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WAGE-PRICE INTERDEPENDENCE IN OPEN ECONOMICS

By

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WAGE-PRICE INTERDEPENDENCIES IN OPEN ECONOMIES

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1. Introduction

1.1 Scandinavian work in recent years on problems of price trends and income distribution has stressed the need for a disaggregated analytical approach. It has become recognized, in particular, that price impulses from abroad may affect individual industries very differently depending upon their ties with the international market. Consequently, a two-sector model distinguishing between "sheltered" industries and "exposed" or "competitive" industries has been found indispensable even in the simplest of analyses aiming at understanding the price and income distribution mechanism. In more advanced models further sub-classifications of these two industry categories have been used. The purpose of this paper is to illustrate the Scandinavian approach by discussing two models (a two-sector model for the long run and a multi-sector model for the short run) which were first formulated in Norway in 1966(1) and expanded in a Swedish report in 1968(2).

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- (1) The ideas contained in these models grew out of research work undertaken at the Central Bureau of Statistics of Norway during the early 1960s. Thus, the distinction between sheltered and exposed industries was introduced for the first time in the Bureau's Economic Survey 1962. The models themselves were formulated and published in 1966 in two reports by a group of three economists who were called upon to provide background material for that year's round of negotiations on wages and agricultural prices. Members of the Committee ("Utredningsutvalget for inntektsoppgjørene 1966") were myself, acting as chairman, Associate Professor Fritz C. Holte, the Agricultural College of Norway, and Professor Gerhard Stoltz, the Norwegian School of Economics and Business Administration. The Committee produced two reports. The first of these contained the multi-sector, short-term model summarized in section 5 below (Innstilling fra Utredningsutvalget for inntektsoppgjørene 1966, avgitt 22. januar 1966, published by the Prime Minister's Office). The second report, which was a study of the causes of long-run price developments in Norway, contained the two-sector, long-term model described in section 3 (Innstilling II fra Utredningsutvalget for inntektsoppgjørene i 1966, avgitt 20. oktober 1966, also published by the Prime Minister's Office).
- (2) Lønebildning och samhällsekonomi ("Wage Determination and the National Economy"), Report by a group of Experts Appointed by SAF, LO and TCO. Stockholm. Mimeographed in 1968, printed in 1969. The report is referred to unofficially as the EFO-report, named after its authors Gösta Edgren, Karl-Olof Faxén, and Clas Odhner. The report adopts and expands the basic approach of the Norwegian two-sector, long-term model.

2. Sheltered and exposed industries

2.1 There is an important distinction in the Norwegian and Swedish models between sheltered and exposed industries. Exposed industries (E-industries) are those industries which are exposed to strong competition from abroad, either because they export most of their products or because they sell their products on the domestic market under strong foreign competition. Mining, most manufacturing industries, and shipping (in some countries even agriculture) are typical examples of this category. Sheltered industries (S-industries), on the other hand, are those industries whose products are marketed at home under conditions such as to leave them relatively free of foreign competition.(1) Building and construction, power, a few manufacturing industries and most service industries belong to this category. According to the classification used at present in Norway, the exposed industries contribute approximately 30 per cent of net national product and employ 22 per cent of the labour force; corresponding figures for Sweden in 1967 were 28.5 per cent and 30 per cent respectively.

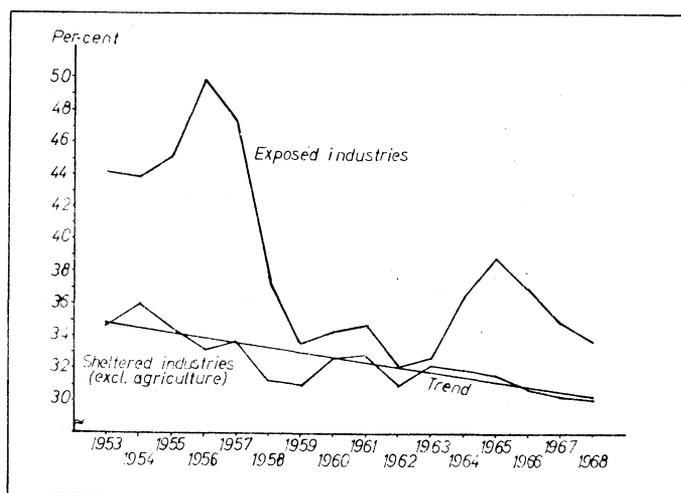
2.2 There are two reasons why a distinction between sheltered and exposed industries is crucial in an analysis of prices and incomes:

(1) First, we must expect the two groups of industries to show marked differences in price behaviour. The output prices of the exposed industries will be largely determined on the world market. These industries, therefore, cannot compensate for a cost increase through an upward adjustment of prices; if their costs increase, they must sustain the whole effect in the form of reduced profits (entrepreneurial incomes). The sheltered industries are in a different position. Since they do not risk losing their market to foreign competitors they tend to compensate for cost increases by raising output prices. There is considerable evidence that, in Norway at least, increasing costs (e.g. as a result of higher wages) are passed on quickly by the sheltered industries in such a way as to leave the share of profits in factor income (factor income = wages + profits) largely unaffected. As is seen from diagram 1, for the group of sheltered industries as a whole this share has followed a downward trend reflecting the decreasing number of employers and self-employed relative to the number of employees within the group.(2) In the exposed industries, which are much more sensitive to the movements of the national cost level relative to that of other countries and also to the business cycle, the profit share has fluctuated much more violently.

(1) Either because of the physical nature of their products or because of government protection. The fact that they are relatively free of foreign competition does not mean, of course, that firms within these industries do not compete on prices amongst themselves. It does mean, however, that as a group they may raise prices when costs go up without having to fear a loss of market to foreign firms.

