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LABOUR SUPPLY, WAGES AND PRICES IN THE BOF4 QUARTERLY MODEL OF THE FINNISH ECONOMY

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ABSTRACT

This paper describes the supply of labour and the determination of wages and prices in the BOF4 model.

Labour supply is modelled as a function of real wage, income and discouraged worker effects.

Wages are a function of the unemployment rate. Besides that they respond to the deviation of actual wages from equilibrium wages dictated by nominal marginal productivity. Expected inflation and taxation are entered through the separate treatment of negotiated wages. Manufacturing is assumed to be the wage leader in the economy so that developments in other sectors are affected by the wage drift in manufacturing and are tied to manufacturing wages also in the long-run.

In sectors open to foreign competition the prices of the products as well as the marginal costs are taken to be determined solely by competitors' prices in the long-run. In the short-run, however, Finnish firms are assumed to possess certain monopoly power over their prices. Pricing in the closed sectors is supposed to be more monopolistic, so that prices are based only on domestic costs including the prices of imported inputs. The cost structure of the different sectors as well as prices of the final demand components are evaluated by the help of input-output tables.

CONTENTS

1 INTRODUCTION

The BOF4 model of the Finnish economy is a quarterly econometric model developed at the Bank of Finland for forecasting and policy analysis.[1] The present paper appears as the third issue in a series intended to cover all sectors of the present version of BOF4.[2] Throughout the text, reference is made to the list of equations of the model. The latest complete list has been published in BOF4 (1987), but the relevant labour force, wage and price equations are included in the present report as appendix 1.

This chapter turns to the "behavioural" aspects of supply side modelling. The exposition follows the approximate order of causation in the model structure. First the labour supply is described as one of the determinants of the labour market situation. This is an important factor in the determination of wages and prices, along with productivity import prices, and competitors' prices in the export markets. These determine wages and domestic prices in three phases.

First, wages are determined on the basis of the labour market situation, productivity, relative prices and inflation expectations. The wages block of the model resembles the Scandinavian inflation model in that the open sector (manufacturing) is the wage leader, and that income distribution (sometimes called the real wage gap)

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[1]The earlier version of the model, BOF3, is documented in Tarkka and Willman (1985).

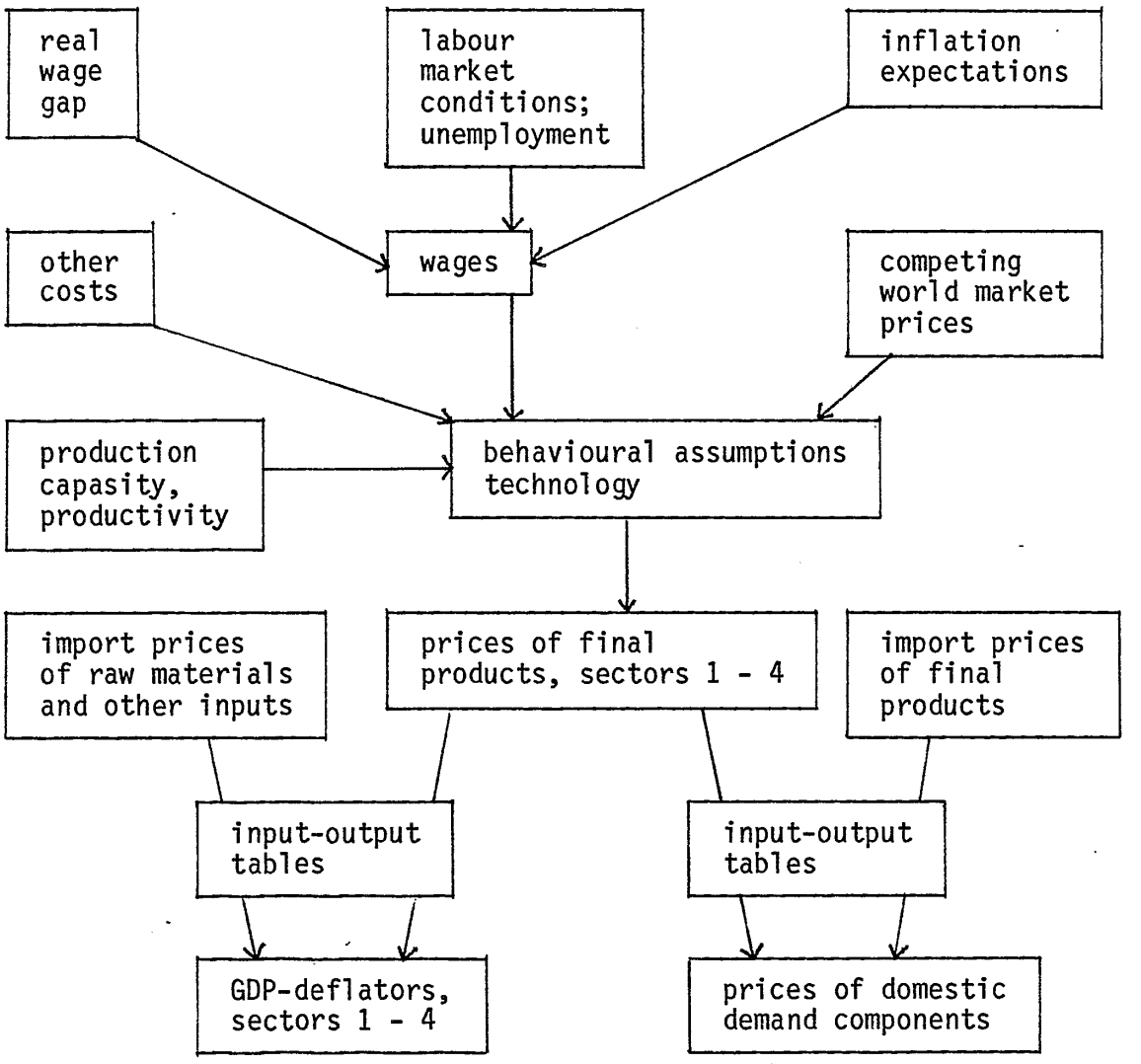
[2]The earlier reports are:
1) Tarkka & Willman (1988): Exports and Imports in the BOF4 Quarterly Model of the Finnish Economy, Bank of Finland Discussion Papers 3/88.
2) Tarkka, Willman and Rasi (1988): Production and Employment in the BOF4 Quarterly Model of the Finnish Economy, Bank of Finland Discussion Papers 14/88.

influences wages also directly, not only through the unemployment rate as in the basic Phillips curve model.

In the second phase, prices of final output of the different production sectors are determined on the basis of marginal costs of production and the prices prevailing on foreign markets. In this phase the technology assumptions of the model play a key role.

In the third phase of the price determination, the model uses input-output coefficients to solve for sectoral value added deflators and the deflators of the different demand components. These are based on the prices of output of the different sectors. Most of the impact of indirect taxes on prices occurs in this phase, although some price effects of commodity taxes and subsidies are imputed in the previous phase of price determination, too.

FIGURE 1. The structure of the wage-price block



2 LABOUR SUPPLY

The labour force equation in BOF4 explains the changes in the participation rate. The participation equation has not changed much from the BOF3 version of the model (see Tarkka & Willman, 1985 pp. 205 - 212). The equation is based on the idea that consumption of goods and leisure[1] are substitutes in households' utility functions.[2] Thus, the after-tax real wage rate, which is the relative price of leisure, is one of the main determinants of the labour force participation decision.

Another relevant factor is the overall level of consumption and ultimately real income: if leisure is a normal good, labour supply is negatively affected by an increase in consumption. Conversely, if leisure is an inferior good, then an increase in consumption should, ceteris paribus, increase the labour supply.

A third factor is the "discouraged worker effect" which is caused by the fixed costs of entering the labour force such as costs of searching a job, getting a suitable training and making other necessary arrangements. In the presence of such costs, the demand for labour has a positive effect on the supply of labour, since the higher is the probability of actually getting a job after the participation decision has been made, the less do the mentioned fixed costs hinder labour force participation (see Abbot & Ashenfelter (1976) and Eaton & Quandt (1983)).

In addition to these arguments, a trend is included in the determinants of labour supply equation captured by the constant term

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[1]Actually the substitution is between consumption of goods on the other hand and leisure combined with homework on the other when the participation decision is made.

[2]See e.g. Deaton and Muellbauer (1980) ch. 4 and 11 for a review of the microeconomics of labour supply equations.

in the estimated difference form. This measures the secular effects of increased education, better pensions and other institutional factors.

According to the estimated equation (see L.13 in appendix 1), leisure is a indeed normal good, so that a general rise in real incomes and consumption will decrease labour supply albeit the elasticity with respect to consumption is very small. The compensated real wage elasticity of labour supply (holding real consumption constant) is positive but even smaller in absolute terms, so that if the rise in real incomes happens as a result of an increase in after-tax wages, the total effect of an increase in real wages on labour supply is a small negative figure, as shown in the following table of labour supply elasticities:

Table 1. Elasticities of the supply of labour (labour force)

variable	elasticity
working-age population	0.382
employment	0.648
consumption	-0.030
real wage rate (the substitution effect)	0.005
real wage rate (the income and substitution effect)	-0.005

The total real wage effect, i.e. the uncompensated real wage elasticity is computed from the 1985 share of net wage income in households' disposable income and assuming that the marginal elasticity of consumption with respect to real disposable income is unity. It is seen that the labour supply curve, if drawn on the basis of these estimates, is slightly backward-bending.

