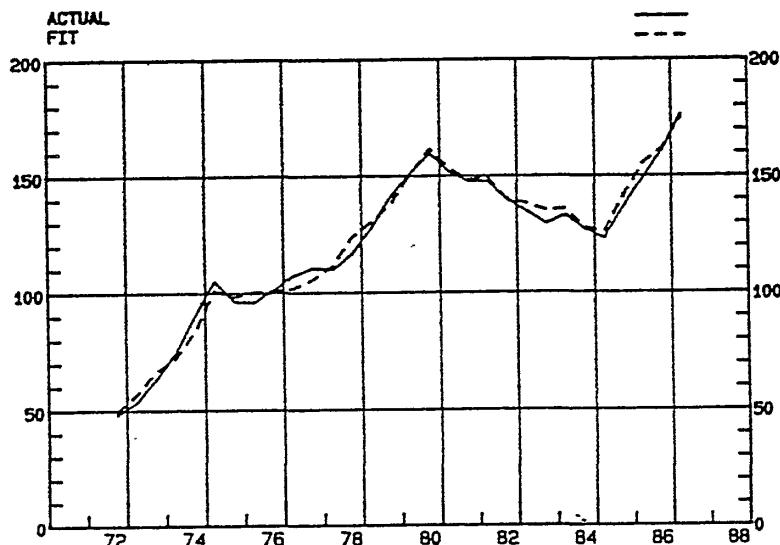
FIULC unit labour costs

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 DEFULATOR



Export prices

OPPX OPEC COUNTRIES EXPORT PRICES

 $\Delta \log OPPX =$

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

$$(12.024) \quad (2.017)$$

$$R^2 = .833$$

$$SEE = .100$$

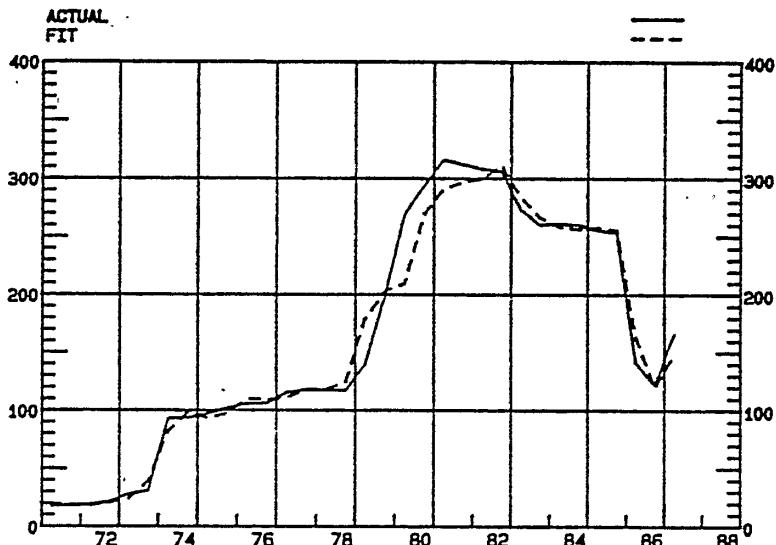
$$DW = 2.053$$

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) (1.93) (2.51)

$$R^2 = .759$$

$$SEE = .037$$

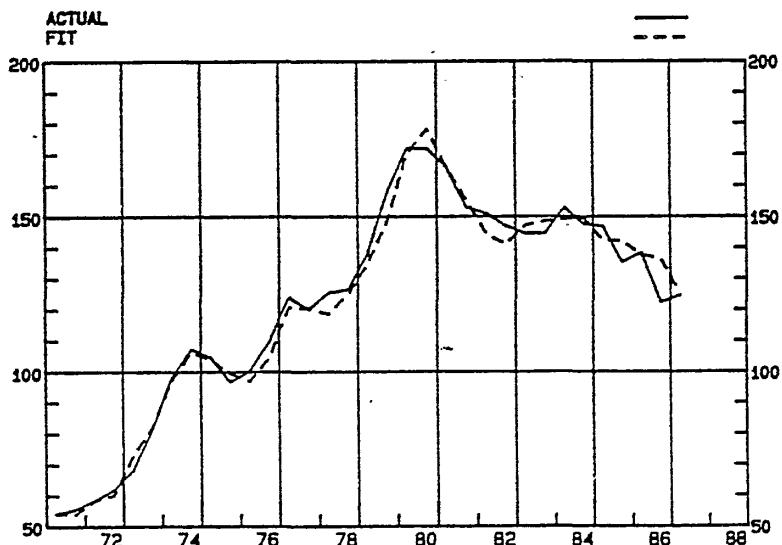
$$DW = 1.966$$

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 =

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

(2.588) (5.585)

$$+ .06629 \log (\text{USM})_{-1} - 9.89963$$

(0.724) (10.599)

$$R^2 = .9960$$

$$\text{SEE} = .0270$$

$$\text{DW} = 1.9082$$

Estimation period 71S2 - 87S1

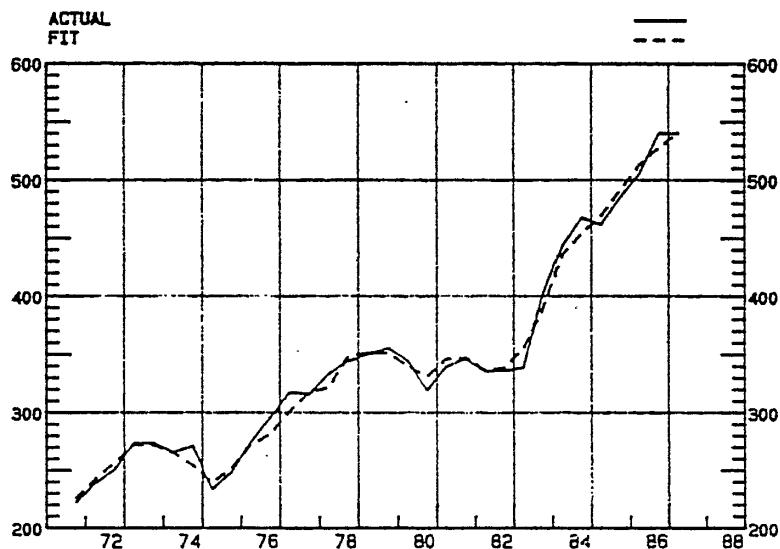
USM imports, volume (82-USD)

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)

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

$$R^2 = .949$$

$$SEE = .039$$

$$DW = .989$$

Estimation period 71S1 - 87S1

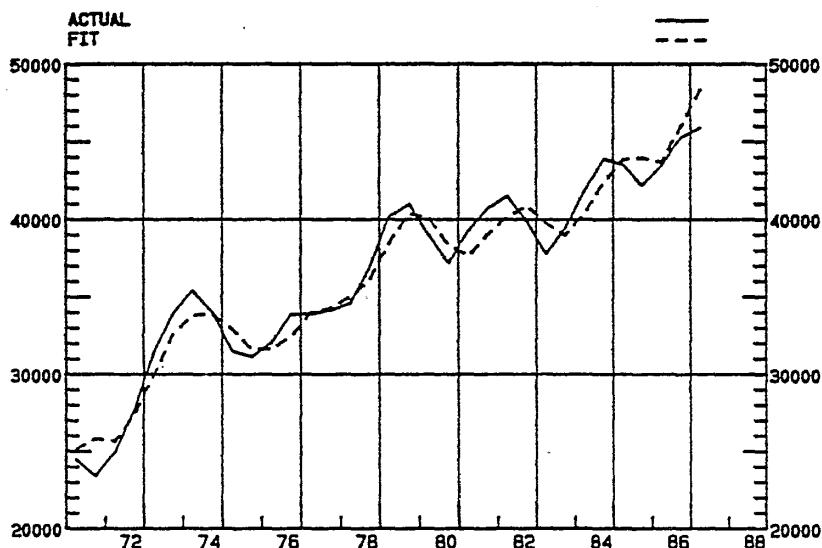
JAM imports, volume (80-YEN)

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) (4.360) (8.896)

$$- 2.78697$$

(4.102)

$$R^2 = .993$$

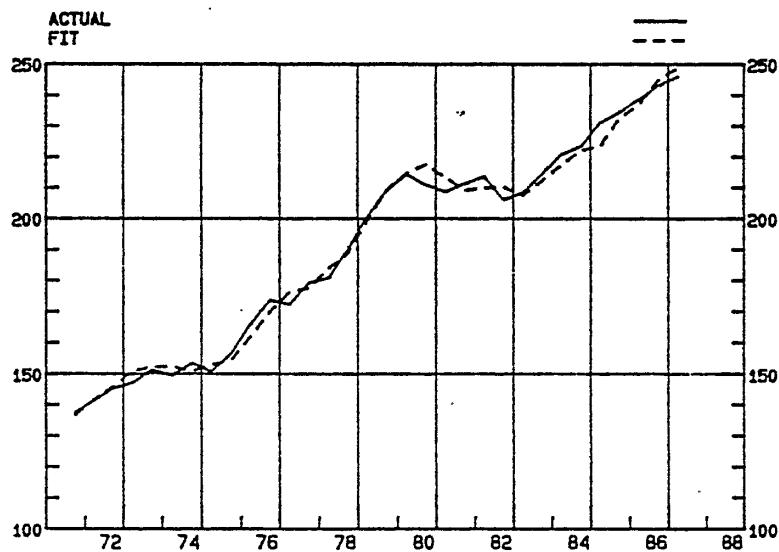
$$SEE = .017$$

$$DW = 1.767$$

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 =

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

(3.198) (5.402)

$$R^2 = .987$$

SEE = .024

$$DW = 1.255$$

Estimation period 71S2 - 87S1

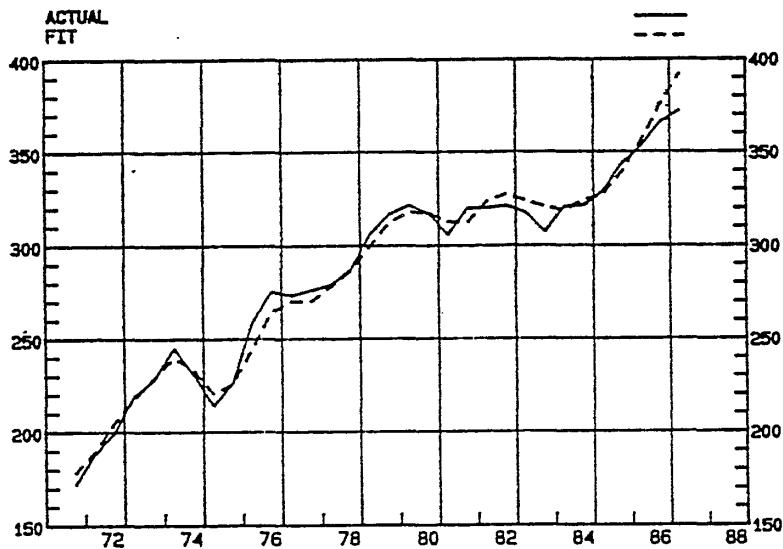
FRM imports, volume (80-FRF)

