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A NOTE ON THE SHORT-TERM DETERMINANTS OF FINNISH EXPORT PRICES

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by Pentti Vartia and Kari Salmi

Abstract

This article discusses the determination of Finnish commodity export prices in 1954-1978, particularly the relative importance of world market prices and domestic cost pressure for short run changes in export prices. Effects coming from changes in world market prices and changes in exchange rates are also separated. Results obtained by using annual aggregate data and our simple regression models suggest that the observed Finnish export price changes can to a large extent be explained in terms of world market prices and exchange rates. A slightly better explanation is obtained when this "Scandinavian model" is augmented by including in it the effects of the relative cost position, but domestic cost pressure alone can explain only a minor part of the changes in export prices.

1. Introduction

The treatment of export prices has greatly varied in Finnish econometric models. In most models - e.g. Grönlund (1965), Mannermaa (1970, 1975), Koivisto (1971), Korpela (1977) and Kykkänen (1976) - export prices have been dealt with as an exogenous variable. Only in the models of the Bank of Finland (1972) and Vartia (1974) and in their more recent versions have export prices been treated as an endogenous variable. The export

price equation estimated by Vartia (1972) used both world market prices in domestic currency (the weighted average in import prices of the markets) and cost variables (unit labour costs and import prices), with a relatively greater emphasis on the world market prices, to explain export prices (in domestic currency). On the other hand, Aurikko (1973) presented quarterly sectoral export price equations where only domestic cost and price variables (labour costs, production prices) and the volume of investment in machinery and equipment were used to explain export prices (in domestic currency)[1]. Vartia (1974) used both world market prices and cost variables, the former being again the main explanatory variable. Also, a simple equation based on the hypothesis that Finnish export prices are determined exclusively by world market prices and exchange rates was shown to provide an unexpectedly good explanation. This same equation for a different time period was later estimated by Tanskanen (1976). Aurikko (1975) presented sectoral export price equations where domestic cost and price variables again were the main determinants of export prices. Also, dummies for devaluation were added and, for one sector (paper industry products), a proxy (export prices of Swedish paper products) for world market prices was used. Recently, Aurikko (1980) has presented sectoral export price equations which also regard world market prices as the main determinant of Finnish export prices.

The choice between these two alternative ways of determination of export prices in macro-economic models is of course crucial for the functioning of the model. It is also crucial for the policy recommendations inferred from the model, and erroneous ideas in this respect may hinder the pursuit of succesful economic policies, e.g., exchange rate and demand management policies.

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1) Results of Aurikko (1973) and Aurikko (1975) have been used in the Bank of Finland quarterly model.

2. Export prices and exchange rate changes

Finland is a small open economy which conducts almost all of its foreign trade in foreign currencies, i.e. its trade agreements are denominated not in Finnmarks but in English pounds, Swedish crowns, etc. The contract share of the mark in exports is, according to Nars (1979), of the order of a few percent[1]. That is why the prices (recorded by the Custom Office) in agreements negotiated before exchange rate changes hold in foreign currencies during the so-called "currency contract period" (see e.g. Magee (1973)) immediately following the exchange rate change. Thus, in the very short run, domestic-currency export prices change almost by the full amount of the exchange rate change. The monthly movements of Finnish export prices after, e.g., the large devaluations of 1957 and 1967 (see Fig. 1.) are in accordance with this view[2]. It is clear that short run changes in export prices immediately following exchange rate changes cannot be properly described by using models where domestic-currency export prices are explained exclusively by domestic cost variables expressed in domestic currency. Implicit in this view is the erroneous idea that export prices in foreign currency would be lowered by the full amount of the devaluation at the moment of the exchange rate change.

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1) The most important currencies in which contracts have been denominated have been the US dollar, pound sterling, Swedish crown, Deutschemark and the rouble.

2) These figures have earlier been presented in P. Vartia (1974, p. 119). The fall in export prices (in domestic currency) at the end of 1967 is not due to a lowering of export prices (in foreign currency) by Finnish firms after the devaluation of the mark in October but to the devaluation of the English pound. This affected export prices immediately, because a large proportion of contracts was denominated in pounds. The trend-like decline in export prices after the full adjustment to devaluation of 1957, rather than being the result of price cuts effected by Finnish exporters in order to increase their market shares, was due to general price movements in the markets.

In order to clearly separate the effects due to exchange rate changes from those due to world market pricechanges let us look at the identity which results from deflating Finnish domestic-currency export prices $\tilde{P}_{xd}$ by a currency index $\tilde{I}$ to arrive at a price series $\tilde{P}_{xf} = \tilde{P}_{xd}/\tilde{I}$ that describes the course of Finnish foreign-currency export prices[1]. The relationship between Finnish foreign-currency export prices and world market prices seems to have been very stable "in the long run", see Fig. 2.