The properties of the equation are such that if working-age population is increased while holding per capita consumption and the unemployment rate constant, then the elasticity of labour supply

with respect to working-age population is unity and the participation rate also stays constant.

It must be pointed out that because labour supply is estimated in the form of the participation rate, it does not measure that part of changes in the supply of labour which is due to movements from full-time work to part-time work and vice versa.

From the point of view of the full macroeconomics model, the significance of the labour force participation equation is that it constitutes one of the determinants of the unemployment rate. Unemployment rate in turn affects wage rates through the wage equations. As aggregate demand is price elastic in the model, the labour force participation equation is thus an important link in the neoclassical adjustment mechanisms which work to balance the goods and labour markets in the long run.

3 WAGES

3.1 Union Behaviour, Negotiated Wage Rates and Expected Inflation

Finnish labour markets are characterized by a high degree of unionization and, also, a high degree of synchronization in making the economy-wide wage contracts which result from collective bargaining between labour unions and organizations of employers. The unionization rate in Finland was 86 per cent in 1985.

The equation for the negotiated wage rate (in fact for the private sector), shown as W.6 in appendix 1, is based on the idea that trade unions are concerned with real disposable (after tax) wages even if bargaining in practice is over nominal wages. The estimated function is of the form

$$(1) \qquad \hat{wn} = (1-\lambda)a + \lambda\hat{wn}_{-1} + (1-\lambda)c\ \pi^{e} + b[\log(1-\hat{tax}) - \lambda\log(1-\hat{tax}_{-1})]$$

where wn is the log of negotiated wages, π^{e} is the expected increase of consumer prices over four quarters (inflogs) and tax is the average personal tax rate. $\hat{}$ over a variable refers to differences over four guarters. The steady state equilibrium implied by (') is

$$(2) \qquad \hat{wn} = a + c\pi^{e} + b\log(1-\hat{tax})$$

In the long-run the price expectations are not completely passed on into negotiated wages the parameter c being 0.67 (calculated from equation W.6). If parameter c were restricted to unity it would imply that price increases were overcompensated in the final behavioral wage equation (see equation W.4 in appendix 1). Because this was not desirable the parameter of the expected inflation was freely estimated as in equation W.6.

Expected inflation (see eq. W.7) is operationalized not only by recent price increases and the constant term, but also a relative price variable, measuring deviations from purchasing power parity between domestic and foreign currencies. This is reasonable since the policy of a pegged exchange rate creates a tendency of the domestic price level to converge over time towards a level dictated by the "law of one price", at least in tradeable goods. If, for example, there is a sudden change in foreign prices domestic prices are also expected to rise. This effect works directly trough the relative price variable in W.7 as well through lagged changes in PCP and P4.

Inflation expectations affect wage behaviour only through their effect on negotiated wages which are left permanently on a higher level after a temporary rise in expected inflation. In the very long-run the effect on actual wages through negotiated wages fades out altogether via the equilibrating mechanism of the wage drift. This can be seen from tables 2 and 3a - 3c. Increasing the average personal tax rate by one percentage point raises negotiated wages immediately by 1.1 per cent and is passed on into actual wages as governed by the specifications of the equations (see the next paragraph and tables 3a - 3c).

Negotiated wages influence the rest of the model only through their influence on actual wages. For forecasting purposes the negotiated wage rate can be exogenised for the near future when the outcome of the wage bargaining is known. In the long-run "market forces" dominate also centralized wage settlements as part of the process of determining actually paid wages.

Table 2. Elasticities of actual wages with respect to negotiated wages in the BOF4 model

	immediate elasticity	one-year elasticity	five-year elasticity	ten-year elasticity
agriculture	1	0.91	0.34	0.08
priv. services etc.	1	1.98	0.42	0.10
forestry	1	0.93	0.36	0.09
manufacturing	1	0.91	0.35	0.08
government	1	1.00	0.71	0.34
wage rate, total	1	0.96	0.46	0.15

3.2 Actual Wage Rates

Actually applied wage rates are not completely dictated by collective agreements. A so-called "wage drift" exists between the negotiated wage rate increases and those actually recorded in different industries. In the BOF4 model, the actual wage rates depend on the negotiated wage rates, on the one hand, and on other "economic factors", on the other. The changes in the wages block of the model since the BOF3 version raported in Tarkka & Willman (1985) are not very great.

The economic aspects of wage determination are mainly included in the wage equation for manufacturing. Other sectors are assumed to be "wage followers" adjusting rather passively to the development of wages in the manufacturing sector. This is in accordance with the so-called scandinavian model of inflation (see e.g. Edgren, Faxen & Odhner, 1969). The equality - or proportionality - of wages in the long run would follow by necessity if labour were homogenous and perfectly mobile.

The most important wage equation of the model, that for manufacturing wages, is shown as W.4 in the list. The equation was first estimated with private sector negotiated wages as an unrestricted explanatory variable allowing the coefficient of negotiated wages to change in 1975, because of a definitional change

in statistics. This gave a parameter close to 1 to negotiated wages in the latter period. After this the equation was estimated in the restricted form so that an increase in negotiated wages is fully passed on into actual wages.

The second explanator is the rate of unemployment. This Phillips curve effect is not very strong in the model and it is also rather slow due to the fact that the rate of unemployment affects the wage drift only after a one-year lag. For example, an increase in the rate of unemployment from 5 to 6 per cent would deccelerate the annual increase of wages by about one half percentage point. This effect would be somewhat stronger on lower levels of unemployment. The effect is also strenghtened by the wage/price linkages of the full BOF4 model as lower wages work through the price mechanism which again feed back on wages etc.

Perhaps the most unconventional part of the specification is the direct effect of "equilibrium wages" on actually paid wages. The deviation of equilibrium wages from actual wages measures the excess demand for labour. Equilibrium wages are operationalized by the nominal marginal product of labour in manufacturing, which in turn depends on the physical marginal product of labour and on the value added deflator. The effect of equilibrium wages is entered through two terms in the equation: the log-change of the value added deflator less indirect labour costs, and an error correction term measuring the "real wage gap", that is the lagged deviation of actually paid wages and indirect labour costs from the marginal productivity of labour.

The presence of marginal productivity in the wage equation might be given an expectations-based interpretation. However, we prefer to think that inflation expectations enter mainly through the negotiated wage rate and that the convergence of wages towards equilibrium wages operationalized by the marginal product of labour are an indication of the influence of excess demand for labour on the price of labour. As argued by Dreze (1987), wage equations should take into account the simultaneous existence of unemployment

and excess demand for labour. It should be noted, moreover, that the marginal productivity hypothesis is the mechanism of wage determination in manufacturing also according to the Scandinavian model of inflation.

The coefficient of the "real wage gap" is 0.058 implying that about 25 per cent of the "real wage gap" tends to be eliminated through wage adjustments within one year. In addition to these variables some seasonal dummies and a dummy measuring a change in the size of the constant term were included in the manufacturing wage equation.

In the equations determining wages in other sectors (see equations W.1, W.2, W.3 and W.5) the private sector negotiated wage rate enters with coefficient one just as in manufacturing. The wage drift in manufacturing drives up wages in other sectors the effect being strongest in agriculture but not identifiable in private services. There both the two-period lag of the level and of the change of unemployment showed up as significant explanators. In the government sector the wage drift variable is lagged by four periods which possibly reflects the fact that public sector wages are often adjusted to observed wage drift in manufacturing after a delay. An error correction mechanism constrains the long-run elasticities of the wages of the other sectors with respect to manufacturing to unity. This adjustment process is slowest in the government sector. The relations between the variables in the wage block can be summarized in tables 3a - 3c.

Tables 3a - 3c. Partial elasticities of the wage block with respect to the main explanatory variables
Inflation expectations are exogenous in columns 1 - 6.

explanatory variable / endogenous variable	1 unemployment UR	2 real wage gap GDP4	3 employers social sec. contrib. rate SOCCR4	4 average personal tax rate ATAX	5 inflation expectations[1] INF	6 prices PGDP4	7 prices when inflation expectations are endogenous PGDP4, PCP
3a. one-year elasticity							
negotiated wages	0.00	0.00	0.00	1.13	0.56	0.00	0.47
agriculture	0.00	0.10	-0.23	1.02	0.52	0.27	0.70
priv. services etc.	-0.82	0.02	-0.08	1.10	0.55	0.10	0.56
forestry	0.00	0.08	-0.19	1.04	0.53	0.23	0.67
manufacturing	0.00	0.10	-0.21	1.03	0.52	0.26	0.69
government	-0.74	0.00	-0.01	1.12	0.56	0.01	0.48
wage rate, total	-0.54	0.04	-0.11	1.08	0.54	0.13	0.59
3b. five-year elasticity							
negotiated wages	0.00	0.00	0.00	1.09	0.67	0.00	0.56
agriculture	-2.18	0.76	-0.58	0.36	0.24	0.73	0.93
priv. services etc.	-2.43	0.66	-0.53	0.45	0.30	0.66	0.90
forestry	-2.14	0.73	-0.57	0.38	0.25	0.71	0.92
manufacturing	-2.14	0.74	-0.57	0.37	0.25	0.72	0.92
government	-2.98	0.33	-0.29	0.76	0.48	0.35	0.76
wage rate, total	-2.46	0.61	-0.49	0.50	0.32	0.61	0.88
3c. ten-year elasticity							
negotiated wages	0.00	0.00	0.00	1.10	0.67	0.00	0.56
agriculture	-2.80	1.05	-0.75	0.10	0.05	0.94	0.98
priv. services etc.	-3.17	1.03	-0.74	0.12	0.07	0.92	0.98
forestry	-2.79	1.05	-0.75	0.11	0.06	0.93	0.98
manufacturing	-2.79	1.05	-0.75	0.10	0.06	0.93	0.98
government	-4.80	0.75	-0.56	0.38	0.23	0.69	0.89
wage rate, total	-3.45	0.97	-0.70	0.18	0.11	0.87	0.96

[1]Inflation expectations increased by one per cent during the first year.