(2) However, when it comes to individual industries within the group the relationship no longer holds. Instead, national accounts data show considerable erratic movements of the relationship between profits and wages for most industries. In the light of this the remarkable stability of the relationship for the group of sheltered industries as a whole is difficult to explain. It may be that (i) fluctuations in output caused by the trade cycle, which cause profits to deviate from the trend, are not synchronized as between industries, and that (ii) though most firms apply some variant of the "cost plus" pricing principle, selling prices are not continuously corrected as direct costs change but rather are adjusted at long intervals and with random lags. (There is reluctance to change selling prices too frequently; it takes time for the first even to realize that costs have changed; sometimes a small increase in costs may be used as an excuse for a long contemplated and considerable increase in prices, etc.) Such a mechanism of randomness would explain our observations in the past but would not guarantee indefinitely the future stability of the profit-wage ratio of the group of sheltered industries as a whole.

Diagram 1. Profits as per cent of factor income. Sheltered and exposed industries, Norway 1953-1968.

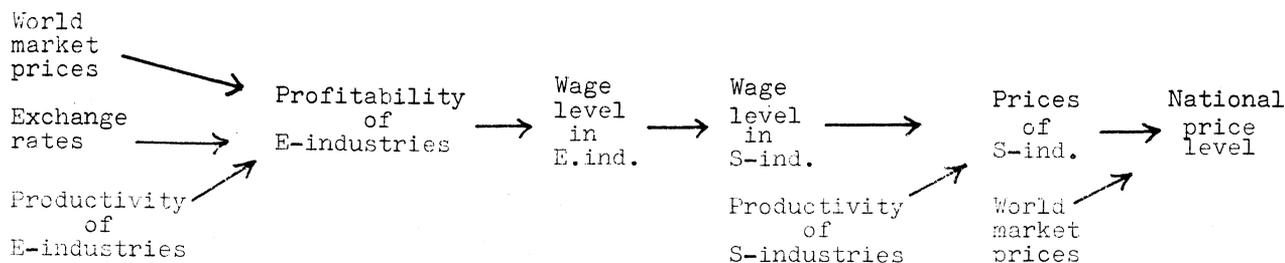


(ii) Secondly, an examination of historical data reveals that there is an important difference between the two industry groups also with respect to productivity trends. It has been found, both in Norway and Sweden, that output per man has gone up much more quickly within the exposed industries, which are typically capital intensive and mass producing, than within the sheltered industries where service industries weigh heavily. The difference is considerable: In Norway, over the period 1957-1969, output per man-year increased by approximately 7 per cent (annual average) within the exposed industries as a whole but by no more than 2.5 per cent within the sheltered industries; for Sweden (1960-1967) corresponding figures were 7.5 per cent and 3 per cent respectively. This means that, for technological reasons, the exposed industries are much better placed than the sheltered industries to absorb wage increases without this having consequences for prices and/or profits.(1)

3. The long-run model

3.1 We shall start by outlining a simple two-sector model based on the characteristic properties of sheltered and exposed industries referred to above. The model purports to describe the mechanism which determines the long-term movement of wages and prices in an economy where, through foreign trade, national wage and price trends are subject to strong price impulses from abroad. The main argument may be sketched as follows:

(1) The points made in this paragraph may be verified from Swedish data in the table annexed to this paper. The table is reproduced from an article by Edgren, Faxén and Odhner (see List of Literature p. 18).



3.2 Put into words the argument may be summed up in five propositions:

(i) World market prices for products of the E-industries, together with existing foreign exchange rates, determine the output prices which the E-industries can ask, measured in national currency. These prices, together with the existing technology ("the productivity of E-industries") are key factors in determining "the profitability" of the E-industries, meaning by "profitability" the ability of the E-industries to earn a surplus available for distribution as wages and/or profits.

(ii) The "profitability" of the E-industries is a key factor in determining the wage level of the E-industries: Mechanisms are assumed to exist which ensure that the higher the "profitability" of the E-industries, the higher their wage level. There will be a tendency for wages in the E-industries to adjust so as to leave actual profits within the E-industries close to a "normal" level.

(iii) The wage level which establishes itself within the E-industries determines the wage level within the S-industries: Mechanisms are assumed to exist (e.g. trade union policy, market forces) which tend to keep wages in the two industry groups in a "normal" relationship to each other.

(iv) The wage level within the S-industries together with the existing technology ("productivity of S-industries") determines the output prices of these industries: Mechanisms are assumed to exist which will cause the S-industries to adjust output prices in such a way as to keep their profits in a "normal" relationship to their wages.

(v) Output prices of E-industries, output prices of S-industries, and world market prices for goods not produced at home, each weighted by their appropriate weights, determine the national price level.

3.3 Taken as a whole, then, the model explains national wage and price trends (the endogenous variables of the model) in terms of price trends on the world market, existing foreign exchange rates, and productivity trends within the sheltered and exposed industries respectively (the exogenous variables of the model). Critical to the validity of the model are the controlling mechanisms postulated by propositions (ii), (iii) and (iv) above. Do such controlling mechanisms in fact exist, and how exact are the relationships postulated by them? In answer to this question there is no need to say much about (iii) and (iv): The observed stability of wages in S-industries relative to wages in E-industries, and the observed stability of the profit share within the S-industries, make it highly probable that the mechanisms assumed by propositions (iii) and (iv) do in fact exist.