When explaining the percentage changes in domestic-currency export prices, i.e. $P_{xd} = 100\Delta\tilde{P}_{xd}/\tilde{P}_{xd-1}$, it would be possible to derive a behavioural explanation for export price changes in foreign currency, i.e. $P_{xf} = 100\Delta\tilde{P}_{xf}/\tilde{P}_{xf-1}$, and arrive at domestic-currency export prices by using the definitional identity[2]

$$P_{xd} = P_{xf} + I + 0.01\, P_{xf} I \qquad (1)$$

where I stands for the percentage change in the currency index $\tilde{I}$. This is the approach adopted, e.g., in the econometric model of the Research Institute of the Finnish Economy[3]. Here, however, we estimate regression equations for P_{xd} and, in some of the equations, constrain *a priori*

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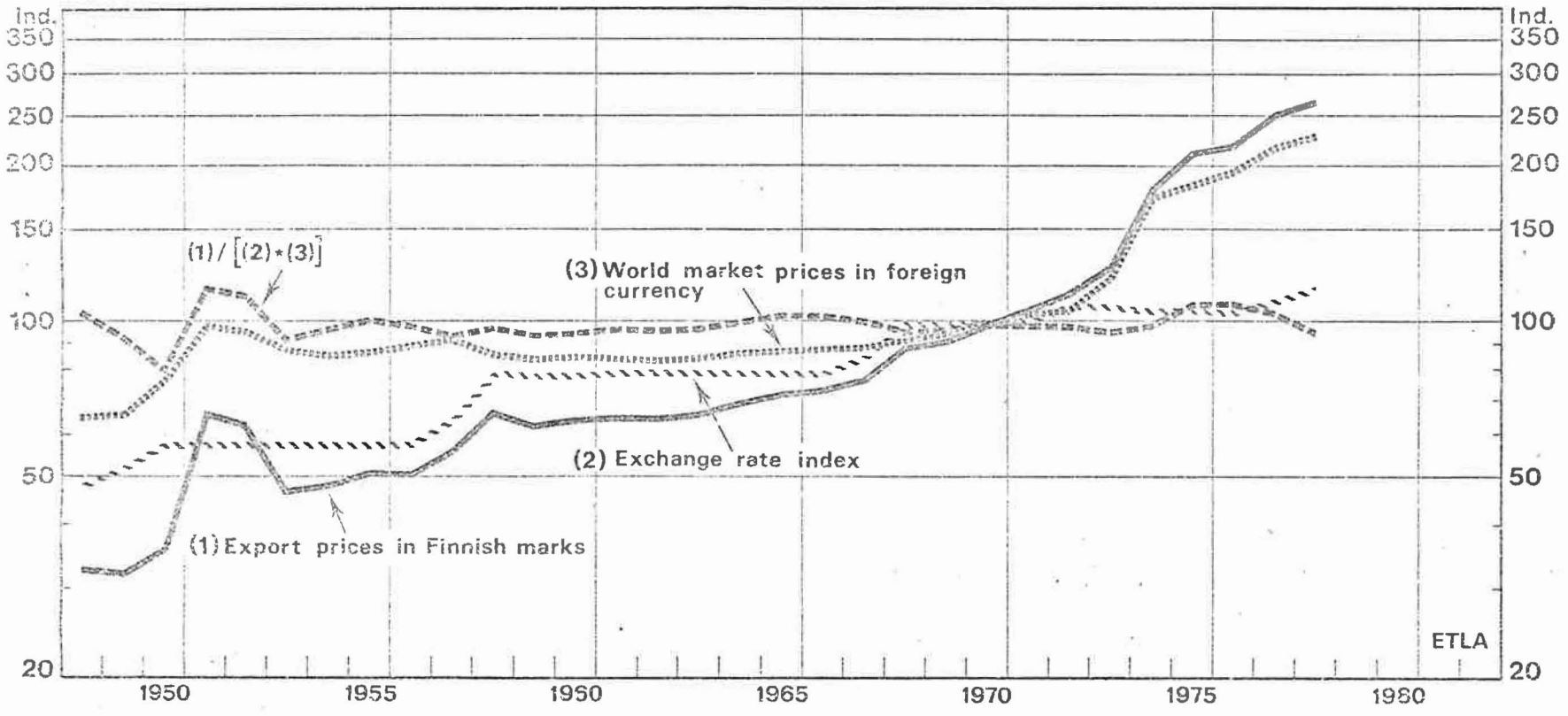
1) We do not have disposal of data on the contract shares and have here used a currency index based on export shares in 1970. Contract shares and trade shares differ to some extent (particularly in the case of the US Dollar).

2) Because of their methodologically attractive properties, i.e. symmetry and additivity (no "cross-term" in eg. (1)), logarithmic differences would be a more satisfactory transformation than relative differences. Their use would facilitate the manipulation of relationships, but the wide use of percentage changes has led us to apply this slightly unsatisfactory procedure in this paper.

3) See, e.g., Vajanne, Pylkkänen, Salmi (1980).