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 =

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

(1.337) (8.124)

$$+ .23762 \log (\text{UKM})_{-1} - 9.59295$$

(2.470) (7.669)

$$R^2 = .975$$

$$\text{SEE} = .025$$

$$\text{DW} = 2.004$$

Estimation period 71S2 - 87S1

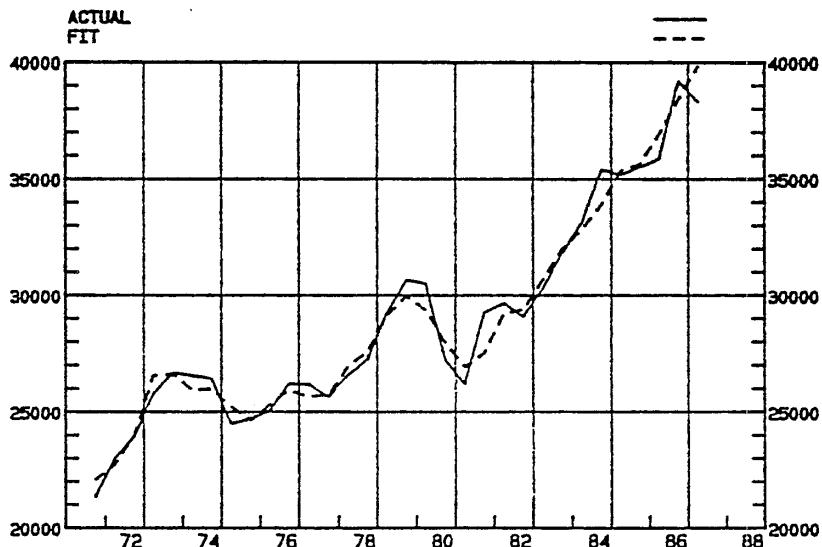
UKM imports, volume (80-GBP)

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 =

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

(2.612) (6.392)

$$+ .26152 \log (\text{SWM})_{-1} - 8.07952$$

(2.045) (5.887)

$$R^2 = .954$$

$$\text{SEE} = .024$$

$$\text{DW} = 1.284$$

Estimation period 71S2 - 87S1

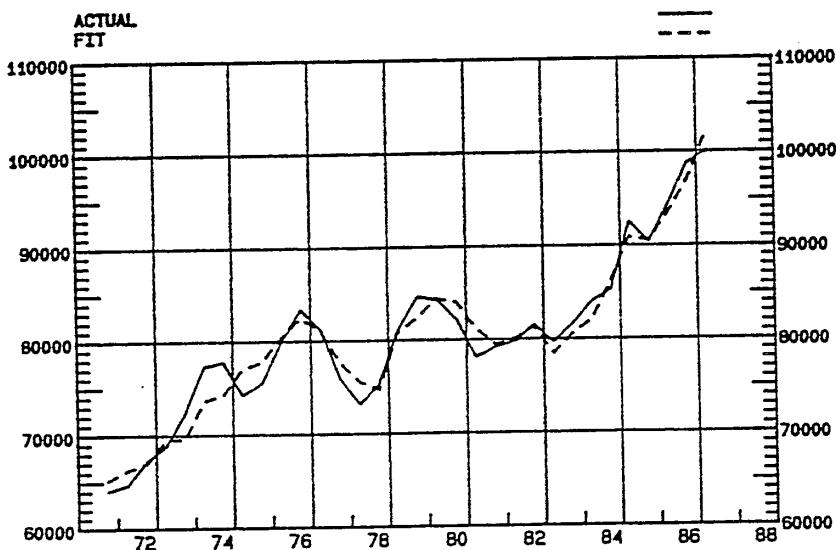
SWM imports, volume (80-SKR)

SWPM imports, unit value index

SWPDDI domestic demand price deflator

SWDD (total) domestic demand

SWEDEN IMPORTS, VOLUME (80-SKA)



Import volumes

FIM FINLAND IMPORTS, VOLUME (85-FIM)

log FIM =

$$-.06080 \log (\text{FIPM}/\text{FIPDDI})_{-1} + 1.02998 \log \text{FIDD} + .15130 \log \text{FIM}_{-1}$$

(.611) (6.632) (1.116)

$$- 3.22266$$

(4.580)

$$R^2 = .959$$

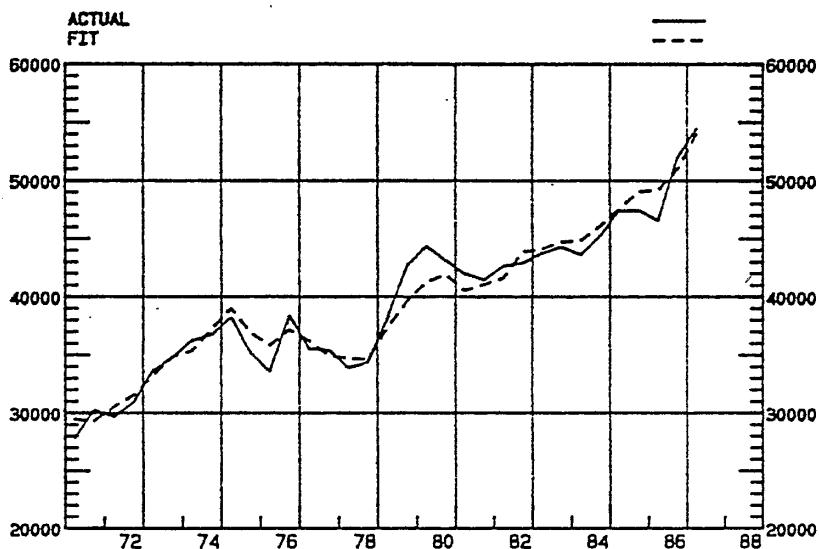
$$\text{SEE} = .033$$

$$\text{DW} = 1.148$$

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 =

$$2.17765 \text{ OODDD} + .28117 (\text{OOMD})_{-1} - 1.41845$$

$$(6.734) \quad (2.519) \quad (2.210)$$

$$R^2 = .719$$

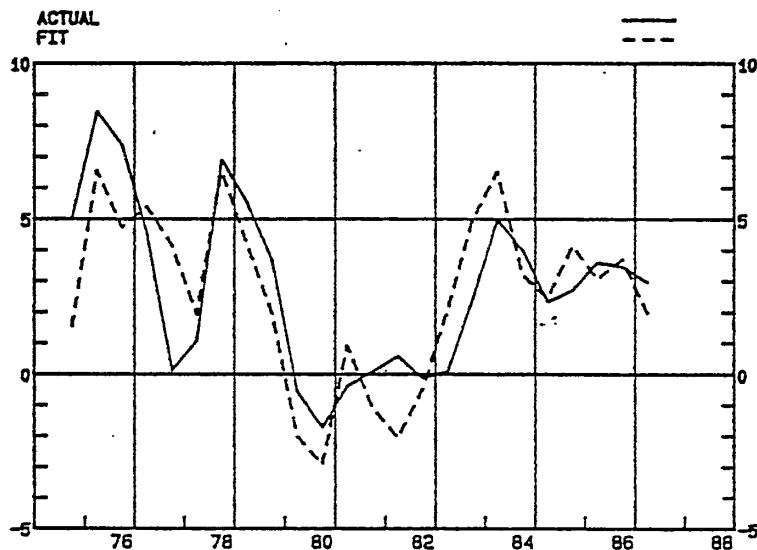
$$\text{SEE} = 2.694$$

$$\text{DW} = 1.492$$

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 =

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

$$2.77520 \\ (6.612)$$

$$R^2 = .975$$

$$SEE = .071$$

$$DW = 1.195$$

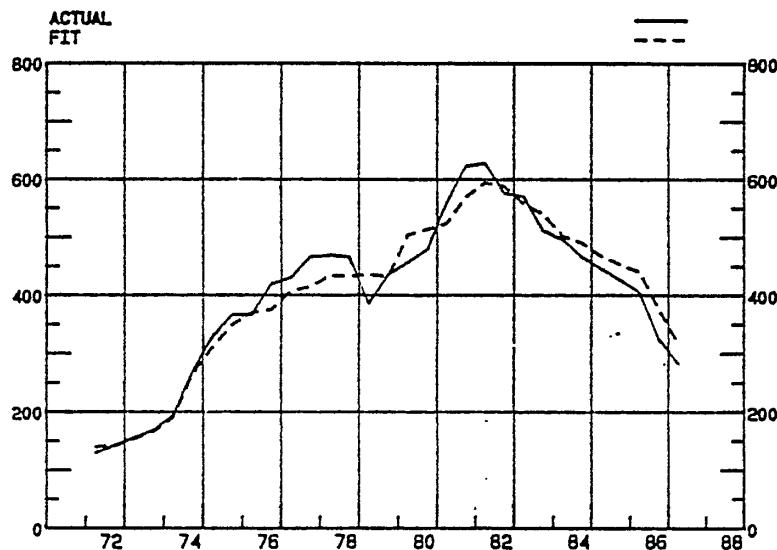
Estimation period 72S1 - 87S1

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)