4 PRICES

4.1 Marginal Costs and the Pricing of Output

Of the five sectors included in the BOF4 model, four produce goods which are sold in the market. Actually, manufactured goods are sold in three different markets, i.e. domestically, as western exports and as eastern (bilateral) exports. Government sector produces public goods for which no market prices exist. (There is, however, a definitional unity between the government sector value added deflator and the producer price of the government sector output.)

Theoretical foundations of the estimated pricing equations of the model are based on the solution of the following profit maximization problem of the firm:

$$(1) \qquad \max_{Y} \sum_{t=0}^{\infty} \emptyset^t \cdot PROFIT_t$$

$$PROFIT = P \cdot Y - w \cdot L - P^m \cdot M - P^k \cdot K$$

s.t.

$$Y = (P^c/P)^{\alpha} \cdot D \cdot (Y_{-1}/D_{-1})^{\mu} \qquad \text{(firm-level demand for output)}$$

$$L = CES^{-1}[(1-a) \cdot Y, K, TIME] \qquad \text{(inverted CES-production function)}$$

$$M = a^*Y \qquad \text{(demand for material imputs)}$$

where Y is output, P is the price of output, w is the nominal wage rate, L is the required labour input, P^m is the price and M the volume of material inputs, P^k is the implicit rent of capital, K the stock of capital, P^c is the price of competing products, D is the demand shift variable, $\emptyset$ is a discount factor, α governs the price

elasticity of demand and μ is used to specify the dynamics of the firm-level demand function. Variables w, P^m, P^k and K are here treated as predetermined.

The specification of dynamics in the demand function is quite general. With the parameter value $\mu = 0$ it collapses to the conventional static demand function $Y = (P^c/P)^{\alpha}D$ and with $\mu = 1$ to the function of infinite long-run price elasticity à la Phelps & Winter (1970)

$$(2) \qquad Y/Y_{-1} = (P^c/P)^{\alpha}(D/D_{-1}).$$

In this latter case firms possess monopoly power over their products only in the short-run. If they permanently keep the price level of their products above that of their competitors, they will lose all of their customers.

Maximization of profits implies the following first order condition for any period t (The Euler equation):

$$(3) \qquad [1-1/\alpha]P_t - SMC_t = -(\phi\mu/\alpha)(P_{t+1}Y_{t+1}/Y_t)$$

where

$$SMC = a \cdot P^m + (1-a)w \cdot (MPL) \qquad \text{(short-run marginal costs of production)}$$

MPL is marginal product of labour $\delta L/\delta Y$. One can easily see that in the case of a static demand curve ($\mu = 0$) the right hand term in equation (3) equals zero implying the following conventional mark-up price equation:

$$(4) \qquad P_t = [\alpha/(\alpha-1)]*SMC_t$$

Estimated equations in the closed sectors 1 and 2 of the model are based on relation (4) interpreted, however, as a definition of only the long-run dependence of prices on marginal costs.

In the open sectors of the economy, however, the firms are assumed to possess monopoly power only in the short run, i.e. $\mu = 1$ and, hence, the demand function (2) is faced by the firms. In this case the equilibrium price relation is determined by the transversality condition,[1] corresponding to equation (3):

$$(5) \qquad \lim_{T\to\infty} \phi^T[P_T(1-1/\alpha) - SMC_T + (\phi/\alpha)P_T] = 0$$

Equations (2) and (5) imply the following long-run relationships between prices, marginal costs and competing foreign prices

$$(6a) \qquad P = [\alpha/(\phi-1+\alpha)]*SMC$$

$$(6b) \qquad P = P^C$$

The mark-up factor in (6a) is the closer to unity the smaller is the rate of time preference (i.e. the closer to 1 is ϕ).

What equations (6a) and (6b) actually state is that it is the price of the competing products, which in the long run determines the development of the price of output as well as the development of the marginal cost variable SMC. This is an argument, which entitles us to use the price of competing foreign products as an explanatory variable, along with the variable SMC, in the price equations of the open sectors and exports to the western markets. The derivation of the excact form of the estimated export price equations is presented in Tarkka and Willman (1988) p. 8 - 9.

Estimated behavioral equations for the prices of gross outputs in sectors 1 - 3 and for the prices of manufactured goods sold in the domestic market and in the western export market, respectively, are

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[1]The transversality condition of the infinite horizon problem is obtained as a limit of the Euler equation solved for the last period T of the corresponding finite horizon problem, when T approaches infinity. (See Sargent (1979) p. 195 - 197.)

presented by equations P.1, P.4, P.7, P.10 and X.5. The corresponding marginal cost variables, the SMC:s are given in equations P.2, P.5, P.8, P.11 and X.6. They are based on the sectoral production functions presented in Tarkka, Willman and Rasi ((1988), p. 11) The marginal cost variables include also indirect taxes contained in production of goods (see definitional equations P.3, P.6, P.9 and P.13).

Table 4. Partial elasticities of output prices with respect to short-run marginal costs of production

Prices in	immediate elasticity	one-year elasticity	long-run elasticity
Agriculture	0.04	0.49	0.97
Priv. services etc.	0.29	0.65	0.99
Forestry	0.12[1]	0.10	0.00
Manufactured goods sold in domestic market	0.24	0.43	1.00
Exports to the western market	0.29	0.49	1.00

[1]The effect with the lag of one quarter.

Partial, single equation simulations in table 4 show that, in the long-run, an increase in the short-run marginal costs raises the corresponding prices approximately proportionately in all sectors except forestry. There the marginal costs have an direct effect on prices only in the short-run. As can be seen from table 5 only in forestry the link from competing foreign prices to the equilibrium output price works directly through the price equation. The long-run elasticity of prices in forestry with respect to world-market prices of wood products is unity even if marginal costs were treated as exogenous.

Table 5. Partial elasticities of output prices and with respect to foreign competitors' price

Prices in	immediate elasticity	one-year elasticity	long-run elasticity
Agriculture	-	-	-
Priv. services etc.	-	-	-
Forestry	0.13	0.31	1.00
Manufactured goods sold in domestic market	0.18[1]	0.10	0.00
Exports to the western market	0.60	0.39	0.00

[1]The effect with the lag of one period.

Due to the exogeneity of marginal costs the partial long-run elasticities in table 5 do not give the full picture of the dependencies of the model. Simulated with the whole model an increase of one per cent in competitors' prices is passed on into the prices and marginal costs of exports and domestically sold manufactured goods within 5 - 6 years. In forestry there is an overshooting of marginal costs but in the very long-run the parity of eq. (6) is approached. (See figures 2 and 3).

In the long-run the prices in the open sector depend only on the competing foreign prices. (See also figure 2). This implies a horizontal demand curve in the long-run. This is in accordance with the infinite price elasticity of the multilateral exports equation given in Tarkka and Willman (1988) table 2.

Equation P.12 determines the aggregate price index of output in manufacturing. It is solved from the identity (expressed at current prices) defining that the output in manufacturing equals the sum of exports and domestic absorbtion of domestically produced manufactured goods.

The prices of bilateral exports are determined by equation X.4. It is based on the assumption that bilateral trade contracts are concluded at the same price at which industrial products are sold in the domestic market. A geometric lag from the domestic manufacturing

FIGURE 2 Dynamic elasticities of prices of manufactured goods with respect to one percent increase in competitors' prices.