Fig. 2. Finnish export prices, world market prices and exchange rates in 1948-1978



the coefficient of I to 1. Though there exists the definitional identity (1) between P_{xd}, P_{xf} and I, the exchange rate change I may of course also affect P_{xf} directly. In this case the coefficient of I in an equation for P_{xf} would not be zero, and its coefficient in an equation for P_{xd} should not be constrained to 1. It should also be noted that, when, in the following, relative unit labour costs (in the same currency) are included in the model as an explanatory variable, exchange rate changes will also enter it via this variable, because relative unit labour costs are derived from unit labour costs in domestic currencies by correcting these for exchange rate changes.

One reason why it is necessary to separate the definitional effects of exchange rates on Finnish domestic-currency export prices from the behavioural relationship between Finnish export prices and world market prices is that the adjustment of export prices to changes in exchange rates and to changes in world market prices may be different. When export price changes are explained by world market price changes, both being expressed in domestic currency, it is more difficult to allow for different adjustment processes. Suppose, e.g., that Finnish foreign-currency export prices P_{xf} adjust to (foreign-currency) world market prices P_{wf} according to the distributed lag scheme

$$P_{xf} = \sum_{i=0}^{k} \lambda_i P_{wf,-i} \qquad (2)$$

Transforming this into an equation for the explanation of export prices in Finnish currency would, according to eq. (1), result in

$$P_{xd} \approx P_{xf} + I = \sum_{i=0}^{k} \lambda_i P_{wf,-i} + I \qquad (3)$$

On the other hand, direct estimation of an equation for domestic-currency export prices P_{xd} involving the domestic-currency world market prices P_{wd} as an explanatory variable would yield

$$P_{xd} = \sum_{i=0}^{k} \gamma_i P_{wd,-i} \approx \sum_{i=0}^{k} \gamma_i (P_{wd} + I)_{-i}$$

$$= \sum_{i=0}^{k} \gamma_i P_{wf,-i} + \sum_{i=0}^{k} \gamma_i I_{-i} \qquad (4)$$

which would mean forcing the same lag structure on P_{wf} and I.

3. Export prices and world market prices

After the currency contract period, during which export price changes in domestic currency are determined by the already negotiated agreements and the exchange rate changes according to equation (1), there follows a so-called "pass-through period". During this period new agreements concerning export prices are made. In the case of Finland, most exporters concretely renegotiate the prices in foreign currencies. The *a priori* idea of Vartia (1972) and (1974) was that export prices in foreign currencies are mainly determined by world market prices and have not changed much after devaluations, i.e. export prices in marks are adjusted upwards by almost the full amount of the devaluation. In other words, there has been little pass-through into lower foreign-currency prices and the devaluations have been used as an opportunity to restore profit margins.

Thus the adjustment of domestic-currency export prices to exchange rate changes, which during the currency contract period is "automatic" (because the already negotiated export prices were determined in foreign currencies), is to a large extent permanent.

The effects that export price changes have, in connection with exchange rate changes or otherwise, on the volume of exports will not be discussed here. It should be noted, however, that exchange rate changes may affect the volume of exports even if there is no pass-through. These effects come from the supply side: in the short run, exploiting some export capacity which has not been profitable may again become so and, in the longer run, improved profitability may increase, e.g., export capacity and marketing efforts. For a discussion of these questions, see e.g. Kukkonen (1977) and Vartia (1979).

The way of constructing the series for the "world market prices" to be used as an explanatory variable in the equation for Finnish export prices is not self-evident. It should also be realized that our models do not explain how "world market prices" are determined. We have here used weighted import prices (in national currencies) of Finlands export markets, the weights being (bilateral) export shares. Because Finland in all of her export countries has a relatively small market share, this kind of weighting system gives (in the case of Finland) roughly the same result as a double weighting system, where weights are derived by taking into account the relative importance of competitors' prices in various markets. The import price index of any country can be considered to be the weighted average of export prices of all countries exporting to this particular market, i.e., those of all competitors

and Finland. As Finland's weight is small, however, the import prices of a market also provides a good approximation to the weighted competitors' prices in the market. This kind of double weighting scheme does not take into account the competition from inside the various markets, i.e., competition from domestic producers in Finland's customer countries.