 $\log(\text{USXDOL}/\text{USXDM}) =$

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

(3.659) -1 (7.455) (2.054)

$R^2 = .832$

$\text{SEE} = .023$

$\text{DW} = 1.592$

Estimation period 71S1 - 87S2

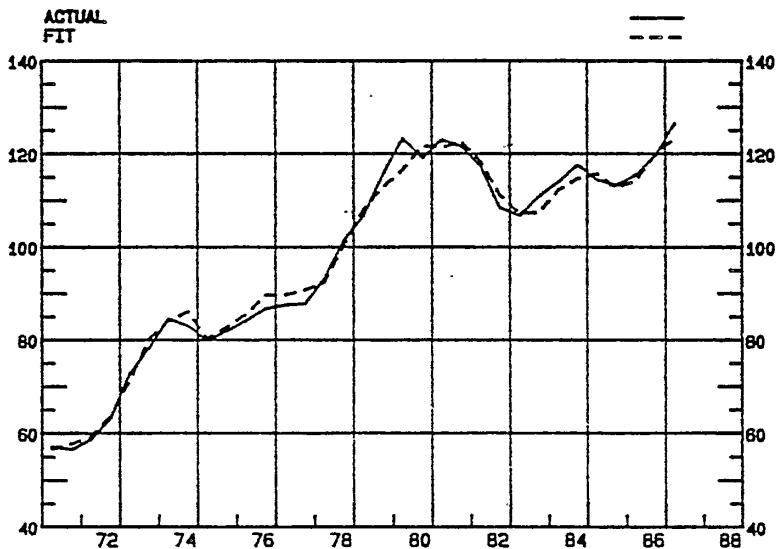
USXDOL exports, volume (82-USD)

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)

 $\log(\text{JAXDOL}/\text{JAXDM}) =$

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

(4.021) (25.184) (3.184)

 $R^2 = .967$

SEE = .031

DW = 1.748

Estimation period 71S1 - 87S1

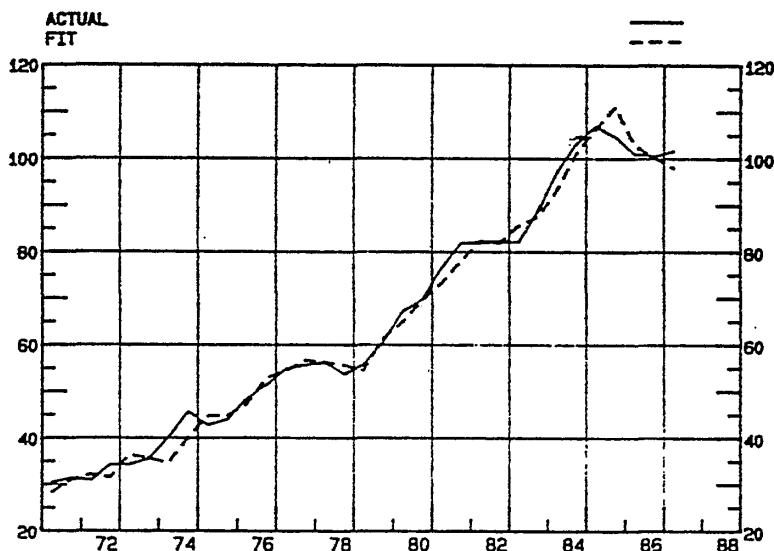
JAXDOL exports, volume (80-USD)

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)

 $\log(GEXDOL/GEXDM) =$

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

(2.405) -2 (9.764)

$$-.00392$$

(0.469)

$$R^2 = .820$$

$$SEE = .023$$

$$DW = 2.623$$

Estimation period 75S1 - 87S1

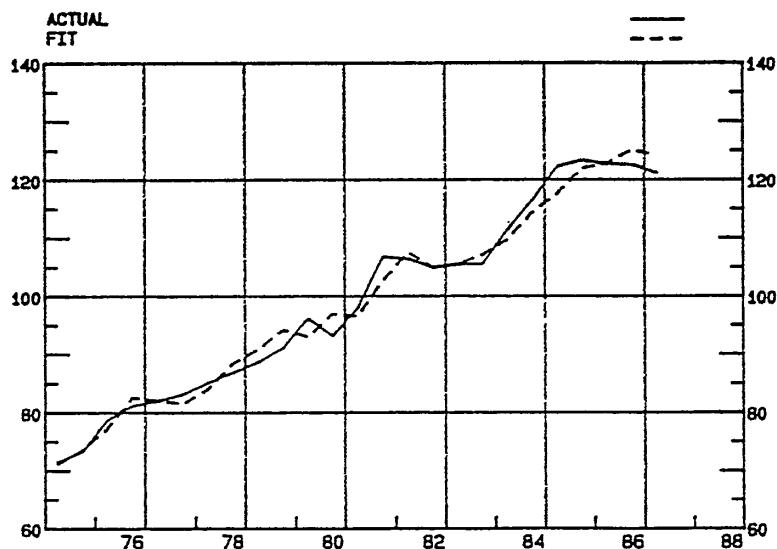
GEXDOL exports, volume (80-USD)

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)

 $\log(\text{FRXDOL}/\text{FRXDM}) =$

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

(3.389) (3.774)

$$-.01322$$

(2.439)

$$R^2 = .661$$

$$\text{SEE} = .018$$

$$\text{DW} = 2.142$$

Estimation period 71S1 - 87S1

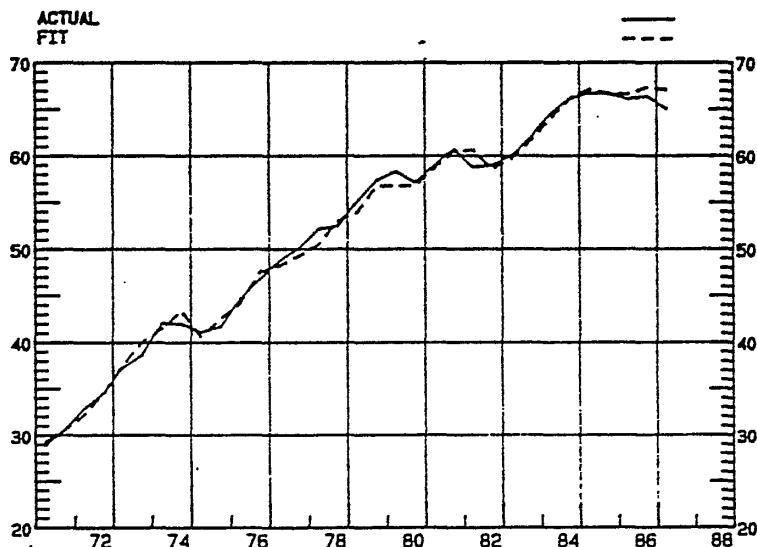
FRXDOL exports, volume (80-USD)

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)

 $\log(\text{UKXDOL}/\text{UKXDM}) =$

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

(4.281) (7.372)

$$+ .04082$$

(4.170)

$$R^2 = .918$$

$$\text{SEE} = .016$$

$$\text{DW} = 1.979$$

Estimation period 75S1 - 87S1

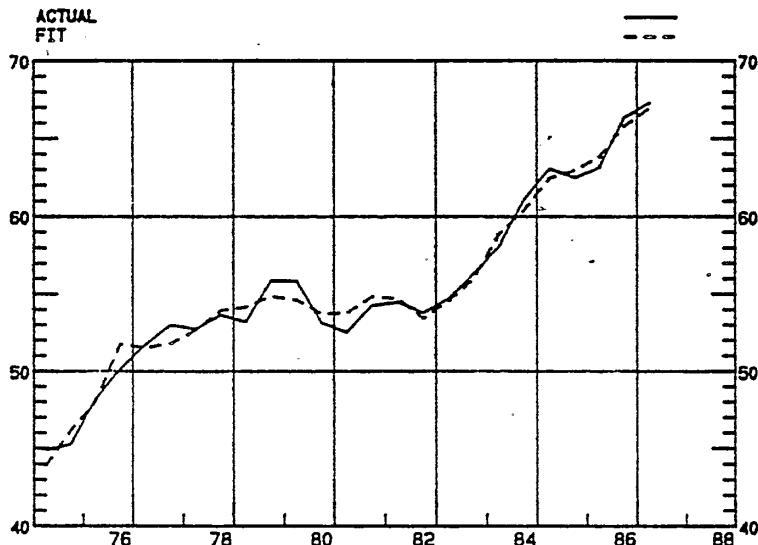
UKXDOL exports, volume (80-USD)

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)

 $\log(SWXDOL/SWXDM) =$

$$-.09138 \log(SWPXDOL/SWPX) + .84285 \log(SWXDOL/SWXDM)_{-1} +$$

(1.939) (18.263)

$$.04237 * DUM82$$

(2.153)

$$R^2 = .910$$

$$SEE = .0242$$

$$DW = 2.328$$

Estimation period 71S1 - 87S1

SWXDOL exports, volume (80-USD)

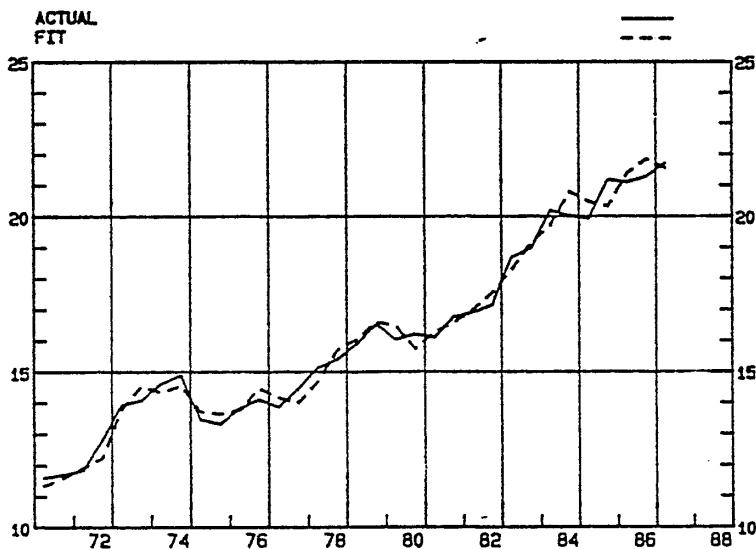
SWXDM exports given by market growth

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)