3.4 The truth of proposition (ii) - that wages in the E-industries tend to adjust so as to leave the E-industries with "normal" profits - is much more doubtful. In fact, historical data show profits of the E-industries to have fluctuated considerably (diagram 1). The relationship between "the profitability of E-industries" and "the

wage level of E-industries" which the model postulates, therefore, is certainly not a relationship which will hold on a year-to-year basis. At best, it is valid only as a long-term relationship and even then only with considerable slack. However, it is equally obvious that the wage level in the E-industries is not completely free to assume any value irrespective of what happens to profits in these industries. Indeed, if actual profits in the E-industries deviate much from "normal" profits, sooner or later forces which will tend to close the gap must be expected to start working. There are at least three correction mechanisms which may be counted upon to have this effect:

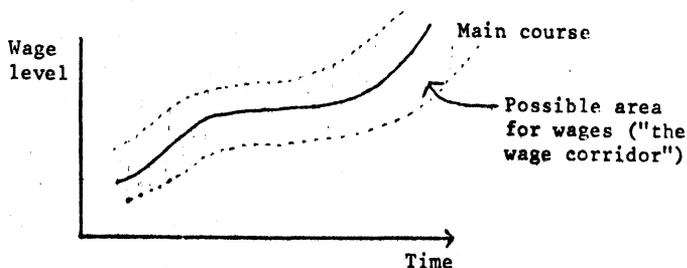
(i) First, deviations will tend to be corrected through the system of wage negotiations. Abnormally high (low) profits will be taken as a sign by the trade unions to ask for larger (smaller) wage increases than normal and at the same time weaken (strengthen) the tendency of entrepreneurs to resist the claims. Therefore, negotiated wage increases will be higher (lower) the higher (lower) are the actual profits of the E-industries.

(ii) Secondly, through the mechanism of the wage drift, market forces will tend to work in the same direction as organised negotiations. Abnormally high (low) profits will motivate higher (lower) demand for labour by entrepreneurs for production and/or investment purposes. Therefore, high (low) profits will lead to a tighter (less tight) labour market and ultimately influence the size of the wage drift. In extreme situations, if actual wages are kept so low as to cause extraordinarily high profits in the exposed industries and - in consequence of this - over-demand for labour, a "wage explosion" may follow with the effect of quickly bringing down profits to more normal levels.

(iii) Thirdly, economic policy will aim to keep profits of the E-industries at a reasonable or "normal" level. In particular, economic policy tends to step in whenever wages become so high (and the competitiveness of E-industries so low) as to endanger employment and the balance of payments. In such cases deflationary measures are resorted to, in order to slow down wage increases and thus restore profits to normal levels.

3.5 We are led to conclude that mechanisms exist which tend to make the national wage level follow a course through time set ultimately by price trends abroad, by the chosen exchange rates, and by the productivity trends of the E-industries. This course is referred to in Norwegian studies as the "main course" of wages. It is defined as the level of wages which is consistent, at any point of time, with normal profits of the E-industries. However, due to the slack in the system, wages are free to deviate, within limits, to either side of the main course, but the further they deviate the stronger will be the forces pulling them back. To use a metaphor, wages are free to move within "a corridor with elastic walls" as illustrated by diagram 2. If wages are near the ceiling of the corridor, profits of the E-industries will be abnormally low, and vice versa.

(Diagram 2)



3.6 Corresponding to the main course of wages there will be a "main course" through time which the national price level will have to follow, again with an allowable margin of variations to either side ("a price corridor"). The main course of prices will depend, in part, on the factors determining the position of the main course of wages. But it will depend also on the productivity trend of the S-industries since this determines the extent to which S-industries have to raise output prices in response to higher wages in order to maintain a "normal" relationship between profits and wages.

4. Some policy implications of the long-run model

4.1 Being "too high" or "too low" in the wage corridor both have consequences which are undesirable. Being low in the corridor means that wage earners receive a comparatively small share of the value added of the E-industries and may conflict with the goal of an equitable income distribution. Being high in the corridor means that the competitiveness of the E-industries is low; if this continues for some time, the ability of these industries to invest will be low, and growth and employment will be endangered. Therefore, granted price trends abroad, the guiding principle of a national wage and price policy might well be stated as follows: Aim for an actual development of wages which does not deviate too much from the main course and accept the amount of inflation which is bound to follow. Rarely are policy aims formulated as bluntly as this, yet the formula describes well what has been the actual practice of most countries in recent years.

4.2 A situation where wages are too low in the wage corridor is easily cured: All that has to be done is to adjust the wage level upwards during the next round of negotiations. A situation where wages are too high in the wage corridor is less easy to handle: Attempts to bring wages down, or even to slow their advance upwards, will meet with strong opposition and may be impossible to achieve through negotiations so that, ultimately, government may have to step in with a "stop" policy with all the unfortunate consequences which a deflationary policy has. One might say that it is much more serious for an economy to err on the upper side of the wage corridor than on the lower side: The consequences are more harmful and the medicine much more unpleasant.

4.3 According to the model, the long-run trends of national wages and prices are determined by international trends. If this is correct, there is little room for manoeuvre for a long-term national wage and price policy. In Norway, over the 20-year period 1951-1971, the level of wages (labour costs per man year) increased 4.5 times or by 7.9 per cent on an annual average. Prices, measured by the gross domestic product deflator, increased 2.15 times or by 3.9 per cent per year during the same period. The model asserts that these wage and price increases were unavoidable, given world market price trends and the prevailing exchange rates. A different wage increase, say 8.9 per cent or 6.9 per cent a year instead of 7.9 per cent (which would have led to a somewhat higher or lower price increase than 3.9 per cent a year), if it had been possible, would have meant a wage level in 1971 some 20 per cent above or below the actual level. At a wage level 20 per cent above the actual, Norwegian industries would not have remained competitive. At a wage level 20 per cent below the actual, E-industries in 1971 would have shown enormous profits. None of these could have happened without the correction mechanisms assumed in section 3.3 having been brought to bear.