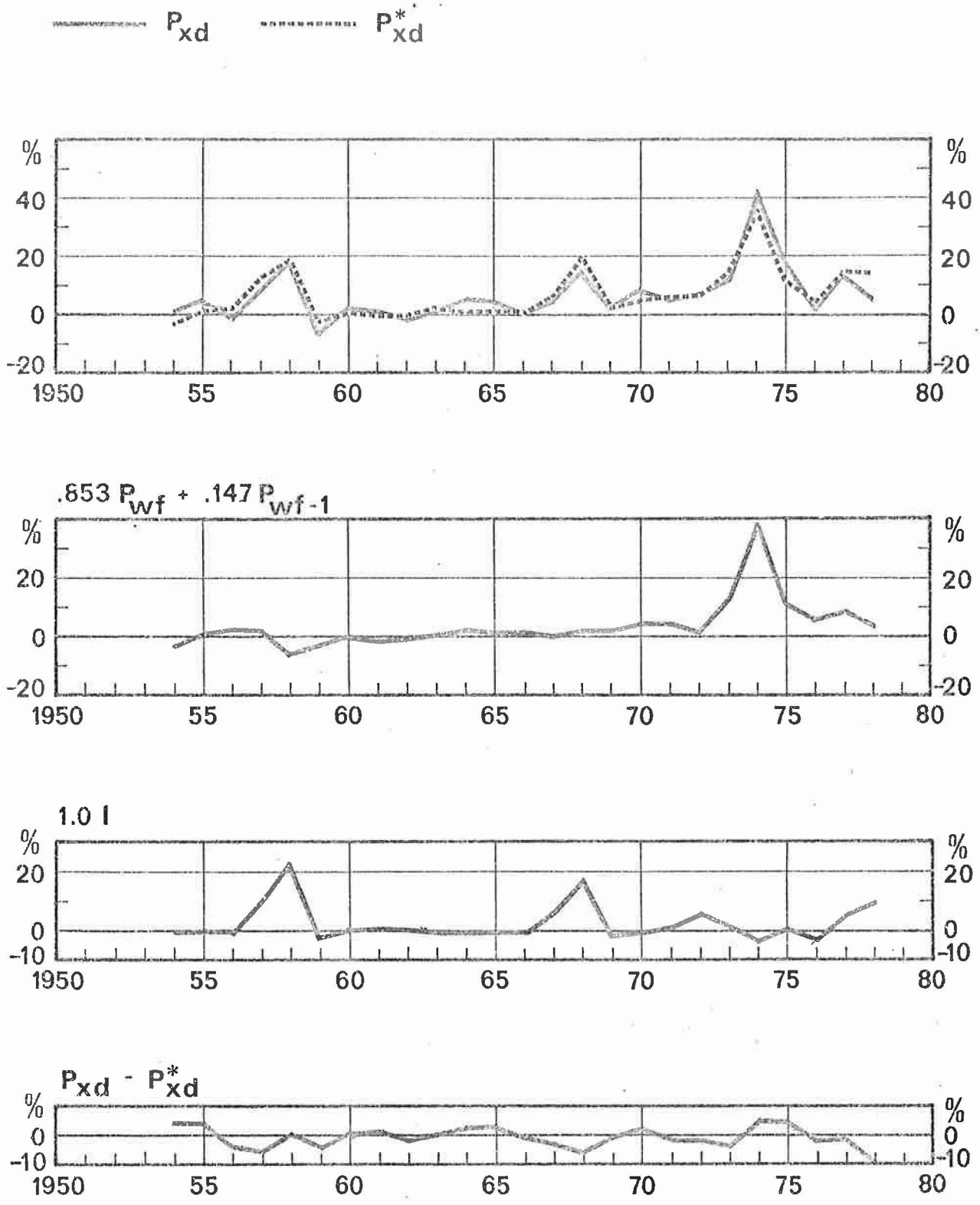
Our series for world market prices thus includes all competitors' prices in our markets, e.g., the prices of bananas, even though Finland does not export bananas. This same series can also be used in the equation describing the volume of exports and it approximates the so-called competitor goods price index in demand theory defined by Rajaoja (1958). The weights of this index should also reflect the substitution elasticities between various competitor goods, which here must be taken to be the same for all goods. Some export price equations, especially sectoral ones, use prices of the same sector in the world markets to explain the course of the export prices of a single country. Thus, e.g., Aurikko (1975, 1980) uses prices of Swedish paper products to explain prices of Finnish paper products. When sectoral equations of this kind are aggregated, the world market prices will be presented by an index which involves only the prices of the goods which the country itself exports. As the price concepts of these two approaches differ theoretically, caution should be exercized in comparing the results of different studies.

When we seek to explain changes in Finland's aggregate export prices by price changes in her markets, we are not testing, we think, any version of "the law of one price". For many of Finland's export products (e.g., well-defined paper, pulp or metal products), commodity arbitrage will guarantee, it is true, that prices within the same market are more or less in line with one another.

Owing to various institutional factors, such as taxes and price controls, and to transport costs, prices may differ between markets; but since we have used percentual changes of the variables, the systematic part of these factors is largely eliminated. From the average price changes of all different well-defined export products in the various markets it is of course possible to derive, by aggregation, an estimate for the change in the aggregate Finnish export price index. However, changes in the prices of different goods do not occur simultaneously, nor are they equal in magnitude. Furthermore, there is plenty of evidence that price changes for the same good in different markets do not take place at the same time. Thus it is clear, e.g., that the relative prices (in domestic currency) of Finnish export products abroad and at home change radically in connection with exchange rate changes and that it may take many years for the old price relations to be re-established. Thus the fact that movements in Finland's aggregate export prices can here be "explained" by the average inflation rate in her markets and the exchange rate changes lends some support to the law of one price but in no way verifies it.