 $\log(FIXDOL/FIXDM) =$

$$\begin{aligned} & -.04116 \log(FIPXDOL/FIWPX) + .92861 \log(FIXDOL/FIXDM)_{-1} \\ & (.662) \quad \quad \quad -1(10.326) \\ & + .01147 \\ & (.785) \end{aligned}$$

 $R^2 = .874$

SEE = .041

DW = 1.686

Estimation period 75S1 - 87S1

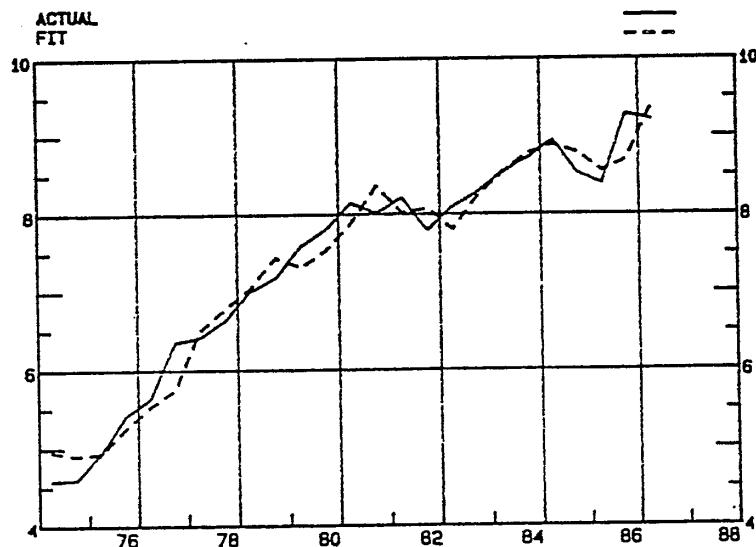
FIXDOL exports, volume (80-USD)

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)

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

$$-.64507 \log(\text{USDDI}/\text{USPDDI}_{-2}) - .00198(\text{PRIMES} * \text{USPDDIE})$$

(10.203) (3.808)

$$+ .62176 \log(\text{USQ}/\text{USQ}_{-2}) + .82004 \log(\text{USQ}_{-2}/\text{USC}_{-2})$$

(11.077) (7.222)

$$- .30586$$

(6.087)

$$R^2 = .936$$

$$\text{SEE} = .005$$

$$\text{DW} = 1.988$$

Estimation period 75S1 - 86S2

USC private consumption, volume (82-USD)

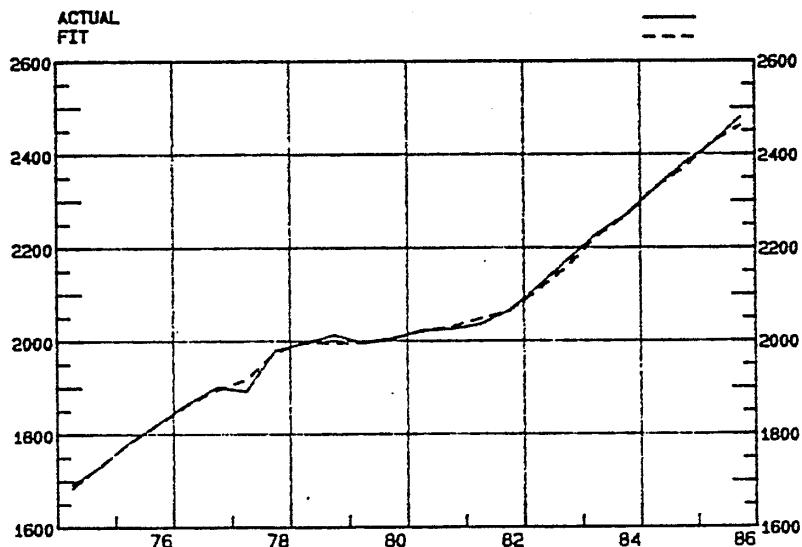
USPDDI domestic demand deflator

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 =

$$.11547 \text{ logJAQ}_{-1} + .76493 \text{ log JAC}_{-1} - .00309 \text{ JAPDDIE}$$

(1.362) (6.913) (1.981)

$$- .00398 \text{ JARI}_{-1} + 1.40971$$

(3.159) (4.060)

$$R^2 = .998$$

$$\text{SEE} = .006$$

$$\text{DW} = 1.25$$

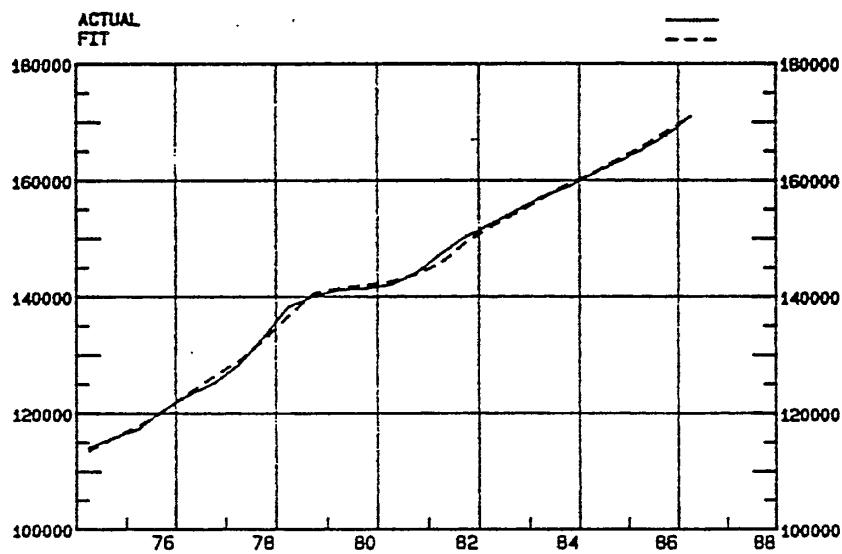
Estimation period 75S1 - 87S1

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)

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

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

$$R^2 = .808$$

SEE = .009

$$DW = .969$$

Estimation period 75S1 - 86S2

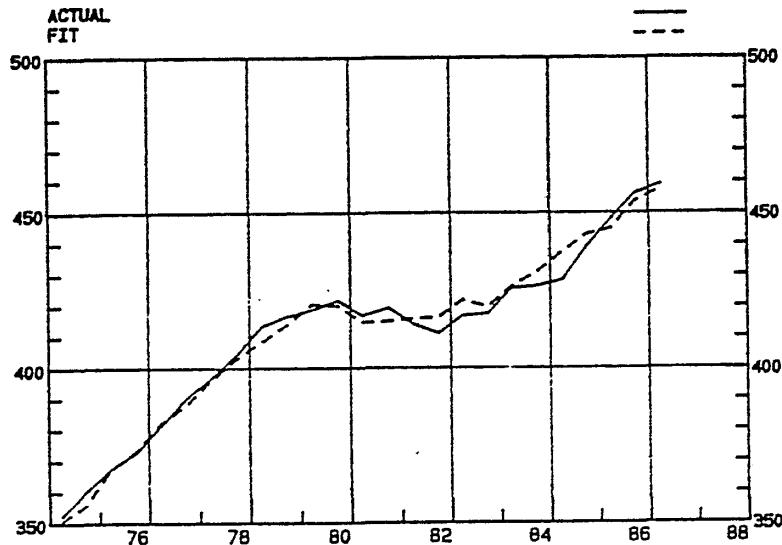
GEC private consumption, volume (80-DEM)

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)

Analog FRF =

$$.74060 \Delta \log FRQ = .00325 \Delta (FRRI - FRPDDIE)$$

$$+ .22291 \log(FRQ_{-1}/FRC_{-1}) - .11138$$

(3.136) (2.970)

$$R^2 = .662$$

SEE = .005

SEE = .005
DW = 2.012

Estimation period 75S1 - 87S1

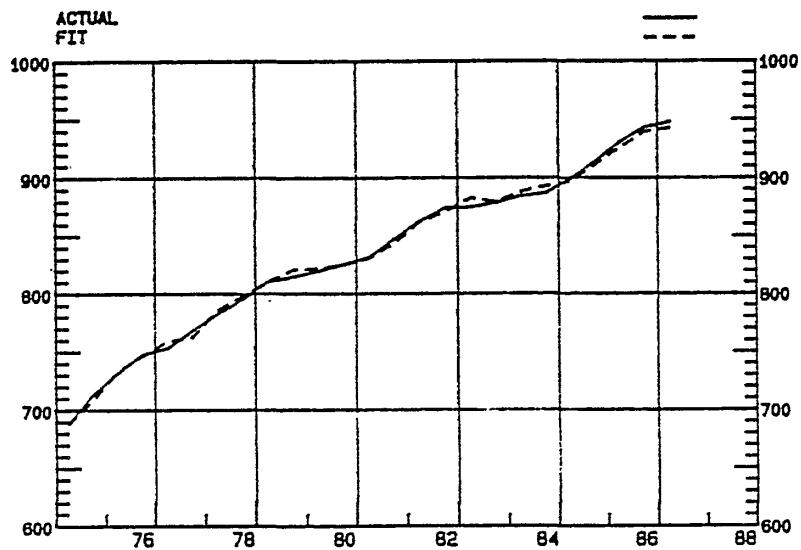
FRC private consumption, volume (80-FRF)

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)