4.4 So far, constant foreign exchange rates have been assumed. The only instrument available to a country wanting to free itself from following the international long-run price trend, is to undertake recurrent parity changes of the national currency. A devaluation will abruptly shift the "wage corridor" upwards and lead to a steeper rise

of actual wages and therefore prices in the years following the devaluation. A re-valuation, on the other hand, will shift the "wage corridor" downwards and cause the wage and price increase to slow down. We find, therefore, that countries which have devalued their currencies (France, United Kingdom), have witnessed higher price increases than others, while countries which have revalued (Western Germany, the Netherlands) have had less inflation than others.

5. The Norwegian Short-run model PRIM

5.1 More insight into the mechanisms which determine price and income trends within an economy may be gained by disaggregating further the two-sector model sketched above. As an example, we shall discuss in the following sections the Norwegian multi-sector model PRIM (PRIM = PRICE Income Model). PRIM may be characterized, in brief, as a short-term, cost-push, input-output type model. It is short-term in that it takes wage rates to be given, i.e. fixed by negotiations; since the model does not attempt to explain wage trends, it is useless as a theory of long-term price movements. It is cost-push in that it explains prices entirely in terms of costs. There is no reference to demand; the model derives changes in prices and income shares (the "unknowns") from changes in wage rates, agricultural prices, productivities, world market prices and a few other "given" variables assumed to affect costs. It is of the input-output type in recognizing the fact that higher output prices in one industry mean higher input prices, i.e. higher costs in other industries. This results in a price propagation process which can be studied through an input-output technique in much the same way as an input-output technique is used for the study of quantitative interrelationships.

5.2 In the latest version of PRIM the following classification of industries is used.(1)

- | | | |
|---|---|-------------------------|
| 1. Agriculture (excluding forestry and fishing)
but including dairying) | } | Sheltered
industries |
| 2. Construction (including building) | | |
| 3. Other sheltered industries | | |
| 4. Import-competing manufacturers | } | Exposed
industries |
| 5. Fisheries | | |
| 6. Shipping (ocean shipping only) | | |
| 7. Other export-oriented industries | | |

An input-output table for these seven industries is reproduced in table 1.

5.3 The following assumptions are made for wages and prices:

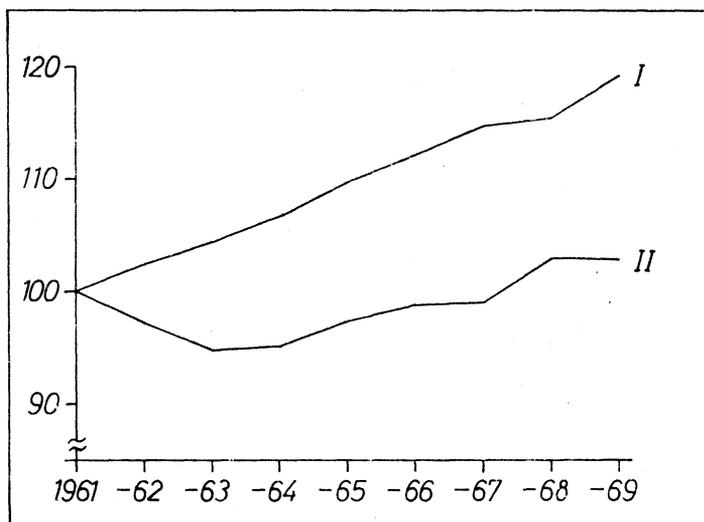
1) The model assumes wages per man-year for any given year and any one industry to be given. (Changes from one year to the next in wages per man-year may be in part due to a wage settlement, and partly due to a wage drift, but this is inessential for the argument.)

1) Agriculture and fisheries are specified because of the special positions of these industries in income negotiations. Construction is kept distinct from other sheltered industries because the output prices of construction primarily influence capital goods' prices and not the prices of consumers goods. Shipping is treated separately because of its unique role in the Norwegian economy. The remaining exposed industries are divided into "import-competing manufacturers" and "other export-oriented industries" according to their market orientation.

- (ii) The model assumes agricultural prices to be given, stipulated by the income settlement for farming.
- (iii) The model assumes import and export prices to be given, determined by the world market.
- (iv) Changes in output prices are percentagewise the same for all deliveries from any one industry, (that is, for all entries along any one row in the input-output table).
- (v) The price of products from construction and "other sheltered industries" is stipulated in such a way that profits in these industries have a fixed ratio to wage costs, determined (in normal years) by the trend value of the share of profits in factor income.
- (vi) The prices of products of "import-competing manufacturers" are assumed to follow the (given) prices of similar imported goods. (An opinion on the realism of this assumption may be formed from diagram 3.)
- (vii) The prices of products of the fishing industry are assumed to be given, stipulated through a government policy of price fixing (sales on the home market) or by world market prices (exports).
- (viii) The prices of products of shipping and "other export-oriented industries" are assumed to follow the (given) export prices.

Diagram 3

Diagram 3. Ab factory prices of output from "import-competing manufacturers" (I) and import prices of similar imported goods (II). Indices, 1961 = 100.



5.4 With respect to volumes PRIM assumes:

- (i) Changes in product volume may occur in all industries. Such changes may be due partly to changes in employment and partly to changes in productivity, i.e. production per man-year worked.(1)

(1) This is the only point where the model is dependent on volume flows. Changes in employment and productivity are important reasons why prices and/or profits in an industry may change. They must, therefore, be explicitly considered in a model designed for the study of price and income changes. It is assumed, in order to keep the model simple, that other possible interactions between volumes and prices may be neglected.