When our measure for the inflation rate in the Finnish export markets is used, a satisfactory explanation for the behaviour of Finnish foreign-currency export prices, i.e. P_{xf}, can be arrived at in terms of this explanatory variable alone. An equation estimated for domestic-currency export prices, with the coefficient of the exchange rate change variable I constrained to 1, is represented in Fig. 3. When estimated freely, the values of the coefficients of P_{wf} and its lagged values closely correspond to our *a priori* ideas, i.e., their sum is close to one (see Table 1). All the equations with which we experimented also seem to involve some lagged effects of world market prices on Finnish

Fig. 3. Equation (17) for export prices



export prices. Table 2 shows, for the purpose of comparison, some equations where world market prices in domestic currency have been used to explain export prices, i.e. in eq. (4) P_{wd} and I are constrained to have same coefficients. These equations possess about the same explanatory power, but theoretical considerations, put forward earlier, cause us to prefer the models presented in Table 1.

4. Export prices and relative costs

Finnish exporters are thus price takers and, as a rough rule of thumb, use the foreign-currency world market prices as a basis for setting their foreign-currency prices. In the following we try to estimate the extent to which this rule of thumb is modified because of changes in relative costs. Relative costs between countries may change, because of differences in the inflation rate or in the course of productivity between countries or because of changes in exchange rates. From exporters pricing behaviour and from the slow adjustment of domestic wages and prices it is clear that domestic relative prices of a country (e.g. export prices in domestic currency/consumer prices and export prices/ wages) do change in connection with exchange rate changes. We do not here discuss the question of how rapidly and to what extent the relative prices that prevailed before the exchange rate change will be restored. Following a devaluation, for instance, there are several inflationary forces causing pressure on domestic wage and price levels. What happens, however, depends to a large extent on the economic policies pursued, on acceptance by society of the changes in income shares implied by the exchange rate change and on the relation of the relative prices and income shares before and after the exchange rate change to some kind of "long run equilibrium relative prices and income shares".

Finnish discussion has sometimes shown a tendency to simplify things to such an extent that our inflation is "explained" by the exchange rate changes and what happens between the exchange rate changes is forgotten[1]. Exchange rate changes, just as no other single factor making for price or wage increases, cannot be branded as the exclusive *primus motor* in this complicated, simultaneous and interdependent inflation process. On the one hand, domestic price and cost levels have risen faster at home than abroad and this has led to devaluations; and on the other hand, devaluations have contributed to a faster inflation rate. The fact that we *ex post* can estimate an increase in one price from an increase in another does not suffice to show that the latter is a "cause" of the former.

Attempts have in some studies been made to establish the relative importance for export prices of world market prices (in domestic currency) P_{wd} and of domestic costs or prices P_d by employing regression equations of the type

$$P_{xd} = \alpha P_{wd} + \beta P_d \cdot \qquad (5)$$

In many of these studies the sum of α and β has come close to unity or has been constrained to unity. The relative sizes of α and β have then been used to decide whether world market prices or domestic costs are the main determinants of export prices. Furthermore, if α has been close to 1 this has sometimes been seen as evidence that the "law of one price" holds; and if it has been small, the law of one price has not been seen to hold. If $\beta = 1-\alpha$ we can transform (5) into

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1) See e.g. Korpinen & Kykkänen (1974).

$$P_{xd} = P_{wd} + \beta(P_d - P_{wd}) . \qquad (6)$$

This can be interpreted as follows: In the long run, export prices of different countries seem to move more or less in line with each other, but in the short run differences between countries in cost and price movements (in the same currency), i.e., $(P_d - P_{wd})$ cause export prices to differ from world market prices. The extent to which this discrepancy is reflected in export prices is given by β. We know from experience that inflation differentials between countries have been in the longer run compensated for by exchange rate changes and thus the contribution coming from this term is not likely to increase in a trendlike manner[1].

Exchange rate changes have, according to (6), two short run effects on export prices. First, given the world market prices in foreign currencies, i.e. P_{wf}, they are reflected by the full amount of the exchange rate change in the domestic-currency world market prices, i.e. P_{wd}, since $P_{wd} \approx P_{wf} + I$. Second, given the costs in national currencies, relative costs (calculated in the same currency) also change by the full amount of the exchange change. Consequently, a change of β times the exchange rate change is carried over to the export prices. Thus, e.g., the effect of a 10 % devaluation on the export prices in (the formulation) (6) above is $(1-\beta)$ 10 %. It should be noted that if the time period from the