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

$$-.00680 \text{ UKPDDIE} + .28561 \log (\text{UKQ}/\text{UKQ}_{-2})$$

(5.231) (1.808)

$$+ .48672 \log(\text{UKQ}_{-2}/\text{UKC}_{-2}) - .20076$$

(4.054) (3.341)

$$R^2 = .761$$

$$\text{SEE} = .013$$

$$\text{DW} = 1.284$$

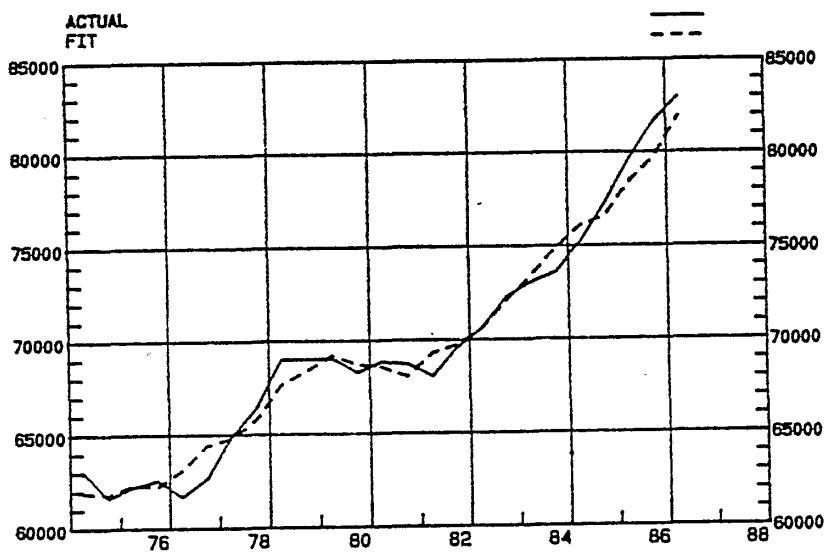
Estimation period 75S1 - 86S2

UKC private consumption, volume (80-GBP)

UKPDDIE expected change of domestic demand deflator

UKQ GDP, VOLUME (80-GBP)

UNITED KINGDOM PRIVATE CONSUMPTION, VOLUME (80-GBP)



Private consumption volumes

SWC SWEDEN PRIVATE CONSUMPTION, VOLUME (80-SKR)

logSKC =

$$.38007 \text{ logSWQ}_{-1} + .60303 \text{ logSWC}_{-1}$$

(4.153) (6.299)

$$- .00728 (\text{SWRI-SWPDDIE})$$

(3.418)

$$R^2 = .878$$

$$\text{SEE} = .012$$

$$\text{DW} = 1.983$$

Estimation period 75S1 - 87S1

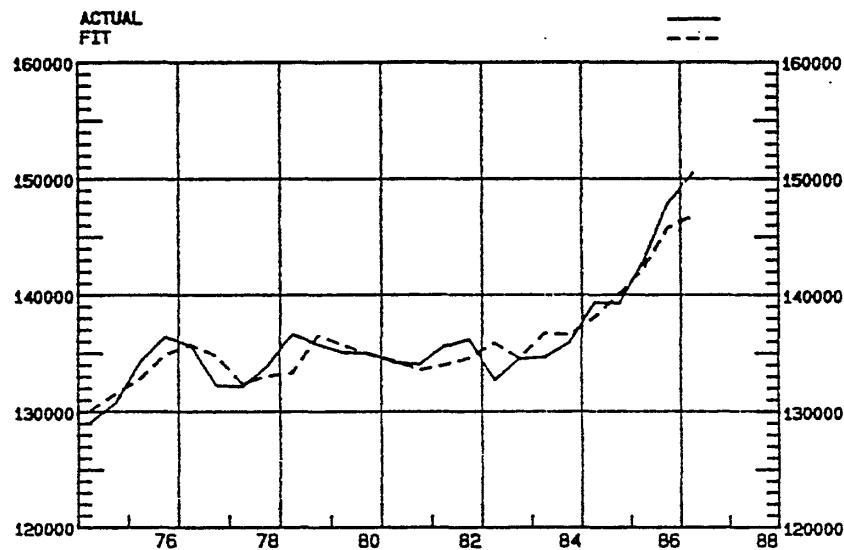
SWC private consumption, volume (80-SKR)

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)

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

$$-.01080 \text{ FIPDDIE} - .01458(\text{FIRI}-\text{FIPDDIE})$$

(3.149) (4.263)

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

(5.277) (4.548)

$$- .14103$$

(2.207)

$$R^2 = .742$$

$$\text{SEE} = .0113$$

$$\text{DW} = 1.544$$

Estimation period 75S1 - 87S2

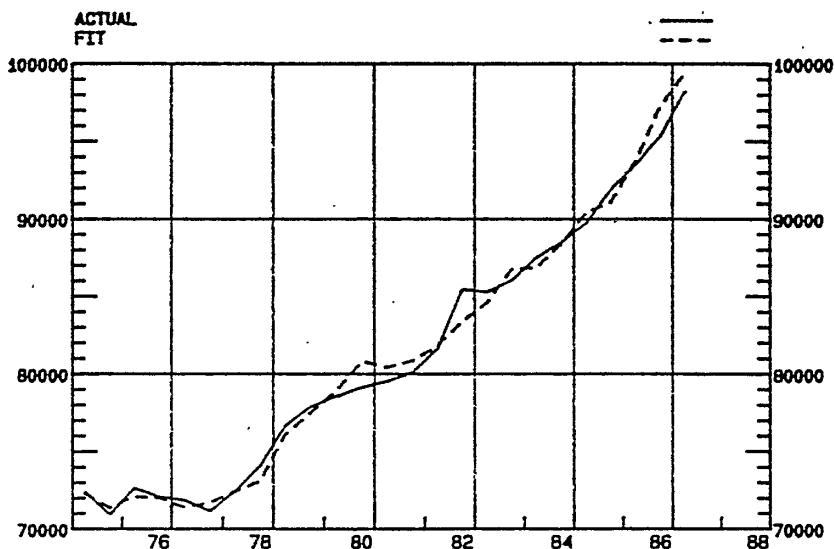
FIC private consumption, volume (85-FIM)

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)

$$\text{USI} = 2.84881 \cdot (100 * \text{USULC}/\text{USPQ})_{-2} \\ (1.515)$$

$$- 8.25340 \cdot \text{USERCOST}_{-1} + 0.21149 \cdot \text{USQ}_{-1} \\ (6.421) \quad (4.871)$$

$$+ 0.46277 \cdot \text{USI}_{-1} - 591.00544 \\ (3.924) \quad (2.258)$$

$$R^2 = 0.970$$

$$\text{SEE} = 13.320$$

$$\text{DW} = 1.718$$

Estimation period 75S2 - 86S1

USI fixed investments, volume (82-USD)

USULC unit labour costs

USPQ GDP-deflator

USQ GDP, volume (82-USD)

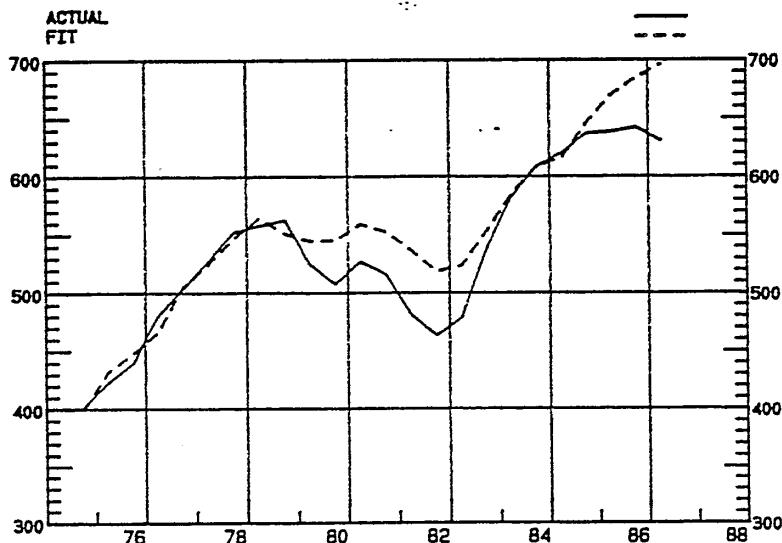
USERCOST $(\text{USPDDI} * (\text{PRIMES} - \text{USPDDIE}))/\text{USPQ}$

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)

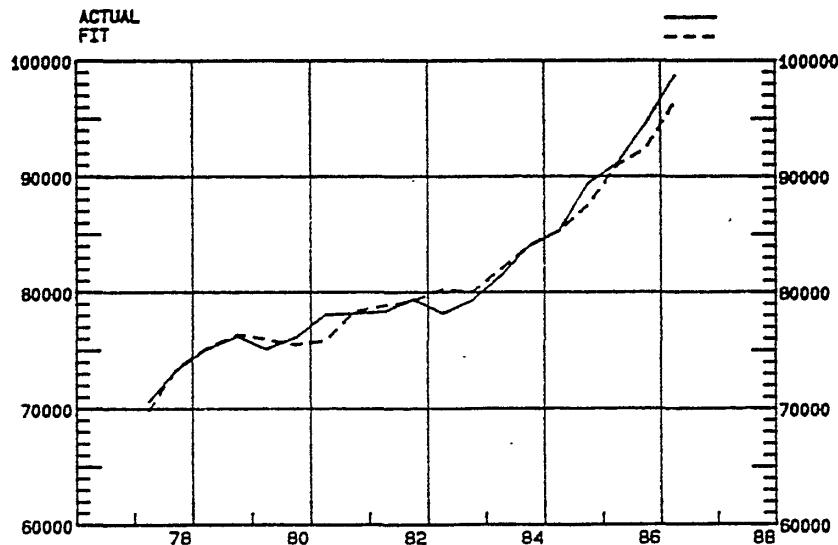
$$\begin{aligned}
 \text{JAI} &= 2.70064 * (100 * \text{JAULC}/\text{JAPQ})_{-2} \\
 &\quad (1.94) \\
 &\quad - 6.75730 * \text{JAUCR}_{-2} + 0.18780 * (\text{JAQ}/100)_{-1} \\
 &\quad (1.96) \quad (3.48) \\
 &\quad + .61237 * (\text{JAI}/100)_{-1} - 319.03424 * 100 \\
 &\quad (3.64) \quad (1.65)
 \end{aligned}$$

$$\begin{aligned}
 R^2 &= .982 \\
 \text{SEE} &= 11.274 \\
 \text{DW} &= 1.998
 \end{aligned}$$