Table 1. Input-output table 1971. Millions of kroner

Receiving sector \ Delivering sector	Agriculture	Construction	Other sheltered industries	Import-competing manufacturers	Fisheries	Shipping	Other export-oriented industries	Private consumption	Publ. cons.+ gross cap. form.	Exports	Total
Agriculture	-	136	1,897	116	-	-	114	3,510	.97	323	6,193
Construction	-	-	-	56	-	-	-	-	18,115	-	18,171
Other sheltered industries	2,349	5,098	-	3,850	150	407	2,699	33,539	17,549	3,473	69,114
Import-competing manufacturers .	128	2,768	1,800	-	94	128	669	5,139	6,298	5,339	22,363
Fisheries	36	1	18	25	-	-	1,405	195	39	57	1,776
Shipping	-	-	121	-	-	-	-	24	15	14,398	14,528
Other export-oriented industries	266	446	1,672	823	17	16	-	996	530	10,101	14,867
Import	549	1,876	3,135	5,620	90	4,455	3,530	7,550	11,316	164	38,285
Dummy Accounts	-	-	-	-	-	-	-	441	2,772	2,331	-
Value added	2,865	7,846	60,471	11,873	1,425	9,522	6,450	-	-	-	100,452
Total	6,193	18,171	69,114	22,363	1,776	14,528	14,867	51,394	51,157	36,186	285,749
Of which:											
Wages	387	4,648	29,221	6,714	108	2,754	3,533				47,365
Profits	2,160	1,603	10,160	2,980	748	1,253	2,088				20,992
Ind. taxes	391	931	14,249	1,357	119	18	570				16,495
- Subsidies	1,269	12	3,194	147	53	0	118				4,793
Depreciation	1,193	673	10,053	986	502	5,496	1,520				20,423

(ii) It is assumed that changes in output neither alter the quantities of intermediate goods consumed per unit of output nor the total volume of depreciation; in other words, the model assumes constant input-output coefficients in volume terms for intermediate goods, and given volumes of depreciation (as determined by the volume of capital employed).

(iii) The model does not endeavour to explain how changes in wages, prices and productivities affect final demand, and figures relating to final demand are excluded from the model. The model simply assumes that there is always sufficient demand somewhere for the products of each of the industries.

5.5 For all industries except agriculture and fishing the model distinguishes between wages and profits. In agriculture and fishing wages and profits are combined into variables called "income from agriculture" and "income from fishing" respectively.⁽¹⁾ The endogenous variables or groups of variables of the model, (variables which the model tries to explain) therefore include i.a. the following price and income variables:

- a. price index of products of "other sheltered industries"
- b. price index for products from construction
- c. price index for consumers' goods
- d. incomes (wages and profits) from agriculture and fishing, in nominal and real terms
- e. profits of industries other than agriculture and fishing, in nominal and real terms
- f. total wages, in nominal and real terms

5.6 The variables which will influence prices and the distribution of income, i.e. the exogenous variables of the model, include i.a.:

- a. price indices of output from agriculture and fishing
- b. wage indices, by industries
- c. productivity indices, by industries
- d. employment indices, by industries
- e. price indices of exports and imports, specified as required by the model
- f. volume indices of depreciation, by industries.

5.7 The model assumes, i.a. the following parameters (structural coefficients) to be given:

- a. input-output coefficients, or inter-industry deliveries and imports of raw materials per unit of output, by industries
- b. two coefficients for the distribution of income (profits as a percentage of factor income) in construction and in "other sheltered industries"
- c. the weights in the index of consumers' prices

(1) The combination of wages and profits in agriculture and fishing is, of course, not essential to the model. It was made in order that the model should reflect as well as possible the issues discussed during income settlements where, in the case of farming, the focus is on total farming income.

d. rates of net indirect taxation.(1)

Most of the structural coefficients used may be computed from an input-output table of a base year, e.g. table 1.

6. Uses of PRIM

6.1 One important use of PRIM - indeed, the one for which it was originally designed - has been to estimate the consequences for prices and income distribution of changes in the wage level and in agricultural prices. Such forecasts have been made in advance of each round of negotiations on wages and agricultural prices, beginning in 1966. In each case a number of alternative forecasts were made. Each alternative related to one particular possible combination of changes in the wage level and the level of agricultural prices. An example is given in table 2 which reproduces an abstract of the forecasts made before the round of negotiations which took place this spring. The idea is that, through such forecasts, the negotiating parties will be in a better position to anticipate the consequences, for themselves and for the national economy, of alternative courses open to them.

6.2 One convenient way of using the model is to compute a "table of effects" as exemplified by table 3. (The table reproduced here is for 1967. It was computed on the basis of an earlier version of PRIM in which construction was included with other sheltered industries", hence construction is not shown separately in table 3.) At the left side of this table are listed a selected number of important exogenous variables of the model, and the income distribution parameter (r_2) of "other sheltered industries". Selected endogenous variables are entered at the top. The table shows, along the rows, the effects which, according to PRIM, are to be expected from a partial one per cent change of the exogenous variable of that row on each one of the endogenous variables listed at the top. The effects are expressed partly as percentages and, in case of income variables, in kroner as well. Row 1 tells us, for instance, that a 1 per cent increase in the wage level, ceteris paribus, may be expected to raise the level of consumers' prices by .47 per cent, to increase the total of nominal factor incomes by .57 per cent, to decrease income from agriculture by .61 per cent, to decrease profits of "import-competing manufacturers" by 3.54 per cent, etc. If read columnwise, the table gives information for each endogenous variable about the exogenous variables which influence it particularly.