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1) It should be noted, however, that for our interpretation to hold for eq. (6) it is necessary that prices in the parenthesis should be similar prices, e.g. tradable goods prices, consumer prices, unit labour costs, etc. Differences in the long-run behaviour between, e.g., export prices of one country and the GDP deflator of another country, even when corrected for exchange rate changes, are likely to occur because of, i.a., productivity differences.

exchange rate change to the recording of renegotiated prices is long the effect coming from the relative costs may come out gradually. Furthermore, when the lag distribution connected with the last term on the right hand side of eq. (6) is examined, it should be remembered that, in this formulation, it will in empirical studies reflect not only firms' pricing policies, but also the currency structure of export contracts. In the case of Finland, where contracts are in foreign currencies and only a small part β of the relative cost pressure is shifted on to export prices, these effects (say, after a devaluation, to lower prices) may in the first months be very small and then cumulate to β. In a country where firms closely follow world market prices but where contracts are in domestic currency, the cumulative effect may first exceed β and then decrease to β.

To determine the importance of domestic cost variables for export prices we included relative unit labour costs as an explanatory variable in our model. Here we availed ourselves of a recent extensive study by Sihtola (1978) on the calculation of relative unit labour costs for Finland. Sihtola compared unit labour cost series using various definitions and various statistical sources. This interesting study reports differences in the resulting series and thus draws attention to the importance of using well-constructed observational series for the testing of various economic hypotheses[1)]. In the present study we have made no allowance for cost effects other than relative unit labour costs H. The exclusion of import prices can be justified to a certain extent on the grounds that import prices of both Finland and her competitors follow the same

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1) See Sihtola (1978). We have used here an index of relative unit labour costs in Finnish industry, derived from bilateral comparisions by weighting different countries by the structure of Finnish imports. Export weights would have been better for our purpose. Fortunately, the difference between the resulting indices is not great.

world market prices. However, a more detailed analysis of various relative cost components, e.g., capital costs and taxes, seems to be called for.

Notice that in formulation (6), where world inflation in the long run determines foreign-currency export prices, it is natural to include the effects of relative cost pressure on export prices, not the absolute cost pressure in the exporting country (see also footnote on page 14). Assume, for example, that the costs of production increase in every country by the same amount. In this case, relative costs do not change in any country and export prices follow the general world inflation, with no extra contribution from the cost side to the export prices of any given country. If the inflation rates differ between countries, a country can shift a part β of this relative cost difference on to its export prices. Generally we may expect that the larger the country, the more it can raise its export prices because of relative costs. In the longer run, of course, a small country like Finland cannot continue to increase its export prices because its competive position, as measured by relative unit labour costs, would worsen. If the cost level of the country is completely out of line with the rest of the world, slower inflation or an exchange rate change is needed to lower the relative costs.

The relative cost variable H in our model thus leads to short run fluctuations around the long run relationship between foreign currency export prices and world price level. If there are neither exchange rate changes nor changes in the relative cost position, i.e. no changes in I or H, then export prices follow the domestic-currency world market prices. It seems that there has been fluctuations but no clear trend in Finland's relative unit labour costs during the estimation period.

This may be taken as evidence that, in the long run, domestic cost and price level, relative to other countries, is also rather stable when expressed in the same currency, i.e. as evidence for the applicability of the purchasing power parity theory in the long run[1].

Examination of our empirical results shows that, when relative unit labour costs are added as an explanatory variable to our simple regression models, the explanation becomes somewhat better. This is particularly so with equations where world market prices and exchange rate changes have *a priori* been constrained to have a full relative effect on the domestic currency export prices, e.g. eq. 21, which is represented in Fig. 4. However, in most of the equations the t-values for the coefficients of H are small and, in some unconstrained equations, the relative unit labour cost variable has even the wrong sign. This is probably due to the (negative) correlation of exchange rate index I and the relative unit labour cost variable, which includes a correction for exchange rate changes. As the interpretation of the constrained equations is simpler and as the difference in explanatory power between the equations is not large, we are inclined to prefer the constrained equations. Table 3 presents some equations in which absolute rather than relative unit labour costs are used as an explanatory variable. Without world market prices the explanatory power of these equations is weak and, with world