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)

$$\begin{aligned}
 \text{GEI} &= 0.67897 * \text{GEI}_{-1} + 0.07822 * \text{GEQ}_{-1} \\
 &\quad (4.109) \qquad \qquad \qquad (1.719) \\
 &- 3.32877 * \text{GEUCR}_{-1} + 0.79500 * \\
 &\quad (2.889) \qquad \qquad \qquad (1.530) \\
 &(100 * \text{GEULC}/\text{GEPQ})_{-2} - 64.23761 \\
 &\qquad \qquad \qquad (1.036)
 \end{aligned}$$

$$R^2 = 0.832$$

SEE = 4.1029

$$\text{DW} = 2.9116$$

Estimation period 75S2 - 86S1

GEI fixed investments, volume (80-DEM)

GEULC unit labour costs

GDP-deflator

GEQ GDP, volume (80-DEM)

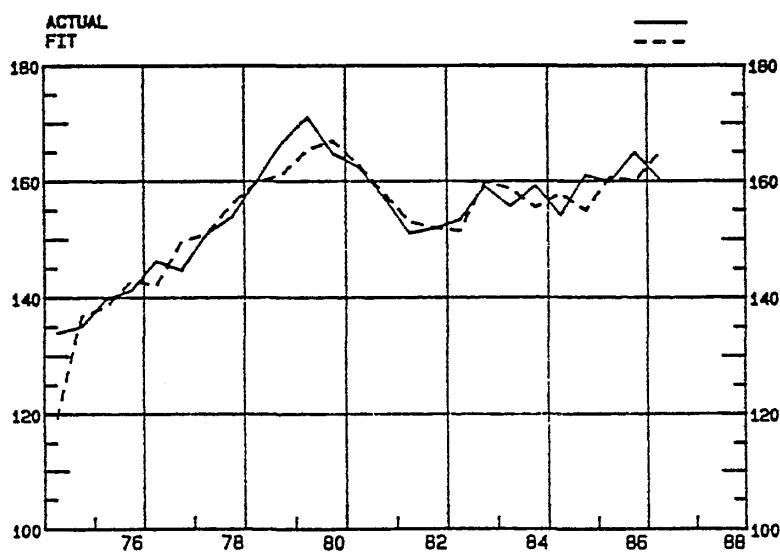
GEUCR (GEPDDI * (GERI-GEPDDIE))/GEPQ

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)

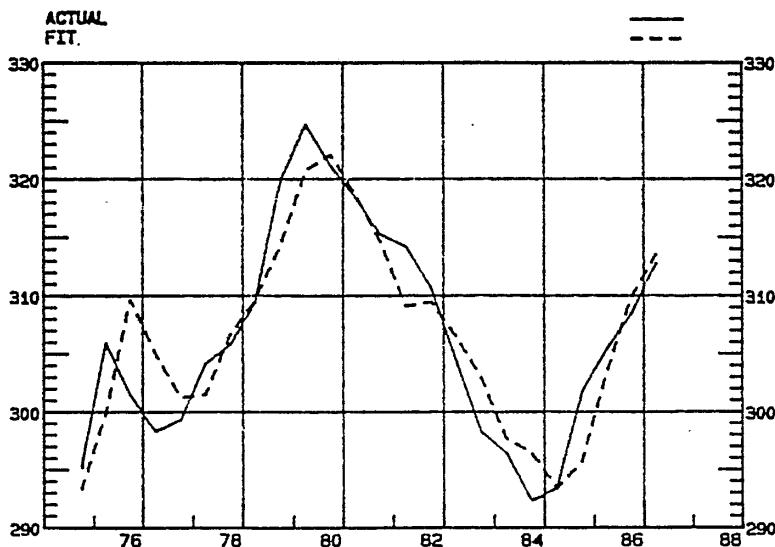
$$\begin{aligned}
 \text{FRI} &= .09958 * (100 * \text{FRULC}/\text{FRPQ})_{-1} - 1.78200 * \\
 &\quad (.113) \qquad \qquad \qquad (1.706) \\
 &\quad \text{FRUCR}_{-1} + .02208 * \text{FRQ}_{-1} + \\
 &\quad (.443) \\
 &\quad .89643 * \text{FRI}_{-1} - 5.97688 \\
 &\quad (9.236) \qquad \qquad \qquad (1.391)
 \end{aligned}$$

$$\begin{aligned}
 R^2 &= .828 \\
 \text{SEE} &= 4.147 \\
 \text{DW} &= 1.496
 \end{aligned}$$

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 guaranteed by govt

FRANCE FIXED INVESTMENTS, VOLUME (80-FRF)



Investment volumes

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

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

$$R^2 = 0.861$$

$$\text{SEE} = 6.767$$

$$\text{DW} = 1.980$$

Estimation period 76S1 - 86S1

UKI fixed investments, volume (80-GBP)

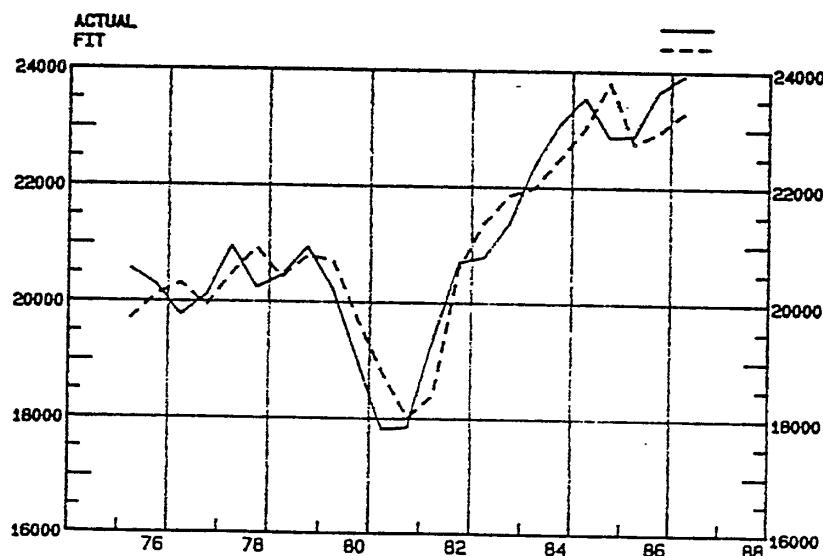
UKPI investment price index

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 =

$$.44957 \log (\text{SWQ}/\text{SWQ}_{-2})$$

(1.162)

$$+ .15349 \log \text{SWQ}_{-1} + .82352 * \log \text{SWI}_{-1}$$

(1.252) (5.867)

$$- .08709 \log (\text{SWUCR}_{-1}/\text{SWUCR}_{-2})$$

(1.479)

$$R^2 = .742$$

$$\text{SEE} = .029$$

$$\text{DW} = 1.995$$

Estimation period 76S1 - 86S1

SWI fixed investments, volume (80-SEK)

SWUCR (SWPDDI) * (SWRI - SWPDDIE)

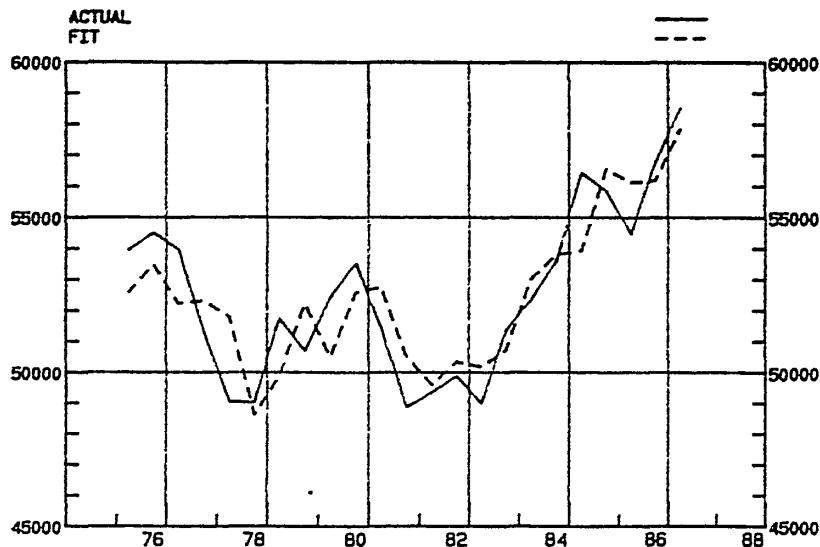
SWPDDI domestic demand deflator

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)

$$\begin{aligned}\text{logFII} &= 1.87999 * \text{logFIQ}_{-1} - .07734 * \text{logFIUCR}_{-1} \\ &\quad (10.27) \quad (4.25) \\ &+ 1.14337 * \text{log(FIULC/FIPQ)}_{-1} - 11.55888 \\ &\quad (5.70) \quad (5.39)\end{aligned}$$