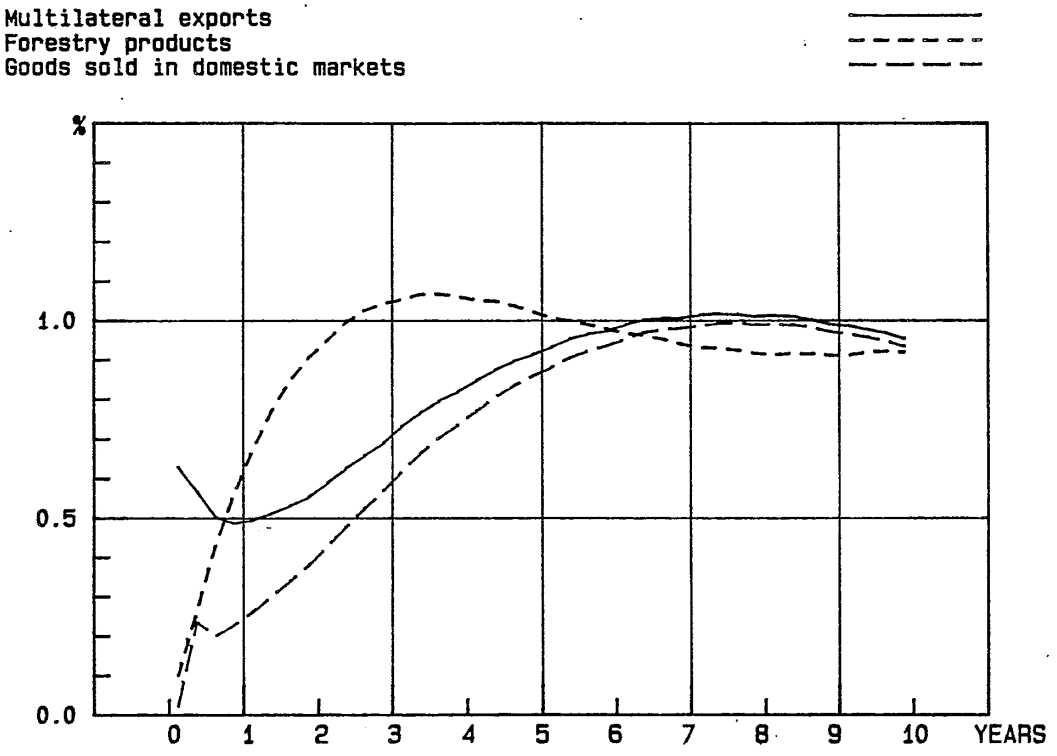
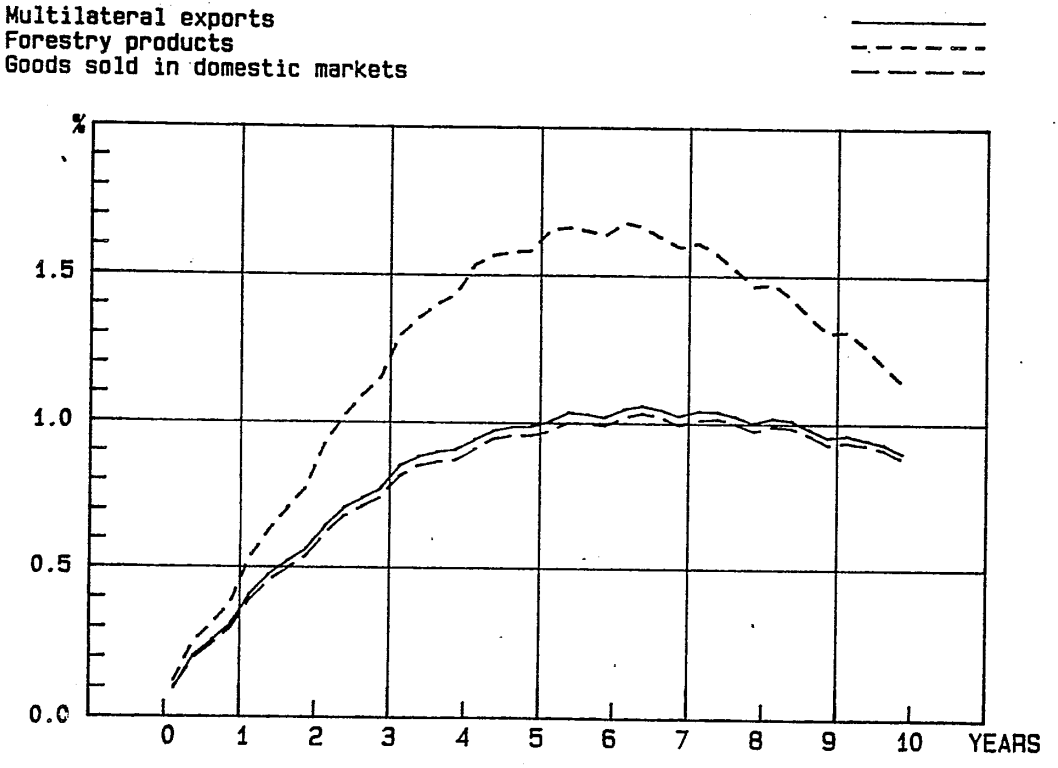


FIGURE 3 Dynamic elasticities of short-run marginal costs of manufactured goods with respect to one per cent increase in competitors' prices.



price to the price of bilateral exports measures the time span between contracts and deliveries. As export contracts are usually made in clearing rubles, changes in the FIM rate of the rouble during the lag has also been taken into account.

4.2 Value Added Deflators

The GDP deflators for the four private sectors of the model is obtained in two stages. In the first stage input-output estimates for the GDP deflators are solved from the sectoral cost functions (see equation 11 in Tarkka, Willman and Rasi (1988)). These estimates are determined by equations P.14 - P.17. In the second stage identifies between the GDP deflators and corresponding input-output deflators are used (see equations P.23 - P.26).

In the government service sector the GDP deflator is determined as a mark-up over labour costs and indirect taxes (see equation P.27).

4.3 Deflators of Demand Components

Besides exports and inventories, the demand in BOF4-model is disaggregated into twelve sub-components for which also price equations are needed. The similar two-stage approach as in the case of the GDP deflator was used. At the first stage input-output estimates are obtained as weighted averages of the prices of sectoral outputs and import prices (these are equations P.18 - P.22 in the list). At the second stage actual prices are explaned by corresponding input-output price estimates and effective indirect tax rates. For example the price of durables in private consumption is given as the result of two equations:

(P.18) $\log PCDIO = .3183 \cdot \log P2 + .4007 \cdot \log PD4 + .2810 \cdot \log PMC$

and

(P.31) $\Delta \log PCD = \Delta \log (1 + TIRCD) + \Delta \log PCDIO$

In the list of equations the prices of demand components and effective indirect tax rates are determined by equations P.29 - P.50. Price indexes of aggregate demand components and the price of GDP deflator at factor cost are solved from identities P.51 - P.56.

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APPENDIX 1

LIST OF EQUATIONS

List of equations connected to the present report of the BOF4 quarterly model of the Finnish economy, July 1988 version. Sections W and P, and parts of sections X and L. The whole X-section is published in Tarkka & Willman (1988) and the whole L-section in Tarkka, Willman & Rasi (1988).

Notation used:

Values of parameter estimates are ordinary least squares estimates.

Standard errors of parameter estimates are in parentheses below the coefficients.

When standard error is not shown, the parameter in question is fixed a priori e.g. on the basis of input-output studies.

Weights of Almon lags are denoted by a_i, b_i, etc.

Variables with a subscript are lagged. Subscripts refer to number of lags in quarters.

Δ	is the difference operator.
Δ^n	denotes difference over n quarters.
log	denotes natural logarithms.

Units:
Values are in millions of FIM.
Volumes are in millions of FIM at 1985 prices.
Price indices take the value 100 in 1985.
Interest rates are in per cent.
Energy is in 1000 toe.
Labour force figures are in 1000 persons.

$\bar{R}^2$	= corrected coefficient of determination
DW	= Durbin - Watson statistic
SE	= standard error of estimate
rho	= coefficient of first-order autocorrelation correction

The estimation period is given after the summary statistics

WNRP	Negotiated wage rate, private sector, 1985 = 100
WR1	Wage rate, agriculture, 1985 = 100
WR4	Wage rate, manufacturing, 1985 = 100
TREND74	Linear trend: 60.1 = 15, 60.2 = 14.75, ..., 74.4 = .25

W. PALKAT
WAGES

W.1 Ansiotasoindeksi, maatalous
Wage Rate, Agriculture

$$\Delta\log(WR1/WNRP) = \underset{(0.0033)}{-\ 0.00018} + \underset{(0.1620)}{1.05674} \cdot \Delta\log(WR4/WNRP) + \underset{(0.0391)}{0.11443} \cdot \log(WR4_{-1}/WR1_{-1}) - \underset{(0.0017)}{0.00447} \cdot TREND74$$

$\bar{R}^2 = 0.404$ DW = 2.478 SE = 0.0201 65.1 - 85.4

WNRP	Negotiated wage rate, private sector, 1985 = 100
WR2	Wage rate, services and other, 1985 = 100
WR3	Wage rate, forestry, 1985 = 100
WR4	Wage rate, manufacturing, 1985 = 100
TREND74	Linear trend: 60.1 = 15, 60.2 = 14.75, ..., 74.4 = .25
UR	Unemployment rate, per cent

W.2 Ansiotasoindeksi, palvelukset ym.
Wage Rate, Services etc.

$$\Delta\log(WR2/WNRP) = \underset{(0.0033)}{+\ 0.01289}$$
$$\underset{(0.0627)}{+\ 0.34396 \cdot \log(WR4_{-1}/WR2_{-1})}$$
$$\underset{(0.0073)}{-\ 0.01338 \cdot \Delta^2 \log UR}$$
$$\underset{(0.0028)}{-\ 0.0083 \cdot \log UR_{-2}}$$

$\bar{R}^2 = 0.264$ DW = 2.092 SE = 0.01197 65.1 - 85.4

W.3 Ansiotasoindeksi, metsätalous
Wage Rate, Forestry

$$\Delta\log(WR3/WNRP) = \underset{(0.0086)}{+\ 0.02949}$$
$$\underset{(0.3436)}{+\ 0.74445 \cdot \Delta\log(WR4/WNRP)}$$
$$\underset{(0.0961)}{+\ 0.50486 \cdot \log(WR4_{-1}/WR3_{-1})}$$
$$\underset{(0.0029)}{-\ 0.01234 \cdot TREND74}$$