6.3 All effects specified in the table are additive for small changes in the exogenous variables. Therefore, the combined effect of a simultaneous change in two or more exogenous variables may be gauged by adding together the effects of each variable taken separately. For instance, a parallel increase of all import prices by 1 per cent may be expected, ceteris paribus, to raise the level of consumers' prices by $.05 + .13 + .12 + .03 = .33$ per cent (column 2). In this manner the table can help in providing quick estimates of the indirect effects to be expected on consumers' prices and incomes of any event or action whose direct impact on the exogenous variables of the model can be foreseen.

(1) Since indirect taxes and subsidies are represented in the model by a few strongly aggregated indices only, PRIM is not really suited for an analysis of the effects on prices of changes in taxation. Such effects can be judged with greater accuracy by more direct methods.

Table 2. Forecasts for changes from 1971 to 1972 in consumers' prices and real (deflated) incomes by alternative combinations of wage increases(1) and increases in agricultural prices. Per cent.

	Alternatives for (nominal) wage increases(1)		
	6 per cent	10 per cent	14 per cent
<u>Agricultural prices increase by 4.5 per cent</u>			
Consumers' prices	2.7	4.6	..
Incomes (deflated):			
Wages(1) per man year	3.0	5.0	..
Income from agriculture, per man year	9.2	4.1	..
Income from fishing " " "	-36.1	-37.7	..
Total profits outside agriculture and fishing	-2.6	-5.7	..
Sheltered industries	4.4	6.5	..
Exposed industries	-15.7	-28.2	..
<u>Agricultural prices increase by 7.5 per cent</u>			
Consumers' prices	3.0	4.8	6.7
Incomes (deflated):			
Wages(1) per man year	2.7	4.8	6.7
Income from agriculture, per man year	16.1	10.9	5.9
Income from fishing " " "	-36.3	-37.8	-39.3
Total profits outside agriculture and fishing	-2.9	-6.0	-8.9
Sheltered industries	4.1	6.2	8.2
Exposed industries	-16.2	-28.6	-40.6

Source: "Om grunnlaget for inntektsoppgjørene 1972", Report No. 1, 1972 from Det tekniske beregningsutvalg for inntektsoppgjørene, NOU 1972.: 10. - The forecasts are based on PRIM and are reproduced from a more detailed table given in the source.

(1) Labour costs per man year including employers' contribution to social security systems.

Table 3. Effects on prices, income and the distribution of income caused by changes in wages, agricultural prices, productivity, foreign prices and the share of profits in other sheltered industries. ("Table of Effects".) 1967

Increase of 1 per cent in:	Prices (change in per cent)		Income (change in millions of kroner)								Income (change in per cent)							
	Prices of products from other sheltered industries	Consumer price level	Total factor income	Total wages (1)	Income from agriculture	Income from fisheries	Profits				Total factor income	Total wages (1)	Income from agriculture	Income from fisheries	Profits			
							Other sheltered industries	Import-competing manufacturers	Shipping	Other export-oriented industries					Other sheltered industries	Import-competing industries	Shipping	Other export-oriented industries
WAGES AND SALARIES:																		
All industries(2)	0.68	0.47	270	307	-13	-3	94	-48	-27	-40	0.57	1.00	-0.61	-0.45	1.00	-3.54	-2.79	-2.05
Other sheltered industries	0.68	0.47	270	217	-13	-3	94	-8	-4	-12	0.57	0.71	-0.61	-0.45	1.00	-0.62	-0.37	-0.64
Import-competing manufacturers .....	..	..	..	40	..	..	..	-40	..	..	..	0.13	..	..	..	-2.92	..	..
Shipping .....	..	..	..	23	..	..	..	..	-23	..	..	0.08	..	..	..	..	-2.43	..
Other export-oriented industries .....	..	..	..	28	..	..	..	..	..	-28	..	0.09	..	..	..	..	..	-1.42
Agricultural prices	0.03	0.08	37	..	39	-	..	-1	-	-1	0.08	..	1.76	-0.02	..	-0.05	-0.01	-0.06
Fish prices	0.01	0.01	7	..	-1	13	..	-	-	-5	0.01	..	-0.04	1.77	..	-0.01	-0.02	-0.26
PRODUCTIVITY IN:																		
Agriculture .....	..	..	21	..	21	..	..	..	..	..	0.04	..	0.94	..	..	..	..	..
Other sheltered industries	-0.83	-0.57	49	..	16	4	..	10	4	15	0.10	..	0.73	0.54	..	0.74	0.44	0.77
Import-competing manufacturers .....	..	..	59	..	..	..	..	59	..	..	0.12	..	..	..	..	4.34	..	..
Fisheries .....	..	..	11	..	..	11	..	..	..	..	0.02	..	..	1.50	..	..	..	..
Shipping .....	..	..	70	..	..	..	..	..	70	..	0.15	..	..	..	..	..	7.34	..
Other export-oriented industries .....	..	..	57	..	..	..	..	..	..	57	0.12	..	..	..	..	..	..	2.92
TOTAL EMPLOYMENT IN:																		
Agriculture .....	..	..	21	..	21	..	..	..	..	..	0.04	..	0.94	..	..	..	..	..
Other sheltered industries(3)	-0.15	-0.10	320	217	3	1	94	2	1	3	0.68	0.71	0.13	0.10	1.00	0.13	0.06	0.14
Import-competing manufacturers(3) .....	..	..	59	40	..	..	..	19	..	..	0.12	0.13	..	..	..	1.42	..	..
Fisheries .....	..	..	11	..	..	11	..	..	..	..	0.02	..	..	1.50	..	..	..	..
Shipping(3) .....	..	..	70	23	..	..	..	..	47	..	0.15	0.08	..	..	..	..	4.91	..
Other export-oriented industries(3) .....	..	..	57	28	..	..	..	..	..	29	0.12	0.09	..	..	..	..	..	1.50
EXPORT PRICES:																		
Shipping	0.01	0.01	106	..	-	-	..	-	107	-	0.22	..	-0.01	-0.01	..	-0.01	11.20	-0.01
Other export-oriented industries	0.05	0.05	97	..	-3	-	..	-6	-1	108	0.21	..	-0.16	-0.04	..	-0.46	-0.08	5.56
IMPORT PRICES:																		
Imported intermediate goods to:																		
Agriculture .....	..	..	-2	..	-2	..	..	..	..	..	..	..	-0.07	..	..	..	..	..
Other sheltered industries	0.08	0.05	-5	..	-2	-	..	-1	-	-1	-0.01	..	-0.07	-0.05	..	-0.07	-0.04	-0.07
Import-competing manufacturers .....	..	..	-35	..	..	..	..	-35	..	..	-0.07	..	..	..	..	-2.53	..	..
Fisheries .....	..	..	-1	..	..	-1	..	..	..	..	..	..	-0.10	..	..	..	..	..
Shipping .....	..	..	-30	..	..	..	..	..	-30	..	-0.06	..	..	..	..	..	-3.19	..
Other export-oriented industries .....	..	..	-28	..	..	..	..	..	..	-28	-0.06	..	..	..	..	..	..	-1.42
Imported consumers' goods(4) .....	..	0.13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Competitive imports(5)	0.05	0.12	106	..	-1	-1	..	112	-1	-3	0.22	..	-0.05	-0.07	..	8.20	-0.09	-0.17
Imported capital goods (excl. ships)(6) ..	0.05	0.03	-19	..	-4	-	..	-5	-	-10	-0.04	..	-0.18	-0.03	..	-0.36	-0.02	-0.51
Imported ships(6) .....	..	..	-38	..	..	..	..	..	-38	..	-0.08	..	..	..	..	..	-3.98	..
Percentage point change in share of profits in other sheltered industries(7) ..	1.00	0.68	393	..	-19	-5	453	-12	-5	-18	0.83	..	-0.88	-0.65	4.81	-0.90	-0.54	-0.92