$$R^2 = .940$$

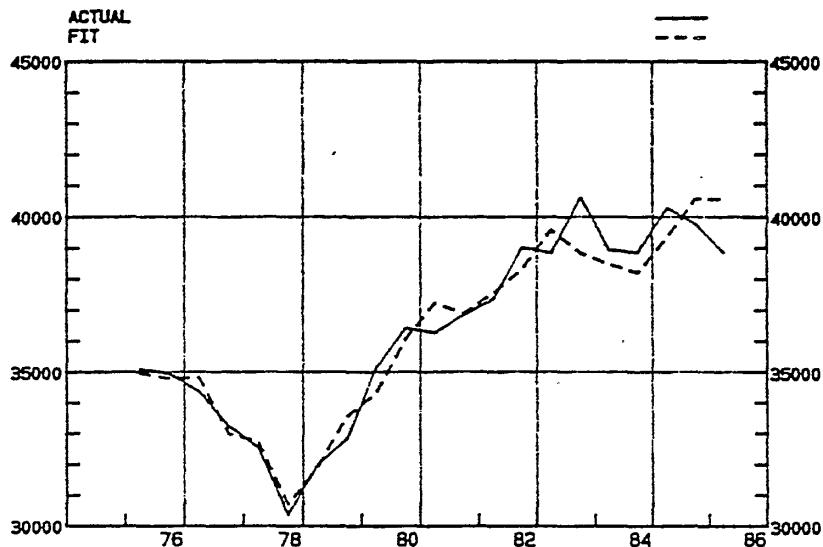
$$\text{SEE} = .022$$

$$\text{DW} = 1.897$$

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 =

$$.85655 \text{ E}100 + .224542 \text{ PRIMES}_{-1}$$

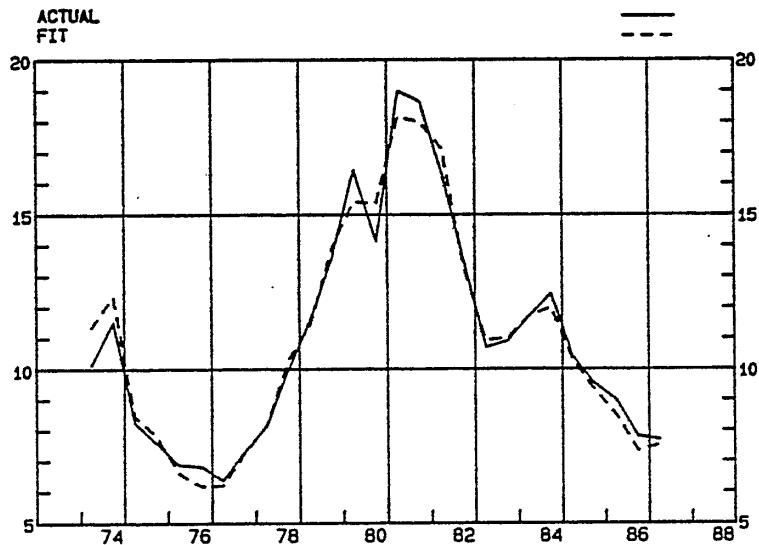
(15.81) (4.61)

$$\begin{aligned} R^2 &= .975 \\ \text{SEE} &= .576 \\ \text{DW} &= 2.045 \end{aligned}$$

Estimation period 74S1 - 87S1

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

USA PRIME RATE



Interest Rates

JARI JAPAN CENTRAL GOVERNMENT BOND YIELD, %

JARI =

$$.3069 * \text{JASRI} - .35288 * \text{JASRI}_{-1} + 1.03188 * \text{JARI}_{-1}$$

(3.05) (3.18) (8.06)

$$R^2 = .917$$

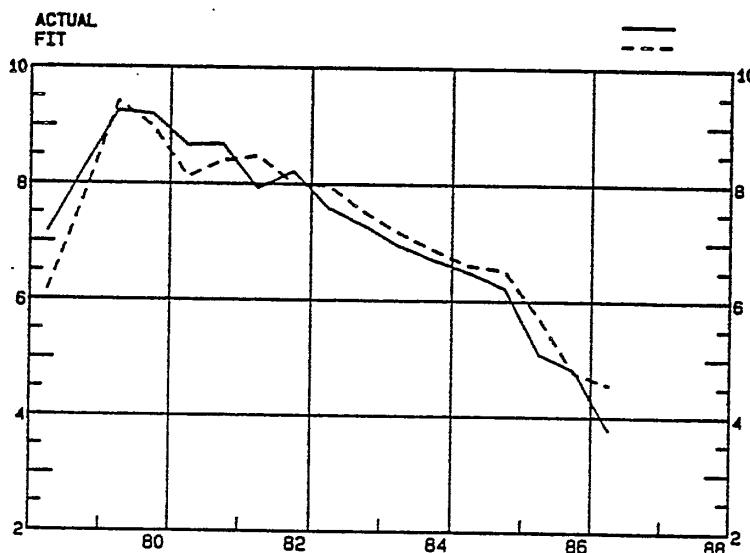
$$\text{SEE} = .452$$

$$\text{DW} = 1.592$$

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 =

$$.49704 \text{ GESRI} - .29700 \text{ GESRI}_{-1} + .68209 \text{ GERI}_{-1} + 1.23020$$

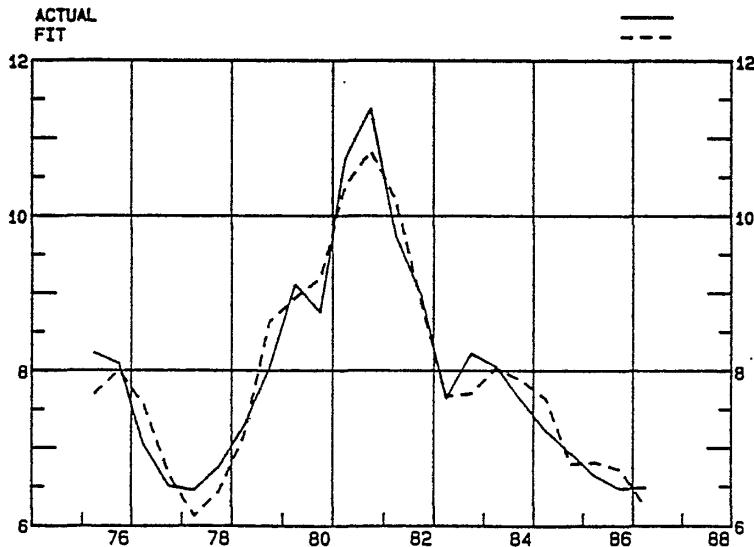
(7.74) (3.05) (5.33) (1.74)

$$\begin{aligned}
 R^2 &= .935 \\
 \text{SEE} &= .377 \\
 \text{DW} &= 2.142
 \end{aligned}$$

Estimation period 76S1 - 87S1

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

P² = 735

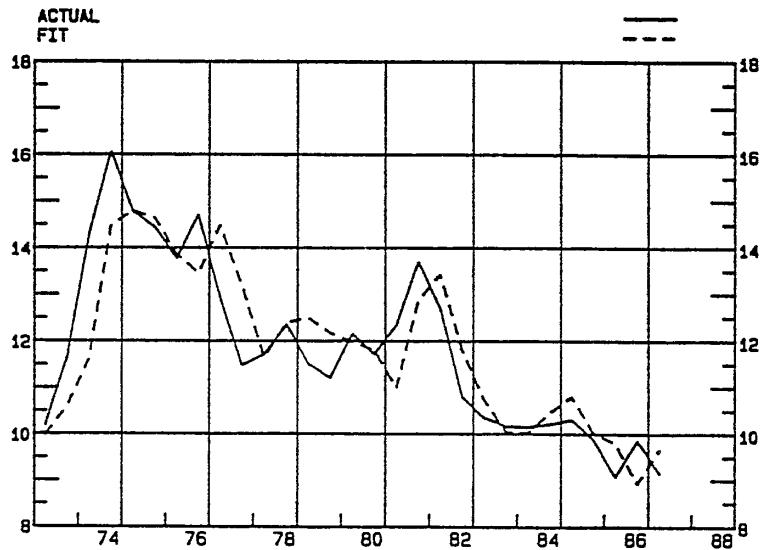
S.E.F. = 1.004

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 DEFULATOR
USPQ USA, GDP DEFULATOR
E100 EURODOLLAR, 3 MONTH RATE

UNITED KINGDOM YIELD OF LONG-TERM GOVT BONDS



Some Price Equations

F161 OECD CONSUMER PRICES, IND. 1980=100

 $\Delta \log F161 =$

$$1.15118 * \Delta \log OEPDDI$$

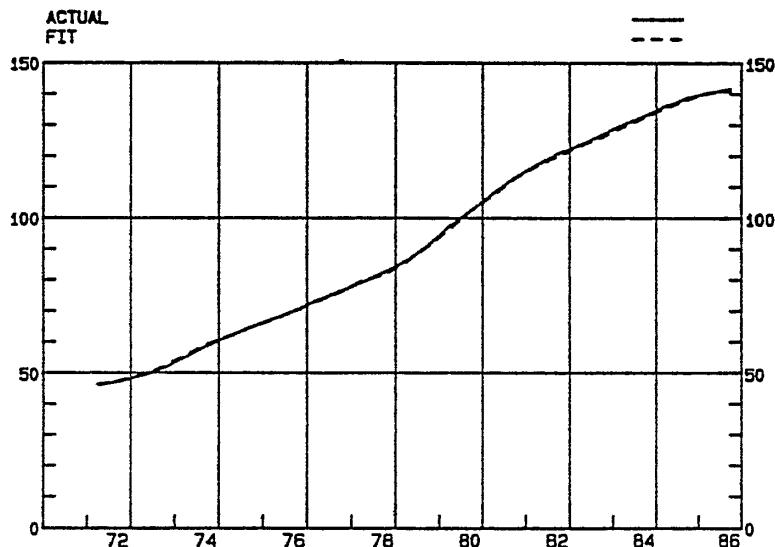
(34.41)