$\bar{R}^2 = 0.292$ DW = 2.139 SE = 0.04262 65.1 - 85.4

GDP4	Production at factor cost, manufacturing, millions of 1985 FIM
LH4	Performed working hours, manufacturing, millions of hours
PGDP4	Value added deflator in manufacturing, 1985 = 100
SOCCR4	Employers' social security contribution rate, manufacturing
TREND	Linear trend: 60.1 = .25, 60.2 = .50 etc.
UR	Unemployment rate, per cent
WNRP	Negotiated wage rate, private sector, 1985 = 100
WR4	Wage rate, manufacturing, 1985 = 100
D75	Dummy: 60.1 - 74.4 = 1, 75.1 - = 0
DQ1	Seasonal dummy, the first quarter
DQ3	Seasonal dummy, the third quarter

W.4 Ansiotasoindeksi, teollisuus
Wage Rate, Manufacturing

$$\begin{aligned}\Delta\log(WR4/WNRP) = &- 0.24900 \\ &(0.0631) \\ &- 0.61823 \cdot D75 \cdot \Delta\log WNRP \\ &(0.0589) \\ &- 0.01019 \cdot \log UR_{-4} \\ &(0.0029) \\ &+ 0.19045 \cdot \Delta\log(PGDP4/(1 + SOCCR4)) \\ &(0.0491) \\ &+ 0.05823 \cdot var1 \\ &(0.0141) \\ &+ 0.01377 \cdot D75 \\ &(0.0029) \\ &- 0.00450 \cdot DQ1 \\ &(0.0023) \\ &- 0.00520 \cdot DQ3 \\ &(0.0023)\end{aligned}$$

jossa $var1 = \log[PGDP4_{-1}/\{WR4_{-1} \cdot (1 + SOCCR4_{-1})\}] + (1/.87496) \cdot \log(GDP4_{-1}/LH4_{-1}) - 0.004377 \cdot TREND$

$\bar{R}^2 = 0.618$ DW = 2.110 SE = 0.0085 65.1 - 85.4

UR Unemployment rate, per cent
WNRP Negotiated wage rate, private sector, 1985 = 100
WR4 Wage rate, manufacturing, 1985 = 100
WRG Wage rate, general government, 1985 = 100

W.5 Ansiotasoindeksi, julkinen toiminta
Wage Rate, Central and Local Government

$$\Delta\log(WRG/WNRP) = \underset{(0.0052)}{+\ 0.01575}$$
$$\underset{(0.0898)}{+\ 0.23479 \cdot \Delta\log(WR_{-4}/WNRP_{-4})}$$
$$\underset{(0.0169)}{+\ 0.03686 \cdot \log(WR4_{-1}/WRG_{-1})}$$
$$\underset{(0.0032)}{-\ 0.00714 \cdot \log UR}$$

$\bar{R}^2 = 0.120$ DW = 1.896 SE = 0.0112 65.1 - 85.4

ATAX	Personal tax rate, estimate
LW	Paid labour input, total, millions of 1985 FIM
P4	Prices in manufacturing, 1985 = 100
PCP	Private consumer prices, 1985 = 100
PFOR	Import prices of Finland's major export countries, FIM, 1985 = 100
WNRP	Negotiated wage rate, private sector, 1985 = 100
WR	Wage rate, total, 1985 = 100
YW	Wages and salaries, total, FIM million
INF	Expected inflation for private consumption prices one year ahead

W.6 Sopimuspalkkaindeksi
Negotiated Wage Rate

$$\Delta^4 \log WNRP = \underset{(0.0047)}{+ 0.00575} + \underset{(0.0750)}{0.41236} \cdot \Delta^4 \log(WNRP_{-1}) + \underset{(0.0642)}{0.39346} \cdot INF - \underset{(0.1463)}{0.73575} \cdot \Delta^4[\log(1-ATAX) - .41 \cdot \log(1-ATAX_{-1})]$$

$\bar{R}^2 = 0.765$ DW = 1.907 SE = 0.0134 66.1 - 85.4

W.7 Inflaatio-odotus
Expected inflation

$$INF = \underset{(0.01150)}{+ 0.00217} + \underset{(0.09116)}{0.83559} \cdot \Delta^4 \log(PCP) + \underset{(0.07353)}{0.23150} \cdot \log(PFXG/P4)$$

Regressand INF in estimation was $\log (PCP_{+4}/PCP)$

$\bar{R}^2 = 0.557$ DW = 0.3711 SE = 0.0276 69.1 - 85.4

W.8 Ansiotasoindeksi
Wage Rate, Total

$$WR = 100 \cdot YW/LW$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDP1	Production at factor cost, agriculture, millions of 1985 FIM
GDPFV	GDP at factor cost, FIM million
GDPV1	Production at factor cost, agriculture, FIM million
GDPVG	Production at factor cost, FIM million
KF1	Net stock of fixed capital, agriculture, millions of 1985 FIM
LH1	Performed working hours, agriculture, millions of hours
P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PMFL	Import prices of fuels and lubricants, 1985 = 100
PMR	Import prices of raw materials, 1985 = 100
SMCD4	Marginal costs of manufacturing goods sold on the domestic market
SMC1	Marginal costs in agriculture
SOCCR1	Employers' social security contribution rate, agriculture
SOCGR	Employers' child allowance contribution rate
SOCSR	Employers' national pensions and sickness insurance contribution rate
SUB	Commodity subsidies, FIM million
SUBT	Subsidies, total, FIM million
TIR1	Indirect tax rate on production, agriculture
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate
WR1	Wage rate, agriculture, 1985 = 100

P. HINNAT JA KUSTANNUKSET
PRICES AND COSTS

P.1 Tuotannon hinta, maatalous
Prices in Agriculture

$$\Delta(P1 - SMC1) = 0.27921 \cdot \Delta(SMC1_{-1} - SMC1)$$
$$(0.04752)$$
$$+ 0.41178 \cdot \Delta(SMC1_{-2} - SMC1)$$
$$(0.04475)$$
$$+ 0.17635 \cdot \Delta(SMC1_{-3} - SMC1)$$
$$(0.05266)$$
$$+ 0.09186 \cdot \Delta(SMC1_{-4} - SMC1)$$
$$(0.05887)$$

$\bar{R}^2 = 0.8185$ DW = 1.9449 SE = 0.8648 62.1 - 85.4

P.2 Tuotannon rajakustannus, maatalous
Marginal Costs in Agriculture

$$SMC1 = 1.03027 \cdot (1+TIR1) \cdot \{.535 \cdot 45.1661 \cdot (1+SOCCR1-.87 \cdot (SOCSR+SOCGR)) \cdot WR1/((.6663 \cdot (KF1/LH1)^{-.02813} + .3337)^{-1/.02813-1}) + .465 \cdot (.2603 \cdot P2 + .0182 \cdot P3 + .6172 \cdot PD4 + .0825 \cdot PMR + .0218 \cdot PMFL)\}$$

P.3 Välillisten verojen osuus tuotannosta, maatalous
Indirect Tax Rate on Production, Agriculture

$$TIR1 = [1 + 0.1737 \cdot TSR \cdot D5863/100 + 0.1040 \cdot (TIV - TSCG)/(GDPFV - GDPVG) - 0.0161 \cdot SUB/(GDPFV - GDPVG) - 0.2726 \cdot (SUBT - SUB)/GDPV1] - 1$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDP2	Production at factor cost, services etc., millions of 1985 FIM
GDPFV	GDP at factor cost, FIM million
GDPV2	Production at factor cost, services and other, FIM million
GDPVG	Production at factor cost, general government, FIM million
KF2	Net stock of fixed capital, services etc., millions of 1985 FIM
LH2	Performed working hours, services etc., millions of hours
LW2	Paid labour input, services etc., millions of 1985 FIM
P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PMFL	Import prices of fuels and lubricants, 1985 = 100
PMR	Import prices of raw materials, 1985 = 100
SMC2	Marginal costs in services etc.
SOCCR2	Employers' social security contribution rate, services etc.
SUB	Commodity subsidies, FIM million
SUBT	Subsidies, total, FIM million
TIOCG	Central government revenue from other indirect taxes, FIM million
TIR2	Indirect tax rate on production, services
TIV	Central government revenue from commodity taxes, FIM million
TREND	Linear trend: 60.1 = .25, 60.2 = .50 etc.
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate
WR2	Wage rate, services and other, 1985 = 100

P.4 Tuotannon hinta, palvelukset ym.
Prices in Services etc.

$$\Delta(P2 - SMC2) = + 0.22987 \cdot \Delta(SMC2_{-1} - SMC2)$$
$$(0.1085)$$
$$+ 0.24906 \cdot \Delta(SMC2_{-2} - SMC2)$$
$$(0.1106)$$
$$+ 0.2504 \cdot \Delta(SMC2_{-3} - SMC2)$$
$$(0.1007)$$

$\bar{R}^2 = 0.398$ RHO = -0.37 SE = 0.913 62.1 - 85.4

P.5 Tuotannon rajakustannus, palvelukset ym.
Marginal Costs in Services etc.

$$SMC2 = .95248 \cdot (1+TIR2) \cdot \{.719 \cdot 1084.187 \cdot (1+SOCCR2) \cdot YW2/ [LH2 \cdot EXP(.0316 \cdot TREND) \cdot (.88821 \cdot (KF2/LH2)^{-.60502+.11179})^{-1/.60605-1}] + .281 \cdot (.0067 \cdot P1 + .0062 \cdot P3 + .6783 \cdot PD4 + .2376 \cdot PMR + .0711 \cdot PMFL)\}$$