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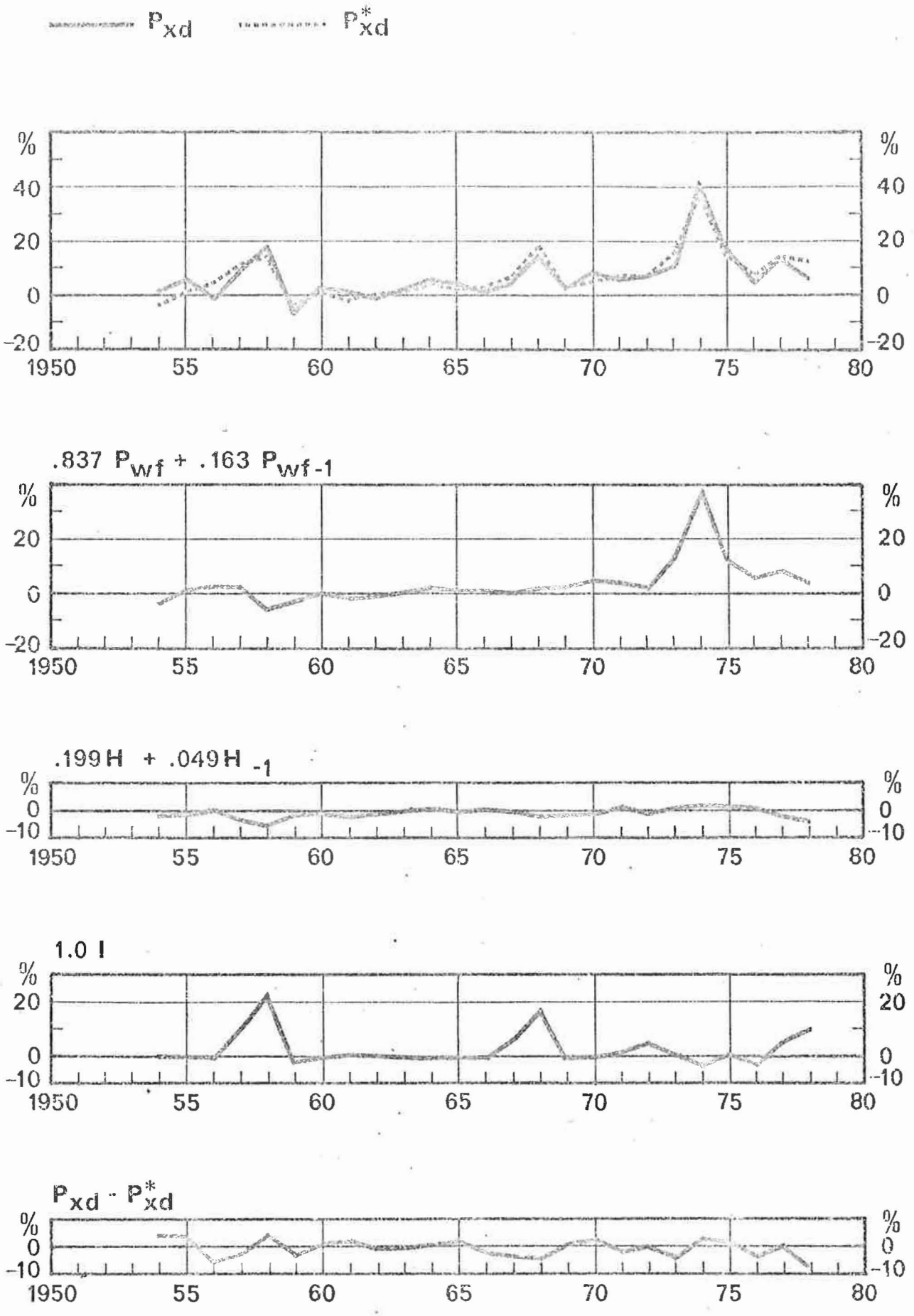
1) Of course, all Finland's domestic prices relative to the similar prices abroad need not be stable in the long run, even if her relative export prices and relative average unit labour costs (in the same currency) seem to have been stable. Because of possible differences in productivity growth between sectors on the one hand, and between Finland and other countries on the other, some relative prices may change even if exchange rates, relative export prices and unit labour costs do not change.

Fig. 4. Equation (21) for export prices



market prices, absolute unit labour costs perform less satisfactorily than relative unit labour costs, as was suggested earlier. Though the coefficient of determination is not much affected by the choice, a priori reasoning (and the t-values) definitely lead us to prefer models with a relative cost variable.

5. Concluding remarks

The results of our simple experiments are in keeping with Vartia (1972, 1974), Tanskanen (1976) and Aurikko (1980) and show that Finland's foreign-currency export prices can satisfactorily be explained in terms of the course of world market prices and changes in exchange rates. Unit labour costs relative to other countries seem to have a minor role in determining the course of export prices, though some studies, e.g. Aurikko (1973) and Aurikko (1975), have used cost pressure as the major explanatory variable. For a more thorough analysis of the determination of export prices a sectoral-level or even a product- and firm-level study would be necessary. Evidently, the relative importance of world market prices, exchange rates and costs varies between sectors. Our simple aggregate models, however, also indicate the average relative importance of these factors at the sectoral level. For a more detailed analysis of the lag distribution, quarterly or monthly data should be used.

As such, it is not ashtonishing that high R^2:s have been earlier obtained with models where the specification (according to our view) has been incorrect. When the models have been defined in terms of levels of the

variables and enough attention has not been given either to multicollinearity or to the autocorrelation properties of the disturbance term, it has been easy to reach high "degrees of determination" because both the variable explained and the explanatory variables have had a common time trend. Many incorrect models, often supported by complicated and completely irrelevant theorizing, would not have confused our minds had enough attention been given to the statistical estimation procedure and criteria, to common sense, and to empirical facts that are easily available.