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

Estimation period 72S1 - 86S2

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

OECD CONSUMER PRICES, INDEX 1980=100



Some Price Equations

F163 OECD EUROPE, CONSUMER PRICES, 1980=100

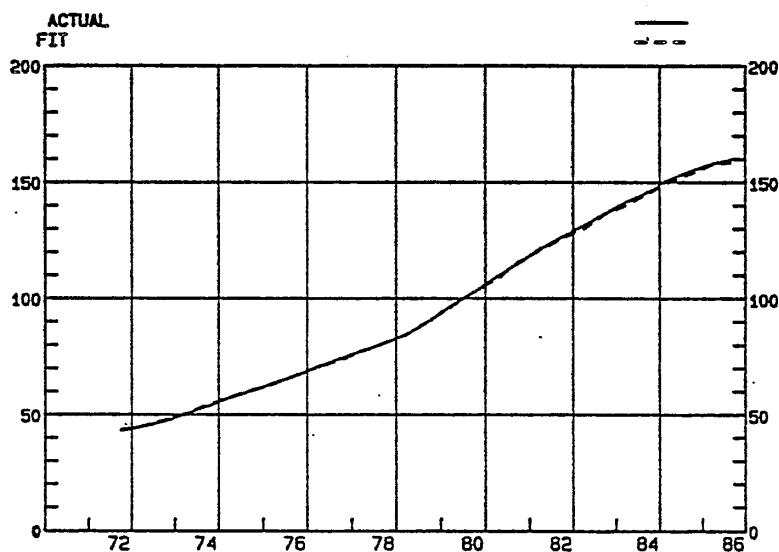
 $\Delta \log F163 =$ 1.22975 $\Delta \log EUPDDI$
(33.98)

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

OECD-EUROPE CONSUMER PRICES, INDEX 1980=100



Some Price Equations

PPFC PRODUCER PRICE FOR MANUFACTURING IN FINNISH EXPORT MARKETS

$\Delta \log PPFC =$

$$.74172 \Delta \log SUP*FIM + .01031$$

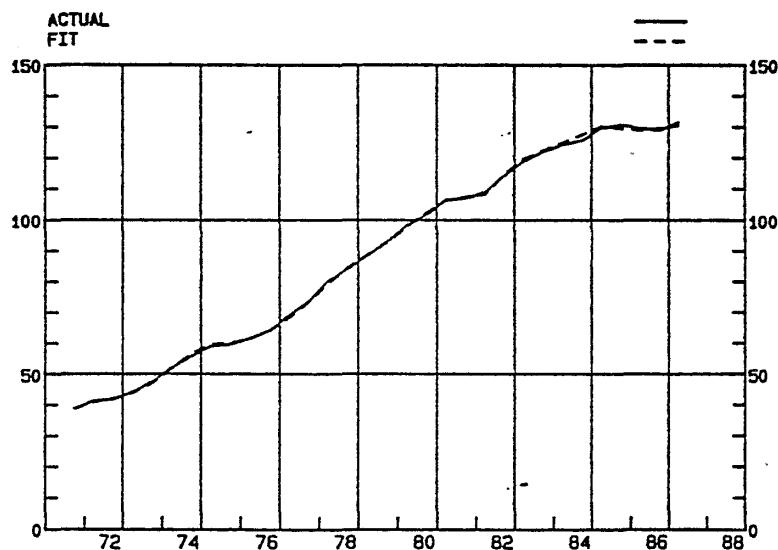
(17.34) (4.67)

$R^2 = .909$
 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 • OPMMDOL + .1885 • DCMDOL	1.1112

JAXDM =

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

GEXDM =

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

FRXDM =

.0219 • USMDOL + .0092 • JAMDOL +	
.1072 • GEMDOL + .0755 • UKMDOL +	
.0432 • SWMDOL + .0305 • FIMDOL +	
.0834 • OOMDOL + .0698 • COMDOL +	
.0761 • OPMMDOL + .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 CHANGE IN TOTAL IMPORTS OF
JAMAD USA, JAPAN, GERMANY, FRANCE, UNITED KINGDOM,
GEMAD SWEDEN, OTHER OECD COUNTRIES, OPEC COUNTRIES AND
FRMAD DEVELOPING COUNTRIES RESPECTIVELY,
UKMAD %-CHANGES
SWMAD
OOMAD
OPMAD
DCMAD

 IMPORT PRICES

$\Delta \log USPM =$

$$\begin{aligned} .1303 \cdot \Delta \log JAPXDOL + .0489 \cdot \Delta \log GEPXDOL + \\ .0218 \cdot \Delta \log FRPXDOL + .0403 \cdot \Delta \log UKPCDOL + \\ .0067 \cdot \Delta \log SWPXDOL + .0019 \cdot \Delta \log FIPXDOL + \\ .2525 \cdot \Delta \log OOPX + .2152 \cdot \Delta \log OPPX + \\ .2827 \cdot \Delta \log DCPX \end{aligned}$$

$\Delta \log JAPMDOL =$

$$\begin{aligned} .1738 \cdot \Delta \log USPX + .0177 \cdot \Delta \log GEPXDOL + \\ .0092 \cdot \Delta \log FRPXDOL + .0138 \cdot \Delta \log SWPXDOL + \\ .0008 \cdot \Delta \log FIPXDOL + .1188 \cdot \Delta \log OOPX + \\ .4180 \cdot \Delta \log OPPX + .2451 \cdot \Delta \log DCPX \end{aligned}$$

$\Delta \log GEPMMDOL =$

$$\begin{aligned} .0754 \cdot \Delta \log USPX + .0305 \cdot \Delta \log JAPXDOL + \\ .1072 \cdot \Delta \log FRPXDOL + .0669 \cdot \Delta \log UKPXDOL + \\ .0211 \cdot \Delta \log SWPXDOL + .0087 \cdot \Delta \log FIPXDOL + \\ .4177 \cdot \Delta \log OOPX + .1156 \cdot \Delta \log OPPX + \\ .1477 \cdot \Delta \log DCPX \end{aligned}$$

$\Delta \log FRPMMDOL =$

$$\begin{aligned} .0795 \cdot \Delta \log USPX + .0205 \cdot \Delta \log JAPXDOL + \\ .1619 \cdot \Delta \log GEPXDOL + .0540 \cdot \Delta \log UKPXDOL + \\ .0153 \cdot \Delta \log SWPXDOL + .0053 \cdot \Delta \log FIPXDOL + \\ .3315 \cdot \Delta \log OOPX + .1947 \cdot \Delta \log OPPX + \\ .1273 \cdot \Delta \log DCPX \end{aligned}$$

$\Delta \log UKPMMDOL =$

$$\begin{aligned} .1176 \cdot \Delta \log USPX + .0331 \cdot \Delta \log JAPXDOL + \\ .1103 \cdot \Delta \log GEPXDOL + .0775 \cdot \Delta \log FRPXDOL + \\ .0286 \cdot \Delta \log SWPXDOL + .0153 \cdot \Delta \log FIPCDOL + \\ .3746 \cdot \Delta \log OOPX + .0910 \cdot \Delta \log OPPX + \\ .1540 \cdot \Delta \log DCPX \end{aligned}$$

$\Delta \log SWPMDOL =$

$$\begin{aligned} .0729 \cdot \Delta \log USPX + .0285 \cdot \Delta \log JAPXDOL + \\ .1675 \cdot \Delta \log GEPXDOL + .0432 \cdot \Delta \log FRPXDOL + \\ .1184 \cdot \Delta \log UKPXDOL + .0682 \cdot \Delta \log FIPXDOL + \\ .2781 \cdot \Delta \log OOPX + .1246 \cdot \Delta \log OPPX + \\ .0985 \cdot \Delta \log DCPX \end{aligned}$$

IMPORT PRICES

$\Delta \log FIPMDOL =$

$$\begin{aligned} & .0581 \cdot \Delta \log USPX + .0325 \cdot \Delta \log JADXDOL + \\ & .1264 \cdot \Delta \log GEPXDOL + .0305 \cdot \Delta \log FRPXDOL + \\ & .0860 \cdot \Delta \log UKPXDOL + .1207 \cdot \Delta \log SWPXDOL + \\ & .1660 \cdot \Delta \log OOPX + .1619 \cdot \Delta \log OPPX + \\ & .2179 \cdot \Delta \log DCPX \end{aligned}$$

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 GDP DEFATORS OF USA, JAPAN, GERMANY, FRANCE,
 JAPQ UK, SWEDEN AND FINLAND RESPECTIVELY

GEPQ

FRPQ

UKPQ

SWPQ

FIPQ

- . PDDI = DOMESTIC DEMAND DEFULATOR
 - . 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 =

$$\begin{aligned} &.458 * USQAD + .214 * JAQAD + .139 * GEQAD + \\ &.102 * FRQAD + .068 * UKQAD + .019 * SWQAD \end{aligned}$$

EUQAD =

$$\begin{aligned} &.424 * GEQAD + .311 * FRQAD + .207 * UKQAD + \\ &.058 * SWQAD \end{aligned}$$

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	GEO	FRO	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	GEPIXDOL	FRPXDOL	UKPXDOL	SWPXDOL	FIPXDOL
competitors' export prices	USWPX	JAPX	GEWPX	FRWPX	UKWPX	SWWPX	FIPWPX
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	UKTDA	SWTDA	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. IMPO- RANT TO FINNISH EXPORTS	OTHER OECD	OECD	OPEC	LDC	REST OF THE WORLD
GDP								
vol., %-change at annual rate deflator, %-change at ann. rate	OEQAD OEPQAD	EUQAD EUPQAD	SVQAD SVPQAD		OEQAD OEPQAD			
IMPORTS								
volume, index vol., %-change from prev. period vol., %-change at annual rate volume in 80-USD unit value in USD unit value in FIM	OEMAD	EUMAD	SVMAD SVPMDOL SVPMFIM	OOOMI OOAMD OOAMAD OOAMDOL	OEMAD	OPMI OPMD OPMAD	DCMI DCMD DCMAD	COMI COMD COMAD
EXPORTS								
volume, index vol., %-change from prev. period vol., %-change at annual rate unit value in USD unit value in FIM	OEXAD	EUXAD	SVXAD SVPXDOL SVPXFIM	OOXI OOXD OOPX	OEXAD	OPX1 OPXD OPPX	DCX1 DCXD DCPX	COXI COXD
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					OODDD			
vol., %-change from prev. period vol., %-change at annual rate deflator, %-change at ann. rate	EDDAD EPDDIAD	UDDAD UPDDIAD	SVDDAD SVPDDIAD		EDDAD EPDDIAD			
FINAL DOMESTIC DEMAND								
vol., %-change at annual rate	EFDAD	UFWDAD			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	DEM	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	USR1	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 excl. energy % change at annual rate					VINO VINOAD		
- tropical goods & beverages					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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