P.6 Välillisten verojen osuus tuotannosta, palvelukset ym.
Indirect Tax Rate on Production, Services etc.

$$TIR2 = [1 + 0.1439 \cdot TSR \cdot D5863/100 + 0.2103 \cdot (TIV - TSCG)/ (GDPFV - GDPVG) - 0.0298 \cdot SUB/(GDPFV - GDPVG) + 0.9125 \cdot TIOCG/GDPV2 - 0.2224 \cdot (SUBT - SUB)/GDPV2] - 1$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
FXSUSD	Exchange rate, FIM/USD
GDP3	Production at factor cost, forestry, millions of 1985 FIM
GDP4	Production at factor cost, manufacturing, millions of 1985 FIM
GDPFV	GDP at factor cost, FIM million
GDPV3	Production at factor cost, forestry, FIM million
GDPVG	Production at factor cost, general government, FIM million
KF3	Net stock of fixed capital, forestry, millions of 1985 FIM
LH3	Performed working hours, forestry, millions of hours
LW3	Paid labour input, forestry, millions of 1985 FIM
P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PMFL	Import prices of fuels and lubricants, 1985 = 100
PMR	Import prices of raw materials, 1985 = 100
PWW	World-market prices of wood products (HWWA), 1985 = 100
SMCD4	Marginal costs of manufacturing goods sold on the domestic market
SMC3	Marginal costs in forestry
SOCCR3	Employers' social security contribution rate, forestry
SUB	Commodity subsidies, FIM millions
SUBT	Subsidies, total, FIM million
TIR3	Indirect tax rate on production, forestry
TIV	Central government revenue from commodity taxes, FIM million
TREND	Linear trend: 60.1 = .25, 60.2 = .50 etc.
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate
WR3	Wage rate, forestry, 1985 = 100

P.7 Tuotannon hinta, metsätalous
Prices in Forestry

$$\begin{aligned}\Delta\log P3 = &- 0.20016 \\ &(0.0515) \\ &+ 0.31891 \cdot \Delta\log P3_{-1} \\ &(0.0863) \\ &+ 0.12945 \cdot \Delta\log(PWW \cdot FXSUSD) \\ &(0.0589) \\ &+ 0.12149 \cdot \Delta\log SMC3_{-1} \\ &(0.0668) \\ &+ 0.10201 \cdot \log(PWW_{-1} \cdot FXSUSD_{-1}/P3_{-1}) \\ &(0.0261) \\ &+ 0.21642 \cdot \Delta\log GDP4_{-1} \\ &(0.1474)\end{aligned}$$

$\bar{R}^2 = 0.353$ DW = 1.939 SE = 0.036 62.1 - 85.4

P.8 Tuotannon rajakustannus, metsätalous
Marginal Costs in Forestry

$$\begin{aligned}SMC3 = {} & .99664 \cdot (1+TIR3) \cdot \\ & \{.925 \cdot 19.22742 \cdot (1+SOCCR3) \cdot YW3/ \\ & \quad [LH3 \cdot EXP(.00285 \cdot TREND) \cdot \\ & \quad (.16109 \cdot (KF3/LH3)^{.32612+83891})^{1/.32612-1}] + \\ & .075 \cdot (.1289 \cdot P1 + .4121 \cdot P2 + .2993 \cdot PD4 + .0993 \cdot PMR + .0604 \cdot PMFL)\}\end{aligned}$$

P.9 Välillisten verojen osuus tuotannosta, metsätalous
Indirect Tax Rate on Production, Forestry

$$\begin{aligned}TIR3 = {} & [1 + 0.013 \cdot TSR \cdot D5863/100 + 0.0266 \cdot (TIV - TSCG)/ \\ & (GDPFV - GDPVG) - 0.0026 \cdot SUB/(GDPFV - GDPVG) - \\ & 0.0029 \cdot (SUBT - SUB)/GDPV3] - 1\end{aligned}$$

DP75	Dummy for change in manufacturing pricing in 1975
GDP4	Production at factor cost, manufacturing, millions of 1985 FIM
KF4	Net stock of fixed capital, manufacturing, millions of 1985 FIM
LH4	Performed working hours, manufacturing, millions of hours
LW4	Paid labour input, manufacturing, millions of 1985 FIM
P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PFXG	Index of competing foreign prices, 1985 = 100
PMFL	Import prices of fuels and lubricants, 1985 = 100
PMR	Import prices of raw materials, 1985 = 100
SMCD4	Marginal costs of manufacturing goods sold on the domestic market
SOCCR4	Employers' social security contribution rate, manufacturing
TIR4	Indirect tax rate on production, manufacturing
TREND	Linear trend: 60.1 = .25, 60.2 = .50 etc.
WR4	Wage rate, manufacturing, 1985 = 100

P.10 Kotimarkkinoilla myydyn tuotannon hinta, teollisuus
Price Index of Manufactured Goods Sold on the Domestic Market

$$\log(PD4/PD4_{-1}) = \underset{(0.0069)}{+\ 0.01074}$$
$$\underset{(0.0436)}{+\ 0.18256 \cdot \Delta\log(PFXG_{-1}/PD4_{-1})}$$
$$\underset{(0.0704)}{+\ 0.23535 \cdot \log(SMCD4/PD4_{-1})}$$
$$\underset{(0.0146)}{-\ 0.04556 \cdot DP75}$$
$$\underset{(0.0161)}{+\ 0.03823 \cdot DP75_{-1}}$$
$$\underset{(0.0143)}{+\ 0.02256 \cdot DP75_{-2}}$$

$\bar{R}^2 = 0.42$ RHO = 0.67 SE = 0.01482 64.1 - 85.4

P.11 Teollisuuden kotimarkkinatuotannon rajakustannus
Marginal Costs of Manufactured Goods sold on the Domestic Market

$$SMCD4 = 1.01434 \cdot (1+TIR4) \cdot \{.437 \cdot 102.83176 \cdot (1+SOCCR4) \cdot YW4/[LH4 \cdot EXP(.03063 \cdot TREND) \cdot (.55349 \cdot (KF4/LH4)^{-.14291} + .44651)^{-1/.14291}] + .563 \cdot (.1654 \cdot P1 + .2745 \cdot P2 + .0997 \cdot P3 + .2829 \cdot PMR + .1775 \cdot PMFL)\}$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDP4	Production at factor cost, manufacturing, millions of 1985 FIM
GDPFV	GDP at factor cost, FIM million
GDPV4	Production at factor cost, manufacturing, FIM million
GDPVG	Production at factor cost, general government, FIM million
P4	Prices in manufacturing, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PXG	Export prices of goods, 1985 = 100
SUB	Commodity subsidies, FIM millions
SUBT	Subsidies, total, FIM million
TIR4	Indirect tax rate on production, manufacturing
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate
XG	Exports of goods, millions of 1985 FIM

P.12 Tuotannon hinta, teollisuus
Prices in Manufacturing

$$P4 = PD4 + 0.307 \cdot (PXG - PD4) \cdot XG/GDP4$$

P.13 Välillisten verojen osuus tuotannosta, teollisuus
Indirect Tax Rate on Production, Industry

$$TIR4 = [1 - 0.0634 \cdot TSR \cdot D5863/100 + 0.0589 \cdot (TIV - TSCG)/(GDPFV - GDPVG) - 0.2886 \cdot SUB/(GDPFV - GDPVG) - 0.0115 \cdot (SUBT-SUB)/GDPV4] - 1$$

P.14 - P.17

	P1/ (1+TIR1)	P2/ (1+TIR2)	P3/ (1+TIR3)	P4/ (1+TIR4)	P1	P2	P3	PD4	PMR	PMFL
PGDP1IO	2.0777	0	0	0	0	-.2338	-.0163	-.5543	-.0741	-.0196
PGDP2IO	0	1.4641	0	0	-.0026	0	-.0024	-.2649	-.0927	-.0277
PGDP3IO	0	0	1.0867	0	-.0104	-.0334	0	-.0243	-.0080	-.0049
PGDP4IO	0	0	0	2.2021	-.2041	-.3387	-.1230	0	-.3490	-.2191

PGDP1IO = Panos-tuotosestimaatti hinnalle PGDP1
Input-Output Estimate for PGDP1

PGDP2IO = Panos-tuotosestimaatti hinnalle PGDP2
Input-Output Estimate for PGDP2

PGDP3IO = Panos-tuotosestimaatti hinnalle PGDP3
Input-Output Estimate for PGDP3

PGDP4IO = Panos-tuotosestimaatti hinnalle PGDP4
Input-Output Estimate for PGDP4

P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
P4	Prices in manufacturing, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PMFL	Import prices of fuels and lubricants, 1985 = 100
PMR	Import prices of raw materials, 1985 = 100
TIR1	Indirect tax rate on production, agriculture
TIR2	Indirect tax rate on production, services
TIR3	Indirect tax rate on production, forestry
TIR4	Indirect tax rate on production, manufacturing