- = negligible effect. .. = no effect.

Notes: (1) Excluding agriculture and fisheries.

- (2) This is to be understood as a proportional increase in W_j ($j = 2, 3, 5, 6$)
 (3) Proportional increase of 1 per cent in total employment (N) and number of wage and salary earners (L) implying a 1 per cent increase in the number of self-employed.
 (4) Import direct for consumption.
 (5) The price of imported goods which compete on the Norwegian market with products from "import competing manufacturers".

- (6) Increase in the price of capital goods leads to an increase in depreciation calculated in current prices. This immediately reduces income from agriculture and profits in the exposed industries and causes "other sheltered industries" to raise output prices.
 (7) The share of profits in "other sheltered industries" in 1967 was 30.3 per cent (of total factor income). The figures on this row show what the effects would have been if this share, ceteris paribus, rose by 1 percentage point, i.e. to 31.3 per cent.

7. Implications for an incomes policy

7.1 Granted that our models give a reasonably accurate description of the price and income distribution mechanism of an economy, certain propositions follow which are of distinct relevance for an incomes policy.

7.2 For one thing, we shall have to give up the popular belief that the struggle over income shares may be viewed mainly as a confrontation of wage-earners and employers. Instead, wage-earners and owners of enterprises in the sheltered industries may have a common interest in rising wages since, according to the model, a rise in wages will lead automatically, via price adjustments, to a proportionate increase in profits of the sheltered industries. Of course, any gain in real incomes obtained by these groups will be at the expense of other groups (farmers and owners of enterprises in the exposed industries). The parties confronting each other in the struggle over income shares, therefore, may be said to be (i) the farmers, (ii) the owners of enterprises in the sheltered industries and the wage-earners, (iii) owners of enterprises in the exposed industries. (We are leaving aside here the factors determining the absolute level of real income, which in any case cannot be studied by means of the present model).

7.3 Farmers can work actively to increase their share of the national income through demanding higher prices for agricultural output. Wage-earners and owners of enterprises in the sheltered industries can work actively to increase their share of the national income through demanding or allowing higher wages. Owners of enterprises in the exposed industries, on the other hand, can work actively to increase their share of the national income only through opposing the price and wage claims of the other groups. The whole burden of holding back on wage increases and avoiding cost-push inflation thus rests with a small group of enterprises in the exposed industries, since all other groups (wage earners, farmers, enterprises in the sheltered industries) may increase their income in the short run by allowing the national cost and price level to be inflated.

7.4 The national price level is determined, according to PRIM, through simultaneous developments in wages, agricultural prices, indirect taxes and subsidies, prices of exports and imports, and productivities. Since this is so, no simple formula can be laid down which will serve as a guide-post, once and for all, for an incomes policy aiming at stable prices. The assertion often heard, for instance, that a necessary and sufficient condition for price stability is that wages should rise in step with average productivity, is a false statement. An incomes policy adhering strictly to this principle might lead to a falling, stable or increasing national price level depending on what happens simultaneously to the other exogenous variables of the model.

7.5 According to the model, the national price level and the distribution of the national income are determined through the same set of exogenous variables. But the ways in which the price level and the individual income shares are affected by the exogenous variables are not identical (see the entries in the columns of table 3). It is most improbable, therefore, that a set of values for the exogenous variables can be found which will result at the same time in a desired development of prices and a desired distribution of incomes: Only by chance will world market prices and productivities (which society does not control) change in such a way that an incomes policy can be designed which will ensure stable prices without having undesired effects for the distribution of income, or maintain the established distribution of income without allowing unwanted changes in the price level. In other words, society's targets for prices and for income distribution may very well be in conflict. An intelligent prices and incomes policy must start by facing this fact squarely.