Table 1. Some regression equations for percentual changes in prices of Finnish commodity exports (A = sum of the coefficients of world market prices constrained to unity, B = coefficient of exchange rate changes constrained to unity)

eq. no	const.	P_{wf}	P_{wf-1}	I	H	H_{-1}	S	R^2
1	7.545 (1.882)						9.409	.0
2	4.237 (1.345)	.796 (.136)					6.101	.579
3	3.673 (1.280)	.683 (.137)	.282 (.132)				5.680	.635
4	3.535 (1.114)	.702(A) (.110)	.298(A) (.110)				5.562	.643
5	6.324 (2.087)			.385 (.301)			9.285	.026
6	1.049 (.967)	.957 (.087)		.794 (.126)			3.732	.843
7	.750 (.837)	.861 (.082)	.223 (.075)	.756 (.109)			3.208	.884
8	1.146 (.729)	.813(A) (.065)	.187(A) (.065)	.737 (.107)			3.203	.882
9	.755 (.860)	.863 (.087)	.225 (.083)	.745 (.202)	-.015 (.200)		3.287	.878
10	.824 (.915)	.860 (.089)	.216 (.090)	.744 (.207)	-.023 (.207)	.035 (.125)	3.365	.872
11	1.034 (.790)	.816(A) (.067)	.184(A) (.067)	.802 (.189)	.072 (.171)		3.265	.877
12	1.096 (.810)	.822(A) (.069)	.178(A) (.069)	.786 (.194)	.035 (.185)	.065 (.115)	3.319	.873
13	5.420 (1.721)			1.0 (B)	.791 (.252)		8.445	.178
14	5.627 (1.689)			1.0 (B)	.647 (.266)	.398 (.277)	8.257	.213
15	.224 (.852)	.999 (.086)		1.0 (B)			3.863	.828
16	-.185 (.785)	.918 (.084)	.204 (.081)	1.0 (B)			3.481	.860
17	.292 (.708)	.853(A) (.070)	.147(A) (.070)	1.0 (B)			3.538	.852
18	.383 (.820)	.857 (.088)	.187 (.078)	1.0 (B)	.195 (.113)		3.333	.872
19	.591 (.669)	.831(A) (.065)	.169(A) (.065)	1.0 (B)	.218 (.099)		3.272	.874
20	.449 (.875)	.855 (.090)	.179 (.086)	1.0 (B)	.188 (.118)	.034 (.127)	3.409	.866
21	.612 (.684)	.837(A) (.068)	.163(A) (.068)	1.0 (B)	.199 (.110)	.049 (.114)	3.335	.869

Table 2. Some regression equations for percentual changes in prices of Finnish commodity exports, with domestic-currency instead of foreign-currency world market prices as an explanatory variable (A = sum of the coefficients of world market prices constrained to unity)

eq. no	const.	$(P_{wf}+I)$	$(P_{wf}+I)_{-1}$	H	H_{-1}	S	R^2
1	.837 (.963)	.916 (.082)				3.776	.838
2	.370 (.990)	.874 (.084)	.120 (.081)			3.681	.847
3	.330 (.722)	.877(A) (.066)	.123(A) (.066)			3.600	.851
4	.509 (.721)	.894(A) (.066)	.106(A) (.066)	.147 (.107)		3.533	.856
5	.547 (.982)	.891 (.084)	.103 (.084)	.147 (.110)		3.616	.853
6	.759 (.969)	.853 (.085)	.126 (.080)	.073 (.119)	.180 (.125)	3.528	.859
7	.615 (.797)	.865(A) (.067)	.135(A) (.067)	.074) (.116)	.176 (.122)	3.447	.863

Table 3. Some regression equations for percentual changes in prices of Finnish commodity exports, with absolute instead of relative unit labour costs as an explanatory variable (A = sum of the coefficients of world market prices constrained to unity, B = coefficient of exchange rate changes constrained to unity)

eq. no	const.	P_{wf}	P_{wf-1}	I	ULC	ULC_{-1}	S	R^2
1	-4.595 (2.508)				1.150 (.255)		7.411	.366
2	-4.101 (2.632)				1.329 (.366)	-.248 (.354)	7.494	.352
3	.040 (1.478)	.929 (.105)	.219 (.119)	1.0(B)	-.042 (.231)		3.560	.854
4	-.681 (1.209)	.863(A) (.070)	.137(A) (.070)	1.0(B)	.124 (.125)		3.539	.852
5	.817 (1.540)	.925 (.102)	.269 (.121)	1.0(B)	.078 (.240)	-.247 (.172)	3.473	.861
6	-.215 (1.252)	.842(A) (.072)	.158(A) (.072)	1.0(B)	.271 (.171)	-.210 (.170)	3.497	.856

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