P.18 - P.22

	log P1	Log P2	log P3	log PD4	log PGDPG	log PMC	log PMI	$\sum$
log PCDIO	0	0.3183	0	0.4007	0	0.2810	0	1
log PCNDIO	0.0562	0.3749	0.0144	0.4518	0	0.1027	0	1
log PCSIO	0.0002	0.9913	0.0003	0.0057	0	0.0025	0	1
log PCGIO	0.0009	0.1340	0.0023	0.0878	0.7422	0.0328	0	1
log PIFIO	0	0.5956	0.0099	0.1340	0	0	0.2605	1

PCDIO = Panos-tuotosestimaatti hinnalle PCD
Input-Output Estimate for PCD

PCNDIO = Panos-tuotosestimaatti hinnalle PCND
Input-Output Estimate for PCND

PCSIO = Panos-tuotosestimaatti hinnalle PCS
Input-Output Estimate for PCS

PCGIO = Panos-tuotosestimaatti hinnoille PCLG ja PCCG
Input-Output Estimate for PCLG and PCCG

PIFIO = Panos-tuotosestimaatti hinnoille PIF1, PIF2, PIF3, PIF4, PICG ja PILG
Input-Output Estimate for PIF1, PIF2, PIF3, PICG and PILG

P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
PD4	Price index of manufacturing goods sold on the domestic market, 1985 = 100
PGDPG	Value added deflator in general government, 1985 = 100
PMC	Import prices of consumer goods, 1985 = 100
PMI	Import prices of investment goods, 1985 = 100

PGDP1 Value added deflator in agriculture, 1985 = 100

PGDP1IO Value added deflator in agriculture, input-output estimate, 1985 = 100

PGDP2 Value added deflator in services etc., 1985 = 100

PGDP2IO Value added deflator in services etc., input-output estimate, 1985 = 100

PGDP3 Value added deflator in forestry, 1985 = 100

PGDP3IO Value added deflator in forestry, input-output estimate, 1985 = 100

PGDP4 Value added deflator in manufacturing, 1985 = 100

PGDP4IO Value added deflator in manufacturing, input-output estimate, 1985 = 100

P.23 Arvonlisäyksen deflaattori, maatalous
Value Added Deflator in Agriculture

$\Delta \log PGDP1 = \Delta \log PGDP1IO$

P.24 Arvonlisäyksen deflaattori, palvelukset ym.
Value Added Deflator in Services etc.

PGDP2 = PGDP2IO

P.25 Arvonlisäyksen deflaattori, metsätalous
Value Added Deflator in Forestry

$\Delta \log PGDP3 = \Delta \log PGDP3IO$

P.26 Arvonlisäyksen deflaattori, teollisuus
Value Added Deflator in Manufacturing

$\Delta \log PGDP4 = \Delta \log PGDP4IO$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDPG	Production at factor cost, general government, millions of 1985 FIM
GDPFV	GDP at factor cost, FIM million
GDPVG	Production at factor cost, general government, FIM million
MGV	Imports of goods, total, FIM million
PCND	Private consumption prices, non-durables and semi-durables, 1985 = 100
PCNDIO	Private consumption prices, non-durables and semi-durables, input-output estimate, 1985 = 100
PGDPG	Value added deflator in general government, 1985 = 100
SOCCRG	Employers' social security contribution rate, general government, FIM million
SUB	Commodity subsidies, FIM million Subsidies, millions of 1985 FIM
TIOCG	Central government revenue from other indirect taxes, FIM million
TIRCND	Indirect tax rate on consumption, non-durables and semi-durables
TIRG	Indirect tax rate on production, general government
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate
YWG	Wages and salaries, general government, FIM million

P.27 Arvonlisäyksen deflaattori, julkinen toiminta
Value Added Deflator in General Government

$$\Delta\log[PGDPG/(1 + TIRG)] = + 3.32444 \quad (0.46605)$$
$$+ 0.46480 \cdot \Delta\log[(1 + SOCCRG) \cdot YWG/GDPG] \quad (0.09185)$$
$$+ 0.70772 \cdot \log VAR1_{-1} \quad (0.09984)$$

jossa $VAR1 = (1 + TIRG) \cdot [(1 + SOCCRG) \cdot YWG/GDPG]/PGDPG$

$\bar{R}^2 = 0.3546$ DW = 2.038 SE = 0.0189 62.1 - 85.4

P.28 Välillisten verojen osuus julkisesta toiminnasta
Indirect Tax Rate, General Government

$$TIRG = (1 + 0.0082 \cdot TIOCG/GDPVG) - 1$$

P.29 Yksityisen kulutuksen hinta, lyhytikäiset ja puolikestävät tavarat
Private Consumption Prices, Non-Durables and Semi-Durables

$$\Delta\log PCND = \Delta\log(1 + TIRCND) + \Delta\log PCNDIO$$

P.30 Välillisten verojen osuus muiden hyödykkeiden kulutuksesta
Indirect Tax Rate on Consumption, Non-Durables and Semi-Durables

$$TIRCND = (1 + 3.5532 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 1.3886 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.7431 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDPFV	GDP at factor cost, FIM million
GDPVG	Production at factor cost, general government, FIM million
MGV	Imports of goods, total, FIM million
PCCG	Central government consumption prices, 1985 = 100
PCD	Private consumption prices, durables, 1985 = 100
PCDIO	Private consumption prices, durables, input-output estimate, 1985 = 100
PCGIO	Public consumption prices, input-output estimate, 1985 = 100
PCS	Private consumption prices, services, 1985 = 100
PCSIO	Private consumption prices, services, input-output estimate, 1985 = 100
SUB	Commodity subsidies, FIM million
TIRCD	Indirect tax rate on consumption, durables
TIRCG	Indirect tax rate on consumption, general government
TIRCS	Indirect tax rate on consumption, services
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate

P.31 Yksityisen kulutuksen hinta, kestokulutustavarat
Private Consumption Prices, Durables

$$\Delta\log PCD = \Delta\log(1 + TIRCD) + \Delta\log PCDIO$$

P.32 Välillisten verojen osuus kestokulutushyödykkeiden kulutuksesta
Indirect Tax Rate on Consumption, Durables

$$TIRCD = (1 + 0.8562 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG))/(1 - 0.9334 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.33 Yksityisen kulutuksen hinta, palvelukset ym.
Private Consumption Prices, Services

$$\Delta\log PCS = \Delta\log(1 + TIRCS) + \Delta\log PCSIO$$

P.34 Välillisten verojen osuus palvelujen kulutuksesta
Indirect Tax Rate, Services etc.

$$TIRCS = (1 + 0.08455 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.5738 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.06299 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.35 Valtion kulutuksen hinta
Central Government Consumption Prices

$$\Delta\log PCCG = \Delta\log(1 + TIRCG) + \Delta\log PCGIO$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDPFV	GDP at factor cost, FIM million
GDPVG	Production at factor cost, general government, FIM million
MGV	Imports of goods, total, FIM million
PCGIO	Public consumption prices, input-output estimate, 1985 = 100
PCLG	Local government consumption prices, 1985 = 100
PIF1	Fixed investment prices, agriculture, 1985 = 100
PIF1IO	
PIF2	Fixed investment prices, services, 1985 = 100
PIF2IO	
SUB	Commodity subsidies, FIM million
TIRCG	Indirect tax rate on consumption, general government
TIRIF1	Indirect tax rate on investment, agriculture
TIRIF2	Indirect tax rate on investment, services
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate

P.36 Kuntien kulutuksen hinta
Local Government Consumption Prices

$$\Delta \log PCLG = \Delta \log(1 + TIRCG) + \Delta \log PCGIO$$

P.37 Välillisten verojen osuus julkisesta kulutuksesta
Indirect Tax Rate on Consumption, General Covernment

$$TIRCG = [(1 + 0.1879 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.3282 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.3807 \cdot 0.01 \cdot TSR \cdot D5863)]^{0.2578} - 1$$

P.38 Kiinteiden investointien hinta, maatalous
Fixed Investment Prices, Agriculture

$$\Delta \log PIF1 = \Delta \log(1 + TIRIF1) + \Delta \log PIFIO$$

P.39 Välillisten verojen osuus investoinneista, maatalous
Indirect Tax Rate on Investment, Agriculture

$$TIRIF1 = (1 + 0.1331 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.005 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.3298 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.40 Kiinteiden investointien hinta, palvelukset ym.
Fixed Investment Prices, Services etc.

$$\Delta \log PIF2 = \Delta \log(1 + TIRIF2) + \Delta \log PIFIO$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDPFV	GDP at factor cost, FIM million
GDPVG	Production at factor cost, general government, FIM million
MGV	Imports of goods, total, FIM million
PIF3	Fixed investment prices, forestry, 1985 = 100
PIFIO	Fixed investment prices, input-output estimate, 1985 = 100
PIF4	Fixed investment prices, manufacturing, 1985 = 100
SUB	Commodity subsidies, FIM million
TIRCG	Indirect tax rate on consumption, general government
TIRIF2	Indirect tax rate on investment, services
TIRIF3	Indirect tax rate on investment, forestry
TIRIF4	Indirect tax rate on investment, manufacturing
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate
TSR7	Sales tax rate, industrial machinery and equipment
TSR8	Sales tax rate, industrial buildings

P.41 Välillisten verojen osuus investoinneista, palvelukset ym.
Indirect Tax Rate on Investment, Services etc.