8. The scope for a national price policy

8.1 We shall conclude this report by asking: In the case of small to medium-sized open economies, what scope is there for a national price policy? To what extent, and through which instruments, can national price trends be influenced by public actions? The answers depend on the time horizon of the analysis.

8.2 In the very long run, say, periods of 5-15 years or more, it is impossible for national prices, measured in international currency units, to move differently from world market prices. It is the up-shot of the long-term model, therefore, that if foreign exchange rates are kept stable, national authorities have little or no room for influencing the long run trend of the price level of their countries. Contrarily, manipulating the exchange rate may be expected to be a very potent long run price policy instrument: A country which revalues (devalues) by 10 per cent is virtually guaranteed over the ensuing years to experience 10 per cent less (more) inflation than other countries. The trouble is, of course, that foreign exchange rates changes are not well suited as a regular instrument of a prices policy.

8.3 In the short run, say, over periods of 1-2 years lasting from the conclusion of one round of wage negotiations until the conclusion of the next, according to PRIM the ability of national authorities to influence price developments is again very limited. Under Scandinavian circumstances, where wage negotiations take place for most groups of wage earners simultaneously the outcome of wage negotiations will set the course of wages (apart from the wage drift) for a period ahead. What policy authorities can do under such circumstances is not much. They may try to slow down the wage drift through a policy of demand management, but such a policy is unlikely to have much effect in the short run. They may try to counter the price increases triggered off by the wage increases by resorting to the use of subsidies, price controls and similar policies. This will delay, but cannot indefinitely hold back, the price increases to be expected as a consequence of the wage settlement. Yet such a policy may have some success if the tariff settlement contains an escalation clause; a slowing down of the price increase may have as an effect a slowing down of the wage increase and thus result in an altogether smaller rise in wages and prices in the course of the tariff period.

8.4 In the medium-run, however, say, over a period of 2-5 years, the scope for a national price policy should be considerable. According to the long-term model it is perfectly possible for wages, over such a period, to rise more or less steeply within the boundaries set by "the wage corridor". Actual wages may move from a position near the lower boundary of the corridor towards the upper boundary, or from the upper boundary towards the lower boundary, depending in part on the outcome of wage negotiations taking place during the period and in part on the size of the wage drift. Since the outcome of wage negotiations and the size of the wage drift presumably depend to some extent on the general economic climate (for instance, the tightness of the labour market) it should be possible for policy authorities to influence wage and price developments in the medium-run through a policy of demand management and/or an incomes policy. Note, however, that such a policy, to the extent that it succeeds in holding back price increases, will have achieved this through holding back wage increases, thus shifting the distribution of the national income in favour of the owners of enterprises in the E-industries. (The point illustrates the latent conflict between price and income distribution targets, hinted in 7.5.) Observe, furthermore, that the scope for such a policy is limited by the need for actual wages to remain always within the boundaries of the wage corridor. In a world with rising prices, where the wage corridor will point steeply upwards at

stable exchange rates, a national policy aiming at stable prices, however successful in the short and medium-run, cannot succeed in the long run unless it is backed by repeated revaluations of the national currency.

Annex Sector product, price movements, productivity changes etc. for 9 sectors, in Sweden

	Sector product 1960		Sector product 1967		Price move- ment	Produc- tivity change	Employment % of total		Development of operating surplus
	mill S. kr.	% of total	mill. S.kr.	% of total			1960	1967	
1. Sheltered goods production	6,273	9.7	9,105	6.8	5.6	4.9	15.41	10.80	1.24
2. Public services or strongly regulated services	7,993	12.4	15,005	11.3	3.8	2.6	3.25	3.72	-0.55
3. Building	5,797	9.0	11,963	9.0	4.8	3.6	8.65	9.76	-0.65
4. Private services	15,059	23.2	42,660	31.9	5.4	3.5	27.87	29.08	-0.19
Total sheltered sector excl. public sector	35,122	54.3	78,733	59.0	5.0	3.6	55.19	53.36	-0.09
5. Public sector	7,085	10.9	16,609	12.5	8.2	-0.1	12.09	16.59	-0.18
Total sheltered sector	42,207	65.2	95,342	71.5	5.6	3.0	67.25	69.95	-0.20
6. Competitive production of raw materials	3,615	5.6	4,246	3.2	0.4	6.4	4.74	3.63	-2.78
7. Intermediate products for export	5,014	7.8	7,930	5.9	0.4	8.0	6.98	6.68	-1.02
8. Import competing production	2,363	3.7	3,456	2.6	2.7	6.9	4.73	3.59	-0.74
9. Finished goods industry	11,492	17.7	22,385	16.8	1.4	7.7	16.30	16.15	-0.49
Total competitive sector	22,484	34.8	38,017	28.5	1.1	7.5	32.75	30.05	-0.95
Total sectors 1-9	64,691	100	133,359	100	4.1	4.7	100	100	-0.48

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Source: Article by Edgren, Faxén and Ödhner.

List of literature

(The list includes only articles available in English.)

1. Fritz C. Holte: A Model for Estimating the Consequences of an Income Settlement. Economics of Planning, no. 1-2, vol. 8, 1968, pp. 57-69.
2. Gösta Edgren, Karl-Olof Faxén and Clas-Erik Odhner: Wages, Growth, and the Distribution of Income. Swedish Journal of Economics 1969, pp. 133-160 (Mainly concerned with the long-term model).
3. Odd Aukrust: PRIM I. A Model of Price and Income Distribution Mechanism of An Open Economy. The Review of Income and Wealth. Series 16 no. 1, March 1970, pp. 51-78. (Also available, with some more material added, as Artikler no. 35 by Statistisk Sentralbyrå, Oslo.)