$$TIRIF2 = (1 + 0.1331 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.005 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.3298 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.42 Kiinteiden investointien hinta, metsätalous
Fixed Investment Prices, Forestry

$$\Delta \log PIF3 = \Delta \log(1 + TIRIF3) + \Delta \log PIFIO$$

P.43 Välillisten verojen osuus investoinneista, metsätalous
Indirect Tax Rate on Investment, Forestry

$$TIRIF3 = (1 + 0.1331 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.005 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.3298 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.44 Kiinteiden investointien hinta, teollisuus
Fixed Investment Prices, Manufacturing

$$\Delta \log PIF4 = \Delta \log(1 + TIRIF4) + \Delta \log PIFIO$$

P.45 Välillisten verojen osuus investoinneista, teollisuus
Indirect Tax Rate on Investment, Industry

$$TIRIF4 = (1 + 0.1331 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.005 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.3916 \cdot 0.01 \cdot (0.7432 \cdot TSR7 + (1 - 0.7432) \cdot TSR8) \cdot D5863) - 1$$

D5863	Dummy replacing sales tax rate in 1958 - 1963
GDPF	GDP at factor cost, millions of 1985 FIM
GDPFV	GDP at factor cost, FIM million
GDPVG	Production at factor cost, general government, FIM million
MGV	Imports of goods, total, FIM million
P2	Prices in services etc., 1985 = 100
PGDPF	Value added deflator at factor cost, 1985 = 100
PICG	Central government investment prices, 1985 = 100
PIFIO	Fixed investment prices, input-output estimate, 1985 = 100
PIH	Residential construction prices, 1985 = 100
PILG	Local government investment prices, 1985 = 100
SUB	Commodity subsidies, FIM million
TIRIG	Indirect tax rate on investment, general goverment
TIRIH	Indirect tax rate on investment, residential construction
TIV	Central government revenue from commodity taxes, FIM million
TSCG	Central government revenue from sales tax, FIM million
TSR	Sales tax rate

P.46 Asuinrakennusinvestointien hinta
Residential Construction Prices

$$\Delta \log PIH = \Delta \log(1 + TIRIH) + \Delta \log P2$$

P.47 Välillisten verojen osuus asuntoinvestoinneista
Indirect Tax Rate on Investment, Residential Construction

$$TIRIH = 1/(1 - 0.2669 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.48 Valtion investointien hinta
Central Government Investment Prices

$$\Delta \log PICG = \Delta \log(1 + TIRIG) + \Delta \log PIFIO$$

P.49 Kuntien investointien hinta
Local Government Investment Prices

$$\Delta \log PILG = \Delta \log(1 + TIRIG) + \Delta \log PIFIO$$

P.50 Välillisten verojen osuus investoinneista, julkinen toiminta
Indirect Tax Rate on Investment, General Covernment

$$TIRIG = (1 + 0.1331 \cdot (TIV - TSCG)/(GDPFV + MGV - GDPVG) - 0.005 \cdot SUB/(GDPFV + MGV - GDPVG))/(1 - 0.3298 \cdot 0.01 \cdot TSR \cdot D5863) - 1$$

P.51 Bruttokansantuotteen hinta
Value Added Deflator at Factor Cost

$$PGDPF = 100 \cdot GDPFV/GDPF$$

C	Total private consumption, millions of 1985 FIM
CG	Total public consumption, millions of 1985 FIM
CGV	Total public consumption, FIM million
CV	Total private consumption, FIM million
I	Private fixed investment, millions of 1985 FIM
IF	Private non residential investment, millions of 1985 FIM
IFV	Private non-residential investment, FIM million
IG	Total public investment, millions of 1985 FIM
IGV	Total public investment, FIM million
ITOT	Total fixed investment, millions of 1985 FIM
ITOTV	Total fixed investment, FIM million
IV	Private fixed investment, FIM million
PCG	Public consumption prices, 1985 = 100
PCP	Private consumption prices, 1985 = 100
PI	Private investment prices, 1985 = 100
PIF	Private non-residential investment prices, 1985 = 100
PIG	Public investment prices, 1985 = 100
PITOT	Investment prices, 1985 = 100

P.52 Yksityisten investointien hinta
Private Investment Prices

PI = 100 • IV/I

P.53 Yksityisten tuotannollisten investointien hinta
Private Non-Residential Investment Prices

PIF = 100 • IFV/IF

P.54 Julkisten investointien hinta
Public Investment Prices

PIG = 100 • IGV/IG

P.55 Investointien hinta
Investment Prices

PITOT = 100 • ITOTV/ITOT

P.56 Julkisen kulutuksen hinta
Public Consumption Prices

PCG = 100 • CGV/CG

P.57 Yksityisen kulutuksen hinta
Private Consumption Prices

PCP = 100 • CV/C

D75	Dummy: 60.1 - 74.4 = 1, 75.1 → = 0
FXSSUR	Exchange rate, USD/SUR
FXSUSD	Exchange rate, FIM/USD
MFOR	Imports of Finland's major export countries, 1985 = 100
P4	Prices in manufacturing, 1985 = 100
PFXG	Index of competing foreign prices, 1985 = 100
PXGE	Export prices of goods, bilateral, 1985 = 100
PXGW	Export prices of goods, multilateral, 1985 = 100
SMCXG	Marginal costs in exports
TREND	Linear trend: 60.1 = .25, 60.2 = .50 etc.
XGW	Exports of goods, multilateral, FIM million

X.4 Tavaroiden idänviennin yksikköarvoindeksi
Export Prices of Goods, Bilateral

$$\log(PXGE/P4) = \underset{(0.02759)}{-\ 0.18544} + \underset{(0.05455)}{0.57920} \cdot \log var1 + \underset{(0.00128)}{0.00882} \cdot TREND$$

jossa $var1 = \log[(PXGE_{-1}/P4)\cdot(FXSUSD/FXSUSD_{-1})\cdot(FXSSUR/FXSSUR_{-1})]$

$\bar{R}^2 = 0.937$ DW = 2.056 SE = 0.0359 64.1 - 85.4

X.5 Tavaroiden lännenviennin yksikköarvoindeksi
Export Prices of Goods, Multilateral

$$\Delta\log PXGW = \underset{(0.00481)}{0.00001} + \underset{(0.17541)}{0.29938} \cdot \Delta\log SMCXG + \underset{(0.16122)}{0.60049} \cdot \Delta\log PFXG + \underset{(0.06186)}{0.10379} \cdot \log(SMCXG_{-1}/PXGW_{-1}) - \underset{(0.10011)}{0.20733} \cdot \Delta^2\log(PFXG_{-1}/PXGW_{-1}) + \underset{(0.04568)}{0.07805} \cdot \Delta\log(XGW_{-1}/MFOR_{-1}) + \underset{(0.02284)}{0.03903} \cdot \Delta\log(XGW_{-2}/MFOR_{-2}) - \underset{(0.03017)}{0.05964} \cdot \Delta D75 + \underset{(0.03240)}{0.07392} \cdot \Delta D75_{-1}$$

$\bar{R}^2 = 0.491$ DW = 1.982 SE = 0.02313 70.1 - 85.4

KF4	Net stock of fixed capital, manufacturing, millions of 1985 FIM
LH4	Performed working hours, manufacturing, millions of hours
P1	Prices in agriculture, 1985 = 100
P2	Prices in services etc., 1985 = 100
P3	Prices in forestry, 1985 = 100
PMFL	Import prices of fuels and lubricants, 1985 = 100
PMR	Import prices of raw materials, 1985 = 100
SMCXG	Marginal costs in exports
SOCCR4	Employers' social security contribution rate, manufacturing
TIR4	Indirect tax rate on production, manufacturing
TIRXG	Indirect tax rate on exports, goods
TREND	Linear trend: 60.1 = .25, 60.2 = .50 etc.
YW4	Wages and salaries, total, FIM million

X.6 Vientituotannon rajakustannus
Marginal Costs in Exports

$$
\begin{aligned}
SMCXG = {} & 1.00866 \cdot (1+TIRXG) \cdot \\
& 1.01334 \cdot (1+TIR4) \cdot \\
& [.437 \cdot 102.83176 \cdot (1+SOCCR4) \cdot YW4 / \\
& \quad \{LH4 \cdot EXP(.03063 \cdot TREND) \cdot \\
& \quad (.55349 \cdot (KF4/LH4) \cdot -.14291 + .44651)^{-1/.14291-1}\} + \\
& .563 \cdot (.1654 \cdot P1 + .2745 \cdot P2 + .0997 \cdot P3 + .2829 \cdot PMR + .1775 \cdot PMFL)]
\end{aligned}
$$

C	Total private consumption, millions of 1985 FIM
LES	Employment (Labour Force Survey), 1000 persons
LFS	Labour force, survey
MTAX	Personal marginal tax rate, estimate
N	Population of working age (15-74 years), 1000 persons
PCP	Private consumption prices, 1985 = 100
WR	Wage rate, total, 1985 = 100

L.13 Työvoima, työvoimatutkimus
Labour Force (Labour Force Survey)

$$\Delta\log(LFS/N) = + 0.00026 \quad (0.00030)$$
$$+ 0.64817 \cdot \Delta\log(LES/N) \quad (0.04672)$$
$$+ 0.00520 \cdot \Delta\log((1 - MTAX)\cdot WR/PCP) \quad (0.00336)$$
$$- 0.03026 \cdot \Delta\log(C/N) \quad (0.01609)$$

$\bar{R}^2 = 0.6871$ DW = 2.0315 SE = 0.0027 63.1 - 85.4

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